

# **Age Bias in the Treatment of Older Women with Breast Cancer**

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**Declaration**

*I declare that the research contained in this thesis, unless otherwise formally indicated within the text, is the original work of the author. The thesis has not been previously submitted to this or any other university for a degree, and does not incorporate any material already submitted for a degree.*

*Daisy Neal*

*08/05/2022*

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**Abstract**

Despite NICE guidelines to treat breast cancer patients “irrespective of age”, older patients receive differential treatment and experience worse outcomes. Research has evidenced the prevalence of ageism and identified the role of implicit bias in reflecting and perhaps perpetuating disparities across society, including in healthcare. Yet age bias has rarely been considered as a factor in poorer outcomes for older breast cancer patients nor, consequentially, has removing age bias been considered as an approach for improving outcomes.

This thesis explores age bias towards older breast cancer patients through three empirical research studies, considering the questions: Is there evidence of age bias in breast cancer health care professionals’ treatment of older patients? Do interventions to address age bias lead to better quality decision making for the treatment of older women with breast cancer?

Study 1 explores implicit, explicit, and decision age bias amongst breast cancer health care professionals. The study finds that health care professionals do not consider themselves to be age biased but vary in what they consider age bias to be, hold negative implicit associations about older women, and deviate from standard treatment more often for older patients.

Studies 2 and 3 test interventions on age bias in decision making for older breast cancer patients. The studies find age bias interventions can facilitate better quality decision making for older patients, evidenced through decreased age-based decision making and increased efforts to include patients in decision making, and highlight the need to consider the role of dementia and decision making.

## AGE BIAS IN BREAST CANCER

This thesis concludes that a focus on age bias offers a useful approach to improving treatment for older women with breast cancer, and that understanding what better-quality treatment looks like from the patients' perspective would be a critical next step.

## 1. Introduction

This thesis explores 1) the contribution of age bias to the differential treatment of older women with breast cancer, and 2) age bias interventions to improve the quality of decision making for the treatment of older breast cancer patients. There is clear evidence of deviation from evidence-based guidelines and worse outcomes in the treatment of older women with breast cancer. It is also apparent that age-related assumptions and stereotypes are pervasive in healthcare, both explicit and internalised.

### 1.1. Research questions

This thesis addresses two primary research questions:

- 1) Is there evidence of age bias in breast cancer health care professionals' treatment of older patients?
- 2) Do interventions to address age bias lead to better quality decision making for the treatment of older women with breast cancer?

These questions guide the experimental studies presented in Parts Two and Three respectively.

### 1.2. Terminology

There are two concepts central to this thesis: bias and older age. As these terms are variously defined in the literature it may be helpful to have a brief explanation from the outset clarifying their intended use. These concepts and their contexts are explored more fully in later chapters.

Bias can be defined as unfair prejudice toward or against something or someone. Bias is often distinguished as implicit or explicit. The popular understanding of implicit bias is unconscious, negative associations and stereotypes towards members of disadvantaged groups. For this thesis, implicit bias refers to internalised associations and stereotypes that negatively affect members of a distinct demographic group, commonly those which

experience social or economic disadvantage. This definition differs from popular understanding in three ways. Firstly, it does not claim that implicit bias is unconscious or beyond control. Secondly, it distinguishes between negative associations and consequences, and regards these as separate. For example, it is not intrinsically negative to associate older adults with vulnerability, yet if a consequence of this association is the underuse of beneficial treatments in older patients, then this would be considered an implicit age bias. Thirdly, it clarifies that implicit bias does not solely impact on groups that experience disadvantage. For example, there are sectors of healthcare where younger people are disadvantaged relative to older people, but in breast cancer treatment older people appear to be systematically disadvantaged. Explicit bias is popularly thought of as conscious attitudes and beliefs which may be reflected upon and used to inform deliberate decisions. This definition of explicit bias contains multiple components which this thesis proposes are often not always true. For example, a person may hold conscious attitudes and beliefs but not reflect upon, or agree with, their potential impact. The constructs of implicit and explicit bias, and the questions this raises for implicit bias measurement, are discussed in more detail in section 3.

This thesis focuses on age bias towards older adults, specifically older patients with breast cancer. Age bias refers to stereotypes, prejudice, and discrimination towards someone based on their age. The terms old, older, and aging have been defined variably in the research literature on age and health outcomes, including aged 60, 65, 70, 75, and over 80 years, with boundaries continually redefined in an aging society. This thesis will use older to describe adults aged 70 years or older, unless stated otherwise, as this is the most consistently used definition in the literature.

Additionally, throughout the empirical studies undergone in this thesis there are mentions of clinical guidance being sought. This refers to guidance from thesis supervisors, two of which are practicing breast cancer clinicians.

## AGE BIAS IN BREAST CANCER

# PART ONE: THE CONTEXT

## 2. The treatment of older women with breast cancer

In the UK, the 2010 Equality Act provides a legal framework to promote equality of opportunity and protect against unfair treatment. Age is one of the protected characteristics set out in the Equality Act. A core principle underpinning UK healthcare is that it is inclusive.

*“The NHS provides a comprehensive service, available to all irrespective of gender, race, disability, **age**, sexual orientation, religion or belief. It has a duty to each and every individual that it serves and must respect their human rights. At the same time, it has a wider social duty to promote equality through the services it provides and to pay particular attention to groups or sections of society where improvements in health and life expectancy are not keeping pace with the rest of the population.”*

The first guiding principle of the NHS.

Department of Health, 2015.

Yet health remains a focal feature of inequality. Old age is something most will experience, yet ageism is under researched and often unacknowledged. This section sets out the evidence that there is deviation from evidence-based guidelines and worse outcomes in the treatment of older women with breast cancer, then outlines the possible explanations which have been offered.

## 2.1. The treatment of older women with breast cancer

Older women with breast cancer are less likely than younger patients to receive surgery, chemotherapy, or radiotherapy, and are more likely to be treated with primary endocrine therapy (PET) (NABCOP, 2021). Whilst cancer treatment can have distressing and adverse side effects, concerns remain as to whether the differential treatment of older breast cancer patients is the consequence of patient choice, comorbidities, tumour and biological characteristics, or whether older women are being unfairly excluded from access to effective evidence-based treatments utilised in their younger counterparts.

### 2.1.1. Epidemiology

In the UK, one in seven women are diagnosed with breast cancer in their lifetime. Breast cancer is the most common cancer for women in the UK with one person diagnosed every ten minutes, totalling to over 55,000 women diagnosed each year. Breast cancer in men is rare, with around 390 men diagnosed each year in the UK (Cancer Research UK, 2021a).

Whilst cancer is not an inevitable consequence of ageing, age is the greatest risk factor for breast cancer (Cancer Research UK, 2021a). Older women experience the highest incidence and worst survival rates for breast cancer in the UK (Cancer Research UK, 2021a; Cancer Research UK, 2021b). Nearly a quarter (24%) of breast cancer diagnoses and almost half (48%) the deaths are in women aged 75 years and over (Cancer Research UK, 2021b). The ageing UK population is forecast to cause exponential growth in breast cancer cases: by 2040 the number of older people with breast cancer will almost quadruple, nearly double the estimated trajectory for younger people with breast cancer (Maddams, Utley, & Møller, 2012).

More women than ever are surviving breast cancer because of improved cancer awareness, increased uptake of mammographic breast screenings, and more effective treatments (Marmot et al., 2013), but these benefits are not seen for older women. In the last 40 years,

breast cancer-related deaths have declined, and survival rates have doubled (Cancer Research UK, 2021c). Around eight out of ten women diagnosed with breast cancer in the UK today will be alive in ten years' time, compared to four out of ten women almost 50 years ago (Cancer Research UK, 2021b). However, improvements in prognosis have only been seen in populations under 75 years old (Smith et al., 2011) and survival rates have worsened for those over 80 years old (Cancer Research UK, 2021b). Breast cancer-related deaths increase with age, independent of risk for other-cause mortality, tumour and treatment characteristics (Ward et al., 2018).

### 2.1.2. Diagnosis

Breast cancer is classified into stages from I to IV depending on the extent of the cancer (Table 2.1), which predicts prognosis and provides the basis for developing a treatment plan. Breast cancer screening uses an x-ray technique, mammography, to identify any abnormalities that may indicate further assessment is needed. Breast screening aims to detect breast cancer early. Earlier stage at diagnosis is strongly related to improved survival outcomes (Myers et al., 2015; Hawkes, 2019; Maroni et al., 2021). Older women are almost twice as likely to be diagnosed with an advanced stage of breast cancer than younger women (National Cancer Registration and Analysis Service, 2015).

**Table 2.1**

***Outline of breast cancer stages***

Stage	
I	<ul style="list-style-type: none"> <li>▪ Early-stage breast cancer</li> <li>▪ Cancer is small &lt;2cm</li> <li>▪ Cancer is only in breast tissue or lymph nodes close to the breast</li> </ul>
II	<ul style="list-style-type: none"> <li>▪ Early-stage breast cancer</li> <li>▪ Cancer is 2-5cms</li> <li>▪ Cancer is either in the breast, nearby lymph nodes, or both</li> </ul>
III	<ul style="list-style-type: none"> <li>▪ Locally advanced breast cancer &gt;5cms</li> <li>▪ Cancer has spread from breast either to lymph nodes near the breast, the skin of the breast, or the chest wall</li> </ul>
IV	<ul style="list-style-type: none"> <li>▪ Advanced cancer or metastatic breast cancer</li> <li>▪ Cancer may be any size</li> <li>▪ Lymph nodes may or may not contain cancer cells</li> <li>▪ Cancer has spread to other parts of the body e.g., bones, lungs, brain</li> </ul>

Despite the high prevalence of breast cancer in older women, routine screening invitations end at 70 years and older women are less likely to receive a mammographic screening, biopsy, or oncology consultation (NABCOP, 2020). The lower age limit for screening is based on evidence that most women below 50 years are at low risk of breast cancer. The frequent exclusion of older women from randomised mammography-based screening clinical trials means the potential benefits of screening in women over 70 years are not known (Walter & Schonberg, 2014). An age extension trial is currently being conducted in the NHS Breast Screening Programme (AgeX trial, 2020), wherein women aged 47 to 49 and 71 to 73 years are also invited in 67 of 80 screening services across England. This may address the benefits and risks of breast screening in older women but only includes women to age 73 years at present and may not provide definitive evidence for a further ten years (AgeX trial, 2020).

Older women are less aware of the prevalence of breast cancer in their age group and the signs and symptoms to check for. Two-thirds of older women believed that breast cancer is as prevalent for women of all ages (Public Health England, 2014). One in five older women have never self-examined their breasts (Public Health England, 2014). A third of women aged 67-73 years were unsure that they would be able to detect changes in their breasts (All Party Parliamentary Group on Breast Cancer, 2013) and most were unaware of non-lump symptoms of breast cancer (Linsell, Burgess, & Ramirez, 2008).

The end of screening invitations at 70 years and a lack of breast cancer awareness campaigns targeting older women has led older women to believe they are less at risk for breast cancer, resulting in older women being less likely to self-examine which delays self-referral upon detecting abnormalities (Collins et al., 2010). Only seven percent of older breast cancer patients were diagnosed through breast screening (NABCOP, 2021). Older patients were more likely to be diagnosed following referral by a GP, after experiencing breast cancer-related symptoms, which is related to later disease stage at diagnosis (NABCOP, 2021). Older women were also more likely than younger women to be diagnosed with breast cancer by presenting at emergency care because their cancer and symptoms

have deteriorated which is strongly linked to worse survival outcomes (although this is not common) (NABCOP, 2021). Consequentially, twice as many older women are diagnosed with advanced breast cancer than younger women (Rutherford, Abel, Greenberg, Lambert, & Lyratzopoulos, 2015).

### 2.1.3. Breast surgery

Surgery is the cornerstone of breast cancer treatment and usually the first type of treatment offered, with 81% of breast cancer patients receiving surgery (Cancer Research UK, 2021d). The principal goal of breast cancer surgery is to remove the primary breast cancer and any affected regional lymph nodes to assess the cancer stage and guide subsequent treatment.

Older women diagnosed with breast cancer are less likely to have surgery: falling from 96% for women aged 50-59 years, to 76% for women over 70 years, and to 19% for women over 90 years (NABCOP, 2021). The preferences of older breast cancer patients are under researched but maintaining independence and quality of life appear to be factors of key importance (Wildiers et al., 2013). A US study indicates surgery can have irreversible adverse effects for extremely frail patients (Tang et al., 2018). Yet whilst patients with extensive comorbidities or frailty may reasonably be less likely to receive surgery, even when fitness levels were matched across age groups older women were less likely to have surgery. The Charlson Comorbidity Index (1987) predicts the one-year mortality of a patient based on any medical conditions they have. Scores 1-2= mild; scores 2-3= moderate; scores  $\geq 5$ = severe. For women with a Charlson Comorbidity score of  $>1$ , 89% of women aged 50-69 years had surgery as compared to 45% of women over 70 years old (NABCOP, 2021). For women who were classified as moderate to severely frail, 62% of women aged 50-69 years had surgery as compared to 21% of women over 70 years (NABCOP, 2021). The WHO performance status (1982) describes how active a patient is, ranging from 0= fully active, to 5= dead. For women with a status of three (capable of only limited self-care) or four (completely disabled), 52% of women aged 50-69 had surgery as compared to 17% of women over 70 years (NABCOP, 2021). This is despite evidence that older patients can

tolerate major elective [non-urgent] surgery as well as younger patients, and older patients who undergo emergency surgery following non-operated or less extensively operated treatment are exposed to higher stress and risk of mortality (Morgan et al., 2020).

The two main types of breast cancer surgery are breast conservation surgery (BCS) and mastectomy. Breast conservation surgery is the removal of the cancerous tumour and a margin of the surrounding healthy tissue, preserving as much normal breast tissue as possible. Mastectomy involves removal of the entire breast tissue and is more common in patients who present with larger or multiple breast cancers. Treatment guidelines state that, unless BCS is not possible due to clinical grounds, women should be offered a choice between BCS and mastectomy (NICE, 2009). Older women are more likely to be offered and treated by mastectomy than by BCS (NABCOP, 2021), partially explained by disproportionately greater rates of advanced stage of breast cancer and attempts to avoid the postsurgical radiotherapy typically undergone with BCS. Yet the wide variation in types of surgery between UK hospitals (persisting after case-mix adjustment) suggest treatment may be driven more by clinician views than patient preference or tumour characteristics (NABCOP, 2020).

Older women are also rarely offered breast reconstruction surgery alongside mastectomy, despite guidance that women undergoing breast surgery should be offered breast reconstruction surgery or oncoplastic approaches to restore the shape and contour of the breast as much as possible (Morgan et al., 2020) and evidence that older patients would like to discuss options for breast reconstruction (Fenlon et al., 2013). The impact of breast surgery on body image and emotional distress appears to either be considered less often in the treatment of older patients or considered as less important to older patients (Oh, Flitcroft, Brennan, & Spillane, 2016), despite evidence that older breast cancer patients have similar concerns regarding body image as younger women (Davis et al., 2020).

#### 2.1.4. Adjuvant therapies

Adjuvant therapy is additional cancer treatment given after the primary treatment to reduce the risk of recurrence. There are four main types of breast cancer adjuvant therapies: radiotherapy, chemotherapy, targeted therapies, and endocrine therapy. Radiotherapy aims to destroy any residual cancer cells within the breast with controlled doses of radiation. Chemotherapy is the administration of systemic cytotoxic medication to kill cancer cells. Targeted biological therapies, such as Trastuzumab, are used to inhibit the effects of the proteins such as human epidermal growth factor which stimulates the growth of certain breast cancers. Endocrine therapy is used to inhibit the effect of the hormone oestrogen systemically which stimulates the growth of oestrogen receptor (ER) positive cancers (as discussed in section 2.1.5). Prior to the primary treatment, additional cancer treatment (usually chemotherapy) may also be offered to reduce the size of the tumour, known as neoadjuvant therapy. Advances in the use of adjuvant therapies for early-stage breast cancer have contributed to the significant improvements in breast cancer mortality over the last 40 years (Park, Anderson, & Gail, 2015). However, their potential benefits and toxicities have not been adequately investigated in older breast cancer who experience lower rates of adjuvant therapy (NABCOP, 2021).

Clinical guidelines have evidenced the use of radiotherapy following BCS for patients with early invasive breast cancer (breast cancer that has spread into the surrounding tissue): when compared to surgery alone, radiotherapy combined with surgery has been shown to reduce the risk of cancer recurrence by 15%, and the likelihood of breast cancer related death 15 years later by four percent (Clark, 2005). Yet among women with early invasive breast cancer, 85% of women aged 50-69 years undergoing BCS receive radiotherapy, compared with 80% of women over 70 years, and 72% of women 80-89 years (NABCOP, 2021). The use of radiotherapy following surgery for patients with Ductal Carcinoma in Situ (a non-invasive cancer that starts in the milk ducts; DCIS) has been found to reduce the risk of cancer recurrence after 10 years by around 50% (Rutqvist, Rose, & Cavallin-Ståhl, 2003). Yet, among women with DCIS, 57% of women aged 50-69 had radiotherapy, compared with 41% of women over 70 years, and 24% of women 80-89 years (NABCOP, 2021). Similarly, of a group of women eligible for chemotherapy, treatment was recommended to 92% of women aged 50-59, compared with 77% of women aged 60-69, and only 23% of women

aged 70 and over (NABCOP, 2021). Older patients undergoing a mastectomy are also less likely to receive chemotherapy and endocrine therapy (NABCOP, 2021). Although the use of adjuvant chemotherapy improves survival rates in patients with early invasive breast cancer, the benefits of chemotherapy require careful consideration in older women who may be more susceptible to the associated toxicities (e.g., increased risk of mucositis, myelotoxicity neutropenia, and anaemia). Adjuvant chemotherapy for some older breast cancer patients can hold an increased risk of hospitalisation (Barcenas et al., 2010), which is associated with adverse impacts on functional reserve and quality of life (Hoogerdujin et al., 2012). The underuse of some adjuvant therapies in older women with breast cancer appears to stem from a clinical concern of doing more harm than good, but the exclusion of older patients from clinical trials has left limited evidence for the potential harms or benefits of these treatments in older patients (Sedrak et al., 2021) (as discussed in detail in section 4.6.1).

#### 2.1.5. Primary endocrine therapy

Older women with breast cancer are more likely to be treated using endocrine therapy alone (primary endocrine therapy or PET) where surgery is omitted entirely (Ward et al., 2018). Though surgery remains the gold standard for breast cancer treatment, PET may be considered for patients who have refused surgery (NICE, 2018) and is more appropriate for very frail patients with poor life expectancies (Tang et al., 2018). Guidelines state surgery should be recommended to all patients who are fit enough, as PET has significantly reduced local control and secondary antioestrogen resistance often develops after two to three years (Biganzoli et al., 2012). However, there is limited evidence available for what the health threshold should be for the use of PET, leaving recommendations stratified by clinician opinion (Morgan et al., 2015a) and rates of PET vary widely both between countries (Derks et al., 2018) and within the UK (Bates, Evans, Lagord, Monypenny, Kearins, & Lawrence, 2014).

In the UK, PET is used with up to 40% of older women as an alternative to surgery (NABCOP, 2018a) and mortality rates for older breast cancer patients are higher than other

comparable countries (Derks et al., 2018). Primary endocrine therapy is sometimes recommended for patients who are fit for surgery by clinicians who reason that it is non-invasive, less intensive, and avoids surgical recovery (Wylie & Ravichandran, 2013), and chosen by patients who reason they can always consider surgery later if necessary (Sowerbutts, Griffiths, Todds, & Lavelle, 2015). Yet whilst meta-analysis survival rates for use of PET versus surgery are overall equal, endocrine therapy alone has been shown to have significantly reduced local control (Hind, Wyld, & Reed, 2007). For some patients PET may be delaying surgery to a time when the patient's health may have deteriorated, and surgery may be less feasible or effective (Pepping, Portielje, van de Water, & de Glas, 2017).

## 2.2. Possible causes for treatment differences

Despite National Institute for Health and Care Excellence (NICE) guidelines to “treat people with invasive breast cancer, irrespective of age” (NICE, 2009, confirmed in NICE, 2018), treatment for older women with breast cancer often differs from guidelines beyond that which could be explained through personal preference, general health, or tumour characteristics. Treatment recommendations are made in multidisciplinary teams (MDTs) in meetings lasting up to five hours, during which the average patient is discussed for 3.2 minutes (Cancer Research UK, 2016). These have become strained under an increasing number of patients, many of which have complex needs. Upon referral and diagnosis, patients undergo a preoperative assessment and receive support, typically from a specialist breast care nurse. The patient and health care professionals should discuss the best course of treatment based on tumour characteristics, the patients' general health, and personal preferences. Yet a national audit by Cancer Research UK (2016) found information beyond tumour characteristics (e.g., comorbidities, psychosocial factors, patient preference) was only being used to inform 14% of discussions. In the UK, current policies on the treatment of older people with breast cancer state that patient health and patient choice are the only acceptable reasons for deviation from clinical guideline-based treatment (Department of Health, 2011). However, healthcare disparities remain after accounting for these factors (Lavelle et al., 2014), raising the question of whether older women with breast cancer are receiving non-guideline compliant care based on influences beyond those recognised in the development of guidelines.

### 2.2.1. Clinical trials

The historical exclusion and continued under representation of older people from clinical trials is a key contributor to the varied treatment and poorer outcomes of older women with breast cancer (Denson & Mahipal, 2014; Hamaker, Stauder, & van Munster, 2014). Older patients with operable early-stage breast cancer are significantly less likely to be invited to participate in breast cancer trials than younger patients even after controlling for comorbidity and physical functioning, despite being equally likely to accept an invitation (Kemeny, Peterson, Kornblith, Muss, Wheeler, & Levine, 2003). This denies older patients the chance for potentially life-saving treatments and has resulted in insufficient evidence of treatment efficacy for older people with breast cancer. As such, there is considerable variation in the treatment of older breast cancer patients, who are frequently receiving over treatment, under treatment, non-standard treatment, and poorer outcomes for older patients.

### 2.2.2. Tumour characteristics

#### ***Biological characteristics***

The biological characteristics of breast cancer at presentation appear to differ between age groups: older women tend to have tumours that are more likely to express steroid receptors, lower proliferative rates, absence of epidermal growth factor receptor, and are hormone receptor positive, meaning the tumour is likely to respond to endocrine therapy (Syed, Green, Rakha, Morgan, Ellis, & Cheung, 2021).

#### ***Advanced cancer stage***

Although older women tend to present with biologically favourable tumours, because of reduced access to screening and less breast awareness, twice as many older women are diagnosed with advanced stage, node-positive breast cancer than younger women, which guides appropriate treatment options (Rutherford, Abel, Greenberg, Lambert, & Lyratzopoulos, 2015).

### 2.2.3. Patient health

Older adults show wide variation in physical function and health, but ageing is associated with increased comorbidities, cognitive impairments, less social support, and frailty. The interplay of these associated risks are important factors to consider in treatment decisions of older women with breast cancer. However, in an ageing society, the UK healthcare system lacks cohesion between specialties, negatively impacting on some health outcomes for older patients' (Liljas, Brattström, Burström, Schön, & Agerholm, 2019).

#### ***Comorbidities***

There is an increased prevalence of comorbidity in older people. Eighty percent of people over 65 years have more than one chronic health condition and most people over 80 years have three or more (Coulter, Roberts, & Dixon, 2013). Comorbidities such as severe cardiac disease, hypertension, and cerebrovascular disease are more likely to be present in older patients, rendering anaesthesia and chemotherapy potentially more hazardous. The pre-cancer diagnosis health of patients influences cancer-specific survival, life expectancy, and treatment decisions (Berglund et al., 2012). A high comorbidity score is associated with a reduced likelihood of receiving guideline compliant therapy, an increased risk of other-cause mortality, and an increased risk of breast cancer-specific mortality (Land, Dalton, Jørgensen, & Ewertz, 2012; Wollschläger et al., 2018). Yet after adjusting for comorbidity patients over 80 years were more than 40 times less likely to have surgery for operable breast cancer than patients aged 65-79 years (Lavelle et al., 2007).

#### ***Cognitive impairments***

The risk of dementia increases with age, with 25% of adults over 80 years diagnosed with dementia and 40% of adults over 90 years (Prince, Bryce, Albanese, Wimo, Ribeiro, & Ferri, 2013). An estimated 7.5% of breast cancer patients also have dementia (McWilliams, Farrell, Grande, Keady, Swarbrick, & Yorke, 2018) (though the actual figure is likely higher as approximately 36% of people living with dementia are undiagnosed; NHS digital, 2020). Cancer patients with dementia receive less extensive cancer treatments and experience

higher mortality rates (McWilliams, Farrell, Grande, Keady, Swarbrick, & Yorke, 2018), though there is also evidence that standard treatment may be overtreatment for breast cancer patients with dementia (Martin et al., 2021).

### ***Social support***

Socioeconomic environment and family context may also interplay in the differential treatment of older patients. Over 30% of people over 65 years live alone, of which 70% are women (Office for National Statistics, 2015). Thirty percent of women over 65 years need assistance with at least one instrumental activity of daily living, of which 15% of needs went unmet (Jones & Neave, 2016). Older patients may be, or assumed to be, less equipped to cope with the everyday life of cancer treatment, such as transport to the hospital, decreased mobility and independence following surgery, or the associated toxicities of adjuvant therapies.

### ***Frailty***

Frailty appears to be a significant factor in the selection of breast cancer treatments for older patients. For very frail patients, there is a reduced ability to tolerate the associated toxicities of adjuvant therapies, and an increased risk of surgical treatments having long-term impacts on quality of life (Tang et al., 2018). Frailty is a complex topic which lacks an agreed definition and diagnostic tests and, as such, is variably interpreted in healthcare (Gordon, Masud, & Gladman, 2014). As frailty is often associated with age-related decline, there are dangers that without routine assessments frailty and vulnerability to treatment may be assumed because a patient is old. There is currently no clear role for geriatric medicine specialists nor standard guidance on the array of frailty measurement instruments in the treatment of older breast cancer patients. Frailty screening can highlight those with additional health requirements and recognise those with good overall fitness levels so that treatment may be tailored accordingly. The European Society of Breast Cancer Specialists and International Society of Geriatric Oncology have recommended that all breast cancer patients over 70 years are screened for frailty (Biganzoli et. al., 2021). Yet over half (58%) of

NHS organisations use no form of pre-treatment fitness assessment, regardless of health concerns (NABCOP, 2021). Guidance also encourages the routine use of geriatric assessments which is evidenced to “improve tolerance, health-related quality of life, and life satisfaction” (Biganzoli et al., 2021). Without formal assessment measures, treatments are recommended based on clinical judgement which is varied and may be susceptible to age-related bias. Recent efforts to provide objective, standardised assessments of older breast cancer patients’ health include a fitness assessment form to identify frailty and inform treatment planning (NABCOP, 2018b).

#### 2.2.4. Variations in patient-centred care

Individuals differ in their preferred involvement for decision making in healthcare: some prefer to make the decision themselves; some prefer the decision is made for them, and some wish to share the decision with others- either the care provider or their immediate support (often a partner) (Chewning, Bylund, Shah, Arora, Gueguen, & Makoul, 2012). Older patients have often been thought of as preferring passive care, placing greater importance on the clinician’s advice, and unlikely to seek medical information (Levinson, Kao, Kuby, & Thisted, 2005; Belcher, Fried, & Agostini, 2006; Bastiaens, Van Royen, Pavlic, Raposo, & Baker, 2007). However more recent research into age differences in decision making, detailed below, has suggested that whilst there appear to be characteristic age-related patterns in decision preferences, age cohorts are highly heterogenous and many older breast cancer patients do want to be involved in treatment decisions (Harder, Ballinger, Langridge, Ring, & Fallowfield, 2013; Lifford et al., 2015; Burton et al., 2017).

Breast cancer treatment and care options are diverse and sensitive to both patient preferences and clinician priorities. Yet, there is limited research on older breast cancer patients’ preferences or the best approaches to determine preference (Angarita, Zhang, Elmi, & Hong, 2020). Older breast cancer patients report that their experience is better when they receive more information, their needs are considered in care planning, there is continuity in their health care provider, and vulnerable patients receive specialised care

(Moser, Melchior, Veenstra, Stoffers, Derks, & Jie, 2021). Yet not all health care professionals routinely engage in shared decision making and can be poor at judging older patients' preferred involvement in treatment decision making (Mulley, Trimble, & Elwyn, 2012; Levit, Balogh, Nass, & Ganz, 2013).

Amongst older women with breast cancer, it may be perceptions of decision making preferences, rather than actual preferences, that are guiding decision making (Lifford et al., 2015). Older and younger breast cancer patients alike have varying preferences for decision making involvement, but older patients more often felt their preference went ignored and they were not involved in all aspects of their care (Hamelinck et al., 2018). Most older breast cancer patients want full information about potential treatments, but some do not appear to be making accurate, informed decisions (Burton et al., 2015). For example, clinicians often cite patient choice as a key reason a patient receives PET (Lavelle et al., 2014), yet patients often choose PET because of concerns around the demands and recovery of surgery and are less likely to choose PET if these concerns are discussed (Ciambrone, 2006).

#### 2.2.5. Clinician choice

Patients often place greater value in physicians' recommendations than their own preferences, even in treatment decisions that are solely a matter of preference (Ciambrone, 2006). Yet there is no reason to believe that clinician judgement is immune to assumptions and bias. The absence of standard assessment approaches for factors associated with increased age (e.g., social support, frailty, comorbidity), lack of evidence for treatment efficacy in older patients, and engrained stereotypes surrounding older people may be leading clinicians to use biological age as a proxy for breast cancer treatment decisions. The few empirical studies which have considered the role of bias amongst health care professionals on older breast cancer patients' experiences found patients who perceived ageism from their clinician experienced higher levels of pain and poorer mental health (Mandelblatt et al., 2003), and were more likely to hold views that pain was an inevitable

part of ageing and medication was unlikely to help with symptoms of pain (Yeom & Heidrich, 2009).

### 2.3. What does high-quality decision making look like?

Fair provision of high-quality health care is underpinned by shared decision making (NICE, 2021). Engaging in shared decision making leads to more successful healthcare as 1) first and foremost it is ethically right that people are involved in decisions about their healthcare, 2) resources are appropriately allocated, and 3) unwarranted clinical variation is reduced (Mulley, Trimble, & Elwyn, 2012).

Shared decision making is particularly important to high-quality care for patients with comorbidities and patients making preference-sensitive decisions, where care must be tailored, more than ever, by the patient's goals, preferences, and health priorities (NICE, 2019). Shared decision making also disproportionately improves outcomes for patients who experience health inequalities (Durand et al, 2014). This makes shared decision making of central importance to the treatment of older women with breast cancer.

There is a body of evidence that shows when patients are better informed, they make different decisions and feel more confident (Stacey et al., 2011). Patients and health care professionals tend to overestimate the likely benefits and underestimate the likely harms of a treatment (Hoffmann & Del Mar, 2015; Hoffmann & Del Mar, 2017). There is a collection of studies showing that when patients are well informed of the likely risks and benefits of surgery, fewer patients choose to have surgery (Stacey et al., 2017). Forty percent fewer patients with benign prostate disease chose surgery after being informed of the risk of sexual dysfunction (Dartmouth Atlas of Health Care, 2012). Twenty percent fewer women with abnormal bleeding from the uterus chose surgery when using a decision aid (Kennedy et al., 2002). Twenty percent fewer patients with stable angina chose surgical treatment when they were informed that the surgery does not reduce risk of a heart attack (Morgan et

al., 2000). Patients with back pain were 30% less likely (patients with herniated disks) or 30% more likely (patients with spinal stenosis) to choose surgery when shown the evidence for whether their type of injury is likely to get better without surgery or not (Deyo, Cherkin, Weinstein, Howe, Ciol, & Mulle, 2000). Research into the association between shared decision making and differential treatment decisions for breast cancer patients has found mixed results. Some studies found engaging in shared decision making increased rates of mastectomy (compared with breast conservation surgery) (Katz et al., 2005), some found a decrease in rates of mastectomy (Hawley et al., 2009), whilst others found no association (Polsky, Keating, Weeks, & Schulman, 2002; Mandelblatt, Kreling, Figueiredo, & Feng, 2006). The presence of an association between shared decision making and treatment choices in some studies indicates the need for more empirical studies to establish a clearer pattern.

There is evidence of marked gaps between what health care professionals think patients want and what patients actually want. Moreover, health care professionals are rarely made aware that they have misunderstood a patient's preferences (Mulley, Trimble, & Elwyn, 2012). Medical training places great emphasis on the difficulties and subtleties of accurate medical diagnoses, requiring highly trained professionals with access to sophisticated medical equipment and evidence-based research. Understanding and diagnosing patient preferences is not awarded the same significance (Mulley, Trimble, & Elwyn, 2012). Patients with life shortening conditions appear to place less value on living as long as possible than doctors perceive (Vollandes et al., 2012). There are also differences between what doctors recommend for patients and what doctors choose for themselves when they become patients (Ubel, Angott, & Zikmund-Fisher, 2011). For breast cancer patients, doctors believed keeping their breast tissue was a top priority for 71% of patients, this was true for seven percent of patients; doctors believed living as long as possible was a top priority for 96% of patients considering chemotherapy, this was true for 59% of patients; and no doctors believed avoiding a prosthesis (artificial breast) was important, this was true for 35% of patients (Lee et al., 2010).

Patients who make decisions about their health care experience more positive health outcomes. Positive outcomes have been demonstrated in multiple ways which include patients feeling more confident and positive about their health care, improved health indicators such as better blood glucose control in diabetes patients, quicker recoveries and shorter hospital stays, improved health literacy, and increased compliance with treatment plans (NHS AQuA programme, 2021). Patients who felt they did not experience shared decision making showed lower adherence to treatment medications and increased risk of emergency hospital admission (Hughes et al., 2018). Shared decision making has been shown to have a disproportionately positive effect on groups who experience healthcare inequalities (NHS AQuA programme, 2021). Conversely, these same groups are least likely to report they received shared decision making (Hughes et al., 2018). There is a small collection of studies which found efforts to increase shared decision making were associated with increased satisfaction for breast cancer patients. Engaging in shared decision making was related to increased satisfaction with information provision (Keating, Guadagnoli, Landrum, Borbas, & Weeks, 2002), the care process (Katz et al., 2005; Mandelblatt, Kreling, Figueiredo, & Feng, 2006), and the treatment received (Katz et al., 2005), although some studies found no associations between shared decision making and patient satisfaction (Schleife, Sachtleben, Finck Barboza, Singer, & Hinz, 2014).

There are clear benefits from shared decision making in healthcare in improving the way resources are allocated, patient experience, health literacy, healthcare compliance, and health outcomes. Despite the ethical and legal imperatives to engage in shared decision making, uptake has been slow, and it is still not common practice (Maskrey, 2019; Waddell, Lennox, Spassova, & Bragge, 2021). Breast cancer clinical treatment guidelines and consensus statements are not adequately promoting shared decision making (Maes-Carballo, Muñoz-Núñez, Martín-Díaz, Mignini, Bueno-Cavanillas, & Khan, 2020). Most health care professionals feel committed to shared decision making but face practical and organisational barriers to providing it consistently and extensively (Joseph-Williams et al., 2017). The key challenges identified are: patients with low health literacy are less likely to expect or receive shared decision making (almost half [43%] of adults in England have low health literacy, defined as the ability to find, understand, and use information to make

appropriate health decisions), more health care professionals feel they provide shared decision making than patients feel receive it, many health care professionals feel they do not have the time or resources with competing demands and priorities, and feel not all patients want to be involved in their own care (Rowlands, Shaw, Jaswal, Smith, & Harpham, 2017).

Shared decision making relies on health care professionals' commitment to creating conversations that allow patients to reach decisions based on careful consideration of all evidence-based options, and patients empowered to ask questions, know what the right questions are for them, and have a comprehensive understanding of the answers (Mulley, Trimble, & Elwyn, 2012). To enable committed professionals and empowered patients, tailored systems which support the use of shared decision making must be intrinsic to all aspects of health care. Supportive systems may include designated time to discuss and review decisions, decision aid tools, the provision of accessible health information tailored to health literacy levels, systematic and transparent documentation of patient preferences and shared decision processes with frequent, regular evaluation.

#### 2.4. Summary

The evidence of poorer outcomes for older women with breast cancer is clear. There are many different factors which may affect treatment decisions. Clinician (e.g., personal beliefs and characteristics, medical expertise and experience, communication style), patient (personal beliefs and characteristics, previous health care experiences, decision perceptions and preferences) and contextual factors (e.g., cultural context, social support, geographic or financial barriers) interact to affect treatment decisions. Following on from previous research undergone by the supervisors and student (undergraduate dissertations and Morgan's et al., 2015 study), this thesis focused on clinician factors. Age bias has rarely been explicitly identified as an underlying cause of differential treatment or outcomes (exceptions are Mandelblatt et al., 2003; Yeom & Heidrich, 2009; International Longevity Centre report, 2019) but may be a root cause. There is a concern that age is being used as a proxy by health care professionals for factors that guide treatment recommendations such as

comorbidities, frailty, and patient preference. It is apparent that concepts of older people as frail, passive, and less healthy may have led to the exclusion of older women with breast cancer from clinical trials, leading in turn to a lack of evidence-based guidelines on the efficacies and toxicities of treatment options, and subsequent undertreatment and exclusion from evidence based guidelines of older women with breast cancer. The older population is a heterogenous cohort, and chronological age alone should not be an indicator of differential breast cancer treatment. There is wide variation in the health status of this age group, with some 75-year-olds who are frail with multiple comorbidities, necessitating assisted living, whilst others are fit, healthy, and active. As average life expectancy continues to rise, there is a need to redefine what it means to be “old”.

### 3. Bias and unequal outcomes

Whilst the possibility that age bias is a root cause of differential treatment for older breast cancer patients has rarely been considered, there are many other areas where bias has been identified as perpetuating group disparities. This section sets out the different types of bias before focusing on the empirical evidence on implicit bias, generally and more specifically in healthcare.

#### 3.1. Types of bias

Bias can be implicit or explicit and can exist at an institutional or individual level. All these forms of bias contribute to group inequalities and individual disadvantages. Whilst these can be distinctly defined, it is often harder to distinguish which processes are involved in group disparities. There are overlaps between institutional policies, and individuals within institutions and the line may blur when trying to separate between implicit and explicit bias.

##### 3.1.1. Institutional bias

###### ***Explicit***

Explicit, or direct, institutional bias refers to policies, structures, or systems that produce outcomes which systematically disadvantage people belonging to a protected characteristic as defined by the 2010 Equality Act. The Met police has been continually described as institutionally racist, with black people nine times more likely to be stopped and searched than white people and just 15% of searches resulting in a charge (Home Office, 2020).

###### ***Implicit***

Implicit, or indirect, institutional bias refers to universal treatment which disregards group differences, disproportionately disadvantaging people who share a protected characteristic. An example of indirect institutional bias is the gender pensions gap. On average, women receive a fifth of men's pensions. As a result of "the motherhood penalty", women are more

likely to work in lower paid, part-time jobs, and to take unpaid time off work for caring responsibilities. Yet pension schemes, including the state pension, do not account for this instead basing pensions on the amount paid in, which institutionally favours men.

### 3.1.2. Individual bias

#### ***Explicit***

Instances of clear explicit discrimination are unlawful and, if identified, normally have clear procedures and consequences to address it, for example hostile language which clearly references a person's protected characteristic. However, much harder to identify and address are instances of explicit but subtle discrimination, for example stereotyping a woman as gentle and then overlooking her for a promotion through perceptions that senior roles should be held by assertive candidates.

#### ***Implicit***

Implicit biases are thought of as socially constructed attitudes that influence understanding, decisions, and actions. These are distinguished from explicit attitudes as they appear to be activated without intention or effort. Implicit bias may not require the perceiver to endorse it or devote attention to its activation. Implicit biases are evolutionary adaptive shortcuts to navigate and predict novel situations, originally defined as a "feeling, favorable or unfavorable, toward a person or thing, prior to, or not based on, actual experience" (Allport, Clark, & Pettigrew, 1954, p. 6). However, these heuristics do not distinguish between useful cognitive shortcuts and biases that make unfounded and potentially damaging assumptions about others.

Implicit biases towards various social groups have been measured using the Implicit Associations Test (IAT) (Greenwald, McGhee, & Schwartz, 1998). The test uses time measures in a pair sorting task linking characteristics (e.g., young and old) with descriptions (e.g., good and bad) to assess the strength of automatic associations between target

categories and evaluations. People tend to be quicker in pairing commonly held stereotypes (e.g., men with work and women with home), and negative attributes with socially disparate groups (e.g., bad with older faces) (Hummert, Garstka, O'Brien, Greenwald, & Mellott, 2002). IATs have been utilised primarily in implicit social cognition, but also amongst other domains such as clinical (Elran-Barak, 2021) and health applications (Beltzer, Moulder, Starns, & Teachman, 2020), as well as in education (Chin, Quinn, Dhaliwal, & Lovison, 2020; Starck, Riddle, Sinclair, & Warikoo, 2020), legal scholarship (Avery, Starck, Zhong, Avery, & Cooper, 2020) and politics (Ksiazkiewicz, 2021). There have been two main findings consistent across IAT studies: there are clear associations between social groups and attitudes or stereotypes, and implicit associations often diverge widely from, and are more negative than, attitudes that individuals are willing to express (Nosek, Banaji, & Greenwald, 2002).

### 3.1.3. Explicit bias remains

Though the focus of this thesis is implicit bias, this is not intended to detract from or dismiss the ongoing prevalence of explicit bias. It could be considered that implicit bias is sometimes offered as an explanation for continuing disparities and unequal treatment that avoids the legal or moral responsibilities and consequences of explicit bias (e.g., in 2018, two black men were arrested in Starbucks after an employee called the police. The crime: waiting to order until the rest of their party arrived. Starbucks denounced the incident as unconscious bias and were widely praised for implementing a mandatory day of implicit bias staff training; The Guardian, 2018). Much enduring discrimination appears not to be hidden at all. A few examples amongst many include 84% of ethnic minority Britons feel racism remains in the UK (Abraham, 2020), 70% of ethnic minority employees have been racially harassed at work (Ashe & Borkowska, 2019), and more than half of women have experienced sexual harassment at work (Congress, 2016). Whilst many assert that they hold no conscious bias, there appears to be a widespread awareness of bias amongst the discriminated, raising questions about how much of biased behaviour is unconscious (see section 3.4.2 for a more detailed discussion).

### 3.2. Implicit bias and group disparities

There are marked tendencies within social and psychological research to consider societies as organised by groups with shared characteristics, long-standing views that there are conflicts or disparities between some groups, and a large body of research which seeks to evidence the existence of these disparities or the efficacy of interventions to overcome them. The persistence of group disparities has led to a wide body of field experiments demonstrating that when all other variables are equal, members of marginalised groups are treated worse. Much of this research is focused on differences between ethnic or racial groups. Black and ethnic minorities are less likely to be employed, more likely to be stopped and arrested by police, and more likely to go to jail (Equality and Human Rights Commission, 2018). Women are less likely to be promoted, assume managerial positions, occupy male-dominated job roles, and are paid less (Equality and Human Rights Commission, 2017). Research in the UK and the US has repeatedly demonstrated that white people, national citizens, men, and younger people are more likely to be considered, interviewed, and hired for jobs than black, foreign, female, and older counterparts (e.g., Bertrand & Mullainathan, 2004; Baert, 2018; Carlsson & Eriksson, 2019; Quillian, Lee, & Oliver, 2020). One study found that black people often attempt to conceal racial cues on their CV to increase their chances of getting an interview (e.g., removing a position at an African American non-profit organisation), that black people were more likely to be racially transparent when applying for jobs in companies with pro-diversity messages, and that these companies with pro-diversity messages were less likely to offer an interview to a black job applicant with a racially transparent CV (Kang, DeCelles, Tilcsik, & Jun, 2016). Most studies have focused on racial, ethnic, or gender discrimination in hiring, but also rental market, legal cases, retail, academics, and daily interactions (Bertrand & Duflo, 2017; Quillian, Pager, Hexel, & Midbooen, 2017; Auspurg, Schneck, & Hinz, 2019). Amongst many, some studies include a black job applicant with a criminal record is three times less likely to receive a call-back than an identical application from a white person (Pager, 2003); a comparison of employment patterns amongst transgender people found that transgender males' earnings rose by eight percent following transition, whereas transgender females' earnings fell by 12% (Schilt & Wiswall, 2008); in Israel, Arabic and Jewish judges were far less likely to detain defendants during bail hearing if the suspect was a member of their own social category (Gazal-Ayal & Sulitzeanu-Kenan, 2010); in the US, black defendants whose appearance was deemed to be

more stereotypically African were more likely to receive a death sentence, as compared to black defendants deemed to have less Afrocentric features, and black defendants received a longer prison sentence when the victim was white (Eberhardt, Davies, Purdie-Vaughns, & Johnson, 2006); when men and white people engage in diversity-valuing behaviour they receive better performance ratings at work, when women and ethnic minorities engage in diversity-valuing behaviour their performance-ratings decrease (Hekman, Johnson, Foo, & Yang, 2017).

Covert forms of institutional and individual bias appear pervasive in perpetuating group disparities. Various studies have compared explicit attitudes, implicit associations, and group disparities and found that unequal outcomes are more consistent with implicit associations than explicit attitudes. These have been evidenced in research spanning fields from employment (Rooth, 2007) to educational outcomes and criminal justice (Pettit & Western, 2004; Plant & Peruche, 2005; Johnson, 2008). There have been repeated studies demonstrating that many people who voice egalitarian views implicitly associate concepts of good with white, thin, straight, and young, and concepts of bad with black, fat, gay, and old (Xu, Nosek, & Greenwald, 2014; Sabin, Riskind, & Nosek, 2015; Elran-Barak & Bar-Anan, 2018). There are also studies demonstrating that many people hold implicit stereotypes which reflect, or perhaps perpetuate, social inequalities: men are more readily associated with workplaces than women (Zitelny, Shalom, & Bar-Anan, 2017), police officers are faster to associate weapons with black people and more likely to mistake an innocuous object for a gun in the hands of a black person and shoot in weapons simulation tasks (Peck, Good, & Seitz, 2021); Arab-Muslims are more readily associated with terrorism than white people (Park, Felix, & Lee, 2007). There is also evidence that implicit bias influences the behaviours of the targeted social groups. When managers who hold implicit biases against ethnic minorities, but report no explicit prejudices, are scheduled to work with minority employees, there is increased employee absenteeism and decreased work productivity (Glover, Pallais, & Pariente, 2017).

There is a body of research which ascribes unequal outcomes to implicit bias. Several studies have indicated a pattern between geographical variation of implicit associations and variation in levels of group disparity, that is, there are stronger levels of implicit bias in regions with wider levels of inequality. In the US, areas with greater disparities of racial shootings are associated with higher race IAT scores (Hehman, Flake, & Calanchini, 2018). Regions with high levels of implicit age bias had poorer health outcomes for over 65 year olds (Giasson & Chopik, 2020). US counties with higher implicit and explicit racial prejudice have a higher racial gap in infant health outcomes (Orchard & Price, 2017). There are also patterns between changes in implicit bias and shifts in social attitudes. There was a substantial reduction in negative implicit associations towards sexual and gender minorities from 2006 to 2013, a period which saw marked shifts in legal rights and public attitudes towards sexual and gender minorities (Westgate, Riskind, & Nosek, 2015). Implicit racial bias was reduced during and following the Black Lives Matter movement (Sawyer & Gampa, 2018). Racially charged coverage of Covid-19 was associated with an increase in implicit bias against Asian Americans (Darling-Hammond et al., 2020).

### 3.3. Implicit bias in healthcare

There are clear healthcare inequalities spanning across many dimensions, including race, gender, and socioeconomic status. Dimensions of inequality often interact to perpetuate disparities. Group health disparities are explained through multiple determinants of health, such as systematic poverty, neighbourhood, community and social context, and access to education and healthcare. People living in the most deprived regions of England can expect to live eight years less than those living in the least deprived areas (Public Health England, 2019). Ethnic minorities are significantly more likely than white people to believe their race impacts negatively on the quality of healthcare they receive and are less trusting of physicians (Chauhan et al., 2020). This may contribute to lower use of medical services (Musa, Schulz, Harris, Silverman, & Thomas, 2009) and poorer adherence to medical advice (Casagrande, Gary, LaVeist, Gaskin, & Cooper, 2007). Black patients are less likely to be admitted to the emergency department, have longer wait times to be seen by a consultant, and receive less pain medication than white patients presenting with the same symptoms

(Pezzin, Keyl, & Green, 2007; Shah, Zogg, & Zafar, 2015). Minority ethnic groups have more health problems and higher mortality rates (Public Health England, 2019).

### 3.3.1. Health care providers implicit bias

Negative implicit bias has been evidenced in health care providers towards various groups of people for which healthcare disparities are also apparent. These span from sexual and gender minorities, women, racial and ethnic minorities, older adults, people with disabilities, AIDs, mental illnesses, low incomes, obese people, and intravenous drug users (FitzGerald & Hurst, 2017). Most research into the influence of implicit bias on healthcare disparities has focused on racial bias and several studies have found physicians who purport no explicit preference often hold implicit racial biases: associating black and low-income patients with drug abuse (Moskowitz, Stone, & Childs, 2012), as less intelligent, more likely to take risks, and less cooperative (van Ryn & Burke, 2000), particularly with regards to medical procedures (Sabin, Rivara, & Greenwald, 2008). Physicians have also been found to show less positive verbal and non-verbal communication towards black patients in end-of-life care than white patients (Elliott, Alexander, Mescher, Mohan, & Barnato, 2016). Health care professionals who specialise in obesity, hold implicit associations towards obese patients as *lazy*, *stupid*, and *worthless* (Schwartz, Chambliss, Brownell, Blair, & Billington, 2003). Health care professionals hold more negative attitudes towards, and are less willing to help, patients with brain injuries if they felt the patient had contributed towards their injury (Redpath, Williams, Hanna, Linden, Yates, & Harris, 2010).

### 3.3.2. Health care providers' implicit bias and healthcare inequalities

Implicit bias research has also examined the relationship between health care providers' implicit bias and the receipt of worse healthcare. A US study found an association between county-levels of implicit racial bias and adverse birth outcomes for black mothers (Orchard & Price, 2017). Physician with low explicit, but high implicit, racial bias were reported by black patients as less friendly, worse at communicating, and providing lower quality of care (Maina, Belton, Ginzberg, Singh, & Johnson, 2018). Independent observers also notice

poorer communication between black patients and white clinicians with high implicit racial bias scores (Penner et al., 2016).

There is also an area of implicit bias research examining the relationship between healthcare providers' implicit bias and the treatments recommended to different patients. There have been mixed findings on the relationship between health care providers' implicit associations and differential treatment recommendations towards patients of different characteristics. Studies have tended to measure implicit racial bias and treatment recommendations for hypothetical patient vignettes. Some studies found an association between providers' high implicit racial bias and deviation from guideline-recommended treatments for Type II diabetes (Charles, 2009), thrombolysis (Green et al., 2007), patient prognosis in mental healthcare (Katz & Hoyt, 2014), and pain management (Sabin & Greenwald, 2012). Yet of these studies, one failed subsequent replication (Cassell, 2015 replicating Green et al., 2007), one found a link for a novel measure of implicit bias but not for the IAT (Katz & Hoyt, 2014), and one found a link for one condition but not several others (Sabin & Greenwald, 2012). Physicians with higher implicit racial bias scores were less likely to recommend appropriate treatment for black patients with coronary heart disease (Green et al., 2007), and under increased time pressures were more likely to underdiagnose black patients and less likely to refer black patients to a specialist (Stepanikova, 2012). Oncologists with high implicit racial bias scores were less likely to recommend black patients with operable lung cancer for surgery than white counterparts (Cykert et al., 2010). Medical students and professionals who held false beliefs about biological differences between black and white people were less likely to recommend appropriate pain medication to black patients (Hoffman, Trawalter, Axt, & Oliver, 2016).

### 3.4. A closer look at implicit bias and the IAT

The IAT has become the standard measurement for implicit, or unconscious, bias. However, there is a growing body questioning the value of the IAT as a measure of implicit bias (Bartlett, 2017; Mitchell & Tetlock, 2017; Singal, 2017). Research into implicit and unconscious bias has helped raise awareness of the long-standing continuation of group

inequalities and has encouraged conversations around possible solutions amongst a wide range of stakeholders. Yet, there are increasing concerns that implicit bias and the IAT are confounded by conceptual and methodological concerns, coupled with common misconceptions, which cast doubt on the validity of these assumptions (Azar, 2008).

#### 3.4.1. The IAT

##### ***Predicting biased behaviours***

Research has indicated the IAT is a weak predictor of biased behaviour (Oswald, Mitchell, Blanton, Jaccard, & Tetlock, 2013) and changes to IAT scores do not appear to lead to changes in biased behaviour (Forscher et al., 2019). Weak predictive validity does not in itself negate the case for using IATs as small effects do not mean unimportant effects but does highlight issues that require further exploration.

Greenwald, Banaji, and Nosek (2015) assert that if statistically small effects influence many people or the same person repeatedly, they can have societally large consequences. They point out that IAT-behaviour effect sizes are larger than those of a daily aspirin, yet the effect of a daily aspirin can prevent over 400,000 heart attacks annually in the US. Though this analogy is not evidence of the IAT's effect, it does highlight that small effect size should not be automatic grounds to dismiss the IAT.

Brownstein, Madva, and Gawronski (2017) suggest that IATs are good predictors of behaviour when it is theoretically relevant and contextually dependent. For example, jurors' scores on a race-value IAT (associating black and white people with words such as *merit*, *value*, *worthless*, and *expendable*) correlated with their likelihood to recommend black men for death sentences and white men for long-term prison sentences. Yet juror scores on a race IAT associating black and white people with words such as *lazy* and *unemployed* did not predict death sentencing (Levinson, Smith, & Young, 2014). IAT meta-analyses have reduced this distinction to paint a simplistic picture; if you were to include the race-value and race-

laziness IATs as predictive measures of jurors' sentencing behaviours, the two would likely cancel out and conceal the importance of theoretical compatibility.

Behaviour is complex, full of oddities, uncertainties, and interactions. There is no behaviour that can be reliably and repeatedly predicted by one measure alone. Yet this does not render any one measure redundant or irrelevant. Many tests which hold validity are also poor predictors of behaviour when examined in isolation, such as the association between IQ and income ( $r = .2-.3$ ) or parent's and child's socioeconomic status ( $r = .2-.3$ ) (Strenze, 2007). This highlights that researchers and organisations should be cautious not to attribute evidence of inequalities or instances of discrimination to implicit bias alone.

### ***Test-retest reliability***

The IAT has attracted concern for its poor test-retest reliability (Bartlett, 2017). Strong test-retest reliability, defined as the consistency of an individual's score at different time points (Vilagut, 2014), is a common stamp of credibility within research. How much can be concluded from a score that would likely be different if the test was taken weeks, days, or even hours earlier or later? Whilst IATs are poor measures of individual behaviours, aggregate scores are stable and relate to patterns of disparity across populations. For example, in the US, regions with high levels of implicit racial bias correlate with greater disparities of racial shootings and higher racial gap in infant health outcomes (Orchard & Price, 2017; Hehman, Flake, & Calanchini, 2018) (for more examples see section 3.2). In the context of group disparities, the IAT may be better used to reflect group bias rather than to detect individual bias.

The IAT's low test-retest reliability could also be important in itself, reflecting situational factors influencing individuals. A study found associating black people with *danger* was related to avoidant behaviour towards a black person for participants placed in an open space and aggressive behaviour towards a black person for participants placed in an enclosed space (Cesario, Plaks, Hagiwara, Navarrete, & Higgins, 2010). This suggests that

behavioural responses to automatic associations are dependent on the situational context. If so, an understanding of these factors could be key to limiting bias in certain contexts. For example, if police officers with higher race IAT scores are more likely to make mistakes on a weapons-identification task when they are tired then that could be grounds for reviewing the necessary number of hours break between shifts.

Whilst IATs have poor test-retest reliability as a measure of negative associations against others, they appear to show clearer measurements of negative associations towards self and subsequent behaviours. IATs that ask participants to associate themselves with *injury* and *death* may predict intent to self-harm and future suicide attempts in psychiatric patients, beyond that which may be predicted through known risk factors (Nock & Banaji, 2007; Nock, Park, Finn, Deliberto, Dour, & Banaji, 2010), and mental illness IAT scores may predict poor mental health (Rüsch, Corrigan, Todd, & Bodenhausen, 2010; Rüsch, Todd, Bodenhausen, Olschewski, & Corrigan, 2010; Rüsch, Schulz, Valerius, Steil, Bohus, & Schmahl, 2011).

### 3.4.2. Implicit bias

#### ***Are we detracting focus from structural bias and discrimination?***

A common definition of implicit bias is behaviour beyond intent or control. Yet labelling bias as beyond intent may be protecting, rather than correcting, behaviours. For example, the George Floyd protests against police brutality and racism called for demands to address racial inequalities. In defence of the company's low diversity, the CEO of a US bank wrote "the unfortunate reality is that there is a very limited pool of Black talent to recruit from". In response to criticism, he later apologised for "making an insensitive comment reflecting my own unconscious bias" (McEnergy, 2020). Labelling behaviours as beyond control may be absolving individuals and institutions of responsibility. When discrimination is framed as implicit, people are less likely to feel someone should be held accountable, regardless of the consequences of the discrimination (Daumeyer, Onyeador, Brown, & Richeson, 2019). A focus on implicit bias may be disguising (unlawful and unacceptable) institutional

discrimination as (allowable) unconscious bias. People are less concerned about, and less willing to support efforts to address, implicit bias as compared to explicit bias (Daumeyer, Onyeador, Brown, & Richeson, 2019). Given the difficulties in reliably measuring or evidencing implicit bias and the low efficacy of bias training to increase diversity in organisations (Onyeador, Hudson, & Lewis Jr, 2021), there is a need to shift away from implicit bias as an explanation for societal inequalities in isolation from other overt and institutionalised forms of bias.

***Are we too quick to label behaviours as unconscious?***

There has been a widespread acceptance that if there is a declaration of unawareness then the bias is unconscious. Yet unreliable narration, particularly for socially sensitive issues, is what prompted work into implicit bias (Greenwald & Banaji, 1995). Causal explanations of the dissonance between self-reported attitudes and biased behaviours have not been established. They may reflect that people are 1) more biased than they realise, 2) more biased than they considered (i.e., hold an assumption without considering or recognising the wider implications or damaging effects of that assumption), or 3) more biased than they are willing to admit. Field experiments which have been used to demonstrate implicit bias in hiring show that recruiters are less likely to hire equally qualified applicants with a protected characteristic, with most studies focusing on race or gender. Yet when the employer is asked to explain their reasoning for hiring, whilst there is no explicit reference to race or gender and a denial of its influence, the reasons given are in line with racial (e.g., a poor cultural fit for the company) or gender (e.g., less assertive) stereotypes (Koch, D’Mello, & Sackett, 2015; Veit, Arnu, Di Stasio, Yemane, & Coenders, 2021). This suggests that people are aware of the assumptions they hold but have not considered how these link to biased behaviour contributing to unequal outcomes. Explicit attitudes tend to align closely with implicit associations either when they refer to views that are largely socially acceptable (e.g., thin equals good), or when the person is less concerned with what is socially acceptable (Nosek et al., 2007). Implicit bias may be better reframed as unconsidered rather than unconscious bias.

### 3.5. Summary

There is a wide body of evidence that implicit bias measures, most commonly the IAT, reflect stereotypes and assumptions which contribute to patterns of inequality. These patterns have been considered evidence that implicit bias plays a role in perpetuating group inequalities. Countless organisations have undergone unconscious bias training in efforts to allay disparities. The IAT has been both celebrated and criticised, and its role in understanding and reducing bias remains contentious. The truth is likely that bias is messy and complicated; the IAT is not a perfect solution to predicting bias, yet not fully understanding its role should not be grounds for dismissal.

## 4. Age bias

The UK population is ageing. As of 2019, one in five people are over 65 years old, compared to one in eight people in 1966 (Office for National Statistics, 2018). This is projected to increase to one in four people by 2039 (Office for National Statistics, 2021). As such, any effects from age bias are likely to worsen as the older population grows. This section describes components of age bias, outlines the dominant theories of ageism, and presents the body of empirical research which has evidenced age bias, most recently in relation to the Covid-19 pandemic. Finally, this section considers the role of gender in age bias. The focus of this thesis is age bias in breast cancer but as most people with breast cancer are women and the perceived importance of breasts is closely linked to age, it is important to consider age bias through the lens of gender.

### 4.1. Components of bias

Age bias, or ageism, can present as stereotypes, prejudice, or discrimination. Age stereotypes are beliefs and expectations about the characteristics of age groups. Age stereotypes may guide assumptions about people, overgeneralising based on their age. Age stereotypes are not always negative, but generalisations can have harmful consequences. These stereotypes are culture and context specific. For example, in the workplace, younger people are stereotyped as ambitious but lazy, older people as reliable but resistant to learning (Bal, Reiss, Rudolph, & Baltes, 2011; Duffy, Shrimpton, & Clemence, 2016; Harris, Krygsman, Waschenko, & Laliberte Rudman, 2018); in the media, younger people are often portrayed as attractive but troublesome, older people as likeable but vulnerable (Loos & Ivan, 2018; Makita, Mas-Bleda, Stuart, & Thelwall, 2021); and in healthcare, younger people are often assumed to be healthier but riskier, older people as dependent and confused (Higashi, Tillack, Steinman, Harper, & Johnston, 2012; Duffy, Shrimpton, & Clemence, 2016). Prejudice is an emotional reaction towards a person based on their perceived group membership, common feelings towards older people appear to be sympathy and pity (Fiske, 2018). Discrimination describes differential policies and behaviours based on a persons perceived age.

## 4.2. Theories of ageism

There are multiple theories behind the underlying drivers of ageism. Three dominant theories are terror management, intergroup threat, and stereotype embodiment.

Terror management theory proposes that ageism stems from our fear of death and associated physical and cognitive decline (Greenberg, Pyszczynski, & Solomon, 1986). Ageism acts as a buffer to distance from older people in efforts to protect oneself against the realities of death (Burke, Martens, & Faucher, 2010). The theory is supported by evidence that people who hold high anxieties around ageing are more likely to direct ageist attitudes towards older people (Marques, Swift, Vauclair, Lima, Bratt, & Abrams, 2015) and people who associate illness with ageing were more likely to disassociate themselves with old age (e.g., believing Covid-19 is only a threat to older adults predicted feeling younger; Terracciano et al., 2021).

Intergroup threat theory posits that people can react with hostility towards those who are not a member of their social group, to strengthen membership towards their own group and protect against any perceived threats (Stephan, Ybarra, & Rios, 2016). This theory may be supported by the mostly positive evidence for the role of intergroup contact as an intervention strategy to reduce bias (see Table 11.1 for intervention studies which have used intergroup contact as a strategy to reduce bias). However, this theory does not clearly align with stereotypes towards older people, who are not typically characterised as threatening but as warm and vulnerable (Fiske, 2018).

Stereotype embodiment theory proposes that ageism occurs as people absorb and internalise cultural ageist attitudes from a young age, these attitudes perpetuate ageism and become self-directed as the person reaches old age (Levy, 2009). This theory stems from evidence that negative attitudes towards ageing predicts poorer health in older age (see section 4.6.4 for supporting evidence).

### 4.3. Evidence of age bias

Much of the research on ageism and attitudes towards ageing is dated, inconclusive, and incomplete, with reviews calling for more and better research (World Health Organisation, 2021). A global systematic review on the impact of ageism on health found in 96% of studies ageism was associated with poorer health outcomes for older adults (Chang, Kannoth, Levy, Wang, Lee, & Levy, 2020).

Ageism is present in the workplace, with employers less likely to hire older job applicants, older employees less likely to be offered training and promotion opportunities, and older employees who faced age discrimination more likely to retire early (Truxillo, Finkelstein, Pylovany, & Jenkins, 2015; Harris, Krygsman, Waschenko, & Laliberte Rudman, 2018). Older people experience stereotyping and prejudice in the workplace, with beliefs that older employees are less able to use technology, harder to train, and less willing to work hard (Kluge & Krings, 2008). Ageism is also present in media representations: characters perceived as older were underrepresented and typically held minor comic roles centred around physical or cognitive decline (Makita, Mas-Bleda, Stuart, & Thelwall, 2021).

Ageism can increase social isolation amongst older adults (Chang, Kannoth, Levy, Wang, Lee, & Levy, 2020), which is a predictor for cognitive decline, dementia, and mortality (Wilson et al., 2007; Holt-Lunstad, Smith, & Layton, 2010). An older person who is stereotyped and discriminated against may withdraw from social roles. Some older people who hold negative attitudes about their own ageing may also feel they are supposed to experience social isolation (Courtin & Knapp, 2017). There are also features of our living environment which may disproportionately hinder older people from engaging socially (Shiovitz-Ezra & Shemesh, 2018). For example, during the easing of Covid-19 lockdown restrictions public toilets remained closed, overlooking the disproportionate isolation this imposed for some, most affecting pregnant women, disabled people, and older people (Pfefferbaum & North, 2020; Steinman, Perry, & Perissinotto, 2020; Tyrrell & Williams, 2020).

#### 4.4. Covid-19- a renewed focus on ageism

A renewed focus on ageism and age-related disparities was sparked in 2020 by the coronavirus pandemic which exposed and magnified existing inequalities within the UK (Ayalon et al., 2020; Swift & Chasteen, 2021). Black people were more likely to die than white people, poor than rich, and old than young (Gov UK, 2020). Years of austerity measures starved the NHS and social care system of resources which led to many unnecessary deaths, disproportionately affecting older people (Marmot, Allen, Goldblatt, Herd, & Morrison, 2021).

Responses to the pandemic repeatedly highlighted older adults were undervalued and neglected. There was evidence of age-based rationing of life support ventilators and beds (White & Lo, 2020). Older people were contacted by their GPs and pressured to sign do not resuscitate orders (Age UK, 2021). The UK government overlooked and failed to protect older people in care homes: almost half the deaths from Covid-19 were care home residents; 25,000 older people were moved from hospitals to care homes without negative Covid tests, so the virus spread; during PPI shortages priority was given to NHS staff above care staff, and the virus spread further (Amnesty International, 2020; Swift & Chasteen, 2021). The deaths of older people from Covid-19 began to be viewed as less significant and inevitable. Media coverage of the lives lost often gave detailed tributes to younger people, whilst older adult's deaths were counted and summarised (Jimenez-Sotomayor, Gomez-Moreno, & Soto-Perez-de-Celis, 2020). Social media dissemination of messages about Covid-19 and ageing highlighted resentful attitudes towards older people (Monahan, Macdonald, Lytle, Apriceno, & Levy, 2020; Soto-Perez-de-Celis, 2020). Older adults, in particular, were encouraged to stay home, experiencing adverse impacts from social isolation (Age UK, 2021). Older people were disproportionately harmed by the loss of support and limited access to healthcare services, with many reporting a decline to their cognitive, mental, and physical health since the pandemic (Age UK, 2021).

#### 4.5. Gendered ageism

Women are affected by ageism in the workplace at a younger age and with greater consequences than for men. Amongst older workers, women are less likely to be hired and promoted, have poorer access to skills training, and receive less pay (Neumark, Burn, & Button, 2019; Francioli & North, 2021). The gender pay gap extends and amplifies into the gender pension gap, leaving women with higher rates of poverty in old age than men. In the UK, the average woman's pension is one fifth of the average man's (Chartered Institute of Insurance, 2018).

There is a double standard of ageing. Of the 2007 US presidential election, a radio commentator predicted Hilary Clinton would not win because who would want to “watch a woman get older before their eyes” (Carlin & Winfrey, 2009). Women are disproportionately subject to ideals that attractiveness is a quality reserved for youth and appearance is intrinsically linked to self-worth (Chrisler, Barney, & Palantino, 2016; Cecil, Pendry, Salvatore, Mycroft, & Kurz, 2021). Actresses “age out” of lead roles decades before actors (Lemish & Muhlbauer, 2012). There is a market dedicated to encouraging women to purchase beauty products to age “successfully” that is, not at all, an impossible feat, such that as this supposedly fades with age so does their worth (Holstein, 2006).

##### 4.5.1. Gender bias in health

###### ***Historical exclusion of women from clinical trials***

There has been a historical underrepresentation of women from clinical trials, and where women have been included a failure to analyse results by gender, such that disorders which present differently in women are often under or misdiagnosed and disorders which affect mainly women are often less understood (Johnson, Fitzgerald, Salganicoff, Wood, & Goldstein, 2014). The reasons behind excluding women are varied: women's bodies and hormones are too complex, there is a danger that including childbearing women in trials risks harming foetal development, men's bodies are prototypical of humans and findings can be easily transferred (Office of Women's Health, 2019). These contradictory rationales posit

that women are simultaneously too complex to be studied and so similar that any findings may be extended to women with ease, that they should be excluded from clinical trials for their own safety but suffer poorer health outcomes because of exclusions.

Though dated, there have been a series of studies that highlight the lack of women in health research for health issues which either equally, disproportionately, or uniquely affect women. A 1986 study investigating the impact of obesity on uterine and breast cancer did not recruit any female patients (cited in Dresser, 1992, original study not referenced). The US's longest running study on ageing began in 1958 but did not recruit any women until 1978 as there were "no female bathrooms on site" (cited in Casamayou, 2001, p.134, referencing the National Institute on Ageing, 2022). A study into child development of morality recruiting only boys concluded that girls were morally inferior to boys (cited in Chicago Tribune, 1986, original study not referenced). Heart disease is a leading cause of death for both men and women, yet studies into risk factors have repeatedly failed to recruit women; exploring the risks for cholesterol (14,000 men, 0 women), daily aspirin (22,000 men, 0 women), and caffeine consumption (13,000 men, 0 women) (Rimm, Katan, Ascherio, Stampfer, & Willett, 1996; Zmuda, Cauley, Kriska, Glynn, Gutai, & Kuller, 1997; Gaziano & Hennekens, 2014).

### ***Less research for healthcare issues affecting women***

There has been a lack of research into diseases which disproportionately affect women, such as fibromyalgia, endometriosis, and reproductive tract infections. Research has also neglected to consider the impact of female-specific health conditions, for example endometriosis and menopause on aspects of well-being, such as work (Department of Health and Social Care, 2021). There are also areas of health where spending is not reflective of the amount of people affected. For example, there is clear evidence for positive outcomes from increased childbirth and post-partum support, and the leading cause of death for women less than one-year post-partum is suicide, yet only three percent of health spending is allocated to maternity care (Women's Equality Party, 2021). The historical exclusion of women from clinical trials, less research and funding dedicated to healthcare

issues which exclusively or disproportionately affect women have left a legacy of engrained gendered assumptions of women's behaviours and emotions which resonate in the unequal treatment and poorer outcomes experienced by women in many areas of healthcare.

### ***Gender disparities in healthcare***

Health care professionals appear less confident in treating or recognising illnesses in women. Women presenting with identical pain symptoms as men are less likely to be admitted to hospital, receive less extensive testing, and receive less pain medication and less extensive treatment (Samulowitz, Gremyr, Eriksson, & Hensing, 2018). Women reporting severe abdominal pain wait an average of 20 minutes longer than men before being treated and are offered less pain relief medication (Chen et al., 2008). A longitudinal Danish study of seven million patients found that women are diagnosed later than men for over 700 diseases (Gagliardi et al., 2020).

#### 4.5.2. Gendered ageism in health

There are interactions between age bias and other protected characteristics. Adults do not become old and cease to be gay, disabled, black, or female. The impact of ageism on health is more likely to affect older people from disadvantaged groups (Chang, Kanno, Levy, Wang, Lee, & Levy, 2020). There is limited research focusing on gendered ageism in health. Amongst critically ill patients over 50 years old, women are less likely to receive intensive care and certain life-supporting treatments and are more likely to die than male patients (Fowler et al., 2007). The leading cause of death for women over 80 years and men over 85 years is dementia and Alzheimer's disease. Over two-thirds of people with dementia are women, yet women with dementia have less contact with their GP, receive less healthcare interventions, and are more likely to take harmful medication (Cooper et al., 2017).

#### 4.5.3. Gendered ageism in breast cancer

Whilst not exclusively affecting women over 99% of breast cancer patients are female, such that the variations seen for older patients are largely specific to older women. A dimension of gendered age bias specific to the treatment of older women with breast cancer is the perceived importance of body image for older women. Across many cultures, breasts are sexualised and seen as intrinsic to a women's body identity, including in breast cancer awareness campaigns (VanEnkevort, 2014). In our society, older women are desexualised, such that there may be an assumption that their breasts are less important to them. This project focuses on breast cancer treatments for older patients specifically between surgery and primary endocrine therapy (PET) but there are also clear age differences in types of breast surgery from mastectomy, breast conservation surgery, and breast reconstruction surgery (NABCOP, 2021) that may, in part, reflect assumptions that older women care less about the loss of their breasts or health care professionals' assumptions that older women's breasts are "less important".

Another aspect of gender bias within the treatment of breast cancer may be male breast cancer patients. Men with breast cancer face stigma of having a "women's disease", creating barriers in clinical trials, diagnosis, and treatment (Midding, Halbach, Kowalski, Weber, Würstlein, & Ernstmann, 2018). Though beyond the scope of this thesis, there is a clear need for research, campaigns, and advocacy to raise awareness of male breast cancer.

#### 4.6. Age bias in medicine

Bias against older patients is endemic in healthcare within the UK, with negative patient outcomes (Chang, Kanno, Levy, Wang, Lee, & Levy, 2020). Much of this bias is covert and implicit, and as such may often go unrecognised or unquestioned by health care providers and older patients alike. A small but growing body of empirical research is starting to evidence the pervasiveness of age bias in medicine, although evidence for ways to prevent this form of bias remains scant. This section explores areas of healthcare where there is evidence of differential treatment and worse outcomes for older adults.

#### 4.6.1. Exclusion of older people from clinical trials

Despite older people now comprising the main users of the NHS, older adults remain underrepresented in clinical trials compared to disease burden. There has been a historical exclusion of older people from clinical trials due to a combination of direct (e.g., upper age limits) and indirect (e.g., protocol restrictions on comorbid conditions and organ function, and treatment toxicity concerns) discrimination. When data is collected on older patients it is often not disaggregated, typically analysing all responses of those over 65 years old together, which disguises the wide variation amongst older populations (cited in World Health Organisation, 2021, pg. 30). This has exacerbated disparities in healthcare treatment due to inadequate treatment guidelines for appropriate age management, and an unclear understanding of a treatment's potential benefits, toxicities, and side effects (van Marum, 2020).

An interplay of patient/caregiver, health care provider, and system factors create barriers to prevent proportionate representation of older patients in clinical trials. Health care providers hold an intrinsic role in whether patients are offered a clinical trial (Sedrak et al., 2019). Health care providers' reported barriers to recruiting older patients included stringent eligibility criteria, concerns related to toxicity, and perceiving older patients as less able to understand complicated trial protocols (Hamaker et al., 2013; McCleary et al., 2018). There is no age-related difference in the likelihood to wish to participate in clinical trials, the reasons for accepting (three most cited are: to improve their health, help find a cure for cancer, and wanted the latest treatment), or reasons for declining (three most cited reasons are: wanted to choose their own treatment, did not want the treatment on offer, did not want to be part of an experiment) (Kemeny et al., 2003).

There is a clear need to increase inclusion of older people in clinical trials. The underrepresentation of older adults in studies on which guidance is based and clinicians' subsequent deviation from guidance when treating older adults, highlights the complexity of age bias in healthcare treatment. It raises a fundamental question of whether clinicians' adopting an age differentiated approach based on personal preference and experience

represent a more or a less ethical approach than following guidance derived from clinical trials which failed to include key population groups.

#### 4.6.2. Resources

Age bias in the allocation of resources exists in two forms. Firstly, some health services are divided by age bands, in which the resources, both financial and in terms of access to services and specialists, are reduced in services for older patients. Secondly, there are fewer resources and less funding for services that disproportionately affect older people.

There is evidence that age discrimination exists in healthcare systems at an institutional level, sometimes reflected in formal policy. A European Commission study found that older adults have reduced access to necessary healthcare and are in danger of “falling through the safety net” of public healthcare coverage programmes (Goddard, 2008). In Greece, there is a policy that stroke patients over 65 years old should be sent to a general internal medicine ward whilst younger patients should be sent to a specialist stroke service (Theofanidis, 2015). In Finland, people over 65 years old are not provided coverage for medical rehabilitation following a stroke, despite guidelines for standard functional rehabilitation in stroke recovery (cited in Europe, 2016) and research that stroke recovery is not age-dependent if appropriate care is received (Saposnik, Kapral, Coutts, Fang, Demchuk, & Hill, 2009). There are various institutional practices that indicate less value is placed on the life of an older person. In the US, Medicare health insurance does not reimburse comprehensive outpatient geriatric care or part-time custodial care at home for frail older people (Boult, Boult, Morishita, Dowd, Kane, & Urdangarin, 2001). In the UK, there are upper age limits to routine screening invitations for breast (69 years) and bowel (64 years) cancer and vascular diseases (74 years), yet these diseases are all most prevalent in older populations (breast cancer: >90 years, bowel cancer: 85-89 years, strokes: >75 years; Cancer Research, 2021).

There is an under detection of illness and under provision of services in mental healthcare for older adults (Royal College of Psychiatry, 2018). Whilst 25% of public mental hospital

admissions are over 65 years, only three percent of the National Institute of Mental Health research funding is spent on mental health in older people (Department of Health and Social Care, 2013). Despite government pledges to achieve parity between mental and physical healthcare services, reports indicate continual decline of already underfunded mental health services for older adults (Joint Commissioning Panel for Mental Health, 2013; Nilforooshan, Benson, Gage, Williams, Zoha, & Warner, 2016; Faculty of Old Age Psychiatry, 2017; Gilbert, 2018). Eighty five percent of older people with mental health conditions do not receive help from the NHS (Burns & James, 2015, cited in Royal College of Psychiatry, 2018). Mental health services are organised by age. Adult mental health services are branched into specialties (e.g., depression, substance abuse etc). In many areas of the UK, older adults experiencing mental health issues are automatically transferred to generic services for older people based on age, not need. Older adult mental health centres are poorly provisioned compared to mental health services for working age adults (Mind, 2005; Mental Health Foundation, 2009). Around 60% of care home residents have dementia, and almost 30% of adults living in care homes have depression (McDougall, Matthews, Kvaal, Dewey, & Brayne, 2007), but fewer than eight percent of care staff have received psychological or psychiatric care training (Mozley et al., 2004), and only 12% of care homes have direct access to a psycho-geriatrician (Glendinning, Jacobs, Alborz, & Hann, 2002). There is also evidence that older people have reduced access to sexual health services. UK psychiatrists were less likely to take older patients' sexual health history, potentially having damaging implications for early detection of sexually related conditions for older patients (Boumen & Arcelus, 2001). Older people are also less likely to seek medical help for sexually related conditions, through a combination of reduced awareness, lack of access to appropriate services, and fear of stigma (Minichiello, Rahman, Hawkes, & Pitts, 2012).

