

Cancer and other long-term health conditions: an evidence review of diagnosis, treatment, and experience

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1. Foreword

Improving access, experience and outcomes for people with cancer and other long-term conditions is a key objective within Macmillan's 2025-2030 Strategy. But what does that actually mean? It means that we know that if you've got more than one long-term condition before you develop the symptoms of cancer, your diagnosis or referral for treatment could be delayed. It means we know that your other diagnoses are likely to influence the cancer treatment options available to you, and may mean you have poorer health as a result. It means we know that having another condition as well as cancer can itself be a source of additional worry and anxiety. So, we commissioned this research to understand more about the evidence base that currently exists around the access, experience and outcomes for people with cancer and other long-term conditions, and seek to build on and develop it further.

Having reviewed this evidence, we developed a series of recommendations that will contribute to our work to help people with cancer and other conditions to expect a better future. Whether you have another condition before cancer, or develop another long-term condition following your treatment, we want to improve the ways in which you can manage your own conditions, the treatment and support you can access from the health and care system, and the infrastructure that underpins the delivery of that support so everyone who needs to understand your conditions can do so much more easily. But we know that we can't do this alone: we need willing partners to add to our knowledge and evidence base, spread best practice among healthcare professionals and influence the design of services to improve multiple condition management. If you think you have a role to play in that, then please join us as we seek to spark a revolution in cancer care for the future.

Paul Butterworth

Director, Cancer and other long-term conditions



2. Executive Summary

Supporting people affected by both cancer and other long-term conditions is a strategic priority for Macmillan Cancer Support. To inform how best to target its support, Macmillan worked in partnership with Strategy Unit to undertake a scoping review.

This review explores the impact of having cancer alongside other long-term conditions across three key stages of the cancer pathway:

- Cancer diagnosis
- Cancer treatment
- Experience of illness and quality of life after treatment

The review examines not only the combined impact of cancer and other long-term conditions, but also the underlying drivers and explanations reported in the literature. The aim is to help Macmillan identify opportunities to improve outcomes and experiences for people affected by both cancer and other long-term conditions.

The review followed a Quick Scoping Review (QSR) approach, designed to balance breadth, rigour, and timeliness to support strategic and policy decision-making. It prioritises breadth over depth—aiming to map the range of relevant literature rather than conduct detailed analysis of individual sources.

There are some notable limitations within the evidence base. For example, research on patient experience is limited, and older adults and individuals with complex needs are generally underrepresented. The presence of comorbidities further complicates research, as these may be influenced by cancer-specific characteristics and sociodemographic factors. A full list of limitations is provided in section 3.3 of the introduction.

Instead of drawing exhaustive or definitive conclusions, the review provides a high-level overview of the available evidence. As such, more targeted reviews or additional research, analysis, engagement, and evaluation may be valuable to address existing gaps and uncertainties.

Summaries of findings for each stage of the cancer pathway are presented in the following sections.

2.1 Cancer diagnosis

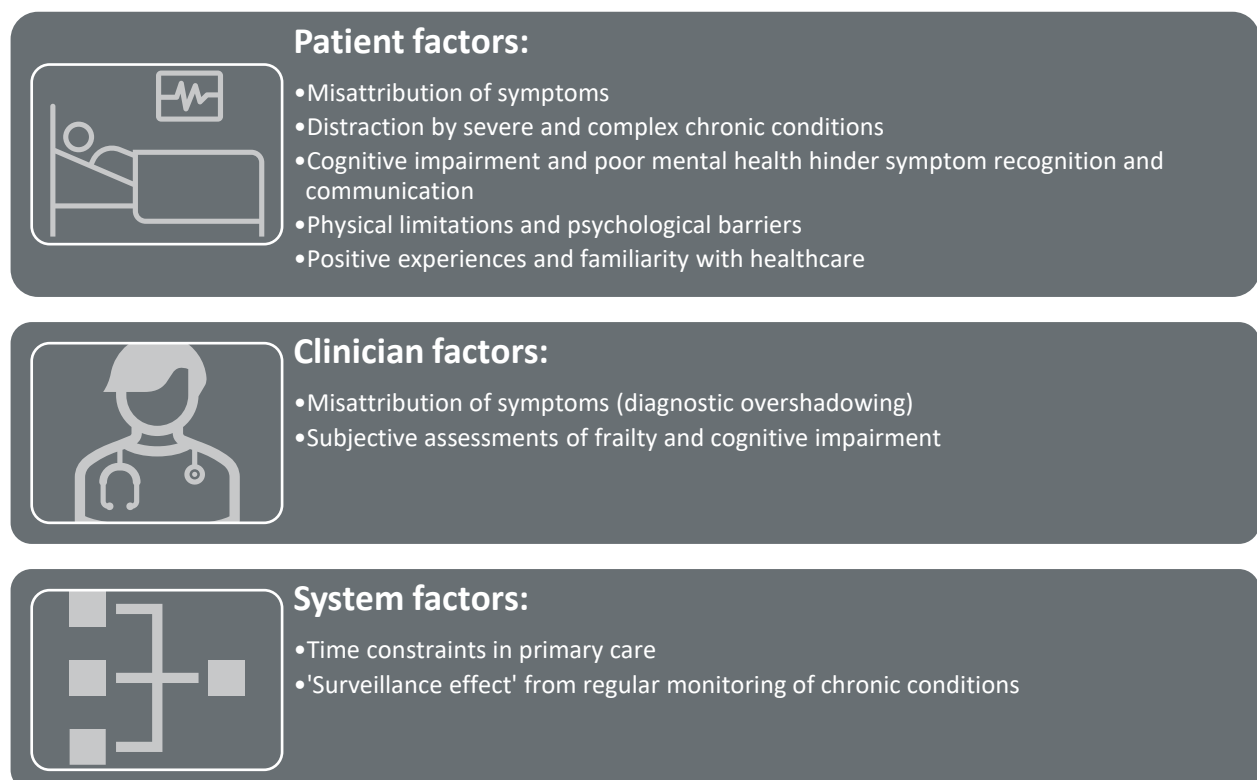
People who already have long-term health conditions can experience delays in getting a cancer diagnosis. Research shows that patients with comorbidities tend to wait longer at each stage of the diagnosis process (primary, secondary and overall diagnostic intervals) and are more likely to face avoidable delays compared to those without long-term conditions.

However, the evidence on how comorbidities affect the stage at which cancer is diagnosed is mixed. Differences are reported depending on cancer site and the specific long-term conditions a person has. However, reviews are limited in the conclusions they can make due to differences in how studies define and report chronic illnesses and cancer types.

A concerning trend emerges from previous work involving Macmillan (Scottish Routes from Diagnosis) which found that people with long-term conditions are much more likely to have no information recorded about the stage of their cancer. This is important because people with unknown cancer stage often have survival outcomes similar to those diagnosed at stage 4 ([Public Health Scotland and Macmillan, 2022](#))—suggesting their cancer may be advanced but not fully recognised or treated properly. This may happen because full cancer staging requires several tests, which some patients may not be well enough to complete or may choose to avoid due to the perceived or actual burden of tests.

Evidence reviews also indicate that people with cancer and other long-term conditions—including dementia—are more likely to be diagnosed through emergency care. This route of cancer diagnosis is associated with more advanced disease and poorer survival outcomes.

Figure 1. Possible explanations for diagnostic differences



The findings of this review highlight the potential benefits of earlier recognition and more proactive management of cancer symptoms in individuals with complex health needs. Misattribution of symptoms—by both patients and clinicians—was identified in this review as a

possible contributing factor to diagnostic delays. Possible explanations for differences in diagnosis explored and summarised across three levels: patient, clinician, and system factors are presented in Figure 1.

While many of these factors report barriers to timely cancer diagnosis, some may support earlier detection. For example, some patients who have positive experiences with healthcare and are familiar with health systems are reported to have improved self-efficacy and confidence in recognising and discussing cancer symptoms with professionals. Additionally, regular monitoring for existing long-term conditions can create opportunities to raise new symptoms during routine appointments. This “surveillance effect” may help identify cancer earlier in some cases.

Further details of the impact of multimorbidity of cancer diagnosis can be found in section 4.

2.2 Cancer Treatment

Patients with cancer who also have other long-term conditions are less likely to receive cancer treatment or may receive care that deviates from established treatment guidelines, compared to those without comorbidities. Across various cancer types, individuals with a higher burden of comorbidity are less likely to undergo surgery, chemotherapy, or radiotherapy, and are more likely to receive conservative or non-curative treatment approaches, including palliative care.

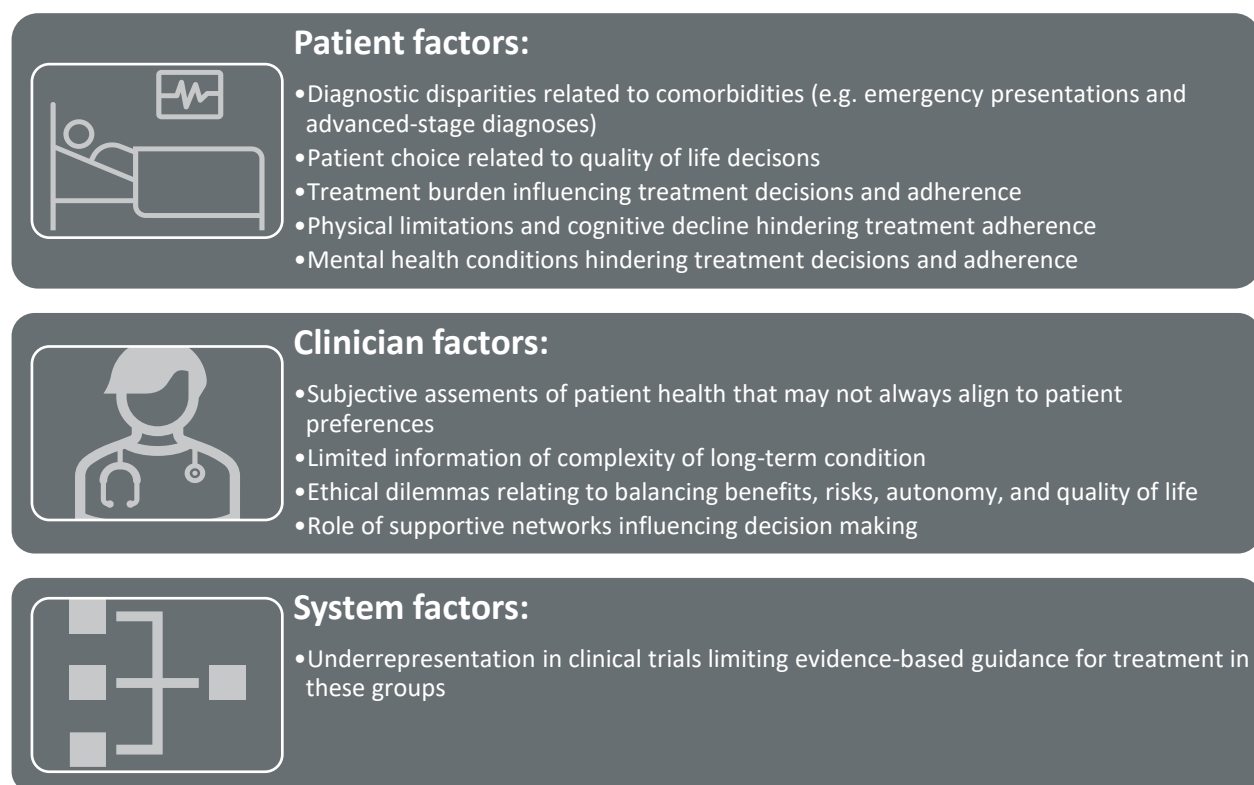
Research focusing on breast cancer specifically, report women with comorbidities are given fewer adjuvant chemotherapies or targeted drugs and are more often managed with non-surgical approaches (like hormone therapy instead of surgery). Similarly, advanced surgical techniques—like laparoscopic or robotic procedures for colorectal cancer—are more commonly offered to patients without comorbidities. Additionally, patients with both cancer and comorbidities including serious mental illness may face longer waits for treatment, further compounding disparities in care.