There is also evidence that medical conditions which disproportionately affect older people receive fewer resources, research, and focus. These conditions include falls, osteoporosis, and incontinence (Clough et al., 2007; Mayor, 2008; Oliver, 2008; Wagg, Potter, Peel, Irwin, Lowe, & Pearson, 2008). Older people are less likely than younger people to receive advice or be targeted for health campaigns on smoking cessation, alcohol use, and weight loss, despite it being no less prevalent or having fewer health consequences in older age (Kerr,

Watson, Tolson, Lough, & Brown, 2006; Menichetti, Cipresso, Bussolin, & Graffigna, 2016). End of life care may be worse for much older people, and this can be partially explained as more advanced palliative care services tend to be directed at patients with a cancer diagnosis, which is not the most common cause of death for much older people (Davies, Higginson, & World Health Organization, 2004).

Community services that disproportionately benefit older adults have seen funding repeatedly cut, such that there are an increasing number of older people not receiving the help they need (Humphries, Thorlby, Holder, Hall, & Charles, 2016). Adult social care services are rationed and allocated by four risk bands- critical, substantial, moderate, and low- with over half of councils restricting resources to the highest two bands (Department of Health, 2008). The implication is that there are many older adults in the lowest risk bands not receiving the support needed for maintaining independence, control, and reducing health risks (Raynes, Clark, & Beecham, 2006). Over 1.6 million people in the UK who have difficulties with essential living activities receive no help (e.g., independently washing and dressing or getting out of bed; Banks et al., 2021). Social care is characterised by an ethos of encouraging independence and choice, control over daily living, and equal access and opportunities (Office for Disability Issues, 2008), yet social care systems for older adults have historically neglected the importance of social needs, wellbeing, and active involvement (Age Concern England, 2007; Bowers et al., 2009). Health and social care improvements mean increasing numbers of people with learning disabilities are living into older age. However older peoples' services have limited resources to focus on the extended support people with learning disabilities often need to create and maintain social relationships, leaving them isolated (Blackman, 2007).

#### 4.6.3. Cancer treatments

Amongst an ageing population, incidence rates of cancer in older adults are growing. Older adults are more likely to experience cancer-related deaths as compared to younger adults beyond that which can be explained by frailty, comorbidities, or tumour biology (Quaglia et

al., 2009; Coleman et al., 2011; De Angelis et al., 2014). Whilst over a third of cancers are diagnosed in people over 75 years old, older adults are less extensively investigated, more likely to have a delayed diagnosis, and receive less treatment (Macmillan, 2012). Delays in diagnosis and subsequent advanced stage of disease upon diagnosis increase the likelihood of older adults presenting with more aggressive tumours. Yet older adults with cancer tend to be undertreated often not receiving curative therapy, with evidence that this is leading to poorer outcomes (Lawler, Selby, Aapro, & Duffy, 2014). Reluctance in major elective surgery, alongside delays in diagnosis and referral, often mean older people are subject to emergency surgery which has a disproportionately higher risk in older age (Preston, Southall, Nel, & Das, 2008).

In the UK, adults over 75 years old accounted for 49% of deaths caused by lung cancer (Cancer Research UK, 2021e), 58% of deaths caused by bowel cancer (Cancer Research UK, 2021f), and 75% of deaths caused by prostate cancer (men) (Cancer Research UK, 2021g). Older patients with lung cancer are less likely to be referred for surgery, despite clinical evidence that post-operative outcomes for major elective surgery are equally beneficial for older and younger patients (Peake, Thompson, Lowe, & Pearson, 2003). Older patients with colon cancer are less likely to be treated with preoperative radiotherapy, which has been evidenced to reduce local recurrence and is considered the gold standard in treatment (Elliot et al., 2014; Hayes et al., 2019). Older patients with colon cancer are also less likely to receive adjuvant chemotherapy (Hubbard & Jatoi, 2011). Of patients which do undergo chemotherapy most stop treatment within three months, likely because of the exclusion of older patients from clinical trials leaving treatment benefits and toxicities less understood amongst older adults. Older patients with prostate cancer are less likely to receive chemotherapy, despite clear survival benefits (Aapro, 2012). Clinicians cite a concern for the ability of older patients to cope with the associated toxicities of chemotherapy, yet most older patients wish to receive chemotherapy and are willing to accept treatment risks (Extermann et al., 2003).

#### 4.6.4. Own age bias and health

Older people are not a marginalised group in the same way that may apply to some other minoritised population groups, in that old age is something most of us will experience. Internalisation of age stereotypes is embodied over the course of a lifetime, such that once a person reaches old age, they are faced with stereotypes that they may have endorsed and perpetuated in previous years.

Research overwhelmingly supports a link between negative self-perceptions of ageing and poorer health outcomes which include poorer life expectancy, quality of life, and social relationships, a greater propensity to engage in risky health behaviours, and increased likelihood of mental, cognitive, and physical illnesses (Top, Eriş, & Kabalcioğlu, 2012; Sargent-Cox, Anstey, & Luszcz, 2014; Sutin, Stephan, Carretta, & Terracciano, 2015; Villiers-Tuthill, Copley, McGee, & Morgan, 2016; Cheng, 2017; Han, 2018). There is evidence that a person's perception of ageing when they are young has important consequences for their future health and well-being. People who hold negative attitudes about what it means to grow old are at a greater risk to markers of Alzheimer's disease (Levy, Ferrucci, Zonderman, Slade, Troncoso, & Resnick, 2016), poor cardiovascular health (Levy, Zonderman, Slade, & Ferrucci, 2009), and slower recovery from a disability (Levy, Slade, Murphy, & Gill, 2012).

There is also evidence that exposure to negative age stereotypes amongst older people reduces healthy ageing: older people who are exposed to negative age stereotypes have worse memory performance and hearing, heightened cardiovascular response to stress, an increased risk of obesity, and a weakened will to live (Levy, Slade, & Gill, 2006; Levy and Liefheit-Limson, 2009; Levy & Slade, 2019). Older people who more readily associate ageing with illness are less likely to seek medical advice, attributing pain as an inevitable and incurable consequence of ageing (Stewart, Chipperfield, Perry, & Weiner, 2012; Makris et al., 2015; Levy, Provolò, Chang, & Slade, 2020). Conversely, exposure to positive age stereotypes amongst older people may buffer against health issues: older people with positive views on ageing are less likely to have depression, anxiety, PTSD, dementia, and

perform better on long-term cognition, (Levy, Slade, Pietrzak, & Ferrucci, 2018; Levy, Chung, Slade, Van Ness, & Pietrzak, 2019; Smith, Desai, Slade, & Levy, 2019).

#### 4.6.5. Care provider attitudes

There is evidence that health care providers' beliefs about and attitudes towards older people influences the care and treatment of older patients. Though there are perceptions that health care professionals hold ageist attitudes towards patients, reviews have concluded that attitudes are varied, complex, and contradictory, and the paucity of studies have been inconclusive (de Sao Jose & Amado, 2017; Rush, Hickey, Epp, & Janke, 2017; Wilson, Nam, Murphy, Victorino, Gondim, & Low, 2017).

Health care workers are trained to cure, but many chronic conditions which disproportionately affect older adults cannot be cured. Health care workers appear to receive less training, and are less willing, to work with older patients (Meisner, 2012; Liu, Norman, & While, 2013; Meiboom, de Vries, Hertogh, & Scheele, 2015; Bodner, Palgi, & Wyman, 2018). Health care professionals tend to spend less time talking to older patients and do not always have a good understanding of their needs and abilities (Nussbaum, Baringer, & Kundrat, 2003; Billings, 2006). Nursing students tend to view geriatric nursing as lower status than other areas of practice (Wells, Foreman, Gething, & Petralia, 2004). Older patients' concerns are viewed as less important (Dawson, Sellers, Spross, Jablonski, Hoyer, & Solomon, 2005), and clinicians are more likely to bypass older patients in making medical treatment decisions (Ambady, Koo, Rosenthal, & Winograd, 2002). A UK study found over half of adults over 60 years believed that health care providers regard symptoms as an inevitable consequence of old age (Help the Aged, 2009).

Age-related assumptions fuel disparities in access to mental healthcare. Many health care professionals are unwilling to talk with older people, particularly men, about mental health through assumptions it will make patients uncomfortable (Collins & Corna, 2018). Poor mental health is often seen as an inevitable consequence of ageing which would not require

or benefit from targeted intervention (Collins & Corna, 2018). Clinicians are less likely to recognize, refer, and treat depression and suicide-risk in older adults, despite higher prevalence of suicide and equal treatment efficacy compared to younger adults (Centre for Policy on Ageing, 2009). Many health care professionals assume older people are less likely to engage with and benefit from therapy (Frost, Beattie, Bhanu, Walters, & Ben-Shlomo, 2019), despite evidence that older people are more likely to engage with and benefit from mental health services when it is offered to them than younger adults (NHS digital, 2017).

Age is the strongest risk factor for dementia and early detection is strongly related to better disease management (WHO, 2021). Yet a survey of UK GPs found that almost half felt it unimportant to actively look for early signs of dementia, that early diagnosis was not beneficial, and over half felt they had insufficient training to diagnose and manage dementia (Audit Commission for Local Authorities and the National Health Service in England and Wales, 2000). Age is also central to GP referral decisions for suspected Parkinson's disease for a specialist assessment: 94% of GPs refer all patients 50 years and under, whilst 58% of GPs refer all patients over 71 years (Thomas & MacMahon, 2002).

There is evidence that negative communication between health care professionals and older breast cancer patients has a direct negative effect on the patients' health and quality of life (Mandelblatt, Figueiredo, & Cullen, 2003; Yeom & Heidrich, 2009), and conversely positive communication between health care professionals and patients leads to increased cooperation in medical treatment (Zolnieriek & DiMatteo, 2009), higher satisfaction with care (Boissy et al., 2016), improved health literacy and health outcomes (Tavakoly Sany, Behzhad, Ferns, & Peyman, 2020). Health care professionals tend to communicate more insensitively (using more patronising and infantile language) (Ben-Harush, Shiovitz-Ezra, Doron, Alon, Leibovitz, & Golander, 2016) offer more simplified information (Nussbaum, Baringer, & Kundrat, 2003; Siminoff, Graham, & Gordon, 2006), and make assumptions about older patients' preferences and capabilities (Lagace, Tanguay, Lavallee, Laplante, & Robichaud, 2012). A review of acute-care nurses' attitudes towards older patients found that older patients were offered less independence, fewer opportunities for decision

making, less health education, and nurses showed less understanding of age-related needs (Courtney, Tong, & Walsh, 2000).

Age bias may be increasingly prevalent in the current UK medical climate, whereby NHS restrictions in funding are putting health care professionals under pressure to spend less time with patients in general with potential disproportionate impact on those with complex medical conditions (Robertson, Wenzel, Thompson, & Charles, 2018). The National Audit Office (2016) estimates a shortfall of 50,000 clinical staff in England. Under time pressures and cognitive demands, people are more likely to use stereotyping shortcuts (Burgess et al., 2014). There is also evidence that levels of prejudice increase under economic strains (Krosch & Amodio, 2014; Johnston & Lordan, 2016). Medical professionals' main reasonings for differential treatment towards older patients are 1) concerns over older patients' ability to tolerate more intensive treatments, 2) frustration with guidelines, and 3) time constraints (Skirbekk & Nortvedt, 2014). Health care providers tend to discourage independence amongst older patients, praising patients when they accept assistance with daily activities, citing time constraints as a major reason not to encourage independent behaviours, such as changing an older patient themselves rather than help them to and from the bathroom (Ben-Harush et al., 2016).

#### 4.7. My contribution

##### ***Conclusions from Part One***

Despite the UK 2010 Equality Act promoting equality of opportunity and protection against unfair treatment, and national guidelines to treat patients with breast cancer "irrespective of age", older women with breast cancer are often treated outside clinical guidelines. Older women experience the highest incidence of breast cancer and inferior survival rates independent of risk for other-cause mortality and tumour characteristics. Whilst cancer treatments are associated with potentially distressing side effects and complications, concerns remain as to whether the differences in the treatment of older women with breast cancer are a consequence of patient choice, comorbidities, tumour and biological

characteristics, or whether older women are being unfairly excluded from access to effective evidence-based treatments utilised in their younger counterparts.

A wide body of research has demonstrated the prevalence of implicit bias which reflects and perhaps perpetuates group inequalities. It is also clear that age bias is pervasive across society. In an ageing population, age bias in health care affects more people than ever before. The differential treatment of older people in medicine is likely the result of a lack of research and trials into the study of ageing in medicine and underinvestment in geriatric medicine resources and education. These have led to absent or unclear guidelines, a poor understanding of older age, and a possible reliance on age-related stereotypes.

***This thesis***

This thesis makes an original contribution to the field of the differential treatment of older women with breast cancer, which until now has focused on the existence of unexplained treatment variations but has rarely considered the role of age bias in these variations. This thesis explores 1) the contribution of age bias to the undertreatment of older women with breast cancer, and 2) possible interventions to reduce the role of age bias in treatment decision for older breast cancer patients.

The focus of this thesis is framed in these two primary research questions: Is there evidence of age bias in breast cancer health care professionals' treatment of older patients? Do interventions to address age bias lead to better quality decision making for the treatment of older women with breast cancer?

Study One focused on establishing whether there is evidence of age bias amongst breast cancer health care professionals. There is a growing body of research demonstrating that the differential treatment of older women with breast cancer is beyond that which can be explained by patient choice, patient health, and tumour characteristics. Additional studies

indicate that clinician preference is an important factor influencing treatment recommendation. There have also been studies indicating that whilst clinicians deny the influence of age, patient age is a significant influencer of clinician recommendation (Caldon, Walters, Ratcliffe, & Reed, 2007; Morgan et al., 2017). The first empirical study aimed to extend the area of investigation by examining the role of age bias in health care professionals' treatment of older breast cancer patients. The study concluded that there are age biases amongst clinicians, some of which may be unconscious, but a lot of it is based on clinicians' views on what is best for the patient- views which are not necessarily in line with the evidence.

Having established that clinicians' age bias is a likely factor in differential outcomes, Studies Two and Three trial age bias interventions to improve decision making for the treatment of older women with breast cancer. Bias training has become common place amongst numerous organisations aiming to improve social equality. Yet the few evaluations of these interventions have mostly seen small or negative effects. Study Two evaluates The Age Gap decision aid, developed to help decision making amongst clinicians and patients for older breast cancer patients, as a tool to help reduce age assumptions in clinicians' decision making. Study Three explores the effects of a novel bias intervention on medical students' decision making for older breast cancer patients. These are presented and explored in detail in Part Three.

## PART TWO: STUDY ONE

Is there evidence of age bias in breast cancer health care professionals' treatment of older patients?

## 5. Study One: methodology

### 5.1. Study aims

This study aimed to confirm, qualify, and extend upon the existing body of research in this field. The specific aims were:

1. To replicate findings that, despite guidelines stating operable breast cancer patients should be treated “irrespective of age” (NICE, 2009; NICE, 2018), patient age exerts an independent influence on treatment recommendations (Caldon, Walters, Ratcliffe, & Reed, 2007; Morgan et al., 2017).
2. To identify whether health care professionals involved in the treatment of older breast cancer patients hold implicit and explicit age biases.
3. To explore whether there is a relationship between measures of health care professionals’ implicit age bias and indications of age bias in their treatment recommendations.

### 5.2. Study objectives

The objectives of the study were:

- To collect multiple measures of breast cancer health care professionals’ age bias, through implicit, explicit, and decision bias.
- To compare breast cancer health care professionals’ treatment recommendations for older and younger patients.
- To explore relationships between breast cancer health care professionals’ implicit age bias and treatment decisions.

### 5.3. Research question

Is there evidence of age bias in breast cancer health care professionals’ treatment of older patients?

## 5.4. Hypotheses

This study tested four hypotheses:

1. Participants will hold implicit bias against older women.
2. Participants will deviate from standard treatment more for older patients compared with younger patients (decision bias).
3. There will be a positive association between participants' implicit bias and decision bias.
4. Participants will not voice explicit bias against older breast cancer patients.

## 5.5. Study design

Breast cancer health care professionals were invited to take part in an online survey (see Appendix A for full copy of the survey presented). The survey covered three components:

1. An adapted age Implicit Associations Test (IAT) to measure participants' implicit age bias.
2. A set of age-related assumptions in breast cancer treatment designed to consider explicit age bias.
3. A series of paired scenarios of older and younger breast cancer patients, for which participants were asked to recommend a primary treatment between surgery or primary endocrine therapy (PET), intended to measure decision bias.

## 5.6. Materials

### 5.6.1. Age Implicit Associations Test

Implicit biases towards various social groups have been measured using IATs. The IAT uses latency measures in a pair sorting task to assess the strength of automatic associations between target categories and evaluations (Greenwald, McGhee, & Schwartz, 1998) (see Table 5.1). People tend to be faster to pair commonly held stereotypes (e.g., *men* with *work* and *women* with *home*), and negative attributes with socially disparate groups, (e.g., *bad* with *black people*).

**Table 5.1**

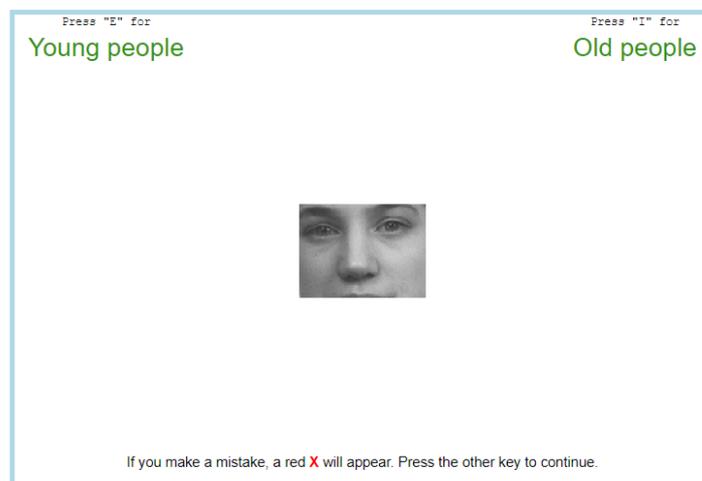
***Age IAT design***

	E- Left Positive/Young	Compatible	I- Right Negative/Old
Block sequence			
Practice target			
Practice category		Good Awful	
Practice and critical combined			
	Negative/Young	Incompatible	Positive/Old
Practice category		Joyful Horrible	
Practice and critical combined		Wonderful 	

The age IAT for this study presents six target photographs of older female faces and six target photographs of younger female faces, eight positive attribute words and eight negative attribute words (see Figure 5.1).

**Figure 5.1**

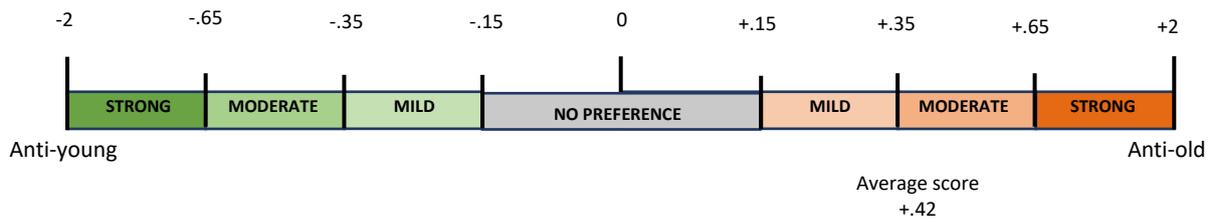
***Age IAT example***



The Harvard Age IAT (Greenwald, McGhee, & Schwartz, 1998), completed by 1.3 million people and 2,803 health practitioners, mostly in the US, between 2002 and 2020, indicates people have a moderate preference for younger faces, that is they are faster to pair *young* with *good*, and *old* with *bad* (see Figure 5.2). There has yet to be an IAT which considers age associations specifically towards women.

**Figure 5.2**

***The Harvard age IAT scoring***



5.6.2. Explicit age bias

A questionnaire on age-related assumptions in breast cancer treatment and opinions around the treatment of older breast cancer patients was used to collect participants' views on older patients' preferred decision making involvement, clinical trial involvement, and treatment outcome priorities. It also assessed participants' views towards treatment toxicities for older patients and treating older patients with dementia, and participants' perceptions of age bias in breast cancer treatment and clinical guidelines for older patients (see Table 5.2). As there is no reliable measure of explicit age bias in breast cancer treatment, these statements were created based on key topics identified in the relevant literature with input from breast cancer clinicians.

Table 5.2

**Statements of age-related assumptions about breast cancer patients**

<b>Statements</b>	<b>Reasons for inclusion</b>
<b>What older patients want</b>	
1. It is unlikely that an older patient will want to consider treatment options which are likely to impact on their quality of daily living	Breast cancer health care professionals hold varied opinions about older patients' treatment priorities (Morgan et al., 2015).
2. An older patient will be unlikely to take an active role in decision making for their breast cancer treatment	Health care professionals hold assumptions about older patients' decision making preferences (Rowlands, Shaw, Jaswal, Smith, & Harpham, 2017).
3. An older patient is less likely than a younger patient to want to take part in a clinical trial	The exclusion of older breast cancer patients from clinical trials is often cited as a key contributor to treatment variations (Denson & Mahipal, 2014; Hamaker, Stauder, & van Munster, 2014).
<b>How participants treat older patients</b>	
4. It takes too long to explain different treatment options to older patients	Some health care professionals find treating older patients frustrating (Meisner, 2012; Liu, Norman, & While, 2013; Meiboom, de Vries, Hertogh, & Scheele, 2015).
5. An older patient will not be able to tolerate the toxicities associated with more aggressive breast cancer treatments	Breast cancer health care professionals hold varied opinions about the role of comorbidities in treating older patients (Morgan et al., 2015).
6. In patients with lack of capacity due to dementia, my preference is to avoid surgical treatment in order to minimize patient distress	Breast cancer health care professionals hold varied opinions about older patients' treatment priorities (Morgan et al., 2015; McWilliams et al., 2018).
<b>Perceptions of age bias in breast cancer treatment</b>	
7. In my view, assumptions about older patients bias the breast cancer care they receive	To understand breast cancer health care professionals' own perceptions for the role of age bias in breast cancer treatment.
8. There have been cases when age-related assumptions may have influenced my treatment decisions for older patients	
9. Current clinical guidelines are appropriate for breast cancer care for older patients	

### 5.6.3. Decision age bias

A Discrete Choice questionnaire was used to identify changes in treatment recommendation associated with age. Discrete Choice Experiments are a quantitative technique increasingly used in healthcare to elicit preferences from participants without directly asking them their preferred option. Participants are presented with a series of scenarios and asked to select their preferred choice between two or more scenarios in which key features have been varied. The patient scenarios were presented as vignettes, in which respondents view successive patients with varying characteristics to determine how different patient characteristics are prioritized by clinicians when recommending treatments (Caldon, Walters, Ratcliffe, & Reed, 2007; Morgan et al., 2017). The patient characteristics were age, comorbidities, cancer stage, and cancer biology. The treatment options were primary endocrine therapy, surgery, or prefer both options equally (see Table 5.3). The rationale for focusing on PET versus surgery was the clear change in management for older patients compared to younger patients. This goes against national guidance that patients should be treated “irrespective of age, with surgery and appropriate systemic therapy, rather than endocrine therapy alone, unless significant comorbidity precludes surgery” (NICE, 2009; NICE 2018). Other breast cancer treatment options (mastectomy versus breast conservation, breast reconstruction, adjuvant therapies) also show age-dependent variation but the patterns are more complex. Much of the variation amongst other breast cancer treatment options may be explained by the exclusion of patients from clinician trials leading to a lack of evidence base. In contrast, there is evidence that elective surgery amongst older patients is safe (Morgan, Wyld, Collins, & Reed, 2014).

**Table 5.3*****Patient scenario variables and levels***

Variables	Levels
Patient age (years)	60-64 65-69 70-74 80-84 85+
Comorbidity	None Mild Moderate/ well controlled Severe
Cognition	None Mild Moderate Severe
Cancer stage	Small, node- (small tumour, no nodal involvement) Small, node+ (small tumour, nodal involvement) Large, node- (large tumour, no nodal involvement) Large, node+ (large tumour, nodal involvement)
Cancer biology	ER++/ HER2- (ER strongly positive, HER2 negative) ER+/ HER2- (ER moderately positive, HER2 negative) ER+/ HER2+ (ER moderately positive, HER2 positive)

Morgan et al.'s (2017) study evidenced age as an independent predictor of treatment recommendations for older breast cancer patients. This study used 34 scenarios: Morgan et al.'s (2017) 17 scenarios and 17 younger counterparts, to compare treatment recommendations where all else is equal except the patients age (see Table 5.4). Younger (60-69 years) and older (70+ years) patients were compared by creating identical scenarios using four different age groups: 1) 60-64 years old compared with 70-74 years old, 2) 60-64 years old compared with 75-79 years old, 3) 65-69 years old compared with 80-84 years old, and 4) 65-69 years old compared with 85+ years. Although breast cancer is common in patients younger than 60 years old, it was decided that 60 years old was the reasonable cut-off point for considering PET.

Previous similar studies indicated that the reasonable maximum each participant could be expected to complete was up to 25 scenarios with five varying characteristics (Caldon, Walters, Ratcliffe, & Reed, 2007; Walters et al., 2011; Morgan et al., 2017). Each participant viewed 23 scenarios: Morgan et al.'s (2017) original 17, interspersed with six randomly presented younger counterparts (see Figure 5.3).

**Table 5.4*****Patient scenarios***

Scenario	Patient age		Comorbidity	Cognitive impairment	Cancer size	Cancer biology
	Older	Younger				
1	85+	65-69	Severe	None	Small, node negative	ER+, HER2+
2	85+	65-69	None	Severe	Small, node positive	ER++, HER2-
3	70-74	60-64	Severe	Normal	Large, node negative	ER+, HER2+
4	80-84	65-69	None	Moderate	Small, node negative	ER+, HER2+
5	70-74	60-64	None	Severe	Large, node negative	ER+, HER2-
6	85+	65-69	Moderate	Moderate	Large, node negative	ER++, HER2-
7	75-79	60-64	Moderate	None	Large, node positive	ER++, HER2-
8	80-84	65-69	Moderate	Mild	Small, node negative	ER+, HER2-
9	85+	65-69	None	Mild	Large, node positive	ER+, HER2+
10	70-74	60-64	Mild	Moderate	Large, node positive	ER+, HER2-
11	70-74	60-64	None	None	Large, node positive	ER+, HER2-
12	85+	65-69	Mild	None	Small, node negative	ER+, HER2-
13	80-84	65-69	None	None	Small, node positive	ER+, HER2-
14	70-74	60-64	Moderate	None	Small, node positive	ER+, HER2+
15	70-74	60-64	None	None	Small, node negative	ER++, HER2-
16	75-79	60-64	None	Mild	Large, node negative	ER+, HER2-
17	80-84	65-69	Mild	None	Large, node negative	ER++, HER2-

**Figure 5.3*****Example patient scenario***

PATIENT AGE (YEARS)	85+		
CO-MORBIDITY	NONE		
TUMOUR STAGE	SMALL TUMOUR, NODE POSITIVE		
BREAST CANCER BIOLOGY	ER++ / HER2-		
COGNITIVE FUNCTION	SEVERE IMPAIRMENT		
For Operation	<input type="checkbox"/>	For PET	<input type="checkbox"/>
Prefer both equally	<input type="checkbox"/>		

**5.7. Data analysis****5.7.1. Participants will hold implicit bias against older women.**

The age IAT was created in the web interface IATGEN (Carpenter et al., 2017) and uploaded directly into a custom built Qualtrics survey. The IAT displays seven randomised blocks consisting of practice trials, and critical compatible and incompatible trials. The IAT presented six target photographs of older female faces, six target photographs of younger female faces, eight positive attribute words, and eight negative attribute words. As participants took the IAT, a running trial-by-trial tally was calculated of the difference on average between the time taken to sort the words in the compatible trial compared to the incompatible trial (*D*-score) (i.e., as a measure of bias where items are paired faster to the same response key if the concepts are closely related, in this case considering implicit associations of older women with negative attributes). The *D*-score ranged from -2 to +2, configured so that positive scores represented an implicit bias against older women and negative scores represented a negative bias against younger women and minus scores represent an implicit bias against younger women.

**5.7.2. Participants will deviate from standard treatment more for older patients compared with younger patients.**

A binomial logistic model was fitted in SPSS to analyse the effects of patient age, alongside other patient characteristics (cancer size, cancer type, comorbidities, and cognition), on the participants' treatment preference. The binomial logistic regression predicts the probability that participants will be less likely to recommend surgery versus other treatments (PET or equal preference) for the older patients as compared to the younger patients.

5.7.3. There will be a positive association between participants' implicit bias and decision bias.

An implicit bias score and decision bias score was calculated for each participant. The implicit bias score was calculated as the standardised difference between how long it took participants to pair older women with positive attributes and older women with negative attributes. The decision bias score was calculated as the difference between the number of times surgery was recommended for older patients compared to younger patients, in keeping with national guidance that breast cancer patients should be treated "irrespective of age, with surgery and appropriate systemic therapy, rather than endocrine therapy alone, unless significant comorbidity precludes surgery" (NICE, 2009; NICE 2018). A Pearson's correlation test was done in SPSS to analyse the direction and strength of any relationship between implicit bias and decision bias scores.

5.7.4. Participants will not voice explicit bias against older breast cancer patients.

Likert responses (five points ranging from *strongly disagree* to *strongly agree*) to the statements about older patients were analysed in SPSS using descriptive statistics.

## 5.8. Ethics

Research ethics approval was obtained from the Brighton and Sussex Medical School, Research Governance and Ethics Committee. The project reference is ER/BSMS9DV8/1 (see Appendix B for copy of ethics approval).

## 6. Study One: results

### 6.1. Overview

This study tested four hypotheses:

Hypothesis	Result
1. Participants will hold implicit biases against older people.	✓
2. Participants will undertreat hypothetical older patients as compared to their younger counterparts.	✓
3. There will be a positive association between participants' implicit bias and their decision bias.	✗
4. Participants will not voice explicit bias against older breast cancer patients.	?

The following section explains the results for each of these hypotheses in turn and then presents additional findings of interest which were not central to the research question.

### 6.2. Participants

#### 6.2.1. Sample size

Thirty-one respondents completed the entire study. An additional 14 participants completed the Discrete Choice Experiment, but not the age IAT or age-related statements, likely reflecting the overall burden of completing three surveys. Participants were either breast cancer oncologists, nurse specialists, surgeons, or trainee surgeons. Of the respondents who completed demographic information, 16 were female and 15 were male, aged between 33 and 59 years ( $M= 48$ ,  $SD= 7.23$ ).

Sample size calculations estimated that 250 participants would be required to estimate treatment preferences for patient scenarios using a 95% confidence interval. However, based on similar studies with similar recruitment methods available and given the challenges of recruiting clinicians, I had hoped to obtain around 100 participants (Caldon, Walters, Ratcliffe, & Reed, 2007; Morgan et al., 2017). Despite numerous recruitment methods, study uptake was less than anticipated. The reason for low uptake is unknown but

is likely related to the inability to contact participants directly (post GDPR) compared to previous similar studies. Previous similar studies (Caldon, Walters, Ratcliffe, & Reed, 2007; Morgan et al., 2017) were able to directly email members of relevant associations whereas post GDPR we were only able to highlight on websites/ newsletters. Follow up recruitment attempts coincided with the beginning of the Covid-19 pandemic which likely had a significant impact on response rates.

#### 6.2.2. Selection

This study was promoted to members of Bridging the Age Gap, National Association of Breast Cancer in Older Patients' newsletter, the Association of Breast Surgery's trial endorsement, colleagues at the National Cancer Research Institute, and attendees of Brighton Breast Day conference and the International Society of Geriatric Oncology conference.

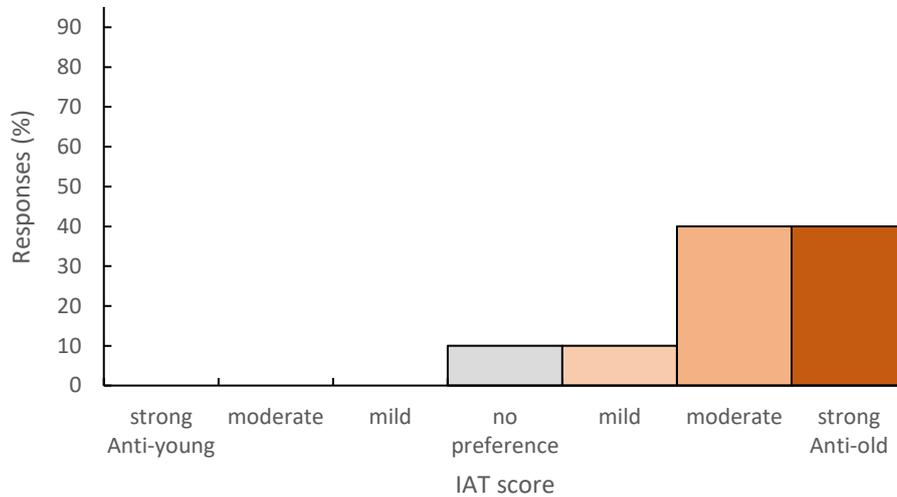
The difficulties of recruiting health care professionals with limited available time were amplified through the onset of Covid-19. This led to seeking participants largely through networks/ contacts/ and supporters of this field. The organisations chosen were selected as project supervisors were often closely involved and could encourage response rate. As most participants were recruited through membership of organisations that are engaged in improving treatment for older breast cancer patients, it is possible that the participants' views, attitudes, and potential bias towards older patients would not be representative of, and likely more positive than, breast cancer health care professionals.

#### 6.3. Hypothesis One: participants will hold implicit biases against older people.

The results showed a significant negative implicit association toward older people. On average, respondents were faster to pair older faces with negative adjectives and younger faces with positive adjectives ( $M = 0.52$ ,  $t(29) = 9.38$ ,  $p < 0.001$ ) as measured using an age

## AGE BIAS IN BREAST CANCER

Implicit Associations Test (IAT). No respondents were “anti-young”, ten percent showed “no preference”, ten percent showed a “mild anti-old” preference, 40% showed a “moderate anti-old” preference, and 40% showed a “strong anti-old” preference. In total, 90% of participants showed an “anti-old” implicit association (see Figure 6.1).

**Figure 6.1*****Participants' implicit age bias scores***

#### 6.4. Hypothesis Two: participants will deviate from standard treatment more for older patients as compared to their younger counterparts.

A binomial logistic regression found participants were significantly less likely to recommend surgery to older patients as compared to identical younger counterparts (see Table 6.1). This was most pronounced for the oldest patients: compared to patients in their 60s, respondents were three percent less likely to recommend surgery to identical patients in their 70s (65% vs 61.86%) and 26% less likely to recommend surgery to identical patients in their 80s (43.33% vs 25.89%) (see Table 6.2). The results also found health care professionals were more likely to recommend surgery for patients with larger tumours and less likely to recommend surgery for patients with increased comorbidities, worse cognition, and strongly hormone-receptor positive tumours.

**Table 6.1*****Likelihood of patient variables to predict surgery versus other treatments***

Patient characteristics		Relative Risk Ratio**	Significance	95% confidence interval	
				Lower	Upper
Cancer size	Small, node-*		.001		
	Small, node+	2.831	.005	1.362	5.886
	Large, node-	1.751	.009	1.151	2.664
	Large, node+	.722	.148	.465	1.122
Comorbidity	None*		.001		
	Mild	.696	.163	.419	1.157
	Moderate	.337	.001	.226	.503
	Severe	.010	.001	.004	.026
Cognitive impairment	None*		.001		
	Mild	.355	.001	.200	.631
	Moderate	.267	.001	.178	.400
	Severe	.020	.001	.010	.040
Cancer biology	ER+, HER2+*		.001		
	ER+, HER2-	1.351	.376	.694	2.629
	ER++, HER2-	.442	.001	.288	.677
Age	Old (compared to Young)	.378	.001	.264	.543

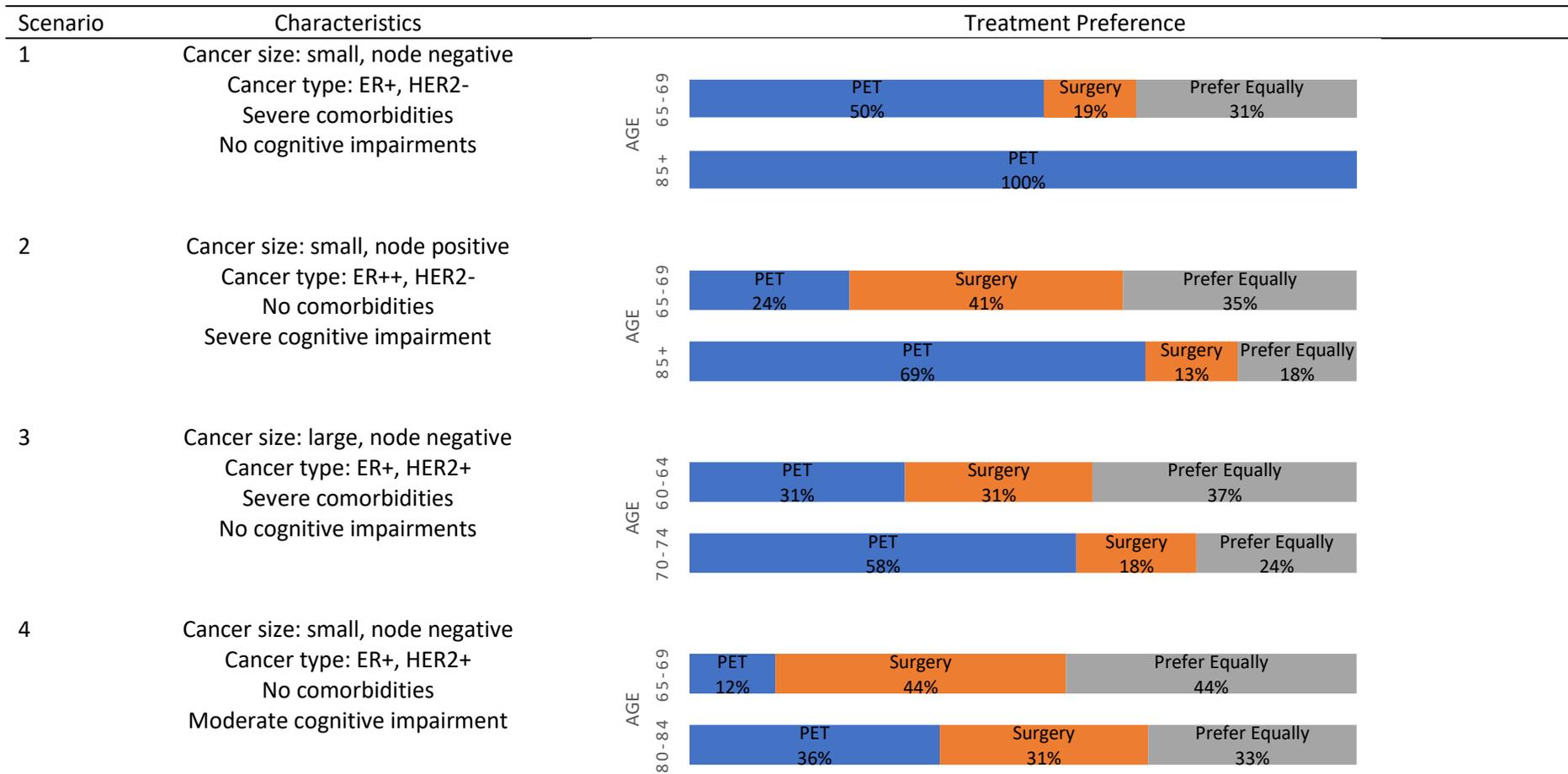
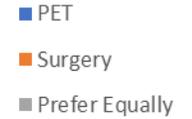
\*Reference categories.

\*\*Values >1 indicate health care professionals were more likely to recommend surgery compared to the reference category. Values <1 indicate health care professionals were less likely to predict surgery compared to the reference category (e.g., health care professionals were 2.8 times more likely to recommend surgery to patients with small, node+ tumours as compared to patients with small, node- tumours).

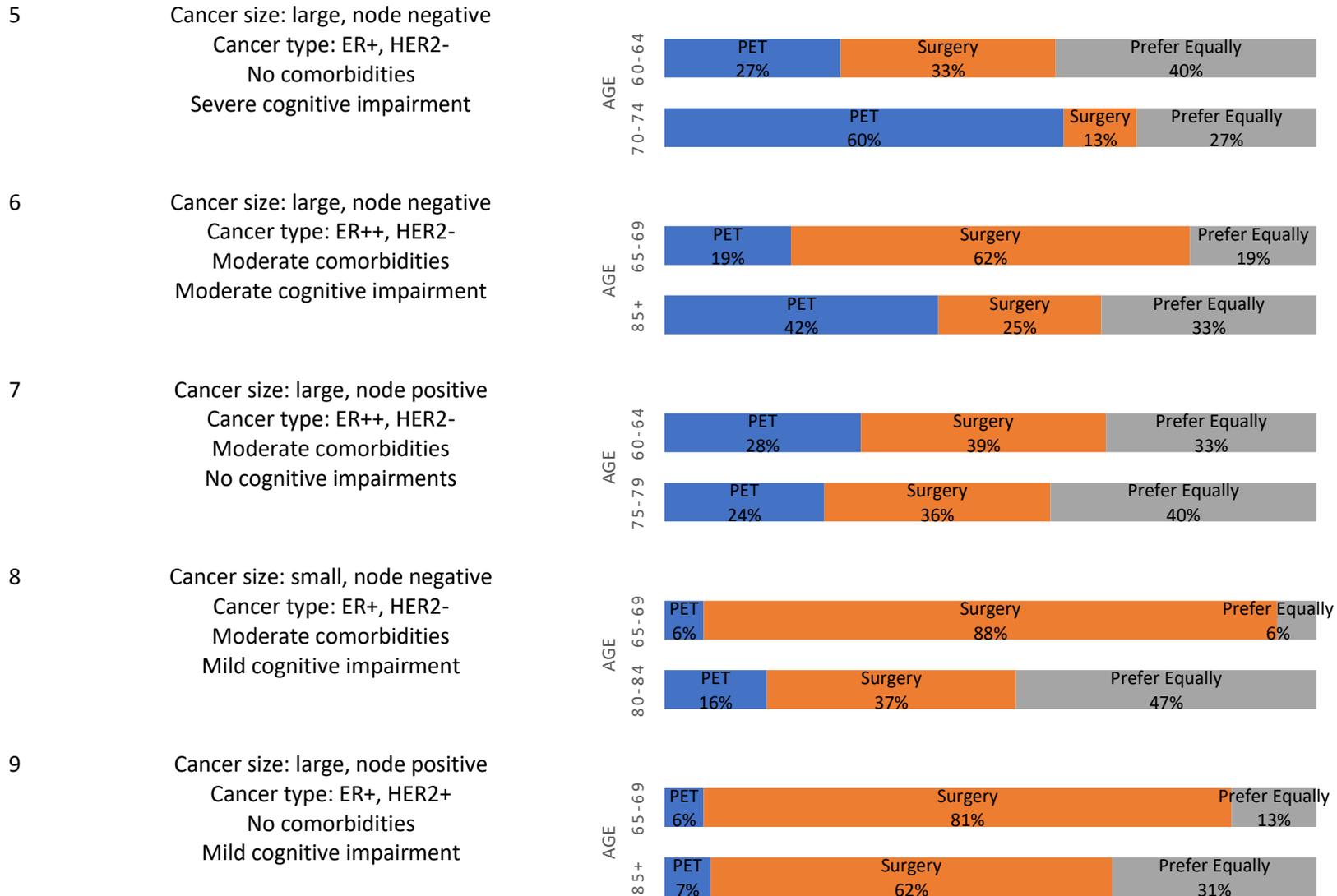
AGE BIAS IN BREAST CANCER

Table 6.2

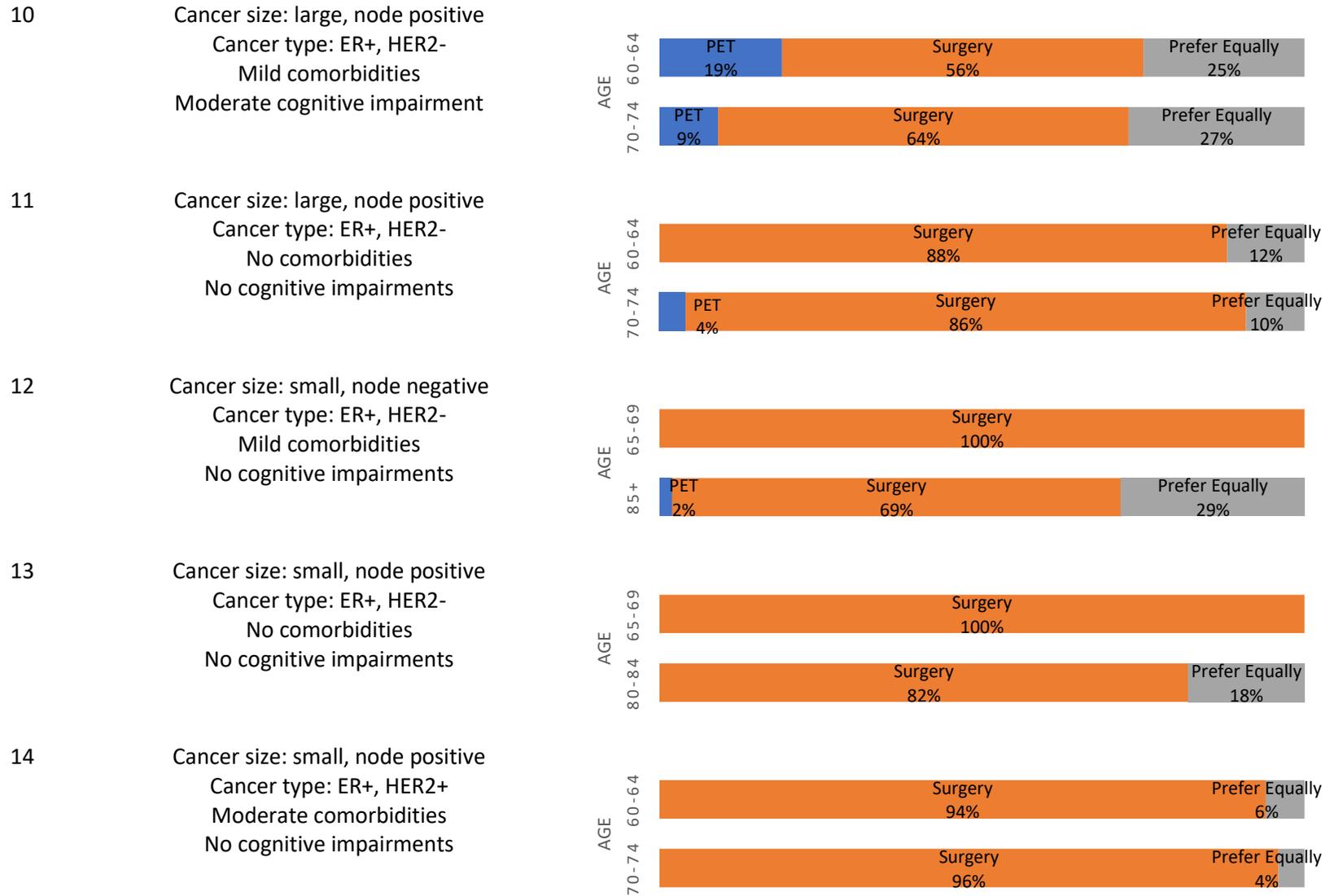
*Treatment recommendation summaries comparing younger and older patients*



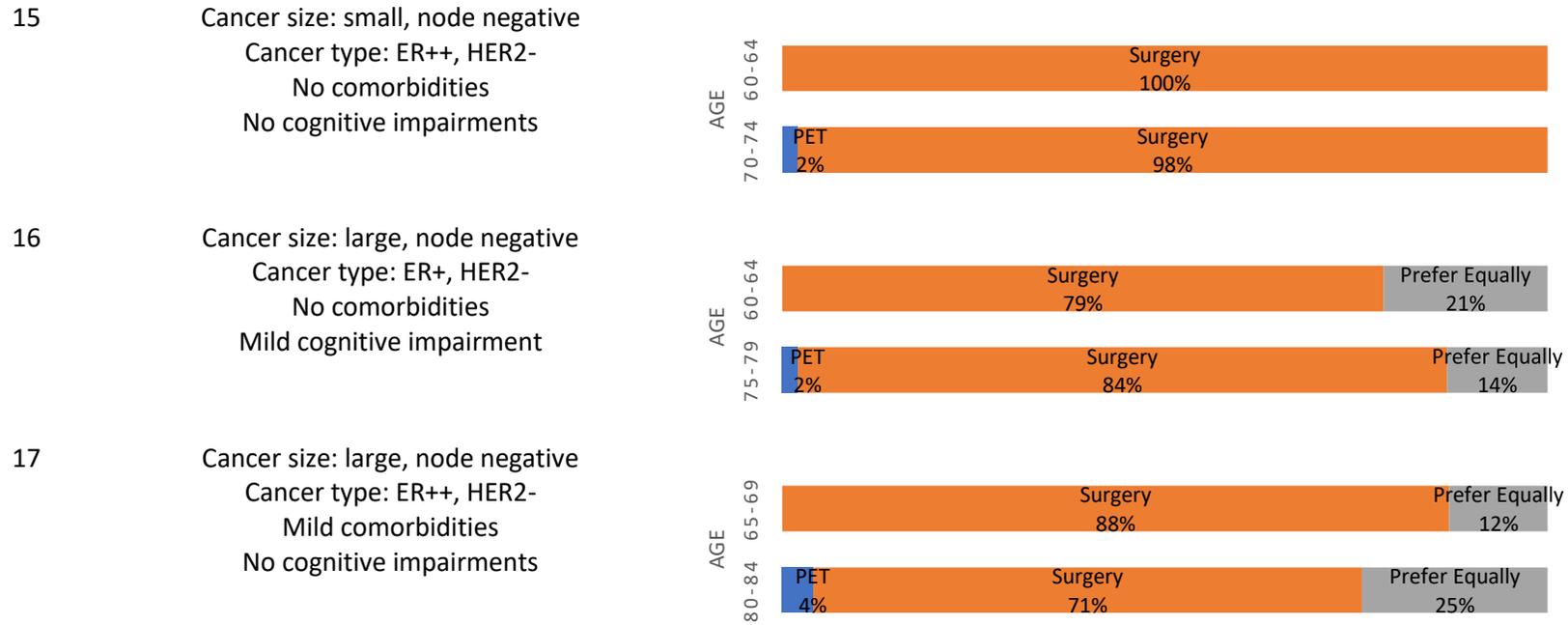
### AGE BIAS IN BREAST CANCER



### AGE BIAS IN BREAST CANCER



### AGE BIAS IN BREAST CANCER



6.5. Hypothesis Three: there will be a positive association between participants' implicit bias and their decision bias.

Implicit bias was measured by participants' IAT scores. Decision bias was represented as the mean difference scores between participants' deviation from surgery in older patients as compared to their younger counterparts (see Figure 6.2). Despite evidence of implicit age bias and age bias in decision making, there was no significant association between these two factors ( $r = .074$ ,  $p = .35$ ) (see Figure 6.3).

Figure 6.2

*Participants' decision bias scores*

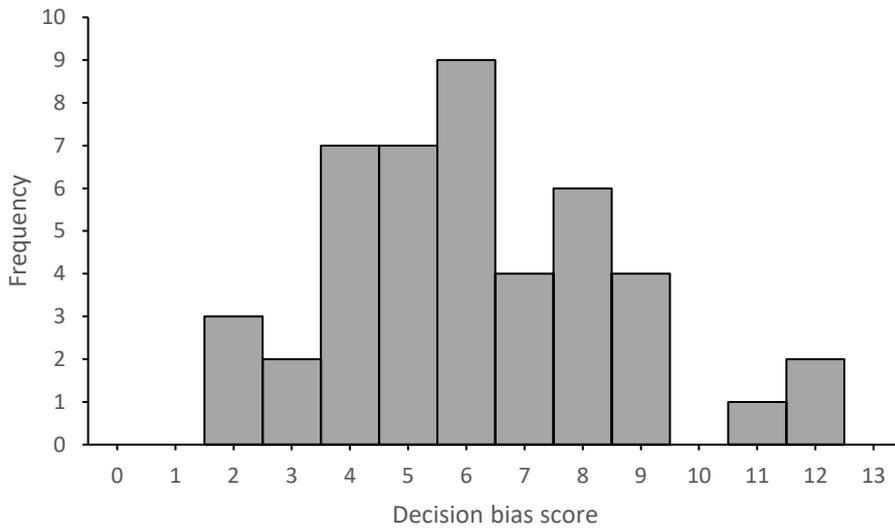
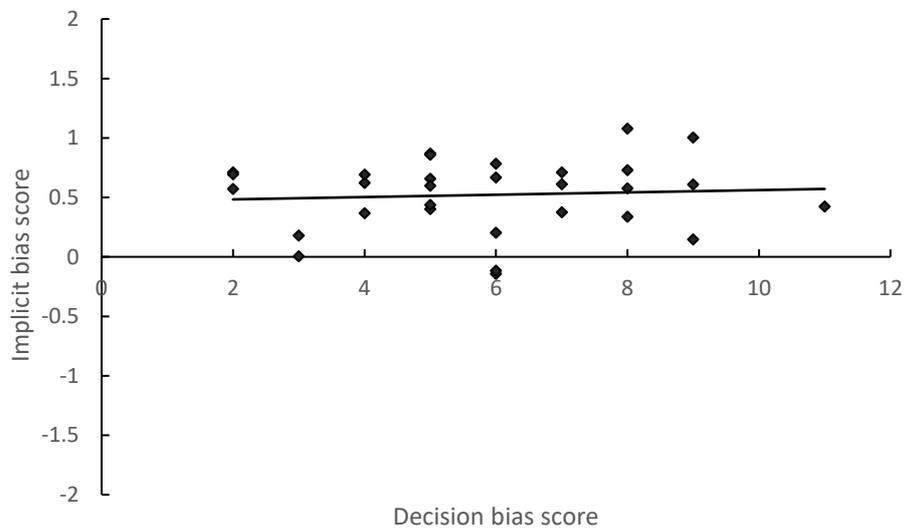


Figure 6.3

*The relationship between participants' implicit bias and decision bias*



#### 6.6. Hypothesis Four: participants will not voice explicit bias against older breast cancer patients.

A clear majority of participants felt that “assumptions about older patients bias the breast cancer care they receive” (90% agree or strongly agree). Whilst just under half (48%) of participants agreed that “age-related assumptions have likely influenced their own practice at times”. In considering whether “current clinical guidelines are appropriate for older breast cancer patients”, most participants were neutral (39%) or disagreed (32%).

Few participants agreed with statements that contained clear cut instances of age-biased behaviours: “older patients are unlikely to take active roles in decision making” (10% agreed), “older patients are less likely to want to take part in a clinical trial” (none agreed), and “it takes too long to explain treatment options to older patients” (5% agreed). There was a wider spread of opinion for statements which had more nuanced implications of age bias: “older patients do not want to consider treatments which will likely impact on their quality of daily living” (32% agreed), “older patients are unable to tolerate the toxicities associated with some treatments” (36% agreed), and “surgery should be avoided for patients with lack of capacity due to dementia” (26% agreed). These statements may reflect their experience with previous patients, but when past experiences colour assumptions of future patients those patients are receiving biased care. The variation in the responses to the medical practice statements (Q.s 4, 5, and 6) is notable as it could be expected, perhaps ideally, that there would be greater agreement on the questions relating to actual patient practice (see Table 6.3).

A factorial analysis of these statements found only weak correlations between statements so statistical claims were inappropriate. Whilst I was unable to make statistical assumptions, the descriptive results indicate that explicit age bias amongst breast cancer health care professionals is nuanced and complex. The findings suggest that it would be worthwhile revisiting these issues with a more detailed qualitative study to explore awareness of, and attitudes towards, age bias in breast cancer treatment.

**Table 6.3**

***Responses to age-related statements toward breast cancer patients***

Statement	Results
1 It is unlikely that an older patient will want to consider treatment options which are likely to impact on their quality of daily living	<p>Disagree 36% No Preference 29% Agree 26%</p>
2 An older patient will be unlikely to take an active role in decision making for their breast cancer treatment	<p>Strongly Disagree 35% Disagree 48% Agree 10%</p>
3 An older patient is less likely than a younger patient to want to take part in a clinical trial	<p>Strongly Disagree 36% Disagree 45% No Preference 19%</p>
4 It takes too long to explain different treatment options to older patients	<p>Strongly Disagree 42% Disagree 48%</p>
5 An older patient will not be able to tolerate the toxicities associated with more aggressive breast cancer treatments	<p>Disagree 45% No Preference 19% Agree 32%</p>
6 In patients with lack of capacity due to dementia, my preference is to avoid surgical treatment in order to minimize patient distress	<p>Disagree 45% No Preference 29% Agree 26%</p>
7 In my view, assumptions about older patients bias the breast cancer care they receive	<p>Disagree 16% Agree 68% Strongly Agree 12%</p>
8 There have been cases when age-related assumptions may have influenced my treatment decisions for older patients	<p>Disagree 26% No Preference 19% Agree 48%</p>
9 Current clinical guidelines are appropriate for breast cancer care for older patients	<p>Disagree 32% No Preference 39% Agree 19%</p>

### 6.7. Influence of health care professionals' characteristics on treatment preference

Of the respondents who completed demographic information ( $N= 31$ ) breast surgeons and oncologists were significantly more likely than breast care nurse specialists to recommend surgery over other treatments. The results also showed older health care professionals were significantly more likely to recommend surgery over other treatments (participants ranged 33- 59 years). The health care professionals' gender was not a significant predictor of their preferences for treatment recommendations (see Table 6.4.).

**Table 6.4**

#### *Influence of health care professionals' characteristics on preference for surgery*

Participant Characteristics	B	S.E.	Wald	df	Sig.	Exp(B)	Lower CI	Upper CI
Age ( $M= 48$ years)	.040	.016	6.404	1	.011	1.040	1.009	1.073
Gender Male (15) vs Female (16)	.271	.232	1.369	1	.242	1.312	.833	2.066
Profession Breast care nurse (4)	Reference.		11.282	2	.004			
Breast surgeon (23)	1.051	.333	9.925	1	.002	2.859	1.487	5.496
Breast oncologist (4)	1.305	.439	8.856	1	.003	3.688	1.561	8.709

### 6.8. A comparison of this study's results and Morgan et al.'s (2017) results

The 17 older scenarios in the current study replicate Morgan et al.'s (2017) Discrete Choice Experiment and so a comparison of the results is both appropriate and interesting (see Table 6.5), although does not represent a central hypothesis for this study. The overall spread of treatment preferences across scenarios was very similar (see Figure 6.4).

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**Table 6.4**

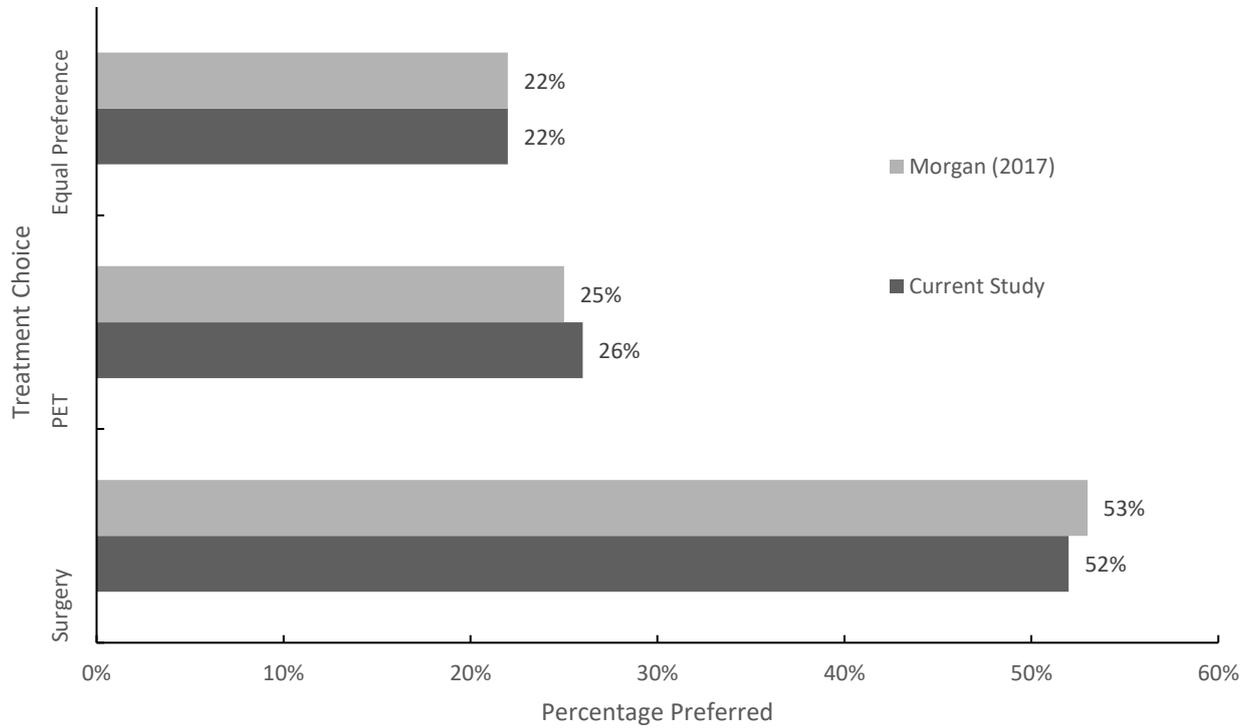
***Comparison of treatment preferences between Morgan et al.'s (2017) study and current study by scenario***

Scenario	Characteristics					Results					
	Patient Age	Comorbidity	Cognitive impairment	Cancer size	Cancer biology	Morgan et al. (2017) N= 248			Current study N= 45		
						Surgery	PET	Prefer equally	Surgery	PET	Prefer equally
1	85+	Severe	None	Small, node-	ER+, HER2+	5.9%	86.2%	7.9%	0%	100%	0%
2	85+	None	Severe	Small, node+	ER++, HER2-	12.6%	61.3%	26.1%	13.6%	68.8%	17.8%
3	70-74	Severe	None	Large, node-	ER+, HER2+	25.3%	43.9%	30.8%	18.2%	57.8%	24.4%
4	80-84	None	Moderate	Small, node-	ER+, HER2+	25.1%	43.0%	31.9%	29.5%	35.6%	33.3%
5	70-74	None	Severe	Large, node-	ER+, HER2-	12.0%	62.2%	25.9%	11.4%	60.0%	26.7%
6	85+	Moderate	Moderate	Large, node-	ER++, HER2-	13.1%	45.6%	41.3%	25.0%	42.2%	33.3%
7	75-79	Moderate	None	Large, node+	ER++, HER2-	22.0%	40.0%	38.0%	34.1%	24.4%	40.0%
8	80-84	Moderate	Mild	Small, node-	ER+, HER2-	39.2%	15.6%	45.2%	38.6%	15.6%	46.7%
9	85+	None	Mild	Large, node+	ER+, HER2+	68.3%	7.9%	23.8%	61.4%	6.7%	31.1%
10	70-74	Mild	Moderate	Large, node+	ER+, HER2-	72.2%	6.3%	21.4%	63.6%	8.9%	26.7%
11	70-74	None	None	Large, node+	ER+, HER2-	92.0%	2.4%	5.6%	86.4%	4.4%	8.9%
12	85+	Mild	None	Small, node-	ER+, HER2-	78.3%	1.2%	20.6%	70.5%	2.2%	28.9%
13	80-84	None	None	Small, node+	ER+, HER2-	83.7%	1.2%	15.5%	81.8%	0.0%	17.8%
14	70-74	Moderate	Normal	Small, node+	ER+, HER2+	90.4%	0.8%	8.8%	95.5%	0.0%	4.4%
15	70-74	None	Normal	Small, node-	ER++, HER2-	99.2%	0.0%	0.8%	97.8%	2.2%	0%
16	75-79	None	Mild	Large, node-	ER+, HER2-	88.1%	2.0%	9.9%	84.1%	2.2%	13.3%
17	80-84	Mild	Normal	Large, node-	ER++, HER2-	77.4%	2.8%	19.8%	70.5%	4.4%	24.4%

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**Figure 6.4**

**Summary comparison of overall treatment preferences between Morgan et al.'s (2017) study and current study**



## 7. Study One: discussion

This chapter considers what the results tell us about age bias in health care providers and breast cancer treatment. Firstly, this section discusses the findings in relation to the primary research question:

Is there age bias in decision making for the treatment of older women with breast cancer?

This chapter then considers the results from an area which was not part of the original research question, but where the study design and data have found interesting results:

Is categorising bias as implicit or explicit helpful or harmful?

Finally, this section concludes by exploring the next steps for the research project.

### 7.1. Is there age bias in decision making for the treatment of older women with breast cancer?

This study found there was age bias in breast cancer specialists' decision making for the treatment of older patients. The study used three measures of age bias: implicit, explicit, and decision bias (see section 4.2 to review these definitions). The results found evidence of bias within each of these but no relationship between implicit and decision bias.

The implicit bias findings show breast cancer specialists tend to associate older women with negative attributes. Whilst there is wide debate around the use of the IAT as a predictor of behaviour or a diagnostic of bias in individuals (as will be discussed in section 7.2), aggregate scores are stable and relate to patterns of disparity across populations (Orchard & Price, 2017; Hehman, Flake, & Calanchini, 2018; Giasson & Chopik, 2020). This study's average age IAT score was slightly higher than the average response to the Harvard age IAT (+0.52 vs +0.42). This difference could reflect 1) the sample size in this study was too small to accurately represent its

population, 2) a difference between UK breast cancer health care professionals compared with predominately US general population, or 3) more negative associations towards older women (this study's IAT) compared to older adults (the Harvard Age IAT).

The explicit statements identified instances of age-based assumptions amongst a minority of breast cancer specialists (range 5-10%) and a wide spread of opinion for the more nuanced age-related assumptions (range 26-32%), which may suggest that interventions to address age bias will also need to take a nuanced approach. Bias training usually aims to raise awareness of bias. Yet this study's findings indicate that, although only half of health care professionals acknowledged that they may be contributing to the differential treatment of older patients, most already felt assumptions about older patients bias the breast cancer care they receive. This suggests raising awareness amongst breast cancer health care professionals of the prevalence of age bias may have limited effect on the treatment of older patients. Approximately one-third of health care professionals agreed that older patients would not wish to consider treatments which would likely impact on their quality of daily living. Research has shown that most older patients value quality of life at least as much as quantity of life (Wildiers et al., 2013), but most older patients wish to receive full information about all possible treatment options (Lifford et al., 2015) and there is often a gap between what patients with breast cancer want and what health care professionals think they want (Lee et al., 2010). Approximately one-third of health care professionals also agreed that older patients would not be able to tolerate the toxicities associated with some treatments. Whilst older age is associated with an increased prevalence of comorbidities and frailty (Coulter, Roberts, & Dixon, 2013) and less intensive treatment may be more appropriate for the frailest breast cancer patients (Tang et al., 2018), there is wide variation amongst older adults and age alone should not be an indicator of receiving less intensive breast cancer treatment. Around one-quarter of health care professionals also agreed that patients lacking capacity due to dementia should not be considered for surgery. Decision making for cancer patients with dementia is complex, varies widely, and lacks guidelines (Caba et al., 2021). The role of cognitive impairments, actual or perceived, in older adults may be a key factor to explain treatment differences. This study also found diverging opinions for the statements which related to actual medical practice, an area where you would hope to find greater consensus, though parallels with the wide treatment variation of older breast cancer patients across the UK (Morgan et al., 2015a). The complexity of

the findings from the explicit bias measure indicates the need for further research using a qualitative approach to gain insight into these nuances.

The lack of relationship found between implicit age associations and differential treatment recommendations of older women could reflect that 1) there is no clear relationship, 2) the sample size was not enough to detect a relationship, which the literature suggests would likely be modest (see section 3.4.1), or 3) differential treatment recommendations may not be driven by ideas that older women are worth less than younger women (which underlies the Age IAT), rather they may be, in part, influenced by assumptions surrounding older women's capabilities and preferences towards healthcare decisions (which the explicit statements suggest may be true).

Results from the decision making task show that breast cancer specialists were less likely to recommend surgery to older patients compared to younger counterparts. This is in line with other studies that have found rates of surgery are lower for older women with operable breast cancer (Lavelle, Todd, Moran, Howell, Bundred, & Campbell, 2007; Ali, Greenberg, Wishart, & Pharoah, 2011). The similarity between the treatments recommended for the older patients in this study and Morgan et al.'s (2017) study strengthen this finding. This divergence from clinical guidelines increases with age indicating that age is driving decision making.

Older breast cancer health care professionals were more likely to recommend surgery than younger professionals. This may reflect age-related differences in perceptions of older patients' ability to tolerate and likelihood to benefit from surgery. This finding could also indicate age-related differences in perceptions of what age is considered old, in line with research that perceptions of ageing shift later as people age (Chopik, Bremner, Johnson, & Giasson, 2018). Alternatively, it may suggest that treatment recommendations are in part influenced by the guidelines and practices most common at the time of the health care professionals' training as well as current policy. Primary endocrine therapy was introduced and gained popularity in the 1980s (Preece, Wood, Mackie, & Cuschieri, 1982). Similarly, the finding that breast surgeons and oncologists were more likely to recommend surgery than breast cancer nurse specialists may reflect differences in training or perceptions of treatment tolerance and efficacy in older patients.

This study's findings indicate that there is age bias amongst health care providers and confirms findings that health care providers offer differential treatment to older patients. This study concludes that a focus on age bias interventions is a useful lens to address the treatment differences of older women with breast cancer.

## 7.2. Is categorising bias as implicit and explicit helpful or harmful?

With the increasing popularity of implicit bias training, concerns have emerged within bias research around categorising bias as implicit or explicit and, the use of the Implicit Associations Test (Mitchell & Tetlock, 2017; Bartlett, 2017; Singal, 2017). A key driver of these concerns is the use of implicit and explicit as a proxy for unconscious and conscious. Firstly, this proxy does not encapsulate the multitudes within explicit bias and secondly, may serve as a caveat to detract from personal responsibility (see section 3.5 for a more detailed discussion). This section considers what the findings from this study can contribute to this debate.

Following the conventions of the body of bias research, this study divided bias into implicit, explicit, or decision bias. The hypotheses for this study were:

1. Participants will hold implicit biases against older people.
2. Participants will undertreat older patients as compared to their younger counterparts.
3. There will be a positive association between participants' implicit bias and their decision bias.
4. Participants will not voice explicit bias against older breast cancer patients.

The study results show a more complex relationships than presented by these hypotheses. The findings indicate that:

1. Participants hold implicit biases against older people.
2. Participants undertreat older patients as compared to their younger counterparts.
3. There was no apparent relationship between participants' implicit age bias and age bias in decision making.

4. Whilst most participants did not believe they had explicit age bias, opinion varied in what constitutes as age bias and whether age-related assumptions lead to unfair treatment.

This study's findings echo concerns that categorising bias as implicit or explicit may not be helpful. Firstly, the results show implicit age bias was not a useful measure for predicting differential treatment recommendations for older patients. Secondly, the findings suggest age bias towards older breast cancer patients does not always readily fall into the categories of implicit or explicit. Explicit and implicit bias tend to be narrowly distinguished by whether attitudes and stereotypes towards, or associations with, people are conscious or unconscious, overt or covert. Yet responses to the age-related statements suggest elements of age bias in breast cancer treatment are conscious but are also nuanced and covert. The definitions of implicit and explicit as they stand do not account for the spectrum of attitudes and behaviours that are apparent amongst breast cancer health care professionals.

From this study's findings, two conclusions follow that are relevant to the debate on whether categorising bias as implicit is helpful or harmful. Firstly, reducing drivers of bias to either implicit or explicit does not capture nuances and range of attitudes within age bias which the results have indicated are there. These binary categories may lead to more subtle instances of explicit bias going unchecked. Secondly, given the lack of correlation between decision bias and implicit bias demonstrated in this study, the Implicit Associations Test may have merit in encouraging thoughtful conversations and reflection around underlying bias, but appears not to be a useful diagnostic of bias. The second part of this thesis will focus on interventions to reduce age bias in the treatment of older women with breast cancer, focusing on changes in decision bias.

### 7.3. Extent and limitation of findings

This is the first study to explicitly consider the role of age bias amongst health care professionals on treatment recommendations for older women with breast cancer. The interpretations of these results should be considered under the caveat of a relatively small sample size, though the traditional limitation of smaller samples is a failure to detect a finding which does exist (Type II error) so the presence of age bias amongst this relatively small sample, alongside the convergence

of this study's results and Morgan et al.'s (2017) ( $N= 248$ ) results, offer reassurance. The majority of participants were recruited through their engagement with research to improve the care of older breast cancer patients. The presence of age bias amongst this selection of healthcare professionals hints that, if anything, this study's findings may underestimate, not overestimate, the presence of age bias amongst breast cancer health care professionals.

The standardised tool for implicit age bias (the age IAT) measures associations towards older people in general, not older patients nor older women, yet views on ageing are complex and context specific (Kornadt & Rothermund, 2011; Rothermund & Kornadt, 2015). Research on ageism in healthcare has tended to measure ageism against older people in general, rather than older patients specifically, yet there is evidence that health care workers have more positive attitudes towards older people than older patients (São José, Amado, Ilinca, Buttigieg, & Taghizadeh Larsson, 2019).

The responses to the explicit attitudes' statements may be vulnerable to desirability bias, that is the tendency to respond to questions in ways that are considered socially desirable. However, this is offset by the convergence of findings across this mixed-methods approach and the resistance of the IAT and DCE to faking (Steffens, 2004).

There are also limitations to drawing wider conclusions from measurements which have yet to be standardised. There are no validated tools for measuring explicit age bias in breast cancer, decision bias in breast cancer, or an accompanying tool to consider any links between implicit, explicit, and decision age bias. This study considered explicit age bias through responses to statements about older breast cancer patients formed from topics identified in the literature alongside breast cancer clinicians. The findings indicated that there are nuanced and varied opinions regarding age-related assumptions of breast cancer patients, but in the absence of a standardised measure we cannot assume to have fully captured explicit age bias nor are we able to explore its relation to decision making in treatment recommendations.

This study defined decision age bias as less likely to recommend standard treatment for an older patient compared to their younger counterpart in accordance with national guidelines to “treat people with invasive breast cancer, irrespective of age” (NICE, 2009; NICE, 2018). However, there is debate around the efficacy of guidelines referencing best practice for older patients but developed based on clinical trials which have excluded older populations (Hurria et al., 2015).

### 7.4. The project’s next steps

The findings from this study provide grounds for exploring age bias interventions to improve breast cancer health care professionals’ decision making. The findings also suggest complexities within age bias through which insight could be gained in a qualitative study. Testing bias interventions in this field moves bias research into new territory; my literature review of the published empirical research in this field finds that none have tested age bias interventions for the treatment of older breast cancer patients (see section 8.1).

## PART THREE: STUDIES TWO AND THREE

Do interventions to address age bias lead to better quality decision making for the treatment of older women with breast cancer?

## 8. Previous bias interventions

Countless organisations carry out bias training with the aim of improving equality. These trainings are usually underpinned with theories of implicit bias as beyond conscious awareness and control. Yet the evidence suggests bias training helps raise awareness of implicit bias, but does not reduce implicit bias, explicit bias, or disparities (Lai et al., 2014; Lai et al., 2016; Forscher et al., 2019). The growing dissonance between commitments to equality and continuing group disparities suggests implicit bias training may not be the solution it was hoped to offer. This section summarises and evaluates the body of empirical studies into bias interventions.

### 8.1. Previous interventions

With a growing body of research suggesting that covert bias is a likely contributor to group disparities (as discussed in sections 3.2 and 3.3), there has been a rise in interventions to counter underlying bias in professional settings (Onyeador, Hudson, & Lewis Jr, 2021). Given how widely implicit bias training is used, there have been surprisingly few studies evaluating intervention effectiveness, and amongst the studies that have been conducted there is no clear consensus on effective approaches to address bias.

The body of research on bias interventions varies widely in biases addressed, intervention approaches, study methodologies, and outcome measures. As such, the study area did not readily fit systematic review methodology, such as PRISMA, and a non-systematic approach was used.

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**Literature review question**

What empirical studies have been conducted evaluating bias interventions?

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**Operationalising the questions- search words and phrases**

1. 'Implicit', 'automatic', 'associations', 'unconscious'
2. 'biases', 'differences', 'discrepancies', 'disparities'
3. 'interventions', 'programmes', 'strategies', 'debiasing'
4. 'stopping', 'improving', 'reducing'

---

**Inclusion and exclusion criteria**

Must be written in English; published in a Peer Review Journal OR statistics from official government website OR official medical websites, published from 2000 onwards

Researcher is restricted to articles able to access through university institutional login

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**Databases used**

Cochrane, Google, Google Scholar, PsycINFO, PubMed, Web of Science

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A literature search identified 74 eligible published studies which have tested interventions to address implicit bias. These studies can be categorised by how they define successful intervention as 1) a reduction in implicit bias, 2) a decrease in biased attitudes, 3) a change in biased behaviour, or 4) some combination of the above.

The literature in this field includes theoretical discussions concerning which interventions may or may not be effective, and trials of bias interventions that report user feedback (e.g., on the intervention design) but do not measure intervention effects. This review focused on the published empirical studies where bias interventions were tested and their effects measured, as it was considered that this would provide the most relevant context and helpful direction for the design of the interventions for this research. The section below summarises the intervention approaches taken, the studies identified, the type of bias addressed, and whether the intervention reduced implicit, explicit, or behavioural bias.

***Stereotype suppression***

Encourages people to suppress group-based stereotypes and focus on personalised judgements. Stereotype suppression interventions have been largely ineffective, often unintentionally reinforcing and strengthening biases through rebound effects, increased social distancing, and depleted cognitive resources all of which make stereotypes more accessible.