Differences in cancer treatment for patients with comorbidities may reflect the clinical reality that poor overall health can affect both the effectiveness and tolerability of cancer therapies. While evaluating treatment efficacy and tolerability was outside the scope of this review, the observed disparities highlight the need for more tailored treatment planning—balancing clinical complexity with equitable access to potentially curative care.

Underrepresentation of people with comorbidities in clinical trials was identified in this review as a possible contributing factor to treatment delays which may act as a potential barrier to tailored treatment planning. Older adults, individuals with frailty, and those with multiple long-term conditions are often excluded from trial populations, resulting in a lack of robust, evidence-based guidance to support treatment decisions for these groups. This gap in representation may contribute to more cautious or conservative treatment approaches.

A list of possible explanations for differences in treatment explored and summarised across three levels: patient, clinician, and system factors are presented in *Figure 2*.

Figure 2. Possible explanations for treatment differences



Further details of the impact of multimorbidity of cancer treatment can be found in section 5.

2.3 Experience of illness and quality of life after treatment

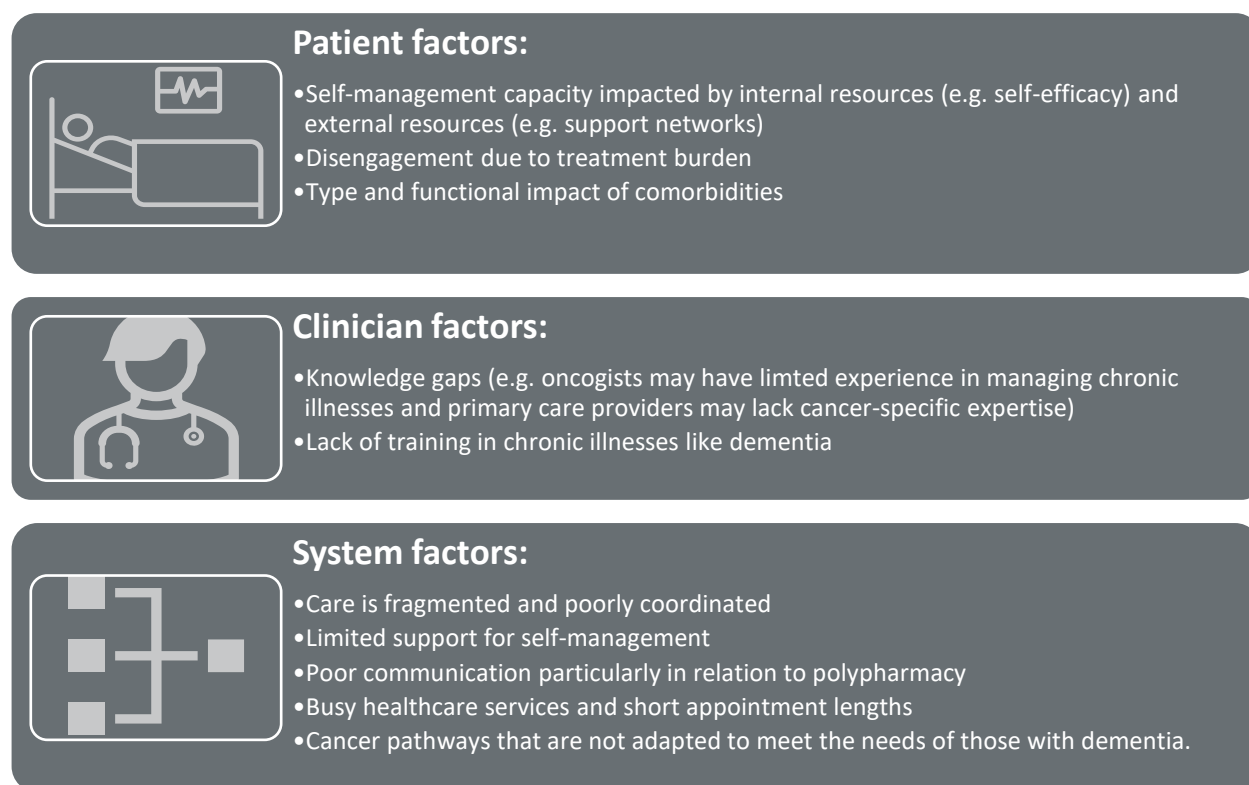
People with cancer and other long-term conditions often experience a compounded impact on their overall well-being. Compared to those without comorbidities, they report poorer general health and more severe physical symptoms—including increased pain, fatigue, and reduced physical function. Individuals with psychological or psychiatric conditions in addition to cancer are especially likely to report worse health status. Moreover, those with other long-term conditions are more prone to elevated emotional distress, with higher levels of anxiety and depression commonly reported.