**Table 8.1*****Intervention studies using stereotype suppression***

Study	Country	Bias addressed	Pps	Summary	Findings		
					Bias reduced		
					Implicit	Explicit	Behaviour
Macrae, Bodenhausen, Milne, & Jetten, (1994)	US	Skinheads	24 students	Stereotype suppression increased subsequent stereotyping and Pps sat further from stereotyped targets than control Pps.	-	×	×
Monteith, Spicer, & Tooman, (1998)	US	sexual and gender minorities	97 students	Stereotype suppression only increased subsequent stereotyping in high prejudice Pps.	-	×	-
Kulik, Perry, & Bourhis (2000)	US	Age	190 students	Stereotype suppression led to less positive evaluations of older job applicants.	-	×	-
Uhlmann and Cohen (2007)	US	Gender	65 men-not company setting	Stereotype suppression increased stereotyping in hiring and reduced the likelihood of recommending female applicants for leadership positions compared to identical male applicants.	-	×	×
Wallaert, Ward, & Mann (2010)	US	Race	114 non-black students	Stereotype suppression reduced race IAT scores.	✓	-	-
					1/1	0/4	0/1

**Education**

The most implemented approach in company implicit bias training has been bias education and awareness. This is grounded in research that for people to be motivated to reverse implicit biases they must be aware they exist, are common, and can be harmful. Educational interventions appear successful in raising awareness of implicit bias and increasing motivation to address biases. Whilst these appear successful in their aim of increased awareness, by their own admission awareness alone does not appear to translate to meaningful behavioural change. Implicit bias awareness training appears to have its place in addressing disparities but should not be the sole intervention.

**Table 8.2****Intervention studies using education**

Study	Country	Bias addressed	Pps	Summary	Findings		
					Bias reduced		
					Implicit	Explicit	Behaviour
Rudman, Ashmore, & Gary (2001)	US	Race	119 students	Diversity education reduced implicit and explicit bias.	✓	✓	-
Dixon-woods et al. (2002) in Morris et al. (2019)	US	sexual and gender minorities	130 medical students	Decreased anxiety around sexuality and increased comfort levels of working with sexual and gender minority patients.	-	✓	-
Park, Felix, and Lee (2007)	US	Religion	43 students	Exposure to positive information reduced implicit bias.	✓	✗	-
O'Brien, Puhl, Latner, Mir, & Hunter (2010)	US	Weight	159 health students	Increasing health students' awareness for the uncontrollable reasons for obesity reduced implicit and explicit bias.	✓	✓	-
Steed (2010)	US	Race	13 occupational therapists	Six hour cultural competency workshop did not change negative attitudes towards black patients.	-	✗	-
Devine, Forscher, Austin, & Cox (2012)	US	Race	91 non-black students	Awareness of bias is vital but not sufficient. Multiple interventions are most effective in reducing implicit bias.	✓	✓	-

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Study	Country	Bias addressed	Pps	Findings			
				Summary	Bias reduced		
					Implicit	Explicit	Behaviour
Reygan & D'Alton (2013) in Morris et al. (2019)	US	sexual and gender minorities	201 health care workers	Improved knowledge of attitudes and comfort levels towards sexual and gender minority patients.	-	✓	-
Hardacker et al. (2013) in Morris et al. (2019)	US	sexual and gender minorities	848 nurses and clinicians	Improved knowledge of and attitudes towards transgender patients.	-	✓	-
Heiphetz in Lai et al. (2014)	US	Race	252	Reflecting on racial injustice did not lead to a change in implicit bias.	✗	-	-
Heiphetz in Lai et al. (2014)	US	Race	388	Promoting and celebrating multiculturalism reduced implicit bias.	✓	-	-
Carabez et al., (2015) in Morris et al. (2019)	US	sexual and gender minorities	122 nursing students	Multiple teaching strategies increased understanding about sexual orientation and gender identity.	-	✓	-
Johnson, Rullo, & Faubion (2015) in Morris et al. (2019)	US	sexual and gender minorities	13 medical students	Improved knowledge of and attitudes towards sexual health issues	-	✓	-
					5/6	8/10	-

**Positive exemplars**

Recognising group differences and promoting positive examples from negatively stereotyped groups. Results have rarely generalised beyond the specific positive exemplar to overall group stereotypes (Blair, 2002).

**Table 8.3****Intervention studies using positive exemplars**

Study	Country	Bias addressed	Pps	Summary	Bias reduced		
					Implicit	Explicit	Behaviour
Dasgupta & Greenwald (2001)	US	Race Age	48 students 28 students	Positive exemplars of the biased group coupled with negative exemplars of the nonbiased group led to short-term reduction in implicit bias but had no effect on explicit bias.	✓	✗	-
McGrane and White (2007)	Australia	Race	118 students	Positive exemplars of racial minority group reduced bias.	✓	✗	-
Joy-Gaba and Nosek (2010)	US	Race	4628 students & project implicit volunteers	Replication of Dasgupta and Greenwald (2001) found weaker effects than original study.	✓	-	-
Columb and Plant (2011)	US	Race	51 non-black students	Exposure to Obama led to reduced implicit bias.	✓	-	-
					4/4	0/2	-

**Counterstereotyping**

Focusing on counter stereotypes may make the original stereotype less accessible when making automatic assumptions e.g., repeated pairings of *older faces* with *strong* may then compete against activating common stereotypes of older adults as weak.

**Table 8.4****Intervention studies using counterstereotyping**

Study	Country	Bias addressed	Pps	Summary	Bias reduced		
					Implicit	Explicit	Behaviour
Kawakami, Dovidio, & van Kamp (2007)	Netherlands	Gender	156 students	Training to form counterstereotypic gender associations using IATs led to reduced explicit gender associations and equal hiring of identical male and female applicants BUT only if delay between training and selection or if asked to simultaneously complete another cognitive task.	-	✓	✓
Calanchini et al. (2013)	US	Race	236 students	Priming black-positive and white-negative associations decreased race IAT scores.	✓	-	-
French, Franz, Phelan, & Blaine (2013)	US	Race	70 students	Prime Middle Eastern-positive and white-neutral associations decreased IAT scores.	✓	✗	-
Cerruti & Shin in Lai et al. (2014)	US	Race	374	Encouraging counterstereotypic associations with an adapted Go/No Go task decreased implicit preferences.	✓	-	-
Marini, Rubichi, & Sartori in Lai et al. (2014)	US	Race	241	Participants imagining they are assaulted by a white man then rescued by a black man reduced implicit bias.	✓	-	-

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Study	Country	Bias addressed	Pps	Findings			
				Summary	Bias reduced		
					Implicit	Explicit	Behaviour
Marini, Rubichi, & Satori in Lai et al. (2014)	US	Race	373	Encouraging counterstereotypic associations reduced implicit bias.	✓	-	-
Teachman in Lai et al. (2014)	US	Race	399	Counterstereotype IAT reduced implicit bias.	✓	-	-
Wojcik & Koleva in Lai et al. (2014)	US	Race	382	Counterstereotype IAT reduced implicit bias.	✓	-	-
					7/7	1/2	1/1

**Perspective taking**

Adopting the perspective of the member of the marginalised group. If the perceiver is asked to appreciate the situation, emotions, and behaviours of the stigmatised individual, they may be less likely to activate negative implicit biases, empathise, and reduce ingroup-outgroup differences.

**Table 8.5****Intervention studies using perspective taking**

Study	Country	Bias addressed	Pps	Summary	Bias reduced		
					Implicit	Explicit	Behaviour
Galinsky & Moskowitz (2000)	US	Age	162 students	Perspective taking reduced implicit and explicit bias, and improved ingroup-outgroup evaluations.	✓	✓	-
Rukavina et al. (2010)	US	Obesity	78 kinesiology students	Multiple classroom learning components including perspective taking did not reduce implicit bias.	✗	✓	-
Todd, Bodenhausen, Richeson & Galinsky (2011)	US	Race	265 non-black students	Pps asked to write 'a day in the life' from the perspective of a black man. Subsequent interactions with a black man were rated more positively, Pps had more positive interracial evaluations- as measured by distance chose to sit from 'Jake' or 'Tyrone'-, and the black man rated interactions they had with intervention Pps more positively.	-	✓	✓
Swift et al. (2013)	UK	Obesity	43 dietic & medical students	Educational films to encourage empathy of marginalised group reduced explicit but not implicit bias.	✗	✓	-
Lehr in Lai et al. (2014)	US	Race	232	Encouraging perspective taking did not lead to a change in implicit bias.	✗	-	-

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Study	Country	Bias addressed	Pps	Findings			
				Summary	Bias reduced		
					Implicit	Explicit	Behaviour
Tarasoff et al. (2014) in Morris et al. (2019)	US	sexual and gender minorities	28 health care workers	Improved knowledge and awareness of sexual and gender minority health needs but not comfort towards sexual and gender minority patients.	-	✓	-
					1/4	5/5	1/1

**Emotional priming**

Triggering positive emotions before exposure to the biased group may help to form positive associations and override biased responses. Emotional priming was established through a task that found participants are faster to categorise words, e.g., *joy as good*, when the preceding word matches the emotional valence, e.g., *happy*, than when it does not, e.g., *death* (Fazio, Sanbonmatsu, Powell, & Kardes, 1986).

**Table 8.6****Intervention studies using emotional priming**

Study	Country	Bias addressed	Pps	Summary	Bias reduced		
					Implicit	Explicit	Behaviour
Huntsinger, Sinclair, & Clore (2009).	US	Race	82 students	Induce positive mood through music led to improvements in race weapons identification task, a decrease in implicit race bias, and a decrease in implicit workplace gender stereotypes.	✓	-	✓
Huntsinger et al. (2009)	US	Gender	111 students		✓	-	-
Haidt in Lai et al. (2014)	US	Race	430	Inducing moral elevation did not lead to a change in implicit bias.	✗	-	-
Lai, Haidt, and Nosek (2014)	US	sexual and gender minorities	3622 volunteers from project implicit	Inducing moral elevation reduced implicit and explicit bias, but effects were small.	✓	✓	-
Schaefer in Lai et al. (2014)	US	Race	282	Promoting empathy through viewing photographs of outgroup members, identifying and empathising with their emotions did not lead to a change in implicit bias.	✗	-	-
					3/5	1/1	1/1

**Appeal to Egalitarian Goals**

Based on the premise that most people do not wish to be biased.

**Table 8.7****Intervention studies using egalitarian goals**

Study	Country	Bias addressed	Pps	Summary	Findings		
					Implicit	Explicit	Behaviour
Blincoe and Harris (2009)	US	Race		Encouraging tolerance, respect, and co-operation reduced implicit racial bias and improved modern racism score.	✓	✓	-
Ho in Lai et al. (2014)	US	Race	370	Encouraging egalitarian views through completing the humanitarian-egalitarian scale and explicit statements of their views did not reduce implicit bias.	✗	-	-
Joy-Gaba in Lai et al. (2014)	US	Race	148	Trying to remind participants that they are prone to bias using 'ease of retrieval' paradigm and 'should-would discrepancy' paradigm in the hope that they will self-correct and behave more objectively did not reduce implicit bias	✗	-	-
					1/3	1/1	-

***Reduce intergroup boundaries***

Based on research that there are pervasive associations of ingroups as positive and outgroups as negative, this intervention aims to increasing exposure to members of the stereotyped group and form a positive common identity. Encouraging interaction between members of biased groups with positive exemplars of marginalised groups and community service immersion may help gain empathy and understanding.

**Table 8.8*****Intervention studies using intergroup boundaries***

Study	Country	Bias addressed	Pps	Summary	Findings		
					Bias reduced		
					Implicit	Explicit	Behaviour
Dermody, Jones, and Cumming (2013)	Australia	sexual and gender minorities		Imagined intergroup contact did not reduce implicit or explicit bias.	✗	✗	-
Turner and Crisp (2010)	UK	Age Religion	25 students 40 students	Imagined intergroup contact reduced implicit bias.	✓	-	-
Turner, Crisp, & Lambert (2007)	UK	Age sexual and gender minorities	52 students 27 male heterosexual students	Imagined intergroup contact reduced intergroup bias and anxiety.	-	✓	-
Chen & Turner in Lai et al. (2014)	US	Race	483	Imagined intergroup contact did not lead to a change in implicit bias.	✗	-	-
Groom, Bailenson, & Nass (2009)	US	Race	98 students	Completing a video game using an avatar of a black person increased implicit racial bias.	✗	-	-
Hall, Crisp, and Suen (2009)	UK	Race	133 white female students	Blurring intergroup boundaries reduced implicit bias. Reduction was moderated by ingroup identification.	✓	-	-
Brannon and Walton (2013)	US	Ethnic minority	222 non-Latino students	Encouraging social connectedness to another social group reduced implicit bias and increased declarations of intentions for social engagement.	✓	-	✓

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Study	Country	Bias addressed	Pps	Findings			
				Summary	Bias reduced		
					Implicit	Explicit	Behaviour
Maister, Sebanz, Knoblich, & Tsakiris (2013)	UK, Hungary, Netherlands	Race	107 white Pps	Adaptation of the Rubber Hand Illusion with white participants and black rubber hands reduced implicit bias.	✓	-	-
Peck et al. (2013)	Spain, Italy, UK	Race	60 white female students	Completing a video game using an avatar of a black person reduced implicit bias.	✓	-	-
Woodcock and Monteith (2013)	US	Race	338 white students	Increasing associations between self and out-group reduced implicit bias.	✓	-	-
Frazier in Lai et al. (2014)	US	Race	402	On a sports team with out-group members and in-group opponents reduced implicit bias.	✓	-	-
Gundemir et al. (2014)	Netherlands	Race	283 students	Promoting dual identity through matching clothes with outgroup members reduced implicit bias score and made participants more likely to hire outgroup members.	✓	-	✓
Hawkins in Lai et al. (2014)	US	Race	387	Attempts to create a sense of common humanity through viewing a clip of a man dancing across the world did not reduce implicit bias.	✗	-	-
Kesebir in Lai et al. (2014)	US	Race	294	Encouraged reminders of shared wider identity (American) between white participants and famous exemplars of black American basketball players did not reduce implicit bias.	✗	-	-

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Study	Country	Bias addressed	Pps	Summary	Findings		
					Bias reduced		
					Implicit	Explicit	Behaviour
Kelley et al. (2008) in Morris et al. (2019)	US	sexual and gender minorities	75 medical students	Patient panels and discussion groups led by sexual and gender minority patients increased knowledge of sexual medicine and confidence discussing sexual health issues.	-	✓	-
Rosen et al. (2008) in Morris et al. (2019)	US	sexual and gender minorities	46 medical students	Patient panels and discussion groups led by sexual and gender minority patients increased knowledge of sexual medicine and confidence discussing sexual health issues.	-	✓	-
					8/13	3/4	2/2

***Intergenerational contact***

Intergroup boundary interventions that specifically hope to address ageism have been developed as intergenerational contact interventions. These aim to foster increased contact with, and understanding of, different generations with hopes to reduce ageism. A systematic review on intergenerational contact interventions to reduce ageism found a slight decrease in prejudice and stereotypes and an increase in knowledge and awareness (Burnes et al., 2019).

**Table 8.9*****Intervention studies using intergenerational contact***

Study	Country	Bias addressed	Pps	Summary	Findings		
					Bias reduced		
					Implicit	Explicit	Behaviour
Babcock, MaloneBeach, & Woodworth-Hou (2016)	US	Age	86 children	Children interact with older adults to explore topics about ageing.	*	*	-
Belgrave (2011)	US	Age	21 children	Children and older adults engage in musical therapy sessions together. A slight increase in children's positive attitudes towards older people and an increase in positive intergenerational interactions.	-	✓	✓
Chase (2010)	US	Age	43 students	Considered the effects of regular email contact with older people on college students' attitudes towards ageing.	-	✓	-
Tam, Hewstone, Harwood, Voci, & Kenworthy (2006)	UK	Age	77 students	Examined the relationship between quality and quantity of contact with grandparents and implicit and explicit attitudes towards ageing. High quality contact was related to positive explicit attitudes, high quantity contact was related to positive implicit attitudes.	✓	✓	-

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Study	Country	Bias addressed	Pps	Summary	Findings		
					Bias reduced		
					Implicit	Explicit	Behaviour
Bousfield & Hutchinson (2010)	UK	Age	61 students	Increased contact with older people was associated with more positive attitudes towards older people, less anxiety to interact with older people, and intent to increase future contact with older people.	-	✓	✓
Bernard, McAuley, Belzer, & Neal (2003)	US	Age	225 medical students	Medical students interviewed older adults in good health about their lifestyle and activities. Improvements in attitudes and prejudices towards older people were seen, but were not significant.	-	✓	-
					1/2	5/6	2/2
					32/45	26/34	11/14
					Total: 64/74		

## 8.2. Review findings

Of the 74 studies identified, 64 concluded that their intervention was successful. All of the intervention approaches have studies that report successful results. Yet most studies measured changes in either implicit bias or self-reported explicit attitudes, with an underlying assumption that changes on these measures would also produce behavioural change. Whether this is true, few studies show.

Most studies measured intervention success as a reduction in implicit bias, specifically lowered scores on the implicit associations test. Whilst it is ostensibly logical that successful efforts to combat implicit bias could be measured as a reduction in implicit bias scores, there is increasing evidence that the IAT is often a poor predictor of, and has an unclear relationship with, behaviour and also has poor test-retest reliability (Forscher et al., 2019). As such, reduced implicit bias may not be the clearest indicator of effective approaches to address unequal treatment.

Many of the intervention studies included changes in explicit attitudes as outcome measures for intervention success. Whilst attitudinal data may be a useful component in an aggregate measure for bias reduction, reported attitudes alone are often poor predictors of behaviour- a finding which sparked the conception of implicit bias research (Greenwald & Banaji, 1995).

Given the aim of these studies is to identify interventions which may reduce the impact of implicit bias on unequal treatment, rather than evaluate intervention effectiveness with imperfect predictors of behaviour, it appears more meaningful to directly measure changes in relevant behaviour. Yet most studies do not include a measure of behavioural change. Of those that do, it is not the focus of their study (exceptions are Goldin and Rouse, 2000; Smith et al., 2015; Devine, Forscher, Cox, Kaatz, Sheridan, & Carnes, 2017). The behaviours themselves are often abstract and may not translate to meaningful changes (e.g., participant's declaring that they intend to change future behaviours; Bousfield & Hutchinson, 2010; Brandon & Walton, 2013).

Alongside the need for studies that focus on actual behaviour rather than self-reported intentions, there is also opportunity to utilise the behavioural effects of implicit bias training already in place through transparent reporting and evaluations within organisations. No such studies were identified in the published literature.

### **Age bias**

Of the 74 studies identified, 11 focused on age bias (see Table 8.2.). Most studies focused on changes to explicit bias through intergenerational contact. There was not a large enough body of evidence to conclude whether other types of interventions are effective at reducing age bias, nor whether interventions were effective at reducing implicit or behavioural bias. However, the collection of studies suggested that intergenerational contact has a positive role in improving self-reported age bias, positive attitudes towards older adults, and comfort levels around older adults.

**Table 8.9**

#### ***Intervention studies addressing age bias***

Study	Summary	Bias reduced		
		Implicit	Explicit	Behaviour
<b>Stereotype suppression</b>				
Kulik, Perry, & Bourhis (2000)	Stereotype suppression led to poorer evaluations of older job applicants.	-	✗	-
<b>Positive exemplars</b>				
Dasgupta & Greenwald (2001)	Positive exemplars of the biased group and negative exemplars of the nonbiased group led to short-term reduction in implicit bias but had no effect on explicit bias.	✓	✗	-
<b>Perspective taking</b>				
Galinsky & Moskowitz (2000)	Perspective taking reduced implicit and explicit bias, and improved in-group/ out-group evaluations.	✓	✓	-
<b>Intergenerational contact</b>				
Turner and Crisp (2010)	Imagined intergroup contact reduced implicit bias.	✓	-	-
Turner, Crisp, & Lambert (2007)	Imagined intergroup contact reduced intergroup bias and intergroup anxiety.	-	✓	-
Babcock, MaloneBeach, & Woodworth-Hou (2016)	Children interacting with older adults to explore topics about ageing did not reduce bias.	✗	✗	-
Belgrave (2011)	Children and older adults engaging in musical therapy sessions	-	✓	✓

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together led to a slight increase in children's positive attitudes towards older people and an increase in positive intergenerational interactions.

Chase (2010)	Regular email contact with older people improved college students' attitudes towards ageing.	-	✓	-
Tam, Hewstone, Harwood, Voci, & Kenworthy (2006)	Children's' high quality contact with grandparents was related to positive explicit attitudes towards ageing. Children's' high quantity contact was related to positive implicit attitudes towards ageing.	✓	✓	-
Bousfield & Hutchinson (2010)	Increased contact with older people was associated with more positive attitudes towards older people, less anxiety to interact with older people, and intent to increase future contact with older people.	-	✓	✓
Bernard, McAuley, Belzer, & Neal (2003)	Interviewing older adults in good health about their lifestyle and activities improved medical students' attitudes towards older people, though changes were not statistically significant.	-	✓	-

### ***Reduced bias in healthcare***

Of the 74 studies found, 18 focused on reducing bias amongst health care workers (see Table 8.3.). Most of the interventions focused on bias towards sexual and gender minorities, but there were also interventions on weight, age, and race. Most of the interventions focused on changes to explicit bias, with none looking at changes to behavioural bias. The studies' findings suggest that multiple intervention approaches (education, encouraging perspective taking, and reducing intergroup boundaries interventions) have a positive role in improving knowledge of, attitudes towards, and comfort treating marginalised patients.

**Table 8.10**

### ***Intervention studies addressing bias in healthcare***

Study	Bias addressed	Summary	Bias reduced		
			Implicit	Explicit	Behaviour
<b>Education</b>					
Dixon-woods et al. (2002) in Morris et al. (2019)	sexual and gender minorities	Decreased anxiety around sexuality and increased comfort levels working with sexual and gender minority patients.	-	✓	-
O'Brien, Puhl, Latner, Mir, & Hunter (2010)	Weight	Education interventions in health students which focused on the uncontrollable reasons for obesity reduced implicit and explicit bias.	✓	✓	-

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Reygan & D'Alton (2013) in Morris et al. (2019)	sexual and gender minorities	Improved knowledge of, and attitudes and comfort levels towards, sexual and gender minority patients.	-	✓	-
Hardacker et al. (2013) in Morris et al. (2019)	sexual and gender minorities	Improved knowledge of and attitudes towards transgender patients.	-	✓	-
Carabez et al., (2015) in Morris et al. (2019)	sexual and gender minorities	Multiple teaching strategies increased understanding about sexual orientation and gender identity.	-	✓	-
Johnson, Rullo, & Faubion (2015) in Morris et al. (2019)	sexual and gender minorities	Improved knowledge of and attitudes towards sexual health issues.	-	✓	-
Strong & Folse (2015) in Morris et al. (2019)	sexual and gender minorities	Improved knowledge of and attitudes towards sexual and gender minority health issues.	-	✓	-
Costa et al. (2016) in Morris et al. (2019)	sexual and gender minorities	Multiple strategies reduced self-reported prejudice towards sexual and gender minority patients.	-	✓	-
Thomas & Safer (2015) in Morris et al. (2019)	sexual and gender minorities	Improved knowledge of and attitudes towards transgender medicine.	-	✓	-
Eriksson & Safer (2016) in Morris et al. (2019)	sexual and gender minorities	Improved knowledge of gender identity and attitudes towards transgender medicine.	-	✓	-
Isaac & Behar-Horenstein (2016) in Morris et al. (2019)	sexual and gender minorities	Improved awareness of sexual prejudice and attitude towards sexual and gender minority patients.	-	✓	-
Ruben & Saks (2020)	Race	Medical students took part in an implicit bias training session which aimed to raise awareness of implicit racial bias in healthcare, negative implicit racial bias remained unchanged.	✗	-	-
<b>Perspective taking</b> Rukavina et al. (2010)	Weight	Multiple classroom learning components including perspective taking did not reduce implicit bias.	✗	✓	-
Swift et al. (2013)	Weight	Educational films to encourage empathy of marginalised group reduced explicit but not implicit bias.	✗	✓	-
Tarasoff et al. (2014) in Morris et al. (2019)	sexual and gender minorities	Improved knowledge and awareness of sexual and gender minority health needs but not comfort towards sexual and gender minority patients	-	✓	-

### **Reduce intergroup boundaries**

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Kelley et al. (2008) in Morris et al. (2019)	sexual and gender minorities	Patient panels and discussion groups led by sexual and gender minority patients increased knowledge of sexual medicine and confidence discussing sexual health issues.	-	✓	-
Rosen et al. (2008) in Morris et al. (2019)	sexual and gender minorities	Patient panels and discussion groups led by sexual and gender minority patients increased knowledge of sexual medicine and confidence discussing sexual health issues.	-	✓	-
Bernard, McAuley, Belzer, & Neal (2003)	Age	Medical students interview older adults in good health about their lifestyle and activities. Improvements in attitudes and prejudices towards older people were seen, but were not significant	-	✓	-

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This literature review also identified a research area which seeks to reduce errors in health care professionals' medical decision making, but which does not attribute errors to bias against patients of protected characteristics (Prakash, Sladek, & Schuwirth, 2019). These studies suggest that educational interventions which encourage deliberate reflection of decisions, close consideration of contrasting patient scenarios, and immediate feedback may hold promise in improving medical professionals' diagnostic decision making.

### 8.3. Discussion

Despite widespread use of bias training, there are few intervention studies. The studies which have been done have rarely been replicated, tend to use one-off, short term outcome measures, and lack common definitions of intervention success. As such, research into bias interventions is limited in helping develop strategies to reduce biased behaviour.

With few replication attempts, it is unclear whether promising approaches remain true in other situations, particularly as many studies 1) focus on biases formed in a sharply defined historical relationship (e.g., UK skinheads in the 1980s; Macrae, Bodenhausen, Milne, & Jetten, 1994) and 2) used student populations to draw conclusions for specific social contexts (e.g., disproportionate police brutality towards black men; Huntsinger, Sinclair, & Clore, 2009). Studies also tend to measure intervention success through one off, short-term outcomes which makes it unclear whether these approaches are sustainable and under which conditions. The studies also vary in what they consider an indicator of a successful intervention. Many studies also included multiple

interventions, limiting understanding of isolating which factors worked. Without systematic comparisons between studies and standardised metrics for success, findings cannot be usefully compared as it is unclear whether changes in bias reduction reflect changes to the intervention itself or in how the intervention's effectiveness is measured. For example, Shook and Fabio (2008) claimed their study offers support for the contact hypothesis as pairing white students with black roommates reduced implicit racial bias. Yet these students also showed an increase in negative explicit racial attitudes and animosity towards black people, so although implicit racial bias scores were reduced it seems strange to consider this a successful study in reducing racial bias.

There are further limitations to these studies due to their underlying assumptions. Discrimination of marginalised groups occurs through both biased assumptions and prejudiced beliefs, and a systemic imbalance of power. There is often an underlying assumption that if someone does not consciously hold biased beliefs they are not contributing to unfair treatment of members of marginalised groups. An assumption underpinning implicit bias research is that the dominant feature of interactions is an ingroup/outgroup relationship, characterised by belonging to either a marginalised group or the group majority. Another lens through which to view this ingroup/outgroup dichotomy is reconceptualising it as power relations, doctor/patient, judge/defendant, employee/boss, policeman/citizen. Considered from this perspective, the interventions become less about ridding the ingroup of its outgroup bias and more about rebalancing the power relations. Historically, social movements to address inequalities have been led by members of socially marginalised groups, such as civil rights, feminist movements, and gay pride, and have focused on power relations, such as women's right to vote.

There is a need for more research in this area: it is evident that covert bias is a widespread problem with serious consequences, but we do not know what works to stop it. The studies which have been undertaken have several methodological and conceptual concerns, chief of which are: a poor measurement tool, lack of replication, poor generalisability, and inconsistent outcomes. Based on the empirical studies reviewed, the direction for future studies in this area should be towards: measuring behavioural change rather than measures which hope to represent behaviour; selecting meaningful outcome variables and using these consistently across studies; and conducting longer term studies to assess whether behaviour changes are sustained.

#### 8.4. Intervention approaches to address bias in health care settings

A major issue in applying bias interventions to healthcare settings is time and cost. There is a tension between the evidence that time pressures and economic strains increase bias (Burgess et al., 2014; Krosch & Amodio, 2014; Johnston & Lordan, 2016) and the need to enact multiple, long-term efforts to reduce bias (Forscher, Mitamura, Dix, Cox, & Devine, 2017) in a constrained healthcare environment. Resolving this dissonance requires a wide body of robust empirical research demonstrating investment in a particular approach would lead to significant improvements in patient outcomes where there are known disparities. Yet research into bias reduction strategies in healthcare environments or focused on age bias is limited. Most studies have been small scale, single site, and has yet to examine long term effects or proposed cost. Meanwhile differential treatment and healthcare disparities remain. This section considers age bias intervention approaches that have been trialled in real-world clinical settings to guide the design of interventions to address age bias in breast cancer treatment.

##### ***Cohesion between specialities***

Older people, many of whom may have multiple morbidities, are now the main users of the NHS (NHS, 2021). Cancer health care professionals are often less experienced in the care of older people and associated risks that come with older age (e.g., comorbidities, polypharmacy, frailty, and cognitive understanding). In the UK, 60% of oncologists have not received specific training in the treatment of older people with cancer, and a further 19% have only received training once (Kalsi & Harari, 2011). Whilst there is rationale for introducing geriatricians as part of the breast cancer team for older patients there is a barrier in the associated costs. The National Association of Breast Cancer in Older Patients has created a fitness assessment tool to be used when treating older breast cancer patients to identify and refer patients that would likely benefit from geriatric assessment. However, feedback from 4/11 participating trusts indicated that even when patients were identified as benefitting from referral geriatricians were not readily available, and 5/11 trusts were unable to use the tool during diagnostic MDTs “due to logistics and time pressures in clinic” (NABCOP, 2019).

Introducing geriatric assessments in oncology changed cancer treatment decisions for approximately one-quarter of patients (median 28%) and increased recommendations for non-oncological interventions (e.g., referrals for social support or nutritional advice) for approximately three-quarters of patients (median 72%) (Hamaker et al., 2018). The direction of change was largely towards less intensive treatments after identifying patients at high risk of adverse treatment outcomes (Hamaker et al., 2018; Sourdet, Brechemier, Steinmeyer, Gerard, & Balardy, 2020). Geriatric assessment is positively associated with a higher rate of treatment completion, a lower rate of toxicity or treatment-related complications, and increases in shared decision making (Ugolini, Zammit, Wright, & Reed, 2017; Hamaker et al., 2018; Rostoft, O'Donovan, Soubeyran, Alibhai, & Hamaker, 2021).

### ***Patient agency***

Patient engagement is critical to high quality healthcare (World Health Organisation, 2016). Engagement in healthcare amongst older patients was associated with improvements in health outcomes and quality of life measures, fewer hospital visits and adverse disease symptoms (Søgaard, Andresen, & Kristiansen, 2021). Considering the collaborative nature of healthcare, involving patients in bias interventions may offer improved outcomes by increasing patient knowledge and agency to question treatment choices and have greater participation in their own care. Covert bias amongst health care professionals has negative effects on patient-provider interpersonal interactions (Elliott, Alexander, Mescher, Mohan, & Barnato, 2016; Penner et al., 2016; Maina, Belton, Ginzberg, Singh, & Johnson, 2018). The focus has traditionally been on the biased person, but another approach is to give patients strategies to recognise and combat bias.

Historically, attempts to address social inequalities have been achieved through social recognition and political action. Social movements have been largely led by members of socially marginalised groups, such as civil rights and feminist movements, and Pride. There is growing recognition for the importance of patient-engaged research in healthcare research (Selby, Beal, & Frank, 2012). Hypothesised impacts of patient engagement are that it will produce better quality research and empower patients to play a more active role in their healthcare, though few studies evaluate outcomes of patient engagement (Esmail, Moore, & Rein, 2015). There is a body of research

indicating that older people often hold an own age bias and that negative perceptions of ageing linked to poor health outcomes (Levy et al., 2016; Han, 2018; Levy, Chung, Slade, Van Ness, & Pietrzak, 2019; Levy & Slade, 2019; Smith, Desai, Slade, & Levy, 2019). The impact of Covid-19 on access to older breast cancer patients prevented this thesis from exploring a patient-focused intervention to improve agency and self-advocacy.

### ***Review processes***

Healthcare policies addressing ageism can be complex, as age can be a marker of physical functioning for some circumstances. Introducing policies as a strategy to reduce ageism relies on 1) establishing clear social norms of what is justifiable (Stangor, Sechrist, & Jost, 2001; Zitek & Hebl, 2007), 2) wishing to avoid the consequences of deviating from policies (Nagin, 2013), and 3) encouraging people to reconcile any dissonance between the policies and their underlying beliefs (Festinger, 1957, cited in World Health Organisation, 2021, p. 95).

There is evidence that, in situations where implicit bias is impacting on explicit behaviours, rather than reducing implicit bias it may be more effective to alter the situation itself to mitigate the effects of implicit bias (e.g., holding blind auditions improved gender diversity in orchestras; Goldin and Rouse, 2000). An approach which has been implemented to reduce disparities in hiring is to shield social identifiers, such as name or gender-blind CVs/ interviews/ auditions (Glazebrook & Ter Meer, 2016). This is not possible in clinical practice, which relies on face-to-face clinician-patient interactions. Rather than attempting to persuade health care professionals to think more carefully about their biases, a system could be introduced which scaffolds choice through deliberate, standardized decision making, reducing scope for bias to interact on judgement. An approach used in aviation, “the humble checklist”, serves as a standardized reminder for the steps required to provide appropriate, high-quality care (as discussed in Barlow, 2008). Introducing this approach in a healthcare setting increased compliance with guideline appropriate treatment for treating patients with venous thromboembolism (from 66 to 84%; Haut et al., 2012). By disentangling the factors required to recommend a medical treatment, health care professionals must deliberately work through each step, ensuring that each patient receives the same care.

***Education and awareness***

An initiative that could be applied to healthcare environments is education and awareness programmes for health care professionals. There is an argument that the undertreatment of older people in healthcare reflects physicians' stereotypes and assumptions of health-related ageing. Geriatric medicine is often seen as less prestigious than some other specialities in medical practice and is neglected in training of other areas of medicine, with the result that the healthcare needs of the fastest growing population may be less well understood by health care professionals (Meiboom, de Vries, Hertogh, & Scheele, 2015; Meiboom, Diedrich, Vries, Hertogh, & Scheele, 2015) (as discussed further in section 4.6.5). Many older breast cancer patients wish to receive full informational provision about their treatment options and feel they receive better care when more information is given (Moser, Melchior, Veenstra, Stoffers, Derks, & Jie, 2021), yet often feel their preferences are ignored or misunderstood by their treating clinician (Hamelinck et al., 2018) (as discussed further in section 2.3).

**8.5. The contribution of this thesis**

Part One of this thesis outlined the differential treatment and poorer outcomes of older women with breast cancer, considered the role of covert bias in perpetuating group disparities, and discussed the potential that age bias may be a root cause in the treatment variations of older breast cancer patients.

Study 1 found that breast cancer health care professionals hold negative associations towards older women, vary in their attitudes towards and opinions about older breast cancer patients, and recommend differential treatments to breast cancer patients based on age. This study concluded there is evidence of age bias amongst breast cancer health care professionals who appear to hold nuanced attitudes and opinions towards older patients which merit study in more detail, and age exerts an independent influence on treatment recommendations.

The review in Part Three found marked gaps in bias intervention research. Various organisations carry out bias training, yet the evidence these trainings are based on is limited and training appears

to take place without any evaluation of its effectiveness. The existing body of empirical bias intervention studies is inconclusive, with studies differing in their intervention approach, the type of bias addressed, and how they measure intervention success, it is currently difficult to gauge whether any approach holds more promise in improving unequal outcomes.

Studies 2 and 3 offer an original contribution through exploring age bias interventions on health care professionals' decision making towards older breast cancer patients. Despite evidence that treatment variations contribute to inferior outcomes for older women with breast cancer and that patient age is a significant factor in breast cancer health care professionals' treatment recommendations (Caldon, Walters, Ratcliffe, & Reed, 2007; Morgan et al., 2017; confirmed in this thesis' Study 1), there are no existing studies on age bias interventions in breast cancer treatment.

Various interventions to counter biases have been tried and implicit bias training, often through education, has become common place within companies and organisations. Yet there remains a lack of evidence as to the effectiveness of these interventions and previous literature does not offer strong support for any one bias intervention approach. As such, this thesis trials two interventions: a tool designed to aid decision making for older breast cancer patients and a novel approach to traditional bias training.

## 9. Study Two: The Age Gap intervention

### 9.1. Introduction

The Age Gap intervention trials a decision aid which predicts older breast cancer patients' survival outcomes for different treatments (Collins et al., 2017). The Age Gap tool was designed 1) as a reference for health care professionals to aid their treatment decisions, 2) to offer decision support for patients, and 3) to facilitate shared decision making between clinicians and patients. Efforts to increase intergenerational contact are the most frequently used approach in age bias interventions (as shown in Table 8.2.) Underpinning intergenerational contact interventions is the premise that frequent positive contact between generations, typically through completing a task together, can foster positive attitudes towards and better communication with older adults (Cadieux, Chasteen, & Packer, 2019). Similarly, shared decision making in healthcare is a collaborative process in which health care professionals and patients work together to form decisions about care, which relies on the health care professional's ability to successfully communicate with the patient to understand their preferences, priorities, and beliefs (NICE, 2021). This intervention aims to provide objective measures of treatment benefits to dispel any instances of inaccurate assumptions based on patient age.

This study conducted an empirical evaluation of the impacts of the Age Gap tool on clinical decision making through interviews with breast cancer health care professionals, during which they discussed and recommended breast cancer treatments for older patients, with and without the tool. A qualitative approach was used to gain insight into how age-related assumptions and attitudes may be influencing treatment recommendations and the Age Gap tool's effect on this (see Appendix C for a copy of the interview presentation). This was done specifically by:

- Comparing the treatment recommendations for breast cancer patients with and without the tool.
- Comparing the reasoning behind treatment recommendations for breast cancer patients with and without the tool.

This study tested two hypotheses:

- 1) Use of the Age Gap tool will decrease focus on age in decision making.
- 2) Use of the Age Gap tool will increase focus on including patients in decision making.

## 9.2. Method

### 9.2.1. Participants

This study recruited breast cancer health care professionals who took part in Study 1 and indicated they were happy to be involved with future studies. Twenty interviews were conducted with breast cancer health care professionals from eight different trusts (seven female, 13 male). Respondents were a mixture of consultant oncoplastic breast surgeons, a breast oncologist, a higher surgical trainee, and a clinical lecturer in breast surgery.

### 9.2.2. Study design

This repeated-measures study asked breast cancer health care professionals to discuss and recommend treatments for older breast cancer patients with varying tumour and personal characteristics, with and without the Age Gap tool. The treatment choices were primary endocrine therapy, surgery, or prefer both options equally. The study information sheet explained that participants should recommend prefer options equally if they felt the pros and cons of each treatment option were sensitive to patient preference and, as such, should be left to patient choice. Responses where the participant had no clear preference and so did not give a recommendation were also coded as prefer options equally.

An independent measures design was considered to avoid order effects, either practice or fatigue, wherein some participants would recommend treatments without the tool and other participants would recommend treatments with the tool. However, given the limited number of available participants, a repeated-measures design was adopted to avoid the potential influence of individual differences between participants associated with an independent measures design and to maximise the number of responses with the Age Gap tool.

The study considered whether the Age Gap tool led to better quality decision making for the treatment of older women with breast cancer against two measures:

- 1) A decrease in the focus of age in decision making, as guidelines state breast cancer patients should be treated “irrespective of age” (NICE, 2009; NICE, 2018). As measured through references to patient age or age-related assumptions.
- 2) An increase in including the patients in decision making. Shared decision making is considered integral to the fair provision of high-quality healthcare (NICE, 2019) and disproportionately improves the care of patient groups who experience inequalities (Durand et al., 2014) yet is often absent in the care of older breast cancer patients (Hamelinck et al., 2018; Maes-Carballo, Muñoz-Núñez, Martín-Díaz, Mignini, Bueno-Cavanillas, & Khan, 2020) (as discussed in section 2.3). As measured in discussions around patient voice or encouraging patient choice. Whilst it was beyond the scope of this study to assign a correct treatment recommendation to each patient scenario, recommendations that the patient choose their own treatment may be considered a reflection of shared decision making.

This study presented patterns of change caused by each intervention, focusing on decreases in the use of age or age-related assumptions and increases in shared decision making.

### 9.2.3. Materials

#### ***Patient scenarios***

The patient scenarios were selected from the scenarios used in Study 1 which had the most divided opinion about treatment recommendations. A range of scenarios was selected with varying patient and tumour characteristics so that the effects of the intervention could be observed on a range of patients.

The patient scenarios were adjusted to a narrative format so that 1) nuance could be explored in the specific drivers of treatment recommendations, 2) the scenarios might feel more realistic to participants and, as such, their responses may be a closer reflection of real practice, and 3) the same patient information could be given before and after the intervention, to see the changes made by the intervention. However, the narrative details could be changed so the respondents may not recognise the scenarios are essentially the same.

Feedback from the narrative scenario pilot indicated that 45 minutes was the reasonable maximum to expect participants to engage. This allowed time to read and discuss six scenarios in depth (three scenarios without the Age Gap tool and three scenarios alongside the Age Gap tool). The patient scenarios presented with and without the Age Gap tool were ostensibly different but essentially the same, as matched by cancer and patient characteristics of the same level. For example, Scenario A describes Elizabeth who “requires full time care including assistance with walking, dressing and eating, and [...] lives in a care home” and Ann who “has lived in a care home for the past nine months as she is unable to get to and from the toilet, dress, or wash independently”. Both patients have severe functional dependence but are presented slightly differently. As such, comparisons could be made between scenarios with and without the Age Gap tool without it being immediately apparent to participants.

The first 12 interviews were conducted using Scenarios A, B1, and C. Once themes were saturated, Scenarios B2, C, and D were introduced for the remaining eight interviews (see Table 11.1). This is in line with theme saturation for other similar studies using “relatively homogenous study populations and narrowly defined objectives” (range 9-17; Hennink & Kaiser, 2021).

- Scenario A was removed from the second phase of interviews as 1) the Age Gap tool was not affecting decision making for this patient, of which health care professionals already had a clear gauge of their limited life expectancy without the tool, and 2) the patient’s severe dementia was clouding conversation around patient age, the focus of this project.
- Similarly, after analysis of the initial 12 interviews, the patient’s age in Scenario B1 was changed from 70-74 years to 80-84 years in Scenario B2 to explore if respondents continued to recognise the benefit of surgery for the older patient (breast cancer-specific survival benefit= 17% for B1 and 16% for B2).
- Scenario C was used in all the interviews as analysis of the initial 12 interviews indicated promising patterns of change due to the Age Gap tool so more data was gathered to establish this trend.
- Scenario D was introduced in the second phase of interviews, as a replacement for Scenario A, to explore how the Age Gap data would effect health care professionals responses to a

patient whose ability to cope with treatments, treatment efficacy, and life expectancy were less clear.

**Table 9.1**

***Age Gap intervention patient scenarios***

Scenario	Patient narrative		Appears in study
<b>A</b> 80-84 years, severe dementia, severe functional dependence, small node-grade I tumour	Elizabeth, aged 83 years old, has been diagnosed with grade I breast cancer after her carer noticed a lump in her right breast. She has a small (20 mm) tumour which has not spread to regional lymph nodes and there are no distant metastases. The cancer is ER+ and HER2-. She moved in with her daughter's family since she was diagnosed with dementia 5 years ago. However in the past year her dementia has progressed and she now requires full time care including assistance with walking, dressing and eating, and she now lives in a care home. She has no other major health problems.	Ann is 81 years old and was recently diagnosed with ER+HER2-, grade I breast cancer. Investigations indicate that the tumour is 18mm and there is no involvement of axillary lymph nodes. Ann was diagnosed with dementia 5 years ago and has lived in a care home for the past 9 months as she is unable to get to and from the toilet, dress, or wash independently. She has no other significant comorbidities other than well controlled hypertension. Ann has been accompanied to the appointment by her daughter who is keen to know what the best treatment would be.	Phase 1
<b>B1</b> 70-74 years, moderate dementia, moderate functional dependence, large node+ grade II tumour	Helen has been diagnosed with a grade II breast cancer after her husband convinced her to visit the GP for a lump in her breast. She is 72 years old, with moderate dementia and mild arthritis. She lives with her husband who is in good health who manages most aspects of her care but they also have help daily to provide some assistance with cooking, shopping, washing and dressing. The tumour is 40mm and has spread to the axillary lymph nodes. The cancer is ER+HER2-. Helen has attended the appointment with her husband, and they are both anxious to hear what treatments are available.	Susan went to her GP after noticing a lump in her left breast. She has been diagnosed with ER+HER2-, grade II breast cancer. The imaging shows the tumour is 43mm and has spread to the axillary nodes. Susan is 74 years old and has moderate dementia. Susan also has mild renal impairment. She lives with her son and daughter-in-law and for the past year has required help with washing and dressing and must be accompanied if she leaves the house. Susan has brought her son to her appointment and they would like to know what the treatment options are.	Phase 1
<b>B2</b> 80-84 years,	Helen has been diagnosed with a grade II breast cancer after her husband	Susan went to her GP after noticing a lump in her left breast. She has been	Phase 2

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<p>moderate dementia, moderate functional dependence, large node+ grade II tumour</p>	<p>convinced her to visit the GP for a lump in her breast. She is 82 years old, with moderate dementia and mild arthritis. She lives with her husband who is in good health who manages most aspects of her care but they also have help daily to provide some assistance with cooking, shopping, washing and dressing. The tumour is 40mm and has spread to the axillary lymph nodes. The cancer is ER+HER2-. Helen has attended the appointment with her husband, and they are both anxious to hear what treatments are available.</p>	<p>diagnosed with ER+HER2-, grade II breast cancer. The imaging shows the tumour is 43mm and has spread to the axillary nodes. Susan is 84 years old and has moderate dementia. Susan also has mild renal impairment. She lives with her son and daughter-in-law and for the past year has required help with washing and dressing and must be accompanied if she leaves the house. Susan has brought her son to her appointment and they would like to know what the treatment options are.</p>	
<p><b>C</b> 85+ years, no comorbidities, no cognitive impairments, independent, small node-grade I tumour</p>	<p>Alice, 88 years old, contacted her GP after noticing a lump in her breast. She has been diagnosed with ER+HER2-, grade I breast cancer. The tumour is 23mm diameter and does not appear to have spread to the axillary lymph nodes. Alice has well controlled type II diabetes but is otherwise fit and well. She lives alone but is visited often by her neighbours and grandson, and meets a friend most days at the local cafe. Her friend has accompanied her and shares that she had had a difficult recovery from surgery a few years ago and doesn't wish the same for Alice. They are both visibly worried and ask what treatment you think is best for Alice.</p>	<p>Grace, aged 86 years, has been referred to your clinic after a recent breast cancer diagnosis. The cancer is grade I, the cancer status is ER+, HER2-, the tumour is 19mm in size and axillary lymph nodes appear normal. Grace lives with her husband and visits her daughter and grandchildren who live nearby on most days. She takes daily medication for long standing and well-controlled epilepsy but is otherwise healthy and active. Grace has read some leaflets detailing different treatment options and is inclined to try tablets but would like your advice as to what would be best for her.</p>	<p>Phases 1 and 2</p>
<p><b>D</b> 75-79 years, moderate comorbidities, severe functional dependence, large, node+, grade II tumour.</p>	<p>Elizabeth, aged 77 years old, has been diagnosed with grade II breast cancer after her carer noticed a lump in her right breast. She has a 43mm tumour which has spread to regional lymph nodes. The cancer is ER+HER2. Elizabeth suffered a stroke two decades ago and has since been wheelchair bound, requiring full time care including assistance with washing and dressing. She has no other major health problems.</p>	<p>Ann is 78 years old and was recently diagnosed with a 42mm, node positive, grade II breast cancer. The cancer is ER+HER2-. Ann has long-standing stable disability and requires full-time care since her involvement in a car accident in her 50s. She has restricted mobility and expressive dysphasia. Ann has been accompanied to the appointment by her daughter and they are keen to know what the right treatment would be.</p>	<p>Phase 2</p>

### ***The Age Gap tool***

This intervention seeks to aid breast cancer treatment recommendations, utilising a tool created by the Bridging the Age Gap programme. The Age Gap tool predicts survival outcomes of different

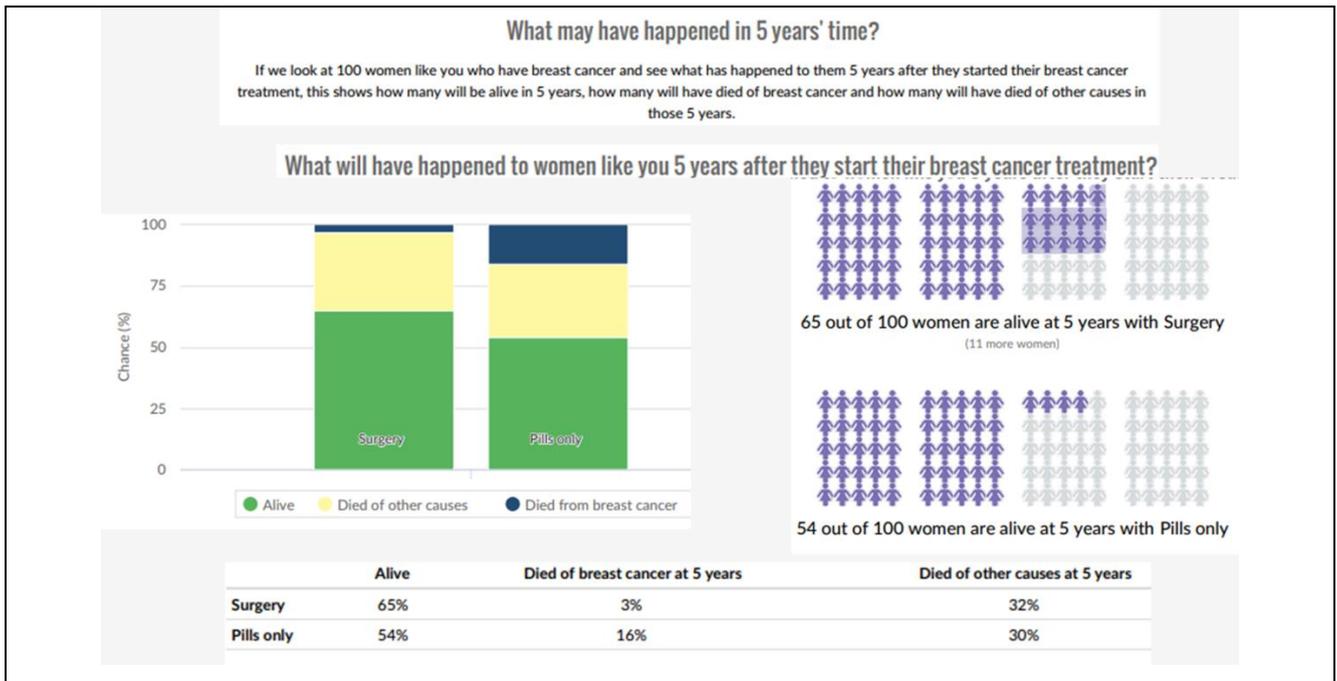
treatment choices for older women with early-stage breast cancer according to patient age, comorbidity, frailty, tumour stage, and ER status. The treatments considered are standard treatment (surgery with adjuvant endocrine therapy) compared with primary endocrine therapy (PET) for women with oestrogen-positive breast cancers, and surgery with and without chemotherapy. The Age Gap tool models estimates of likely survival outcomes based on the actual outcomes of patients over 70 years diagnosed with early breast cancer from the UK cancer registration data between 2002 and 2012. The model is based on National Cancer Data Repository records of approximately 24,000 patients diagnosed with primary operable breast cancer from the Northern and Yorkshire and West Midlands regions (which represent the largest and most complete cancer registries for breast cancer with long term outcomes data). The model has been validated on a second dataset and published in peer review journals (Richards et al., 2016; Ward et al., 2018; Ward et al., 2020). The tool is intended to provide an estimate of likely outcomes, used in collaboration with clinical expertise and patient preference to aid patient decision making. A randomised control trial across 46 UK breast care units found that in women offered a choice of endocrine therapy alone or surgery plus adjuvant endocrine therapy, patients in the intervention group made more informed decisions (knowledge about treatments= 94% vs 74%;  $p = 0.003$ ; Wyld et al., 2022).

The Age Gap tool is designed and optimised to guide clinicians in their treatment of older women. Cancer health care professionals are not always experienced in the care of older people and associated risks that come with older age, such as multiple morbidities, polypharmacy, frailty, and cognitive impairment (Kalsi & Harari, 2011). Other web-based algorithms for breast cancer treatment (such as Predict or Adjuvant!Online) consider the likely outcomes for adjuvant treatments after surgery but not the impact of surgery itself, they do not consider the impact of PET, nor do they individually consider the impact of specific comorbidities, frailty, functional, or cognitive status, and may show less accurate 10 year predictions for older women (Dos Reis et al., 2017).

### **Figure 9.1**

#### ***Age Gap data example***

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**Table 9.2**

**Summary of Age Gap data for patient scenarios**

Scenario	Treatment options	Age Gap outcomes					
		2 years			5 years		
		Alive	Died of breast cancer	Died of other causes	Alive	Died of breast cancer	Died of other causes
A	Surgery	75%	1%	24%	43%	3%	55%
	PET	70%	6%	24%	36%	13%	51%
B1	Surgery	86%	6%	8%	64%	14%	22%
	PET	79%	13%	8%	50%	31%	20%
B2	Surgery	71%	7%	21%	37%	15%	48%
	PET	63%	16%	20%	27%	31%	42%
C	Surgery	89%	1%	10%	65%	3%	32%
	PET	84%	5%	10%	54%	16%	30%
D	Surgery	86%	5%	10%	61%	14%	25%
	PET	80%	11%	9%	48%	29%	23%

9.2.4. Data analysis

Interviews were conducted by the principal researcher and two oncoplastic breast surgeons. The interviewers were familiarised with study materials and interview process through a pilot study

and observation of the initial three interviews (see Appendix D for the information leaflet provided to interviewers). A semi-structured interview approach was adopted to guide the conversation, ensure certain topics were covered, and maintain consistency between interviewers, whilst allowing for exploration of any emergent themes of interest (see Appendix E for a copy of the interview script).

Analysis followed the National Centre for Social Research Framework approach (Ritchie, Spencer, & O'Connor, 2003). The framework approach was chosen as it enables recognition of patterns across many levels (e.g., age and age-related assumptions, treatment recommendations, shared decision making) for large amounts of data whilst emphasising transparency of analysis (Gale, Heath, Cameron, Rashid, & Redwood, 2013). Analysis consists of five main stages:

1) *Familiarisation*

Interviews were transcribed by the principal researcher (see Appendix F for interview transcript examples). Each interview recording was listened to in full several times to note any early impressions, reactions, or comments of interest. Transcripts were organised into responses for each patient scenario with and without the Age Gap tool and coded for the treatment recommended. The researcher focused on topics outlined in the study objectives (patient age and patient involvement in decision making), and any recurring issues.

2) *Identifying a thematic framework*

A framework matrix was created using a mixture of known themes of interest (patient age and patient involvement in decision making) as set out in the study aims and objectives and any emergent themes as raised by the participants (see Appendix G for themes identified). Once themes were identified they were categorised into subthemes and considered against the study aims to ensure the research question was addressed.

3) *Indexing*

The thematic framework was then applied systematically to each participant transcript using NVivo software.

4) *Charting*

The coded data was then lifted from the transcripts and rearranged into the thematic framework. The thematic framework was organised by patient scenario with and without the Age Gap tool and data within themes was coded by treatment recommendation. In this way patterns could be identified in the different themes arising between patients, with and without the Age Gap tool, and for different treatment recommendations (see Appendix H for the thematic framework).

5) *Interpretation*

The thematic framework was then considered for interpretation. Data was moved into Excel to visually identify patterns. Key patterns of interest to the study research question were 1) scenarios where the Age Gap tool appeared to have made a difference in either the themes arising or the treatments recommended, 2) comparing themes around patient age between patient scenarios with and without the Age Gap tool, and 3) comparing themes around patient involvement in decision making between patient scenarios with and without the Age Gap tool.

This process was done for the first phase of interviews which discussed Scenarios A, B1, and C. For the second phase of interviews, which discussed Scenarios B2, C, and D, the transcripts were read through multiple times and considered against the thematic framework to identify if different themes had emerged. Ten percent of transcripts (2/20) were double coded by a second researcher (JM) to ensure interrater reliability.

9.2.5. Ethics

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Research ethics approval was obtained from the Sciences & Technology Cross-Schools Research Ethics Committee. The project reference is ER/BSMS9DV8/2 (see Appendix I for a copy of the ethics approval).

### 9.3. Results

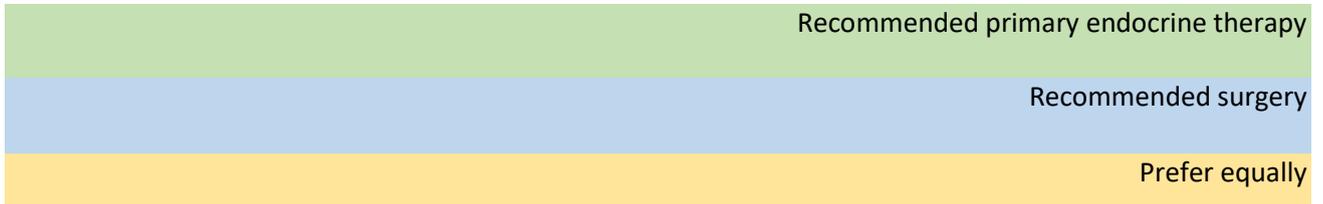
#### 9.3.1. Summary

The affects from the Age Gap tool varied across the indicators of age bias used in this study. Introducing the Age Gap tool did not reduce health care professionals' discussion of patient age or age-related assumptions. The Age Gap tool appeared to encourage shared decision making and have some affect on treatment recommendations, but these benefits were not seen for patients with dementia.

Scenarios A, B1, and B2 described patients with cognitive impairments due to dementia. For Scenario A (severe dementia), most respondents had firmly decided against surgery regardless of the Age Gap data and there was no clear shift in treatment recommendations (Fisher's exact test found no significant difference  $p= .318$ ). For Scenario B1 (70-74 years, moderate dementia), most respondents had already decided surgery was preferable with or without the Age Gap tool (Fisher's exact test found no significant difference  $p= .455$ ). For Scenario B2 (80-84 years, moderate dementia), the Age Gap tool introduced conflict in decision making between concerns for surgery from the patient description and the benefit of surgery shown in the Age Gap data and there was a move away from a clear treatment preference (Fisher's exact test found no significant difference  $p= .429$ ).

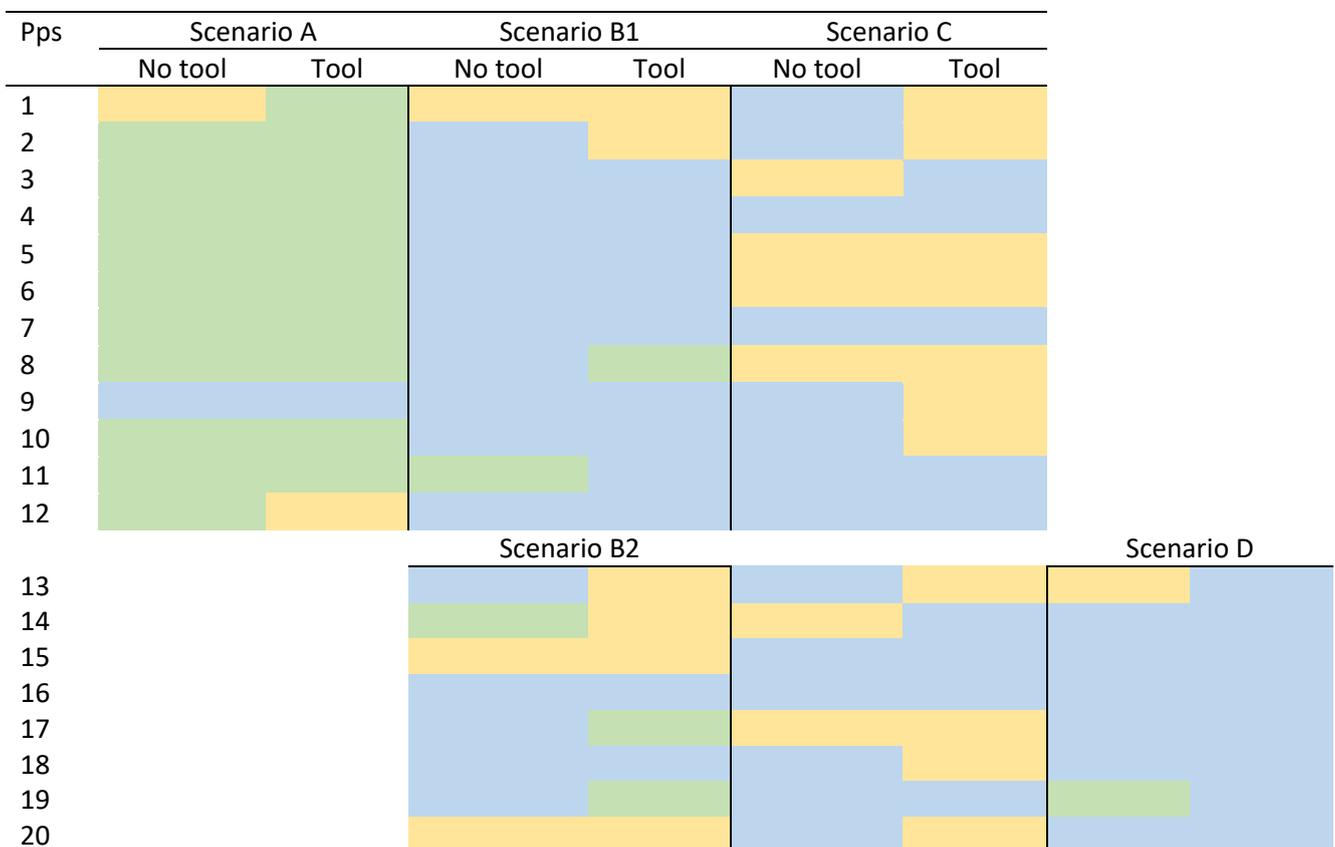
Scenarios C and D described patients without cognitive impairments. For Scenario C the Age Gap tool was seen as a valuable aid to help the patient make a fully informed choice and there was an increase in shared decision making accompanied by a shift from recommending surgery towards recommending patient choice (Fisher's exact test found no significant difference  $p= .642$ ). For Scenario D there was also an increase in efforts to include the patient in decision making and a slight shift with the Age Gap tool towards a unanimous preference for surgery (Fisher's exact test found no significant difference  $p= .467$ ).

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**Table 9.3**

**Summary of treatment recommendations**



**Table 9.4****Summary of key themes**

Scenario	Themes and main treatment recommendation	
	Without tool	With tool
<b>A</b> 80-84 years, severe dementia, severe functional dependence, small node- grade I tumour	<ol style="list-style-type: none"> <li>1. Concerns with dementia</li> <li>2. Patient unable to make treatment choices</li> <li>3. Poor life expectancy</li> </ol>	<ol style="list-style-type: none"> <li>1. Concerns with dementia</li> <li>2. Patient unable to make treatment choices</li> <li>3. Poor functional status</li> </ol>
<b>B1</b> 70-74 years, moderate dementia, moderate functional dependence, large node+ grade II tumour	<ol style="list-style-type: none"> <li>1. Benefits of surgery</li> <li>2. Concerns with dementia</li> <li>3. Patient unable to make treatment choices</li> </ol>	<ol style="list-style-type: none"> <li>1. Benefits of surgery</li> <li>2. Patient is relatively young</li> <li>3. Dangers of delaying surgery</li> </ol>
<b>B2</b> 80-84 years, moderate dementia, moderate functional dependence, large node+ grade II tumour	<ol style="list-style-type: none"> <li>1. Considering dementia</li> <li>2. Patient may be unable to make treatment choices</li> <li>3. Could cope with surgery</li> </ol>	<ol style="list-style-type: none"> <li>1. Considering dementia</li> <li>2. Patient may be unable to make treatment choices</li> <li>3. Concerns about coping with surgery</li> </ol>
<b>C</b> 85+ years, no comorbidities, no cognitive impairments, independent, small node- grade I tumour	<ol style="list-style-type: none"> <li>1. Patient choice</li> <li>2. Patient doing well for their age</li> <li>3. No contraindications for surgery</li> </ol>	<ol style="list-style-type: none"> <li>1. Patient choice</li> <li>2. Patient doing well for their age</li> <li>3. Informed decision making</li> </ol>
<b>D</b> 75-79 years, moderate comorbidities, severe functional dependence, large, node+, grade II tumour	<ol style="list-style-type: none"> <li>1. Life expectancy</li> <li>2. Surgery as the gold standard</li> <li>3. Could cope with surgery</li> </ol>	<ol style="list-style-type: none"> <li>1. Life expectancy</li> <li>2. Gauging patient preferences</li> <li>3. Respecting patient choice</li> </ol>

## 9.3.2. Patient age

The patients' older age was never voiced as the main reason for recommending treatments, but was often listed alongside other factors (e.g., cognitive impairment, functional status, tumour biology). There was equal focus on patient age with and without the tool.

*"She's 80, it's a small cancer, it's hormone sensitive, her dementia is significant, and she lives in a care home."* Pp6, Scenario A without tool, recommendation: PET.

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Some discussed patient age in reference to the risks of surgery for older patients.

*“Somebody who's 88, you need to bear in mind the impact of surgery, and it is likely that it will have some impact on her because surgery gets harder to recover from as you get older.”* Pp1, Scenario C, recommendation: surgery, without tool.

Some discussed patient age in reference to limited life expectancy.

*“At 86 her chances of living five more years are not brilliant.”* Pp4, Scenario C with tool, recommendation: surgery.

Others mentioned older age as a reason in itself to consider PET.

*“She's 86 so I think it's reasonable to offer a choice.”* Pp2, Scenario C with tool, recommendation: patient choose.

Several health care professionals commented that patient age should not limit treatment options.

*“[Surgery is] the gold standard. We shouldn't discriminate based on age.”* Pp2, Scenario B1 without tool, recommendation: surgery.

Yet there were instances where older age was a consideration for recommending PET and younger age was a factor for recommending surgery.

*“She's 81 and in a care home.”* Pp2, Scenario A with tool, recommendation PET.

*“She's only 72. That's not a grand old age at all, not compared to the other patients in their 80s. So, this lady definitely surgery.”* Pp9, Scenario B1 with tool, recommendation: surgery.

Some respondents commented that there are barriers to considering some treatment options for older patients.

*“From my experience with oncology they wouldn't give an 82-year-old chemotherapy.”* Pp16, Scenario B2 without tool, recommendation: surgery.

*“Many ladies this age, I don't know if I can say this but, many women in this age say, ‘oh doctor, I'm realistic, just take the whole breast’. We wouldn't challenge them if this is what they want.”* Pp16, Scenario B2 without tool, recommendation: surgery.

Some respondents commented that treatment efficacy may be less important for older patients but stressed the importance of considering the patient as an individual.

*“Especially the 80 odd year olds. For a lot of them it doesn't really matter what we do to their breast cancer because they're more likely to die with their cancer than of it anyway. But then you're living with cancer, which for some people is really distracting. So, I think that there's a role for surgery, irrespective of age, it's just whether that's the right thing for that person.”* Pp1, general comment.

There was some evidence that patient health was used as a proxy for age. Several health care professionals referenced older age as a reason for recommending PET to a patient in their early 80s with progressed dementia and severe functional dependence (Scenario A), whilst none mentioned age for a patient also in their early 80s but with moderate dementia, living with some assistance (Scenario B2).

There was also evidence that patient age was used as a proxy for health. Two narratives described a patient with moderate dementia either in their early 70s (Scenario B1) or early 80s (Scenario B2). For both scenarios there was wide variation in how health care professionals perceived dementia and functional dependencies. Yet, whilst there was no change in references to patient age, health care professionals focused more on functional status as a reason for PET for the older patient and tumour biology as a reason for surgery for the younger patient.

### 9.3.3. Age-related assumptions

There were several instances of age-related assumptions. These were rarely voiced in reference to a specific patient but as general comments and remained apparent with the Age Gap tool.

One assumption was that older patients are more afraid of surgery.

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*“By the time she needs an operation she’ll be in her 90s [...] so might as well get on with it now rather than later when she’s more afraid.” Pp9*

*“We see patients like this in clinic. Because of their age they perceive breast cancer surgery to be something more major.” Pp3*

Another assumption was that older patients are less able to understand treatment options, accompanied by language which may be considered patronising.

*“It’s a shame that you probably can’t share it with many of the patients that actually need it because they’re probably demented, or maybe they can’t see, they forgot their glasses. [...] Many of these patients cannot really recognize what the bar chart is.” Pp9*

*“I will put it simply because most women want things to be simplified for them, especially at this age.” Pp16*

*“Patients of this generation, and I’m not going to generalize but, are often a bit data averse. They crave the advice of someone they can implicitly trust.” Pp12*

*“These dementia ladies.” Pp1*

Another assumption was that older patients do not want full information about their likely treatment outcomes and cannot cope with information that gives a poor prognosis.

*“It’s not nice to show an 83 year old their chances of dying within a year is 80%. It’s like when you use the ‘adjuvant!Online’ isn’t it. We use it in good prognosis tumours, but you don’t show it to the bad prognosis because otherwise they’re going to commit suicide or something.” Pp9*

### 9.3.4. Shared decision making

The Age Gap tool increased health care professionals’ efforts to engage in shared decision making for patients without cognitive impairments, but not for patients with dementia.

Without the Age Gap tool, one patient narrative outlined that the patient has attended the appointment with a friend who “shares that she had had a difficult recovery from surgery a few

years ago and doesn't wish the same for Alice" (Scenario C). Several participants commented that they would not let the friend's concerns influence their recommendation.

*"I would disregard what the friend said."* Pp8, Scenario C without tool, recommendation: patient choose.

Few respondents acknowledged the likely impact these concerns would have on the patient's preferences and the ways they could address this.

*"Often patients will come with concerns because they know someone that's had a bad experience and you have to explore that with them because it's likely that they're not comparable."* P15, Scenario C without tool, recommendation: surgery.

The Age Gap tool increased discourse around respecting patient choice, considering patient concerns and priorities, and ensuring patients are making informed decisions.

*"Obviously it depends on what she wants to do as well and what her preferences and wishes are."* Pp13, Scenario D with tool, recommendation: surgery.

Many referenced the tool as a useful aid for informed decision making.

*"I would want her to make an informed choice and so I would use the Age Gap tool to show her what the outcomes are likely to be, and I think that will help her to make a better-quality decision."* Pp11, Scenario C with tool, recommendation: patient choose.

There was no consensus on how to explore patient wishes and decision making for patients with dementia. Many health care professionals felt patients with dementia are unable to be involved in healthcare decision making.

*"Nearly all the others have got dementia so it's not reasonable to give them a choice."* Pp5, general comment.

Some explored how they would attempt to ascertain and respect the patients' wishes if they felt the patient did not have capacity to express this clearly.

*"Even if she doesn't have full capacity, [if] she had a strong preference that she didn't like the fact there was a cancer in her breast and we thought that it was reasonable to proceed with surgery [...]"*

*then I think it's reasonable to try and do that for her.*" Pp1, Scenario A without tool, recommendation: unclear.

*"See a little bit about what her husband's thoughts were and whether she had explored any of this in advance with him. We talk about things like advanced directives for these dementia ladies. Sometimes if that's in place that can be useful."* Pp1, Scenario B1 without tool, recommendation: unclear.

*"If her mental health means she couldn't be part of a choice, I would ask her family whether she expressed any previous desires [or] wishes. In those circumstances if they've lived with you for five years you've probably had some careful thoughts about what you felt was in their best interest."* Pp7, Scenario A without tool, recommendation: PET.

Most did not discuss this and decided the treatment for the patient.

*"I think offering a choice is going to be difficult because I'm not sure if she'd retain or understand the choice, so I think endocrine therapy would be my preferred option."* Pp4, Scenario A without tool, recommendation: PET.

One respondent stated the notion of discussing choice for patients with dementia is unrealistic.

*"Giving her a choice with the dementia I think that you're fooling around there aren't you [...]. Surgery is the preferable treatment."* Pp9, Scenario A with tool, recommendation: surgery.

Health care professionals varied in whether they adopted a patient-centred or doctor-centred approach to decision making for different patients. A patient-centred approach is characterised by gauging patient priorities, informed decision making, and respecting patient choice.

*"If she doesn't want surgery, no one's going to twist her arm."* Pp14.

*"It very much depends on the patient you've got in front of you."* Pp15.

A patient-centred approach was adopted less often for patients with severe functional dependence (Scenarios A and D).

A doctor-centred approach is characterised by persuading the patient to choose their preferred treatment, not involving the patient in decision making, and bypassing patient preferences.

*"I will respect her wishes but I would still try to talk her through to do the surgery."* Pp16.

A doctor-centred approach was adopted most often for patients with dementia (Scenarios A and B).

PET was recommended across almost a quarter (24%) of all scenarios. Yet health care professionals who used a patient-centred approach recommended PET eight percent of the time, whilst health care professionals who used a doctor-centred approach recommended PET 42% of the time. Conversely, patient choice was also recommended across almost a quarter (24%) of all scenarios. Yet of those who used a patient-centred approach patient choice was recommended 38% of the time, whilst of those who used a doctor-centred approach only four percent of recommendations were patient choice. Surgery was recommended equally (52%) between those who adopted a patient-centred or doctor-centred approach to decision making.

#### 9.3.5. Treatment recommendations

The Age Gap tool appeared to have some affect treatment recommendations for patients without cognitive impairments (although the direction of change was not clear), but not for patients with dementia.

#### ***Dementia***

There was marked variation in health care professionals' perceptions of dementia, their opinions on how this might progress, and consequently which treatment was recommended. Almost all health care professionals felt that PET was the most appropriate treatment for patients with severe dementia (Scenario A). Without the Age Gap tool, the reasons for recommending PET were largely centred around limited life expectancy, the challenges of surgical wounds and increased risk of complications for patients with dementia.

*"I think that her life expectancy with the dementia is three to five years maximum."* Pp12, Scenario A, recommendation: PET.

*"If she's got progressive dementia and she needs full-time care now I don't know how well she'd cope with surgery [...]. If she gets any complications from her surgery how is she going to cope with*

*that? I don't think it would be a good idea to put her under to do an operation."* Pp2, Scenario A, recommendation: PET.

With the tool, health care professionals acknowledged the survival benefit of surgery but recommended PET through concerns that surgery would negatively impact on quality of life.

*"I would still go with primary endocrine therapy even with the survival benefit because she's not surviving to have any, although it's judgmental, my judgment is I don't think she's getting a great benefit in quality of life."* Pp11, Scenario A, recommendation: PET.

Opinion was divided on whether patients with moderate dementia would be well enough for an operation (Scenarios B1 and B2). Half of health care professionals considered a patient in their early 70s with moderate dementia to be well enough for an operation (Scenario B1).

*"She just needs a little bit of a help with cooking and shopping but they're generally well."* Pp2, Scenario B1 without tool, recommendation: surgery.

Whilst half of health care professionals raised concerns about whether the patient would be well enough for an operation.

*"She has a limited life expectancy in that she can't function on her own so this lady is not far away from needing a nursing home care."* Pp11, Scenario B1 without tool, recommendation: PET.

Most respondents focused on treatment efficacy and recommended surgery based on the cancer biology.

*"If someone can have surgery, they should. It is the best treatment."* Pp4, Scenario B1 with tool, recommendation: surgery.

Responses were also varied for the same patient in their early 80s (Scenario B2), though more respondents regarded the patient as unwell. Some participants felt the patient could cope with surgery.

*"She actually sounds reasonably fit, apart from the dementia. So potentially I would recommend surgery."* Pp13, Scenario B2 without tool, recommendation: surgery.

Most participants raised concerns about the patient's ability to cope and few recommended a treatment with the Age Gap tool.

*“How traumatic an operation would be for her. They're coming into the hospital and the stress of that and whether or not that would be something we, and they, felt that she could deal with.”* Pp15, Scenario B2 with tool, recommendation: no clear preference.

### ***Operating later***

Health care professionals held varied opinions on reserving surgery for later. Most health care professionals recommended PET through concerns that patients with dementia would not cope with surgery. Some respondents discussed how they could operate later if necessary.

*“She'd be seen often. You see them every three or four months and if the tumour is progressing or not getting better then you could do an operation.”* Pp2, Scenario B1 with tool, recommendation: unclear.

Whilst several participants warned of the dangers of delaying surgery, which increased with the Age Gap tool. Warnings were focused on the patient being older or the tumour being more advanced. None commented that dementia is a progressive disease so the patients' health will likely deteriorate over time.

*“This is the kind of patient you see in the clinic, and you see them when they're 88 and then they turn back up when they're 93 and they're in a real state because you haven't treated them aggressively enough. It's a real error to miss out on somebody like this.”* Pp11, Scenario C with tool, recommendation: surgery.

### ***Patient choice***

Most health care professionals recommended that patients should choose their treatment when they considered there to be little difference between PET and surgery (Scenario C), this increased with the Age Gap tool.

*“I'd be quite equivocal about which of these will be better for her.”* Pp5, Scenario C with tool, recommendation: patient choose.

Patient choice was also recommended for situations where the health care professional felt the patient's tumour and general health meant they should be able to cope with surgery, but the

patient's older age meant they should be able to receive PET if that was their preference (Scenario C).

*"I would give her the choice. Although she's 88 she has a reasonable, it would appear, quality of life. She's independent. She's fit and well. She has a small cancer. It's grade I. It's hormone sensitive. So, it would really come down to what she prefers."* Pp6, Scenario C without tool, recommendation: patient choose.

One respondent stated that the practice of offering patients a choice was a pretence.

*"I always offer the patient a choice and that's the answer for all patients. Now the problem with the choice is how do you get the patients to do what you actually want them to do. The idea of giving the patient a choice is false pretences, whereby you know you're just saying it for the sake of saying it but at the end of the day they do what you want them to do. That's my job as a salesman: selling. We always say give the patient a choice, but in all fairness they get what we want them to get."* Pp9, Scenario B1 without tool, recommendation: surgery.

Whilst no other respondents made such explicit statements, patient choice was often caveated by the clinicians' own recommendation.

*"Ofcourse, you give the patient choice, but I think personally i'd be very hesitant to offer primary endocrine therapy."* Pp3, Scenario B1 without tool, recommendation: surgery.

### 9.3.6. Responses to the Age Gap tool

There were mixed responses to the potential role of the Age Gap tool in clinical practice. Half the participants reported that the tool had reinforced or acted as a checkback to their decision

*"It's always good to have something objective because it's not easy decision making [...] there's almost no rights and wrong and I think a lot of it's swayed by patient preferences."* Pp3, Scenario C

Whilst half the participants reported that the tool had made no difference to their decision.

*"It wasn't useful, I would've made that decision anyway."* Pp9, Scenario B1

Several participants felt the tool was not useful to their decision but could be used to facilitate discussion with the patient or their family to help explain their decision.

*"I don't think it has helped with my decision making but, bearing in mind my decision was to give the patient a choice, I think it'll probably help the patient decide."* Pp4, Scenario B1

Some commented that the Age Gap data could be used to facilitate shared decision making to ensure the patient makes an informed decision.

*"If you had this tool, you could show her and say that 'this is what it'll be' and that can help inform her decision as well."* Pp2, Scenario C

A few participants felt the difference in survival benefit between treatments caused them to change their initial treatment preference towards surgery.

*"It's interesting because I would have probably offered her primary endocrine therapy but with the Age Gap data, I think I'd lean towards surgery [...]. The difference at five years is greater than I was expecting."* Pp5, Scenario B1

Several health care professionals felt that considerations of quality of life should take higher priority than life expectancy for some patients.

*"[The data's] only telling us are that they are alive, not if they are alive and well."* Pp5, Scenario A

Some participants commented that the Age Gap data conflicted with their own judgements.

*"My emotional response is 'just have the tablets' but my brain is telling me i've got to offer a choice because there's just enough of a difference there."* Pp12, Scenario A

There were varied perceptions of survival differences as small or large both within and between patient scenarios.

For Scenario A, half the respondents focused on the difference in life expectancy between treatments at two years (5%), considering it to be small.

*"I don't think there's a huge difference in the survival from this tool."* Pp2

Whilst half the respondents focused on the difference in life expectancy between treatments at five years (10%), feeling it was considerable.

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*"I find it slightly interesting that surgery makes such a big difference. [...] Once you start looking at that it pushes you towards surgery doesn't it frankly." Pp11*

The Age Gap data showed a seven percent difference in overall life expectancy for two scenarios: at five years for Scenario A (80-84 years) and at two years for Scenario B1 (70-74 years). Of those that commented on this difference, for Scenario A all felt it was small, whilst for Scenario B1 all felt it was large.

The difference in life expectancy between treatments at five years was similar for Scenarios B1 (17%) and B2 (16%). For Scenario B1 all respondents felt the difference was considerable.

*"There's a big difference in survival." Pp10, recommendation without and with tool: surgery.*

Whilst for Scenario B2 perceptions varied. Some respondents viewed the difference as large.

*"She has nearly double the chance of dying because of the breast cancer if we didn't operate. So, I would call it a risk worth taking to do the surgery." Pp16, Scenario B2*

However, more often respondents commented that the difference was small.

*"I've got no strong opinion here [...]. There's a slight improvement with surgery [...]. She's roughly got a two-thirds chance of being alive in two years time and roughly a third chance of being alive in five years time whatever we do." Pp13, Scenario B2*

For Scenario B2, there were also varied perceptions for the difference in life expectancy at two years (8%), with half considering it to be small and half to be large.

There was wide variation in perceptions of the Age Gap data for Scenario C. Slightly more than half (56%) felt the difference in overall life expectancy at five years (11%) was large and recommended surgery.

*"She's got actually a higher than I thought chance of making it to five years and, I suspect, higher than she thought." Pp7, Scenario C*

Whilst slightly less than half (44%) felt it was small and recommended patient choice.

*"There's not a huge difference in life expectancy but there is some." Pp5, Scenario C*

#### 9.4. Discussion

This study considered the effects of a decision aid on age bias in health care professionals' decision making for older women with breast cancer.

The Age Gap tool did not appear to reduce health care professionals' focus on patient age. Some health care professionals voiced age-related assumptions about older patients, in line with stereotypes of older adults as "doddering but dear" (Cuddy & Fiske, 2002) that older patients are less able or willing to be involved in their treatment choices and wish to receive less intensive treatment. The assumptions were rarely referencing a specific patient and were present with and without the Age Gap tool.

There were mixed results for the effect of the Age Gap tool on including patients in decision making. There was some evidence that the Age Gap tool was more likely to affect treatment recommendations and encourage patient-centred care for patients who were seen to have the cognitive capacity to be involved in their treatment choices (C and D), but not for the patients with dementia (A, B1, and B2). Many respondents stated that patients with dementia cannot contribute to their treatment decisions and most respondents expressed that the Age Gap tool would not benefit patients with cognitive impairments. A randomised control trial of the Age Gap tool found patients perceived high levels of shared decision making, though found no difference with or without the tool and patients with dementia were not considered separately (Wyld et al., 2021). There are no guidelines on the role of dementia in decision making for cancer patients, and care varies widely (Caba et al., 2021). Research on the cancer care of patients with dementia consistently finds decision making is complex and should be individualised, yet oncologists are often unsure of how best to communicate with patients with dementia (Witham, Haigh, & Foy, 2014; Courtier, Milton, King, Tope, Morgan, & Hopkinson, 2016; Griffiths et al., 2020). Family carers are critical for facilitating high-quality cancer care, but the support needs of carers are often unrecognised (Courtier, Milton, King, Tope, Morgan, & Hopkinson, 2016); carers rely on expert opinion from clinicians (Martin, Burton, & Wyld, 2021), but do not always feel they have understood the treatment options (McWilliams et al., 2018). People living with dementia often wish to engage in shared decision making and be involved in treatment decisions but feel overlooked by health care professionals and family caregivers (Daly, Bunn, & Goodman, 2018).

The Age Gap tool was used as an age bias intervention in hopes that objective data would dispel subjective assumptions. However, findings within this study highlighted that how health care professionals select and interpret decision aids may still be suspect to bias. Health care professionals varied widely in how they interpreted the Age Gap data, and some respondents expressed that when offering patients a choice, they are swaying the patient towards their own preference. The framing effect on cancer treatment decisions has been consistently observed, whereby surgery is generally preferred when treatment outcomes are framed positively (e.g., there is an 80% chance of living another five years) and adjuvant treatments are generally preferred when treatment outcomes are framed negatively (e.g., there is a 20% chance of dying within five years) (Tang & Chooi, 2021). There is evidence that an effective debiasing strategy to reduce the framing effect is to provide visual information, such as graphs or icons, in addition to statistical information (Ludolph & Schulz, 2018). Whilst the Age Gap tool presents survival outcomes for different treatments as a table, chart, and pictogram, variation remained in which parts of the data health care professionals focused on and whether they framed the outcomes positively or negatively. Although this study was unable to directly consider the framing effect on patient decisions, the findings highlighted that even if equal and comprehensive information is provided to all patients, the framing of this information by clinicians is likely to affect how patients understand and perceive treatment risks, and therefore the choices they make.

### ***Limitations***

This study considered the effects of the Age Gap tool on decision making for a small number of patient scenarios and as such, the effect of the tool on a wider range of patient and cancer characteristics have yet to be explored. For instance, it is unclear whether the views of many respondents that patients with dementia would be unable to be involved in their treatment decisions are specific to dementia, or other forms of cognitive impairments or factors such as frailty.

Under ideal conditions, the study's design would enable direct comparison with Study 1, considering the effects of the Age Gap tool on the same patient scenarios. This would allow for direct comparison on the impact of each intervention on reducing the age bias evidenced in Study

1. Study 1 comprised of a larger number of patient scenarios which varied by age to enable direct comparison between treatment recommendations for younger and older patients. As the number of patient scenarios in Study 2 was limited, the study focused on a selection of older patients. Consequently, Study 2 offers a rich commentary on the effects of the Age Gap tool on treatment recommendations and reasoning behind them but could not compare changes between older and younger patients and, as such, could not examine possible reductions to the age bias evidenced in Study 1.

There are no standard metrics for defining intervention success (as discussed in Chapter 8). The study offered clear rationale for considering improvements in decision making as a decreased focus on age and increased inclusion of patients in decision making. Yet recognises that a vital piece of research to undertake is exploring what high-quality decision making looks like from the perspective of older breast cancer patients.

### ***Future directions***

The varied interpretations by health care professionals of the same data and resistance of some health care professionals to engage with the tool suggests the tool may be best used during MDTs (multidisciplinary teams, during which multiple health care professionals' views may be offered), and indicates a possible benefit to include some objective indicator of these differences to help reduce bias in the interpretation of the data. In absence of guidance akin to that commonly accepted in the recommendation of chemotherapy in breast cancer treatments based on predicted survival benefit at five years (<3%= no chemotherapy, 3-5%= discuss risks and benefits equally, >5%= discuss the benefits of chemotherapy), there could be scope to include the actual treatments undergone by previous patients with these characteristics as a benchmark against which to consider own recommendations.

There is a need to further evaluate the role of the Age Gap tool as a decision aid for breast cancer patients with cognitive impairments. If this pattern should be confirmed in follow-up studies, there would be a need to address how the Age Gap tool may be adapted to ensure it is equally accessible and beneficial to all older breast cancer patients.

There is also a need to consider what high quality decision looks like from the patients' perspective. What remains unclear is, what do patients want, and how best can health care professionals find out? To maximise the potential benefits of age bias interventions, further research is needed into how health care professionals can best:

1. Gauge and respect the wishes and choices of patients with cognitive impairments and functional dependencies independent of influence of age.
2. Help patients to make fully informed choices guided by patients' priorities, rather than health care professionals' preferences.

### ***Implications and conclusions***

This study's results indicate that the Age Gap tool may aid shared decision making and inform health care professionals judgements for patients who are viewed to have cognitive capacity but not for patients with dementia. The results highlight interventions to address age bias must also consider indirect factors of age bias, such as fair provision to comprehensive and informed decision making for patients with cognitive impairments.

## 10. Study Three: Novel bias training

### 10.1. Introduction

This intervention was education based, focusing on the existence of age bias, the effects it has, and the participants' responsibility to address it. An evaluation of medical perceptions of bias training found that most organisations already had some form of training in place and felt implicit bias was an important issue worth addressing. However, few felt that their current training was making a difference (Tsai & Michelson, 2020). Estimates of billions of pounds are spent each year on unconscious bias training (cited in Carter, Onyeador, & Lewis Jr, 2020), yet there is little evidence that these programs yield meaningful change and some evidence of negative effects (Bezrukova, Spell, Perry, & Jehn, 2016; Dobbin & Kalev, 2016; Atewologun, Cornish, & Tresh, 2018; Chang et al., 2019). Despite this, bias training in some form will likely remain at the forefront of diversity initiatives as it offers organisations a relatively easy approach to display efforts to reduce inequality (Onyeador, Hudson, & Lewis Jr, 2021). Many people who do not belong to a marginalised group are unaware of the extent of inequalities around them (Kraus, Onyeador, Daumeyer, Rucker, & Richeson, 2019) and Study 3's intervention continued traditional bias training's focus on raising awareness of inequality. However, Study 3 departed from traditional bias training through 1) a shift away from abstract models of unconscious bias towards recognising and addressing familiar acts of conscious bias, and 2) creating a culture of accountability not complicity.

An underlying premise of bias training is that bias is often unconscious and, consequentially, an awareness of bias leads to change in behaviour. Yet there is little evidence that teaching the psychology of bias is helpful for reducing it and increasing evidence that the behaviours captured by the IAT may not be unconscious at all (Gawronski, Hofmann, & Wilbur, 2006; Hahn & Gawronski, 2014; Gawronski, 2019). Framing bias as largely unconscious diminishes the prevalence of overt discrimination and confuses unintentional with unconscious. There has been an assumption that because the IAT infers associations through performance rather than report, the associations captured are beyond conscious awareness (Nosek, Banaji, & Greenwald, 2002). Low correlations between implicit associations and self-reported attitudes have been considered as evidence that people are unaware of these associations (Greenwald & Banaji, 1995). Yet studies have shown that correlations are only low when mediated by factors such as desirability bias and motivation to control prejudices (Hofmann, Gschwendner, Nosek, & Schmitt, 2005), and that

people can predict their implicit bias results (Hahn, Judd, Hirsh, & Blair, 2014). It may be that people are aware of their associations but are unaware of, or unwilling to voice, the impact of these associations on their behaviour. Whilst conscious bias and biased systems remain, unconscious bias training may be unlikely to impact on social or health inequalities. Rather than reduce implicit associations, it may be more meaningful to reduce the behaviours these associations manifest, in turn improving patient/ provider interactions. The intervention explored in Study 3 moves away from traditional methods of bias training, and instead focuses on acknowledging and changing biased behaviours using tangible familiar scenarios and simple solutions which can be easily incorporated into daily patterns.

Bias training's suggestion that implicit bias is beyond intent or control, may leave people with a perception that trying is futile. Lessons may be taken from social movements such as #MeToo and Black Lives Matters which call for recognition of our own biases and complicit contributions to social inequalities, and demands for accountability; transitioning the dialogue of inequalities away from minority issues we need to empathise with to problems we all need to solve (Soucie, Parry, & Cousineau, 2018; Chabloz, 2021). Paradoxically, increasing individual accountability appears to allow people to "see the bigger picture" as we see publicly how widespread and entrenched inequalities are, it leads to introspection of how you can do better and the continuous role you can play to improve social equality. As the spotlight is shone on organisation after organisation, scrutiny is turned less to the act itself and more to the reaction of the wrong-doer. Do they accept accountability? What are their pledges moving forward? This intervention diverges from most bias training programmes by encouraging participants to consider their role and responsibility to address and interrupt biases. This study developed a novel approach to bias training to improve decision making for older breast cancer patients. This was done specifically by:

- Comparing the treatment recommendations for breast cancer patients before and after the intervention.
- Comparing the reasoning behind treatment recommendations for breast cancer patients before and after the intervention.

This study tested two hypotheses:

- 1) The novel bias training will decrease focus on age in decision making.

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- 
- 2) The novel bias training will increase focus on including patients in decision making.

## 10.2. Method

### 10.2.1. Participants

This study recruited later year medical students. Student samples are common in research studies due to ease of recruitment as compared to qualified clinicians and reduced cost of administration (Arnett, 2016). Student studies can be criticised as overgeneralising results to wider populations. This study recruited medical students not as a proxy for health care professionals, but on the basis that they were likely to be more amenable to awareness-raising about age bias than experienced consultants, and that an intervention early in their careers would likely have a greater impact in the long term.

This study recruited students from Brighton and Sussex Medical School through university mailing lists accessed by project supervisors. Financial incentive was offered to encourage participation (£10 per participant). Available funding for participation incentive monies capped the number of participants at 30.

### 10.2.2. Materials

#### ***Patient Scenarios***

This study used the three patient narratives from phase two of the Age Gap intervention (Study 2): Scenarios B2, C, and D (see section 9.2.3 for a more detailed explanation) (Table 10.1). Additional medical information was also provided to ensure the scenarios were appropriate for a student population, for example whether a 20mm tumour in the breast is considered small or large, whilst retaining information key to the study design.

Table 10.1

*Novel bias training patient scenarios*

Scenario	Patient narrative	
<b>B2</b> 80-84 years, moderate dementia, moderate functional dependence, large node+ grade II tumour	Helen has been diagnosed with a grade II breast cancer after her husband convinced her to visit the GP for a lump in her breast. She is 82 years old, with moderate dementia and mild arthritis. She lives with her husband who is in good health who manages most aspects of her care but they also have help daily to provide some assistance with cooking, shopping, washing and dressing. The tumour is 40mm and has spread to the axillary lymph nodes. The cancer is ER+HER2-. Helen has attended the appointment with her husband, and they are both anxious to hear what treatments are available.	Susan went to her GP after noticing a lump in her left breast. She has been diagnosed with ER+HER2-, grade II breast cancer. The imaging shows the tumour is 43mm and has spread to the axillary nodes. Susan is 84 years old and has moderate dementia. Susan also has mild renal impairment. She lives with her son and daughter-in-law and for the past year has required help with washing and dressing and must be accompanied if she leaves the house. Susan has brought her son to her appointment and they would like to know what the treatment options are.
<b>C</b> 85+ years, no comorbidities, no cognitive impairments, independent, small node- grade I tumour	Alice, 88 years old, contacted her GP after noticing a lump in her breast. She has been diagnosed with ER+HER2-, grade I breast cancer. The tumour is 23mm diameter and does not appear to have spread to the axillary lymph nodes. Alice has well controlled type II diabetes but is otherwise fit and well. She lives alone but is visited often by her neighbours and grandson, and meets a friend most days at the local cafe. Her friend has accompanied her and shares that she had had a difficult recovery from surgery a few years ago and doesn't wish the same for Alice. They are both visibly worried and ask what treatment you think is best for Alice.	Grace, aged 86 years, has been referred to your clinic after a recent breast cancer diagnosis. The cancer is grade I, the cancer status is ER+, HER2-, the tumour is 19mm in size and axillary lymph nodes appear normal. Grace lives with her husband and visits her daughter and grandchildren who live nearby on most days. She takes daily medication for long standing and well-controlled epilepsy but is otherwise healthy and active. Grace has read some leaflets detailing different treatment options and is inclined to try tablets but would like your advice as to what would be best for her.
<b>D</b> 75-79 years, moderate comorbidities, severe functional dependence, large node+ grade II tumour	Elizabeth, aged 77 years old, has been diagnosed with grade II breast cancer after her carer noticed a lump in her right breast. She has a 43mm tumour which has spread to regional lymph nodes. The cancer is ER+HER2-. Elizabeth suffered a stroke two decades ago and has since been wheelchair bound, requiring full time care including assistance with washing and dressing. She has no other major health problems.	Ann is 78 years old and was recently diagnosed with a 42mm, node positive , grade II breast cancer. The cancer is ER+HER2-. Ann has long-standing stable disability and requires full-time care since her involvement in a car accident in her 50s. She has restricted mobility and expressive dysphasia. Ann has been accompanied to the appointment by her daughter and they are keen to know what the right treatment would be.

**Novel bias training**

The intervention was an [educating bias film](#), designed and created for this study. The film depicts health care professionals showing subtle age-biased behaviors. These behaviours accumulate so that the older patient feels less confident engaging in conversations with medical professionals, is less likely to seek medical attention, and, as such, receives differential treatment to a younger patient.

The aim is to demonstrate how health care providers' subtle behaviors can amount to patients experiencing differential care. Research identifies patterns amongst older patients that may be linked to negative health outcomes. Older patients are more likely to have low health literacy (Von Wagner, Knight, Steptoe, & Wardle, 2007; Ashida et al., 2011), hold a traditional perspective of healthcare as doctor-centred, and do not always feel they would be welcome to participate in treatment decisions (Ocloo, Garfield, Franklin, & Dawson, 2021). Health care professionals are more likely to bypass older patients in deciding treatments (Ambady, Koo, Rosenthal, & Winograd, 2002), communicate with less sensitivity (Ben-Harush, Shiovitz-Ezra, Doron, Alon, Leibovitz, & Golander, 2016), and make assumptions about older patients' preferences (Lagace, Tanguay, Lavallee, Laplante, & Robichaud, 2012). The scenarios describe health care professionals' responsibilities to try to gauge and respect patient priorities, ensure that information is equally accessible to all patients, and recognise the important role family caregivers provide whilst ensuring the patient is not bypassed.

**Table 10.2****Film Script Outline**

Script	Illustrative film stills
<p>Introduction</p> <p>A core principle underpinning UK healthcare is inclusivity, yet inequality remains a focal feature of access to healthcare. In breast cancer treatment, there is clear evidence of deviation from evidence-based guidelines and worse outcomes in the treatment of older women.</p>	

Script	Illustrative film stills
<p>Poorer outcomes for older breast cancer patients</p> <ol style="list-style-type: none"> <li>Older women experience the highest incidence and worst survival rates for breast cancer in the UK. One in eight women will be diagnosed with breast cancer in their lifetime.</li> <li>Nearly 60% of breast cancer diagnoses are in women over 65 years, over 80% of breast cancer cases are in women over 50 years, and over half of breast cancer related deaths are in women over 75 years.</li> <li>In the last 40 years, breast cancer survival rates have doubled. However, improvements have only been seen in populations under 65 years old and survival rates have worsened for those over 80 years old.</li> </ol> <p>Over half of older women with breast cancer are undertreated, inadequately treated, or treated outside clinical guidelines. Breast cancer related deaths increase with age, independent of risk for other-cause mortality, tumour, and treatment characteristics.</p>	 
<p>Differential treatments for older breast cancer patients</p> <ol style="list-style-type: none"> <li>Older women are less likely to receive surgery, chemotherapy, and radiotherapy.</li> <li>They are also more likely to be offered and treated by mastectomy rather than breast conservation surgery and less likely to be offered breast reconstruction surgery.</li> <li>These differences remain even when comorbidities, frailty, functional status, and life expectancy are accounted for.</li> </ol> <p>The differential treatment of older people in medicine is likely the result of 1) a lack of research and trials into the study of ageing in medicine and 2) underinvestment in geriatric medicine resources and education. These have led to a lack of evidence-based guidelines, a poor understanding of older age, and a reliance on age-related assumptions. As such chronological age may be being used as a proxy for factors such as biological age, comorbidities, frailty, and patient preference.</p>	   
<p>Scenarios</p> <p>While it may be very challenging to accurately explain conditions and treatments without using medical terms or acronyms, patients may shut down rather than vocalise something they may not understand. Although outwardly agreeing, inwardly they may feel confused, overwhelmed, and unable to express their need for a clearer explanation.</p> <hr/> <p>There is evidence that older patients may not always voice their concerns or questions for fear of wasting the doctor's time. This leaves potential worries unanswered, such as 'how would I get from my house to the hospital all the time?', 'who will care for my family if I'm sick?', 'How will I manage financially?' 'I don't want to be stuck</p>	 

Script	Illustrative film stills
<p>in a hospital bed, sick and in pain’ and stops the patient from making a fully informed decision.</p>	
<p>Sometimes, doctors will feel that the best way to help is to give their patient as much information as possible. Whilst sharing information is important, clinicians run the risk of information overload. The patient may feel overwhelmed and panicked by the amount of information they're given at once and unsure of where to start. Possibly leading to more distress and confusion.</p>	
<p>A patient’s family and friends are often key in offering practical and emotional support and may want to be highly involved in conversations around treatment planning. There is a chance that the patient may feel their opinions and wishes have been overlooked and their voice has gone unheard.</p>	
<p><b>Conclusions</b></p> <p>It can be difficult to distinguish ageism from carefully reasoned clinical care, particularly when evidence for best-practice medicine in older adults is sparse. So how exactly can you foster your commitment to anti-ageism in patient treatment?</p> <p><b>Actively reflect</b> on your conversations with older patients and the power balance between you.</p> <p><b>Get advice</b> from care of the elderly physicians and tools and resources about older patients’ needs.</p> <p><b>Encourage older patients</b> to ask questions and participate in their treatment as much as they wish.</p>	 

### 10.2.3. Study design

The study was carried out online (see Appendix J for copy of online survey). Medical students were asked to explain their reasoning and recommend treatments for three older patients with operable breast cancer, varying in personal and tumour characteristics. The treatment options were 1) primary endocrine therapy, 2) surgery, and 3) prefer options equally (representing patient choice). Participants then viewed the intervention film and recommended treatments for three more patients. The patient scenarios before and after the intervention were ostensibly different but essentially the same, as matched by cancer and patient characteristics of the same level (see section 9.2.3 for a more detailed explanation).

#### 10.2.4. Data analysis

A Bhapkar test was calculated in Excel to see if the intervention had a significant effect on the overall distribution of treatment recommendations for each scenario. A McNemar post-hoc test with Bonferroni adjustment criterion of 0.025 was carried out to see which recommendation changed significantly after the intervention: PET, surgery, or equal preference.

Thematic analysis followed the National Centre for Social Research Framework approach (Ritchie, Spencer, & O'Connor, 2003). The responses were organised by patient scenario before and after the intervention and coded for the treatment recommended. Responses were read through several times to familiarise the researcher with initial impressions, common themes, or noteworthy comments. In recognition of medical students' limited experience recommending treatments, responses were also read whilst considering whether the participant was demonstrating adequate understanding. Two treatment recommendations were removed from final analysis due to inadequate understanding e.g., one respondent misunderstood C as the patient had previously had a difficult recovery from surgery, rather than her friend, and consequentially recommended PET. The responses were considered against the thematic framework developed for the Age Gap intervention, and the framework was adjusted for any new themes that emerged in the novel bias training. The framework was then considered for interpretation focusing on differences within patient scenarios before and after the intervention in 1) the treatments recommended, 2) themes around patient age, and 3) themes around patient involvement in decision making (see section 9.2.4 for a more detailed explanation of the framework analysis process) (see Appendix K for the novel bias training's thematic framework).

Differences in participants' confidence in their treatment recommendations before and after the intervention were analysed in SPSS using percentages, median responses, and range.

#### 10.2.5. Ethics

## AGE BIAS IN BREAST CANCER

Ethical approval was obtained from the Sciences & Technology Cross-Schools Research Ethics Committee. The project reference is ER/BSMS9DV8/2.

## 10.3. Results

### 10.3.1. Summary

The novel bias training was associated with a shift in treatment recommendations towards patient choice (Scenario B2: 20 to 47%, Scenario C: 19 to 60%, Scenario D: 23 to 40%). There was also a decrease in references to the patients' older age in their reasoning for recommending treatments (Scenario B2: 36 to 6%, Scenario C: 26 to 19%, Scenario D: 17 to 6%). Also, there was an increase in discourse around patient voice (Scenario B2: 19 to 55%, Scenario C: 48 to 74%, Scenario D: 23 to 48%) (Table's 10.3 and 10.4).

Scenario B2 described a patient aged 80-84 years, with moderate dementia and moderate functional dependence, diagnosed with a large, node positive, grade II tumour. Before the intervention, the main treatment recommendation was PET (19/30) and the main reasonings behind decision making were 1) the patient's older age, 2) concerns with comorbidities, and 3) concerns with whether the patient could cope with surgery. After the intervention, the main treatment recommendation was patient choice (14/30) and the main reasonings remained 1) concerns with comorbidities and 2) concerns with whether the patient could cope with surgery, alongside 3) the importance of respecting patient choice. Respondents' confidence in their treatment recommendation remained unchanged, with just under half (47%) feeling confident in their decision before and after the intervention.

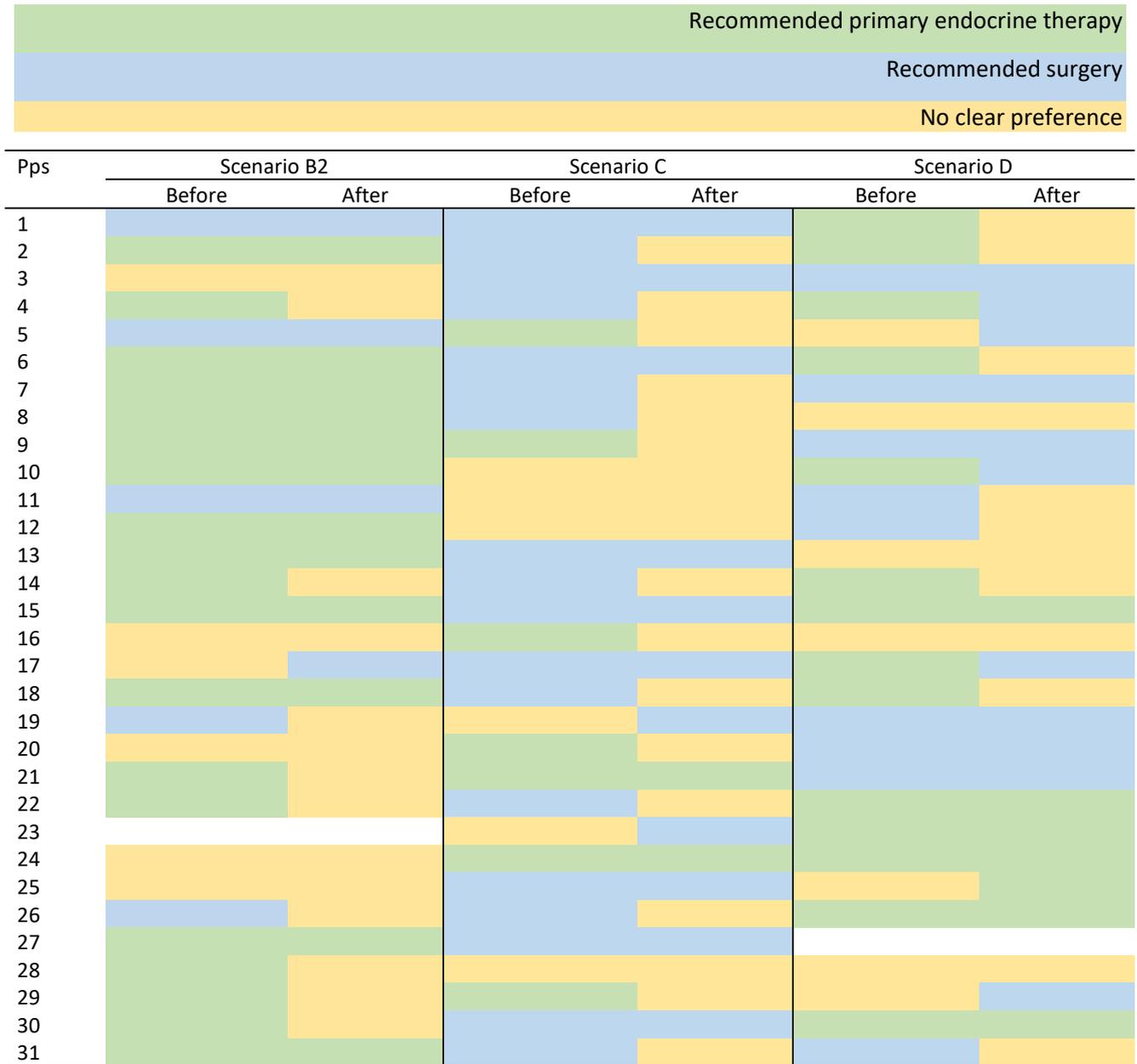
Scenario C described a patient aged 85+ years, living independently with no cognitive impairments, diagnosed with a small, node negative, grade I tumour. Before the intervention the main treatment recommendation was surgery (18/31) and the main reasonings behind decision making were 1) the patient appears in reasonable health, 2) treatment efficacy, and 3) the importance of respecting patient choice. After the intervention, the main treatment recommendation shifted to equal preference (18/31) and the main reasonings remained 1) the patient appears in reasonable health and 2) the importance of respecting patient choice, alongside 3) ensuring the patient is fully informed. Respondents' confidence in their treatment recommendation increased, from almost two-thirds (65%) feeling confident in their decision before the intervention to three-quarters feeling confident in their decision after the intervention.

Scenario D described a patient aged 75-79, with a long-standing stable disability and severe functional dependence, diagnosed with a large, node positive, grade II tumour. Before the intervention the main treatment recommendation was PET (14/30) and the main reasonings behind decision making were 1) concerns with comorbidities, 2) concerns with whether the patient could cope with surgery, and 3) the patient's life expectancy. After the intervention, the main treatment recommendation shifted to equal preference (12/30) and main reasonings remained 1) the patient's life expectancy, alongside 2) the importance of finding out what the patient's thoughts are, and diametrically 3) feeling the patient could cope with surgery. Respondents' confidence in their treatment recommendation increased, from half feeling confident before the intervention to just over three-quarters (77%) feeling confident after the intervention.

AGE BIAS IN BREAST CANCER

**Table 10.3**

**Treatment recommendations for the novel bias training**



**Table 10.4**

**Summary of treatment recommendations and significance values before and after the novel bias training**

Scenario	Treatment recommendations before and after the intervention											
	Overall significance			Surgery			PET			Patient choice		
	$\chi^2$	df	Sig.	Before	After	Sig.	Before	After	Sig.	Before	After	Sig.
B2	17.368	2	.000**	17%	23%	.63	63%	30%	.002*	20%	47%	.001**
C	13.603	2	.001**	60%	37%	.04*	23%	7%	.06	20%	60%	.003*
D	6.675	2	.036*	30%	37%	.72	47%	20%	.03*	23%	40%	.13

\*p < .05. \*\*p < .01

### 10.3.2. Before the intervention

#### ***Patient age***

The narrative around patient age varied. Some reasoned that older patients have a finite life expectancy.

*“She is 84. Surgery is dangerous in her age, and she has nearly lived her life expectancy.”* Pp21, Scenario B2, recommendation: PET.

Some were concerned with the risks of surgery for older patients.

*“She has high morbidity and is quite elderly. Surgery would be very risky.”* Pp4, Scenario B2, recommendation: PET.

Others offered no explanation for why older age was an important consideration, rather listed age as a reason in itself to avoid surgery/ favour PET.

*“The woman is 82 years old.”* Pp8, Scenario B2, recommendation: PET.

There was most focus on age not for the eldest patient (85+ years, Scenario C), but the patient with dementia (80-84 years, Scenario B2). There was less focus on patient age after the intervention across all scenarios.

#### ***Concerned with comorbidities***

A key feature of participants' reasoning behind decision making was concerns around patient comorbidities and this persisted after the intervention. There was marked variation in how medical students perceived dementia and their opinions on how this might progress which impacted on decision making. Some felt the patient with dementia was relatively frail.

*“Her frailty suggests a short-term treatment may be most appropriate.”* Pp17, Scenario B2, recommendation: PET.

Others perceived the patient to be in reasonable health.

*"It sounds like she still has a reasonably good quality of life."* Pp4, Scenario B2, recommendation: patient choose.

### ***Coping with surgery***

Coping with surgery was a dominant theme before the intervention. Many participants were concerned about the possible distress surgery may cause patients with dementia (Scenario B2) and the risks of an adverse recovery process.

*"I would be somewhat hesitant to perform surgery on someone with moderate dementia as they may be at greater risk of various post-operative complications, particularly delirium."* Pp11, Scenario B2, recommendation: PET.

Most participants also felt that patients with high dependence for Activities of Daily Living (Scenario D) suggested poor baseline health and, as such, were concerned with their ability to cope with surgery.

*"Given the patient's underlying frailty (indicated by level of care required with ADLs), I am doubtful how well the patient would do physically post-surgery."* Pp13, Scenario D, recommendation: patient choose.

### ***Life expectancy***

Life expectancy was a key consideration for many respondents' treatment recommendations and discourse around life expectancy remained unchanged after the intervention: where patients were judged likely to live more than two years, they were also considered likely to outlive the benefits of PET.

*"She has quite a few years of life ahead of her."* Pp5, Scenario D, recommendation: surgery.

### 10.3.3. After the intervention

#### ***Respecting patient choice***

Following the intervention many participants spoke of the importance of respecting patient choice, which was not a key feature prior to the intervention. Several respondents noted the importance of not making assumptions about what the patient wants.

*“It would be best not to assume what the patient would want.”* Pp26, Scenario B2, recommendation: patient choose.

Some respondents stressed that it was ultimately the patient’s choice, and they would respect their decision.

*“In the end, the choice is theirs.”* Pp6, Scenario B2, recommendation: PET.

#### ***Informed decision making***

For the cases where the narratives described a patient who was inclined to choose PET but wanted the clinician’s advice (Scenario C), both before and after the intervention there was a clear stance that if the patient’s preference was to avoid surgery, then their wishes should be prioritised and respected. After the intervention this was often voiced alongside a need to ensure the patient’s choice is fully informed.

*“I would want to explore the patient’s reasons for preferring endocrine therapy as the decision should ultimately rest with the patient.”* Pp13, Scenario C after intervention, recommendation: surgery.

#### ***Patient preferences***

After the intervention, a key discourse was the importance of finding out what the patient’s thoughts are and for most respondents this was discussed as a precursor to what their treatment

recommendation would be, with the narrative framed that the treatment recommended would depend on the patient's priorities and wishes.

*"It would be essential to ensure that the patient was supported to communicate her opinion as fully as possible but, as she is medically stable, she would be a good candidate for surgery."* Pp5, Scenario D, recommendation: surgery.

#### 10.3.4. Participants' response to bias training

Participants were asked to consider what they felt they had learnt from the intervention and if the intervention would affect the way they treat their older patients in future practice. Responses fell under three main categories:

- 1) Recognising and challenging the issues present in the treatment of older women with breast cancer.

*"I hope it will make me think more about assumptions and challenging them when treating my older patients."* Pp1.

*"Genuinely opened my eyes to how we can forget the needs of elderly patients. There does seem to be a lot of ageism when it comes to care of the elderly and this is something that I hope future generations of doctors will learn to combat the stereotypes and assumptions that come with older age."* Pp27.

- 2) Considering if age-related assumptions are influencing clinical judgements.

*"I will try to think 'would I operate or do this procedure for this person if they were 50?' to ensure that my decision is based on clinical facts not numerical age."* Pp3.

*"Doctors are equally vulnerable to having biases."* Pp25.

- 3) Engaging patients to inform decision making.

*"I am more likely to put more energy into exploring patient concerns and making sure nothing has gone unsaid on the part of the patient. Also I thought it would be good to have an idea of some common concerns of older patients in a certain position so I can use them as examples to help older patients open up about their own concerns by normalising these feelings."* Pp25.

*"I think the key thing is to ask patients about their priorities and discuss options early but also frequently to allow people the chance to change their minds." Pp26.*

#### 10.4. Discussion

This study considered the effects of a novel approach to bias training on age bias in medical students' decision making for older women with breast cancer.

This study found fewer medical students focused on patient age in their decision making after the intervention. National guidance states that breast cancer patients should be treated "irrespective of age" (NICE, 2009; NICE, 2018) and current policies state that patient health and patient choice are the only acceptable reasons for deviation from clinical guideline-based treatment (Department of Health, 2011). Yet there is evidence that older patients receive differential treatments (NABCOP, 2021) and a significant factor in health care professionals' treatment recommendations is patient age (Caldon, Walters, Ratcliffe, & Reed, 2007; Morgan et al., 2017; Study 1).

In line with other research (Morgan et al., 2015), this study found varied perceptions for the role of dementia in cancer care. This study also found students were most likely to focus on patient age and reason that older patients should receive PET not for the eldest patient but for the patient with dementia. National guidelines state that patients should only be treated with endocrine therapy alone if there is "significant comorbidity that precludes surgery" (NICE, 2009; NICE, 2018). Yet guidelines do not specify what may render surgery impossible leaving such judgements to the treating clinician often in close discussions with the patients' family caregiver (Martin, Burton, & Wyld, 2021). A reduced likelihood to undergo additional or more intensive treatments may stem from health care professionals' efforts to avoid high mortality rates and functional decline for the frailest patients (Tang et al., 2018). Yet some treatment differences, such as receiving less pain management, may be explained by oncologists' poorer understanding of, and communication with, patients with dementia (McWilliams et al., 2018). Health care professionals treating older cancer patients with dementia are often unaware of the existence or severity of the dementia and, as such, cannot address their care needs (Martin, Shrestha, Burton, Collins, & Wyld, 2019). The varied interpretations of comorbidities, frailty, and dementia in this study suggests a need to increase medical training in relation to these patients.

The study found participants expressed greater consideration of the patients' thoughts, wishes, and choices in their decision making, and were more likely to recommend the patient choose their own treatment after the intervention. Shared decision making is intrinsic to the fair provision of high-quality care. There is evidence that there are gaps between what health care professionals think patients want and what breast cancer patients actually want (Lee et al., 2010), most older breast cancer patients want to be involved in their care and treatment decisions (Moser, Melchior, Veenstra, Stoffers, Derks, & Jie, 2021), when breast cancer patients are well informed, they make difference choices (Katz et al., 2005; Hawley et al., 2009), and efforts to increase shared decision making are associated with increased satisfaction for breast cancer patients (Keating, Guadagnoli, Landrum, Borbas, & Weeks, 2002; Katz et al., 2005; Mandelblatt, Kreling, Figueiredo, & Feng, 2006).

The trend away from focusing on patient age and towards adopting shared decision making indicates a positive role for the intervention in ensuring older breast cancer patients receive high-quality care.

### ***Limitations***

The use of student populations is common practice in research, particularly for early trials to identify promising approaches, and it is recognised that any findings are caveated by use of a student sample (Hanel & Vione, 2016). The use of participants who did not have a background of decision making in this group of patients enabled the study to explore the potential of age bias interventions early in their education and training to prevent biased behaviour rather than reverse it.

There are mixed results for educational interventions on improving medical students' attitudes, with long-term and multiple interventions associated with more positive outcomes (Tullo, Spencer, & Allan, 2010). Bias training would represent one element amongst multiple efforts to engender positive and informed care of older patients. For example, exposure to healthy older adults

through senior mentoring programs or intergenerational housing between medical students and older adults in care homes (Arentshorst, Kloet, & Peine, 2019), which is associated with more positive attitudes towards older patients compared to the current UK model of exposure to older patients through a clinical environment (Eleazer, Stewart, Wieland, Anderson, Simpson, & Steering, 2009).

Broadly, the novel bias training appeared to have a more positive impact on medical students' decision making compared to the Age Gap tool on health care professionals' decision making. The methodology, populations, and interventions themselves differed and, as such, it is not possible to draw conclusions on what these indicate without replicating each intervention using both methodologies and study populations. For example, there were no age-related assumptions amongst medical students' responses either before or after the novel bias training. It is unclear whether the absence of age-related assumptions amongst medical students' reasoning and the presence of age-related assumptions in some health care professionals' reasoning is a reflection of individual differences in beliefs, group differences of experience, or differences in the study formats. Most of the age-related assumptions voiced by health care professionals were anecdotal comments of their experiences of patients in clinic, something medical students will have had much less experience with. Health care professionals were interviewed whilst medical students responded through an online survey, which resulted in differences in how detailed the responses were, and perhaps also how censored.

### ***Future directions***

Underlying this study's design was that a shift away from some of the features of traditional bias training would yield more positive results in reducing bias. This was a trial of a novel intervention to identify if there were promising indications of reducing age bias. To consider whether the principles underlying this intervention are more successful than traditional bias training a randomised control trial is required comparing the effects of this intervention, traditional bias training, and no intervention.

A comparison of Studies 2 and 3 appears to indicate that medical students hold fewer age-related assumptions about older patients and are more responsive to interventions targeting age bias than experienced health care professionals. These findings suggest that efforts to improve the treatment of older patients would be best concentrated towards medical students and early career doctors. Medical students may be reluctant to work with older patients (Fitzgerald, Wray, Halter, Williams, & Supiano, 2003) because of a lack of exposure during training and perceptions of geriatric care as lower status and frustrating (Meiboom, de Vries, Hertogh, & Scheele, 2015). To engender a meaningful change in the treatment of older patients there needs to be a shift towards a patient-centred curriculum which is representative of the patient population, emphasises the importance of patient care alongside cure, and highlights the extent of age inequalities in healthcare through this study's novel approach to bias training (Meiboom, de Vries, Scheele, & Hertogh, 2018).

### ***Implications and conclusions***

The results indicate this novel approach to bias training may hold a valuable role in reducing focus on patient age, encouraging patient choice, and respecting patient voice for older breast cancer patients. This pilot study presents preliminary findings which indicate there is value in further refining, replicating, and improving this approach to bias training, with the aim to improve the care and treatment of older breast cancer patients.

## PART FOUR: DISCUSSION

## 11. Discussion

This thesis aimed to contribute to greater understanding of 1) the roles of different forms of bias in perpetuating inequalities and 2) potential interventions to interrupt biased behaviours, and more specifically to 1) the potential role of age bias in the treatment of older women with breast cancer and 2) the effects of age bias interventions on the reasoning and treatment recommendations for older breast cancer patients.

The starting point of this investigation was the clear evidence of differential treatment and poorer outcomes for older women with breast cancer. This was framed within empirical studies which have aligned implicit bias with group inequalities (mostly focused on race), the existence and impact of age bias (mostly focused on workplace settings), and a limited body of research on the role of health care professionals in differential treatment towards older patients. Study 1 considered the role of age bias amongst health care professionals in the differential treatment of older patients by measuring implicit age bias, explicit attitudes, and treatment recommendations. Study 1's finding of no relationship between implicit age bias and differential treatment recommendations towards older patients steered Studies 2 and 3 to concentrate on explicit age bias. Study 1's findings of age bias amongst breast cancer health care professionals grounded Studies 2 and 3's focus on the effect of age bias interventions on decision making for older breast cancer patients, both through the treatments recommended and the reasoning behind them. There has been no previous research specifically addressing the role of implicit age bias in the treatment of older breast cancer patients, or age bias interventions to improve decision making in the treatment of older women with breast cancer.

The existing body of evidence indicated that the role of age bias in the treatment of older women with breast cancer and interventions to improve treatment was a worthwhile pursuit. Yet as the first to explore these issues, there was little research directing what were the right questions to ask. As such, this thesis considered two broad research questions:

1. Is there evidence of age bias in breast cancer health care professionals' treatment of older patients?

2. Do interventions to address age bias lead to better quality decision making for the treatment of older women with breast cancer?

These questions respectively guided the three experimental studies. Study 1 explored the presence of implicit, explicit, and decision age bias amongst breast cancer health care professionals. Studies 2 and 3 evaluated age bias interventions to improve health care workers' decision making for older breast cancer patients.

Such broad and novel research questions cannot be definitively answered within a single research project. This thesis offers partial answers to the original questions which indicate that these were useful questions to ask, provide insights, and offer a platform to base future enquiries.

This section considers the experimental findings in response to the original research questions.

### 11.1. Is there evidence of age bias in breast cancer health care professionals' treatment of older patients?

Study 1 found evidence of implicit and explicit age bias amongst breast cancer health care professionals. The primary focus of Studies 2 and 3 was to explore whether the interventions enabled better quality decision making for older breast cancer patients. An additional benefit of the methods used was that the in-depth examination of treatment recommendations gave new insights into the age bias evidenced in Study 1.

#### ***Implicit age bias***

Study 1 hypothesised that breast cancer professionals would hold implicit, but not explicit, age bias and that this would influence differential treatment recommendations for older breast cancer patients. The study found evidence of implicit bias and confirmed age bias in treatment recommendations, but found no link between the two. This study concluded that binary categorising of bias as implicit or explicit was not helpful as 1) it did not capture the nuance and

range of opinion in explicit bias, and 2) implicit bias was not a useful predictor of biased behaviour in this instance.

The interviews in Study 2 offer a possible explanation for the lack of relationship between implicit and decision bias in Study 1. Implicit bias was measured using an IAT which paired synonyms of *good* and *bad* with older and younger female faces. A relationship between the Age IAT and differential treatment recommendations for older patients could likely be interpreted as meaning that treatment differences stem from an underlying association that older people are less deserving of effective treatment. Study 2's interviews paint a more nuanced picture. There was no indication that health care professionals felt older patients were worth less, but there were assumptions that older patients were more afraid, less willing and less able to make decisions about their own treatments. As such, there may be a clearer relationship between implicit associations and treatment recommendations if the IAT measured associations of age with capabilities rather than characteristics. There is evidence that the relationship between implicit associations and behaviour is context dependent (Blair, 2002; Casper, Rothermund, & Wentura, 2010; Müller & Rothermund, 2012), and a clearer relationship can be found when the IAT measures responses to behaviours, not values (Levinson, Smith, & Young, 2014). If a clearer association were found between breast cancer health care professionals' associations of older patients as less capable and differential treatment recommendations for older patients then there may be merit in trialling a positive-associations intervention, that is matching older faces with words such as *capable*, *independent*, and *active* and evaluating subsequent treatment recommendations and reasoning (see Table 8.1 for counter stereotyping approaches. These have been successful in reducing implicit bias scores, but few have tested explicit or behavioural bias).

### ***Age-based assumptions***

This thesis found health care professionals held assumptions about older patients' preferences and abilities which align with patterns of differential treatment. The questionnaire (Study 1) and interviews (Study 2) shed light on how clinicians reason their preferences demonstrating awareness that they are making non guideline compliant recommendations. Assumptions that older patients do not want full information about treatment outcomes, are less able to understand

treatment risks and benefits, and are unable to cope with information that gives a poor prognosis would likely steer health care professionals away from attempts to engage older patients in informed decision making. Assumptions that older patients are less willing and able to make treatment decisions would likely decrease health care professionals' efforts to involve older patients in shared decision making. Assumptions that older patients prefer less extensive treatments, are more afraid, and that life expectancy is less important for older patients would likely steer health care professionals towards recommending PET in situations where there are risks and benefits for both PET and surgery. Previous research has shown that some breast cancer health care professionals consider older patients less willing to be involved in decision making and prioritise quality of life over quantity (Morgan et al., 2015b). Whilst some studies indicate that quality of life is a priority for older patients (Wildiers et al., 2013), other research has found that "many older patients are willing to accept the toxicity associated with cancer treatment if it increases their chance of survival" (Hurria et al., 2006).

Results in studies 2 and 3 show health care professionals use patient health as a proxy for age, and age as a proxy for health. In Study 2, whilst around a quarter of health care professionals stated that older age should not be used as a proxy for poor health, the same number of health care professionals also used younger age as an indicator of good health. Similarly, in Study 3, medical students were most likely to reason that the patient is old and should therefore receive PET not for the eldest patient but for the patient with the most significant cognitive and functional impairments. This draws parallels with other research in which health care professionals were more likely to cite frailty and comorbidities as reasons to avoid chemotherapy for the oldest patients, despite there being no available information on patient frailty or comorbidity for a third of the patient descriptions (Ring, Harder, Langridge, Ballinger, & Fallowfield, 2013).

### ***Indirect factors of age bias***

This thesis also found wide variation in interpretations and approaches to issues which disproportionately affect older patients. In line with previous research (Morgan, Collins, Burton, Reed, & Wyld, 2014; Morgan et al., 2015b), health care professionals varied in how best to treat patients with cognitive impairments or functional dependencies. Specifically, regarding how

involved patients with dementia should be in treatment decisions, the extent to which the comorbidities were impacting on their health, and the extent to which the comorbidities should guide treatment. Health care professionals also varied in their perceptions of differences in life expectancy outcomes between treatments as large or small, with most variation for the oldest patients. In Study 2, some health care professionals discussed how best to gauge and respect the wishes of patients with dementia, but most assumed it would not be possible. The absence of methods to gauge and respect the wishes of patients with cognitive impairments hinted at possible practices which may be disproportionately disadvantaging older patients. These variations may indicate a need for clearer guidelines, training, and cohesion between specialties.

### ***Summary***

In breast cancer cases where patients have severe comorbidities, are frail, or choose an alternative treatment, it is appropriate for clinicians to deviate from the evidence-based guidelines by recommending a treatment even though it may be less effective. However, this research has found that clinician decisions about breast cancer treatments for older women are at least partially driven by age-based assumptions about what older women want or can cope with. A lack of clear guidance on how to define and measure frailty, and limited understanding of cognitive impairments, such as dementia, which disproportionately affect older women (as discussed in section 2.2.3), also contribute to assumption-driven rather than evidence-based decision making in these cases.

In line with implicit bias research conventions, this thesis hypothesised that breast cancer health care professionals would hold implicit, but not explicit, age bias, and implicit age bias would be associated with recommending differential treatments to older patients. The empirical studies found 1) breast cancer health care professionals hold implicit age bias, 2) there was no link between implicit age bias and differential treatment recommendations, and 3) two other, more tangible forms of age bias: unconsidered (age-related assumptions which were voiced candidly, and so were unlikely considered to be biased) and indirect bias (a poor understanding of the issues which disproportionately affect older patients, such as dementia). Whilst more tangible forms of age bias remain, it may be unlikely that targeting implicit age bias alone would lead to a clear shift

in treatment recommendations for older women with breast cancer, as drawn from the lack of evidence that implicit bias training is effective in improving unequal outcomes (Bezrukova, Spell, Perry, & Jehn, 2016; Dobbin & Kalev, 2016; Atewologun, Cornish, & Tresh, 2018; Chang et al., 2019).

### 11.2. Do interventions to address age bias lead to better quality decision making for the treatment of older women with breast cancer?

Studies 2 and 3 considered the effect of age bias interventions on the reasoning and treatment recommendations for older breast cancer patients. Two age bias interventions were trialled: a decision aid providing likely survival outcomes for different treatments evaluated with breast cancer health care professionals, and a novel approach to bias training designed to raise awareness of age bias and encouraging thoughtful decision making trialled on medical students. Broadly, the novel bias training appeared to have more positive changes for the measures considered than the Age Gap tool.

**Table 11.0.1**

#### *Intervention studies results*

Scenario	Decreased focus on age	Increased including patients in decision making	
		Discussions on including patients	Recommending patients choose their treatment
The Age Gap tool			
A	x	x	x
B1	x	x	x
B2	x	x	x
C	x	✓	✓
D	x	✓	x
Novel bias training			
B2	✓	✓	✓
C	✓	✓	✓
D	✓	✓	✓

The intervention studies considered evidence of better-quality decision making using two measures:

- 1) A decrease in the focus of age in decision making, as guidelines state breast cancer patients should be treated “irrespective of age” (NICE, 2009; NICE, 2018).

- The novel bias training saw fewer references to the patients' older age in their reasoning for treatment recommendations; the Age Gap tool did not impact on the explicit use of age in recommending treatments.
  - There were occasions of age-based assumptions voiced amongst health care professions both with and without the Age Gap tool; medical students did not voice any explicit age-based assumptions either before or after the bias training.
- 2) An increase in including the patients in decision making, considered an integral feature of high quality healthcare (NHS, 2021).
- The novel bias training led to a focus on patient-centred care for all patients; the Age Gap intervention saw a focus on patient-centred care for the patients without dementia.
  - The novel bias training saw a shift in medical students' treatment recommendations away from PET and towards patient choice for all patients; the decision aid intervention saw a slight shift in breast cancer health care professionals' treatment recommendations for the patients without dementia.
  - Though not consistently seen for all patients, both interventions appeared to encourage greater consideration of the impact treatments might have on the patients' emotional and psychological well-being and quality of life.
  - An emerging theme was that the Age Gap tool may be less suited to aid health care professionals' decision making for patients who were seen to lack the cognitive capacity to be involved in their care.

Overall, the intervention studies showed promising findings for the effects of the novel bias training, indicated that focusing on early career doctors and medical students may yield greater change, and found limited impact of a decision aid which is similar in format to tools which are in routine use in the NHS (e.g., Predict and Adjuvant!Online).

### 11.3. Future directions

The experimental studies point to several areas of enquiry which may offer fuller answers to the original research questions: 1) is there evidence of age bias in breast cancer health care professionals' treatment of older patients? And 2) do interventions to address age bias lead to better quality decision making for the treatment of older women with breast cancer?

#### ***Is there evidence of age bias in breast cancer health care professionals' treatment of older patients?***

The experimental studies established the presence of age bias amongst breast cancer health care professionals. Several steps could be taken to understand the influence of age bias on treatment recommendations towards older patients.

As a novel enquiry, this thesis considered the role of age bias in the treatment of older breast cancer patients by following the conventions of implicit bias research that health care professionals would not voice explicit bias but would hold implicit bias. The findings indicated that there may be implicit age bias but there is clearly also explicit age bias. Follow up qualitative studies may focus specifically on breast cancer health care professionals age-related assumptions of older patients to better understand the scope and extent of the issue.

This thesis concluded that implicit bias is not a useful lens through which to focus bias interventions but that the IAT is a powerful tool for encouraging awareness that assumptions, stereotypes, and prejudices perpetuate group inequalities. This thesis found no relationship between health care professionals' implicit associations against older women and differential treatment recommendations for older patients. However, the interviews indicated that differential treatment recommendations may partially reflect healthcare professionals' assumptions around older patients' capabilities. Future studies could explore whether a tool could be developed with similar ease of administration and high level impact to the IAT but focused on biased judgements rather than implicit association (e.g., a riddle describes a child rushed to the hospital by their father. Upon arrival the surgeon claims they cannot operate as the child is their son. The realisation

that the surgeon is the child's mother forces you to consider your assumptions about gender roles in the workplace).

This thesis contributes a piece to the puzzle of implicit bias and its role in perpetuating group inequalities. Studies 1 and 2 found that some breast cancer health care professionals hold assumptions about older patients, specifically that older women as less willing and able to make decisions and prefer less extensive treatments. The experimental findings indicate that whilst there may be elements of unconscious bias, there are also more tangible forms of bias and addressing unconscious bias alone may have a limited impact. Dispelling age-related assumptions in clinical judgements could be addressed either by encouraging consideration or by blocking its influence. For instance, through information campaigns dispelling common misconceptions and highlighting heterogeneity amongst this population or by introducing a standardised checklist of topics for health care professionals to cover during discussions of treatment options, preferences, and priorities to ensure all patients are receiving access to the same informed care.

***Do interventions to address age bias lead to better quality decision making for the treatment of older women with breast cancer?***

In a novel research area, the positive findings from Study 3 points to the potential impact further research could have on improving the treatment of older breast cancer patients. Several follow up areas were identified which could provide further insight to the role of age bias interventions.

The underlying principles of the novel bias training could be applied to interventions targeting other forms of bias in health care, to evaluate the effects of the training in different contexts. The training was designed to increase awareness and considerations of bias, with a deliberate shift away from features commonly used in educational interventions. An educational approach was selected as these are already established and commonly used within many organisations.

However, as there is evidence that educational interventions often have small or negative effects (Dobbin & Kalev, 2016), the educating bias film was designed to address shortcomings of educational interventions. The principles which underpinned the educating bias film could be applied to any education-based intervention: 1) a shift away from abstract models for changing

unconscious beliefs and towards recognising and addressing familiar acts of conscious bias, and 2) creating a culture of accountability not complicity.

The validated Age Gap decision tool allows the inclusion of comorbidities and function and provides clinicians and patients with guidance on the likely outcomes for surgery and endocrine therapy versus PET. However, in the scenarios presented to clinicians in this study this approach appeared to have limited impact on individual clinician decision making. Other approaches such as the use of the tool to inform MDT discussions and treatment planning should be explored.

There is a need to investigate the differences between the results of the Age Gap tool and the novel bias training through replication to determine whether these reflect differences in study methodology, population (breast cancer health care professionals and medical students), or the interventions themselves.

The intervention studies found breast cancer health care professionals and medical students may not always have a strong understanding of comorbidities which disproportionately affect older patients. Intervention approaches could be trialled which focus on alleviating the impact of this indirect age bias. One suggestion could be extending the Age Gap tool such that inputting patient characteristics could signpost health care professionals to relevant NICE guidelines for any comorbid conditions.

Similarly, interventions could be trialled that aim to provide fair access and support to shared decision making for patients with cognitive impairments. Study 2 found the Age Gap tool may not support health care professionals' decision making for patients with cognitive impairments. The Age Gap tool could be harnessed such that if a cognitive impairment is identified whilst inputting patient characteristics then this could generate relevant guidance for health care professionals and patients to provide a framework for decision-making in patients with cognitive impairments (although it is acknowledged that there is little guidance available to health care professionals regarding dementia and decision making).

This thesis trialled age bias interventions to improve decision making in treating older breast cancer patients. Shared decision making is considered an essential part of high-quality decision making in health care and, as such, represented a less biased approach. However, this was based on literature which broadly considers decision-making in healthcare, with little available evidence specifically on what older breast cancer patients consider important for providing high-quality care. The studies could be accused of jumping steps- trying to evidence and dispel age bias in breast cancer treatment before considering the patients' perspective of what positive change might look like. There is a need to reconsider what 'less biased' care looks like with input from patient perspectives. If we hope to improve the treatment of older women with breast cancer, we must first understand the views, experiences, and recommendations of older breast cancer patients and survivors.

### 11.4. Summary

This thesis addressed two core research questions:

1. Is there evidence of age bias in breast cancer health care professionals' treatment of older patients?
2. Do interventions to address age bias lead to better quality decision making for the treatment of older women with breast cancer?

The headline findings of this thesis were:

1. Age bias is present in decision making for the treatment of older women with breast cancer through explicit use of older age as a factor for treatment recommendations, age-related assumptions about older patients' capabilities and priorities, and varied understanding of conditions which disproportionately affect older patients.
2. Efforts to improve the treatment of older women with breast cancer would be best focused on understanding and alleviating the role of these, more explicit, forms of age bias in decision making, rather than implicit age bias.

3. The age bias interventions trialled found promising changes for a novel approach to bias training and highlighted the need to consider the role of cognitive impairments in age bias interventions.

The results from this thesis indicate the importance of considering age bias as a likely influencer to the treatment variations of older breast cancer patients and present promising findings for the role of age-targeted interventions in changing the reasoning and decision making for treatment recommendations of older patients. These findings must be considered under the caveat that these were small scale studies, conducted in a novel research area that has yet to be replicated. Yet the findings do indicate that such replications would be worthwhile, there are promising results which point to the need for further research to build a basis for policy change to improve breast cancer decision making for older patients and potentially reduce worse outcomes.

Yet before the development of interventions can go further, a step is missing: the patients' voice. This thesis was constrained by ethical clearance and the impact of Covid-19 (which prevented face to face contact with older breast cancer patients to conduct primary research) but recognises that a crucial missing piece to the puzzle of improving the quality of care is an investigation into how older breast cancer patients wish to be cared for.

## References

- Aapro, M. S. (2012). Management of advanced prostate cancer in senior adults: the new landscape. *The Oncologist*, 17(S1), 16-22.
- Abraham, T. (2020). *84% of BAME Britons think the UK is still somewhat or very racist*.  
<https://yougov.co.uk/topics/politics/articles-reports/2020/06/26/nine-ten-bame-britons-think-racism-exists-same-lev>, Accessed: July 2021
- Age Concern England. (2007). *Age of equality? — outlawing age discrimination beyond the workplace*. London: Age Concern England
- Age UK. (2021). *Impact of Covid-19 on older people's mental and physical health: one year on*. Accessed: [https://www.ageuk.org.uk/globalassets/age-uk/documents/reports-and-publications/reports-and-briefings/health--wellbeing/coronavirus/impact-of-covid-19-on-older-peoples-health\\_one-year-on.pdf](https://www.ageuk.org.uk/globalassets/age-uk/documents/reports-and-publications/reports-and-briefings/health--wellbeing/coronavirus/impact-of-covid-19-on-older-peoples-health_one-year-on.pdf)
- AgeX trial. (2020). *NHS Breast Screening Programme AgeX Trial*. Accessed: <http://www.agex.uk/>
- Ali, A. M. G., Greenberg, D., Wishart, G. C., & Pharoah, P. (2011). Patient and tumour characteristics, management, and age-specific survival in women with breast cancer in the East of England. *British journal of cancer*, 104(4), 564-570.
- All Party Parliamentary Group on Breast Cancer. (2013). *Age is just a number*. Pg 10. Accessed: <https://breastcancer.org/sites/default/files/age-is-just-a-number-report.pdf>
- All Party Parliamentary Group on Breast Cancer. (2015). *Two years on: age is still just a number*. Accessed: <https://breastcancer.org/sites/default/files/age-is-still-just-a-number-report.pdf>
- All Party Parliamentary Group on Dementia (APPG). (2016). *Dementia Rarely Travels Alone: Living with Dementia and Other Conditions*. London: Alzheimer's Society
- Allport, G. W., Clark, K., & Pettigrew, T. (1954). *The nature of prejudice*.
- Ambady, N., Koo, J., Rosenthal, R., & Winograd, C. H. (2002). Physical therapists' nonverbal communication predicts geriatric patients' health outcomes. *Psychology and aging*, 17(3), 443.
- Amnesty International. (2020). *As if expendable*. Accessed: <https://www.amnesty.org/en/wp-content/uploads/2021/05/EUR4531522020ENGLISH.pdf>

- Angarita, F. A., Zhang, Y., Elmi, M., & Hong, N. J. L. (2020). Older women's experience with breast cancer treatment: A systematic review of qualitative literature. *The Breast, 54*, 293-302.
- Arentshorst, M. E., Kloet, R. R., & Peine, A. (2019). Intergenerational housing: the case of humanitas Netherlands. *Journal of Housing for the Elderly, 33*(3), 244-256.
- Arnett, J. J. (2016). The neglected 95%: why American psychology needs to become less American.
- Ashe, S. M., & Borkowska, J. N. (2019). Racism ruins lives: An analysis of the 2016–2017 Trade Union Congress Racism at Work Survey. *University of Manchester and Trade Union Congress*.
- Ashida, S., Goodman, M., Pandya, C., Koehly, L. M., Lachance, C., Stafford, J., & Kaphingst, K. A. (2011). Age differences in genetic knowledge, health literacy and causal beliefs for health conditions. *Public health genomics, 14*(4-5), 307-316.
- Atewologun, D., Cornish, T., & Tresh, F. (2018). Unconscious bias training: An assessment of the evidence for effectiveness. *Equality and human rights commission research report series*.
- Audit Commission for Local Authorities and the National Health Service in England and Wales. (2000). *Forget me not: Mental health services for older people*. Audit Commission.
- Auspurg, K., Schneck, A., & Hinz, T. (2019). Closed doors everywhere? A meta-analysis of field experiments on ethnic discrimination in rental housing markets. *Journal of Ethnic and Migration Studies, 45*(1), 95-114.
- Avery, J. J., Starck, J., Zhong, Y., Avery, J. D., & Cooper, J. (2020). Is your own team against you? Implicit bias and interpersonal regard in criminal defense. *The Journal of social psychology, 1-17*.
- Ayalon, L., Chasteen, A., Diehl, M., Levy, B., Neupert, S. D., Rothermund, K., Tesch-Römer, C., Wahl, H.-W. (2020). Aging in times of the COVID-19 pandemic: Avoiding ageism and fostering intergenerational solidarity. *The Journals of Gerontology: Series B*. Advance online publication. DOI: <https://doi.org/10.1093/geronb/gbaa051>
- Azar, B. (2008). IAT: Fad or fabulous. *Monitor on Psychology, 39*(7), 44.
- Babcock, R. L., MaloneBeach, E. E., & Woodworth-Hou, B. (2016). Intergenerational intervention to mitigate children's bias against the elderly. *Journal of Intergenerational Relationships, 14*(4), 274-287.

- Baert, S. (2018). Hiring discrimination: An overview of (almost) all correspondence experiments since 2005. *Audit studies: Behind the scenes with theory, method, and nuance*, 63-77.
- Bal, A. C., Reiss, A. E., Rudolph, C. W., & Baltes, B. B. (2011). Examining positive and negative perceptions of older workers: A meta-analysis. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 66(6), 687-698.
- Banks, J., Batty, G. David, Breedvelt, J., Coughlin, K., Crawford, R., Marmot, M., Nazroo, J., Oldfield, Z., Steel, N., Steptoe, A., Wood, M., Zaninotto, P. (2021). *English Longitudinal Study of Ageing: Waves 0-9, 1998-2019*. [data collection]. 37th Edition. UK Data Service. SN: 5050, DOI: 10.5255/UKDA-SN-5050-24
- Barcenas, C. H., Niu, J., Zhang, N., Zhang, Y., Buchholz, T. A., Elting, L. S., ... & Giordano, S. H. (2014). Risk of hospitalization according to chemotherapy regimen in early-stage breast cancer. *Journal of clinical oncology*, 32(19), 2010.
- Barlow, E. (2008). A simple checklist that saves lives. *Harvard T.H. Chan*. Retrieved: <https://www.hsph.harvard.edu/news/magazine/fall08checklist/>, accessed: June 2022
- Bartlett, T. (2017). *Can we really measure implicit bias? Maybe not*. The chronicle of higher education.
- Bastiaens, H., Van Royen, P., Pavlic, D. R., Raposo, V., & Baker, R. (2007). Older people's preferences for involvement in their own care: a qualitative study in primary health care in 11 European countries. *Patient education and counseling*, 68(1), 33-42.
- Bates, T., Evans, T., Lagord, C., Monypenny, I., Kearins, O., & Lawrence, G. (2014). A population based study of variations in operation rates for breast cancer, of comorbidity and prognosis at diagnosis: Failure to operate for early breast cancer in older women. *European Journal of Surgical Oncology*, 40(10), 1,230–6.
- Belcher, V. N., Fried, T. R., Agostini, J. V., & Tinetti, M. E. (2006). Views of older adults on patient participation in medication-related decision making. *Journal of general internal medicine*, 21(4), 298.
- Belgrave, M. (2011). The effect of a music therapy intergenerational program on children and older adults' intergenerational interactions, cross-age attitudes, and older adults' psychosocial well-being. *Journal of music therapy*, 48(4), 486-508.

- Beltzer, M. L., Moulder, R. G., Starns, A. L., & Teachman, B. A. (2020). EXPLICIT-IMPLICIT DISCREPANCY IN MACRO-LEVEL MENTAL ILLNESS STIGMA IS LINKED TO PREVALENCE AND CARE. *Journal of Social and Clinical Psychology, 39*(8), 675-707.
- Ben-Harush, A., Shiovitz-Ezra, S., Doron, I., Alon, S., Leibovitz, A., Golander, H., ... & Ayalon, L. (2017). Ageism among physicians, nurses, and social workers: findings from a qualitative study. *European journal of ageing, 14*(1), 39-48.
- Berglund, A., Wigertz, A., Adolfsson, J., Ahlgren, J., Fornander, T., Wärnberg, F., & Lambe, M. (2012). Impact of comorbidity on management and mortality in women diagnosed with breast cancer. *Breast cancer research and treatment, 135*(1), 281-289.
- Bernard, M. A., McAuley, W. J., Belzer, J. A., & Neal, K. S. (2003). An evaluation of a low-intensity intervention to introduce medical students to healthy older people. *Journal of the American Geriatrics Society, 51*(3), 419-423.
- Bertrand, M., & Duflo, E. (2017). Field experiments on discrimination. *Handbook of economic field experiments, 1*, 309-393.
- Bertrand, M., & Mullainathan, S. (2004). Are Emily and Greg more employable than Lakisha and Jamal? A field experiment on labor market discrimination. *American economic review, 94*(4), 991-1013.
- Bezrukova, K., Spell, C. S., Perry, J. L., & Jehn, K. A. (2016). A meta-analytical integration of over 40 years of research on diversity training evaluation. *Psychological bulletin, 142*(11), 1227.
- Biganzoli, L., Battisti, N. M. L., Wildiers, H., McCartney, A., Colloca, G., Kunkler, I. H., ... & Brain, E. G. (2021). Updated recommendations regarding the management of older patients with breast cancer: a joint paper from the European Society of Breast Cancer Specialists (EUSOMA) and the International Society of Geriatric Oncology (SIOG). *The Lancet Oncology*.
- Biganzoli, L., Wildiers, H., Oakman, C., Marotti, L., Loibl, S., Kunkler, I., ... & Cutuli, B. (2012). Management of elderly patients with breast cancer: updated recommendations of the International Society of Geriatric Oncology (SIOG) and European Society of Breast Cancer Specialists (EUSOMA). *The lancet oncology, 13*(4), e148-e160.
- Billings, J. (2006). Staff perceptions of ageist practice in the clinical setting: practice development project. *Quality in Ageing, 7*(2), 33-45

- Blackman, N. (2007). *People with learning disabilities - an ageing population*. Respond. Retrieved from: [http://www.respond.org.uk/support/resources/articles/people\\_with\\_learning\\_disabilities\\_-\\_an\\_ageing\\_population.html](http://www.respond.org.uk/support/resources/articles/people_with_learning_disabilities_-_an_ageing_population.html)
- Blair, I. V. (2002). The malleability of automatic stereotypes and prejudice. *Personality and social psychology review*, 6(3), 242-261.
- Blincoe, S., & Harris, M. J. (2009). Prejudice reduction in white students: Comparing three conceptual approaches. *Journal of Diversity in Higher Education*, 2(4), 232.
- Bodner, E., Palgi, Y., & Wyman, M. F. (2018). Ageism in mental health assessment and treatment of older adults. *Contemporary perspectives on ageism*, 241-262.
- Boissy, A., Windover, A. K., Bokar, D., Karafa, M., Neuendorf, K., Frankel, R. M., ... & Rothberg, M. B. (2016). Communication skills training for physicians improves patient satisfaction. *Journal of general internal medicine*, 31(7), 755-761.
- Boult, C., Boult, L. B., Morishita, L., Dowd, B., Kane, R. L., & Urdangarin, C. F. (2001). A randomized clinical trial of outpatient geriatric evaluation and management. *Journal of the American Geriatrics Society*, 49(4), 351-359.
- Bouman, W. P., & Arcelus, J. (2001). Are psychiatrists guilty of 'ageism' when it comes to taking a sexual history?. *International journal of geriatric psychiatry*, 16(1), 27-31.
- Bousfield, C., & Hutchison, P. (2010). Contact, anxiety, and young people's attitudes and behavioral intentions towards the elderly. *Educational Gerontology*, 36(6), 451-466.  
<https://doi.org/10.1080/036012709033243>
- Bowers, H., Clark, C., Crosby, G., Easterbrook, L., Macadam, A., MacDonald, R., Macfarlane, A., Maclean, M., Patel, M., Runnicles, D., Oshinaike, T., & Smith, C. (2009). *Older people's vision for long-term care*. York: Joseph Rowntree Foundation
- Brannon, T. N., & Walton, G. M. (2013). Enacting cultural interests: How intergroup contact reduces prejudice by sparking interest in an out-group's culture. *Psychological Science*, 24(10), 1947-1957.
- Bridging the Age Gap. (2020). Bridging the Age Gap: Integration of quality of life outcomes into the decisionmaking of older women with early breast cancer. Retrieved: <https://fundingawards.nihr.ac.uk/award/NIHR202048>, Accessed: March 2021

- Brownstein, M., Madva, A., & Gawronski, B. (2017). Understanding Implicit Bias: How the Critics Miss the Point.
- Burgess, D. J., Phelan, S., Workman, M., Hagel, E., Nelson, D. B., Fu, S. S., ... & van Ryn, M. (2014). The effect of cognitive load and patient race on physicians' decisions to prescribe opioids for chronic low back pain: a randomized trial. *Pain Medicine, 15*(6), 965-974.
- Burke, B. L., Martens, A., & Faucher, E. H. (2010). Two decades of terror management theory: A meta-analysis of mortality salience research. *Personality and Social Psychology Review, 14*(2), 155-195.
- Burnes, D., Sheppard, C., Henderson Jr, C. R., Wassel, M., Cope, R., Barber, C., & Pillemer, K. (2019). Interventions to reduce ageism against older adults: A systematic review and meta-analysis. *American Journal of Public Health, 109*(8), e1-e9.
- Burns, M. D., Monteith, M. J., & Parker, L. R. (2017). Training away bias: The differential effects of counterstereotype training and self-regulation on stereotype activation and application. *Journal of Experimental Social Psychology, 73*, 97-110.
- Burton, M., Collins, K. A., Lifford, K. J., Brain, K., Wyld, L., Caldon, L., ... & Reed, M. W. (2015). The information and decision support needs of older women (> 75 yrs) facing treatment choices for breast cancer: a qualitative study. *Psycho-Oncology, 24*(8), 878-884.
- Burton, M., Kilner, K., Wyld, L., Lifford, K. J., Gordon, F., Allison, A., ... & Collins, K. A. (2017). Information needs and decision-making preferences of older women offered a choice between surgery and primary endocrine therapy for early breast cancer. *Psycho-Oncology, 26*(12), 2094-2100.
- Caba, Y., Dharmarajan, K., Gillezeau, C., Ornstein, K. A., Mazumdar, M., Alpert, N., ... & Liu, B. (2021). The impact of dementia on cancer treatment decision-making, cancer treatment, and mortality: a mixed studies review. *JNCI cancer spectrum, 5*(3), pkab002.
- Cadieux, J., Chasteen, A. L., & Packer, PhD, D. J. (2019). Intergenerational contact predicts attitudes toward older adults through inclusion of the outgroup in the self. *The Journals of Gerontology: Series B, 74*(4), 575-584.
- Calanchini, J., Gonsalkorale, K., Sherman, J. W., & Klauer, K. C. (2013). Counter-prejudicial training reduces activation of biased associations and enhances response monitoring. *European Journal of Social Psychology, 43*(5), 321-325.

- Caldon, L. J., Walters, S. J., Ratcliffe, J., & Reed, M. W. (2007). What influences clinicians' operative preferences for women with breast cancer? An application of the discrete choice experiment. *European journal of cancer*, 43(11), 1662-1669.
- Cancer Research UK. (2016). Meeting Patients Needs. Retrieved:  
[https://www.cancerresearchuk.org/sites/default/files/full\\_report\\_meeting\\_patients\\_needs\\_improving\\_the\\_effectiveness\\_of\\_multidisciplinary\\_team\\_meetings\\_.pdf](https://www.cancerresearchuk.org/sites/default/files/full_report_meeting_patients_needs_improving_the_effectiveness_of_multidisciplinary_team_meetings_.pdf), Accessed: May 2020
- Cancer Research UK. (2021a). Breast cancer incidence. Retrieved:  
<https://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/breast-cancer/incidence-invasive#heading-Zero>, Accessed August 2021.
- Cancer Research UK. (2021b). Breast cancer mortality. Retrieved:  
<https://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/breast-cancer/mortality#heading-One>, Accessed August 2021.
- Cancer Research UK. (2021c). Breast cancer survival. Retrieved:  
<https://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/breast-cancer/survival#heading-Two>, Accessed March 2022
- Cancer Research UK. (2021d). Breast cancer diagnosis and treatment. Retrieved:  
<https://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/breast-cancer/diagnosis-and-treatment#heading-Zero>, Accessed August 2021.
- Cancer Research UK. (2021e). Lung cancer mortality statistics. Retrieved:  
<https://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/lung-cancer/mortality#heading-One>, Accessed January 2022.
- Cancer Research UK. (2021f). Bowel cancer mortality statistics. Retrieved:  
<https://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/bowel-cancer/mortality>, Accessed March 2022
- Cancer Research UK. (2021g). Prostate cancer mortality statistics. Retrieved:  
<https://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/prostate-cancer/mortality#heading-One>, Accessed January 2022.
- Carabez, R., Pellegrini, M., Mankovitz, A., Eliason, M. J., & Dariotis, W. M. (2015). Nursing students' perceptions of their knowledge of lesbian, gay, bisexual, and transgender issues: Effectiveness of a

- multi-purpose assignment in a public health nursing class. *Journal of Nursing Education*, 54(1), 50-53.
- Carlin, D. B., & Winfrey, K. L. (2009). Have you come a long way, baby? Hillary Clinton, Sarah Palin, and sexism in 2008 campaign coverage. *Communication Studies*, 60(4), 326-343.
- Carlsson, M., & Eriksson, S. (2019). Age discrimination in hiring decisions: Evidence from a field experiment in the labor market. *Labour Economics*, 59, 173-183.
- Carpenter, T. P., Pullig, C. P., Pogacar, R., Kouril, M., LaBouff, J., & Isenberg, N. (2017). Measuring implicit cognition in Qualtrics with iatgen: A free, user-friendly tool for building survey-based IATs. *Poster session presented at the 18th Annual Meeting of the Society for Personality and Social Psychology*, San Antonio, TX.
- Carter, E. R., Onyeador, I. N., & Lewis Jr, N. A. (2020). Developing & delivering effective anti-bias training: Challenges & recommendations. *Behavioral Science & Policy*, 6(1), 57-70.
- Casagrande, S. S., Gary, T. L., LaVeist, T. A., Gaskin, D. J., & Cooper, L. A. (2007). Perceived discrimination and adherence to medical care in a racially integrated community. *Journal of general internal medicine*, 22(3), 389-395.
- Casamayou, M. H. (2001). *The politics of breast cancer*. Georgetown University Press.
- Casper, C., Rothermund, K., & Wentura, D. (2010). Automatic stereotype activation is context dependent. *Social Psychology*.
- Cecil, V., Pendry, L. F., Salvatore, J., Mycroft, H., & Kurz, T. (2021). Gendered ageism and gray hair: must older women choose between feeling authentic and looking competent?. *Journal of Women & Aging*, 1-16.
- Centre for Policy on Ageing. (2009). Ageism and age discrimination in mental health care in the United Kingdom: A review from the literature. Centre for Policy on Ageing: London, UK. Retrieved from <http://www.cpa.org.uk/information/reviews/reviews.html>, Accessed March 2022
- Cesario, J., Plaks, J. E., Hagiwara, N., Navarrete, C. D., & Higgins, E. T. (2010). The ecology of automaticity: How situational contingencies shape action semantics and social behavior. *Psychological Science*, 21(9), 1311-1317.
- Chabloz, N. (2021). Black Lives Matter: Bridging the Gap Between Accountability and Justice.