Given the increased burden of pain, fatigue, and reduced function, there appears a need for earlier and more proactive symptom management strategies to improve quality of life and prevent deterioration. However, the review found that support from healthcare professionals for self-management is often limited—reducing opportunities to ease this burden and improve outcomes. Additionally, fragmented and poorly coordinated care was identified as a contributing factor to

these challenges, with many patients reporting that instead of alleviating their workload, the healthcare system often adds to the complexity of managing their health.

Possible explanations for differences in experience were explored and summarised according to patient, clinician, and system factors. Key themes are presented in Figure 3.

Figure 3. Possible explanations for differences in experience



Further details of the impact of multimorbidity of the experience of illness and quality of life after cancer treatment can be found in section 6.

2.4 Next Steps

Based on the findings of this broad review, Macmillan have considered the implications and developed a series of recommendations that will inform and strengthen their ongoing efforts to help people with cancer and other conditions to expect a better future.

A full list of recommendations made by Macmillan can be found in section 7.

3. Introduction

3.1 Background

The reported prevalence of long-term conditions among people living with cancer in the United Kingdom (UK) varies significantly across the literature. For example, the proportional estimates of people living with cancer in England who also have at least one other long term condition range from as low as 62% ([National Cancer Patient Experience Survey, 2025](#)) to as high as 82% ([Stafford et al., 2018](#)). This variation can be attributed to differences in how long-term conditions are defined and the methodologies used across studies.

Among the available evidence, the 2015 Deloitte Monitor report commissioned by Macmillan Cancer Support is a robust and comprehensive estimate aligned with the NICE definition of comorbidities ([NICE 2023](#)). This research estimated that approximately 70% of people living with cancer in the UK have at least one other long-term condition ([Macmillan, 2015](#)). However, the study did not account for conditions such as frailty, substance misuse, or learning disabilities. Given the aging population it is reasonable to assume that the current prevalence is likely to exceed 70%.

Recognising the growing complexity of needs among people affected by both cancer and other long-term conditions, Macmillan Cancer Support has made supporting individuals affected by both cancer and other long-term conditions a key strategic priority. To help understand how best to focus their support, Macmillan worked in partnership with Strategy Unit to undertake a scoping review.

This scoping review explores the impact of having cancer and other long-term conditions on people across the cancer pathway. It aims to inform Macmillan's work in understanding and identifying opportunities for improving the experiences and outcomes of those affected by both cancer and other long-term conditions. Based on the findings, Macmillan have considered the implications and developed a series of recommendations that will inform and strengthen their ongoing efforts to help people with cancer and other conditions to expect a better future. A full list of recommendations made by Macmillan can be found in section 7.

3.2 Methodology

The Quick Scoping Review (QSR) method was selected for the review, as it is particularly well-suited to addressing the broad, exploratory questions posed by Macmillan. Rather than focusing on narrowly defined questions, the review aimed to provide a high-level overview of the existing evidence. QSRs are also valuable for informing policy and strategy, as they help map the current evidence base and enable important gaps to emerge during analysis that may warrant further exploration through stakeholder engagement, research, evaluation, or analysis.

Scoping searches were conducted in November 2024. Macmillan had broad areas of interest, and it was agreed that the scoping review focused on:

What is the impact of having cancer and other long-term conditions on people across the cancer pathway, including:

- cancer diagnosis
- cancer treatment and
- experience of illness and quality of life after treatment.

This includes the impact of having cancer and other long-term conditions as well as any drivers and explanations reported.

The population of interest was adults with cancer (or those living beyond cancer) who also had at least one other long-term condition, including frailty. While we did not limit the population to individuals currently receiving treatment, the areas of focus mean that the review is more likely to reflect the experiences of those undergoing treatment. It is important to note that a significant proportion of people diagnosed with cancer do not receive anticancer treatment. Reasons for this include advanced disease at diagnosis, the presence of other long-term conditions, frailty, or personal choice. As a result, some experiences may not be captured in this review.

A summary of the agreed scope of the review can be found in 8.1 - appendix 1 and an example search strategy in 8.2 - appendix 2.

3.3 Limitations

The scoping review methodology is not intended to be exhaustive or offer definitive recommendations. More focussed reviews and/or further exploration through research, analysis, engagement, and evaluation may be required to address gaps and uncertainties.