- Chalmers, I., Atkinson, P., Fenton, M., Firkins, L., Crowe, S., & Cowan, K. (2013). Tackling treatment uncertainties together: the evolution of the James Lind Initiative, 2003–2013. *Journal of the Royal Society of Medicine*, *106*(12), 482-491.
- Chang, E. H., Milkman, K. L., Gromet, D. M., Rebele, R. W., Massey, C., Duckworth, A. L., & Grant, A. M. (2019). The mixed effects of online diversity training. *Proceedings of the National Academy of Sciences*, *116*(16), 7778-7783.
- Chang, E. S., Kanno, S., Levy, S., Wang, S. Y., Lee, J. E., & Levy, B. R. (2020). Global reach of ageism on older persons' health: A systematic review. *PloS one*, *15*(1), e0220857.
- Charles, L. T. (2009). Causal and predictive relationships among race, implicit racial bias, and simulated treatment recommendations (Doctoral dissertation, Capella University).
- Charlson, M., Pompei, P., Ales, K., & MacKenzie, C. (1987). A new method of classifying prognostic comorbidity in longitudinal studies: Development and validation. *Journal of Chronic Diseases*, *40*(5), 373–83. doi:10.1016/0021-9681(87)90171-8. PMID 3558716
- Chartered Institute of Insurance. (2018). Moments that matter. Retrieved: [https://www.cii.co.uk/media/9224351/iwf\\_momentsthatmatter\\_full.pdf](https://www.cii.co.uk/media/9224351/iwf_momentsthatmatter_full.pdf), Accessed: May 2021
- Chase, C. A. (2010). An intergenerational e-mail pal project on attitudes of college students toward older adults. *Educational Gerontology*, *37*(1), 27-37.
- Chauhan, A., Walton, M., Manias, E., Walpole, R. L., Seale, H., Latanik, M., ... & Harrison, R. (2020). The safety of health care for ethnic minority patients: a systematic review. *International journal for equity in health*, *19*(1), 1-25.
- Chen, E. H., Shofer, F. S., Dean, A. J., Hollander, J. E., Baxt, W. G., Robey, J. L., ... & Mills, A. M. (2008). Gender disparity in analgesic treatment of emergency department patients with acute abdominal pain. *Academic Emergency Medicine*, *15*(5), 414-418.
- Cheng, S. T. (2017). Self-perception of aging and satisfaction with children's support. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *72*(5), 782-791.
- Chewning, B., Bylund, C. L., Shah, B., Arora, N. K., Gueguen, J. A., & Makoul, G. (2012). Patient preferences for shared decisions: a systematic review. *Patient education and counseling*, *86*(1), 9-18.

- Chicago Tribune. (1986). Female Trouble. Accessed: <https://www.chicagotribune.com/news/ct-xpm-1986-10-29-8603210488-story.html>, retrieved: May 2021
- Chin, M. J., Quinn, D. M., Dhaliwal, T. K., & Lovison, V. S. (2020). Bias in the air: A nationwide exploration of teachers' implicit racial attitudes, aggregate bias, and student outcomes. *Educational Researcher*, *49*(8), 566-578.
- Chopik, W. J., Bremner, R. H., Johnson, D. J., & Giasson, H. L. (2018). Age differences in age perceptions and developmental transitions. *Frontiers in psychology*, *67*.
- Chrisler, J. C., Barney, A., & Palatino, B. (2016). Ageism can be hazardous to women's health: Ageism, sexism, and stereotypes of older women in the healthcare system. *Journal of Social Issues*, *72*(1), 86-104.
- Ciambrone, D. (2006). Treatment decision-making among older women with breast cancer. *Journal of women & aging*, *18*(4), 31-47.
- Clarke, M. (2005). Early Breast Cancer Trialists' Collaborative Group (EBCTCG). Effects of chemotherapy and hormonal therapy for early breast cancer on recurrence and 15-year survival: an overview of the randomised trials. *Lancet*, *365*, 1687-1717.
- Clough, R., Manthorpe, J., Raymond, V., Sumner, K., Bright, L., & Hay, J.; OPRSI (Older People Researching Social Issues). (2007). The support older people want and the services they need. *Joseph Rowntree Foundation*.
- Coleman, M. P., Forman, D., Bryant, H., Butler, J., Rachet, B., Maringe, C., ... & ICBP Module 1 Working Group. (2011). Cancer survival in Australia, Canada, Denmark, Norway, Sweden, and the UK, 1995–2007 (the International Cancer Benchmarking Partnership): an analysis of population-based cancer registry data. *The Lancet*, *377*(9760), 127-138.
- Collins, K., Reed, M., Lifford, K., Burton, M., Edwards, A., Ring, A., ... & Wyld, L. (2017). Bridging the Age Gap in breast cancer: evaluation of decision support interventions for older women with operable breast cancer: protocol for a cluster randomised controlled trial. *BMJ open*, *7*(7), e015133.
- Collins, K., Winslow, M., Reed, M. W., Walters, S. J., Robinson, T., Madan, J., ... & Wyld, L. (2010). The views of older women towards mammographic screening: a qualitative and quantitative study. *British journal of cancer*, *102*(10), 1461-1467.

- Collins, N., & Corna, L. (2018). General practitioner referral of older patients to Improving Access to Psychological Therapies (IAPT): an exploratory qualitative study. *BJPsych bulletin*, *42*(3), 115-118.
- Columb, C., & Plant, E. A. (2011). Revisiting the Obama effect: Exposure to Obama reduces implicit prejudice. *Journal of Experimental Social Psychology*, *47*(2), 499-501.
- Congress, T. U. (2016). Still Just a Bit of Banter?: Sexual Harassment in the Workplace in 2016. *Trades Union Congress*.
- Cooper, C., Lodwick, R., Walters, K., Raine, R., Manthorpe, J., Iliffe, S., & Petersen, I. (2017). Inequalities in receipt of mental and physical healthcare in people with dementia in the UK. *Age and ageing*, *46*(3), 393-400.
- Costa, A. B., Pase, P. F., de Camargo, E. S., Guaranha, C., Caetano, A. H., Kveller, D., ... & Nardi, H. C. (2016). Effectiveness of a multidimensional web-based intervention program to change Brazilian health practitioners' attitudes toward the lesbian, gay, bisexual and transgender population. *Journal of Health Psychology*, *21*(3), 356-368.
- Coulter, A., Roberts, S., & Dixon, A. (2013). Delivering better services for people with long-term conditions. Building the house of care. *The King's Fund*, 1-28.
- Courtier, N., Milton, R., King, A., Tope, R., Morgan, S., & Hopkinson, J. (2016). Cancer and dementia: an exploratory study of the experience of cancer treatment in people with dementia. *Psycho-Oncology*, *25*(9), 1079-1084.
- Courtin, E., & Knapp, M. (2017). Social isolation, loneliness and health in old age: a scoping review. *Health & social care in the community*, *25*(3), 799-812.
- Courtney, M., Tong, S., & Walsh, A. (2000). Acute-care nurses' attitudes towards older patients: A literature review. *International journal of nursing practice*, *6*(2), 62-69.
- Coy, M. (2009). Milkshakes, lady lumps and growing up to want boobies: How the sexualisation of popular culture limits girls' horizons. *Child Abuse Review: Journal of the British Association for the Study and Prevention of Child Abuse and Neglect*, *18*(6), 372-383.
- Cuddy, A. J., & Fiske, S. T. (2002). Doddering but dear: Process, content, and function in stereotyping of older persons. *Ageism: Stereotyping and prejudice against older persons*, *3*, 26.

- Cykert, S., Dilworth-Anderson, P., Monroe, M. H., Walker, P., McGuire, F. R., Corbie-Smith, G., ... & Bunton, A. J. (2010). Factors associated with decisions to undergo surgery among patients with newly diagnosed early-stage lung cancer. *Jama*, *303*(23), 2368-2376.
- Daly, R. L., Bunn, F., & Goodman, C. (2018). Shared decision-making for people living with dementia in extended care settings: a systematic review. *BMJ open*, *8*(6), e018977.
- Darling-Hammond, S., Michaels, E. K., Allen, A. M., Chae, D. H., Thomas, M. D., Nguyen, T. T., ... & Johnson, R. C. (2020). After “The China Virus” Went Viral: Racially Charged Coronavirus Coverage and Trends in Bias Against Asian Americans. *Health Education & Behavior*, *47*(6), 870-879.
- Dartmouth Atlas of Health Care (2012). Understanding of the efficiency and effectiveness of the health care system. Retrieved: [www.dartmouthatlas.org](http://www.dartmouthatlas.org), accessed: May 2021
- Dasgupta, N., & Asgari, S. (2004). Seeing is believing: Exposure to counterstereotypic women leaders and its effect on the malleability of automatic gender stereotyping. *Journal of experimental social psychology*, *40*(5), 642-658.
- Dasgupta, N., & Greenwald, A. G. (2001). On the malleability of automatic attitudes: combating automatic prejudice with images of admired and disliked individuals. *Journal of personality and social psychology*, *81*(5), 800.
- Daumeyer, N. M., Onyeador, I. N., Brown, X., & Richeson, J. A. (2019). Consequences of attributing discrimination to implicit vs. explicit bias. *Journal of Experimental Social Psychology*, *84*, 103812.
- Davies, E., Higginson, I. J., & World Health Organization. (2004). *Better palliative care for older people*. No. EUR/03/5045272. Copenhagen: WHO Regional Office for Europe.
- Davis, C., Tami, P., Ramsay, D., Melanson, L., MacLean, L., Nersesian, S., & Ramjeesingh, R. (2020). Body image in older breast cancer survivors: A systematic review. *Psycho-Oncology*, *29*(5), 823-832.
- Dawson, R., Sellers, D. E., Spross, J. A., & Jablonski, E. S. (2005). Do patients' beliefs act as barriers to effective pain management behaviors and outcomes in patients with cancer-related or noncancer-related pain?. *Oncology Nursing Forum*, *32*(2), 363.
- De Angelis, R., Sant, M., Coleman, M. P., Francisci, S., Baili, P., Pierannunzio, D., ... & EUROCARE-5 Working Group. (2014). Cancer survival in Europe 1999–2007 by country and age: results of EUROCARE-5—a population-based study. *The lancet oncology*, *15*(1), 23-34.

- de São José, J. M. S., & Amado, C. A. F. (2017). On studying ageism in long-term care: a systematic review of the literature. *International psychogeriatrics*, *29*(3), 373-387.
- Denson, A. C., & Mahipal, A. (2014). Participation of the elderly population in clinical trials: barriers and solutions. *Cancer Control*, *21*(3), 209-214.
- Department of Health and Social Care. (2013). 2011/12 National Survey of Investment in Mental Health Services for Older People. Retrieved: <https://www.gov.uk/government/publications/investment-in-mental-health-in-2011-to-2012-working-age-adults-and-older-adults>, Accessed: May 2021
- Department of Health and Social Care. (2021). Government launches call for evidence to improve health and wellbeing of women in England. Retrieved: <https://www.gov.uk/government/news/government-launches-call-for-evidence-to-improve-health-and-wellbeing-of-women-in-england>, Accessed: May 2021
- Department of Health. (2008). Secretary of State report on disability equality - health and care services. Retrieved: [http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_091263](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_091263), Accessed: May 2021
- Department of Health. (2011). *Improving Outcomes: A Strategy for Cancer*. London.
- Department of Health. (2015). The NHS constitution. *Department of Health: London*.
- Derks, M. G., Bastiaannet, E., Kiderlen, M., Hilling, D. E., Boelens, P. G., Walsh, P. M., ... & Van De Velde, C. J. (2018). Variation in treatment and survival of older patients with non-metastatic breast cancer in five European countries: a population-based cohort study from the EURECCA Breast Cancer Group. *British journal of cancer*, *119*(1), 121-129.
- Dermody, N., Jones, M. K., & Cumming, S. R. (2013). The failure of imagined contact in reducing explicit and implicit out-group prejudice toward male homosexuals. *Current Psychology*, *32*(3), 261-274.
- Devine, P. G., Forscher, P. S., Austin, A. J., & Cox, W. T. (2012). Long-term reduction in implicit race bias: A prejudice habit-breaking intervention. *Journal of experimental social psychology*, *48*(6), 1267-1278.
- Devine, P. G., Forscher, P. S., Cox, W. T., Kaatz, A., Sheridan, J., & Carnes, M. (2017). A gender bias habit-breaking intervention led to increased hiring of female faculty in STEMM departments. *Journal of Experimental Social Psychology*, *73*, 211-215.

- Deyo, R. A., Cherkin, D. C., Weinstein, J., Howe, J., Ciol, M., & Mulle Jr, A. G. (2000). Involving patients in clinical decisions: impact of an interactive video program on use of back surgery. *Medical care*, 959-969.
- Dixon-Woods, M., Regan, J., Robertson, N., Young, B., Cordle, C., & Tobin, M. (2002). Teaching and learning about human sexuality in undergraduate medical education. *Medical education*, 36(5), 432-440.
- Dobbin, F., & Kalev, A. (2016). Why diversity programs fail. *Harvard Business Review*, 94(7), 14.
- Dos Reis, F. J. C., Wishart, G. C., Dicks, E. M., Greenberg, D., Rashbass, J., Schmidt, M. K., ... & Pharoah, P. D. (2017). An updated PREDICT breast cancer prognostication and treatment benefit prediction model with independent validation. *Breast Cancer Research*, 19(1), 1-13.
- Dresser, R. (1992). Wanted single, white male for medical research. *The Hastings Center Report*, 22(1), 24-29.
- Duffy, B., Shrimpton, H., & Clemence, M. (2016). Millennial: myths and realities. *Paris: IPSOS Mori*, Retrieved: <https://www.ipsos.com/sites/default/files/2017-07/ipsos-mori-thinks-millennial-myths-and-realities.pdf>, Accessed March 2022.
- Durand, M. A., Carpenter, L., Dolan, H., Bravo, P., Mann, M., Bunn, F., & Elwyn, G. (2014). Do interventions designed to support shared decision-making reduce health inequalities? A systematic review and meta-analysis. *PloS one*, 9(4), e94670.
- Eberhardt, J. L., Davies, P. G., Purdie-Vaughns, V. J., & Johnson, S. L. (2006). Looking deathworthy: Perceived stereotypicality of Black defendants predicts capital-sentencing outcomes. *Psychological science*, 17(5), 383-386.
- Eleazer, G. P., Stewart, T. J., Wieland, G. D., Anderson, M. B., Simpson, D., & Steering Committee of the National Evaluation of Senior Mentor Programs. (2009). The national evaluation of senior mentor programs: older adults in medical education. *Journal of the American Geriatrics Society*, 57(2), 321-326.
- Elliot, A. H., Martling, A., Glimelius, B., Nordenvall, C., Johansson, H., & Nilsson, P. J. (2014). Preoperative treatment selection in rectal cancer: a population-based cohort study. *European Journal of Surgical Oncology (EJSO)*, 40(12), 1782-1788.

- Elliott, A. M., Alexander, S. C., Mescher, C. A., Mohan, D., & Barnato, A. E. (2016). Differences in physicians' verbal and nonverbal communication with black and white patients at the end of life. *Journal of pain and symptom management, 51(1)*, 1-8.
- Elran-Barak, R. (2021). The implicit association of high-fat foods with shame and its link with ED symptoms: The moderating role of race/ethnicity. *Eating Behaviors, 101498*.
- Elran-Barak, R., & Bar-Anan, Y. (2018). Implicit and explicit anti-fat bias: The role of weight-related attitudes and beliefs. *Social Science & Medicine, 204*, 117-124.
- Equality and Human Rights Commission. (2017). Gender pay gap. Retrieved: <https://www.equalityhumanrights.com/en/publication-download/research-report-109-gender-pay-gap>, Accessed: June 2021
- Equality and Human Rights Commission. (2018). Is Britain Fairer? Retrieved: <https://www.equalityhumanrights.com/en/publication-download/britain-fairer-2018>, Accessed: June 2021
- Eriksson, S. E., & Safer, J. D. (2016). Evidence-based curricular content improves student knowledge and changes attitudes towards transgender medicine. *Endocrine Practice, 22(7)*, 837-841.
- Esmail, L., Moore, E., & Rein, A. (2015). Evaluating patient and stakeholder engagement in research: moving from theory to practice. *Journal of comparative effectiveness research, 4(2)*, 133-145.
- Europe, A. P. (2016). AGE platform Europe position on structural ageism
- Extermann, M., Albrand, G., Chen, H., Zanetta, S., Schonwetter, R., Zulian, G. B., ... & Droz, J. P. (2003). Are older French patients as willing as older American patients to undertake chemotherapy?. *Journal of clinical oncology, 21(17)*.
- Faculty of Old Age Psychiatry. (2017). Survey of Services Based on Information from Faculty Members. Royal College of Psychiatrists. Retrieved: [www.rcpsych.ac.uk/workinpsychiatry/faculties/oldagepsychiatry/newsreportsresources.aspx](http://www.rcpsych.ac.uk/workinpsychiatry/faculties/oldagepsychiatry/newsreportsresources.aspx), Accessed: October 2018.
- Fazio, R. H., Sanbonmatsu, D. M., Powell, M. C., & Kardes, F. R. (1986). On the automatic activation of attitudes. *Journal of personality and social psychology, 50(2)*, 229.

- Fenlon, D., Frankland, J., Foster, C. L., Brooks, C., Coleman, P., Payne, S., ... & Addington-Hall, J. M. (2013). Living into old age with the consequences of breast cancer. *European Journal of Oncology Nursing, 17*(3), 311-316.
- Fiske, S. T. (2018). Stereotype content: Warmth and competence endure. *Current directions in psychological science, 27*(2), 67-73.
- FitzGerald, C., & Hurst, S. (2017). Implicit bias in healthcare professionals: a systematic review. *BMC medical ethics, 18*(1)
- Fitzgerald, J. T., Wray, L. A., Halter, J. B., Williams, B. C., & Supiano, M. A. (2003). Relating medical students' knowledge, attitudes, and experience to an interest in geriatric medicine. *The Gerontologist, 43*(6), 849-855.
- Forscher, P. S., Lai, C. K., Axt, J. R., Ebersole, C. R., Herman, M., Devine, P. G., & Nosek, B. A. (2019). A meta-analysis of procedures to change implicit measures. *Journal of personality and social psychology.*
- Fowler, R. A., Sabur, N., Li, P., Juurlink, D. N., Pinto, R., Hladunewich, M. A., ... & Martin, C. M. (2007). Sex- and age-based differences in the delivery and outcomes of critical care. *Cmaj, 177*(12), 1513-1519.
- Francioli, S. P., & North, M. S. (2021). The older worker: gender and age discrimination in the workplace. In *Handbook of the Psychology of Aging* (pp. 215-235). Academic Press.
- Fraser, S., Lagacé, M., Bongué, B., Ndeye, N., Guyot, J., Bechard, L., ... & Tougas, F. (2020). Ageism and COVID-19: What does our society's response say about us?. *Age and ageing, 49*(5), 692-695.
- French, A. R., Franz, T. M., Phelan, L. L., & Blaine, B. E. (2013). Reducing Muslim/Arab stereotypes through evaluative conditioning. *The Journal of Social Psychology, 153*(1), 6-9.
- Frost, R., Beattie, A., Bhanu, C., Walters, K., & Ben-Shlomo, Y. (2019). Management of depression and referral of older people to psychological therapies: a systematic review of qualitative studies. *British Journal of General Practice, 69*(680), e171-e181.
- Gagliardi, A. R., Dunn, S., Foster, A. M., Grace, S. L., Khanlou, N., Stewart, D. E., & Straus, S. E. (2020). Is patient-centred care for women a priority for policy-makers? Content analysis of government policies. *Health research policy and systems, 18*(1), 1-8.

- Gale, N. K., Heath, G., Cameron, E., Rashid, S., & Redwood, S. (2013). Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC medical research methodology*, *13*(1), 1-8.
- Galinsky, A. D., & Moskowitz, G. B. (2000). Perspective-taking: decreasing stereotype expression, stereotype accessibility, and in-group favoritism. *Journal of personality and social psychology*, *78*(4), 708.
- Gawronski, B. (2019). Six lessons for a cogent science of implicit bias and its criticism. *Perspectives on Psychological Science*, *14*(4), 574-595.4
- Gawronski, B., Hofmann, W., & Wilbur, C. J. (2006). Are “implicit” attitudes unconscious?. *Consciousness and cognition*, *15*(3), 485-499.
- Gazal-Ayal, O., & Sulitzeanu-Kenan, R. (2010). Let My People Go: Ethnic In-Group Bias in Judicial Decisions—Evidence from a Randomized Natural Experiment. *Journal of Empirical Legal Studies*, *7*(3), 403-428.
- Gaziano, J. M., & Hennekens, C. H. (2014). Physicians' Health Study (PHS). *Wiley StatsRef: Statistics Reference Online*.
- Giasson, H. L., & Chopik, W. J. (2020). Geographic patterns of implicit age bias and associations with state-level health outcomes across the United States. *European Journal of Social Psychology*, *50*(6), 1173-1190.
- Gilburt, H. (2018). Funding and Staffing of NHS Mental Health Providers: Still Waiting for Funding Parity. *The King's Fund*.
- Glazebrook, K. & Ter Meer, J. (2016). Putting Applied to the test. Retrieved: <https://medium.com/@kateglazebrook/putting-applied-to-the-test-part-1-701b93b0416f>, Accessed April 2022.
- Glendinning, C., Jacobs, S., Alborz, A., & Hann, M. (2002). A survey of access to medical services in nursing and residential homes in England. *British Journal of General Practice*, *52*(480), 545-548.
- Glover, D., Pallais, A., & Pariente, W. (2017). Discrimination as a self-fulfilling prophecy: Evidence from French grocery stores. *The Quarterly Journal of Economics*, *132*(3), 1219-1260.

- Goddard, M. K. (2008). Quality in and equality of access to healthcare services. *Country report for England. York, England, University of York Centre for Health Economics.*
- Goldin, C., & Rouse, C. (2000). Orchestrating impartiality: The impact of "blind" auditions on female musicians. *American economic review, 90(4)*, 715-741.
- Gordon, A. L., Masud, T., & Gladman, J. R. (2014). Now that we have a definition for physical frailty, what shape should frailty medicine take?. *Age and ageing, 43(1)*, 8-9.
- Gov UK. (2020). Unconscious bias and diversity training – what the evidence says. Retrieved: <https://www.gov.uk/government/publications/unconscious-bias-and-diversity-training-what-the-evidence-says>, Accessed: May 2021
- Green, A. R., Carney, D. R., Pallin, D. J., Ngo, L. H., Raymond, K. L., Iezzoni, L. I., & Banaji, M. R. (2007). Implicit bias among physicians and its prediction of thrombolysis decisions for black and white patients. *Journal of general internal medicine, 22(9)*, 1231-1238.
- Greenberg, J., Pyszczynski, T., & Solomon, S. (1986). The causes and consequences of a need for self-esteem: A terror management theory. In *Public self and private self* (pp. 189-212). Springer, New York, NY.
- Greenwald, A. G., & Banaji, M. R. (1995). Implicit social cognition: attitudes, self-esteem, and stereotypes. *Psychological review, 102(1)*, 4.
- Greenwald, A. G., Banaji, M. R., & Nosek, B. A. (2015). Statistically small effects of the Implicit Association Test can have societally large effects.
- Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. (1998). Measuring individual differences in implicit cognition: the implicit association test. *Journal of personality and social psychology, 74(6)*, 1464.
- Griffiths, A. W., Ashley, L., Kelley, R., Cowdell, F., Collinson, M., Mason, E., ... & Surr, C. (2020). Decision-making in cancer care for people living with dementia. *Psycho-Oncology, 29(8)*, 1347-1354.
- Groom, V., Bailenson, J. N., & Nass, C. (2009). The influence of racial embodiment on racial bias in immersive virtual environments. *Social Influence, 4(3)*, 231-248.
- Gündemir, S., Homan, A. C., De Dreu, C. K., & Van Vugt, M. (2014). Think leader, think white? Capturing and weakening an implicit pro-white leadership bias. *PloS one, 9(1)*, e83915.

- Hahn, A., & Gawronski, B. (2014). Do implicit evaluations reflect unconscious attitudes?. *Behavioral and Brain Sciences*, 37(1), 28.
- Hahn, A., Judd, C. M., Hirsh, H. K., & Blair, I. V. (2014). Awareness of implicit attitudes. *Journal of Experimental Psychology: General*, 143(3), 1369.
- Hall, N. R., Crisp, R. J., & Suen, M. W. (2009). Reducing implicit prejudice by blurring intergroup boundaries. *Basic and Applied Social Psychology*, 31(3), 244-254.
- Hamaker, M. E., Seynaeve, C., Nortier, J. W., Wymenga, M., Maartense, E., Boven, E., ... & Smorenburg, C. H. (2013). Slow accrual of elderly patients with metastatic breast cancer in the Dutch multicentre OMEGA study. *The Breast*, 22(4), 556-559.
- Hamaker, M. E., Stauder, R., & van Munster, B. C. (2014). Exclusion of older patients from ongoing clinical trials for hematological malignancies: an evaluation of the National Institutes of Health Clinical Trial Registry. *The oncologist*, 19(10), 1069-1075.
- Hamaker, M. E., Te Molder, M., Thielen, N., van Munster, B. C., Schiphorst, A. H., & van Huis, L. H. (2018). The effect of a geriatric evaluation on treatment decisions and outcome for older cancer patients—a systematic review. *Journal of geriatric oncology*, 9(5), 430-440. Unpublished raw data. As cited in
- Hamelinck, V. C., Bastiaannet, E., Pieterse, A. H., van de Velde, C. J., Liefers, G. J., & Stiggelbout, A. M. (2018). Preferred and perceived participation of younger and older patients in decision making about treatment for early breast cancer: a prospective study. *Clinical breast cancer*, 18(2), e245-e253.
- Hamilton, A. S., Albertsen, P. C., Johnson, T. K., Hoffman, R., Morrell, D., Deapen, D., & Penson, D. F. (2011). Trends in the treatment of localized prostate cancer using supplemented cancer registry data. *BJU international*, 107(4), 576-584.
- Han, J. (2018). Chronic illnesses and depressive symptoms among older people: functional limitations as a mediator and self-perceptions of aging as a moderator. *Journal of aging and health*, 30(8), 1188-1204.
- Hanel, P. H., & Vione, K. C. (2016). Do student samples provide an accurate estimate of the general public?. *PloS one*, 11(12), e0168354.

- Hardacker CT, Rubinstein B, Hotton A, Houlberg M. Adding silver to the rainbow: the development of the nurses' health education about LGBT elders (HEALE) cultural competency curriculum. *J Nursing Manage.* 2014;22(2):257–66.
- Harder, H., Ballinger, R., Langridge, C., Ring, A., & Fallowfield, L. J. (2013). Adjuvant chemotherapy in elderly women with breast cancer: patients' perspectives on information giving and decision making. *Psycho-Oncology*, 22(12), 2729-2735.
- Harris, K., Krygsman, S., Waschenko, J., & Laliberte Rudman, D. (2018). Ageism and the older worker: A scoping review. *The Gerontologist*, 58(2), e1-e14.
- Haut, E. R., Lau, B. D., Kraenzlin, F. S., Hobson, D. B., Kraus, P. S., Carolan, H. T., ... & Streiff, M. B. (2012). Improved prophylaxis and decreased rates of preventable harm with the use of a mandatory computerized clinical decision support tool for prophylaxis for venous thromboembolism in trauma. *Archives of surgery*, 147(10), 901-907.
- Hawkes, N. (2019). Cancer survival data emphasise importance of early diagnosis.
- Hawley, S. T., Griggs, J. J., Hamilton, A. S., Graff, J. J., Janz, N. K., Morrow, M., ... & Katz, S. J. (2009). Decision involvement and receipt of mastectomy among racially and ethnically diverse breast cancer patients. *Journal of the National Cancer Institute*, 101(19), 1337-1347.
- Hayes, L., Forrest, L., Adams, J., Hidajat, M., Ben-Shlomo, Y., White, M., & Sharp, L. (2019). Age-related inequalities in colon cancer treatment persist over time: a population-based analysis. *J Epidemiol Community Health*, 73(1), 34-41.
- Hehman, E., Flake, J. K., & Calanchini, J. (2018). Disproportionate use of lethal force in policing is associated with regional racial biases of residents. *Social psychological and personality science*, 9(4), 393-401.
- Hekman, D. R., Johnson, S. K., Foo, M. D., & Yang, W. (2017). Does diversity-valuing behavior result in diminished performance ratings for non-white and female leaders?. *Academy of Management Journal*, 60(2), 771-797.
- Helfand, B. K., Webb, M., Gartaganis, S. L., Fuller, L., Kwon, C. S., & Inouye, S. K. (2020). The exclusion of older persons from vaccine and treatment trials for coronavirus disease 2019—missing the target. *JAMA internal medicine*, 180(11), 1546-1549.

- Help the Aged (2009) Specialist doctors label the NHS institutionally ageist and demand a law to bring it to an end. (Press release, 27 January 2009), Retrieved: [http://press.helptheaged.org.uk/\\_press/Releases/\\_items/\\_Specialist+doctors+label+the+NHS+institutionally+ageist+and+demand+a+law+to+bring+it+to+an+end.htm](http://press.helptheaged.org.uk/_press/Releases/_items/_Specialist+doctors+label+the+NHS+institutionally+ageist+and+demand+a+law+to+bring+it+to+an+end.htm), Accessed: June 2020
- Hennink, M., & Kaiser, B. N. (2021). Sample sizes for saturation in qualitative research: A systematic review of empirical tests. *Social Science & Medicine*, 114523.
- Higashi, R. T., Tillack, A. A., Steinman, M., Harper, M., & Johnston, C. B. (2012). Elder care as “frustrating” and “boring”: understanding the persistence of negative attitudes toward older patients among physicians-in-training. *Journal of Aging Studies*, 26(4), 476-483.
- Hind, D., Wyld, L., & Reed, M. (2007). Surgery, with or without tamoxifen, vs tamoxifen alone for older women with operable breast cancer: Cochrane review. *British Journal of cancer*, 96(7), 1025-1029.
- Hoffman, K. M., Trawalter, S., Axt, J. R., & Oliver, M. N. (2016). Racial bias in pain assessment and treatment recommendations, and false beliefs about biological differences between blacks and whites. *Proceedings of the National Academy of Sciences*, 113(16), 4296-4301.
- Hoffmann, T. C., & Del Mar, C. (2015). Patients’ expectations of the benefits and harms of treatments, screening, and tests: a systematic review. *JAMA internal medicine*, 175(2), 274-286.
- Hoffmann, T. C., & Del Mar, C. (2017). Clinicians’ expectations of the benefits and harms of treatments, screening, and tests: a systematic review. *JAMA internal medicine*, 177(3), 407-419.
- Hofmann, W., Gschwendner, T., Nosek, B. A., & Schmitt, M. (2005). What moderates implicit—explicit consistency?. *European review of social psychology*, 16(1), 335-390.
- Holstein, M. (2006). On being an old woman. *Age matters: Realigning feminist thinking*. New York: Routledge Taylor and Francis Group.
- Holt-Lunstad, J., Smith, T. B., & Layton, J. B. (2010). Social relationships and mortality risk: a meta-analytic review. *PLoS medicine*, 7(7), e1000316.
- Home Office. (2020). *Police powers and procedures, England and Wales, year ending 31 March 2020 second edition*. Retrieved: <https://www.gov.uk/government/statistics/police-powers-and-procedures-england-and-wales-year-ending-31-march-2020>, Accessed April 2022.

- Hoogerduijn, J. G., Buurman, B. M., Korevaar, J. C., Grobbee, D. E., de Rooij, S. E., & Schuurmans, M. J. (2012). The prediction of functional decline in older hospitalised patients. *Age and ageing, 41(3)*, 381-387.
- Hubbard, J., & Jatoi, A. (2011). Adjuvant chemotherapy in colon cancer: ageism or appropriate care. *J Clin Oncol, 29(24)*, 3209-3210.
- Hughes, T. M., Merath, K., Chen, Q., Sun, S., Palmer, E., Idrees, J. J., ... & Pawlik, T. M. (2018). Association of shared decision-making on patient-reported health outcomes and healthcare utilization. *The American Journal of Surgery, 216(1)*, 7-12.
- Hummert, M. L., Garstka, T. A., O'Brien, L. T., Greenwald, A. G., & Mellott, D. S. (2002). Using the implicit association test to measure age differences in implicit social cognitions. *Psychology and aging, 17(3)*, 482.
- Humphries, R., Thorlby, R., Holder, H., Hall, P., & Charles, A. (2016). Social care for older people. *The Kings Fund: Home truths. London.*
- Huntsinger, J. R., Lun, J., Sinclair, S., & Clore, G. L. (2009). Contagion without contact: Anticipatory mood matching in response to affiliative motivation. *Personality and social psychology bulletin, 35(7)*, 909-922.
- Huntsinger, J. R., Sinclair, S., & Clore, G. L. (2009). Affective regulation of implicitly measured stereotypes and attitudes: Automatic and controlled processes. *Journal of Experimental Social Psychology, 45(3)*, 560-566.
- Hurria, A., Hurria, A., Zuckerman, E., Panageas, K. S., Fournier, M., D'Andrea, G., ... & Hudis, C. (2006). A prospective, longitudinal study of the functional status and quality of life of older patients with breast cancer receiving adjuvant chemotherapy. *Journal of the American Geriatrics Society, 54(7)*, 1119-1124.
- Hurria, A., Levit, L. A., Dale, W., Mohile, S. G., Muss, H. B., Fehrenbacher, L., ... & Postow, M. A. (2015). Improving the evidence base for treating older adults with cancer: American Society of Clinical Oncology statement. *J Clin Oncol, 33(32)*, 3826-3833.
- Husain, L. S., Collins, K., Reed, M., & Wyld, L. (2008). Choices in cancer treatment: a qualitative study of the older women's (> 70 years) perspective. *Psycho-Oncology: Journal of the Psychological, Social and Behavioral Dimensions of Cancer, 17(4)*, 410-416.

- International Longevity Centre. (2019). *Ageism in breast cancer*. Retrieved: <https://ilcuk.org.uk/wp-content/uploads/2019/04/Ageism-in-breast-cancer-2.pdf>, Accessed February 2022.
- Isaac, C., & Behar-Horenstein, L. (2016). Impact of interviews on heterosexual Students' expressions of cultural competency. *The Qualitative Report*, 21(10), 1785.
- Jimenez-Sotomayor, M. R., Gomez-Moreno, C., & Soto-Perez-de-Celis, E. (2020). Coronavirus, ageism, and Twitter: An evaluation of tweets about older adults and COVID-19. *Journal of the American Geriatrics Society*, 68(8), 1661-1665.
- Johnson, D. (2008). Racial prejudice, perceived injustice, and the Black-White gap in punitive attitudes. *Journal of criminal justice*, 36(2), 198-206.
- Johnson, K., Rullo, J., & Faubion, S. (2015). Student-initiated sexual health selective as a curricular tool. *Sexual medicine*, 3(2), 118-127.
- Johnson, P., Fitzgerald, T., Salganicoff, A., Wood, S. F., & Goldstein, J. M. (2014). Sex-specific medical research: why women's health can't wait. *Brigham and Women's Hospital*.
- Johnston, D. W., & Lordan, G. (2016). Racial prejudice and labour market penalties during economic downturns. *European Economic Review*, 84, 57-75.
- Joint Commissioning Panel for Mental Health. (2013). Guidance for Commissioners of Older People's Mental Health Services. Retrieved: [www.jcpmh.info/good-services/older-peoples-services](http://www.jcpmh.info/good-services/older-peoples-services), Accessed: October 2018
- Jones, H., & Neave, A. (2016). Health Survey for England 2015. Adult Social Care. *Health and Social Care Information Centre, London*.
- Joseph-Williams, N., Lloyd, A., Edwards, A., Stobbart, L., Tomson, D., Macphail, S., ... & Thomson, R. (2017). Implementing shared decision making in the NHS: lessons from the MAGIC programme. *Bmj*, 357.
- Joy-Gaba, J. A., & Nosek, B. A. (2010). The surprisingly limited malleability of implicit racial evaluations. *Social Psychology*.
- Kalsi, T. & Harari, D. (2011). *Geriatric Oncology training needs: A Survey of Oncology SpRs*.
- Kang, S. K., DeCelles, K. A., Tilcsik, A., & Jun, S. (2016). Whitened résumés: Race and self-presentation in the labor market. *Administrative Science Quarterly*, 61(3), 469-502.

- Katz, A. D., & Hoyt, W. T. (2014). The influence of multicultural counseling competence and anti-Black prejudice on therapists' outcome expectancies. *Journal of counseling psychology, 61*(2), 299.
- Katz, S. J., Lantz, P. M., Janz, N. K., Fagerlin, A., Schwartz, K., Liu, L., ... & Morrow, M. (2005). Patient involvement in surgery treatment decisions for breast cancer. *J Clin Oncol, 23*(24), 5526-5533.
- Kawakami, K., Dovidio, J. F., & Van Kamp, S. (2007). The impact of counterstereotypic training and related correction processes on the application of stereotypes. *Group Processes & Intergroup Relations, 10*(2), 139-156.
- Keating, N. L., Guadagnoli, E., Landrum, M. B., Borbas, C., & Weeks, J. C. (2002). Treatment decision making in early-stage breast cancer: should surgeons match patients' desired level of involvement?. *Journal of clinical oncology, 20*(6), 1473-1479.
- Kelley, L., Chou, C. L., Dibble, S. L., & Robertson, P. A. (2008). A critical intervention in lesbian, gay, bisexual, and transgender health: knowledge and attitude outcomes among second-year medical students. *Teaching and learning in medicine, 20*(3), 248-253.
- Kemeny, M. M., Peterson, B. L., Kornblith, A. B., Muss, H. B., Wheeler, J., Levine, E., ... & Cohen, H. J. (2003). Barriers to clinical trial participation by older women with breast cancer. *Journal of Clinical Oncology, 21*(12), 2268-2275.
- Kennedy, A. D., Sculpher, M. J., Coulter, A., Dwyer, N., Rees, M., Abrams, K. R., ... & Stirrat, G. (2002). Effects of decision aids for menorrhagia on treatment choices, health outcomes, and costs: a randomized controlled trial. *Jama, 288*(21), 2701-2708.
- Kerr, S., Watson, H., Tolson, D., Lough, M., & Brown, M. (2006). Smoking after the age of 65 years: a qualitative exploration of older current and former smokers' views on smoking, stopping smoking, and smoking cessation resources and services. *Health and Social Care in the Community, 14*(6), 572- 582.
- Kerse, N., Buetow, S., Mainous, A. G., Young, G., Coster, G., & Arroll, B. (2004). Physician-patient relationship and medication compliance: a primary care investigation. *The Annals of Family Medicine, 2*(5), 455-461.
- Kluge, A., & Krings, F. (2008). Attitudes toward older workers and human resource practices. *Swiss journal of psychology, 67*(1), 61-64.

- Koch, A. J., D'Mello, S. D., Sackett, P. R. (2015). A meta-analysis of gender stereotypes and bias in experimental simulations of employment decision making. *Journal of Applied Psychology, 100*(1), 128–161.
- Kornadt, A. E., & Rothermund, K. (2011). Contexts of aging: Assessing evaluative age stereotypes in different life domains. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 66*(5), 547-556.
- Kraus, M. W., Onyeador, I. N., Daumeyer, N. M., Rucker, J. M., & Richeson, J. A. (2019). The misperception of racial economic inequality. *Perspectives on Psychological Science, 14*(6), 899-921.
- Krosch, A. R., & Amodio, D. M. (2014). Economic scarcity alters the perception of race. *Proceedings of the National Academy of Sciences, 111*(25), 9079-9084.
- Ksiazkiewicz, A. (2021). Political ideology and diurnal associations: A dual-process motivated social cognition account. *Politics and the Life Sciences, 1-16*.
- Kulik, C. T., Perry, E. L., & Bourhis, A. C. (2000). Ironic evaluation processes: Effects of thought suppression on evaluations of older job applicants. *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior, 21*(6), 689-711.
- Lagacé, M., Tanguay, A., Lavallée, M. L., Laplante, J., & Robichaud, S. (2012). The silent impact of ageist communication in long term care facilities: Elders' perspectives on quality of life and coping strategies. *Journal of Aging Studies, 26*(3), 335-342.
- Lai, C. K., Haidt, J., & Nosek, B. A. (2014). Moral elevation reduces prejudice against gay men. *Cognition & emotion, 28*(5), 781-794.
- Lai, C. K., Marini, M., Lehr, S. A., Cerruti, C., Shin, J. L., Joy-Gaba, J. A., & Nosek, B. A. (2014). A comparative investigation of 17 interventions to reduce implicit racial preferences. *Journal of Experimental Psychology: General, 143*, 1765-1785.
- Lai, C. K., Skinner, A. L., Cooley, E., Murrar, S., Brauer, M., Devos, T., ... & Nosek, B. A. (2016). Reducing implicit racial preferences: II. Intervention effectiveness across time. *Journal of Experimental Psychology: General, 145*(8), 1001.
- Land, L. H., Dalton, S. O., Jørgensen, T. L., & Ewertz, M. (2012). Comorbidity and survival after early breast cancer. A review. *Critical reviews in oncology/hematology, 81*(2), 196-205.

- Laurence, L., & Weinhouse, B. (1997). *Outrageous practices: how gender bias threatens women's health*. Rutgers University Press.
- Lavelle, K., Sowerbutts, A. M., Bundred, N., Pilling, M., Degner, L., Stockton, C., & Todd, C. (2014). Is lack of surgery for older breast cancer patients in the UK explained by patient choice or poor health? A prospective cohort study. *British Journal of Cancer*, *110*(3), 573.
- Lavelle, K., Todd, C., Moran, A., Howell, A., Bundred, N., & Campbell, M. (2007). Non-standard management of breast cancer increases with age in the UK: a population based cohort of women >65 years. *British Journal of Cancer*, *96*, 1197–1203.
- Lawler, M., Selby, P., Aapro, M. S., & Duffy, S. (2014). Ageism in cancer care. *BMJ*, *348*.
- Lee, C. N., Dominik, R., Levin, C. A., Barry, M. J., Cosenza, C., O'Connor, A. M., ... & Sepucha, K. R. (2010). Development of instruments to measure the quality of breast cancer treatment decisions. *Health Expectations*, *13*(3), 258-272.
- Lemish, D., & Muhlbauer, V. (2012). "Can't have it all": representations of older women in popular culture. *Women & Therapy*, *35*(3-4), 165-180.
- Levinson, J. D., Smith, R. J., & Young, D. M. (2014). Devaluing death: An empirical study of implicit racial bias on jury-eligible citizens in six death penalty states. *NYUL Rev.*, *89*, 513.
- Levinson, W., Kao, A., Kuby, A., & Thisted, R. A. (2005). Not all patients want to participate in decision making: a national study of public preferences. *Journal of general internal medicine*, *20*(6), 531-535.
- Levit, L., Balogh, E., Nass, S., & Ganz, P. A. (2013). Patient-centered communication and shared decision making. In *Delivering high-quality cancer care: charting a new course for a system in crisis*. National Academies Press (US).
- Levy B. R., Ferrucci L., Zonderman A. B., Slade M. D., Troncoso J., & Resnick S. M. (2016). A culture-brain link: Negative age stereotypes predict Alzheimer's disease biomarkers. *Psychology and Aging*, *31*, 82–88. doi:10.1037/pag0000062
- Levy B. R., Slade M. D., Murphy T. E., & Gill T. M. (2012). Association between positive age stereotypes and recovery from disability in older persons. *JAMA*, *308*, 1972–1973. doi:10.1001/jama.2012.14541

- Levy B. R., Zonderman A. B., Slade M. D., & Ferrucci L. (2009). Age stereotypes held earlier in life predict cardiovascular events in later life. *Psychological Science, 20*, 296–298. doi:10.1111/j.1467-9280.2009.02298.x
- Levy, B. R. (2009). Stereotype embodiment: A psychosocial approach to aging. *Current directions in psychological science, 18*(6), 332-336.
- Levy, B. R., & Leifheit-Limson, E. (2009). The stereotype-matching effect: greater influence on functioning when age stereotypes correspond to outcomes. *Psychology and aging, 24*(1), 230.
- Levy, B. R., & Slade, M. D. (2019). Positive views of aging reduce risk of developing later-life obesity. *Preventive medicine reports, 13*, 196-198.
- Levy, B. R., Chung, P. H., Slade, M. D., Van Ness, P. H., & Pietrzak, R. H. (2019). Active coping shields against negative aging self-stereotypes contributing to psychiatric conditions. *Social Science & Medicine, 228*, 25-29.
- Levy, B. R., Provolo, N., Chang, E. S., & Slade, M. D. (2020). Negative Age Stereotypes Associated with Older Persons' Rejection of COVID-19 Hospitalization. *Journal of the American Geriatrics Society*.
- Levy, B. R., Slade, M. D., & Gill, T. M. (2006). Hearing decline predicted by elders' stereotypes. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 61*(2), 82-87.
- Levy, B. R., Slade, M. D., Pietrzak, R. H., & Ferrucci, L. (2018). Positive age beliefs protect against dementia even among elders with high-risk gene. *PloS one, 13*(2), e0191004.
- Lifford, K. J., Witt, J., Burton, M., Collins, K., Caldon, L., Edwards, A., ... & Brain, K. (2015). Understanding older women's decision making and coping in the context of breast cancer treatment. *BMC medical informatics and decision making, 15*(1), 1-12.
- Liljas, A. E., Brattström, F., Burström, B., Schön, P., & Agerholm, J. (2019). Impact of integrated care on patient-related outcomes among older people—a systematic review. *International Journal of Integrated Care, 19*(3).
- Limb, M. (2021). Disparity in maternal deaths because of ethnicity is “unacceptable”.
- Linsell, L., Burgess, C. C., & Ramirez, A. J. (2008). Breast cancer awareness among older women. *British journal of cancer, 99*(8), 1221-1225.

- Liu, Y. E., Norman, I. J., & While, A. E. (2013). Nurses' attitudes towards older people: A systematic review. *International Journal of Nursing Studies*, *50*(9), 1271–1282. <https://doi.org/10.1016/j.ijnurstu.2012.11.021>
- Loos, E., & Ivan, L. (2018). Visual ageism in the media. In *Contemporary perspectives on ageism* (pp. 163-176). Springer, Cham.
- Ludolph, R., & Schulz, P. J. (2018). Debiasing health-related judgments and decision making: a systematic review. *Medical Decision Making*, *38*(1), 3-13.
- Macmillan. (2012). Age Old Excuse Report. Retrieved: <https://www.macmillan.org.uk/documents/getinvolved/campaigns/ageoldexcuse/ageoldexcusereport-macmillancancersupport.pdf>, Accessed March 2019.
- Macrae, C. N., Bodenhausen, G. V., Milne, A. B., & Jetten, J. (1994). Out of mind but back in sight: Stereotypes on the rebound. *Journal of personality and social psychology*, *67*(5), 808.
- Maddams, J., Utley, M., & Møller, H. (2012). Projections of cancer prevalence in the United Kingdom, 2010–2040. *British journal of cancer*, *107*(7), 1195.
- Maes-Carballo, M., Muñoz-Núñez, I., Martín-Díaz, M., Mignini, L., Bueno-Cavanillas, A., & Khan, K. S. (2020). Shared decision making in breast cancer treatment guidelines: Development of a quality assessment tool and a systematic review. *Health Expectations*, *23*(5), 1045-1064.
- Maina, I. W., Belton, T. D., Ginzberg, S., Singh, A., & Johnson, T. J. (2018). A decade of studying implicit racial/ethnic bias in healthcare providers using the implicit association test. *Social Science & Medicine*, *199*, 219-229.
- Maister, L., Sebanz, N., Knoblich, G., & Tsakiris, M. (2013). Experiencing ownership over a dark-skinned body reduces implicit racial bias. *Cognition*, *128*(2), 170-178.
- Makita, M., Mas-Bleda, A., Stuart, E., & Thelwall, M. (2021). Ageing, old age and older adults: a social media analysis of dominant topics and discourses. *Ageing & Society*, *41*(2), 247-272.
- Makris, U. E., Higashi, R. T., Marks, E. G., Fraenkel, L., Sale, J. E., Gill, T. M., & Reid, M. C. (2015). Ageism, negative attitudes, and competing co-morbidities—why older adults may not seek care for restricting back pain: a qualitative study. *BMC geriatrics*, *15*(1), 39.

- Mandelblatt, J. S., Edge, S. B., Meropol, N. J., Senie, R., Tsangaris, T., Grey, L., ... & Weeks, J. (2003). Predictors of long-term outcomes in older breast cancer survivors: perceptions versus patterns of care. *Journal of Clinical Oncology*, *21*(5), 855-863.
- Mandelblatt, J., Figueiredo, M., & Cullen, J. (2003). Outcomes and quality of life following breast cancer treatment in older women: When, why, how much, and what do women want?. *Health and quality of Life Outcomes*, *1*(1), 45.
- Mandelblatt, J., Kreling, B., Figueiredo, M., & Feng, S. (2006). What is the impact of shared decision making on treatment and outcomes for older women with breast cancer?. *Journal of clinical Oncology*, *24*(30), 4908-4913.
- Marmot, M. G., Altman, D. G., Cameron, D. A., Dewar, J. A., Thompson, S. G., & Wilcox, M. (2013). The benefits and harms of breast cancer screening: an independent review. *British journal of cancer*, *108*(11), 2205.
- Marmot, M., Allen, J., Goldblatt, P., Herd, E., & Morrison, J. (2021). Build back fairer: the COVID-19 Marmot review the pandemic, socioeconomic and health inequalities in England.
- Maroni, R., Massat, N. J., Parmar, D., Dibden, A., Cuzick, J., Sasieni, P. D., & Duffy, S. W. (2021). A case-control study to evaluate the impact of the breast screening programme on mortality in England. *British journal of cancer*, *124*(4), 736-743.
- Marques, S., Swift, H. J., Vauclair, C. M., Lima, M. L., Bratt, C., & Abrams, D. (2015). 'Being old and ill' across different countries: Social status, age identification and older people's subjective health. *Psychology & health*, *30*(6), 699-714.
- Martin, C., Burton, M., & Wyld, L. (2021). Caregiver experiences of making treatment decisions for older women with breast cancer and dementia. *Health & social care in the community*.
- Martin, C., Shrestha, A., Burton, M., Collins, K., & Wyld, L. (2019). How are caregivers involved in treatment decision making for older people with dementia and a new diagnosis of cancer?. *Psycho-oncology*, *28*(6), 1197-1206.
- Martin, C., Shrestha, A., Morgan, J., Bradburn, M., Herbert, E., Burton, M., ... & Wyld, L. (2021). Treatment choices for older women with primary operable breast cancer and cognitive impairment: Results from a prospective, multicentre cohort study. *Journal of Geriatric Oncology*, *12*(5), 705-713.

- Maskrey, N. (2019). Shared decision making: why the slow progress? An essay by Neal Maskrey. *BMJ*, 367.
- Mayor, S. (2008). Osteoporosis experts launch guidance to fill gaps left by NICE. *British Medical Journal*, 337, a2204.
- McCleary, N. J., Hubbard, J., Mahoney, M. R., Meyerhardt, J. A., Sargent, D., Venook, A., & Grothey, A. (2018). Challenges of conducting a prospective clinical trial for older patients: lessons learned from NCCTG N0949 (alliance). *Journal of geriatric oncology*, 9(1), 24-31.
- McDougall, F. A., Matthews, F. E., Kvaal, K., Dewey, M. E., & Brayne, C. (2007). Prevalence and symptomatology of depression in older people living in institutions in England and Wales. *Age and Ageing*, 36(5), 562-568.
- McEnery, T. (2020). Wells Fargo CEO: 'Limited pool of black talent to recruit from'. *NY Post*. Retrieved: <https://nypost.com/2020/09/22/wells-fargo-ceo-ruffles-feathers-with-comments-about-diverse-talent/>, Accessed: Feb 2022
- McGrane, J. A., & White, F. A. (2007). Differences in Anglo and Asian Australians' explicit and implicit prejudice and the attenuation of their implicit in-group bias. *Asian Journal of Social Psychology*, 10(3), 204-210.
- McWilliams, L., Farrell, C., Grande, G., Keady, J., Swarbrick, C., & Yorke, J. (2018). A systematic review of the prevalence of comorbid cancer and dementia and its implications for cancer-related care. *Aging & mental health*, 22(10), 1254-1271.
- McWilliams, L., Farrell, C., Keady, J., Swarbrick, C., Burgess, L., Grande, G., ... & Yorke, J. (2018). Cancer-related information needs and treatment decision-making experiences of people with dementia in England: a multiple perspective qualitative study. *BMJ open*, 8(4), e020250.
- Meiboom, A. A., de Vries, H., Hertogh, C. M., & Scheele, F. (2015). Why medical students do not choose a career in geriatrics: a systematic review. *BMC medical education*, 15(1), 1-9.
- Meiboom, A. A., de Vries, H., Scheele, F., & Hertogh, C. M. (2018). Raising enthusiasm for the medical care of elderly patients: a concept mapping study to find elements for an elderly friendly medical curriculum. *BMC Medical Education*, 18(1), 1-9.

- Meiboom, A., Diedrich, C., Vries, H. D., Hertogh, C., & Scheele, F. (2015). The hidden curriculum of the medical care for elderly patients in medical education: a qualitative study. *Gerontology & geriatrics education, 36*(1), 30-44.
- Meisner, B. A. (2012). Physicians' attitudes toward aging, the aged, and the provision of geriatric care: A systematic narrative review. *Critical Public Health, 22*(1), 61–72. <https://doi.org/10.1080/09581596.2010.539592>
- Menichetti, J., Cipresso, P., Bussolin, D., & Graffigna, G. (2016). Engaging older people in healthy and active lifestyles: a systematic review. *Ageing & Society, 36*(10), 2036-2060.
- Mental Health Foundation. (2009). All things being equal: age equality in mental health care for older people in England. *London: Mental Health Foundation.*
- Midding, E., Halbach, S. M., Kowalski, C., Weber, R., Würstlein, R., & Ernstmann, N. (2018). Men with a “woman’s disease”: Stigmatization of male breast cancer patients—A mixed methods analysis. *American journal of men's health, 12*(6), 2194-2207.
- Mind. (2005). Access all ages: Mind's Access all ages campaign: mental health needs in later life must be met, not marginalised. *London: Mind.*
- Minichiello, V., Rahman, S., Hawkes, G., & Pitts, M. (2012). STI epidemiology in the global older population: emerging challenges. *Perspectives in Public Health, 132*(4), 178-181.
- Mitchell, G., & Tetlock, P. E. (2017). Popularity as a poor proxy for utility: The case of implicit prejudice. *Psychological science under scrutiny: Recent challenges and proposed solutions, 164-195.*
- Monahan, C., Macdonald, J., Lytle, A., Apriceno, M., Levy, S. R. (2020). COVID-19 and ageism: How positive and negative responses impact older adults and society. *American Psychologist, 75*, 887–896. <https://doi.org/10.1037/amp0000699>
- Monteith, M. J., Spicer, C. V., & Tooman, G. D. (1998). Consequences of stereotype suppression: Stereotypes on AND not on the rebound. *Journal of Experimental Social Psychology, 34*(4), 355-377.
- Morgan, C., Webb, R. T., Carr, M. J., Kontopantelis, E., Chew-Graham, C. A., Kapur, N., & Ashcroft, D. M. (2018). Self-harm in a primary care cohort of older people: incidence, clinical management, and risk of suicide and other causes of death. *The Lancet Psychiatry, 5*(11), 905-912.

- Morgan, J. L., Burton, M., Collins, K., Lifford, K. J., Robinson, T. G., Cheung, K. L., ... & Bridging the Age Gap Trial Management Team. (2015b). The balance of clinician and patient input into treatment decision-making in older women with operable breast cancer. *Psycho-Oncology*, *24*(12), 1761-1766.
- Morgan, J. L., Collins, K., Burton, M., Reed, M. W., & Wyld, L. (2014). 13. Healthcare professionals' opinions of treating older women with operable breast cancer: A mixed methods study. *European Journal of Surgical Oncology*, *40*(11), S14-S15.
- Morgan, J. L., George, J., Holmes, G., Martin, C., Reed, M. W. R., Ward, S., ... & Wyld, L. (2020). Breast cancer surgery in older women: outcomes of the Bridging Age Gap in Breast Cancer study. *Journal of British Surgery*, *107*(11), 1468-1479.
- Morgan, J. L., Shrestha, A., Reed, M. W. R., Herbert, E., Bradburn, M., Walters, S. J., ... & Wyld, L. (2021). Bridging the Age Gap in breast cancer: impact of omission of breast cancer surgery in older women with oestrogen receptor-positive early breast cancer on quality-of-life outcomes. *British Journal of Surgery*, *108*(3), 315-325.
- Morgan, J. L., Walters, S. J., Collins, K., Robinson, T. G., Cheung, K. L., Audisio, R., ... & Wyld, L. (2017). What influences healthcare professionals' treatment preferences for older women with operable breast cancer? An application of the discrete choice experiment. *European Journal of Surgical Oncology (EJSO)*, *43*(7), 1282-1287.
- Morgan, J., Richards, P., Ward, S., Francis, M., Lawrence, G., Collins, K., ... & Wyld, L. (2015a). Case-mix analysis and variation in rates of non-surgical treatment of older women with operable breast cancer. *Journal of British Surgery*, *102*(9), 1056-1063.
- Morgan, J., Wyld, L., Collins, K. A., & Reed, M. W. (2014). Surgery versus primary endocrine therapy for operable primary breast cancer in elderly women (70 years plus). *Cochrane Database of Systematic Reviews*, (5).
- Morgan, M. W., Deber, R. B., Llewellyn-Thomas, H. A., Gladstone, P., Cusimano, R. J., O'rourke, K., ... & Detsky, A. S. (2000). Randomized, controlled trial of an interactive videodisc decision aid for patients with ischemic heart disease. *Journal of General Internal Medicine*, *15*(10), 685-693.

- Morris, M., Cooper, R. L., Ramesh, A., Tabatabai, M., Arcury, T. A., Shinn, M., ... & Matthews-Juarez, P. (2019). Training to reduce LGBTQ-related bias among medical, nursing, and dental students and providers: a systematic review. *BMC medical education*, *19*(1), 1-13.
- Moser, A., Melchior, I., Veenstra, M., Stoffers, E., Derks, E., & Jie, K. S. (2021). Improving the experience of older people with colorectal and breast cancer in patient-centred cancer care pathways using experience-based co-design. *Health Expectations*, *24*(2), 478-490.
- Moskowitz, G. B., Stone, J., & Childs, A. (2012). Implicit stereotyping and medical decisions: unconscious stereotype activation in practitioners' thoughts about African Americans. *American Journal of Public Health*, *102*(5), 996-1001.
- Mozley C., Sutcliffe, C., Bagley, H., Cordingley, L., Challis, D., Huxley, P. & Burns, A; University of Manchester. (2004). Towards quality care: outcomes for older people in care homes. *Aldershot: Ashgate, Personal Social Services Research Unit*.
- Müller, F., & Rothermund, K. (2012). Talking loudly but lazing at work—Behavioral effects of stereotypes are context dependent. *European Journal of Social Psychology*, *42*(5), 557-563.
- Mulley, A. G., Trimble, C., & Elwyn, G. (2012). Stop the silent misdiagnosis: patients' preferences matter. *Bmj*, *345*.
- Musa, D., Schulz, R., Harris, R., Silverman, M., & Thomas, S. B. (2009). Trust in the health care system and the use of preventive health services by older black and white adults. *American journal of public health*, *99*(7), 1293-1299.
- Myers, E. R., Moorman, P., Gierisch, J. M., Havrilesky, L. J., Grimm, L. J., Ghatge, S., ... & Sanders, G. D. (2015). Benefits and harms of breast cancer screening: a systematic review. *Jama*, *314*(15), 1615-1634.
- Nagin, D. S. (2013). Deterrence in the twenty-first century. *Crime and justice*, *42*(1), 199-263.
- National Audit of Breast Cancer in Older Patients (NABCOP). (2018a). 2018 Annual Report. Retrieved: <https://www.nabcop.org.uk/reports/nabcop-2018-annual-report/>, Accessed: March 2021.
- National Audit of Breast Cancer in Older Patients (NABCOP). (2018b). Fitness assessment for older patients in breast clinic. Retrieved: <https://www.nabcop.org.uk/resources/fitness-assessment-tool/>, Accessed: June 2022.

- National Audit of Breast Cancer in Older Patients (NABCOP). (2019). 2019 Annual Report. Retrieved: <https://www.nabcop.org.uk/reports/nabcop-2019-annual-report/>, Accessed: March 2021.
- National Audit of Breast Cancer in Older Patients (NABCOP). (2020). 2020 Annual Report. Retrieved: <https://www.nabcop.org.uk/reports/nabcop-2020-annual-report/>, Accessed: March 2021.
- National Audit of Breast Cancer in Older Patients (NABCOP). (2021). 2021 Annual Report. Retrieved: [https://www.nabcop.org.uk/content/uploads/2021/08/NABCOP-2021-Annual-Report-V1\\_high-res.pdf](https://www.nabcop.org.uk/content/uploads/2021/08/NABCOP-2021-Annual-Report-V1_high-res.pdf), Accessed: December 2021.
- National Audit Office. (2016). Managing the supply of NHS clinical staff in England. *Report by the Comptroller and Auditor General HC 736*.
- National Cancer Intelligence Network. (2011). The Second All Breast Cancer Report. Retrieved: <https://associationofbreastsurgery.org.uk/news/2011/june/the-second-all-breast-cancer-report/>, Accessed March 2019.
- National Cancer Registration and Analysis Service. (2015). Routes to diagnosis of cancer by stage 2012-2013. Retrieved: [http://www.ncin.org.uk/publications/routes\\_to\\_diagnosis](http://www.ncin.org.uk/publications/routes_to_diagnosis), Accessed August 2021.
- National Institute on Ageing. (2022). BLSA history. Retrieved: <https://www.nia.nih.gov/research/labs/blsa/history>, Accessed March 2022.
- Neumark, D., Burn, I., & Button, P. (2019). Is it harder for older workers to find jobs? New and improved evidence from a field experiment. *Journal of Political Economy*, 127(2), 922-970.
- NHS AQuA programme. (2021). Shared decision making to improve health outcomes. Retrieved: <https://www.england.nhs.uk/shared-decision-making/why-is-shared-decision-making-important/shared-decision-making-to-improve-health-outcomes/>, Accessed February 2022
- NHS Digital. (2017). Psychological Therapies: Annual Report on the Use of IAPT Services 2016–17. *NHS Digital*.
- NHS Digital. (2020). Retrieved: <https://digital.nhs.uk/data-and-information/publications/statistical/recorded-dementia-diagnoses/>, Accessed May 2020
- NHS. (2014). Five year forward view. Retrieved: <https://www.england.nhs.uk/wp-content/uploads/2014/10/5yfv-web.pdf>, Accessed, February 2022

NHS. (2021). Improving care for older people. How old is an older person?

Retrieved: <https://www.england.nhs.uk/ourwork/clinical-policy/older-people/improving-care-for-older-people/>, Accessed, February 2022

NICE. (2009). Early and locally advanced breast cancer: diagnosis and management. Retrieved:

<https://www.nice.org.uk/guidance/ng101/chapter/recommendations>, Accessed, February 2022

NICE. (2018). Early and locally advanced breast cancer: diagnosis and management. Retrieved:

<https://www.nice.org.uk/guidance/ng101/chapter/Recommendations#adjuvant-chemotherapy-for-invasive-breast-cancer>, Accessed: February 2022

NICE. (2021). Shared decision making. Retrieved: <https://www.nice.org.uk/about/what-we-do/our-programmes/nice-guidance/nice-guidelines/shared-decision-making>,

Accessed, February 2022

Nilforooshan, R., Benson, L., Gage, H., Williams, P., Zoha, M., & Warner, J. (2017). Comparison of service utilisation and costs of working age adults and older adults receiving treatment for psychosis and severe non-psychotic conditions in England: implications for commissioning. *International Journal of Geriatric Psychiatry*, 32(1), 110-115.

Nock, M. K., & Banaji, M. R. (2007). Assessment of self-injurious thoughts using a behavioral test. *American Journal of Psychiatry*, 164(5), 820-823.

Nock, M. K., Park, J. M., Finn, C. T., Deliberto, T. L., Dour, H. J., & Banaji, M. R. (2010). Measuring the suicidal mind: Implicit cognition predicts suicidal behavior. *Psychological science*, 21(4), 511-517.

Nosek, B. A., Banaji, M. R., & Greenwald, A. G. (2002). Harvesting implicit group attitudes and beliefs from a demonstration web site. *Group Dynamics: Theory, Research, and Practice*, 6(1), 101.

Nosek, B. A., Smyth, F. L., Hansen, J. J., Devos, T., Lindner, N. M., Ranganath, K. A., ... & Banaji, M. R. (2007). Pervasiveness and correlates of implicit attitudes and stereotypes. *European Review of Social Psychology*, 18(1), 36-88.

Nuffield Trust. (2021). Cancer Mortality Rates. Retrieved:

<https://www.nuffieldtrust.org.uk/resource/cancer-mortality-rates>. Accessed: August 2021.

Nussbaum, J. F., Baringer, D., & Kundrat, A. (2003). Health, communication, and aging: Cancer and older adults. *Health Communication*, 15(2), 185-192.

- O'Brien, K. S., Puhl, R. M., Latner, J. D., Mir, A. S., & Hunter, J. A. (2010). Reducing anti-fat prejudice in preservice health students: a randomized trial. *Obesity, 18*(11), 2138-2144.
- Ocloo, J., Garfield, S., Franklin, B. D., & Dawson, S. (2021). Exploring the theory, barriers and enablers for patient and public involvement across health, social care and patient safety: a systematic review of reviews. *Health research policy and systems, 19*(1), 1-21.
- Office for Disability Issues. (2008). Independent living: a cross-government strategy about independent living for disabled people. Retrieved: <http://www.officefordisability.gov.uk/docs/wor/ind/ilr-executive-report.pdf>, Accessed May 2020.
- Office for National Statistics. (2015). Adult Health in Great Britain 2013. Retrieved: <https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandlifeexpectancies/compendium/opinionsandlifestylesurvey/2015-03-19/adulthealthgreatbritain2013>, Accessed: March 2019.
- Office for National Statistics. (2018). Living longer: how our population is changing and why it matters. Retrieved: <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/ageing/articles/livinglongerhowourpopulationischangingandwhyitmatters/2018-08-13>, Accessed March 2019.
- Office for National Statistics. (2021). Overview of the UK Population: January 2021. Retrieved: <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/articles/overviewoftheukpopulation/january2021>, Accessed: January 2022.
- Office of Women's Health. (2019). Policy of inclusion of women in clinical trials. Retrieved: Accessed: <https://www.womenshealth.gov/30-achievements/04>, Accessed: May 2020.
- Oh, D. D., Flitcroft, K., Brennan, M. E., & Spillane, A. J. (2016). Patterns and outcomes of breast reconstruction in older women—a systematic review of the literature. *European Journal of Surgical Oncology (EJSO), 42*(5), 604-615.
- Oliver, D. (2008). 'Acopia' and 'social admission' are not diagnoses: why older people deserve better. *Journal of the Royal Society of Medicine, 101*(4), 168-174.
- Onyeador, I. N., Hudson, S. K. T., & Lewis Jr, N. A. (2021). Moving beyond implicit bias training: Policy insights for increasing organizational diversity. *Policy Insights from the Behavioral and Brain Sciences, 8*(1), 19-26.

- Orchard, J., & Price, J. (2017). County-level racial prejudice and the black-white gap in infant health outcomes. *Social science & medicine*, *181*, 191-198.
- Oswald, F. L., Mitchell, G., Blanton, H., Jaccard, J., & Tetlock, P. E. (2013). Predicting ethnic and racial discrimination: a meta-analysis of IAT criterion studies. *Journal of personality and social psychology*, *105*(2), 171.
- Pager, D. (2003). The mark of a criminal record. *American journal of sociology*, *108*(5), 937-975.
- Park, J. H., Anderson, W. F., & Gail, M. H. (2015). Improvements in US breast cancer survival and proportion explained by tumor size and estrogen-receptor status. *Journal of Clinical Oncology*, *33*(26), 2870.
- Park, J., Felix, K., & Lee, G. (2007). Implicit attitudes toward Arab-Muslims and the moderating effects of social information. *Basic and Applied Social Psychology*, *29*(1), 35-45.
- Peake, M. D., Thompson, S., Lowe, D., & Pearson, M. G. (2003). Ageism in the management of lung cancer. *Age and Ageing*, *32*(2), 171-177.
- Peck, T. C., Good, J. J., & Seitz, K. (2021). Evidence of Racial Bias Using Immersive Virtual Reality: Analysis of Head and Hand Motions During Shooting Decisions. *IEEE Transactions on Visualization and Computer Graphics*, *27*(5), 2502-2512.
- Peck, T. C., Seinfeld, S., Aglioti, S. M., & Slater, M. (2013). Putting yourself in the skin of a black avatar reduces implicit racial bias. *Consciousness and cognition*, *22*(3), 779-787.
- Penner, L. A., Dovidio, J. F., Gonzalez, R., Albrecht, T. L., Chapman, R., Foster, T., ... & Gadgeel, S. (2016). The effects of oncologist implicit racial bias in racially discordant oncology interactions. *Journal of clinical oncology*, *34*(24), 2874.
- Pepping, R. M. C., Portielje, J. E. A., van de Water, W., & de Glas, N. A. (2017). Primary endocrine therapy in older women with breast cancer. *Current geriatrics reports*, *6*(4), 239-246.
- Pettit, B., & Western, B. (2004). Mass imprisonment and the life course: Race and class inequality in US incarceration. *American sociological review*, *69*(2), 151-169.
- Pezzin, L. E., Keyl, P. M., & Green, G. B. (2007). Disparities in the emergency department evaluation of chest pain patients. *Academic Emergency Medicine*, *14*(2), 149-156.

- Pfefferbaum, B., & North, C. S. (2020). Mental health and the Covid-19 pandemic. *New England Journal of Medicine*, 383(6), 510-512.
- Plant, E. A. & Peruche, B. M. (2005). The consequences of race for police officers' responses to criminal suspects. *Psychological Science*, 16, 180-183.
- Polsky, D., Keating, N. L., Weeks, J. C., & Schulman, K. A. (2002). Patient choice of breast cancer treatment: impact on health state preferences. *Medical care*, 1068-1079.
- Prakash, S., Sladek, R. M., & Schuwirth, L. (2019). Interventions to improve diagnostic decision making: a systematic review and meta-analysis on reflective strategies. *Medical teacher*, 41(5), 517-524.
- Preece, P. E., Wood, R. A., Mackie, C. R., & Cuschieri, A. (1982). Tamoxifen as initial sole treatment of localised breast cancer in elderly women: a pilot study. *British medical journal (Clinical research ed.)*, 284(6319), 869.
- Preston, S. D., Southall, A. R. D., Nel, M., & Das, S. K. (2008). Geriatric surgery is about disease, not age. *Journal of the Royal Society of Medicine*, 101(8), 409-415.
- Prince, M., Bryce, R., Albanese, E., Wimo, A., Ribeiro, W., & Ferri, C. P. (2013). The global prevalence of dementia: a systematic review and metaanalysis. *Alzheimer's & dementia*, 9(1), 63-75.
- Public Health England. (2013). NHS breast screening: helping you decide. Retrieved: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1031049/BSP01\\_plain\\_text\\_A4\\_PDF.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1031049/BSP01_plain_text_A4_PDF.pdf), Accessed: May 2020
- Public Health England. (2014). *News release: 1 in 3 breast cancers are in woman over 70*. Accessed: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/276856/Breast\\_cancer\\_launch\\_PHE\\_-\\_3\\_February\\_2014.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/276856/Breast_cancer_launch_PHE_-_3_February_2014.pdf)
- Public Health England. (2019). Public Health Outcomes Framework: Health Equity Report. Retrieved: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/733093/PHOF\\_Health\\_Equity\\_Report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/733093/PHOF_Health_Equity_Report.pdf), Accessed: May 2020
- Quaglia, A., Tavilla, A., Shack, L., Brenner, H., Janssen-Heijnen, M., Allemani, C., ... & EURO CARE Working Group. (2009). The cancer survival gap between elderly and middle-aged patients in Europe is widening. *European Journal of Cancer*, 45(6), 1006-1016.

- Quillian, L., Lee, J. J., & Oliver, M. (2020). Evidence from field experiments in hiring shows substantial additional racial discrimination after the callback. *Social Forces*, *99*(2), 732-759.
- Quillian, L., Pager, D., Hexel, O., & Midtbøen, A. H. (2017). Meta-analysis of field experiments shows no change in racial discrimination in hiring over time. *Proceedings of the National Academy of Sciences*, *114*(41), 10870-10875.
- Raynes, N., Clark, H., & Beecham, J.; Joseph Rowntree Foundation. (2006). The report of the Older People's Inquiry into 'That Bit of Help'. Retrieved: <http://www.jrf.org.uk/sites/files/jrf/9781859354612.pdf>, Accessed: June 2021
- Redpath, S. J., Williams, W. H., Hanna, D., Linden, M. A., Yates, P., & Harris, A. (2010). Healthcare professionals' attitudes towards traumatic brain injury (TBI): the influence of profession, experience, aetiology and blame on prejudice towards survivors of brain injury. *Brain Injury*, *24*(6), 802-811.
- Reygan, F. C., & D'Alton, P. (2013). A pilot training programme for health and social care professionals providing oncological and palliative care to lesbian, gay and bisexual patients in Ireland. *Psycho-Oncology*, *22*(5), 1050-1054.
- Richards, P., Ward, S., Morgan, J., Lagord, C., Reed, M., Collins, K., & Wyld, L. (2016). The use of surgery in the treatment of ER+ early stage breast cancer in England: Variation by time, age and patient characteristics. *European Journal of Surgical Oncology (EJSO)*, *42*(4), 489-496.
- Rimm, E. B., Katan, M. B., Ascherio, A., Stampfer, M. J., & Willett, W. C. (1996). Relation between intake of flavonoids and risk for coronary heart disease in male health professionals. *Annals of internal medicine*, *125*(5), 384-389.
- Ring, A., Harder, H., Langridge, C., Ballinger, R. S., & Fallowfield, L. J. (2013). Adjuvant chemotherapy in elderly women with breast cancer (AChEW): an observational study identifying MDT perceptions and barriers to decision making. *Annals of oncology*, *24*(5), 1211-1219.
- Ritchie, J., Spencer, L., & O'Connor, W. (2003). Carrying out qualitative analysis. *Qualitative research practice: A guide for social science students and researchers*, 2003, 219-62.
- Robertson, R., Wenzel, L., Thompson, J., & Charles, A. (2018). Understanding NHS financial pressures: How are they affecting patient care? *King's Fund*, 2017.

- Rooth, D. O. (2007). Implicit discrimination in hiring: Real world evidence. *Bonn, Germany: Institute for the Study of Labor*.
- Rosen, R., Kountz, D., Post-Zwicker, T., Leiblum, S., & Wiegel, M. (2006). EDUCATION: Sexual Communication Skills in Residency Training: The Robert Wood Johnson Model. *The journal of sexual medicine, 3*(1), 37-46.
- Rostoft, S., O'Donovan, A., Soubeyran, P., Alibhai, S. M., & Hamaker, M. E. (2021). Geriatric assessment and management in cancer. *Journal of Clinical Oncology, 39*(19), 2058-2067.
- Rothermund, K., & Kornadt, A. E. (2015). Views on aging: Domain-specific approaches and implications for developmental regulation. *Annual review of gerontology and geriatrics, 35*(1), 121-144.
- Rowlands, G., Shaw, A., Jaswal, S., Smith, S., & Harpham, T. (2017). Health literacy and the social determinants of health: a qualitative model from adult learners. *Health promotion international, 32*(1), 130-138.
- Royal College of Psychiatry. (2018). Suffering in silence: age inequality in older people's mental health care. Retrieved: [https://www.rcpsych.ac.uk/docs/default-source/improving-care/better-mh-policy/college-reports/college-report-cr221.pdf?sfvrsn=bef8f65d\\_2](https://www.rcpsych.ac.uk/docs/default-source/improving-care/better-mh-policy/college-reports/college-report-cr221.pdf?sfvrsn=bef8f65d_2), Accessed: October 2020
- Ruben, M., & Saks, N. S. (2020). Addressing implicit bias in first-year medical students: A longitudinal, multidisciplinary training program. *Medical Science Educator, 30*(4), 1419-1426.
- Rudman, L. A., Ashmore, R. D., & Gary, M. L. (2001). " Unlearning" automatic biases: the malleability of implicit prejudice and stereotypes. *Journal of personality and social psychology, 81*(5), 856.
- Rukavina, P. B., Li, W., Shen, B., & Sun, H. (2010). A service learning based project to change implicit and explicit bias toward obese individuals in kinesiology pre-professionals. *Obesity Facts, 3*(2), 117-126.
- Rüsch, N., Corrigan, P. W., Todd, A. R., & Bodenhausen, G. V. (2010). Implicit self-stigma in people with mental illness. *The Journal of Nervous and Mental Disease, 198*(2), 150-153.
- Rüsch, N., Schulz, D., Valerius, G., Steil, R., Bohus, M., & Schmahl, C. (2011). Disgust and implicit self-concept in women with borderline personality disorder and posttraumatic stress disorder. *European Archives of Psychiatry and Clinical Neuroscience, 261*(5), 369-376.

- Rüsch, N., Todd, A. R., Bodenhausen, G. V., Olschewski, M., & Corrigan, P. W. (2010). Automatically activated shame reactions and perceived legitimacy of discrimination: A longitudinal study among people with mental illness. *Journal of Behavior Therapy and Experimental Psychiatry, 41(1)*, 60-63.
- Rush, K. L., Hickey, S., Epp, S., & Janke, R. (2017). Nurses' attitudes towards older people care: An integrative review. *Journal of Clinical Nursing, 26(23-24)*, 4105-4116.
- Rutherford, M. J., Abel, G. A., Greenberg, D. C., Lambert, P. C., & Lyratzopoulos, G. (2015). The impact of eliminating age inequalities in stage at diagnosis on breast cancer survival for older women. *British journal of cancer, 112(1)*, 124.
- Rutqvist, L. E., Rose, C., & Cavallin-Ståhl, E. (2003). A systematic overview of radiation therapy effects in breast cancer. *Acta oncologica, 42(5-6)*, 532-545.
- Sabin, J. A., & Greenwald, A. G. (2012). The influence of implicit bias on treatment recommendations for 4 common pediatric conditions: pain, urinary tract infection, attention deficit hyperactivity disorder, and asthma. *American journal of public health, 102(5)*, 988-995.
- Sabin, J. A., Riskind, R. G., & Nosek, B. A. (2015). Health care providers' implicit and explicit attitudes toward lesbian women and gay men. *American Journal of Public Health, 105*, 1831-1841.
- Sabin, J. A., Rivara, F. P., & Greenwald, A. G. (2008). Physician implicit attitudes and stereotypes about race and quality of medical care. *Medical care, 46(7)*, 678-685.
- Samulowitz, A., Gremyr, I., Eriksson, E., & Hensing, G. (2018). "Brave men" and "emotional women": A theory-guided literature review on gender bias in health care and gendered norms towards patients with chronic pain. *Pain Research and Management, 2018*.
- São José, J. M. S., Amado, C. A. F., Ilinca, S., Buttigieg, S. C., & Taghizadeh Larsson, A. (2019). Ageism in health care: a systematic review of operational definitions and inductive conceptualizations. *The Gerontologist, 59(2)*, e98-e108.
- Saposnik, G., Kapral, M. K., Coutts, S. B., Fang, J., Demchuk, A. M., & Hill, M. D. (2009). Do all age groups benefit from organized inpatient stroke care?. *Stroke, 40(10)*, 3321-3327.
- Sargent-Cox, K. A., Anstey, K. J., & Luszcz, M. A. (2014). Longitudinal change of self-perceptions of aging and mortality. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 69(2)*, 168-173.

- Sawyer, J., & Gampa, A. (2018). Implicit and explicit racial attitudes changed during Black Lives Matter. *Personality and Social Psychology Bulletin, 44*(7), 1039-1059.
- Schilt, K., & Wiswall, M. (2008). Before and after: Gender transitions, human capital, and workplace experiences. *The BE Journal of Economic Analysis & Policy, 8*(1).
- Schleife, H., Sachtleben, C., Finck Barboza, C., Singer, S., & Hinz, A. (2014). Anxiety, depression, and quality of life in German ambulatory breast cancer patients. *Breast cancer, 21*(2), 208-213.
- Schwartz, M. B., Chambliss, H. O. N., Brownell, K. D., Blair, S. N., & Billington, C. (2003). Weight bias among health professionals specializing in obesity. *Obesity research, 11*(9), 1033-1039.
- Sedrak, M. S., Freedman, R. A., Cohen, H. J., Muss, H. B., Jatoi, A., Klepin, H. D., ... & Cancer and Aging Research Group (CARG). (2021). Older adult participation in cancer clinical trials: A systematic review of barriers and interventions. *CA: A Cancer Journal for Clinicians, 71*(1), 78-92.
- Sedrak, M. S., Hurria, A., Li, D., George, K., Padam, S., Liu, J., ... & Dale, W. (2019). Barriers to clinical trial enrollment of older adults with cancer: A systematic review.
- Sedrak, M. S., Mohile, S. G., Sun, V., Sun, C. L., Chen, B. T., Li, D., ... & Dale, W. (2020). Barriers to clinical trial enrollment of older adults with cancer: A qualitative study of the perceptions of community and academic oncologists. *Journal of geriatric oncology, 11*(2), 327-334.
- Selby, J. V., Beal, A. C., & Frank, L. (2012). The Patient-Centered Outcomes Research Institute (PCORI) national priorities for research and initial research agenda. *Jama, 307*(15), 1583-1584.
- Shah, A. A., Zogg, C. K., Zafar, S. N., Schneider, E. B., Cooper, L. A., Chapital, A. B., ... & Haider, A. H. (2015). Analgesic access for acute abdominal pain in the emergency department among racial/ethnic minority patients: a nationwide examination. *Medical care, 53*(12), 1000-1009.
- Shiovitz-Ezra, S., & Shemesh, J. (2018). Pathways from ageism to loneliness. In *Contemporary perspectives on ageism* (pp. 131-147). Springer, Cham.
- Siminoff, L. A., Graham, G. C., & Gordon, N. H. (2006). Cancer communication patterns and the influence of patient characteristics: disparities in information-giving and affective behaviors. *Patient education and counseling, 62*(3), 355-360.
- Singal, J. (2017). Psychology's favorite tool for measuring racism isn't up to the job. *New York Magazine, 11*.

- Skirbekk, H., & Nortvedt, P. (2014). Inadequate treatment for elderly patients: Professional norms and tight budgets could cause “ageism” in hospitals. *Health Care Analysis, 22*(2), 192-201.
- Smith, B. D., Jiang, J., McLaughlin, S. S., Hurria, A., Smith, G. L., Giordano, S. H., & Buchholz, T. A. (2011). Improvement in breast cancer outcomes over time: are older women missing out?. *Journal of Clinical Oncology, 29*(35), 4647-4653.
- Smith, E. B., Desai, M. M., Slade, M., & Levy, B. R. (2019). Positive aging views in the general population predict better long-term cognition for elders in eight countries. *Journal of aging and health, 31*(10), 1739-1747.
- Smith, J. L., Handley, I. M., Zale, A. V., Rushing, S., & Potvin, M. A. (2015). Now hiring! Empirically testing a three-step intervention to increase faculty gender diversity in STEM. *BioScience, 65*(11), 1084-1087.
- Søgaard, M. B., Andresen, K., & Kristiansen, M. (2021). Systematic review of patient-engagement interventions: potentials for enhancing person-centred care for older patients with multimorbidity. *BMJ open, 11*(12), e048558.
- Soto-Perez-de-Celis, E. (2020). Social media, ageism, and older adults during the COVID-19 pandemic. *EClinicalMedicine, 29*.
- Soucie, S. M., Parry, D. C., & Cousineau, L. S. (2018). The fourth wave: What# MeToo can teach us about millennial mobilization, intersectionality, and men’s accountability. In *Feminisms in Leisure Studies* (pp. 149-164). Routledge.
- Sourdet, S., Brechemier, D., Steinmeyer, Z., Gerard, S., & Balardy, L. (2020). Impact of the comprehensive geriatric assessment on treatment decision in geriatric oncology. *BMC cancer, 20*(1), 1-9.
- Sowerbutts, A. M., Griffiths, J., Todd, C., & Lavelle, K. (2015). Why are older women not having surgery for breast cancer? A qualitative study. *Psycho-Oncology, 24*(9), 1036-1042.
- Stacey, D., Légaré, F., Lewis, K., Barry, M. J., Bennett, C. L., Eden, K. B., ... & Trevena, L. (2017). Decision aids for people facing health treatment or screening decisions. *Cochrane database of systematic reviews, (4)*.
- Stangor, C., Sechrist, G. B., & Jost, J. T. (2001). Changing racial beliefs by providing consensus information. *Personality and Social Psychology Bulletin, 27*(4), 486-496.

- Starck, J. G., Riddle, T., Sinclair, S., & Warikoo, N. (2020). Teachers Are People Too: Examining the Racial Bias of Teachers Compared to Other American Adults. *Educational Researcher*, *49*(4), 273-284, doi:10.3102/0013189X20912758
- Steed, R. (2010). Attitudes and beliefs of occupational therapists participating in a cultural competency workshop. *Occupational Therapy International*, *17*(3), 142-151.
- Steinman, M. A., Perry, L., & Perissinotto, C. M. (2020). Meeting the care needs of older adults isolated at home during the COVID-19 pandemic. *JAMA internal medicine*, *180*(6), 819-820.
- Steffens, M. C. (2004). Is the implicit association test immune to faking?. *Experimental psychology*, *51*(3), 165.
- Stepanikova, I. (2012). Racial-ethnic biases, time pressure, and medical decisions. *Journal of Health and Social Behavior*, *53*(3), 329-343.
- Stephan, W. G., Ybarra, O., & Rios, K. (2016). Intergroup threat theory.
- Stewart, T. L., Chipperfield, J. G., Perry, R. P., & Weiner, B. (2012). Attributing illness to 'old age:' consequences of a self-directed stereotype for health and mortality. *Psychology & health*, *27*(8), 881-897.
- Strenze, T. (2007). Intelligence and socioeconomic success: A meta-analytic review of longitudinal research. *Intelligence*, *35*(5), 401-426.
- Strong, K. L., & Folse, V. N. (2015). Assessing undergraduate nursing students' knowledge, attitudes, and cultural competence in caring for lesbian, gay, bisexual, and transgender patients. *Journal of nursing education*, *54*(1), 45-49.
- Sutin, A. R., Stephan, Y., Carretta, H., & Terracciano, A. (2015). Perceived discrimination and physical, cognitive, and emotional health in older adulthood. *The American Journal of Geriatric Psychiatry*, *23*(2), 171-179.
- Swift, H. J., & Chasteen, A. L. (2021). Ageism in the time of COVID-19. *Group Processes & Intergroup Relations*, *24*(2), 246-252.
- Swift, H. J., Abrams, D., Lamont, R. A., & Drury, L. (2017). The risks of ageism model: How ageism and negative attitudes toward age can be a barrier to active aging. *Social Issues and Policy Review*, *11*(1), 195-231.

- Swift, H. J., Drury, L., & Lamont, R. A. (2016). The perception of ageing and age discrimination.
- Swift, J. A., Tischler, V., Markham, S., Gunning, I., Glazebrook, C., Beer, C., & Puhl, R. (2013). Are anti-stigma films a useful strategy for reducing weight bias among trainee healthcare professionals? Results of a pilot randomized control trial. *Obesity Facts*, *6*(1), 91-102.
- Syed, B. M., Green, A. R., Rakha, E. A., Morgan, D. A., Ellis, I. O., & Cheung, K. L. (2021). Age-Related Biology of Early-Stage Operable Breast Cancer and Its Impact on Clinical Outcome. *Cancers*, *13*(6), 1417.
- Tadros, G., Salama, R. A., Kingston, P., Mustafa, N., Johnson, E., Pannell, R., & Hashmi, M. (2013). Impact of an integrated rapid response psychiatric liaison team on quality improvement and cost savings: the Birmingham RAID model. *The Psychiatrist*, *37*(1), 4-10.
- Tam, T., Hewstone, M., Harwood, J., Voci, A., & Kenworthy, J. (2006). Intergroup contact and grandparent–grandchild communication: The effects of self-disclosure on implicit and explicit biases against older people. *Group Processes & Intergroup Relations*, *9*(3), 413-429.
- Tang, V., Zhao, S., Boscardin, J., Sudore, R., Covinsky, K., Walter, L. C., ... & Finlayson, E. (2018). Functional status and survival after breast cancer surgery in nursing home residents. *JAMA surgery*, *153*(12), 1090-1096.
- Tang, Y. T., & Chooi, W. T. (2021). A systematic review of the effects of positive versus negative framing on cancer treatment decision making. *Psychology & health*, 1-26.
- Tarasoff, L. A., Epstein, R., Green, D. C., Anderson, S., & Ross, L. E. (2014). Using interactive theatre to help fertility providers better understand sexual and gender minority patients. *Medical humanities*, *40*(2), 135-141.
- Tavakoly Sany, S. B., Behzad, F., Ferns, G., & Peyman, N. (2020). Communication skills training for physicians improves health literacy and medical outcomes among patients with hypertension: a randomized controlled trial. *BMC health services research*, *20*(1), 1-10.
- Terracciano, A., Stephan, Y., Aschwanden, D., Lee, J. H., Sesker, A. A., Strickhouser, J. E., ... & Sutin, A. R. (2021). Changes in subjective age during COVID-19. *The Gerontologist*, *61*(1), 13-22.

- The Guardian. (2018). Why Starbucks shouldn't be praised for its misguided racism workshops. Retrieved: <https://www.theguardian.com/commentisfree/2018/apr/18/starbucks-misguided-racism-workshops>, Accessed May 2020
- Theofanidis, D. (2015). Nursing Stroke Patients in Greece in Austerity Times. *International Journal of Caring Sciences*, 8(2).
- Thomas, D. D., & Safer, J. D. (2015). A simple intervention raised resident-physician willingness to assist transgender patients seeking hormone therapy. *Endocrine Practice*, 21(10), 1134-1142.
- Thomas, S. & MacMahon, D. (2002). Managing Parkinson's disease in long-term care (Continuing professional development: Parkinson's disease). *Nursing Older People*, 14(9), 23-31.
- Todd, A. R., Bodenhausen, G. V., Richeson, J. A., & Galinsky, A. D. (2011). Perspective taking combats automatic expressions of racial bias. *Journal of personality and social psychology*, 100(6), 1027.
- Top, M., Eriş, H., & Kabalcioğlu, F. (2012). Quality of life and attitudes toward aging among older women in Turkey. *Affilia*, 27(4), 406-419.
- Truxillo, D. M., Finkelstein, L. M., Pytlovany, A. C., & Jenkins, J. S. (2015). Age discrimination at work: A review of the research and recommendations for the future. *The Oxford handbook of workplace discrimination*, 1, 129-142.
- Tsai, J. W., & Michelson, C. D. (2020). Attitudes toward implicit bias and implicit bias training among pediatric residency program directors: a national survey. *The Journal of Pediatrics*, 221, 4-6.
- Tullo, E. S., Spencer, J., & Allan, L. (2010). Systematic review: helping the young to understand the old. Teaching interventions in geriatrics to improve the knowledge, skills, and attitudes of undergraduate medical students. *Journal of the American Geriatrics Society*, 58(10), 1987-1993.
- Turner, R. N., & Crisp, R. J. (2010). Imagining intergroup contact reduces implicit prejudice. *British Journal of Social Psychology*, 49(1), 129-142.
- Turner, R. N., Crisp, R. J., & Lambert, E. (2007). Imagining intergroup contact can improve intergroup attitudes. *Group Processes & Intergroup Relations*, 10(4), 427-441.
- Tyrrell, C. J., & Williams, K. N. (2020). The paradox of social distancing: Implications for older adults in the context of COVID-19. *Psychological Trauma: Theory, Research, Practice, and Policy*, 12(S1), S214.

- Ubel, P. A., Angott, A. M., & Zikmund-Fisher, B. J. (2011). Physicians recommend different treatments for patients than they would choose for themselves. *Archives of internal Medicine*, *171*(7), 630-634.
- Ugolini, F., Zammit, C., Wright, J., & Reed, M. (2017). A joint geriatric oncology clinic for the management of elderly women diagnosed with breast cancer: the Brighton experience. *European Journal of Surgical Oncology*, *43*(5), S22.
- Uhlmann, E. L., & Cohen, G. L. (2007). "I think it, therefore it's true": Effects of self-perceived objectivity on hiring discrimination. *Organizational Behavior and Human Decision Processes*, *104*(2), 207-223.
- van der Cammen, T. J., & Crome, P. (2018). Persistent exclusion of older people from clinical trials of cardiovascular and antithrombotic medicinal products.
- van Marum, R. J. (2020). Underrepresentation of the elderly in clinical trials, time for action. *British Journal of Clinical Pharmacology*, *86*(10), 2014.
- Van Ryn, M., & Burke, J. (2000). The effect of patient race and socio-economic status on physicians' perceptions of patients. *Social science & medicine*, *50*(6), 813-828.
- VanEnkevort, E. A. (2014). "*I Love Boobies*": *The influence of sexualized breast cancer campaigns on objectification and women's health* (Doctoral dissertation, Texas Christian University).
- Veit, S., Arnu, H., Di Stasio, V., Yemane, R., & Coenders, M. (2021). The "Big Two" in Hiring Discrimination: Evidence From a Cross-National Field Experiment. *Personality and Social Psychology Bulletin*, *0146167220982900*.
- Vilagut, G. (2014). Test-Retest Reliability. In: Michalos, A.C. (eds) *Encyclopedia of Quality of Life and Well-Being Research*. Springer, Dordrecht. [https://doi.org/10.1007/978-94-007-0753-5\\_3001](https://doi.org/10.1007/978-94-007-0753-5_3001)
- Villiers-Tuthill, A., Copley, A., McGee, H., & Morgan, K. (2016). The relationship of tobacco and alcohol use with ageing self-perceptions in older people in Ireland. *BMC public health*, *16*(1), 1-10.
- Volandes, A. E., Levin, T. T., Slovin, S., Carvajal, R. D., O'Reilly, E. M., Keohan, M. L., ... & Noy, A. (2012). Augmenting advance care planning in poor prognosis cancer with a video decision aid: a preintervention-postintervention study. *Cancer*, *118*(17), 4331-4338.
- Von Wagner, C., Knight, K., Steptoe, A., & Wardle, J. (2007). Functional health literacy and health-promoting behaviour in a national sample of British adults. *Journal of Epidemiology & Community Health*, *61*(12), 1086-1090.

- Waddell, A., Lennox, A., Spassova, G., & Bragge, P. (2021). Barriers and facilitators to shared decision-making in hospitals from policy to practice: a systematic review. *Implementation Science, 16*(1), 1-23.
- Wagg, A., Potter, J., Peel, P., Irwin, P., Lowe, D., & Pearson, M. (2007). National audit of continence care for older people: management of urinary incontinence. *Age and ageing, 37*(1), 39-44.
- Wallaert, M., Ward, A., & Mann, T. (2010). Explicit control of implicit responses. *Social Psychology.*
- Walter, L. C., & Schonberg, M. A. (2014). Screening mammography in older women: a review. *Jama, 311*(13), 1336-1347.
- Walters, S. J., Winslow, M., Collins, K., Robinson, T., Green, T., Madan, J., ... & Wyld, L. (2011). Health care professionals' preferences for extending mammographic breast screening to the over 70s. *Journal of geriatric oncology, 2*(1), 1-10.
- Ward, S. E., Holmes, G. R., Morgan, J. L., Broggio, J. W., Collins, K., Richards, P. D., ... & Wyld, L. (2020). Bridging the Age Gap: a prognostic model that predicts survival and aids in primary treatment decisions for older women with oestrogen receptor-positive early breast cancer. *Journal of British Surgery, 107*(12), 1625-1632.
- Ward, S. E., Richards, P. D., Morgan, J. L., Holmes, G. R., Broggio, J. W., Collins, K., ... & Wyld, L. (2018). Omission of surgery in older women with early breast cancer has an adverse impact on breast cancer-specific survival. *Journal of British Surgery, 105*(11), 1454-1463.
- Wells, Y., Foreman, P., Gething, L., & Petralia, W. (2004). Nurses' attitudes toward aging and older adults. *Journal of Gerontological Nursing, 30*(9), 5-9.
- Westgate, E. C., Riskind, R. G., & Nosek, B. A. (2015). Implicit preferences for straight people over Lesbian Women and Gay Men weakened from 2006 to 2013. *Collabra, 1*, (Art. 1).
- White, D. B., Lo, B. (2020). A framework for rationing ventilators and critical care beds during the COVID-19 pandemic. *JAMA, 323*, 1773–1774. <https://doi.org/10.1001/jama.2020.5046>
- WHO Performance Status. Oken, M., Creech, R., & Tormey, D., et al. (1982). Toxicity and response criteria of the Eastern Cooperative Oncology Group. *Am. J. Clin. Oncol, 5*(6), 649–55.  
doi:10.1097/00000421-198212000-00014. PMID 7165009

- Wildiers, H., Mauer, M., Pallis, A., Hurria, A., Mohile, S. G., Luciani, A., ... & Wedding, U. (2013). End points and trial design in geriatric oncology research: a joint European organisation for research and treatment of cancer–Alliance for Clinical Trials in Oncology–International Society Of Geriatric Oncology position article. *Journal of Clinical Oncology*, *31*(29), 3711-3718.
- Wilson, D. M., Nam, M. A., Murphy, J., Victorino, J. P., Gondim, E. C., & Low, G. (2017). A critical review of published research literature reviews on nursing and healthcare ageism. *Journal of clinical nursing*, *26*(23-24), 3881-3892.
- Wilson, R. S., Krueger, K. R., Arnold, S. E., Schneider, J. A., Kelly, J. F., Barnes, L. L., ... & Bennett, D. A. (2007). Loneliness and risk of Alzheimer disease. *Archives of general psychiatry*, *64*(2), 234-240.
- Witham, G., Haigh, C., & Foy, S. (2014). The challenges of health professionals in meeting the needs of vulnerable patients undergoing chemotherapy: a focus group study. *Journal of Clinical Nursing*, *23*(19-20), 2844-2853.
- Wollschläger, D., Meng, X., Wöckel, A., Janni, W., Kreienberg, R., Blettner, M., & Schwentner, L. (2018). Comorbidity-dependent adherence to guidelines and survival in breast cancer—Is there a role for guideline adherence in comorbid breast cancer patients? A retrospective cohort study with 2137 patients. *The breast journal*, *24*(2), 120-127.
- Women's Equality Party. (2021). Equality in Health. Retrieved: *Equality in Health - Women's Equality (womensequality.org.uk)*, Accessed January 2022
- Woodcock, A., & Monteith, M. J. (2013). Forging links with the self to combat implicit bias. *Group Processes & Intergroup Relations*, *16*(4), 445-461.
- World Health Organisation. (2021). *Dementia key facts*. Retrieved: <https://www.who.int/news-room/fact-sheets/detail/dementia>, Accessed April 2022
- World Health Organization. (2016). Patient engagement.
- World Health Organization. (2021). Global report on ageism.
- Wyld, L., Reed, M. W., Collins, K., Burton, M., Lifford, K., Edwards, A., ... & Thompson, A. M. (2021). Bridging the Age Gap in breast cancer: cluster randomized trial of two decision support interventions for older women with operable breast cancer on quality of life, survival, decision quality, and treatment choices. *British Journal of Surgery*, *108*(5), 499-510.

- Wylie, S., & Ravichandran, D. (2013). A UK national survey of breast surgeons on primary endocrine therapy of early operable breast cancer. *The Annals of The Royal College of Surgeons of England, 95*(5), 353-356.
- Xu, K., Nosek, B. A., Greenwald, A. G. (2014). Data from the Race Implicit Association Test on the Project Implicit Demonstration website. *Journal of Open Psychology Data, 2*, e3. Doi:10.5334/jopd.ac
- Yeom, H. E., & Heidrich, S. M. (2009). Effect of perceived barriers to symptom management on quality of life in older breast cancer survivors. *Cancer nursing, 32*(4), 309.
- Zitek, E. M., & Hebl, M. R. (2007). The role of social norm clarity in the influenced expression of prejudice over time. *Journal of Experimental Social Psychology, 43*(6), 867-876.
- Zitelny, H., Shalom, M., & Bar-Anan, Y. (2017). What is the implicit gender-science stereotype? Exploring correlations between the gender-science IAT and self-report measures. *Social Psychological and Personality Science, 8*, 719-735.
- Zmuda, J. M., Cauley, J. A., Kriska, A., Glynn, N. W., Gutai, J. P., & Kuller, L. H. (1997). Longitudinal relation between endogenous testosterone and cardiovascular disease risk factors in middle-aged men: a 13-year follow-up of former multiple risk factor intervention trial participants. *American journal of epidemiology, 146*(8), 609-617.
- Zolnierek, K. B. H., & DiMatteo, M. R. (2009). Physician communication and patient adherence to treatment: a meta-analysis. *Medical care, 47*(8), 826.

## APPENDICES

### Appendix A. Study 1 online survey

#### Information sheet:



The  
University  
Of  
Sheffield.

US  
UNIVERSITY  
OF SUSSEX

brighton and sussex  
medical school

The Treatment of Older Women with Breast Cancer

#### Information Sheet

We would like to invite you to take part in a research study being organised by Brighton and Sussex Medical School. Please take time to read the following information carefully and feel free to contact us for further information.

#### What is the purpose of the study?

In the UK there is wide variation in practice relating to the treatment of older women with breast cancer.

This study is part of a research project concerning possible age bias in breast cancer treatment. This research is being conducted at Sussex University and Brighton and Sussex Medical School and is funded by Sussex University.

This study aims to better understand decision making for treatment options of older women with breast cancer.

All responses are invaluable to this project and greatly appreciated.

#### Why have I been invited to take part?

You have been chosen to take part for your expertise in breast cancer treatment, as selected by the mailing lists of Association of Breast Surgery, Mammary Fold for trainees, the Association of Cancer Physicians, Brighton Breast Day, NABCOP, and the Oncology Section of the Royal Society of Medicine.

#### Do you have to take part?

Your taking part in this study is entirely voluntary. If you do not want to take part, you do not have to give a reason and you will not be contacted again about this study. If you decide to take part but later change your mind, you can withdraw from the study at any time and do not have to give a reason.

#### What will happen if you take part?

Participation involves three short decision-making tasks which should take no longer than 30 minutes to complete. The first section involves categorising items into groups, the second section describes 23 clinical scenarios; for each scenario, you will be asked to determine a preferred treatment pathway for a hypothetical cancer patient, and the third section involves answering a few statements regarding your experience of treatment breast cancer.

#### Will my information in this study be kept confidential?

All data the study collects will not include participant identifiers. All data collected will be anonymous and databases will be password protected, available only to the study team, in accordance with the Data Protection Act.

Participants must only provide personal information if they wish to receive a copy of the final report, i.e. name and email address. Should they wish to do so this information will be kept separately to the data and may only be accessed by the lead investigator.

#### Who is organising and funding the research?

## AGE BIAS IN BREAST CANCER

The research is being undertaken as a PhD project, funded by BSMS, Sussex University, and Sussex Cancer Charity.

### **Who has approved this study?**

The study has been ethically reviewed by the BSMS RGEC, application number: ER/BSMS9DV8/1

### **Contact for further information**

If you would like to find out more about the study before deciding whether to take part please contact either Daisy Neal, a researcher on the project, at [d.neal@bsms.ac.uk](mailto:d.neal@bsms.ac.uk) or Malcolm Reed, supervisor on the project, at [m.reed@bsms.ac.uk](mailto:m.reed@bsms.ac.uk).

### **Insurance**

The University of Sussex has insurance in place to cover its legal liabilities in respect of this study

**Thank you for reading this information sheet and for taking an interest in the research study.**

**Consent form:**



The  
University  
Of  
Sheffield.

**US**  
UNIVERSITY  
OF SUSSEX

 brighton and sussex  
medical school

**Please read through the following carefully**

- You may stop at any time and, should you wish to do so, any information you have provided till that point will not be included in the final report.
- All information will be anonymised.
- All data will be destroyed once the research study is completed
- The data will be used for research purposes and will not be used beyond that without consent as set out below.
- The research has been approved by the University of Sussex Ethics Committee.

**Please select 'yes' if you agree to the following**

- I am happy to take part in this research. YES/NO
- I am happy for any findings to be included anonymously in the final report. For example, 'most oncologists recommended chemotherapy for scenario four'. YES/NO

## AGE BIAS IN BREAST CANCER

### DCE explanation:

In this first section you will be given **23** clinical scenarios on which you are asked to make a clinical decision. They are concerned with the importance you place on various factors influencing your preferred option for surgery or Primary Endocrine Therapy in individual women  $\geq 60$  with operable breast cancer.

**Please Note:** the option for surgery may include operations under General, Regional, or Local anaesthetic if this is how you would treat the patient.

- |                               |  |                                   |
|-------------------------------|--|-----------------------------------|
| <b>1. Patient age (years)</b> | <b>Divided into the following age bands:</b><br>60 – 64<br>70 – 74<br>80 – 84  | 65 – 69<br>75 – 79<br>85 and over |
| <b>2. Co-morbidity</b>        | <b>Divided into the following:</b><br>1) No co-morbidity<br>2) Mild co-morbidity, e.g. arthritis, hypertension<br>3) Moderate/well-controlled co-morbidity, e.g. diabetes, coronary heart disease, moderate COPD<br>4) Severe co-morbidity, e.g. disabling stroke, congestive cardiac failure, severe COPD                                     |                                   |
| <b>3. Cancer Stage</b>        | <b>Divided into the following:</b><br>1) Small tumour, no nodal involvement<br>2) Small tumour, nodal involvement<br>3) Large tumour, no nodal involvement<br>4) Large tumour, nodal involvement   |                                   |
| <b>4. Cancer Biology</b>      | <b>Divided into the following:</b><br>1) ER++/HER2- (ER strongly positive, HER2 negative)<br>2) ER+/HER2- (ER moderately positive, HER2 negative)<br>3) ER+/HER2+ (ER moderately positive, HER2 positive)  |                                   |
| <b>5. Functional Status</b>   | <b>Divided into the following:</b><br>1) Fully independent<br>2) Mild dependence; requires weekly help for domestic activities, e.g. shopping<br>3) Moderate dependence; requires daily help with washing, dressing, continence management, etc.<br>4) Severe dependence; requires 24-hour care, e.g. resides in a residential or nursing home |                                   |
| <b>6. Cognitive Function</b>  | <b>Divided into the following:</b><br>1) Normal cognitive function<br>2) Mild cognitive impairment; functions normally in society<br>3) Moderate cognitive impairment; unable to cope without help<br>4) Severe cognitive impairment; requires daily social services   |                                   |

## AGE BIAS IN BREAST CANCER

### DCE scenarios

PATIENT AGE (YEARS)	70-74
CO-MORBIDITY	MODERATE
TUMOUR STAGE	SMALL TUMOUR, NODE POSITIVE
BREAST CANCER BIOLOGY	ER+ / HER2+
FUNCTIONAL STATUS	INDEPENDENT
COGNITIVE FUNCTION	NORMAL

- Surgery
- Primary Endocrine Therapy
- Prefer options equally

PATIENT AGE (YEARS)	70-74
CO-MORBIDITY	MILD
TUMOUR STAGE	LARGE TUMOUR, NODE POSITIVE
BREAST CANCER BIOLOGY	ER+ / HER2-
FUNCTIONAL STATUS	MODERATE DEPENDENCE
COGNITIVE FUNCTION	MODERATE IMPAIRMENT

- Surgery
- Primary Endocrine Therapy
- Prefer options equally

PATIENT AGE (YEARS)	80-84
CO-MORBIDITY	NONE
TUMOUR STAGE	SMALL TUMOUR, NODE NEGATIVE
BREAST CANCER BIOLOGY	ER+ / HER2+
FUNCTIONAL STATUS	SEVERE DEPENDENCE
COGNITIVE FUNCTION	MODERATE IMPAIRMENT

- Surgery
- Primary Endocrine Therapy
- Prefer options equally

## AGE BIAS IN BREAST CANCER

PATIENT AGE (YEARS)	60-64
CO-MORBIDITY	NONE
TUMOUR STAGE	LARGE TUMOUR, NODE NEGATIVE
BREAST CANCER BIOLOGY	ER+ / HER2-
FUNCTIONAL STATUS	SEVERE DEPENDENCE
COGNITIVE FUNCTION	SEVERE IMPAIRMENT

- Surgery
- Primary Endocrine Therapy
- Prefer options equally

PATIENT AGE (YEARS)	85+
CO-MORBIDITY	NONE
TUMOUR STAGE	LARGE TUMOUR, NODE POSITIVE
BREAST CANCER BIOLOGY	ER+ / HER2+
FUNCTIONAL STATUS	INDEPENDENT
COGNITIVE FUNCTION	MILD IMPAIRMENT

- Surgery
- Primary Endocrine Therapy
- Prefer options equally

PATIENT AGE (YEARS)	70-74
CO-MORBIDITY	NONE
TUMOUR STAGE	LARGE TUMOUR, NODE NEGATIVE
BREAST CANCER BIOLOGY	ER+ / HER2-
FUNCTIONAL STATUS	SEVERE DEPENDENCE
COGNITIVE FUNCTION	SEVERE IMPAIRMENT

- Surgery
- Primary Endocrine Therapy
- Prefer options equally

AGE BIAS IN BREAST CANCER

PATIENT AGE (YEARS)	75-79
CO-MORBIDITY	MODERATE
TUMOUR STAGE	LARGE TUMOUR, NODE POSITIVE
BREAST CANCER BIOLOGY	ER++ / HER2-
FUNCTIONAL STATUS	SEVERE DEPENDENCE
COGNITIVE FUNCTION	NORMAL

- Surgery
- Primary Endocrine Therapy
- Prefer options equally

PATIENT AGE (YEARS)	60-64
CO-MORBIDITY	MODERATE
TUMOUR STAGE	LARGE TUMOUR, NODE POSITIVE
BREAST CANCER BIOLOGY	ER++ / HER2-
FUNCTIONAL STATUS	SEVERE DEPENDENCE
COGNITIVE FUNCTION	NORMAL

- Surgery
- Primary Endocrine Therapy
- Prefer options equally

PATIENT AGE (YEARS)	70-74
CO-MORBIDITY	SEVERE
TUMOUR STAGE	LARGE TUMOUR, NODE NEGATIVE
BREAST CANCER BIOLOGY	ER+ / HER2+
FUNCTIONAL STATUS	MODERATE DEPENDENCE
COGNITIVE FUNCTION	NORMAL

- Surgery
- Primary Endocrine Therapy
- Prefer options equally

AGE BIAS IN BREAST CANCER

PATIENT AGE (YEARS)	85+
CO-MORBIDITY	MILD
TUMOUR STAGE	SMALL TUMOUR, NODE NEGATIVE
BREAST CANCER BIOLOGY	ER+ / HER2-
FUNCTIONAL STATUS	INDEPENDENT
COGNITIVE FUNCTION	NORMAL

- Surgery
- Primary Endocrine Therapy
- Prefer options equally

PATIENT AGE (YEARS)	70-74
CO-MORBIDITY	NONE
TUMOUR STAGE	SMALL TUMOUR, NODE NEGATIVE
BREAST CANCER BIOLOGY	ER++ / HER2-
FUNCTIONAL STATUS	INDEPENDENT
COGNITIVE FUNCTION	NORMAL

- Surgery
- Primary Endocrine Therapy
- Prefer options equally

PATIENT AGE (YEARS)	65-69
CO-MORBIDITY	MODERATE
TUMOUR STAGE	SMALL TUMOUR, NODE NEGATIVE
BREAST CANCER BIOLOGY	ER+ / HER2-
FUNCTIONAL STATUS	MODERATE DEPENDENCE
COGNITIVE FUNCTION	MILD IMPAIRMENT

- Surgery
- Primary Endocrine Therapy
- Prefer options equally

AGE BIAS IN BREAST CANCER

PATIENT AGE (YEARS)	80-84
CO-MORBIDITY	MILD
TUMOUR STAGE	LARGE TUMOUR, NODE NEGATIVE
BREAST CANCER BIOLOGY	ER++ / HER2-
FUNCTIONAL STATUS	INDEPENDENT
COGNITIVE FUNCTION	NORMAL

- Surgery
- Primary Endocrine Therapy
- Prefer options equally

PATIENT AGE (YEARS)	80-84
CO-MORBIDITY	NONE
TUMOUR STAGE	SMALL TUMOUR, NODE POSITIVE
BREAST CANCER BIOLOGY	ER+ / HER2-
FUNCTIONAL STATUS	MILD DEPENDENCE
COGNITIVE FUNCTION	NORMAL

- Surgery
- Primary Endocrine Therapy
- Prefer options equally

PATIENT AGE (YEARS)	85+
CO-MORBIDITY	SEVERE
TUMOUR STAGE	SMALL TUMOUR, NODE NEGATIVE
BREAST CANCER BIOLOGY	ER+ / HER2-
FUNCTIONAL STATUS	SEVERE DEPENDENCE
COGNITIVE FUNCTION	NORMAL

- Surgery
- Primary Endocrine Therapy
- Prefer options equally

AGE BIAS IN BREAST CANCER

PATIENT AGE (YEARS)	65-69
CO-MORBIDITY	MILD
TUMOUR STAGE	LARGE TUMOUR, NODE NEGATIVE
BREAST CANCER BIOLOGY	ER++ / HER2-
FUNCTIONAL STATUS	INDEPENDENT
COGNITIVE FUNCTION	NORMAL

- Surgery
- Primary Endocrine Therapy
- Prefer options equally

PATIENT AGE (YEARS)	70-74
CO-MORBIDITY	NONE
TUMOUR STAGE	LARGE TUMOUR, NODE POSITIVE
BREAST CANCER BIOLOGY	ER+ / HER2-
FUNCTIONAL STATUS	MILD DEPENDENCE
COGNITIVE FUNCTION	NORMAL

- Surgery
- Primary Endocrine Therapy
- Prefer options equally

PATIENT AGE (YEARS)	85+
CO-MORBIDITY	MODERATE
TUMOUR STAGE	LARGE TUMOUR, NODE NEGATIVE
BREAST CANCER BIOLOGY	ER++ / HER2-
FUNCTIONAL STATUS	MILD DEPENDENCE
COGNITIVE FUNCTION	MODERATE IMPAIRMENT

- Surgery
- Primary Endocrine Therapy
- Prefer options equally

## AGE BIAS IN BREAST CANCER

PATIENT AGE (YEARS)	80-84
CO-MORBIDITY	MODERATE
TUMOUR STAGE	SMALL TUMOUR, NODE NEGATIVE
BREAST CANCER BIOLOGY	ER+ / HER2-
FUNCTIONAL STATUS	MODERATE DEPENDENCE
COGNITIVE FUNCTION	MILD IMPAIRMENT

- Surgery
- Primary Endocrine Therapy
- Prefer options equally

PATIENT AGE (YEARS)	65-69
CO-MORBIDITY	NONE
TUMOUR STAGE	SMALL TUMOUR, NODE POSITIVE
BREAST CANCER BIOLOGY	ER+ / HER2-
FUNCTIONAL STATUS	MILD DEPENDENCE
COGNITIVE FUNCTION	NORMAL

- Surgery
- Primary Endocrine Therapy
- Prefer options equally

PATIENT AGE (YEARS)	85+
CO-MORBIDITY	NONE
TUMOUR STAGE	SMALL TUMOUR, NODE POSITIVE
BREAST CANCER BIOLOGY	ER++ / HER2-
FUNCTIONAL STATUS	MODERATE DEPENDENCE
COGNITIVE FUNCTION	SEVERE IMPAIRMENT

- Surgery
- Primary Endocrine Therapy
- Prefer options equally

AGE BIAS IN BREAST CANCER

PATIENT AGE (YEARS)	75-79
CO-MORBIDITY	NONE
TUMOUR STAGE	LARGE TUMOUR, NODE NEGATIVE
BREAST CANCER BIOLOGY	ER+ / HER2-
FUNCTIONAL STATUS	INDEPENDENT
COGNITIVE FUNCTION	MILD IMPAIRMENT

- Surgery
- Primary Endocrine Therapy
- Prefer options equally

PATIENT AGE (YEARS)	60-64
CO-MORBIDITY	NONE
TUMOUR STAGE	LARGE TUMOUR, NODE NEGATIVE
BREAST CANCER BIOLOGY	ER+ / HER2-
FUNCTIONAL STATUS	INDEPENDENT
COGNITIVE FUNCTION	MILD IMPAIRMENT

- Surgery
- Primary Endocrine Therapy
- Prefer options equally

## AGE BIAS IN BREAST CANCER

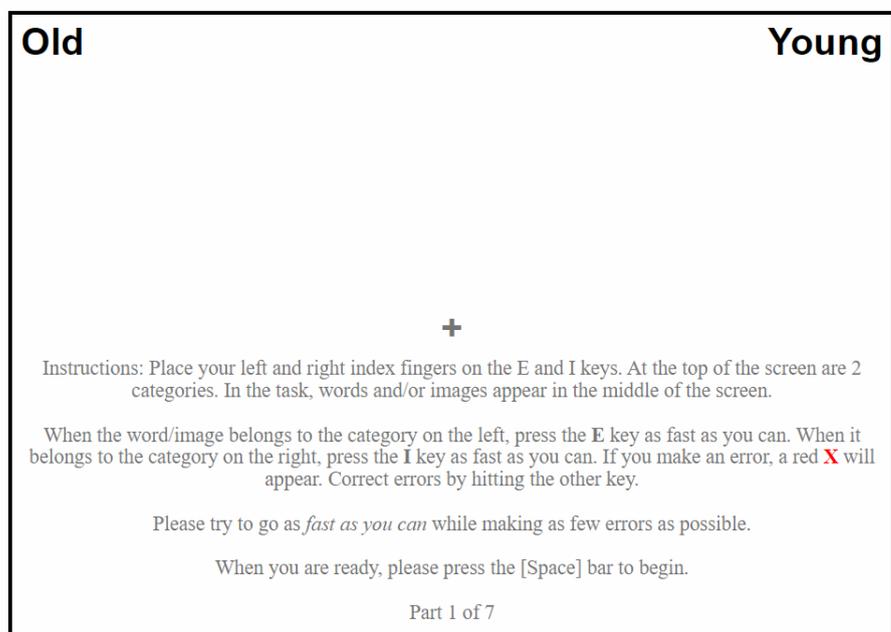
### IAT explanation:

Thank you for completing section one of the survey.

Section two asks you to complete an Age Implicit Associations Test, in which you will be asked to pair people of different ages with positive/ negative evaluations as quickly as possible. This section should take no more than 10 minutes to complete.

If you would like to receive your Age Implicit Associations results, please fill out the contact information at the end.

### IAT instructions screenshot:



The screenshot shows a rectangular window with a black border. At the top left is the word "Old" and at the top right is "Young". In the center is a plus sign "+". Below the plus sign are several lines of text: "Instructions: Place your left and right index fingers on the E and I keys. At the top of the screen are 2 categories. In the task, words and/or images appear in the middle of the screen." followed by "When the word/image belongs to the category on the left, press the E key as fast as you can. When it belongs to the category on the right, press the I key as fast as you can. If you make an error, a red X will appear. Correct errors by hitting the other key." then "Please try to go as *fast as you can* while making as few errors as possible." and "When you are ready, please press the [Space] bar to begin." At the bottom center is "Part 1 of 7".

**Old** **Young**

+

Instructions: Place your left and right index fingers on the E and I keys. At the top of the screen are 2 categories. In the task, words and/or images appear in the middle of the screen.

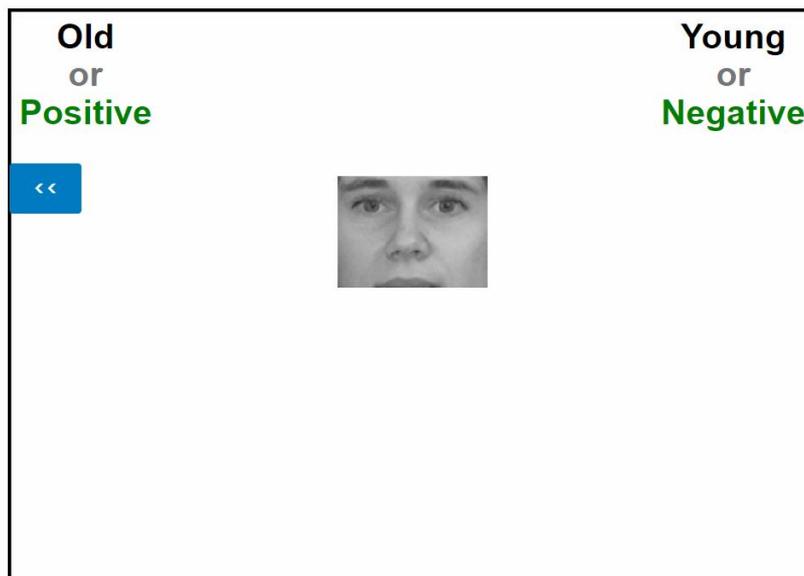
When the word/image belongs to the category on the left, press the E key as fast as you can. When it belongs to the category on the right, press the I key as fast as you can. If you make an error, a red X will appear. Correct errors by hitting the other key.

Please try to go as *fast as you can* while making as few errors as possible.

When you are ready, please press the [Space] bar to begin.

Part 1 of 7

IAT task screenshot:



Demographics and age-related statements:

We would greatly appreciate you answering a few questions about yourself and your opinion on some statements regarding the treatment of older women with breast cancer . Any answers you choose to give will remain anonymous.

What is your gender?

- Male
- Female
- Prefer not to say

What is your age in years?

What is your profession or specialty?

- Breast Surgeon
- Breast Care Nurse Specialist
- Trainee Breast Surgeon
- Other (please specify)

How did you hear about this study?

- Association of Breast Surgery (ABS)
- National Audit of Breast Cancer in Older Patient (NABCOP)
- Bridging the Age Gap
- Mammary Fold
- Other (please specify)

## AGE BIAS IN BREAST CANCER

Current clinical guidelines are appropriate for breast cancer care for older patients

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

It takes too long to explain different treatment options to older patients

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

In patients with lack of capacity due to dementia, my preference is to avoid surgical treatment in order to minimize patient distress

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

An older patient is less likely than a younger patient to want to take part in a clinical trial

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

There have been cases when age-related assumptions may have influenced my treatment decisions for older patients

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

It is unlikely that an older patient will want to consider treatment options which are likely to impact on their quality of daily living

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

## AGE BIAS IN BREAST CANCER

An older patient will be unlikely to take an active role in decision making for their breast cancer treatment

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

In my view, assumptions about older patients bias the breast cancer care they receive

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

An older patient will not be able to tolerate the toxicities associated with more aggressive breast cancer treatments

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

## AGE BIAS IN BREAST CANCER

### Appendix B: Research ethics committee approval for Study 1

**Ethical Review Application (ER/BSMS9DV8/1)**
Submit Amendment Copy Application Help

Amendments: [ER/BSMS9DV8/6](#)

<b>Project Title</b>	Implicit age biases in the treatment of older women with breast cancer
<b>Status</b>	Approved
<b>Email</b>	D.Neal@bsms.ac.uk
<b>Phone No.</b>	
<b>Applicant Status</b>	PG (Research)
<b>Department</b>	Psychology
<b>Project Start Date</b>	01-Jan-2019
<b>Project End Date</b>	01-Aug-2019
<b>External Funding in place</b>	✘
<b>External Collaborators</b>	✘
<b>Funder/Project Title</b>	
<b>Name of Funder</b>	
<b>Project Description</b>	<p>This project aims to address age bias in the treatment of older women with breast cancer. In the context of this research, age bias refers to unfair treatment on the basis of older age. Older women with breast cancer are often under treated with higher mortality rates as a result. Despite the proliferation of interventions to target implicit biases, these have had inconsistent results and have yet to look at age biases in a clinical context. As the UK population ages and the incidence of cancer in older people continues to rise, attention should be turned to implicit age biases in treatment of breast cancer patients.</p> <p>Many older women with breast cancer are denied access to a full range of treatments even when positive outcomes are as likely for them as for younger people. Research has linked implicit biases amongst clinicians to conscious decisions which perpetuate group health disparities. There is clear evidence of deviation from evidence-based guidelines in the management of older women with breast cancer and previous work by the supervisors has demonstrated that whilst clinicians deny explicit bias based on age, they demonstrate clearly different preferences for the treatment of older patients, with reference to surgery and other treatments such as endocrine therapy.</p> <p>This research will address the potential influence of unconscious age bias in the management of older women with breast cancer, and possible interventions to address these biases. This project will explore the prevalence of implicit bias utilising implicit attitude tests and compare the outcomes to treatment preferences of clinicians managing breast cancer utilising discreet choice experiment vignette-based questionnaires.</p> <p>This study aims to understand the influence of Health Care Professionals implicit and explicit potential age bias on treatment recommendations for older women with breast cancer. The study will involve administering an Age Implicit Associations Test (IAT) and Discrete Choice Experiment (DCE) to breast cancer surgeons (and trainees), breast cancer specialist nurses, and oncologists (and trainees). The DCEs will consist of up to 25 hypothetical patient scenarios with varying tumour characteristics and ages and asking Health Care Professionals to recommend a treatment choice for each patient.</p>
<b>Is this an IRP project?</b>	✘

Submission History (ER/BSMS9DV8/1)				Help
Submission Date	Submitted To	Risk Rating	Decision / Status	Reason(s) for Return
02-Jul-2019 15:31	BSMS RGEC <a href="#">(Caroline Brooks)</a>	Standard	Approved	
01-Jul-2019 19:50	BSMS RGEC <a href="#">(Caroline Brooks)</a>	Standard	Returned for revision	• Amendments required to the application
14-Jun-2019 13:56	BSMS RGEC <a href="#">(Caroline Brooks)</a>	Standard	Returned for revision	• Amendments required to the application
29-Mar-2019 11:25	BSMS RGEC <a href="#">(Caroline Brooks)</a>	Standard	Returned for revision	• Amendments required to the application

Appendix C. Study 2 interview presentation

Study overview:

## Overview

Our research aims to improve understanding of the factors influencing variations in treatment of breast cancer patients, specifically with a view to improving the care and experiences of older women with breast cancer.

Previous studies have shown that older age is be a factor in treatment variations – sometimes these are appropriate but often they are not based on evidence. Early phases of this study have highlighted actions which may reduce age related variations without any reduction in treatment benefits: prioritising shared decision making, recognising different treatment preferences, and empowering patients to have a say in their treatment.

This study wishes to work with breast cancer healthcare professionals to understand how actions to improve decision-making for breast cancer treatment in older women can be implemented and embedded within the healthcare system.

We will go through six hypothetical breast cancer patient scenarios for you to recommend a treatment to each of them, explaining your reasoning as you go as much as possible. They are concerned with the importance that you place on various factors influencing your preferred option for \*surgery, Primary Endocrine Therapy, or patient choice\*\* in women over 70 years old with ER+HER2- operable breast cancer. There are no right or wrong answers. We wish to better understand the reasoning behind healthcare professional's decision-making for recommending treatments to breast cancer patients.

PLEASE NOTE: \*the option for surgery may include operations under General, Regional or Local anaesthetic if this is how you would treat the patient.

\*\*Patient choice may mean you do not have a clear preference for one treatment over the other and so would not recommend either OR in this situation you think there are clear pros and cons to both treatments, so the choice is a matter of personal preference to the patient.

We also appreciate that covid-19 may have had a significant impact on how you evaluate and treat older patients but for the purposes of these scenarios please imagine the treatments you would recommend in a pre-covid world.

Scenario A:

Ann

*Ann is 81 years old and was recently diagnosed with ER+HER2-, grade I breast cancer. Investigations indicate that the tumour is 18mm and there is no involvement of axillary lymph nodes. Ann was diagnosed with dementia 5 years ago and has lived in a care home for the past 9 months as she is unable to get to and from the toilet, dress, or wash independently. She has no other significant comorbidities other than well controlled hypertension. Ann has been accompanied to the appointment by her daughter who is keen to know what the best treatment would be. Would you recommend Primary Endocrine Therapy, Surgery, or offer Ann a choice?*

## Scenario B1:



Susan

*Susan went to her GP after noticing a lump in her left breast. She has been diagnosed with ER+HER2-, grade II breast cancer. The imaging shows the tumour is 43mm and has spread to the axillary nodes. Susan is 74 years old and has moderate dementia. Susan also has mild renal impairment. She lives with her son and daughter-in-law and for the past year has required help with washing and dressing and must be accompanied if she leaves the house. Susan has brought her son to her appointment and they would like to know what the treatment options are. Would you recommend Primary Endocrine Therapy, Surgery, or offer Susan a choice?*

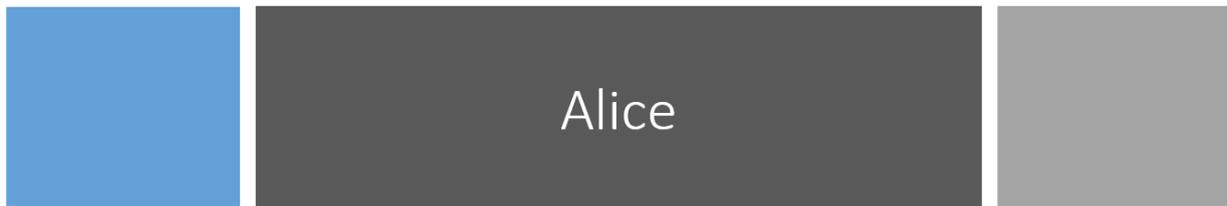
## Scenario B2:



Helen

*Helen has been diagnosed with a grade II breast cancer after her husband convinced her to visit the GP for a lump in her breast. She is 82 years old, with moderate dementia and mild arthritis. She lives with her husband who is in good health who manages most aspects of her care but they also have help daily to provide some assistance with cooking, shopping, washing and dressing. The tumour is 40mm and has spread to the axillary lymph nodes. The cancer is ER+HER2-. Helen has attended the appointment with her husband, and they are both anxious to hear what treatments are available. Would you recommend Primary Endocrine Therapy, Surgery, or prefer options equally?*

## Scenario C:



*Alice, 88 years old, contacted her GP after noticing a lump in her breast. She has been diagnosed with ER+HER2-, grade I breast cancer. The tumour is 23mm diameter and does not appear to have spread to the axillary lymph nodes. Alice has well controlled type II diabetes but is otherwise fit and well. She lives alone but is visited often by her neighbours and grandson, and meets a friend most days at the local cafe. Her friend has accompanied her and shares that she had had a difficult recovery from surgery a few years ago and doesn't wish the same for Alice. They are both visibly worried and ask what treatment you think is best for Alice. Would you recommend Primary Endocrine Therapy, Surgery, or prefer options equally?*

## Scenario D:



*Elizabeth, aged 77 years old, has been diagnosed with grade II breast cancer after her carer noticed a lump in her right breast. She has a 43mm tumour which has spread to regional lymph nodes. The cancer is ER+HER2-. Elizabeth suffered a stroke two decades ago and has since been wheelchair bound, requiring full time care including assistance with washing and dressing. She has no other major health problems.*

*Would you recommend Elizabeth has Surgery, Primary Endocrine Therapy, or prefer options equally?*

Scenario A:



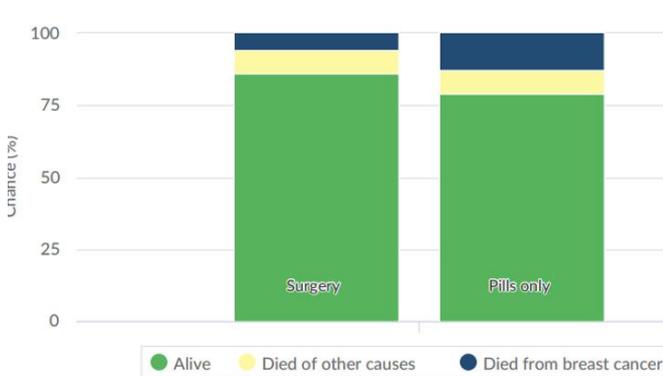
Elizabeth

*Elizabeth, aged 83 years old, has been diagnosed with grade I breast cancer after her carer noticed a lump in her right breast. She has a small (20 mm) tumour which has not spread to regional lymph nodes and there are no distant metastases. The cancer is ER+ and HER2-. She moved in with her daughter's family since she was diagnosed with dementia 5 years ago. However in the past year her dementia has progressed and she now requires full time care including assistance with walking, dressing and eating, and she now lives in a care home. She has no other major health problems. Would you recommend Primary Endocrine Therapy, Surgery, or offer Elizabeth a choice?*

What may have happened in 2 years' time?

If we look at 100 women like you who have breast cancer and see what has happened to them 2 years after they started their breast cancer treatment, this shows how many will be alive in 2 years, how many will have died of breast cancer and how many will have died of other causes in those 2 years.

What will have happened to women like you 2 years after they start their breast cancer treatment?



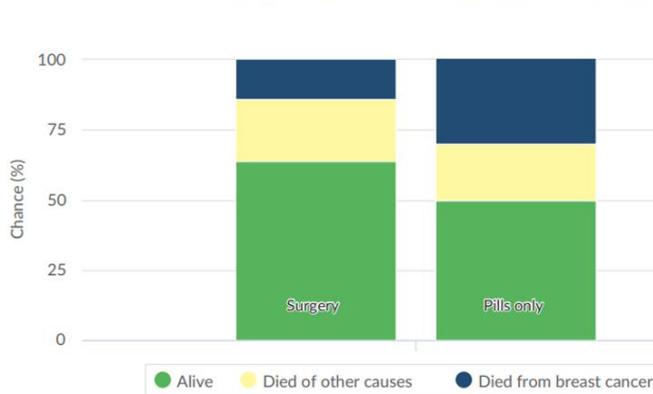
	Alive	Died of breast cancer at 2 years	Died of other causes at 2 years
Surgery	86%	6%	8%
Pills only	79%	13%	8%

## AGE BIAS IN BREAST CANCER

### What may have happened in 5 years' time?

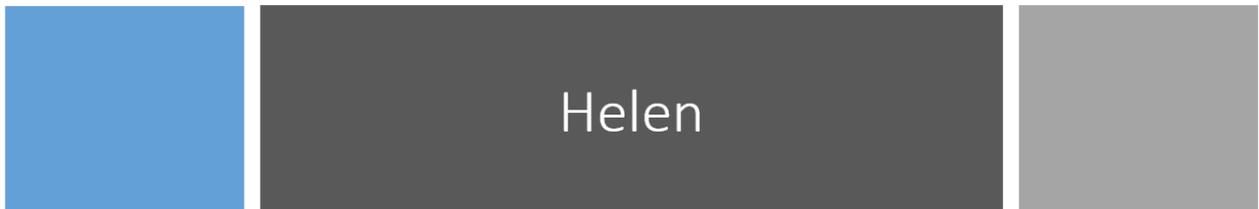
If we look at 100 women like you who have breast cancer and see what has happened to them 5 years after they started their breast cancer treatment, this shows how many will be alive in 5 years, how many will have died of breast cancer and how many will have died of other causes in those 5 years.

### What will have happened to women like you 5 years after they start their breast cancer treatment?



	Alive	Died of breast cancer at 5 years	Died of other causes at 5 years
Surgery	64%	14%	22%
Pills only	50%	31%	20%

### Scenario B1:



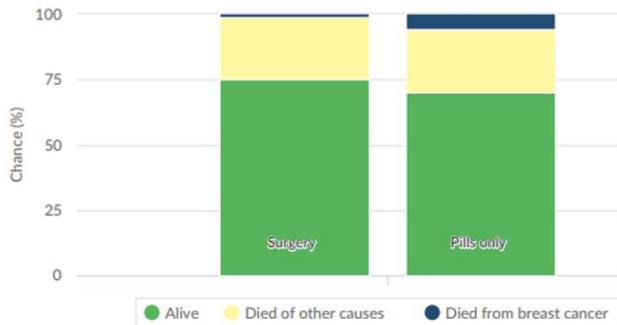
*Helen has been diagnosed with a grade II breast cancer after her husband convinced her to visit the GP for a lump in her breast. She is 72 years old, with moderate dementia and mild arthritis. She lives with her husband who is in good health who manages most aspects of her care but they also have help daily to provide some assistance with cooking, shopping, washing and dressing. The tumour is 40mm and has spread to the axillary lymph nodes. The cancer is ER+HER2-. Helen has attended the appointment with her husband, and they are both anxious to hear what treatments are available. Would you recommend Primary Endocrine Therapy, Surgery, or offer Helen a choice?*

# AGE BIAS IN BREAST CANCER

## What may have happened in 2 years' time?

If we look at 100 women like you who have breast cancer and see what has happened to them 2 years after they started their breast cancer treatment, this shows how many will be alive in 2 years, how many will have died of breast cancer and how many will have died of other causes in those 2 years.

### What will have happened to women like you 2 years after they start their breast cancer treatment?

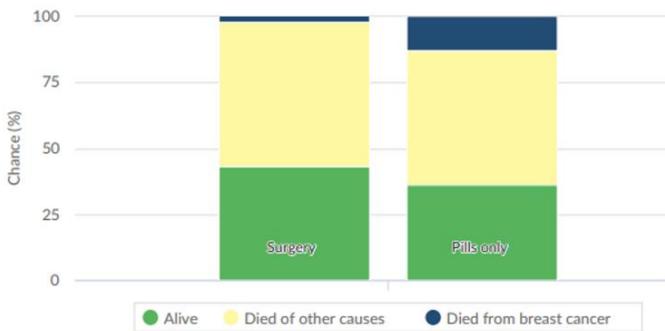


	Alive	Died of breast cancer at 2 years	Died of other causes at 2 years
<b>Surgery</b>	75%	1%	24%
<b>Pills only</b>	70%	6%	24%

## What may have happened in 5 years' time?

If we look at 100 women like you who have breast cancer and see what has happened to them 5 years after they started their breast cancer treatment, this shows how many will be alive in 5 years, how many will have died of breast cancer and how many will have died of other causes in those 5 years.

### What will have happened to women like you 5 years after they start their breast cancer treatment?



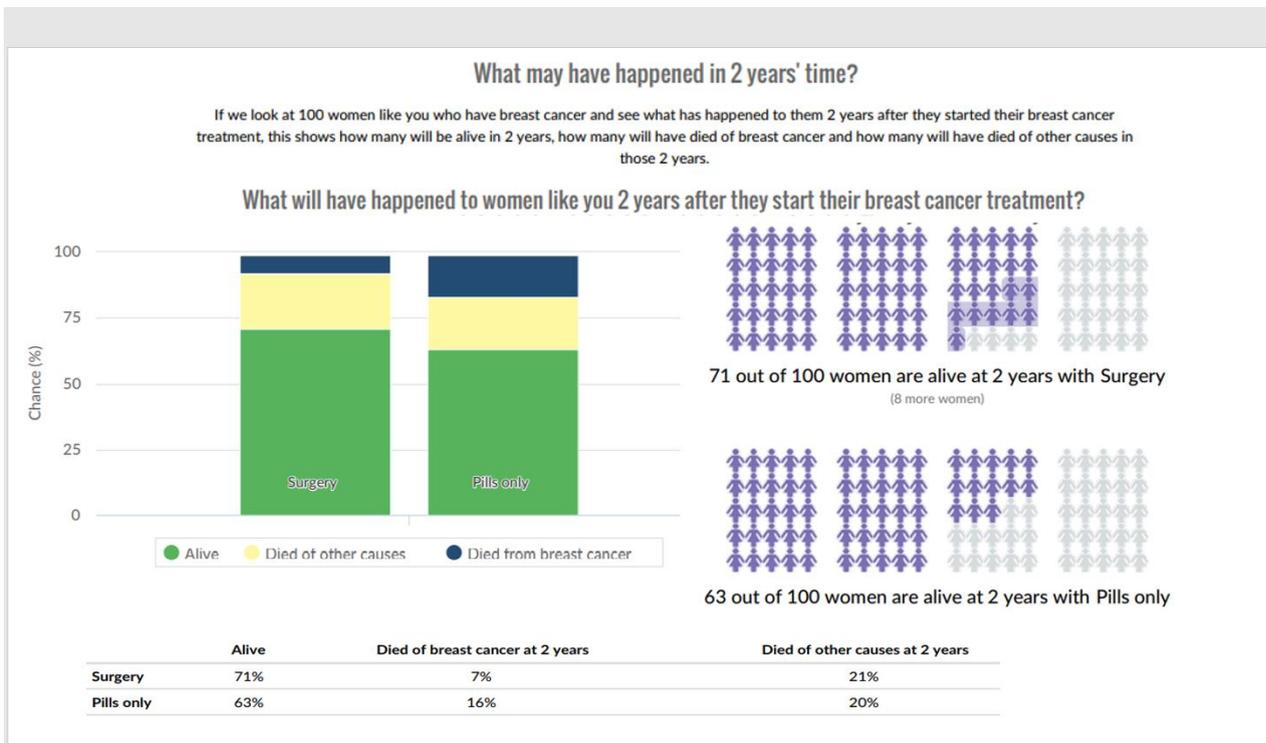
	Alive	Died of breast cancer at 5 years	Died of other causes at 5 years
<b>Surgery</b>	43%	3%	55%
<b>Pills only</b>	36%	13%	51%

Scenario B2

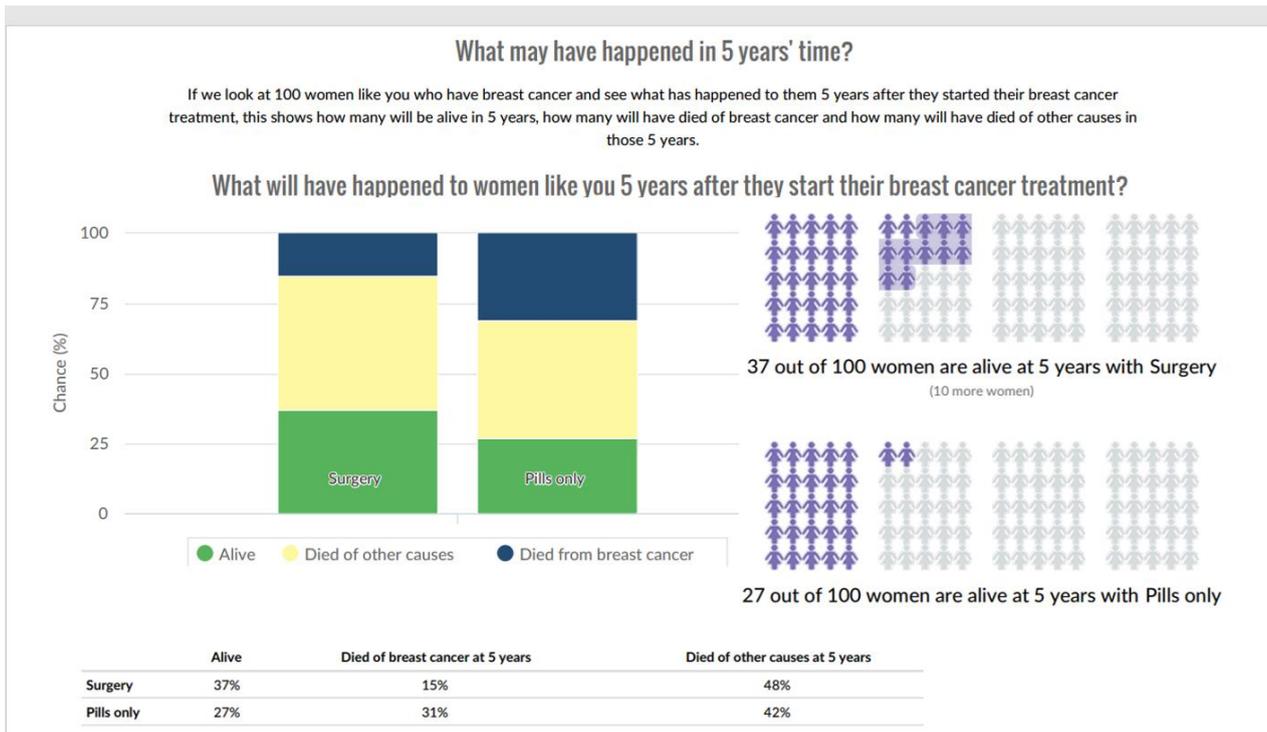


Susan

*Susan went to her GP after noticing a lump in her left breast. She has been diagnosed with ER+HER2-, grade II breast cancer. The imaging shows the tumour is 43mm and has spread to the axillary nodes. Susan is 84 years old and has moderate dementia. Susan also has mild renal impairment. She lives with her son and daughter-in-law and for the past year has required help with washing and dressing and must be accompanied if she leaves the house. Susan has brought her son to her appointment and they would like to know what the treatment options are. Would you recommend Primary Endocrine Therapy, Surgery, or prefer options equally?*



## AGE BIAS IN BREAST CANCER



### Scenario C:



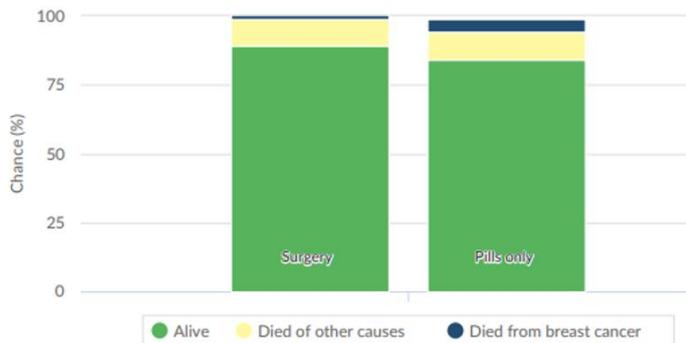
*Alice, 88 years old, contacted her GP after noticing a lump in her breast. She has been diagnosed with ER+HER2-, grade I breast cancer. The tumour is 23mm diameter and does not appear to have spread to the axillary lymph nodes. Alice has well controlled type II diabetes but is otherwise fit and well. She lives alone but is visited often by her neighbours and grandson, and meets a friend most days at the local cafe. Her friend has accompanied her and shares that she had had a difficult recovery from surgery a few years ago and doesn't wish the same for Alice. They are both visibly worried and ask what treatment you think is best for Alice. Would you recommend Primary Endocrine Therapy, Surgery, or offer Alice a choice?*

# AGE BIAS IN BREAST CANCER

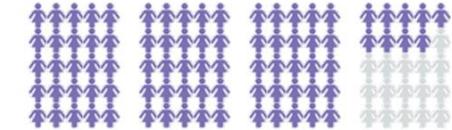
## What may have happened in 2 years' time?

If we look at 100 women like you who have breast cancer and see what has happened to them 2 years after they started their breast cancer treatment, this shows how many will be alive in 2 years, how many will have died of breast cancer and how many will have died of other causes in those 2 years.

### What will have happened to women like you 2 years after they start their breast cancer treatment?



89 out of 100 women are alive at 2 years with Surgery  
(5 more women)



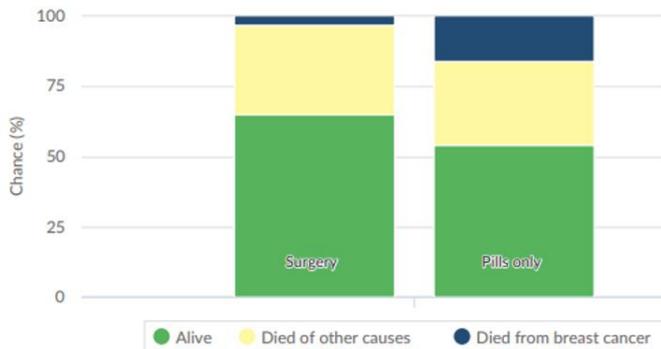
84 out of 100 women are alive at 2 years with Pills only

	Alive	Died of breast cancer at 2 years	Died of other causes at 2 years
Surgery	89%	1%	10%
Pills only	84%	5%	10%

## What may have happened in 5 years' time?

If we look at 100 women like you who have breast cancer and see what has happened to them 5 years after they started their breast cancer treatment, this shows how many will be alive in 5 years, how many will have died of breast cancer and how many will have died of other causes in those 5 years.

### What will have happened to women like you 5 years after they start their breast cancer treatment?



65 out of 100 women are alive at 5 years with Surgery  
(11 more women)



54 out of 100 women are alive at 5 years with Pills only

	Alive	Died of breast cancer at 5 years	Died of other causes at 5 years
Surgery	65%	3%	32%
Pills only	54%	16%	30%

Scenario D:



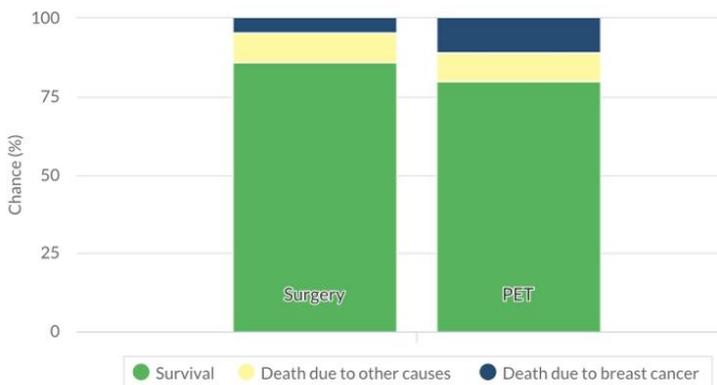
*Ann is 78 years old and was recently diagnosed with a 42mm, node positive , grade II breast cancer. The cancer is ER+HER2-. Ann has long-standing stable disability and requires full-time care since her involvement in a car accident in her 50s. She has restricted mobility and expressive dysphasia. Ann has been accompanied to the appointment by her daughter and they are keen to know what the right treatment would be.*

*Would you recommend Primary Endocrine Therapy, Surgery, or prefer options equally?*

What may have happened in 2 years' time?

If we look at 100 women like you who have breast cancer and see what has happened to them 2 years after they started their breast cancer treatment, this shows how many will be alive in 2 years, how many will have died of breast cancer and how many will have died of other causes in those 2 years.

What will have happened to women like you 2 years after they start their breast cancer treatment?



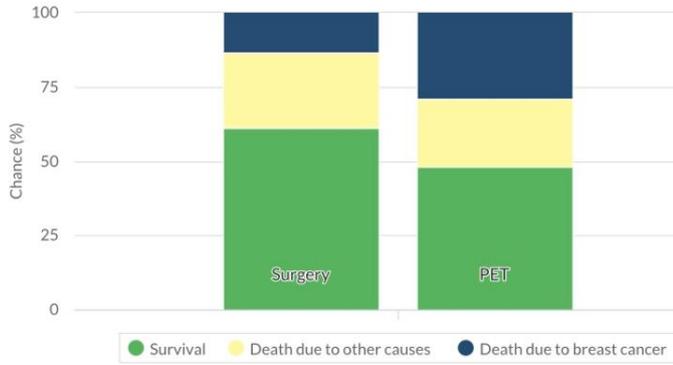
	Alive	Died of breast cancer at 2 years	Died of other causes at 2 years
Surgery	86%	5%	10%
Pills only	80%	11%	9%

# AGE BIAS IN BREAST CANCER

## What may have happened in 5 years' time?

If we look at 100 women like you who have breast cancer and see what has happened to them 5 years after they started their breast cancer treatment, this shows how many will be alive in 5 years, how many will have died of breast cancer and how many will have died of other causes in those 5 years.

### What will have happened to women like you 5 years after they start their breast cancer treatment?



61 out of 100 women are alive at 5 years with Surger  
(13 more women)



48 out of 100 women are alive at 5 years with Pills on

	Alive	Died of breast cancer at 5 years	Died of other causes at 5 years
<b>Surgery</b>	61%	14%	25%
<b>Pills only</b>	48%	29%	23%

## Appendix D. Information booklet for interviewers

## Age Bias in Breast Cancer

Breast cancer is the most common cancer for women in the UK. Older women experience the highest incidence and worst survival rates. In the last 40 years breast cancer related deaths have declined, and survival rates have doubled. However, improvements have only been seen in those under 65 years old and in fact survival rates have worsened for those over 80 years old. Older women with breast cancer are undertreated, inadequately treated, or treated outside clinical guidelines. As incidences of breast cancer amongst older women continue to grow, there is an urgent need to look at how age-related assumptions and stereotypes may be inadvertently contributing to age disparities and mortality rates amongst older women with breast cancer.

The differential treatment of older people in medicine may be a result of 1) a lack of research into the impact of ageing in medicine and the historical systematic exclusion of older people from clinical trials, 2) an underinvestment in education, resources, and funding for healthcare issues which disproportionately effect older people. Both of these may have led to 3) age assumptions and stereotypes guiding both patient and healthcare provider judgements. Yet, much of this bias is covert and implicit, meaning it is largely unrecognised and even accepted as normal, appropriate, and natural. Whilst cancer treatments can have distressing side effects, concerns remain as to whether the differences in the treatment of older women with breast cancer are the consequence of patient choice, comorbidities, tumour and biological characteristics, or whether older women are being unfairly excluded from access to effective evidence-based treatments utilised in their younger counterparts.



## Our Research

This PhD's focus is 1) the role of health care professionals' possible age bias in the undertreatment of older breast cancer patients and 2) interventions to address unfair treatment variations between older and younger women with breast cancer. Despite clear evidence of age-related disparities pervasive across society, there has been little research on age bias and its possible drivers and even less so within breast cancer treatment. The focus has been on the existence of unwarranted age variations in cancer treatment with limited research on the influence of age bias, the forms of age bias and how they are manifested. There is also a marked gap in bias interventions, not only in healthcare but more broadly. Countless organisations roll out bias training seminars in the hopes of improving, or being seen to improve, equality and equity. Yet the research these bias trainings are based on is limited and training typically takes place without any evaluation of its effectiveness.

## Previous Study

This study explored age bias amongst health care professionals involved in the treatment of older breast cancer patients. The study compared the prevalence of implicit age bias utilising implicit attitude tests, explicit age bias through responses to age-related statements, and decision age bias through a discrete choice experiment comprising vignette-based questionnaires and examined any associations between these measures.

Our previous study findings show that 1) despite guidelines stating operable breast cancer patients should be treated 'irrespective of age', the patients age exerts an independent influence on treatment recommendations and 2) there appears to be instances of underlying and covert older age bias, assumptions, and stereotypes amongst many breast cancer health care professionals.



## This Study and Your Role

The projects next step is to conduct a series of interviews with breast cancer health care professionals to gain insight into the reasons behind different treatment recommendations for older women with breast cancer and hopefully reduce unwanted variation. This would involve a half an hour live video chat with some of the breast cancer health care professionals that took part in our previous study. During which, they would go through six hypothetical older breast cancer patient scenarios and recommend a treatment for each of them, explaining their reasoning and decision-making processes throughout. Half of the scenarios will be done in conjunction with a decision aid tool which predicts survival benefits of different treatment choices according to patient age, comorbidity, frailty, tumour stage, and ER status. The Age Gap tool differs from existing web based algorithms for breast cancer treatment (such as Predict or [Adjuvant!Online](#)), designed and optimised to guide clinicians in their treatment of older women, permitting frailty and comorbidity to be specified and offering predictions for PET or surgery/AET choices. Surgeons, oncologists, and other cancer health care professionals are often not experienced in the care of older people and associated risks that come with older age, such as multiple morbidities, polypharmacy, frailty, and cognitive understanding. The use of the Bridging the Age Gap feedback tool hopes to reduce age variation in clinicians' treatment decisions.

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Appendix E. Interview script.