The Quick Scoping Review (QSR) method was agreed as the most appropriate given the broad subject interest. This method does not aim to be exhaustive but rather pragmatic, balancing time, breadth, and rigour to inform strategy, policy and decision making. In this context, a scoping review was well suited to the task of building a conceptual understanding of the various issues faced by patients with both cancer and at least one long term condition. To provide that broad understanding, the review includes research-derived evidence, from reviews and various study types – the review does not include critical appraisal or assessments of quality or bias so does not provide definitive recommendations. There will be themes which are covered at a high level which may warrant more focused reviews and there will also be gaps and uncertainties which warrant further exploration through research, analysis, engagement, and evaluation.

The scope of the review is focussed on the impact of having both cancer and at least one other long-term condition on diagnosis, treatment, and experience. Evidence has also been limited by evidence type and country of study.

Macmillan are interested in a broad scope of areas for exploration given their aim of understanding and identifying opportunities for improving the experiences and outcomes of those living with both cancer and other long-term conditions.

The three priority stages of the cancer pathway—diagnosis, treatment, and the experience of illness and quality of life after treatment—were agreed as the focus for exploration. It is likely that this analysis will highlight other questions or themes that may benefit from further exploration.

Due to high volumes of search results evidence was limited by evidence type. Evidence type was limited to evidence reviews and research studies conducted in the United Kingdom (UK).

Many of the included evidence reviews were narrative or reported on qualitative research and therefore did not report statistical information.

Evidence from the United Kingdom (UK) includes the UK as well as the four nations (England, Scotland, Wales, and Northern Ireland). Evidence reported from the four nations is based on the availability of published research and is therefore not consistently reported across the review. Evidence identified included some primary research focusing on UK wide populations however a large proportion of the primary research focused on England only. There was some evidence reporting on Scotland only populations, however no research focused on Wales or Northern Ireland only.

No restrictions on cancer type were made, however due to heterogeneity of the included studies cancer type summaries for each of the areas explored is not possible.

In this review, research is not limited to specific cancer types and includes research covering multiple cancer types (as defined by the researchers so variable) as well as single cancer types. It was therefore not possible to provide a summary of the impact of cancer type on each of the areas explored due to the heterogeneity of the included studies. Where specific cancer types have been explored, we have grouped the presentation of evidence where possible.

There is no universal definition of comorbidity therefore definitions and data collection methods vary across studies. Average comorbidity scores are commonly used; however, they may exclude important comorbid conditions and overlook variations in individual coexisting conditions. Similarly, variability within specific grouped conditions can mask significant differences.

Multimorbidity is a broad concept defined as the co-occurrence of two or more long term conditions ([Johnston et al., 2019](#)). However, there is ongoing debate about what defines a long-term condition ([Aiden, 2018](#)).

In this review, research is not limited to specific conditions and includes research defined by authors as comorbidity or multimorbidity and includes research on specific chronic conditions.

Research therefore spans various conditions including physical and mental health long-term conditions, learning disability, and frailty and cognitive impairment.

A common way to define and research comorbidity is the use of index-based systems that generate an average comorbidity score based on a list of conditions. However, these systems have notable limitations. One key concern is that they often assume comorbidities have a similar impact across different disease populations, which may not be accurate ([Chang and Lai, 2024](#)). The general applicability of such systems can also be problematic. For instance, the Charlson Comorbidity Index (CCI) is widely used in clinical research to assess comorbidity. Although it was originally developed as a prognostic tool to predict mortality in longitudinal studies ([Charlson et al., 2022](#)), its use has since expanded beyond survival-focused research. Researchers have highlighted that the CCI may be less suitable for studies involving cancer survivors, as it excludes many common conditions in this population—such as chronic pain, chronic fatigue, depression, anaemia, and constipation ([Ahmad et al., 2023](#)). Since the CCI includes conditions that affect mortality, it may not adequately capture comorbidities that influence other important outcomes like quality of life ([Ahmad et al., 2023](#)).

Research focusing on specific conditions may also have limitations within specific populations. The impact of chronic diseases may vary depending on their severity; however, this information is seldom reported in the literature ([Renzi et al., 2019](#)). For example dementia populations may include people with advanced dementia, who may also have frailty and limited life expectancy, as well as people with early-stage dementia, who may be younger and fitter ([Ashley et al., 2023](#)).

Data sources to identify comorbidity also varies between studies. Comorbidity may be determined via healthcare administrative data such as hospital or primary care records, as well as via self-reported data.

The delay in data availability means that the information in research may reflect patients seen well before the publication date and thus may not accurately represent current experiences and outcomes.

Whilst this evidence review was limited to research published in the last ten years (2015-2025), some studies may be based on data from patients treated several years prior to that. For example, a research study published in 2022 included patients diagnosed with colorectal cancer between 2011 and 2015 ([Majano et al., 2022](#)). For reviews this was even more apparent; a review published in 2016 included evidence published from 2005 onwards, however evidence included studies that used data from as early as 1992 ([Hopkinson et al., 2016](#)). This time lag may mean that the impact is not truly representative of the current situation.

Comorbidity may be associated with other influencing factors such as cancer specific factors and sociodemographic factors.

Comorbidity may be associated with other reasons for differences in diagnosis, treatment, and experiences. For example, cancer specific factors (e.g. type of cancer, stage of cancer) and sociodemographic factors (age, sex, ethnicity, deprivation) may be influencing factors. For example, socioeconomic deprivation is associated with worse outcomes across the cancer pathway ([Cancer Research UK, 2025](#)), and a recent scoping review found that cancer multimorbidity tends to be higher amongst those from ethnic minority groups and those with lower socio-economic status ([Ahmad et al., 2023](#)). Key factors such as cancer sites and patient cohorts have been highlighted where available, including where research has controlled for such factors.

For some patients in poor health, comorbidity can influence the effectiveness and tolerability of cancer treatment. The effectiveness and tolerability of cancer treatments are not within the agreed scope for this review.

There may also be valid clinical reasons why some people with cancer and multimorbidity don't receive treatment (e.g. high risk, low benefit); however, outcomes such as clinical safety and efficacy of treatment are outside the scope of this review.

There was limited evidence identified in relation to experience of illness, further analysis of grey literature sources may be useful.

Whilst searches for experience of illness included terms for general experience and access to health care limited evidence was identified. This area is therefore likely to warrant further investigation. Grey literature sources were out of scope for this review, however analysis of sources such as Cancer Patient Experience Surveys would be a useful to explore further.

Quality of life studies varied in measures and instruments used.

The literature on health status found that terms like health status, health-related quality of life, and quality of life are often used interchangeably ([Ahmad et al., 2023](#)). A range of validated instruments were also reported to assess health status ([Ahmad et al., 2023](#)). Instruments include measures spanning generic, cancer-generic and cancer-specific domains ([Mason et al., 2018](#)).

The inclusion of people with complex needs is limited in research, with multimorbidity not always the focus of study.

Clinical trials have traditionally excluded older adults and those with frailty or multiple long-term conditions, even though a significant proportion of patients belong to this group ([Corbett and Bridges, 2019](#)).

Qualitative data on the experience of living with cancer with comorbidities has been identified in reviews as difficult to identify and not the focus of the study ([Corbett et al., 2020](#); [Cavers et al., 2019](#)). Where qualitative studies have researched people with cancer and comorbidity, the population may not be fully representative. For example, qualitative research to explore the

psychosocial support needs of people with cancer and comorbidity highlights that the study population was in relatively good health at the time of the interview ([Cavers et al., 2024](#)). For example, participants living with well-managed hypertension or with conditions where pain was well controlled as well as their cancer. This research may therefore not be representative of those with recurrent or metastatic cancer or advanced chronic conditions. Experiences may also be limited to experiences of individuals with particular characteristics such as breast cancer, Caucasian, and female ([Corbett et al., 2020](#)).

4. Cancer Diagnosis

4.1 What is the impact of multimorbidity on cancer diagnosis?

4.1.1 Stage of diagnosis

The presence of comorbidities has different effects depending on cancer site, however across cancer sites people with comorbidities are significantly more likely to have unknown staging information about their cancer.

The Scottish Routes from Diagnosis project ([Public Health Scotland and Macmillan, 2022](#)) analysed the four most common types of cancer found in Scotland: breast, prostate, colorectal and lung, using national datasets from 2007 and 2012.

The impact of comorbidities (as determined by Charlson score) on cancer diagnosis was found to vary across cancer sites. Overall, the analysis found:

- People with breast cancer were more likely to be diagnosed at a later stage in the presence of comorbidities¹;
- People with lung cancer were more likely to be diagnosed at an earlier stage in the presence of comorbidities²; and
- Comorbidity did not appear to be associated with grade at diagnosis for colorectal cancer or prostate cancer ([Public Health Scotland and Macmillan, 2022](#)).

Whilst there was variation across sites according to comorbidities a consistent finding across the four cancer sites was that people with comorbidities were significantly more likely to have unknown staging information about their cancer ([Public Health Scotland and Macmillan, 2022](#)). Across all cancer cohorts, the proportion of individuals diagnosed with an unknown cancer stage increased with increases in Charlson Comorbidity Index (CCI) scores. People with severe comorbidities (CCI 3 or more) were over twice as likely to have an unknown cancer stage compared to those with no CCI, with at least 20% unstaged across all cohorts (breast 23%, lung 26%, colorectal 28%, prostate 42%). The research highlights that this trend reflects the fact that complete cancer staging requires multiple diagnostic procedures, which some patients with comorbid conditions may be medically unfit to undergo or may opt out of due to the perceived or actual burden of further investigation.

Understanding data on patients with an unknown cancer stage is particularly important, as their survival outcomes are often similar to those diagnosed with stage 4 cancer ([Public Health Scotland](#)

¹ One in ten of those with severe comorbidities (CCI 3 or more) had stage 4 breast cancer compared to 1 in 20 with no or zero CCI score.

² The proportion of people diagnosed with stage 4 lung cancer was greater for those with no or zero CCI score (around 50%) than those with any Charlson condition (36% for those with a CCI score of one, 38% for a score of two and 40% for a CCI of three or more).

[and Macmillan, 2022](#)), indicating a potentially advanced disease that may be under-recognised or inadequately managed within the clinical care pathway.

Condition specific analysis shows that the impact of multimorbidity on cancer diagnosis stage is mixed: while conditions like pulmonary, cardiovascular, neurological, psychiatric disorders, dementia, and serious mental illness have been linked to later-stage or metastatic diagnoses, others such as hypertension or some gastrointestinal and musculoskeletal conditions may lead to earlier detection. However, it is difficult to draw conclusions due to limitations such as variation in the cancer type and severity of chronic conditions.