Description	Script	On screen
Greetings and introductions	Introduces self and thank participant for attending.	Webcam
	Asks participant's name and job title	
Study purpose and consent	This research hopes to better understand and improve the treatment of older women with breast cancer.	Share screen-information sheet
	This study aims to better understand the reasoning behind healthcare professional's decision-making for recommending treatments to breast cancer patients.	
	It should take up to 30 minutes, during which I will go through six hypothetical breast cancer patient scenarios and ask you to recommend a treatment for each of them, explaining your reasoning as you go as much as possible.	
	You may stop at any time.	
	Are you happy to begin?	
Scenario One	I'm going to read through a hypothetical patient scenario and then ask you to recommend a treatment for them. It would be very helpful if you try to explain your reasoning as you go.	Share screen-scenario information details
	Read scenario aloud	Share screen-scenario one
	Elizabeth, aged 83 years old, has been diagnosed with breast cancer after her carer noticed a lump in her right breast. She has a small (20 mm) tumour which has not spread to regional lymph nodes and there are no distant metastases. The cancer is ER+ and HER2-. She moved in with her daughter's family since she was diagnosed with dementia 5 years ago. However, in the past year her dementia has progressed and she now requires full time care including assistance with walking, dressing and eating and she now lives in a care home. She has no other major health problems.	
	Asks participant would you like to recommend primary endocrine therapy, surgery, or offer the patient a choice.	
	Please explain your choice (if they haven't already done so)	
Scenario Two	Read scenario aloud	Share screen-scenario two
	Helen has been diagnosed with breast cancer after her husband convinced her to visit the GP for a lump in her breast. She is 72 years old, with moderate dementia and mild arthritis. She lives with her husband who is in good health who manages most	

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	<p>aspects of her care but they also have help daily to provide some assistance with cooking, shopping, washing and dressing. The tumour is 40mm and has spread to the axillary lymph nodes. The cancer is ER+HER2-. Helen has attended</p>	
	<p>the appointment with her husband, and they are both anxious to hear what treatments are available.</p> <p>Please explain your choice (if they haven't already done so)</p> <p>Asks participant would you like to recommend primary endocrine therapy, surgery, or offer the patient a choice</p> <p>Please explain your choice (if they haven't already done so)</p>	
Scenario Three	<p>Reads scenario aloud</p> <p>Alice, 88 years old, contacted her GP after noticing a lump in her breast. She has been diagnosed with ER+HER2- breast cancer. The tumour is 23mm diameter and does not appear to have spread to the axillary lymph nodes. Alice has well controlled type II diabetes but is otherwise fit and well. She lives alone but is visited often by her neighbours and grandson, and meets a friend most days at the local cafe. Her friend has accompanied her and shares that she had had a difficult recovery from surgery a few years ago and doesn't wish the same for Alice. They are both visibly worried and ask what treatment you think is best for Alice. What do you recommend?</p> <p>Asks participant would you like to recommend primary endocrine therapy, surgery, or offer the patient a choice</p> <p>Please explain your choice (if they haven't already done so)</p>	Share screen-scenario three
Introduce Age Gap tool	<p>We'll now do three more hypothetical patient scenarios but in conjunction with a decision aid tool.</p> <p>This is a tool designed to aid decision making specifically for older breast cancer patients.</p> <p>It is similar to tools such as Predict and Adjuvant but is specifically with older patients in mind.</p> <p>Do you use any decision aids in your daily practice?</p>	Webcam

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	<p>*additional prompts:</p> <p>Do you find decision aids useful? (If answers no) Why not?</p> <p>In what way do you use aids? I.e. prior to consultation for your own reference, with a patient to help them understand treatment options?</p>	
	Walk through the features and sections of Age Gap tool to demonstrate data input and the format of the outputs.	Share screen-Age Gap tool
Scenario Four with Age Gap tool	<p>Read scenario aloud.</p> <p>Susan went to her GP after noticing a lump in her left breast. She has been diagnosed with ER+HER2- breast cancer. The imaging shows the tumour is 43mm and has spread to the axillary nodes. Susan is 74 years old and has moderate dementia. Susan also has mild renal impairment. She lives with her son and daughter-in-law and for the past year has required help with washing and dressing and must be accompanied if she leaves the house. Susan has brought her son to her appointment and they would like to know what the treatment options are.</p>	Share screen-scenario four
	Go through each bit of Age Gap tool, filling it in for them, aloud and checking back/ prompting as to whether they agree	Share screen-Age Gap tool
	Calculate results and go through each table with them.	
	Asks participant would you like to recommend primary endocrine therapy, surgery, or offer the patient a choice	Share screen-back to scenario four
	Please explain your choice (if they haven't already done so)	
Scenario Five with Age Gap tool	<p>Read scenario aloud</p> <p>Ann is 81 years old and was recently diagnosed with ER+HER2- breast cancer. Investigations indicate that the tumour is 18mm and there is no involvement of axillary lymph nodes. Ann was diagnosed with dementia 5 years ago and has lived in a care home for the past 9 months as she is unable to get to and from the toilet, dress, or wash independently. She has no other significant comorbidities other than well controlled hypertension. Ann has been accompanied to the appointment by her daughter who is keen to know what the best treatment would be.</p>	Share screen-scenario five
	Go through each bit of Age Gap tool, filling it in for them, aloud and checking back/ prompting as to whether they agree	Share screen-Age Gap tool
	Calculate results and go through each table with them.	

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	<p>Asks participant would you like to recommend primary endocrine therapy, surgery, or offer the patient a choice</p> <p>Please explain your choice (if they haven't already done so)</p>	Share screen-back to scenario five
Scenario Six with Age Gap tool	<p>Read scenario aloud.</p> <p>Grace, aged 86 years, has been referred to your clinic after a recent breast cancer diagnosis. The cancer status is ER+, HER2-, the tumour is 19mm in size and axillary lymph nodes appear normal. Grace lives with her husband and visits her daughter and grandchildren who live nearby on most days. She takes daily medication for long standing and well-controlled epilepsy but is otherwise healthy and active. Grace has read some leaflets detailing different treatment options and is inclined to try tablets but would like your advice as to what would be best for her. What would you recommend?</p>	Share screen-scenario six
	<p>Go through each bit of Age Gap tool, filling it in for them, aloud and checking back/ prompting as to whether they agree</p>	Share screen-Age Gap tool
	<p>Calculate results and go through each table with them.</p>	
	<p>Asks participant would you like to recommend primary endocrine therapy, surgery, or offer the patient a choice</p> <p>Please explain your choice (if they haven't already done so)</p>	Share screen-back to scenario six
Age Gap tool evaluation	<p>How helpful did you find the tool?</p> <p>*additional prompt: Which bits most/ least?</p>	Share screen-Age Gap tool
	<p>Would you be happy to use the tool in practice?</p>	
	<p>If yes, in what way? I.e. prior to consultations as a reference for yourself or with patient to help explain treatments or both</p>	
	<p>Any recommendations for adjustments/ improvements?</p>	
Study debrief	<p>Thank them for taking part</p>	Webcam
	<p>Ask if they have any questions. If yes but unable to answer them, make a note of them and promise that a follow up email will be sent to them.</p>	
	<p>Ask if they'd like a copy of the results once ready (and if yes, verify their contact details)</p>	
	<p>Goodbyes</p>	

**Appendix F. Interview transcript sample**

**Interview P01, on 19<sup>th</sup> February 2021.**

**JM** *I'd like to thank you first for agreeing to do this we really appreciate it. Right so i know you already know me so i'm not gonna go through all of the introductions. What i am gonna do is quickly change the presenting mode and before i do that i'm just gonna check that as we've just said you're happy to be recorded and you're happy to go ahead and you've read the information and the consent form*

**P01** Yes all of that yeah

**JM** *Thank you very much so now you should be able to see the introduction slides*

**P01** Yeah i can

**JM** *Perfect. Let's just go to the overview then so i'm just going to take you through a little bit about what we're planning to do today so this is research is hoping to better understand and improve the treatment of older women with breast cancer. We're aiming to better understand the reasoning behind healthcare professionals' decision making and why they recommend certain treatments to breast cancer patients. Okay so the interview should take between half an hour and 45 minutes and during this time i'll go through six hypothetical breast cancer patient scenarios and i'm going to ask you to recommend a treatment to each of them and we'll sort of discuss and and i'm going to ask you to sort of explain your reasoning as you go as much as possible just to get as much data as we can. So, the scenarios are concerned with the importance that you place on various factors that will influence your treatment options for either surgery or primary endocrine therapy and we're talking about women over the age of 70 with operable breast cancers. I just want to make sure that you know that there's no right or wrong answers this is an opinion sort of study*

**P01** Yeah that's fine yeah cool

**JM** *So the option for surgery may also include operations under general regional or local anaesthetic if that's how you would treat the patient and we also know that covid 19 is having a significant impact on how you might evaluate and treat older patients at the moment so for the purpose of this we're going to imagine that we're in a pre-covid world*

**P01** Yeah that's fine

**JM** *Okay and i also need to tell you that you can stop at any all time so if you're happy we'll crack on*

**P01** Yeah go for it yeah okay so the first scenario is Elizabeth who is aged 83 and has been diagnosed with a grade one breast cancer after her carer noticed a lump in her right breast she has a small 20 millimeter tumor which is not spread to the regional lymph nodes and there are no distant metastases it's er positive her2 negative and she recently moved in with her daughter's family since she was diagnosed with dementia five years ago but in the past year her dementia has progressed and she now requires full-time care including assistance with walking dressing and eating and so she's moved to a care home. She has no other health problems. And so i'm going to ask whether you would recommend primary endocrine therapy, surgery, or offer a choice of treatment to Elizabeth.

**P01** That's tough isn't it. So i think you'd need to make an assessment of her capacity to withhold the information to make a decision for herself. Clearly it's operable so if she wanted to go down that line and was able to understand what we were going to do and then remember that when we saw her back for pre-assessment and things like that she was still able to hold on to that information

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then i think that's very reasonable. But it is an er positive cancer in somebody with fairly significant health problems and leaving her with surgical wounds and things like that would potentially be a challenge if she's really struggling with cognitive function so i think i i'd need to make an assessment really and see her ideally with a carer or member of family in clinic face to face and then talk through with her what she understands of what's happened to her already and then what her thoughts would be and then try and find out a wee bit from her family if she clearly didn't have capacity herself whether she had already expressed thoughts about how she might like to be treated if she did have problems come up because sometimes people have kind of explored that in advance

**JM** *So it sounds to me like you'd be happy offering either treatment, but it would depend more about the patient and the relative's preference and the and the patient really?*

**P01** Yeah so i think even if she doesn't have full capacity (if) she had a strong preference that she didn't like the fact there was a cancer in her breast and we thought that it was reasonable to proceed with surgery and that we could manage to look after her and give her a smooth run through then i think it's reasonable to try and do that for her but i wouldn't be twisting her arm saying we have to operate at all i think primary endocrine treatment is a safe and very reasonable approach to take for her but if she wanted an operation then I would be prepared to talk about it and consider it.

**JM** *Yeah yeah that's good thank you okay. So, the next lady is helen who is 72 years old and has been diagnosed with a grade 2 breast cancer after her husband convinced her to visit the gp because she found a lump in her breast. She's also got moderate dementia with mild arthritis. She lived with her husband who is in good health and manages most aspects of her care, but they also have some daily help to provide assistance with like cooking and shopping and washing. The tumor is 40 millimeters and has spread to her lymph nodes but is negative for metastases. The cancer is er positive, her2 negative and helen has attended the appointment with her husband and they are both anxious to hear what treatments are available and so in this case would you recommend primary therapy, surgery, or offer the patient a choice?*

**P01** Exactly the same so i'd talk to her and assess her capacity and you said she's got moderate dementia, i'm not sure if that's a sort of technical kind of thing but i'm not sure what that means so i'd start from square one and go through things like abbreviated mental test score and see how she did with that and then talk to her about her understanding of what's happened already because it sounds like she's been staged she's had biopsies she's had imaging so she's obviously had a fair bit done and try and find out what she remembered about all of that and what her thoughts were. It would also depend a little bit on things like the size of her breast, because 40 millimetres is a reasonably large cancer we would be thinking about offering her an axillary node clearance if she did want to have surgery but realistically an axillary clearance probably isn't going to have a massive impact on her survival so you could perhaps make an argument for essentially like a operation where you removed the cancer either as a mastectomy or a lumpectomy wide local if that seemed reasonable with a breast volume and leave her exhale alone and give her endocrine treatment following that. I think i'd want to talk to her and see what her thoughts were, see what her thoughts about having more invasive surgery and also see a little bit about what her husband's thoughts were and whether she had explored any of this in advance with him and when we talked about things like advanced directives for these dementia ladies but sometimes obviously if that's in place and that can be useful. She apparently requires help washing and dressing which suggests that she's really quite frail perhaps something like that that makes me have fairly significant concerns about how

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she's going to cope with the trauma of something like a mastectomy or an auxiliary node clearance they're relatively morbid operations for somebody who goes into it with that level of function. It would hopefully be an option to consider primary endocrine if it looked like the impact of surgery was going to be very difficult to manage in terms of quality of life and function thereafter. I think it depends a bit on how her dementia is progressing it sounds like it's not great but it's sort of a variable feast isn't it some people with dementia will have a really very limited life expectancy and i think if they're deteriorating fairly rapidly i wouldn't be in a hurry to persuade them to undergo surgery in the last few months of life whereas if it's relatively stable disease then i think that's a very different situation.

**JM** *That's really helpful. okay we'll move on to alice who is 88 years old and contacted her gp after noticing a lump in her breast and she again has got er positive her2 negative grade one breast cancer which is 23 millimeters and doesn't appear to have spread to the lymph nodes. She's got well-controlled type 2 diabetes but is otherwise fit and well. She lives alone and is visited often by her neighbors and grandson and meets a friend most days at the local café, obviously pre-covid. Her friend has accompanied her and shares that she had a difficult recovery from surgery a few years ago and doesn't wish the same for Alice. They're both visibly worried and asked what treatment you think is best for Alice. Would you recommend primary endocrine therapy, surgery, or offer a choice?*

**P01** So alice is 88 but actually sounds like she's very well for 88 with really good function and she's independent and she's got well-controlled type 2 diabetes so i see no contraindication to surgery and we know that outcomes are better with surgery, albeit we're talking about outcomes in terms of prognosis and survival, somebody who's 88 you need to bear in mind the impact of surgery and it is likely that she's going to have some impact on her because surgery gets harder to recover from as you get older but the conversation i would usually have with someone like alice is that breast surgery is generally well tolerated and whilst you do get some local effects most people do get back to relatively normal function relatively quickly and that might be a different type of operation that your friend might have had so i wouldn't completely rule it out and then i think i would usually talk a bit about the the way that primary endocrine treatment can be very effective but sometimes can stop being effective in the future and we can end up in a situation where we have to think about surgery because we have no other options when the cancer is perhaps more advanced or the patient's age has increased so that they do have more physical health concerns so i think if there's a window for opportunity in somebody who is slightly older but otherwise well i would usually say that ordinarily I would recommend surgery but if they didn't want to have surgery then there is another option which is to use primary endocrine treatment but i wouldn't be twisting her arm either way i try and give her a bit of a balanced idea about the pros and cons of both of them. my gut feeling is that it sounds like surgery would be very reasonable for her i guess if she pushed me that would be what i would say.

**JM** *They often ask you what would you do doctor*

**P01** You'd probably say well i think surgery is a gold standard treatment for breast cancer as combined with hormone tablets afterwards is likely to give her the best outcome in terms of getting rid of it and keeping it away so that hopefully her the rest of her life remains either cancer-free or essentially cancer-free but that does come with the impact of surgery the likelihood is she probably wouldn't need to have radiotherapy so we could do something relatively minimal depending on her views of general anaesthetic, again it's feasible that she could have something either regional or under a local block. i would give her all the information and try and encourage her to weigh it up

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and potentially bring her back with a different friend in a week's time and see whether she'll be different thoughts

**JM** *Is her age entering into your decision making here?*

**P01** Not hugely the only thing that i suppose i'm mindful of and it's slightly bleak i suppose but is how long do i think this lady's got left and how much of an impact is surgery going to have on that time so she could potentially have another 10 years i would like to think she would make a full recovery perhaps three to six months after surgery which is longer than i would expect for someone in their 50s but I think that's probably more realistic so i think she stands to benefit from surgery potentially but then you never know what's around the corner so again i think it's hard. her age is just a number biologically i think she's probably younger than some of the previous ladies we've discussed

**JM** *Yeah yeah that's great thank you. Right so i'm going to stop here with the scenarios just for a second because we're going to go through three more hypothetical patient scenarios but in conjunction with a decision aid tool. Now i'm sure that you'll have seen the bridging the Age Gap decision tool. It was part of the Age Gap study that was nihr funded and it was designed to optimize the management of old women with breast cancer.*

**P01** I don't use it routinely but i've seen it. I try and then use judgment and discussion as opposed to the actual bold numbers.

**JM** *Yeah i agree. So, let's go on to our next three patients then. So susan has got an er positive her2 negative grade two breast cancer that's 43 millimeters with positive auxiliary nodes and she's 74 and we've said moderate dementia and mild renal impairment. She lives with her son and daughter-in-law and for the past year has required help with washing and dressing and must be accompanied if she leaves the house, we're assuming this is because of the dementia. Susan has brought his son to the appointment, and they would like to know what the treatment options are. This is susan's Age Gap outcome just for your information to see whether or not you find it helpful, or whether it you know makes a difference as to what you might recommend. So, this is at two years, we've got a difference there of if she has surgery, we're saying 86 out of a hundred women would be alive at two years and 79 out of 100 at two years if they were treated with endocrine therapy.*

**P01** It still doesn't really make much difference to me so i'd go through the same chat as i have with the last one trying to assess their capacity and their understanding their views and thoughts about surgery thoughts about taking tablets thoughts about future problems and try and work out what sounded like it was going to be right for her. 74, she's relatively young but she's obviously got problems and i guess it's trying to work out what her thoughts are if she is able to articulate them and kind of make that weigh things up, and if she isn't then whether she's expressed preferences already and if she hasn't then i guess we need to talk to her son and see what their thoughts are as well. you said she's got a positive axilla and 43 millimetre cancer so there is an option of doing something like a mastectomy in the auxiliary clearance or just a mastectomy or if she's got relatively large breast volume then even a lumpectomy, you could potentially do a lumpectomy and a chest

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wall and auxiliary radiotherapy if she was somebody who is going to be able to manage and comply with the radiotherapy requirements for positioning and things like that. I would have slightly more reservation about putting somebody with a large positive auxiliary tumour on tablets and expecting them to do well out of that which is i guess why i want to assess her generally medically and see what kind of crude feeling i have for how long i think she's likely to benefit from surgery if at all and if it doesn't look like she's going to benefit from surgery then i think it would be reasonable to think about putting on endocrine and see how she gets on i wouldn't feel comfortable with either option i think she's in a difficult situation

**JM** *Right let's go to ann who is 81, her2 negative, grade one, 18 millimeters, node negative and she's been in a care home for nine months, can't get to or from the toilet, dress, or wash independently*

**P01** So it sounds like she's deteriorated over the last year perhaps fairly significantly. I think i would probably be nudging her in the direction of primary endocrine treatment.

**JM** *If you can see her yellow block here, they're very similar actually. That's how five years other cause. Survival is the yellow box there.*

**P01** Yeah yeah kind of what i'd expect it to look like really [the Age Gap data]. I think if she felt strongly that she wanted to have the cancer removed again we could talk about it and explore how she was going to cope with the trauma of being in hospital and surgery and wounds and things like that and that is an option i wouldn't say that there's a correct option just one that i think might be more appropriate for her, but that's quite paternalistic.

**JM** *That's fine. So, Grace is 86 has been referred to clinic after breast cancer diagnosis with a grade 1 er positive her2 negative, 19 millimeter tumor, no lymph nodes. She lives with her husband and visits her daughter and grandchildren who live nearby on most days. She takes medication for long-standing and well-controlled epilepsy but is otherwise healthy and active. Grace has read some leaflets detailing different treatment options and she's inclined to try tablets but would like your advice as to what would be best for her and i'm just going to pop down to her, that's her five-year survival.*

**P01** She's again really fit and active sounding 86 year old so i think that she has a choice. the graphs do show quite nicely that the risk of her dying of breast cancer is slightly less if she has surgery but if she felt strongly that she didn't want to have an operation she wanted to have tablets i think that's entirely reasonable with the caveat that we need to keep a close eye on things and if they did change that we we might end up having to think about surgery later on and just explore that option with her whether she felt that if she needed to have surgery she would rather have done it now and how she'd potentially feel would she feel like she'd made the right decision within three years time when things perhaps weren't quite as easy for her she needed an operation it's difficult isn't it because it's all very hypothetical but i think either option is very reasonable and i would give her a choice.

**JM** *That was brilliant Emma, thank you. I'm just going to stop the recording now.*

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### Interview P09, on 5<sup>th</sup> April 2021.

**RK** *So i'll summarize it but essentially what this research is aiming to do is to improve understanding of the factors influencing variations in treatment of breast cancer patients specifically looking at improving the care and experiences for older women. Previous studies have shown that older age is a factor in treatment variations. Sometimes these are appropriate but often they're not based on any evidence. Early phases of this study have highlighted actions which may reduce age-related variations: prioritizing shared decision-making, recognizing different treatment preferences, and empowering patients. So what this study looks to do is to work with breast cancer health care professionals such as yourself to understand how actions to improve decision making for breast cancer patients can be implemented and embedded. What we'll do is we'll go through six hypothetical breast cancer patient scenarios and i want you to recommend a treatment for each of them explaining your rationale as you go along. We're primarily concerned with the importance you place on various factors influencing your preferred option for surgery or primary endocrine therapy or a choice, in which case you'd be happy with either. There are no right or wrong answers. All of the women in this study are over 70, they're all er positive her2 negative, and for the purpose of this study they're all er eight out of eight. It's a pre-covid world so don't factor covid into your thinking.*

*Brilliant okay so the first patient is Susan. Susan went to her GP after noticing a lump in her left breast. She has been diagnosed with ER+and HER2- breast cancer. The imaging shows the tumour is 43mms and has spread to the axillary nodes. Susan is 84 years old and has moderate dementia. Susan also has mild renal impairment. She lives with her son and daughter-in-law and for the past year has required help with washing and dressing and must be accompanied if she leaves the house. Susan has brought her son to her appointment and they would like to know what the treatment options are. Which treatment would you prefer Susan has, surgery, primary Endocrine Therapy, or prefer options equally?*

**P09** Okay i mean basically i always offer the patient a choice yes. That's the answer for all patients. Now the problem with the choice is how do you get the patients to do what you actually want them to do. It is false pretenses whereby you know you're just saying it for the sake of saying it but at the end of the day they do what you want them to do. That's my job as a salesman, selling. But my thinking is yes, we always say give the patient a choice but, in all fairness, they get what we want them to get. So, patient i think surgery would be best for her because the disease is already quite locally aggressive because the axilla size 43. Preferably a mastectomy with auxiliary clear so that she does not need to have any radiotherapy and put her on anti estrogens and hopefully that would be it

**RK** *So you'd be recommending surgery for her based on the tumor biology mostly. Okay fantastic next up is Ann. Ann is 78 years old and was recently diagnosed with a 42mm, node positive, grade II breast cancer. Ann has long-standing stable disability and requires full-time care since her involvement in a car accident in her 50s. She has restricted mobility and expressive dysphasia. Ann has been accompanied to the appointment by her daughter and they are keen to know what the right treatment would be. Which treatment would you prefer Ann has, Surgery, Primary Endocrine Therapy, or prefer options equally?*

**P09** So what i would normally do is put her on primary endocrine therapy send it to the generative clinic for optimization and then operate okay so my preferable treatment will be surgery after optimization

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**RK** *Okay that's interesting so if the geriatricians send her back to your clinic and they say look she's on a very low dose of ramaxin for high blood pressure for example there's nothing more that we can do she's the best that she's gonna be then with the same clinical scenario you'd offer surgery?*

**P09** Yes

**RK** *Okay what's your reasoning for surgery?*

**P09** Because what i do not want this being a grade one is in two three four four years, she's still alive here coming with a locally advanced tumour and then you know resistant to endocrine treatment and then we're stuck again with the same scenario of needing to operate then. so i want to do it now when it's easy and quick for her rather than in three four years time when she's fully resistant has gone through all the endocrine options and i've got no option other than surgery if she does long enough and she might do okay. the question to ask me ross is whether I would do a central node on her or not.

**RK** *Would you do the central node on her or not?*

**P09** If you follow protocol you know you would but i've had cases whereby after mdm discussion I made the case for them not to have sent in the node as the chances of it being positive is extremely low less than three % with grade one eighty millimeters and um even if it is positive it's not going to change our management of us giving her endocrine treatment and we're not going to give her radiotherapy so doing the same thing i know just to tick all the boxes in my opinion is not necessarily the case for all patients but that's not probably the subject of this study is it

**RK** *So you would offer her surgery based on the fact that it's small and operable now and you don't want to get into a situation further down the line where it's inoperable and resistance to endocrine options?*

**P09** Surgery at this point in time is actually curative for her isn't it when you think about it yes and whenever she's compliant with medication or not doesn't really matter that much so that's the reason the main reason why

**RK** *Ok. Next patient is Grace. Grace is 86. She has been referred to your clinic after a recent breast cancer diagnosis. The cancer status is ER+ and HER2-, the tumour is 19mms in size and axillary lymph nodes appear normal. Grace lives with her husband and visits her daughter and grandchildren who live nearby on most days. She takes daily medication for long standing and well-controlled epilepsy but is otherwise healthy and active. Grace has read some leaflets detailing different treatment options and is inclined to try tablets but would like your advice as to what would be best for her. Which treatment would you prefer Grace has, surgery, PET, or give Grace a choice?*

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- P09** I mean as i said we always offer a choice and I'm just going to say the same as before where i give a primary endocrine subject to toleration for the medication and again it gets hard to be seen in the combined geriatric clinic but from my point of view I'll put it on the medication see how she's tolerant on it with the option of operating sooner rather than later.
- RK** *So the primary endocrine therapy is a bridging tactic and in this case you would your primary treatment would still be surgery?*
- P09** Ultimately ultimately yeah okay
- RK** *What's your rationale for that as opposed to just leaving her on primary endocrine therapy for example?*
- P09** Again you know by the time she needs an operation should be in her 90s and you don't want to operate on her when she's medically more unfit than she is now so this is again a fully treatable small tumor so might as well get on with it rather than operate on her later when she's more afraid
- RK** *Fair enough. Okay good so the next three questions we'll use the Age Gap tool. Have you have you heard of the Age Gap tool, or do you use it in your clinical practice at all?*
- P09** I've heard of it, i haven't used it.
- RK** *Okay good so I'll just give a bit of background then to the Age Gap tool. It was developed by prof and the team at Sheffield, and they looked at data from 2002 to 2012 from the national cancer registry and they created an algorithm based on a bit of patient characteristics, a bit of tumour biology, and then also a frailty score and they use these factors. So, if I just click on a few, dementia, and let's say heart failure, and let's say she needs a bit of help getting dressed and a bit of difficulty walking. Then if you click generate outcomes it gives you data based on their survival with surgery versus primary endocrine therapy alone.*
- P09** This tool is a good tool to use for the surgeon or the combined clinic. It's a shame that you probably can't share it with many of the patients that actually need it because they're probably demented or maybe they can't see they forgot their glasses so you can't actually probably use it as a as a mode of discussion with them. Because many of these patients cannot really recognize what the bar chart is. Maybe I'm being ageist I don't know. It's not nice to show an 83 year old their chances of dying within a year is 80 %. I don't think that's nice to show her either. It's like when you use the adjuvant! Online isn't it. We use it in good prognosis tumours, but you don't show it to the bad prognosis because otherwise they're going to commit suicide or something.
- RK** *Okay fine so the next three scenarios will be the same layout but what I'll do is after reading the scenario I'll show you the Age Gap data and see if that changes or helps with your decision making at all. So, the next one is Elizabeth. Elizabeth is 77 years old. She's been diagnosed with grade II breast cancer after her carer noticed a lump in her right breast. She has a 43mm tumour which has spread to regional lymph nodes. Elizabeth suffered a stroke two decades ago and has since been*

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*wheelchair bound, requiring full time care including assistance with washing and dressing. She has no other major health problems. Would you recommend Elizabeth has surgery, PET, or prefer options equally?*

**P09** *Now again giving her a choice with the dementia i think that you're fooling around there aren't you. So i will start her on primary endocrine. See whether she's tolerating it or not. Again get a medical assessment on her and then an aesthetic assessment and again surgery is the preferable treatment from my point of view but I will start on primary endocrine so i don't have to worry about timelines and things*

**RK** *Okay so let's say she's tolerating it well, the anaesthetists say that she's certainly fit for an operation and she comes back to see you in clinic in three months time?*

**P09** *Essentially again I'll go through the discussion with the family and check the drug chart. If she's coming from a nursing home to check on compliance. If it looks all good I'll keep an eye on her and review her again six months later to see how she is*

**RK** *Has the Age Gap two data there helped you make that decision?*

**P09** *Not really you know using %ages which is not statistically correct to do and i know it's easy to understand but from a statistical point of view it's not going to be much different isn't it*

**RK** *So seven % at two years and 14 at five years.*

**P09** *Yeah yeah*

**RK** *Okay next scenario is Helen who has been diagnosed with breast cancer after her husband convinced her to visit the GP for a lump in her breast. She is 82 years old, with moderate dementia and mild arthritis. She lives with her husband who is in good health who manages most aspects of her care, but they also have help daily to provide some assistance with cooking, shopping, washing, and dressing. The tumour is 40mm and has spread to the axillary lymph nodes. The cancer is ER+ and HER2-. Helen has attended the appointment with her husband, and they are both anxious to hear what treatments are available. Which treatment would you prefer Helen has, PET, surgery, or offer her a choice? And just to show you the Age Gap data so in this scenario surgery 75 survival versus 70 at two years. At five years surgery 43 survival versus 36 survival with primary endocrine therapy. So, seven % difference at five years, five % difference at two years.*

**P09** *Do they tell you the life expectancy of the patient as such?*

**RK** *This is the life expectancy based off surgery versus pills only*

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**P09** Yeah but they don't have the life expectancy in the higher age group, but the medical aim is if going to live in 10 years or something today. What's important here which i look into is the death from other causes at two years. From my point of view the patient is going to be alive in one or two years that my option is always surgery okay so with this lady i said domestic deterioration, relies on her aging husband. I would offer her surgery yes as it's basically easier to manage now for her and her husband rather than, and she's only 72 that's not the grand old age at all no compared to the other patients in their 80s. So, this lady definitely surgery.

**RK** *Fantastic. Okay last one. Alice is 88 years old. She contacted her GP after noticing a lump in her breast. She has been diagnosed with ER+ and HER2- breast cancer. The tumour is 23mms diameter and does not appear to have spread to the axillary lymph nodes. Alice has well controlled type II diabetes but is otherwise fit and well. She lives alone but is visited often by her neighbours and grandson and meets a friend most days at the local cafe. Her friend has accompanied her and shares that she had had a difficult recovery from surgery a few years ago and doesn't wish the same for Alice. They are both visibly worried and ask what treatment you think is best for Alice. What would you recommend for Alice and why?*

**P09** *That's definitely i think this is the only patient from the ones you've mentioned that she actually is competent mentally isn't she. Yes, this lady doesn't have dementia so i can actually discuss with that to give her a choice. Yeah, of these six because she's the one who can actually you know see what she thinks. Yes, and then I'll lay it out for her. So, this is the only one of all those that actually will involve her with her choice. Yes, I'm not scaring her off surgery, but I think the Age Gap data might be useful in this situation as you can basically understand it compared to the others. So, I will give her a choice. We'll start her on primary endocrine until she makes a decision so she won't be pressurized by time and then yes i think i'll operate because if she lives alone it will be a problem if she has uncontrolled tumours in two three years time so yes choice would be first.*

**RK** *So you'll be equally happy if she chooses primary endocrine therapy or surgery?*

**P09** So i will still put her on primary endocrine when she needs the clinic so that i can get an anaesthetic review

**RK** *Did you find the Age Gap data helpful?*

**P09** I think for this one probably yes for me and because i can show it to her and if she's fully with it i can discuss it a bit easier so it will be an aid to discussion with the patient if she's fully aware enough yes looking at it and then understanding it but might need explaining it

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### Appendix G. Themes identified

Main theme	Sub themes
Patient voice	1. Finding out what the patients wants
	2. Offering the patient a choice
	3. Unable to offer the patient a choice
	4. Helping the patient make an informed decision
Patient age	5. Patient is relatively young
	6. Patient is relatively old
	7. Age should be irrelevant
	8. Assumptions about patient based on age
	9. Patient doing well for their age
	10. Don't delay surgery
Treatment risks and benefits	11. Treatment efficacy
	12. Patient can cope with treatment
	13. Concerns about patient coping with treatment
	14. Quality of life
Patient characteristics	15. Dementia needs to be considered
	16. Patient has poor functional status
	17. Tumour biology

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Appendix H. The Age Gap intervention, interview analysis matrix

Phase one interviews, Scenarios A, B1, and C

Recommended primary endocrine therapy
Recommended surgery
No clear preference

Theme	Pps	Scenario A		Scenario B1		Scenario C		General comments
		No tool	Tool	No tool	Tool	No tool	Tool	
<b>PATIENT VOICE</b>								
Finding out what patient wants	P1	Clearly it's operable, so if she wanted to go down that line and was able to understand what we were going to do and then remember that when we saw her back for pre-assessment and things like that she was still able to hold on to that information then i think that's very reasonable.  Talk through	If she felt strongly that she wanted to have the cancer removed again we could talk about it and explore how she was going to cope.	Try and find out what [...] her thoughts were.  I think i'd want to talk to her and see what her thoughts were about having more invasive surgery and also see a little bit about what her husband's thoughts were and whether she had explored any of this in advance with him. When we talked about things like advanced directives for	Go through the same chat to assess [...] their views and thoughts about surgery, thoughts about taking tablets, thoughts about future problems and try and work out what sounded like it was going to be right for her.  It's trying to work out what her thoughts are, if she is able to articulate them, and [...] weigh things up, and if	We could do something relatively minimal depending on her views of general anaesthetic.	The risk of her dying of breast cancer is slightly less if she has surgery, but if she felt strongly that she didn't want to have an operation she wanted to have tablets (then) i think that's entirely reasonable.	Try and see what patients want and even if they want something where the outcome perhaps isn't as good as long as they appreciate what their decision means for them then i'm generally happy to support that. I don't answer that 'what would you do doctor' question very quickly and these ladies, especially the 80 odd year

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	<p>with her [...] what her thoughts would be and then try and find out a wee bit from her family, if she [...] clearly didn't have capacity herself, whether she had already expressed thoughts about how she might like to be treated if she did have problems come up because sometimes people have kind of explored that in advance.</p> <p>Even if she doesn't have full capacity, [if] she had a strong preference that she didn't like the fact there</p>		<p>these dementia ladies but sometimes obviously if that's in place that can be useful. <i>(P1, Female, consultant oncoplastic breast surgeon. Leeds teaching hospital)</i></p>	<p>she isn't (able to articulate her thoughts) then whether she's expressed preferences already, and if she hasn't then i guess we need to talk to her son and see what their thoughts are as well.</p>			<p>olds, for a lot of them it doesn't really matter what we do to their breast cancer because actually they're more likely to die with their cancer than of it anyway but then you're living with cancer which for some people is really distracting so i think that there's definitely a role for surgery irrespective of age it's just whether that's the right thing for that person</p>
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		was a cancer in her breast and we thought that it was reasonable to proceed with surgery [...] then I think it's reasonable to try and do that for her. (						
	P2						She's already talking about having pills so if that's something she knows about already and she already wants to have that i don't think it's unreasonable to offer her that.	
	P5					i would have thought that surgery would be the preferred option but endocrine therapy is an option. If alice is fit at 88 she's likely to want to survive.		

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<p><b>P6</b></p>			<p>obviously it would be a conversation I have with helen and her husband about what she wants</p>	<p>surgery in the first instance that's what i recommend but obviously it's a discussion that you would have with her</p>	<p>It would really come down to what she prefers you can equally manage it with endocrine therapy or you can manage it with surgery and it would be a conversation with her. it's hormone sensitive she raises some anxieties about her recovery from surgery so she doesn't want to have surgery and endocrine therapy would be a valid alternative</p>		
<p><b>P7</b></p>	<p>unfortunately it's likely that her dementia means that she wouldn't retain the information but i would assess that on the day and try my best to discuss it with her yeah so if her mental</p>		<p>i would discuss with them again what their thoughts were and had they any clear previous ideas about what they wanted to happen</p>				

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	health means she couldn't be part of a choice i would ask her family whether she expressed any previous desires wishes in those circumstances and with someone if they've lived with you for five years you've probably had some careful thoughts about what you felt was in their best interest						
<b>P9</b>						of these six because she's the one who can actually you know see what she thinks	
<b>P10</b>			would be thinking of surgery but i would discuss it with her and her family			so i would talk to her about what she preferred and i wouldn't really have a strong opinion in her	

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				i would not be at all keen on primary endocrine therapy but i would discuss it with her and her family			case I would just sort of ask her what she thought I would be happy with either	
Offering patient a choice	<b>P1</b>	You'd need to make an assessment of her capacity to withhold the information to make a decision for herself  Primary endocrine treatment is a safe and very reasonable approach to take for her but if she wanted an operation then i would be prepared to talk about it and consider it.						
	<b>P2</b>			I mean i think it's				

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			always important to offer a choice but i think we'd recommend surgery for her.			
<b>P3</b>			Ofcourse you give the patient choice, but I think personally i'd be very hesitant to offer primary endocrine therapy.			
<b>P4</b>					<p>I'd offer a choice [...], i think you need to offer everyone a choice</p> <p>I would talk to her about her fears [...] in terms of her friend [...].If she's really not keen because she's got fears because of her friend and everything you talk about endocrine but [...]</p>	

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					i'd be veering towards surgery. {...} I wouldn't mention primary endocrine unless she's really adamant she didn't want it (surgery).		
P5				I would go along with her choice primarily on the understanding that if she doesn't get on with it she comes back for surgery.	I would offer her surgery but tell her the primary endocrine therapy is available and this is one i think i really would give her the option.  That would be a true patient choice.  i'd be quite equivocal about which of these will be better for her	offer a choice.  you can go either way with in terms of what you can offer her yeah so i would offer a choice	
P6					i give her a choice purely offer a choice		
P7			her dementia isn't so significant that she couldn't be			I respect her voice her choice i do always think	

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			<p>part of that discussion so i would offer her a choice but I think surgery is an option for her</p> <p>i would offer her surgery as my recommendation but i would be very clear that it was a choice</p>			<p>patients make good choices they tend to know themselves very well</p>	
<b>P8</b>					<p>i would offer alice a choice okay i would not over emphasize one over the other</p>	<p>i would offer a choice</p>	
<b>P9</b>						<p>i think this is the only patient from the ones you've mentioned that she actually is competent mentally isn't she yes this lady doesn't have dementia no there's no evidence of dementia so i can actually discuss with that to give her</p>	

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						a choice  this is the only one of all those that actually will involve her with her choice.	
	<b>P10</b>					i would be inclined to steer towards surgery but i would discuss a choice  well i think this is one where I would generally offer her a choice because I wouldn't really have a strong preference either way	
	<b>P12</b>		My emotional response is just have the tablets but my brain is telling me i've got to offer a choice because there's just enough of a difference there				
Unable to offer patient a choice	<b>P4</b>	If she's got dementia and it's significant then i think offering her choice is going to be difficult because i'm		I don't have the choice the reason being is that with a four centimetre, node positive tumour her prognosis is			

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		not sure if she'd retain or understand the choice		significantly worse without surgery than with secretary				
	<b>P5</b>	nearly all the others have got dementia so it's not reasonable to give them a choice	nearly all the others have got dementia so it's not reasonable to give them a choice	nearly all the others have got dementia so it's not reasonable to give them a choice	nearly all the others have got dementia so it's not reasonable to give them a choice			
	<b>P6</b>	it would appear that giving her a choice may not be an option because she's got dementia						
	<b>P7</b>	In this case a choice because unfortunately it's likely that her dementia means that she wouldn't retain the information but i would assess that on the day and try my best to discuss it with her if her mental health means she couldn't be						

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	<p>part of a choice i would ask her family whether she expressed any previous desires wishes in those circumstances and with someone if they've lived with you for five years you've probably had some careful thoughts about what you felt was in their best interest</p>						
P9		<p>again giving her a choice with the dementia i think that you're fooling around there aren't you</p>	<p>basically i always offer the patient a choice yes um and that's the answer for all patients now the problem with the choice is how do you get the patients to do what you actually want them to do, the idea of giving the patient a choice</p>				<p>it's a shame that you probably can't share it with many of the patients that actually need it because they're probably demented or maybe they can't see they forgot their glasses so you can't actually probably use it</p>

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			is false pretences whereby you know you're just saying it for the sake of saying it but at the end of the day they do what you want them to do that's my job as a salesman selling but my thinking is yes we always say give the patient a choice but in all fairness they get what we want them to get				as as a mode of discussion with them because many of these patients cannot really recognize what the bar chart is maybe i'm being ageist i don't know	
	<b>P11</b>	we can't offer a choice i would still go with any primary endocrine therapy	i don't think susan would have the mental capacity to understand the choice so yeah primary endocrine therapy would be my choice for this					
Helping patient make an informed decision	<b>P1</b>					I would usually say that ordinarily I would recommend surgery but if	If they did change (stops responding to PET) that we might end up	I find discussing mortality with patients the first time i meet them quite

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						<p>they didn't want to have surgery then there is another option, which is to use primary endocrine treatment. But i wouldn't be twisting her arm either way, i try and give her a bit of a balanced idea about the pros and cons of both of them.</p> <p>I would give her all the information and try and encourage her to kind of weigh it up.</p>	<p>having to think about surgery later on and explore that option with her whether she felt that if she needed to have surgery she would rather have done it now and how she'd potentially feel would she feel like she'd made the right decision within three years time when things perhaps weren't quite as easy for her if she needed an operation</p>	<p>shocking and i know we're telling them they've got cancer and for most people that does automatically link to a little box that says i'm going to die of this i spend quite a lot of time trying to persuade them that might not be the case and actually a lot of what we do is generally curative or at least very close to</p>
	<b>P2</b>						<p>I can only give her the information but it's an informed choice, isn't it.</p>	
	<b>P5</b>			<p>i'd encourage her to choose surgery but i think it is very</p>	<p>i would explain that both treatments were available</p>			

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			important that she and her husband know that primary endocrine is a good option {instead of) surgery.	(but) i would encourage Helen to consider surgery.			
<b>P6</b>						she's keen to find out the options and so you would discuss the options in either way and in that circumstance you may use your Age Gap tool to facilitate the discussion because she's keen to know what the options	
<b>P7</b>					whilst hormones might be okay for a while sometimes i find for these patients if you put them on hormone therapy just while they get to know you because	i'd want her to be clear that she understood exactly what those values were and that we could make it as safe as possible and again when you	

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					often they are just so frightened that when they've got to know you and you've had a few conversations with them and sometimes they do work for surgery, yeah i sometimes it's nice to give them chance to think	tell them that it's day case they suddenly say oh it's not such a big deal and yes i think i could manage that	
<b>P8</b>					if she doesn't want the surgery after we've discussed the possible complications then she can have primary endocrine therapy	so i will discuss both with her and help her to make up her mind	
<b>P9</b>						i'm not scaring her off surgery but i think the Age Gap data might be useful in this situation as she can basically understand it compared to the others yeah	

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						so i will give her a choice we'll start her on primary endocrine until she makes a decision so she won't be pressurized by time	
<b>P10</b>						happy i think the thing with the Age Gaps tool is if i was offering somebody a choice I would use the tool to show her the outcomes um and i would say well okay there's not a huge difference in life expectancy but there is some so there's an advantage to having surgery yes but there's also possibility that you may get away without and so	

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						<p>i think the Age Gap tool to me comes in in those cases where you've really got you know you can't kind of sitting on the fence with this and you want the woman to make an informed decision herself for some of the scenarios you've shown me i would be inclined to either strongly offer surgery or strongly not offer surgery yes um i think for this lady i would be fairly easy with either option but i would want her to make an informed choice and so i would use the Age Gap tool to</p>	
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						show her what the outcomes are likely to be and i think that will help her to make a better quality decision i would be happy to operate on her if that was her decision but you know there are some risks morbidities associated with surgery in her age group and so i think it's helpful in informing her choice	
	<b>P12</b>		The difference in survival with surgery is enough that I think you have to share that information with the patient				
<b>PATIENT AGE</b>							
Patient is relatively young	<b>P1</b>				74 she's relatively young but she's obviously got		

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				problems			
<b>P3</b>				She's only 74 yeah 74 , 43 millimetres, i'll be more inclined to offer surgery because when you look at the five years (survival difference between PET and surgery) that gap does widen out and she's only 74 years old			
<b>P8</b>			would actually offer helen surgery because she's got lymph node disease and she's also 72 [...] because she's 72 she's not as old if she was over 80 and has other medical conditions then that would sway me towards endocrine but in				

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			this case i would offer her surgery				
	<b>P9</b>			she's only 72 that's not the grand old age at all no compared to the other patients in their 80s so this lady definitely surgery definitely surgery			
	<b>P10</b>			this is a 72 year old [...] she's a youngish woman with good health			
Patient is relatively old	<b>P1</b>		so looking at the numbers of survival I would tend to go with surgeries but looking at an old lady in that circumstances i still might want to offer primary endocrine therapy		somebody who's 88 you need to bear in mind i suppose the impact of surgery and it is likely that she's going to have it will have some impact on her because surgery gets harder to recover from as you get older		especially the you know the 80 odd year olds and it i think for a lot of them it doesn't really matter what we do to their breast cancer because actually they're more likely to die with their cancer than of it anyway so yeah

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								but then you're living with cancer which for some people is really distracting so i think that there's definitely a role for surgery irrespective of age it's just whether that's the right thing for that person.
<b>P2</b>		she's 81 and in a care home with poor functional status and it's also the biology of the cancer					She's 86 so i think it's reasonable to offer a choice really.	
<b>P4</b>	i think it's based on her dementia and in small brackets her age					At 86 her chances of living five more years are not brilliant [...] so what you're really asking is would I operate a 86 year old woman with a grade one small breast cancer yes is the answer.	The fact of the matter is that she's unlikely to live for five more years, well not unlikely, but at 86 her chances of living five more years are not brilliant.	If a 90-year-old woman that was sick as a dog then it wouldn't be choice or surgery it would be endocrine treatment
<b>P5</b>						Mortality when		

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					you're 88 is probably at least 50 % of five years		
<b>P6</b>	she's 80 so she's got dementia it's a small cancer it's hormone sensitive her dementia is significant and she lives in a care home yeah so i think all those the combination of all those factors means that surgery would have a significant impact on her recovery and ability to deal with surgery						
<b>P8</b>	because she's over the age of 80 and she's had dementia for five years my primary choice would be endocrine therapy	she's 81 with significant dementia so as far as i'm concerned she probably would do well with the primary endocrine					
<b>P10</b>			she's only 74				

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Patient doing well for their age	P1					She is 88 but actually sounds like she's very well for 88 with really good function and she's independent and she's got well-controlled type 2 diabetes so i see no contraindication to surgery.	she's a really fit and active sounding 86 year old so i think that she has a choice	
	P2						There's no reason why she shouldn't be able to have surgery to be honest, she's done well regardless of her age so i think she could cope with the surgery	
	P3					I'd be more inclined to offer surgery she's 86 but she seems to be quite fit and well		
	P4					If they've lived to 88 and they've gone over that		

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					<p>85, 86 year old threshold it's likely they're going to have another five years</p> <p>She's 88, she's well, she's got a good quality of life, she goes out and sees her friends, she's a fit 88 year old woman.</p>		
<b>P6</b>					<p>although she's 88 she has a reasonable it would appear quality of life she's independent she's fit and well her diabetes is well controlled</p>		
<b>P7</b>					<p>you know if you've gone to 88 and you're in that kind of nick the fact is you might well go on for another five or ten years</p> <p>okay so alice is</p>	<p>this lady is really quite fit for her years but often patients underestimate their likelihood to survive so she's got to this stage and she's</p>	

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					pretty fit for 88 years  if she is fully independent at 88 i would offer her surgery	in good nick and doing all the things she's doing and she is likely to make it to that five years	
						given the fact that she's physiologically good at 86 i would offer a choice	
					having got to 86 she could well survive to a hundred	surgery definitely. again she's likely to live to a hundred	
Age doesn't matter					her age is just a number biologically i think she's probably younger than some of the previous ladies we've discussed.		
			she's got moderate dementia mild arthritis and 72 so i think she'd be well enough to offer surgery that's the gold		It doesn't matter about her age she's well enough to have the operation  Functionally she's excellent isn't she so regardless of		

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			standard we shouldn't discriminate just because of age.		age, you would see people 20 30 years younger than that with far more comorbidities and still probably offer them surgery in some cases so i don't see there's any reason (not to offer surgery).	
<b>P3</b>	I would be more inclined to offer her primary endocrine therapy, it's not because of her age, it's the dementia that's the major concern.					we're getting better treating all the patients surgically so you know the age seems to be less of an issue now and patients are recovering very well you know in their 80s.
<b>P4</b>						what did what did you think of the data that's being shown do you think it's helpful?  oh yeah i think i think it is i think it's helpful for us

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							<p>as surgeons to kind of uh to kind of check our bias.</p> <p>inherently i'm not age bias i know i'm not so i'm very happy to operate on people i'm the only one that does local anesthetic mastectomies in the past because i don't believe that old people who can't have a ga should be excluded.</p>
	<b>P6</b>	Although she's 83 that isn't necessarily a contraindication to surgery					
Assumptions on patient based on age	<b>P1</b>						
	<b>P3</b>					i think we see patients like this in	

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					<p>clinic because of their age they perceive breast cancer surgery to be something more major but i think we always try and reassure them actually it's a day case operation the physical recovery is quite quick.</p>		
P9							<p>it's a shame that you probably can't share it with many of the patients that actually need it because they're probably demented or maybe they can't see they forgot their glasses so you can't actually probably use it as a mode of discussion with them because many of these</p>

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								patients cannot really recognize what the bar chart is maybe i'm being ageist i don't know
	<b>P12</b>							Patients of this generation, and i'm not going to generalize but, are often a bit data averse. They crave the advice of someone they can implicitly trust
<b>TREATMENT RISKS AND BENEFITS</b>								
Could cope with treatment	<b>P1</b>	(If) we thought that it was reasonable to proceed with surgery and that we could manage to look after her and give her a smooth run through then i think it's reasonable to try and do that for her	If she felt strongly that she wanted to have the cancer removed we could talk about it and explore how she was going to cope with the trauma of being in hospital and surgery and wounds and things like that.			the conversation i would usually have with someone like alice is that breast surgery is generally well tolerated and whilst you do get some local effects most people do get back to relatively normal function relatively quickly		

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						<p>but that does come with the impact of surgery the likelihood is she probably wouldn't need to have radiotherapy so we could do something relatively minimal depending on her views of general anaesthetic.</p> <p>I would like to think she would make a full recovery perhaps three to six months after surgery which is longer than i would expect for someone in their 50s but I think that's probably more realistic so i think she stands to benefit from surgery potentially but then you never know what's round the corner</p>		
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P2						There's no reason why she shouldn't be able to have surgery to be honest, she's done well regardless of her age so i think she could cope with the surgery.	
P6			i recommend surgery on the basis that she's got moderate dementia she's independent lives with the husband they both appear to cope well with activities of daily living tumour is a large tumour and there is evidence to spread to her lymph nodes and on that basis i think surgery would be valuable because it would offer local control as	(dementia) isn't necessarily a contraindication to having an operation though moderate dementia is still a reasonable uh consideration in terms of...it's not a contraindication for surgery malware impairment is not a contraindication of surgery yeah and even leaving not leaving the house is not a			

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			well and i think that she would be fit enough based on all those descriptive factors to undergo surgery	contraindication of surgery			
			and it sounds to me like she would actually manage with surgery				
			she's also got a husband who can actually look after her okay fine so she's got a good support network which would help her through the surgery				
					i would be inclined to talk about surgery for her she's fit she's active independent	i mean surgery should be fairly well tolerated by her	
Concerns about coping with treatment	P1	Somebody with fairly significant health problems and leaving her with surgical wounds and		She apparently requires help washing and dressing which suggests that she's really quite frail.		Somebody who's 88 you need to bear in mind i suppose the impact of surgery and it is likely it will have some	

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	<p>things like that would potentially be a challenge if she's really struggling with cognitive function.</p>		<p>Perhaps something like that makes me have fairly significant concerns about how she's going to cope with the trauma of something like a mastectomy or an auxiliary node clearance. They're relatively morbid operations for somebody who goes into it with that level of function.</p> <p>Hopefully (it would) still be an option to consider primary endocrine if it looked like the impact of surgery was going to be very difficult to manage in terms of quality of life and function</p>		<p>impact on her because surgery gets harder to recover from as you get older</p>		
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			thereafter.				
P2	<p>If she's got progressive dementia um and she needs full-time care now i don't know how well she'd cope with surgery even just the right local religion and i think i favour offering her primary endocrine therapy [...] she probably wouldn't tolerate radiotherapy either so you could say that if she wants to have an operation she'd probably need to have a mastectomy</p> <p>If she gets any complications from her surgery how is</p>			<p>If she needs help washing and dressing and she's probably only going to get worse rather than better with that how well she's going to cope with having a surgery.</p> <p>she needs help washing and dressing, leaving the house (what if) she gets lymphedema or if she gets lots of problems infections wound breakdown you know it could be a big issue</p>			

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	she going to cope with that I don't think it would be a good idea to put her under to do an operation for her.						
P4		At least she doesn't have to go through an operation (which would make her) quality of life worse	I would offer either but I would recommend surgery if she's physically well enough to have it.				
P5		I think it will be quite traumatic for it to have an operation (and the) dementia may deteriorate.					
P6	she's 80 so she's got dementia it's a small cancer it's hormone sensitive her dementia is significant and she lives in a care home yeah so i think						

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	all those the combination of all those factors means that surgery would have a significant impact on her recovery and ability to deal with surgery						
<b>P7</b>	I'd also ask whether they've had any procedures before because sometimes if they've had a fractured neck of fema or something they've had an anaesthetic whether that has had an impact on their condition because sometimes certainly with dementia it can be difficult to predict how they're going to progress (after	if she isn't able to get to and from the toilet and dress it's going to have quite an impact on her i'd probably recommend hormone therapy					

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	surgery).						
<b>P8</b>		she probably would do well with the primary endocrine therapy because surgery is not without some complication					
<b>P11</b>			the other problem you've got with her is that she if she's got a degree of dementia she may have some difficulty coping with the surgery because surgery for this lady would essentially be a mastectomy and auxiliary clearance which would require inpatient care you know this isn't something you're going to be able to send home the same day or the next				

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			day because of her cognitive state				
	<b>P12</b>	She would be at very high risk of delirium and perioperative problems and complications, so I think any benefit in survival from a surgery perspective is outweighed by the risks					
Treatment efficacy	<b>P1</b>			<p>I would have slightly more reservation about putting somebody with a large positive auxiliary tumour on tablets and expecting them to do well out of that</p> <p>See what crude feeling i have for how long i think she's likely to benefit from surgery if at all</p>	<p>We know that outcomes are better with surgery albeit we're talking about outcomes in terms of prognosis and survival</p> <p>Surgery is a gold standard treatment for breast cancer as combined with hormone tablets afterwards is likely to give her the</p>	<p>The risk of her dying of breast cancer is slightly less if she has surgery but if she felt strongly that she didn't want to have an operation she wanted to have tablets i think that's entirely reasonable.</p>	

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					<p>and if it doesn't look like she's going to benefit from surgery then i think it would be reasonable to think about putting (her) on endocrine and see how she gets on.</p>	<p>best outcome in terms of getting rid of it and keeping it away so that hopefully her the rest of her life remains either cancer-free or essentially cancer-free.</p> <p>How long do i think this lady's got left recently and how much of an impact is surgery going to have on that time so she could potentially have another 10 years i would like to think she would make a full recovery.</p>	
P2	<p>It's a small cancer, it should respond to endocrine therapy.</p>	<p>I'd be inclined to offer endocrine therapy [...] i don't think there's a huge difference in survival.</p>	<p>I think she's well enough to offer surgery that's the gold standard</p>			<p>it's a small cancer grade one she'd probably do well with primary endocrine</p> <p>The gold</p>	

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		It's also the biology of the cancer it's a small grade one cancer so she'd probably do well with endocrine therapy.				standard is surgery that's what we'd offer, but she could have primary endocrine which can keep it under control	
<b>P3</b>	She'll have reasonable response to endocrine therapy, we treat lots of patients like this and they manage for at least 12 months fine on endocrine therapy	<p>The best choice is surgery but i'd be quite reluctant for surgery here.</p> <p>If you look at the survival difference at five years it's not as marked so i think for her i'll be more inclined to offer primary endocrine therapy</p>				Surgery does seem to offer 11 (%) survival difference at five years, i'd be more inclined to offer her surgery [...] Obviously she has a choice, if she doesn't want to have surgery then (it's a) small cancer, ER positive so you know it'll be safe to put (her) on endocrine therapy that's done, that's no issue as such	
<b>P4</b>	I think endocrine			My belief is that if someone can			

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	therapy would be my preferred option reason being that at 83 she has a finite life ahead of her, a very average age of death in the UK for a woman's 84, 85.			have surgery it is best, it's the best treatment.			
<b>P5</b>			I would encourage her to consider surgery because it's the better treatment  She's only at moderate dementia (so may live another) 10 years plus, her cancer could be controlled at this stage with surgery.				
<b>P6</b>	it's a grade one cancer it's a small cancer it's hormone sensitive it hasn't spread to lymph nodes	looking at your values there even though surgery is better the differences are not tremendous	tumour is a large tumour and there is evidence to spread to her lymph nodes and on that basis i think surgery	would recommend surgery on the basis that it's a large tumour with auxiliary node spread			

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	and she's got dementia which has progressed and given that it's a small cancer I think there is a scope for managing her with endocrine therapy	and one could i don't know what the statistically significant difference of those would be but that the difference failing surgery would not swing me my decision to offer endocrine therapy	would be valuable because it would offer local control	yeah uh and it would appear that she's a good quality life and she would be able to tolerate surgery			
P7			the evidence is if we treat people at 72 years of age with appropriate surgery even considering other options radiotherapy and hormone therapy that they do well	I'd recommend surgery for this lady because she's still got a good chance of having another five years of endocrine therapy she's going to get better survival and i think actually the two-year survival is more impressive than the five-year survival interestingly so	if she is fully independent at 88 i would offer her surgery again there's evidence that they do well actually i've discharged somebody at 97 recently after I operated on them at 92		

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				there's a seven % difference there at two years and that becomes 14 at five years and actually to be honest you want that extra time those two years when you're as fit as possible			
<b>P8</b>			offer helen surgery because she's got lymph node disease and she's also 72 although it will play in my mind that she's got moderate dementia but local control is very important here  she's got a decent life expectancy remaining and so we need to control the breast cancer				
<b>P9</b>			i think surgery	from my point			

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			would be best for her yeah because she'll struggle with compliances of endocrine treatment the disease is already quite locally aggressive with positive axilla size 43 judges into this size of breast probably preferably a mastectomy with auxiliary clear so that she does not need to have any radiotherapy and um you know put her on anti estrogens and hopefully that would be it	of view, if the patient is going to be alive in one or two years that my option is always surgery			
<b>P10</b>	would be probably thinking about primary therapy for that on the grounds that it's grade one	I would recommend primary endocrine therapy because the cancer is very unlikely to kill	surgery would be the better treatment because she's only 74 and her other comorbidities are only mild	i would be inclined for surgery there and the Age Gap data reinforces the decision because there's		she may well survive for a few more years and benefit from the surgery	

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	<p>it's small it's not got any node involvement so it's likely that it's not going to affect her life for a long time anyway even if we do nothing her life expectancy with that degree of dependency in a nursing home with moderate to severe dementia probably not going to be much more than a couple of years and so i think primary endocrine therapy would be the better option in that lady</p>	<p>her in what i think is going to be her life expectancy</p>	<p>renal impairment which probably has no impact on her general health and moderate dementia life expectancy will be probably 10 years at least</p>	<p>a big difference in survival which i would expect there to be for those descriptors so you know she's a youngish woman with good health and moderate dementia isn't going to shorten her life expectancy too much and it's a nasty tumour so it needs to come out yeah so i'm happy with that decision for surgery</p>			
<b>P11</b>	<p>this is a grade one cancer which is not small but it's not large and</p>	<p>i find it slightly interesting that that surgery makes such a big difference</p>					

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	<p>you could even argue that you don't need to do anything because of the likely progression of the disease which is likely to be slow so and again she's got dementia and she's in a care home yeah again she's got a limited life expectancy i think this would be another situation where you know because of her limited life expectancy and because of the good prognosis of this cancer without any treatment you know she could die without this causing her any problems</p>	<p>seven % yeah i'm kind of questioning why they died, breast cancer is three versus 13 so I guess you could say that they are what's that</p> <p><i>almost four, just over four times more likely to die of breast cancer if they go with primary endocrine therapy alone but the died of other causes as you can see you know they've got over 50 chance of dying of other causes which fits with the fact that she's care home and needs and is dependent for all of her activities</i></p> <p>i'm just trying to</p>					
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whatsoever  
yeah so again i  
think primary  
endocrine  
therapy would  
be the way  
forward

get my head  
around this and  
it's because it's  
trying to work  
out what the  
benefit is really  
so this if we go  
back to so two  
years, yep two  
years with  
surgery almost  
nobody dies but  
with endocrine  
therapy is  
another five %  
die  
uh okay uh let's  
go to five years i  
mean once you  
start looking at  
that you start to  
pushes you  
towards surgery  
doesn't it  
frankly

*well if we go  
back to the  
vignette so you  
can see all the  
other factors for  
this patient  
(summarised,  
not verbatim)*

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		just show me the data again i'm sorry so two years it's 75 versus 70 and at five years it's 43 versus 36 % i then you would likely to choose surgery because there is you know that you know there's a 10 benefit at five years					
	<b>P12</b>			To me it's clear that there's a benefit from surgery. This person is very likely to live five years, real benefit from surgery.			Over 85 it doesn't make much difference. But that's so so so much the average and so chronological and this is an independent individual
Quality of life	<b>P1</b>		an option to consider primary endocrine surgery if it looked like the impact of surgery was going to be very difficult to				

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			manage in terms of quality of life and function thereafter.				
P4		I would recommend endocrine treatment because i'm assuming that her inability to get up from the toilet dress or wash independently is the dementia so the quality of life perhaps is limited		She has moderate dementia, her quality of life is likely to decrease as dementia progresses it doesn't get better.	She's 88, she's well, she's got a good quality of life, she goes out and sees her friends, she's a fit 88 year old woman.		
P5		I'd still probably offer a primary endocrine [...] as this is only telling us are they alive not whether they're alive and well [...] and i think it will be quite traumatic for her to have an operation					
P6				it would appear	she has a		

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				that she's a good quality life and she would be able to tolerate surgery in the first instance that's what i recommend	reasonable it would appear quality of life she's independent she's fit and well her diabetes is well controlled		
<b>P7</b>			treating their breast cancer such that it doesn't have a detriment on their current quality of life is so important	i'm not really that worried when i've got to the stage when i'm really not that well but not completely incapacitated so although she's needing help with washing she also has a reasonable quality of life yeah yeah at the end of the day it's up to them yes but I would offer them surgery			
<b>P11</b>		i would still go with any primary endocrine therapy even though the					

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			<p>survival benefit because she's not surviving to have any for although it's judgmental my judgment is i don't think she's getting a great benefit quality of life</p>					
Surgery later if needed	<b>P2</b>	<p>You'd want to primary endocrine and then follow her up every few months with ultrasound scans, obviously if following her up the tumour is getting bigger on endocrine therapy and it's not working then you might consider some surgery</p>	<p>I would offer to have primary endocrine therapy and follow her up regularly to make sure it's doing the job.</p> <p>You're always going to follow these patients up if it's getting out of control then you can always change your minds, making that decision doesn't mean that you have to stick by that forever you can always go back to the mdt</p>		<p>If she did go for primary endocrine she'd be seen often, you see them every three or four months and (if the tumour's) progressing or not getting better then you could do an operation (but) someone like that it might be an idea to try some primary endocrine first of all</p>		<p>she could have primary endocrine which can keep it under control and should things change we can always consider going back to surgery so it's a choice.</p>	

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		or rediscuss it with her and her family so yeah initially primary endocrine therapy i think						
<b>P3</b>	As a last resort if she progressed on endocrine therapy you would operate this on local anaesthetic but again in a patient with dementia it depends how they are.							
<b>P4</b>	she could easily be held with endocrine treatment with a switch if she doesn't tolerate it or if it progresses and we could reserve surgery for if it becomes necessary but i							

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	don't think it will.						
<b>P8</b>	my primary choice would be endocrine therapy but if she if for whatever reason she doesn't tolerate the tablet or she doesn't comply then i would offer surgery			<p>i would not rush into surgery here okay i would probably offer our primary endocrine therapy or neo-adjuvant endocrine therapy and see if she settles with that review in about six months</p> <p>probably treat our primary endocrine therapy okay and offer surgery as a last result for local control if need be despite the data</p> <p>prefer to see what difference in time makes but say neo adjuvant endocrine</p>			

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					<p>therapy and then review again maybe in about three or six months before changing to surgery</p> <p><i>and if nothing had changed in three to six months since she'd been on neoadjuvant endocrine would you switch tact and offer surgery?</i></p> <p>Yes yes yes</p>			
Don't delay surgery	<b>P1</b>					<p>I would usually talk a bit about the way that primary endocrine treatment can be very effective but sometimes can stop being effective in the future and we can end up in a situation where we have to think about surgery</p>		

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						<p>because we have no other options when the cancer is perhaps more advanced or the patient's age has increased so that they do have more physical health concerns so i think if there's a window for opportunity in somebody who is slightly older but otherwise well i would usually recommend surgery</p> <p>if she felt strongly that she didn't want to have an operation she wanted to have tablets i think that's entirely reasonable with the caveat that we need to keep a close eye on things and if they did change that we might end up having to</p>		
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						think about surgery later on and just explore that option with her whether she felt that if she needed to have surgery she would rather have done it now and how she'd potentially feel whether she'd made the right decision within three years time when things perhaps weren't quite as easy for her she needed an operation.		
	P3			endocrine therapy she may well do well on but she equally may well not do well on and if she were then five years older and then requiring surgery it's much more difficult and i think then you're in a much more				

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				difficult position in terms of keeping her as fit and well as you would like to			
<b>P4</b>					she's got marked cognitive impairment it's likely she will live another 10 years by which time she will escape endocrine treatment pretty much definitely and it will progress and by the time it is agreed there might be a position where we can't (do surgery) so i would offer her choice but i'd recommend surgery.		
<b>P7</b>						she is likely to make it to that five years when it's going to make quite a	

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						difference and therefore i would suggest her that surgery needs careful consideration	
P9	what i do not want this being a grade one is in two three four four years she's still alive here coming with a locally advanced tumour and then you know resistant to endocrine treatment and then we're stuck again with the same scenario of needing to operate then. so i want to do it now when it's easy and quick for her rather than in three four years time when she's fully resistant			i would offer her surgery yes as it's basically easier to manage now for her and her husband rather than (later)	i'll put it on the medication see how she's tolerant on it with the option of operating sooner rather than later  by the time she needs an operation should be in her 90s and you don't want to operate on her when she's medically more unfit than she is now so this is again a fully treatable small tumor so might as well get on with it rather than operate on her later when she's more afraid	i'll operate because if she lives alone it will be a problem if she has uncontrolled tumours in two three years time	

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	has gone through all the endocrine options and i've got no option other than surgery if she does live long enough and she might do.						
<b>P10</b>			life expectancy will be probably 10 years at least so i would not be at all keen on primary endocrine therapy		she's fit she's active independent and i think her life expectancy would probably be longer than prime endocrine therapy would likely work		
<b>P11</b>				would definitely be going for surgery in this lady because of the problems of local control now she's got a big tumour and she's got auxiliary nodes and even if she gets some control with endocrine		this is the kind of patient if you missed a boat in you could be you know this is kind of patient you see in the clinic and you see them when they're 88 and then they turn back up when they're 93 and they're in a real	

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					therapy if that comes out of control she's going to die badly with that uncontrolled local disease in her axilla and the breast and she could end up with fungation and she could end up with lymphedema of her arm		state because you haven't treated them aggressively enough and it's a real error to miss out on somebody like this is going to live for a long time and when they come back with progressive local disease sometimes it's too late to operate	
<b>PATIENT CHARACTERISTICS</b>								
Dementia needs to be considered	<b>P1</b>	that's tough isn't it so i think you'd need to make an assessment of her capacity to um to withhold the information to make a decision for herself.  In somebody with fairly significant	it sounds like she's deteriorated over the last year perhaps fairly significantly if she was living independently before that so to have gone from either living independently or managing all of those things	i'd start from square one and go through things abbreviated mental test score and see how she did with that and then talk to her about her understanding of what's happened already  it depends a bit	i'd go through the same chat as i have with the last one trying to assess their capacity and their understanding			

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	health problems and leaving her with surgical wounds and things like that would potentially be a challenge if she's really struggling with cognitive function	to not managing any of them in a year i'd have concerns about how rapidly her disease is progressing and we know that dementia is an independent risk factor ford mortality we know that the life expectancy is reduced by that	on how her dementia is progressing it sounds like it's not great but it's sort of a variable feast isn't it some people with dementia will have a really very limited life expectancy and i think if they're deteriorating fairly rapidly i wouldn't be in a hurry to persuade them to undergo surgery in the last few months of life whereas if it's relatively stable disease then i think that's a very different it's a really different situation				
P2	I'd be inclined to offer endocrine therapy if she's		Things could get worse in the future if the dementia gets				

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	got quite severe dementia she's full care yeah i don't think you'd want to (do surgery).		worse, but you've got to treat the patient as they are now i think she should have the gold standard treatment.				
<b>P3</b>	It's the dementia that's the major Concern and okay she won't have capacity						
<b>P4</b>		I don't think her tumour is going to take her off, i think it's going to be complications of her dementia mobility and that sort of stuff.					
<b>P5</b>	I would recommend primary endocrine Therapy, the mortality associated with her dementia in the next five years is greater than the						

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	<p>mortality from a 20 millimetre breast cancer.</p> <p>The risks of her breast cancer causing her death are significantly smaller than the risks of her dementia causing her death</p>						
<b>P6</b>	<p>she's 80 so she's got dementia it's a small cancer it's hormone sensitive her dementia is significant and she lives in a care home yeah so i think all those the combination of all those factors means that surgery would have a significant impact on her recovery and ability to deal</p>	<p>she's got a significant level of dementia she lives in a care home she has difficulty with activities of daily living and so the basis of all of those my feeling would be that endocrine therapy would be the most appropriate for her</p>					

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	with surgery						
<b>P7</b>	<p>certainly with dementia it can be difficult to predict how they're going to progress</p> <p>i know you shouldn't base your practice on a patient i always remember a patient who was very physically with it and but quite demented yeah and the surgery just knocked her for six and she deteriorated and ends up in care home and died within six months</p>		<p>think it would help family very much okay understand the reasons because they are very frightened that we might upset the dementia side of things because the dementia side of things has such a greater impact on their life and their quality of life than their breast cancer and their breast cancer is likely to be asymptomatic for quite some time so treating their breast cancer such that it doesn't have a detriment on their current quality of life is so important</p>				
<b>P8</b>	<p>because she's over the age of 80 and she's had dementia</p>	<p>she's 81 with significant dementia so as far as i'm</p>	<p>although it will play in my mind that she's got moderate</p>	<p>the mortality here is not is not to be disregarded, it's</p>			

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	for five years my primary choice would be endocrine therapy	concerned she probably would do well with the primary endocrine	dementia	a difficult one i think, she has moderate dementia i probably treat our primary endocrine therapy			
<b>P10</b>		with that degree of dependency in a nursing home with moderate to severe dementia probably not going to be much more than a couple of years					
<b>P11</b>	she's got dementia and she's in a care home yeah again she's got a limited life expectancy		the other problem you've got with her is that she if she's got a degree of dementia she may have some difficulty coping with the surgery because surgery for this lady would essentially be a mastectomy and auxiliary clearance which				

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			would require inpatient care you know this isn't something you're going to be able to send home the same day or the next day because of her cognitive state				
Patient has poor functional status	<b>P1</b>		she's got a fairly significant other organ pathology i suppose is the point i'm making that i think her disease comorbidities are really quite extensive and i think i think i would probably be nudging her in the direction of primary endocrine treatment.	She apparently requires help washing and dressing which suggests that she's really quite frail kind of sort of frailer perhaps something like that that makes me have fairly significant concerns about how she's going to cope with the trauma of something like a mastectomy or an auxiliary node clearance			

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			they're relatively morbid operations for somebody who goes into it um with that level of function				
<b>P2</b>		<p>i'd be inclined to offer endocrine therapy. she's in a care home, can't go to the toilet</p> <p>she would do better off with primary endocrine therapy i think [...]</p> <p>she's 81 and in a care home with poor functional status.</p>		<p>she needs help washing and dressing house you know she gets you know you can if she gets lymphedema or if she gets lots of problems infections wound breakdown you know it could be a big issue.</p> <p>thing is i mean if she needs help washing and dressing and you know she's probably only watching she's probably only going to get worse</p>			

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				rather than better with that how well she's going to cope with having i mean a surgery			
<b>P3</b>		what worries me here is that it's not the tumor biology it's what you know she doesn't seem very independent at all and requires all care at home with dementia					
<b>P6</b>		she's got a significant level of dementia she lives in a care home she has difficulty with activities of daily living and so the basis of all of those my feeling would be that endocrine therapy would					

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		be the most appropriate for her					
<b>P7</b>	given she's now in a care-home and with the limitations described i would recommend endocrine	i would probably suggest that it's going to be a real struggle with those co-morbidities even have a day case procedure even though physiologically she would probably do okay with the anaesthetic because she hasn't got lots of medical co-morbidities if she isn't able to get to and from the toilet and dress it's going to be have quite an impact on us i'd probably recommend hormone therapy					
<b>P10</b>	with that degree of dependency in	Primary endocrine therapy would					

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		a nursing home with moderate to severe dementia probably not going to be much more than a couple of years	probably be my preference in view of the degree of dependency					
	<b>P11</b>	she's got dementia and she's in a care home yeah again she's got a limited life expectancy		this lady is probably not going to live a long time, number one is that she has a limited life expectancy in that she can't function on her own so this lady is not far away from needing a nursing home care or emi care so her life expectancy is going to be limited by that rather than by her other general health				
<b>Life expectancy</b>	<b>P12</b>	I think that her life expectancy with the dementia is			To me it's clear that there's a benefit from surgery. This		'I'm slightly surprised [...] that it comes out with that	

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		three to five years maximum			person is very likely to live five years, real benefit from surgery.		much of a difference at five years. I think before looking at that I would have said choice [but now] I would recommend surgery	
--	--	-----------------------------	--	--	--	--	---	--

AGE BIAS IN BREAST CANCER

Phase two interviews, Scenarios B2, C, and D

	Pps	Scenario B2		Scenario C		Scenario D	
		Without tool	With tool	Without tool	With tool	Without tool	With tool
Helping the patient make an informed choice	14				i think I'd present the pros and the cons		
	15			i would prefer surgery with her but if she was reticent i would offer primary endocrine therapy as an alternative but would explain the pros and cons	I would discuss both with her		
	17				she herself is inclined to try tablets which is important to know because she's obviously read some literature which i would then want to confirm what she's read as accurate so she's got a clear picture		
Offering the patient a choice	13			so i probably say prefer options equally and discuss with patient and friend because they've clearly got anxieties about operation	she's got very clear feeling that she might prefer endocrine so i would offer both options	i would talk to the patient i would say you know there are two options. there's no right or wrong answer	obviously it depends on what she wants to do as well and what her preferences and wishes are

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14				if she doesn't want it of course no one's gonna twist her arm because having primary endocrine therapy is entirely reasonable		all of this of course is influenced very much by what she and her family think about things
15	<p>in this patient i would probably talk to her about both so if my preference i guess is equal and i would be guided a little bit about by them and i would discuss the pros and cons or you know</p> <p>it very much depends on the patient you've got in front of you</p>		<p>very minimal risk surgery even in an 88 year old and so i would prefer surgery with her but if she was reticent i would offer primary endocrine therapy [...] i think it's important when you're discussing treatment options with patients that you do give them all the options and that may include one that you feel is lesser in its effectiveness and as long as you convey that information to the patient in a way that they can understand really the treatment decision is up to them</p>	<p>if she was keen to try tablets and did not want to have an operation then I would absolutely support that decision</p>	<p>so my issue with these three choices is that i wouldn't just make a judgment myself, i wouldn't just go and tick a box</p> <p>obviously if she turned around to me and said 'no i don't really want to risk the complications and i think that actually i you know i'm more interested about my quality of life rather than quantity of life' then I would talk to her about primary endocrine therapy and offer it as a</p>	

AGE BIAS IN BREAST CANCER

					choice	
					in terms of what i would prefer and how i would counseling her i think I would be going with surgery as the sort of main option	
16			she's worried because her friend had a difficult recovery, i will talk her through that and if she then does not want surgery then i can give her primary endocrine but i will try and talk her through surgery a bit	i would consider surgery & PET the same for now so with this and the fact that she does not wish to have surgery i wouldn't challenge her decision [...] i would still try to talk her through to do the surgery but i will respect her wishes		
17	as with everything it's down to patient choice	i would want to take into account her and her son's wishes but i would be inclined to offer primary endocrine therapy in this circumstance				

AGE BIAS IN BREAST CANCER

Find out what the patient wants	13						obviously it depends on what she wants to do as well and what her preferences and wishes are
	14						all of this of course is influenced very much by what she and her family think about things

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15	would probably talk to them about both equally and see what they felt as a couple		i would explore her concerns about having an operation. often patients will come with concerns because they know someone that's had a bad experience and you have to you have to explore that with them because it's likely that they're not comparable [...] we make recommendations to the patients and then we explore what they think and if they go 'yeah i'm fine having an operation that sounds like a sensible plan if that's the best thing for me then you just go on with it' but if they say 'oh i'm a bit unsure' that's when you start exploring, it's based on the patient's wants and needs	if she didn't bring it up then I wouldn't, I would say 'surgery is the gold standard for you'.		
17	first of all you need to assess her wishes and have a chat with her and her husband about what they would wish					i would take into account her views but i would be offering surgery for this. that's my preferred option

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Ignore the friend	13			so take out the friend			
	14			i don't think that her friend's experience of previous surgery should necessarily count			
	17			even though i would be polite to the friend i wouldn't take it into account her friend's experience as a decision maker in this circumstance for alice			
Unable to offer the patient a choice	13	She actually sounds reasonably fit, apart from the dementia. So potentially I would recommend surgery but obviously discuss it with carer.	i see she's got dementia so i'm not sure if the carer has got the power of attorney but basically if presumably she's not able to make a decision herself				
	16		if she has dementia all we need to know is would we consent her we need to judge as she does she have and the same with the other lady does she have full capacity to understand and make a decision				

AGE BIAS IN BREAST CANCER

	17						it's difficult with this lady as she's got an expressive dysphasia so that makes consenting very difficult and i would lean heavily on the daughter to understand what she feels her mum would have wanted
<b>PATIENT'S AGE</b>							
too old	14			she may be able to be treated much more satisfactorily with a surgery and a local anesthetic but she is really pretty elderly			
	15			i would offer primary endocrine therapy as an alternative but would explain the pros and cons because she is 88 and it's not an unreasonable thing to try			
not too old	15			very minimal risk surgery even in an 88 year old and so i would prefer surgery with her but if she was reticent i would offer primary endocrine therapy			
	16						she's 78 so she's not