A systematic review exploring specific comorbid chronic diseases and cancer diagnosis found that there is mixed evidence on the effects of multimorbidity on stage of cancer diagnosis ([Renzi et al., 2019](#)). People with cancer and pre-existing pulmonary, cardiovascular, neurological and psychiatric conditions are more likely to be diagnosed at a later stage ([Renzi et al., 2019](#)). Whereas people with cancer and hypertension and certain gastrointestinal and musculoskeletal conditions might be associated with a timelier diagnosis. Cancer types were not consistently reported across studies, and the review highlights limitations, including significant variation in how chronic diseases were defined and how data were collected, and the potential influence of disease severity on diagnostic outcomes, but such details were seldom provided.

People living with dementia are also more likely to have cancer diagnosed at an advanced stage—if diagnosed at all—and without staging information ([Ashley et al., 2023](#); [McWilliams, 2020](#); [Hopkinson et al., 2016](#)). Whilst dementia is reported to be associated with later and advanced stage diagnosis a literature review by [Ashley et al. \(2023\)](#) reports evidence that suggests dementia is not associated with diagnostic delay once cancer symptoms have been presented in primary care. However, the evidence was from studies with small sample sizes and the authors suggest this may be because people living with dementia often present with more advanced symptoms, sometimes as emergencies, bypassing typical diagnostic pathways. Additionally, lower referral rates and potential under-recognition by clinicians may contribute to undiagnosed cases not captured in these studies ([Ashley et al., 2023](#)).

People with serious mental illnesses (SMI) are also more likely to have an increased likelihood of metastatic disease at diagnosis compared to those without SMI ([Charlesworth et al., 2023](#); [Grassi et al., 2025](#)). Patients with comorbid anxiety and depression are more likely to receive a late diagnosis ([Grassi et al., 2025](#); [Massa et al., 2021](#)). However whilst co-occurring anxiety and depression has been reported to increase the risk of diagnosis delay, the increased risk was not seen for patients with anxiety alone or depression alone, indicating a combined or amplifying effect of these conditions ([Massa et al., 2021](#)).

4.1.2 Diagnosis intervals

Increased number of comorbidities are associated with delays in cancer diagnosis and increased period between referral and diagnosis (diagnostic intervals).

A systematic review exploring comorbid chronic diseases and cancer diagnosis found that overall, patients with a pre-existing condition (versus none) have longer diagnostic intervals across a range of cancers including leukaemia, myeloma, oesophageal, colorectal and laryngeal cancers ([Renzi et al., 2019](#)). The diagnostic interval was defined as the time between a patient's first symptomatic presentation in primary care and their eventual cancer diagnosis.

In England, increased number of comorbidities is associated with greater odds of GP-assessed avoidable delay in cancer diagnosis. Analysis of the 2014 English National Cancer Diagnosis Audit found that 24% of 14,259 cancer patients experienced GP-assessed avoidable diagnostic delays ([Swann et al., 2020](#)). The odds of an avoidable delay increased with increasing number of comorbidities (see Table 1). Patients with three or more comorbidities had higher odds of delay with adjusted odds ratios (OR) ranging between 1.25 and 1.63 compared to those without comorbidities ([Swann et al., 2020](#)). Avoidable delay varied substantially according to cancer site, however the impact of comorbidities on specific cancer site is not reported.

Table 1. Odds ratios of avoidable delay status for number of comorbidities ([Swann et al., 2020](#))

Number of comorbidities	Avoidable delay (n)	No avoidable delay (n)	Crude odds ratio (95% CI)	Compositional Model adjusted* OR (95% CI)
None	740 (21.1)	2765 (78.9)	Ref	Ref
One	1020 (24.0)	3233 (76.0)	1.18 (1.06 to 1.31)	1.21 (1.08 to 1.36)
Two	788 (23.3)	2596 (76.7)	1.13 (1.01 to 1.27)	1.19 (1.05 to 1.35)
Three or more	782 (26.7)	2148 (73.3)	1.36 (1.21 to 1.53)	1.43 (1.25 to 1.63)
Not known	42 (22.5)	145 (77.5)	1.08 (0.75 to 1.53)	1.06 (0.73 to 1.50)

*The Compositional Model adjusted for avoidable delay, age at diagnosis, sex, ethnicity, number of comorbidities, IMD quintile, cancer site and symptoms at presentation.

The 2014 Scottish National Cancer Diagnosis Audit on patients diagnosed with cancer explores primary care intervals and diagnostic intervals by patient characteristics (including number of comorbidities). The median primary care interval was five days (interquartile range 0–23 days), with 11.3% of patients having a primary care interval longer than 60 days and 7.7% longer than 90 days. The median diagnostic interval was 30 days (interquartile range 13–68 days), with 28.3% of patients having a diagnostic interval longer than 60 days and 17.8% longer than 90 days. The proportion of patients with primary care intervals and diagnostic intervals beyond 60 and 90 days also appeared to be higher in those with more than three comorbidities compared to those with none or fewer

(see Table 2) ([Murchie et al., 2020](#)). Intervals varied substantially according to cancer site, however the impact of comorbidities on specific cancer site is not reported.