AGE BIAS IN BREAST CANCER

							that old
	17			i'd also be very happy to operate on her in spite of her age			
Age-related previous experience/ assumptions	16	i don't think oncology because my experience with oncology they wouldn't give an 82 year old chemotherapy ... many ladies with this age i don't know if i can say this many women in this age they're a bit they're saying 'oh doctor i'm realistic just take the whole breast we wouldn't challenge them if this is what they want			i will tell put it simply because most women they want things to be simplified for them especially at this age		
<b>TREATMENT RISKS AND BENEFITS</b>							
Surgery as gold standard	13					my first preference in every patient is surgery because of the evidence to say that potentially is better if you can do it safely	i would er towards surgery until proved otherwise

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	16			she would be fit for for surgery because this is the standard and best treatment		i'll do the standard treatment which is surgery	
Treatment efficacy	13		an operation is slightly better from the point of view of outcomes it's slightly better potentially if we're worried about progression and inoperability and progress on endocrine	i'm recommending surgery for this lady because i think that would potentially be the best treatment for her			
	14		well i think the message of surgery being better is clear				
	15			she would have to be aware that it's not the best treatment for her			it's the best option
	16			she would be fit for for surgery because this is the standard and best treatment	i would consider surgery & PET the same for now		
Concerned about coping with surgery	14			she may be able to be treated much more satisfactorily with a surgery and a local anesthetic but she is really pretty elderly			

AGE BIAS IN BREAST CANCER

	15	how traumatic an operation would be for her you know they're coming into the hospital and the stress of that and whether or not that would be something we and they felt that she would deal with				
	17	she needs help leave she's not safe to leave the house by herself and that to me shows that she's got quite advanced dementia. in which case you think she'd struggle to recover from an operation the general anaesthetic can make her delirious				
Concerns about delaying surgery	13	In five years time, around a third of women are going to be alive there's a 10 difference at five years and so by then she's 89 with dementia which may have progressed				

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	16				you are better off doing the surgery now because you're fit now it will give you a better chance of having a less recurrence and a better life with surgery		
The kinder option	17		she's got advanced dementia doesn't have long enough life expectancy to warrant doing it and that's backed up in the data and that there's just a 10 difference so taking a tablet for me seems like the kinder option there				
Can always operate later	13		if i was concerned that it wasn't responding you could fall back very quickly onto surgery	we can always delay surgery depending how she gets on with primary endocrine but there's no reason why this patient shouldn't be offered surgery		we could try and primary endocrine we're going to see how it's going and if it doesn't respond we can always fall back on surgery	
	14	i think i would probably recommend primary endocrine therapy with close					

AGE BIAS IN BREAST CANCER

	review on a sort of three monthly basis				
16				if you want to try tablets, try tablets we will monitor you because it is grade one which means it's very slow growing	
17			if you slowed things down with pet for a few years she would be well into her 90s before she became symptomatic and i would also give i would put her on pet but i would also follow her regularly like every say six months or so in case she changes her mind	she's 86 so slowing it down with primary endocrine therapy would take her into her early 90s before she would become symptomatic from breast cancer, you can follow up In clinic you don't have to give primary endocrine therapy and say goodbye so you can give primary endocrine therapy given that she's inclined and then change the plan if the tumor grows rapidly or if she	

AGE BIAS IN BREAST CANCER

Could cope with surgery					decides actually she wants surgery		
	13				i thought surgery potentially was slightly better for her given that shes fit and well and very active and normal		
	15			you could easily get this woman through an operation	would be a very small, day-case operation		

AGE BIAS IN BREAST CANCER

	16	if they have no heart or respiratory problems and their only problems that they're just older and have a bit of dementia i would do surgery	there's no reason why this patient shouldn't be offered surgery	she would be fit for for surgery because this is the standard and best treatment		she would be fit for a general anesthetic	she has a stable disability because of an old long-lasting accident so overall she is fit for surgery apart from the disability
	17			she's got such a good quality of life is fit if she wanted to go for surgery i'd also be very happy to operate on her	she's fit, she's got great quality of life and it's a small tumor so it shouldn't be a particularly challenging operation	obviously you'd have to assess her and assess her quality of life but given the tumor biology and that medical background i would be offering surgery	
Impact on Quality of Life	15					it depends on which side it is as well so if she's got a hemiparesis on the left side from her stroke so she can't move her left side and that's why she's in a wheelchair and the cancer's on her right chair and you roger her arm function on that side then she's going to be much worse off	i would want to talk to her about the fact that if she's already got restricted mobility there is likely to be some quality of life and functional impairment following the surgery but that usually has resolved by sort of one to two years postoperatively

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	19		She may find the process of surgery and recovery distressing which could affect her quality of life.				
	20		Well I would say surgery because there's a clear survival advantage. But the death from other causes for surgery at five years makes me worry about quality of life. It would suggest to me that, whilst more are alive with surgery, there is likely a %age who are not alive and well as a result of the surgery				
<b>OTHER PATIENT CHARACTERISTICS</b>							

AGE BIAS IN BREAST CANCER

Concern with comorbidities	13					the fact that she's been in a wheelchair full-time care implies i'm probably going more towards primary endocrine if i have to choose between	
	14	she's 82 patients with dementia, she'll have a shorter life expectancy for that reason	with those comorbidities particularly the dementia i guess i'm probably still on the fence				
	15	a patient that has got a formal diagnosis of dementia probably has severe enough dementia that it will impact on their length of life, life expectancy is probably slightly less than that six years	she's got the moderate dementia with the impact on her functional status and then life expectancy and she's got quite severe functional dependence				
	17		she needs help leave she's not safe to leave the house by herself and that to me shows that she's got quite advanced dementia				

AGE BIAS IN BREAST CANCER

Appears in reasonable health	13	She actually sounds reasonably fit, apart from the dementia. So potentially I would recommend surgery but obviously discuss it with carer.		she's otherwise fit and well	i thought surgery potentially was slightly better for her given that shes fit and well and very active and normal		
	14	she's 82 patients with dementia, she'll have a shorter life expectancy for that reason		if we're contemplating surgery and in very healthy patients like this staging is a reasonable way forward			
	15			so she is fit and active and lives alone and she's 88[...]she still has a decent life expectancy and quality of life so I would be favoring surgery			really she doesn't have any significant co-morbidities in terms of the impact on surgery or her quality of life
	16	would be fit for surgery actually because apart from dementia she doesn't look like she has much comorbidities		she is pretty fit	she is perfectly fit for surgery		

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	17	given that she's actually not got any medical comorbidities she's got dementia and arthritis and she's got a good enough quality of life		she has a fantastic quality of life and that she regularly sees her family and she's able to get out and about and enjoys going to the local cafe	she's got a really good quality of life and she sees her family every day	she's had a stroke and she's wheelchair-bound requires full-time care with washing dressing but has no other major health problems so cognitively she's fine. she's 77 the stroke was two decades ago so she's got on well since then	
	19				She is generally fit and well and independent		
Life expectancy	13		the survival 16 to seven %, basically she is a an 84 year old in two years time with a 71 % versus 63 chance being alive whichever you give so that can be brought into the conversation		probably surgery is statistically slightly better for her though it's small proportions		that becomes a 10 difference of five years and still she's got a you know 60 chance of being alive just under 50 chance to be like with endocrine so i would say that the bridging the gap tool backs up my initial preferences

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	14 she's 82 patients with dementia, she'll have a shorter life expectancy for that reason				she's had this stroke two decades ago her health is otherwise stable although she's highly dependent and so at 77 she may survive for a significant amount of time so i think surgery should be considered	she's got a good survival expectation
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	15	<p>so an 82 year old lady, i generally go on the premise that the average life expectancy of a woman in the uk is about 85. that being said once you've got to 80 it obviously goes up so a sort of otherwise fit and healthy woman that's got to 82 probably has a life expectancy of around 88, so we're looking at five or six years</p>	<p>she's got the moderate dementia with the impact on her functional status and then life expectancy and she's got quite severe functional dependence...i was thinking probably primary endocrine therapy but the tool shows you actually there is quite a difference in breast cancer deaths you know you are doubling your risk of um dying from breast cancer at five years aren't you. although how many are actually alive not very many it's 37 versus 27 it's a perfectly appropriate treatment option in this woman isn't it um so i would probably talk to them</p>	<p>she's got to the age of 88 so she's got a predictive life expectancy in her 90s</p>		<p>she still may have sort of seven eight years life expectancy</p>	<p>so regardless of the fact that you're doubling your breast cancer-specific survival surgery she's got a good chance you know she's over 60 chance of being alive in five years so her life expectancy on average then is more than five years so surgery is the preferred treatment option[...]so her life expectancy is if I use my cutoff of 87 again at least seven years</p>
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	16	if we operate she has 7.3 chance % chance of dying due to breast cancer whereas if we don't operate and give her the primary she has 16.4 chance of death because of breast cancer so i would in this way i would call it a risk worth taking to do the surgery	she's 86 she has a good lifespan of living maybe beyond her 90s	died of other causes is 10 % other causes so surgery still is there she has more chance of dying of other causes than because of the breast cancer if she had surgery
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	17		<p>i would be inclined to offer primary endocrine therapy in this circumstance and my reason for that is that the difference isn't that significant in my opinion at five years[...]you've got to ask yourself why are we treating that cancer as aggressively in someone that if she's got advanced dementia doesn't have long enough life expectancy to warrant doing it and that's backed up in the data and that there's just a 10 difference so taking a tablet for me seems like the kinder option there</p>		<p>you get an 11 survival benefit at five years with surgery</p>	<p>ideally i would want to offer her surgery because it would yield enough of a significant increase in life expectancy as compared to primary endocrine therapy</p>	<p>a car accident in that her mobility is a bit restricted and she has this expressive dysphagia I presume as a result of that accident but otherwise she's not got any other medical history so she may live five to ten years easily</p>
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# AGE BIAS IN BREAST CANCER

## Appendix I. Research ethics committee approval for Studies Two and Three

Ethical Review Application (ER/BSMS9DV8/2)		Copy Application	Help
Amendments: <a href="#">ER/BSMS9DV8/3</a>			
<b>Project Title</b>	Interventions addressing age bias in the treatment of older women with breast cancer		
<b>Status</b>	Conditional approval		
<b>Email</b>	D.Neal@bsms.ac.uk		
<b>Phone No.</b>	07752209198		
<b>Applicant Status</b>	PG (Research)		
<b>Department</b>	Psychology		
<b>Supervisor</b>	Ormerod, Thomas C		
<b>Project Start Date</b>	27-Jul-2020		
<b>Project End Date</b>	01-Jul-2021		
<b>External Funding in place</b>	✘		
<b>External Collaborators</b>	✘		
<b>Funder/Project Title</b>			
<b>Name of Funder</b>			
<b>Project Description</b>	<p>This project explores the potential influence of age bias on the treatment of older women with breast cancer and possible interventions to address these biases. There is clear evidence of deviation from evidence-based guidelines and poorer outcomes in the treatment of older women with breast cancer. There is also strong evidence that covert and implicit forms of bias create or exacerbate disparities between demographic groups, and indications that age bias, both explicit and internalised, may be pervasive in healthcare. Various interventions to counter such biases have been tried and implicit bias training through education in particular has become common place within companies and organisations. Yet, there remains a paucity of evidence as to the effectiveness of these interventions. This project hopes to better understand the potential influence of age bias in the management of older women with breast cancer, and possible interventions to reduce age variations in clinical decision making.</p> <p>Previous literature does not offer strong support for any one bias intervention approach. Few empirical studies have been conducted, and those which have been done lack a clear theoretical basis and raise methodological and conceptual concerns, throwing doubt on the value of their claims. As such, this project proposes to pilot two interventions on medical students which the author hopes will address key methodological and theoretical issues of previous education interventions. The first intervention will be education based, focusing on the existence of age bias, the effects it has, and the participant's responsibility to address it. The second intervention will ask participants to make decisions, review the probabilities of decision success (as based on an algorithm) and, if they wish, re-evaluate their initial decision. Once piloted, these interventions will then be trialled on clinicians alongside semi-structured interviews to explore professional opinion regarding implementing interventions in medical practices.</p>		

Submission History (ER/BSMS9DV8/2)						Help
Submission Date	Submitted To	Risk Rating (System)	Risk Rating (User)	Decision / Status	Reason(s) for Return	
30-Jul-2020 07:24	Sciences & Technology C-REC (Karen Long)	Low	Low	Conditional approval		
<b>Explanation of Return</b> Approved on the condition that the following minor correction is made to the information sheet:  Under the heading "What will happen if you take part" it states that participants will have a short presentation and then recommend treatments. As some participants will not be having the presentation (because of control group) please can this be clarified.  There is no need to submit any further documentation in this regard.						
28-Jul-2020 12:04	Supervisor (Thomas Ormerod)	Low	Low	Approved by supervisor		
20-Jul-2020 12:07	Sciences & Technology C-REC (Karen Long)	Low	Low	Returned for revision	<ul style="list-style-type: none"> <li>Supporting document/s missing</li> <li>Amendments required to the application</li> </ul>	
<b>Explanation of Return</b> All applications are screened for completeness before being sent to CREC members for review. The following issues must be addressed before this application can be sent for review.  <b>APPLICATION FORM</b> 1. Project start and end dates: please amend these to the correct dates 2. Q B2. Please clarify whether the incentive payment to medical students will also be made to the clinicians taking part  <b>INFORMATION SHEET</b> 3. Please amend the sheet so that it also works for clinicians (or provide a separate sheet for them) as at present the information sheet refers to final year medical students only 4. Under the heading "Who has approved this study" please replace the reference to approval by the SREO with the following text: "This study has been approved by the Sciences & Technology Cross-Schools Research Ethics Committee. The project reference number is If you have any ethical concerns, please contact the ethics chair (crecscitec@sussex.ac.uk)"  <b>SUPPORTING DOCUMENTS</b> 5. Please upload your recruitments material/e-mail wording to the supporting documents section (for both medical students and clinicians) 6. Please provide the questions participants will be asked on Qualtrics (in addition to the task you have already provided in the exemplar document, as the link in the information sheet is not yet active)  When the required changes have been made, your application will be sent to CREC members for review. When you resubmit your application, please upload a PDF document outlining your responses to each of the numbered points above.  Date comments returned: 27-07-2020						
19-Jul-2020 12:15	Supervisor (Thomas Ormerod)	Low	Low	Approved by supervisor		

## **Appendix J. Study 3 online survey**

### **Information sheet:**

We would like to invite you to take part in a research study being organised by Brighton and Sussex Medical School. There is a £10 participation incentive. Please take time to read the following information carefully and feel free to contact us for further information.

### **What is the purpose of the study?**

There is clear evidence of deviation from evidence-based guidelines and worse outcomes in the treatment of older women with breast cancer. It is also apparent that age-related assumptions may be pervasive in healthcare, both explicit and internalised. We are recruiting final year medical students to help us better understand and improve the care of older women with breast cancer in a climate of an aging NHS.

### **Why have I been invited to take part?**

As a final year medical student, you will provide invaluable data which will inform a follow up trial with practicing breast cancer health care professionals.

### **What will happen if you take part?**

The study asks you to recommend treatments for six hypothetical breast cancer patients and watch a short film which is concerned with ageing in breast cancer treatment.

### **Ethics**

This study has been approved by the Sciences & Technology Cross-Schools Research Ethics Committee. The project reference number is If you have any ethical concerns, please contact the ethics chair (crecscitec@sussex.ac.uk) Contact for further information If you would like to find out more about the study before deciding whether to take part, please contact either Daisy Neal, a researcher on the project, at d.neal@bsms.ac.uk or Malcolm Reed, supervisor on the project, at m.reed@bsms.ac.uk.

## AGE BIAS IN BREAST CANCER

### Consent form:

#### Please read through the following carefully:

- You may stop at any time and, should you wish to do so, any information you have provided till that point will not be included in the final report.
- All information will be anonymised.
- All data will be destroyed once the research study is completed
- The data will be used for research purposes and will not be used beyond that without consent as set out below.
- The research has been approved by the University of Sussex Ethics Committee.

#### Please check you agree to each of the following:

- I am happy to take part in this study.
- I am happy for any findings to be included anonymously in the final report. For example, 'the majority of oncologists recommended chemotherapy for scenario four'.

## AGE BIAS IN BREAST CANCER

### Study explanation:

We will go through six clinical scenarios on which you are asked to make a hypothetical decision, explaining your reasoning as you go as much as possible. Partway through you will be shown a short film on ageing in breast cancer treatment.

The scenarios are concerned with the importance that you place on various factors influencing your preferred option for surgery or Primary Endocrine Therapy in women over 70 years old with operable breast cancer. There are no right or wrong answers.

Surgery is the most common treatment for breast cancer. The principal goal of surgery is to remove the primary breast cancer and any affected regional lymph nodes. Surgery may include operations under General, Regional or Local anaesthetic if this is how you would treat the patient. Some women have health problems which mean surgery may not be appropriate and some women may not wish to have surgery. Primary Endocrine Therapy offers an alternative treatment for these patients. Primary Endocrine Therapy is often preferred for its non-invasiveness and ease of administration. However, the treatment may temporarily shrink the tumour or stop it growing but it will not get rid of the cancer. The cancer builds a resistance to this therapy within a medium of 2-3 years, so it should only be considered for patients with significant comorbidities or a life expectancy of less than two years. Sometimes there is no clear preference for one treatment over the other. In this instance you may recommend the patient considers the relative risks and benefits of each treatment and chooses for themselves.

As you go through the scenarios, hover over **highlighted** words for additional information which should help inform your treatment recommendation.

## AGE BIAS IN BREAST CANCER

### Patient scenarios:

#### Susan

Susan went to her GP after noticing a lump in her left breast. She has been diagnosed with **ER+** **HER2-** breast cancer. The imaging shows the tumour is **43mms** and has spread to the **axillary nodes**. Susan is 84 years old and has **moderate dementia**. Susan also has mild renal impairment. She lives with her son and daughter-in-law and for the past year has required help with washing and dressing and must be accompanied if she leaves the house. Susan has brought her son to her appointment and they would like to know what the treatment options are.

Which treatment would you prefer Susan has, **Surgery**, **Primary Endocrine Therapy**, **prefer options equally?**

- I would recommend Primary Endocrine Therapy
- I would recommend surgery
- No clear preference for one option over the other

Please explain your reasoning behind your recommendation.  
There are no right or wrong answers

How confident do you feel in your decision?

- Very certain
- Fairly certain
- Fairly unsure
- Very unsure

## AGE BIAS IN BREAST CANCER

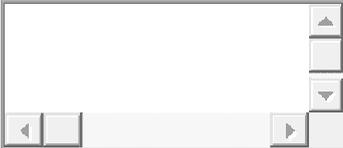
### Ann

Ann is 78 years old and was recently diagnosed with a 42mm, node positive, grade II breast cancer. Ann has long-standing stable disability and requires full-time care since her involvement in a car accident in her 50s. She has restricted mobility and expressive dysphasia. Ann has been accompanied to the appointment by her daughter and they are keen to know what the right treatment would be.

Which treatment would you prefer Ann has, Surgery, Primary Endocrine Therapy, or prefer options equally?

- I would recommend Primary Endocrine Therapy
- I would recommend surgery
- No clear preference for one option over the other

Please explain your reasoning behind your recommendation.  
There are no right or wrong answers



How confident do you feel in your decision?

- Very certain
- Fairly certain
- Fairly unsure
- Very unsure

## AGE BIAS IN BREAST CANCER

### Grace

Grace, aged 86 years, has been referred to your clinic after a recent breast cancer diagnosis. The cancer status is ER+HER2-, the tumour is 19mms in size and axillary lymph nodes appear normal. Grace lives with her husband and visits her daughter and grandchildren who live nearby on most days. She takes daily medication for long standing and well-controlled epilepsy but is otherwise healthy and active. Grace has read some leaflets detailing different treatment options and is inclined to try tablets but would like your advice as to what would be best for her.

Which treatment would you prefer Grace has, Surgery, Primary Endocrine Therapy, or prefer options equally?

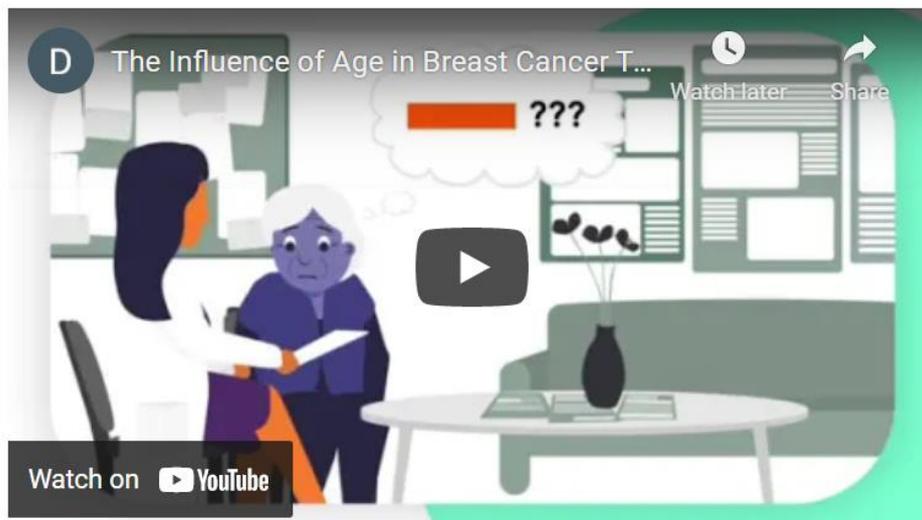
- I would recommend Primary Endocrine Therapy
- No clear preference for one option over the other
- I would recommend surgery

Please explain your reasoning behind your recommendation.  
There are no right or wrong answers

How confident do you feel in your decision?

- Very certain
- Fairly certain
- Fairly unsure
- Very unsure

We now wish for you to watch this short film which we hope encourages you to consider and reflect upon how best to treat older patients. Once you have finished the film, please continue to the next page to complete another set of patient scenarios.



## AGE BIAS IN BREAST CANCER

### Alice

Alice, 88 years old, contacted her GP after noticing a lump in her breast. She has been diagnosed with ER+HER2- breast cancer. The tumour is 23mms diameter and does not appear to have spread to the axillary lymph nodes. Alice has well controlled type II diabetes but is otherwise fit and well. She lives alone but is visited often by her neighbours and grandson, and meets a friend most days at the local cafe. Her friend has accompanied her and shares that she had had a difficult recovery from surgery a few years ago and doesn't wish the same for Alice. They are both visibly worried and ask what treatment you think is best for Alice.

Which treatment would you prefer Alice has, Surgery, Primary Endocrine Therapy, or prefer options equally?

- No clear preference for one option over the other
- I would recommend Primary Endocrine Therapy
- I would recommend surgery

Please explain your reasoning behind your recommendation.  
There are no right or wrong answers

How confident do you feel in your decision?

- Very certain
- Fairly certain
- Fairly unsure
- Very unsure

## AGE BIAS IN BREAST CANCER

### **Helen**

Helen has been diagnosed with breast cancer after her husband convinced her to visit the GP for a lump in her breast. She is 82 years old, with moderate dementia and mild arthritis. She lives with her husband who is in good health who manages most aspects of her care but they also have help daily to provide some assistance with cooking, shopping, washing and dressing. The tumour is 40mm and has spread to the axillary lymph nodes. The cancer is ER+ and HER2-. Helen has attended the appointment with her husband, and they are both anxious to hear what treatments are available.

Which treatment would you prefer Helen has, Surgery, Primary Endocrine Therapy, or prefer options equally?

- No clear preference for one option over the other
- I would recommend surgery
- I would recommend Primary Endocrine Therapy

Please explain your reasoning behind your recommendation.

There are no right or wrong answers

How confident do you feel in your decision?

- Very certain
- Fairly certain
- Fairly unsure
- Very unsure

## AGE BIAS IN BREAST CANCER

### **Elizabeth**

Elizabeth, aged 77 years old, has been diagnosed with grade II breast cancer after her carer noticed a lump in her right breast. She has a **43mm tumour** which has spread to regional **lymph nodes**. Elizabeth suffered a stroke two decades ago and has since been wheelchair bound, requiring full time care including assistance with washing and dressing. She has no other major health problems.

Which treatment would you prefer Elizabeth has, **Surgery**, **Primary Endocrine Therapy**, or **prefer options equally**?

- I would recommend Primary Endocrine Therapy
- I would recommend surgery
- No clear preference for one option over the other

Please explain your reasoning behind your recommendation.  
There are no right or wrong answers

How confident do you feel in your decision?

- Very certain
- Fairly certain
- Fairly unsure
- Very unsure

## AGE BIAS IN BREAST CANCER

**Finally, we would like to ask you a couple of questions on how useful you found the film. The more information you can provide, the better.**

What, if anything, do you feel you have learnt from watching the film?

Do you feel this will have an effect on the way you treat your older patients in future practice? (Please explain)

Thank you very much for taking part in this study. We hope you found it interesting and value your contribution. This is part of a PhD project interested in age associations and stereotypes and their impact on treatment recommendations for older women with breast cancer, with a view to improving older women's treatment.

Please complete the following to receive the £15 participation monies.

Email address

Name of account holder

Name of bank

Account number (8 digits)

Sort code (6 digits)

If you have any questions or concerns relating to the study please feel free to email either Daisy Neal, PhD researcher, at [d.neal@bsms.ac.uk](mailto:d.neal@bsms.ac.uk), or Malcolm Reed, project supervisor, at [m.reed@bsms.ac.uk](mailto:m.reed@bsms.ac.uk)

AGE BIAS IN BREAST CANCER

**Appendix K. Novel bias training, thematic analysis matrix.**

Increase in references after intervention
Decrease in references after intervention
Equal number of references after intervention

*Summary of themes discussed*

Topic		Scenario B2		Scenario C		Scenario D	
		Before	After	Before	After	Before	After
Patient voice	Helping patient be fully informed	0	4	3	6	2	3
	Shouldn't make assumptions	0	1	0	1	0	1
	Respect patient's choice	4	7	9	10	2	3
	Find out what patient's thoughts are	1	3	2	5	2	6
	Advocating for patient	1	2	1	1	1	2
	Patient unable to choose	1	2	0	0	1	0
Patient health	Concern with comorbidities	10	9	0	0	9	5
	Appears in reasonable health	5	2	12	19	7	6
	Patient is old	11	2	8	6	5	2
	Life expectancy	7	5	5	5	9	9
The best treatment	Surgery as gold standard	1	0	1	1	0	0
	Tumour characteristics	14	9	19	15	10	9
	Treatment efficacy	2	4	10	6	4	4
Coping with treatment	Concerned about coping with surgery	9	12	3	1	11	6
	Concerns about delaying surgery	1	2	2	0	1	0
	Can always operate later	0	0	1	0	0	0
	Could cope with surgery	1	0	2	5	3	8
	Impact on Quality of Life	6	4	3	3	2	2

AGE BIAS IN BREAST CANCER

Recommended primary endocrine therapy

Recommended surgery

No clear preference

		Scenario B2		Scenario C		Scenario D	
		Without tool	With tool	Without tool	With tool	Without tool	With tool
Topic	Pps	Reason	Reason	Reason	Reason	Reason	Reason
PATIENT VOICE							
Respect patient choice	2		If they wished to explore surgery I would seek advice to see if this was a safe option and advocate for the patient wherever possible.		Her preference for PET is very important and if she preferred this route I would support her through that and answering her concerns.		

AGE BIAS IN BREAST CANCER

	3	<p>If she had capacity to make the decision for herself then it should be her own choice, but if not then the potential distress a surgical procedure may cause her should be taken into account when acting in her best interests with her husband.</p>	<p>It would be essential to assess her understanding and then make a joint decision about treatment.</p>				
	5			<p>If the patient would prefer to not have surgery, I think it would be reasonable to offer an alternative treatment.</p>			<p>If she is willing to have surgery, I don't see a problem with her being able to.</p>

AGE BIAS IN BREAST CANCER

6		in the end the choice is theirs	of course she'd have the final choice to make!	If she wanted to have tablets or was particularly averse to surgery then that would be her decision, but I think she'd be a good candidate for surgical management.		
7				Of course, if Grace would prefer tablets then this could be offered		
8				the patient's age and their wishes, make me consider the primary endocrine therapy		

AGE BIAS IN BREAST CANCER

9			She has had a previous traumatic experience with surgery and does not wish to have this again, so this should be taken into consideration.			
10				Given her age, lack of node involvement, and preference		
12			she has good potential for positive outcomes from surgery but may still wish to avoid it, and this needs to be understood and respected	her decision must be respected and supported and she must not be made to feel overwhelmed with information or that you are trying to change her mind! autonomy!!		i now realise she may not wish to undergo the mental stress of surgery - unfamiliar environment, new care staff, team unfamiliar with her disabilities, pain, being away from family.

AGE BIAS IN BREAST CANCER

	13				<p>However, I would want to explore the patient's reasons for preferring endocrine therapy as the decision should ultimately rest with the patient.</p>	<p>I would want to have an in depth discussion with the patient about their priorities, gain more of an understanding of their physical fitness and be frank in explaining both the risks of surgery and the likely prognosis if they opt for primary endocrine therapy (PET). My personal opinion would be that it would be better to receive TEP and have 2 or 3 years of higher quality life than go through traumatic surgery with an uncertain prognosis. However I think the patient should be able</p>	<p>The patient should therefore be allowed to weigh up what is most important to them and assess which risk they would rather take.</p>
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AGE BIAS IN BREAST CANCER

16	it depends on her capacity, wishes and preferences.	It would be best not to assume what the patient would want so I feel discussing both options with the patient and her son along with the pros and cons of both treatment options would help them let me know their wishes and opinions which would then help me recommend the best course of management				
19			Hormonal therapy might be a good option for her if she is keen to avoid surgery and understands that it would not be curative			

AGE BIAS IN BREAST CANCER

20	I think the risks and benefits are similar so it should be patient choice.		The patient is keen to try tablets instead of surgery.			
22				The surgery may be curative and offer her a good quality of life and a better life expectancy however her wishes against having a surgery should be respected if that is her preference.		
23			Might be inclined to try non-surgical treatment first as this is the patient's preference but can do surgery later if cancer worsens			

AGE BIAS IN BREAST CANCER

	25					<p>I would recommend surgery alongside adjuvant radiotherapy in this instance, if she consents to it. However, her immobility poses a risk for potential DVTs and PEs, which would lead me to consider PET as a better option for this lady. If surgery was the option the patient desired, then a robust MDT input is needed, incorporating physiotherapists as well as occupational therapists.</p>	
	26		<p>both appear good options depending on what she prefers</p>				

AGE BIAS IN BREAST CANCER

	27		<p>Once again, I would like to explain the risks and benefits of each treatment so that Helen and her husband can make an informed decision. If they preferred surgery I wouldn't rule it out, but I think PET might be better here.</p>	<p>Given that Grace feels she'd prefer tablets, obviously patient choice is a priority and if she continued to opt for this then this would be preferable.</p>	<p>I think that given that Alice has a small tumour with no spread, she could be considered for surgery with potentially curative intent, as opposed to managing the disease with PET but not long-term. She appears to have good baseline health. Once again, patient choice is a key factor but based on the information given of a small tumour that could hopefully be removed, I would recommend surgery.</p>		
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AGE BIAS IN BREAST CANCER

28	<p>It would depend on the decision made by the patient however surgery may have impacts on patients life post-surgery. May not return to her baseline level of function and could possibly provide worse outcomes.</p>		<p>Small tumour with no spread so could do a lumpectomy surgery as may be less complicated however if she preferred taking tablets to surgery this could also be an option as the tumour is ER +</p>			
31				<p>Her age of 88 would make me lean towards recommending endocrine therapy, however she is functionally fit and well and could benefit from surgical removal of the tumour. I would explain pros and cons of both to patient and let her decide.</p>		

AGE BIAS IN BREAST CANCER

Find out what patient's thoughts are	2		I would advise PET as the recommended choice, however I would listen to the patient and hear their concerns.				The expressive dysphasia makes this difficult to understand the patients wishes and concerns, trying as best as possible and involving the family
	3						It would be essential to ensure that the patient was supported to communicate her opinion as fully as possible

AGE BIAS IN BREAST CANCER

	6	I think Elizabeth should be given the opportunity to weigh up the decision.				I think the expressive dysphasia has no bearing on treatment options in a medical sense, but this would influence how careful the team would need to be about making sure her feelings and concerns are validated.
	7					We would want to be extra careful when communicating with this patient because of her expressive dysphasia.
	8			However, it would be important to ask Alice what her wishes were		This case will be difficult as it may be challenging as this patient may struggle to communicate their wishes.

AGE BIAS IN BREAST CANCER

	10			<p>She has had a previous difficult recovery from surgery but this is not reported by the patient so would need to explore these with her.</p>		<p>I would want to have an in depth discussion with the patient about their priorities, gain more of an understanding of their physical fitness and be frank in explaining both the risks of surgery and the likely prognosis if they opt for primary endocrine therapy (PET). My personal opinion would be that it would be better to receive TEP and have 2 or 3 years of higher quality life than go through traumatic surgery with an uncertain prognosis. However I think the patient should be able</p>	
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AGE BIAS IN BREAST CANCER

to weigh up this decision themselves.

AGE BIAS IN BREAST CANCER

	13				<p>However, I would want to explore the patient's reasons for preferring endocrine therapy as the decision should ultimately rest with the patient.</p>		
	16		<p>It would be best not to assume what the patient would want so I feel discussing both options with the patient and her son along with the pros and cons of both treatment options would help them let me know their wishes and opinions which would then help me recommend the best course of management</p>		<p>I would like to explore her reasons for why she would like the tablets and ask her her opinions on having surgery before I make a recommendation for a confirmed management plan.</p>	<p>However I can not determine what's in her best interests without talking with her and her family about it and so I decided in this case I wouldn't be confident in recommending either as the best choice.</p>	<p>As mentioned previously, a discussion with the patient and her loved one would help them and me as her doctor get a clear understanding of her priorities and also help me decide the best course of management.</p>

AGE BIAS IN BREAST CANCER

	20			<p>The patient is concerned about the risks of surgery so this should be explored (including how diabetes may impact on the surgery and vice versa) but it should be explained that as she is generally fit and well and able to get out and about surgery may give her the best opportunity to cure the cancer.</p>		
	23			<p>As the cancer has not spread to the nodes and is a small tumour, I think I would offer surgery as she is fit enough and I would explore her fears and concerns over surgery</p>		

AGE BIAS IN BREAST CANCER

	27				Whilst Alice and her friend are anxious about surgery, it's important to ask her questions about what is making her anxious as some of these may be possible to be resolved. Whilst Alice's friend had a poor experience, it doesn't mean that Alice will and it's important to make that clear.	
	29		I would want to know their thoughts on recovery.			
Advocating for patient	6	I think that as her carer it's a good thing her husband's in the room				
	14					I would discuss and decide in best interests

AGE BIAS IN BREAST CANCER

16							As mentioned previously, a discussion with the patient and her loved one would help them and me as her doctor get a clear understanding of her priorities and also help me decide the best course of management.
17				I do understand Alice's concerns however and would take the time to explain my reasoning and explain the procedure to her before stating this as my preference.			

AGE BIAS IN BREAST CANCER

19		<p>She is likely to respond to the hormonal therapy and they would both find it easier to manage but it would likely be the breast cancer that kills her. More support may be required at home which could be provided</p>		<p>Her friend's concerns are valid but this should be discussed with Alice directly and as she has a good support network around her then she will be well supported in her recovery.</p>		
20		<p>Compliance with medication may be an issue given the dementia but if the husband/carers are able to help remind the patient then this shouldn't preclude endocrine therapy as an option as the stress of a surgery may</p>				

AGE BIAS IN BREAST CANCER

		not be welcome.				
22					Due to the patient's disability and the difficulties around obtaining her preference, risks of surgery and quality of life. A best interest design should be made	

AGE BIAS IN BREAST CANCER

Helping patient be fully informed	4					The risks associated with surgery I would think might be too great, though should be discussed with her.
	6		I'd always give the patient information about both options	I'd make sure to reassure her about the procedure though, and		
	10		I would explore the options with them			
	12			her friend may have had a negative experience but it is important that the patient is supported to make a well informed decision	the patient has a preference to avoid surgery, but I am now more keen to explore this and inform about the positive outcomes from surgery.	

AGE BIAS IN BREAST CANCER

	13				<p>I would want to have an in depth discussion with the patient about their priorities, gain more of an understanding of their physical fitness and be frank in explaining both the risks of surgery and the likely prognosis if they opt for primary endocrine therapy (PET). My personal opinion would be that it would be better to receive TEP and have 2 or 3 years of higher quality life than go through traumatic surgery with an uncertain prognosis. However I think the patient should be able</p>	<p>The patient should therefore be allowed to weigh up what is most important to them and assess which risk they would rather take.</p>
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AGE BIAS IN BREAST CANCER

						to weigh up this decision themselves.	
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AGE BIAS IN BREAST CANCER

	16		<p>It would be best not to assume what the patient would want so I feel discussing both options with the patient and her son along with the pros and cons of both treatment options would help them let me know their wishes and opinions which would then help me recommend the best course of management</p>				
	18				<p>She could be a good candidate for surgery but given her friend's experience I would want the patient to make an informed choice for herself.</p>		<p>Would want to establish QoL and let her make an informed decision</p>

AGE BIAS IN BREAST CANCER

19			<p>Hormonal therapy might be a good option for her if she is keen to avoid surgery and understands that it would not be curative</p>			
20				<p>The patient is concerned about the risks of surgery so this should be explored (including how diabetes may impact on the surgery and vice versa) but it should be explained that as she is generally fit and well and able to get out and about surgery may give her the best opportunity to cure the cancer.</p>		

AGE BIAS IN BREAST CANCER

25

Alice's diabetes is well controlled and she is described as fit and well. She has a localised lump that can be easily resected, and her lymph nodes have not been affected. I can understand her concerns, but would provide her enough information of the surgery and risks of what could happen if she decides to have it or not so that she can make an informed decision.

AGE BIAS IN BREAST CANCER

	16					<p>It is imperative not to make assumptions about patient's quality of life before talking things through with them regardless of the circumstances</p>
	27		<p>Once again, I would like to explain the risks and benefits of each treatment so that Helen and her husband can make an informed decision. If they preferred surgery I wouldn't rule it out, but I think PET might be better here.</p>		<p>Whilst Alice and her friend are anxious about surgery, it's important to ask her questions about what is making her anxious as some of these may be possible to be resolved. Whilst Alice's friend had a poor experience, it doesn't mean that Alice will and it's important to make that clear.</p>	

AGE BIAS IN BREAST CANCER

Shouldn't make assumptions	31				Her age of 88 would make me lean towards recommending endocrine therapy, however she is functionally fit and well and could benefit from surgical removal of the tumour. I would explain pros and cons of both to patient and let her decide.	
	18					Would want to establish QoL and let her make an informed decision

AGE BIAS IN BREAST CANCER

	28		<p>However, there may be some difficulty post surgery with her recovery and rehabilitation so may require additional support in which case hormone therapy seems most appropriate depending on the details of home circumstances.</p>				
	29				<p>a long recovery is an important consideration, I wouldn't want to persuade Alice without more information for her and for me.</p>		

AGE BIAS IN BREAST CANCER

Concerned with patient's ability to make choice	3	It might be difficult for the patient to understand fully the risks/benefits of surgery	The patient may have difficulty in understanding the risks/benefits of surgery and therefore might find the day of the procedure extremely stressful and distressing.			
	22				Due to the patient's disability and the difficulties around obtaining her preference, risks of surgery and quality of life. A best interest design should be made	
	25		If this lady has moderate dementia - can she consent to a surgery? Or would her husband be in charge of her care?			

AGE BIAS IN BREAST CANCER

PATIENT AGE							
Patient is old	2	As the patient is elderly and suffers with dementia she has a poorer prognosis from hospital stay and complications.	Given the patients age, dementia and comorbidities I would be concerned about the surgical complication risk for this patient.	surgery is favourable but the patient is elderly as well as unsure about the complications/recovery		The patient is elderly	I would imagine the surgical risk is high given the patients age
	4	she has high morbidity and is quite elderly - surgery would be very risky					
	5	although she is an older patient		She is also quite old for surgery at 88			
	7			Although she is 88			
	8	The woman is 82 years old			the patient's age and their wishes, make me consider the primary endocrine therapy		
	10				Given her age, lack of node involvement, and preference		

AGE BIAS IN BREAST CANCER

11	Unsure as 82 years old					
13			Despite being 88			
14					Older with comorbidities	
16					She is also 77 and requires assistance with ADLs	
17	Although older and also with some underlying conditions it sounds like this patients overall health is better.					
18			No lymph node involvement, good functional status despite age, if she is fit for surgery there could have a high chance of success			

AGE BIAS IN BREAST CANCER

19	Although she is dependent on others, nothing in her medical history suggests that she is likely to die in the next 2 years except perhaps her age generally					
20	At 84, the patient is nearing the end of her natural life so resistance to the therapy after 2-3yrs is less concerning than it would be in a younger patient.		At 86 the concern about endocrine therapy only working for 2-3yrs is less of an issue than with a younger patient.	At 88 the concern about lack of efficacy beyond 2yrs is less concerning than in a younger patient, however this patient is still fairly fit and well.		
21	Tumour is ER+ and she is 84, surgery is dangerous in her age and she has nearly lived her life expectancy		No node involvement and tumour is ER+ She is 85 so we wouldn't add many years to her life expectancy	she is 88 tumour is ER+		

AGE BIAS IN BREAST CANCER

22						Due to her co morbidities, high burden of disease and risk of having a surgery for her age. Her recovery may also challenging
23	84 year old woman					Concerns over her fitness for surgery as she is an older women requiring full time care
26						she is elderly and has a number of morbidities and therefore surgery may not be the best option for her

AGE BIAS IN BREAST CANCER

	27	She also sounds relatively frail as she needs assistance with AoDL and given this, along with her age and background of dementia, one could argue that she will die of something else before the cancer and thus risk of surgery outweighs benefits.					
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AGE BIAS IN BREAST CANCER

	31		<p>Because of her age and dementia, also she has a poor functional status and needs help with her ADLs, so she would struggle to recover from surgery and it might place a lot of stress onto her husband as her primary carer.</p>	<p>She is fit and well despite being 86, so I would recommend surgery over endocrine therapy alone because of the life-prolonging benefit of surgery. Also her nodes are not affected yet and so she has a good prognosis if the tumour is removed</p>	<p>Her age of 88 would make me lean towards recommending endocrine therapy, however she is functionally fit and well and could benefit from surgical removal of the tumour. I would explain pros and cons of both to patient and let her decide.</p>		
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TREATMENT RISKS AND BENEFITS

AGE BIAS IN BREAST CANCER

Concern with comorbidities	1	her dementia is moderate but I am not sure how quickly she has deteriorated with this				She already has had a stroke causing significant impairment and requires lots of help with her ADLs, so her baseline seems quite low.	she seems to have significant comorbidities so not sure of her candidacy for surgery
	2	As the patient is elderly and suffers with dementia she has a poorer prognosis from hospital stay and complications <sup>12</sup> .	Given the patients age, dementia and comorbidities I would be concerned about the surgical complication risk for this patient.			has a history of stroke, given she has wheelchair bound mobility she would possibly be at high risk for a VTE during/following surgery	I would imagine the surgical risk is high given the patients age and immobility.
	4	she has high morbidity				She has a high level of morbidity and is reliant on others for basic ADLs already.	
	5					but is also very disabled and might not be suitable for surgery.	

AGE BIAS IN BREAST CANCER

6		She has renal impairment and moderate dementia, and has difficulty with ADLs.				
7		has a couple of life-limiting co-morbidities and I would also worry that surgery could worsen her renal impairment				
8	has moderate dementia	moderate dementia, mild renal impairment				

AGE BIAS IN BREAST CANCER

13						<p>Despite being in a stable physical condition the patient could still be considered severely frail due to the high care need. The surgery needed is likely to be quite extensive. As such I would think the patient is at high risk of complications.</p>
14					Older with comorbidities	

AGE BIAS IN BREAST CANCER

17					<p>However in light of her co-morbidities and the fact she is wheelchair bound and requires assistance for ADLs her the risk to both the surgical procedure and the recovery process is probably quite high and could even if successful possibly worsen the patients overall health.</p>	
18	<p>Mild cognitive impairment + frailty (living with family) suggests a short term treatment may be most appropriate?</p>	<p>Decreased functional status and lymph node spread</p>				

AGE BIAS IN BREAST CANCER

22	Due to patient's co morbidities, age and risks of surgery and anaesthesia, life expectancy and quality of life	The patient has long standing medical conditions and a reduced life expectancy however she might benefit from a potentially curative surgery			Due to the patient's disability and the difficulties around obtaining her preference, risks of surgery and quality of life. A best interest design should be made	Due to her co morbidities, high burden of disease and risk of having a surgery for her age. Her recovery may also be challenging
23					Concerns over her fitness for surgery as she is an older woman requiring full time care	Despite not having any health problems other than the stroke I'm concerned about her fitness for surgery due to her high caring needs

AGE BIAS IN BREAST CANCER

25	Initially I wanted to recommend surgery as she has a positive cancer diagnosis and it is a guideline-recommended treatment. However, considering this patient may be quite frail, knowing she is not independent and has dementia + renal impairment I would question whether surgery may exacerbate her condition. Thus, PET is also a reasonable option for this lady.					
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AGE BIAS IN BREAST CANCER

26					she is elderly and has a number of morbidities and therefore surgery may not be the best option for her	
27	She also sounds relatively frail as she needs assistance with AoDL and given this, along with her age and background of dementia, one could argue that she will die of something else before the cancer and thus risk of surgery outweighs benefits.	I feel that PET may be beneficial in this scenario as Helen already seems to have some frailty and a poor baseline of health, as she needs assistance with all AoDLs				

AGE BIAS IN BREAST CANCER

	30	Susan has no absolute contraindications for surgery, however her significant co-morbidities would need to be taken into account. She probably has an ASA score of 3, and her quality of life may arguably be more compromised by the risks of surgery versus endocrine therapy.	Helen has moderate dementia, which may increase her risk of complications following an anaesthetic. She otherwise has no other severe systemic illness, however, is dependent on her husband and carers for ADLs, which might compromise her ability to recover from surgery.				
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AGE BIAS IN BREAST CANCER

	31	I would not recommend surgery because of her co-morbidities of dementia and renal impairment.	Because of her age and dementia, also she has a poor functional status and needs help with her ADLs, so she would struggle to recover from surgery and it might place a lot of stress onto her husband as her primary carer.				
Concerned about coping with surgery	3	could be an extremely distressing time for her if she was to go ahead with the procedure.	might find the day of the procedure extremely stressful and distressing.				
	4	surgery would be very risky and the additional benefit may not be worth the hospital stay and risks of surgery.	There clearly would be risks with surgery			She has a high level of morbidity and is reliant on others for basic ADLs already.	

AGE BIAS IN BREAST CANCER

6	surgery with recovery in hospital may be really difficult for Elizabeth with her dementia	She has renal impairment and moderate dementia, and has difficulty with ADLs. I think this would complicate her recovery from surgery, especially in an unfamiliar hospital environment.			I think that surgery would need to remove a lot of LNs to make it get rid of all the tumour, and I think that this would be difficult to recover from.	I think that surgical recovery may be difficult in patients with limited mobility, but unlike Susan, Ann does not have comorbidities aside from a stable disability, so surgical recovery may be a bit easier.
8		The surgery would be a big stressor event on this woman who has some comorbidities and frailty e.g. needs help washing.				
9	As she requires care from her husband, it might be difficult for her to recover from the surgery	the patient requires assistance with daily living, and surgery could make this more difficult				

AGE BIAS IN BREAST CANCER

	10					Given her current state of fitness and difficulty with ADLs she may be anaesthetic risk, and I would be concerned over how her recovery from surgery would be.	
	11	Surgery presents risks such as infection etc and high emotional and physical impact to both her and her family					

AGE BIAS IN BREAST CANCER

	13	<p>I would be somewhat hesitant to perform surgery in someone with moderate dementia as they may be at greater risk of various post-operative complications, particularly delirium. Furthermore, the underlying dementia and possible delirium may mean the patient struggles to engage with post-operative physio, putting her at greater risk of physical complications. I suspect she would require a longer hospital stay to recover post-operatively which would again, put her at higher risk of complications.</p>	<p>I would say the patient is at least moderately frail given her CKD, and the help needed with ADLs and mobilising outside of the house. The surgery required would be relatively extensive as it would need axillary node clearing. Given this and her moderate dementia I don't think she would tolerate surgery well and would be at high risk of complications, both physical and in terms of psychological distress. I therefore do think the risks outweigh the benefits.</p>			<p>Given the patient's underlying frailty (indicated by level of care required with ADLs) I am doubtful how well the patient would do physically post surgery. I fear that if they were not be able to engage well with the required physio they may be at higher risk of complications such as chest infections</p>	
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AGE BIAS IN BREAST CANCER

	17				<p>However in light of her co-morbidities and the fact she is wheelchair bound and requires assistance for ADLs her the risk to both the surgical procedure and the recovery process is probably quite high and could even if successful possibly worsen the patients overall health.</p>	
	18				<p>Frailty and may not be fit for surgery</p>	

AGE BIAS IN BREAST CANCER

	19	The main pros and cons I see to balance are the risk of surgery being very distressing for her (she would likely require a GA due to her dementia as well)	Her comorbidities don't suggest she will die in the next 2 years but as she has moderate dementia she may find the process of surgery and recovery distressing which could affect her QoL.	Surgery would likely be curative but there would be risks with anaesthesia and her epilepsy could put her at higher risk.			
	22	Due to patient's co morbidities, age and risks of surgery and anaesthesia, life expectancy and quality of life		Her surgery may be curative although there are risks to having the surgery and her life expectancy is low		Due to the patient's disability and the difficulties around obtaining her preference, risks of surgery and quality of life. A best interest design should be made	Due to her co morbidities, high burden of disease and risk of having a surgery for her age. Her recovery may also be challenging

AGE BIAS IN BREAST CANCER

	23	Concerns over whether she is fit for surgery considering her high caring requirements		Concerns over her fitness for surgery as she is an older women requiring full time care	Despite not having any health problems other than the stroke I'm concerned about her fitness for surgery due to her high caring needs
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AGE BIAS IN BREAST CANCER

	25		<p>However, after a larger surgery she would need carer input to keep her legs moving and have someone help put on stockings for her to reduce DVTs. The fact that she has a moderate dementia may make this whole experience quite traumatising for her, which would not be ideal, so in that case PET may be the better option. It is hard for me to choose.</p>			<p>I would recommend surgery alongside adjuvant radiotherapy in this instance, if she consents to it. However, her immobility poses a risk for potential DVTs and PEs, which would lead me to consider PET as a better option for this lady. If surgery was the option the patient desired, then a robust MDT input is needed, incorporating physiotherapists as well as occupational therapists.</p>	<p>This lady has a stroke history, and is therefore more susceptible to post-operative complications. Her immobility is also a factor I took in my decision to give PET instead of surgery. The fact that the cancer spread to regional lymph nodes has made the situation more difficult for her in terms of surgery. I believe the best treatment for her is PET.</p>
	26						<p>surgery may impact her wellbeing and recovery time will be long</p>

AGE BIAS IN BREAST CANCER

	27	I feel that PET may be beneficial in this scenario as Helen already seems to have some frailty and a poor baseline of health, as she needs assistance with all AoDLs			
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AGE BIAS IN BREAST CANCER

	28		<p>However, there may be some difficulty post surgery with her recovery and rehabilitation so may require additional support in which case hormone therapy seems most appropriate depending on the details of home circumstances.</p>		<p>She is fit and well patient and is a small tumour size, so could be a good candidate for surgery. However it may cause more problems post surgery and she may not have the appropriate support network in place with additional care at home or may not return to her baseline. Hormone therapy could also be a good option as her tumour is ER+ and has not spread to the axilla.</p>	<p>However surgery may not be best option due to her ongoing care needs and post op rehabilitation.</p>
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AGE BIAS IN BREAST CANCER

	29					Ann seems of sound mind and may survive long enough for surgery benefits. However, her disability may make recovery problematic and put her at high risk of post op infection. Given aphasia I cannot infer either way.	
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AGE BIAS IN BREAST CANCER

	30	Helen has moderate dementia, which may increase her risk of complications following an anaesthetic. She otherwise has no other severe systemic illness, however, is dependent on her husband and carers for ADLs, which might compromise her ability to recover from surgery.				
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AGE BIAS IN BREAST CANCER

	31		Because of her age and dementia, also she has a poor functional status and needs help with her ADLs, so she would struggle to recover from surgery and it might place a lot of stress onto her husband as her primary carer.				
Concerns about delaying surgery	9	the recurrence from endocrine therapy might bring up issues if her dementia progresses.		the risk of recurrence with the endocrine therapy should be taken into consideration.			

AGE BIAS IN BREAST CANCER

	13					<p>However, given current life expectancies and the fact that the patient has no other underlying illness I suspect their life expectancy is more than 2-3 years. This means that if they did not receive surgery, I suspect the breast cancer would be the pathology which kills them.</p>	
	17			<p>This may be the only chance to cure the cancer before it spreads.</p>			

AGE BIAS IN BREAST CANCER

	19		<p>She is likely to respond to the hormonal therapy and they would both find it easier to manage but it would likely be the breast cancer that kills her. More support may be required at home which could be provided</p>				
	25		<p>Since the cancer has not metastasised yet it would be a good idea to resect the tumour before it worsens and provide adjuvant radiotherapy.</p>				

AGE BIAS IN BREAST CANCER

Can always operate later	23			<p>Might be inclined to try non-surgical treatment first as this is the patient's preference but can do surgery later if cancer worsens</p>			
Could cope with surgery	3				<p>She would be a good candidate for surgery as she is likely to recover well</p>	<p>She does not have any cardiorespiratory conditions that would create additional risk of anaesthesia.</p>	<p>she is medically stable with little chance of deterioration of her condition directly due to her disability, she would be a good candidate for surgery/anaesthesia for surgery.</p>

AGE BIAS IN BREAST CANCER

6				I think she'd recover well from surgery		I think that surgical recovery may be difficult in patients with limited mobility, but unlike Susan, Ann does not have comorbidities aside from a stable disability, so surgical recovery may be a bit easier.
7			would probably have a low surgical risk	however because of her good health she probably has longer than 2 year life expectancy and would stand a good chance in surge		
9						she does not have comorbidities that would make surgery inappropriate

AGE BIAS IN BREAST CANCER

	10					<p>She is young and has positive nodes so surgery is the preferred option. Her disability is long standing and has adequate care in place to assist recovery from surgery.</p>
	12				<p>She has high potential to recover well from surgery and has a support system for the emotional impact</p>	<p>the patient is young and her disabilities are well supported, physically a good patient for surgery</p>
	13			<p>Given the patient only has one comorbidity, which is well-controlled, and appears to have a good level of physical fitness, she is more likely to tolerate the surgery well.</p>		

AGE BIAS IN BREAST CANCER

19						She would have full support at home to help with recovery.
20	However there are no significant comorbidities mentioned that would mean surgery would be inappropriate and this woman may go on to live well into her 90s and so surgery may be a better option.					n
28					Her disability is long standing and stable so could possibly cope with surgery or endocrine option	

AGE BIAS IN BREAST CANCER

	29						Elizabeths PMHx makes discussions difficult. She may already have the assistance she would require for recovery. She has ~5 years of life (average) so surgical risks may be justified.
	30			She seems fairly mobile and active, given that she visits her grandchildren. Therefore inclined to believe that her cardiorespiratory functioning may tolerate surgery, which should be offered as per NICE guidelines	She sounds fairly active and independent (visits family, goes to cafes), meaning that her cardiorespiratory status may toelrate surgery, which should be offered as per NICE guidelines		
Impact on quality of Life	6		if she could be kept in a familiar place and not have too much disturbance it would be nicer				

AGE BIAS IN BREAST CANCER

	10		would probably recommend PET given that this option is likely to be less impactful on her life.				
	12	with her current well being it may reduce her quality of life and lengthen recovery	Again I feel worried that surgery would have a large negative impact on the patient's quality of life - reducing quality time with family while she is in hospital / recovery, pain, the physical and emotional stress of surgery and being in an unfamiliar environment (dementia / delirium)	we can judge fairly well how medically suitable a patient is for surgery, but quality of life also reflects mental health and wellbeing (the stress of surgery needs to be reflected on by the patient)			i now realise she may not wish to undergo the mental stress of surgery - unfamiliar environment, new care staff, team unfamiliar with her disabilities, pain, being away from family.

AGE BIAS IN BREAST CANCER

13					My personal opinion would be that it would be better to receive TEP and have 2 or 3 years of higher quality life than go through traumatic surgery with an uncertain prognosis.	
16			she is quite independent at the moment and having surgery may risk her losing this.			
19	Her quality of life would also be important when making this decision.	Her comorbidities don't suggest she will die in the next 2 years but as she has moderate dementia she may find the process of surgery and recovery distressing which could affect her QoL.				

AGE BIAS IN BREAST CANCER

	22	Due to patient's co morbidities, age and risks of surgery and anaesthesia, life expectancy and quality of life			The surgery may be curative and offer her a good quality of life and a better life expectancy however her wishes against having a surgery should be respected if that is her preference.	Due to the patient's disability and the difficulties around obtaining her preference, risks of surgery and quality of life. A best interest design should be made	
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AGE BIAS IN BREAST CANCER

	25	Initially I wanted to recommend surgery as she has a positive cancer diagnosis and it is a guideline-recommended treatment. However, considering this patient may be quite frail, knowing she is not independent and has dementia + renal impairment I would question whether surgery may exacerbate her condition. Thus, PET is also a reasonable option for this lady.					
	26						surgery may impact her wellbeing and recovery time will be long

AGE BIAS IN BREAST CANCER

	28	It would depend on the decision made by the patient however surgery may have impacts on patients life post-surgery. May not return to her baseline level of function and could possibly provide worse outcomes.			She is fit and well patient and is a small tumour size, so could be a good candidate for surgery. However it may cause more problems post surgery and she may not have the appropriate support network in place with additional care at home or may not return to her baseline. Hormone therapy could also be a good option as her tumour is ER+ and has not spread to the axilla.		
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AGE BIAS IN BREAST CANCER

	29			<p>Grace is active and seems to enjoy life. A long surgical recovery may prevent her from doing what she enjoys. PET may provide her with "quality time"</p>	<p>a long recovery is an important consideration, I wouldn't want to persuade Alice without more information for her and for me.</p>		
	30	<p>Susan has no absolute contraindications for surgery, however her significant co-morbidities would need to be taken into account. She probably has an ASA score of 3, and her quality of life may arguably be more compromised by the risks of surgery versus endocrine therapy.</p>					

AGE BIAS IN BREAST CANCER

Surgery as gold standard	25	Initially I wanted to recommend surgery as she has a positive cancer diagnosis and it is a guideline-recommended treatment. However, considering this patient may be quite frail, knowing she is not independent and has dementia + renal impairment I would question whether surgery may exacerbate her condition. Thus, PET is also a reasonable option for this lady.					
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AGE BIAS IN BREAST CANCER

	30			She seems fairly mobile and active, given that she visits her grandchildren. Therefore inclined to believe that her cardiorespiratory functioning may tolerate surgery, which should be offered as per NICE guidelines	She sounds fairly active and independent (visits family, goes to cafes), meaning that her cardiorespiratory status may tolerate surgery, which should be offered as per NICE guidelines		
Treatment efficacy	1			tumour is small and local so hopefully surgery would mean cure			
	2			The cancer is ER+ so PET would hopefully be effective at preventing spread			
	3					removal of the primary tumour and lymph nodes would be likely to provide a very good chance of increased survival.	

AGE BIAS IN BREAST CANCER

4		surgery but it is likely to be more beneficial to Susan than endocrine therapy alone.				She is likely to benefit most from surgery
5			Also she is likely to have a good response to endocrine therapy as she is ER+.	could live for some more years with surgery.		
8	the axillary lymph nodes could be removed, therefore removing the cancer completely		it is more likely to be cured by removal of the breast cancer.			
9		As the cancer has spread, surgery would be less effective.		surgery could potentially be curative and should be considered	the tumour is very large and so endocrine therapy is unlikely to be able to have a bit impact, unlike surgery.	Surgery could remove the primary tumour and the affected lymph nodes, whereas the endocrine therapy would only shrink the tumour.

AGE BIAS IN BREAST CANCER

	13			<p>Although I think Alice would respond well to endocrine therapy [..] Overall I would say the benefits of the surgery outweigh the risks. To not have the surgery I think could shorten her life expectancy, even with a good response to the endocrine therapy. The benefits of endocrine therapy over surgery therefore do not outweigh the risks in my opinion.</p>	<p>She is likely to respond to endocrine therapy well, however the breast cancer may still end up being the cause of her death. I therefore think the risks of surgery are relatively small and the benefits still outweigh those of hormone therapy.</p>	<p>The risks of each option are therefore relatively high and with similar levels of benefits.</p>
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AGE BIAS IN BREAST CANCER

17				given the context of her cancer and overall health, surgery would give her the best chance of eradicating her cancer		
19	the endocrine therapy not being curative		Surgery would likely be curative but there would be risks with anaesthesia and her epilepsy could put her at higher risk.		The tumour is also large so surgery would have a much better response than the hormonal therapy.	Her comorbidities don't suggest she will die in the next 2 years and surgery would be likely to have the best outcomes.
22		The patient has long standing medical conditions and a reduced life expectancy however she might benefit from a potentially curative surgery	Her surgery may be curative although there are risks to having the surgery and her life expectancy is low	The surgery may be curative and offer her a good quality of life and a better life expectancy however her wishes against having a surgery should be respected if that is her preference.		

AGE BIAS IN BREAST CANCER

	26		the tumour would be fairly easy to excise and give her the best long term outcomes		
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AGE BIAS IN BREAST CANCER

	27		She also has a large tumour that has already spread to LNs and one that should theoretically respond well to PET and be slow growing.	The tumour is small meaning there is potential to resect with curative intent as opposed to 'staving off' the cancer with PET	I think that given that Alice has a small tumour with no spread, she could be considered for surgery with potentially curative intent, as opposed to managing the disease with PET but not long-term. She appears to have good baseline health. Once again, patient choice is a key factor but based on the information given of a small tumour that could hopefully be removed, I would recommend surgery.		
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AGE BIAS IN BREAST CANCER

	29				Ann seems of sound mind and may survive long enough for surgery benefits. However, her disability may make recovery problematic and put her at high risk of post op infection. Given aphasia I cannot infer either way.	
	31		She is fit and well despite being 86, so I would recommend surgery over endocrine therapy alone because of the life-prolonging benefit of surgery. Also her nodes are not affected yet and so she has a good prognosis if the tumour is removed			

AGE BIAS IN BREAST CANCER

OTHER PATIENT CHARACTERISTICS

Appears in reasonable health	1			she seems to have a good QoL	Good QoL		
	2				she would make a good surgical candidate given the small size of the tumour as well as her lack of comorbidities and active and independent lifestyle.		
	3			The patient is independent, seems to have a good quality of life, has minimal comorbidities r.e. the procedure and anaesthesia.	The patient has a good performance status and has stable medical conditions which are unlikely to deteriorate.	She seems to have been coping for a long time with her residual stroke symptoms and therefore is stable medically.	she is medically stable with little chance of deterioration of her condition directly due to her disability, she would be a good candidate for surgery/anaesthesia for surgery.
	4		It sounds like Susan still has a reasonably good quality of life				While she has a disability this is stable.

AGE BIAS IN BREAST CANCER

5	I don't think she has significant comorbidities that would stop her having surgery	Her co-morbidites aren't so bad that they would contraindicate surgery.	although she seems to be mostly fit and well.	She seems relatively well and fit		
6				Grace is active		
7	She is 82 and has only a couple of co-morbidities so would probably be okay with surgery		she seems to be fit, well and active	her good health	She is in good health apart from her previous stroke	Although she has restricted mobility, she has been living like that for a long time and seems as though other than this she is coping okay
8			The patient is relatively well with controlled diabetes type 2.	the patient is fairly well		
9			she is fit and well	The patient is well	She has no other comorbidities that might impact on her life expectancy, aside from her previous stroke	The patient is well, but does require full time care
10	no significant health problems that would affect surgery					

AGE BIAS IN BREAST CANCER

12				she may be a very fit 86 year old and recover and cope well with surgery	She has a good quality of life and is currently well supported with her disabilities.	the patient is young and her disabilities are well supported, physically a good patient for surgery
13			she still appears to have relatively good physical fitness (she is able to go to the local cafe) and is not particularly frail (given only one other co-morbidity and independant of ADLs).	Given the patient only has one comorbidity, which is well-controlled, and appears to have a good level of physical fitness, she is more likely to tolerate the surgery well.		
17	Although older and also with some underlying conditions it sounds like this patients overall health is better.			This lady sounds like she is fit and healthy and thus her age is really irrelevant		

AGE BIAS IN BREAST CANCER

18			No lymph node involvement, good functional status despite age, if she is fit for surgery there could have a high chance of success			
19				is generally fit and well and independent.		
20	However there are no significant comorbidities mentioned that would mean surgery would be inappropriate and this woman may go on to live well into her 90s and so surgery may be a better option.			At 88 the concern about lack of efficacy beyond 2yrs is less concerning than in a younger patient, however this patient is still fairly fit and well.	I am unsure whether her comorbidities would affect suitability for surgery, but she has lived for approx. 2 decades with these disabilities.	

AGE BIAS IN BREAST CANCER

	23		She is fit and healthy	As the cancer has not spread to the nodes and is a small tumour, I think I would offer surgery as she is fit enough and I would explore her fears and concerns over surgery	
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AGE BIAS IN BREAST CANCER

25			<p>This lady is a good candidate for surgery. She has a fairly small tumour that hasn't affected the lymph nodes yet. She is also healthy and active and there don't seem to be any outstanding health problems. In her best interests, surgery is the better option.</p>	<p>Alice's diabetes is well controlled and she is described as fit and well. She has a localised lump that can be easily resected, and her lymph nodes have not been affected. I can understand her concerns, but would provide her enough information of the surgery and risks of what could happen if she decides to have it or not so that she can make an informed decision.</p>		
26				<p>not spreading, fit and well</p>		

AGE BIAS IN BREAST CANCER

27			<p>Aside from long-standing epilepsy Grace has a good baseline of health and is fit and active.</p>			
28				<p>She is fit and well patient and is a small tumour size, so could be a good candidate for surgery. However it may cause more problems post surgery and she may not have the appropriate support network in place with additional care at home or may not return to her baseline. Hormone therapy could also be a good option as her tumour is ER+ and has not spread to the axilla.</p>	<p>Her disability is long standing and stable so could possibly cope with surgery or endocrine option</p>	

AGE BIAS IN BREAST CANCER

	30			<p>She seems fairly mobile and active, given that she visits her grandchildren. Therefore inclined to believe that her cardiorespiratory functioning may tolerate surgery, which should be offered as per NICE guidelines</p>	<p>She sounds fairly active and independent (visits family, goes to cafes), meaning that her cardiorespiratory status may tolerate surgery, which should be offered as per NICE guidelines</p>		
	31				<p>Her age of 88 would make me lean towards recommending endocrine therapy, however she is functionally fit and well and could benefit from surgical removal of the tumour. I would explain pros and cons of both to patient and let her decide.</p>	<p>Although she has a long-standing disability, she is stable and I believe that she would benefit from surgery over endocrine therapy alone because I would expect her to live longer than 3 years, so endocrine therapy would not be the best option</p>	<p>Although she is disabled from the effects of her stroke, she is otherwise well. She is 77 and so possibly could see benefit from surgery in prolonging her life.</p>

AGE BIAS IN BREAST CANCER

Life expectancy	4	isn't nearing the end of her life so surgery should be considered.				
	5	I don't think her lifespan would be less than 3yrs, so I would prefer surgery.			She may live longer than 3 years, meaning endocrine therapy would stop working	She has quite a few years of life ahead of her, even though she is disabled.
	6	In terms of life expectancy, I'm really not sure, but I think that the large tumour size and LN spread would make this an aggressive cancer and may limit her life expectancy beyond 2 years			a fast moving disease with a prognosis of less than 2 years	
	7			she probably has longer than 2 year life expectancy	She is in good health apart from her previous stroke and is 77 years old so probably has a life expectancy longer than 2	

AGE BIAS IN BREAST CANCER

					years	
8	However this woman does not appear to be approaching end of life care, so may live longer than 2/3 years				from the history it does not appear that the woman is approaching end of life, even though some of her activities of daily living are affected by her previous stroke.	The woman does not sound like she is coming to end of life care

AGE BIAS IN BREAST CANCER

13			Despite being 88 I believe she could easily survive beyond 2 years as she has no other terminal conditions and her diabetes is well-controlled.	For this reason she is also less likely to have a life expectancy of 2 years or less.	However, given current life expectancies and the fact that the patient has no other underlying illness I suspect their life expectancy is more than 2-3 years. This means that if they did not receive surgery, I suspect the breast cancer would be the pathology which kills them.	However, owing to the patient's stable state her life-expectancy may well be beyond 2 years.
17						Also her disability is stable and it does not sound like she is near the end of her life or going to deteriorate any time soon

AGE BIAS IN BREAST CANCER

18	Although she is dependent on others, nothing in her medical history suggests that she is likely to die in the next 2 years except perhaps her age generally.					
19		Her comorbidities don't suggest she will die in the next 2 years but as she has moderate dementia she may find the process of surgery and recovery distressing which could affect her QoL.	There is no significant comorbidity that would suggest she will die in the next 2 years.	She has no comorbidities which would suggest she will die in the next 2 years	Although Ann is disabled and dependent her medical history doesn't suggest she is likely to die in the next 2 years.	Her comorbidities don't suggest she will die in the next 2 years and surgery would be likely to have the best outcomes.

AGE BIAS IN BREAST CANCER

20	At 84, the patient is nearing the end of her natural life so resistance to the therapy after 2-3yrs is less concerning than it would be in a younger patient.		At 86 the concern about endocrine therapy only working for 2-3yrs is less of an issue than with a younger patient.	At 88 the concern about lack of efficacy beyond 2yrs is less concerning than in a younger patient, however this patient is still fairly fit and well.		
21	Tumour is ER+ and she is 84, surgery is dangerous in her age and she has nearly lived her life expectancy		No node involvement and tumour is ER+ She is 85 so we wouldn't add many years to her life expectancy		She has at least 10 more years to live, tumour has involved the nodes	surgery can give her another 10 years to live
22	Due to patient's co morbidities, age and risks of surgery and anaesthesia, life expectancy and quality of life	The patient has long standing medical conditions and a reduced life expectancy however she might benefit from a potentially curative surgery	Her surgery may be curative although there are risks to having the surgery and her life expectancy is low	The surgery may be curative and offer her a good quality of life and a better life expectancy however her wishes against having a surgery should be respected if that is her preference.		

AGE BIAS IN BREAST CANCER

27	<p>She also sounds relatively frail as she needs assistance with AoDL and given this, along with her age and background of dementia, one could argue that she will die of something else before the cancer and thus risk of surgery outweighs benefits.</p>					
29	<p>Susan may not live long enough to benefit from improved outcomes of surgery.</p>				<p>Ann seems of sound mind and may survive long enough for surgery benefits. However, her disability may make recovery problematic and put her at high risk of post op infection. Given aphasia I cannot infer either way.</p>	<p>Elizabeths PMHx makes discussions difficult. She may already have the assistance she would require for recovery. She has ~5 years of life (average) so surgical risks may be justified.</p>

AGE BIAS IN BREAST CANCER

	31					Although she has a long-standing disability, she is stable and I believe that she would benefit from surgery over endocrine therapy alone because I would expect her to live longer than 3 years, so endocrine therapy would not be the best option	Although she is disabled from the effects of her stroke, she is otherwise well. She is 77 and so possibly could see benefit from surgery in prolonging her life.
Tumour characteristics	1	The tumour is quite large so might be best to excise it completely	tumour is large so might need surgery for effective clearance	her tumour is small and local	small tumour [...] no axillary LN issues means hopefully would be cleared successfully with surgery	already at lymph nodes so would require removal there too.	tumour is large which could warrant it

AGE BIAS IN BREAST CANCER

2	The cancer is ER+ so will likely benefit from PET.	Given the cancer is ER+ I would advise PET as the recommended choice	the tumour is small and hasn't spread so surgery is favourable	she would make a good surgical candidate given the small size of the tumour	Despite this the cancer appears to be relatively low grade so with PET the patient may become a surgical candidate if the VTE risk was mitigated	
3		The fact that the tumour would respond well to endocrine treatment is a further factor making the two choices more equal.	The tumour is also small so she would not be likely to need a radical mastectomy, in which case it would also be a fairly straightforward recovery for her.	her surgery would be likely a wide local excision if there is no sign of axillary node spread.	She does not have metastatic spread of her cancer	
4	Being ER+, it is more likely to respond to hormonal therapy.					

AGE BIAS IN BREAST CANCER

6	ER+ve tumours may respond better to endocrine treatment [...] However, local spread is less bad than regional spread (I believe?) and so the surgery may be successful in removing all the tumour, and HER2-ve tumours may respond worse	I think that ER+ve tumours have a good chance of responding to endocrine therapy	I think her smaller tumour and no LN spread make her a good candidate for surgical treatment.	a small tumour that has not metastasized	The large tumour size and regional LN spread suggest a fast moving disease	the tumour is large and has spread to lymph nodes
7	however her tumour would be likely to respond to endocrine therapy as it is ER+ and slow growing as is HER2-		the tumour is quite small and has not spread.			

AGE BIAS IN BREAST CANCER

8	has spread beyond the breast tissue. The tumour is also ER +ve therefore it would respond to primary endocrine therapy. This pushes me to be more in favour of this option.	size of tumour, spread to lymph nodes, moderate dementia, mild renal impairment and ER +ve (more likely to respond to hormonal therapy)	The tumour is on the smaller side and has not spread to the axillary lymph nodes	confined to the breast, small size, not HER2 +ve	has spread to regional lymph nodes, therefore the surgery would be unlikely to remove the breast cancer completely and there is a chance that it has metastasised already. The tumour is quite large.	The breast cancer is stage 2B, large size + node positive.
9	Being ER+ means she has a good chance of responding to endocrine therapy, however, the tumour is large, so surgery might be required.	her cancer is ER+ so should respond to the endocrine therapy	The patient has a small tumour that has not spread, and would be responsive to therapy as it is ER+.	the tumour is small and has not spread to the lymph nodes		
10	Given that her breast cancer is ER+ then it would respond to primary endocrine therapy.					

AGE BIAS IN BREAST CANCER

13			The tumour is not large and has not invaded lymph nodes meaning the surgery may be less extensive and so better tolerated.	The tumour is small with no lymph node involvement and so surgery may be less less extensive.	As the tumour is large and has spread to the lymph nodes I imagine the surgery would be relatively extensive.	
14	Because its responsive to receptors		As it hasn't spread yet	As it hasn't spread yet and because she has epilepsy		
16	Given that she has a large tumour and it is ER+ve, ideally I would like to discuss the option of having a wide local excision surgery with lymph node biopsy (+/- clearance) along with Endocrine therapy as an adjunct.		Seeing that Alice has a medium sized tumour which hasn't spread and that it is ER+ve, I feel Primary endocrine therapy may be most appropriate here		Elizabeth's cancer consists of a large tumour and has spread to regional lymph nodes meaning there is some potential for serious deterioration through metastasis.	

AGE BIAS IN BREAST CANCER

17			Although worried about surgery I do feel this may be the best option for Alice. Her tumour is not very large at this stage and is confined to the breast tissue only.		Given the cancer is at present confined to the primary site and regional lymph nodes, surgery with lymph node clearance may be the best potentially curative option.	I believe surgery is still preferred in grade 2 breast cancer and despite her other conditions this may be the better option for her.
18		Decreased functional status and lymph node spread	No lymph node involvement, good functional status despite age, if she is fit for surgery there could have a high chance of success			
19			it is a small and slow growing tumour so she may have longer than 2 years.		The tumour is also large so surgery would have a much better response than the hormonal therapy.	

AGE BIAS IN BREAST CANCER

20	The tumour is ER+ so should respond well to endocrine therapy, however the tumour is already large and has spread to lymph nodes.			The tumour is small and ER+ so likely to respond to endocrine therapy.		The tumour is quite large and surgery is more likely to get rid of it all.
21	Tumour is ER+ and she is 84, surgery is dangerous in her age and she has nearly lived her life expectancy	Tumour is ER+Tumour has spread to lymph nodes	No node involvement and tumour is ER+ She is 85 so we wouldn't add many years to her life expectancy	she is 88 tumour is ER+	She has at least 10 more years to live, tumour has involved the nodes	
22						Due to her co morbidities, high burden of disease and risk of having a surgery for her age. Her recovery may also be challenging

AGE BIAS IN BREAST CANCER

	23		Small tumour Not spread to axillary	As the cancer has not spread to the nodes and is a small tumour, I think I would offer surgery as she is fit enough and I would explore her fears and concerns over surgery	Large tumour
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AGE BIAS IN BREAST CANCER

	25		<p>This lady is a good candidate for surgery. She has a fairly small tumour that hasn't affected the lymph nodes yet. She is also healthy and active and there don't seem to be any outstanding health problems. In her best interests, surgery is the better option.</p>	<p>Alice's diabetes is well controlled and she is described as fit and well. She has a localised lump that can be easily resected, and her lymph nodes have not been affected. I can understand her concerns, but would provide her enough information of the surgery and risks of what could happen if she decides to have it or not so that she can make an informed decision.</p>		<p>This lady has a stroke history, and is therefore more susceptible to post-operative complications. Her immobility is also a factor I took in my decision to give PET instead of surgery. The fact that the cancer spread to regional lymph nodes has made the situation more difficult for her in terms of surgery. I believe the best treatment for her is PET.</p>
	26	her disease is more advanced as it is spreading to regional lymph nodes		not spreading, fit and well		

AGE BIAS IN BREAST CANCER

27	Susan has what is likely to be a slow growing tumour (HER2 neg) and one that will likely respond well to PET (ER+).		The tumour is small meaning there is potential to resect with curative intent as opposed to 'staving off' the cancer with PET	I think that given that Alice has a small tumour with no spread, she could be considered for surgery with potentially curative intent, as opposed to managing the disease with PET but not long-term. She appears to have good baseline health. Once again, patient choice is a key factor but based on the information given of a small tumour that could hopefully be removed, I would recommend surgery.		
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AGE BIAS IN BREAST CANCER

	28		<p>Her tumour is large and has spread to the lymph nodes, which means she has a higher risk of it spreading further so surgery seems like the most appropriate option.</p>	<p>Small tumour with no spread so could do a lumpectomy surgery as may be less complicated however if she preferred taking tablets to surgery this could also be an option as the tumour is ER +</p>	<p>She is fit and well patient and is a small tumour size, so could be a good candidate for surgery. However it may cause more problems post surgery and she may not have the appropriate support network in place with additional care at home or may not return to her baseline. Hormone therapy could also be a good option as her tumour is ER+ and has not spread to the axilla.</p>	<p>Large tumour with spread to regional lymph nodes so may need WLE and lymph node clearance.</p>
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AGE BIAS IN BREAST CANCER

	31		She is fit and well despite being 86, so I would recommend surgery over endocrine therapy alone because of the life-prolonging benefit of surgery. Also her nodes are not affected yet and so she has a good prognosis if the tumour is removed		
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