Table 2. Percentage of patients with intervals over 60 and 90 days by number of comorbidities ([Murchie et al., 2020](#))

Number of comorbidities	Primary care interval*		Diagnostic intervals**	
	% >60 days	% >90 days	% >60 days	% >90 days
None	10.4	7.7	28.5	17.0
One	9.6	6.6	23.9	16.0
Two	10.3	5.5	28.2	16.0
Three or more	15.9	11.9	34.4	23.7

*Primary care intervals were defined as days from date of first presentation in primary care with symptoms relevant to the final cancer diagnosis, to date of first referral from primary care. **Diagnostic intervals were defined as days from date of first relevant presentation in primary care to date of diagnosis recorded in the Scottish Cancer Registry.

Research focusing on specific cancer types has also shown an association between multimorbidity and diagnostic delay. Analysis of 2014-15 English cancer registry data exploring secondary care diagnostic timeliness in colorectal cancer patients and lung cancer shows that comorbidities (as determined by Charlson score) were associated with longer intervals for both cancer sites ([Pearson et al., 2019](#)). Colorectal cancer patients with a Charlson comorbidity score of three or more had increased odds of having a longer secondary care diagnostic interval ranging between 1.22–1.45 compared with patients with no comorbidities (see Table 3) ([Pearson et al., 2019](#)). Lung cancer patients with a Charlson comorbidity score of three or more had increased odds of having a longer secondary care diagnostic interval ranging between 2.30–2.62 compared with patients with no comorbidities (see Table 3) ([Pearson et al., 2019](#)). Secondary care diagnostic interval (SCDI) was defined as the time from first event in secondary care (referral to secondary care or diagnostic test in secondary care) and diagnosis date.

Table 3. Odds ratios (OR) of secondary care diagnostic interval for number of comorbidities ([Pearson et al., 2019](#)).

Number of comorbidities	Colorectal cancer		Lung cancer	
	Unadjusted OR (95% CI)	Adjusted* OR (95% CI)	Unadjusted OR (95% CI)	Adjusted* OR (95% CI)
None	Reference	Reference	Reference	Reference
One	1.30 (1.24-1.37)	1.31 (1.24-1.40)	1.91 (1.83-2.00)	1.75 (1.66-1.84)
Two	1.33 (1.24-1.42)	1.37 (1.27-1.49)	2.25 (2.12-2.38)	2.09 (1.95-2.23)
Three or more	1.16 (1.08-1.24)	1.33 (1.22-1.45)	2.51 (2.37-2.65)	2.46 (2.30-2.62)

*Socio-demographic variable (age group, sex, deprivation quintile and ethnicity), disease (stage, comorbidities) and other factors (diagnostic route, other diagnostic events) were analysed. Variable added to the multivariate logistic regression models were determined by univariate analysis, previous literature and

advice from clinical colleagues were determined by univariate analysis, previous literature, and advice from clinical colleagues.

A population based study including 11870 patients diagnosed with lung cancer in England between 1990 and 2019, using data from the Clinical Practice Research Datalink linked with hospital admission and cancer registry records, investigated the impact of comorbidities on the diagnostic interval for lung cancer ([Rogers et al., 2024](#)). The diagnostic interval was defined as the time from a patient's first presentation in primary care with symptoms suggestive of possible lung cancer to the date of diagnosis. Fourteen comorbidities were explored, categorised into two groups: ten "competing demands" conditions—unrelated to lung cancer—and four "alternative explanation" conditions that share symptoms with lung cancer. Initial univariate analysis revealed that the diagnostic interval increased with the number of comorbidities. For instance, patients with three or more competing demands conditions had a median diagnostic interval of 196 days, compared to 101 days for those with none. Similarly, patients with two or more alternative explanation conditions had a median interval of 246 days, versus 90 days for those without any (see Table 4) ([Rogers et al., 2024](#)). Multivariable analysis found diagnostic interval was strongly associated with the presence of alternative conditions. The presence of one alternative explanation condition (chronic obstructive pulmonary disease, asthma, chronic fatigue syndrome, or a prescription for an ACE inhibitor) was associated with a 31-day increase in the diagnostic interval, while having two or more alternative explanation conditions led to a 74-day increase, compared to patients without alternative explanation conditions ([Rogers et al., 2024](#)). The analysis adjusted for several covariates, including sex, age, calendar year of diagnosis, number of competing demand and alternative explanation comorbidities, Index of Multiple Deprivation (IMD), usual consultation frequency, changes in consultation frequency, and presenting symptoms.

Table 4. Median diagnostic interval (days) for competing demand conditions and alternative explanation conditions by number of comorbidities ([Rogers et al., 2024](#))

Number of conditions	Competing demand	Alternative explanation
None	101 (36, 241)	90 (34, 224)
One	146 (49, 272)	164 (56, 281)
Two	162 (55, 279)	246 (137, 320)
Three or more	196 (80, 298)	Not reported

Analysis of the National Cancer Registry of patients diagnosed with colorectal cancer between 2011 and 2015 in England found that diagnostic intervals were notably longer for comorbid (defined by Charlson comorbidity score and using from the Hospital Episode Statistics) versus non-comorbid patients ([Majano et al., 2022](#)). The median symptom-to-test, test-to-diagnosis and overall symptom-to-diagnosis intervals for comorbid versus non-comorbid patients were 136 versus 74 days; 20 versus 5 days; and 266 versus 111 days, respectively, among colon cancer patients

([Majano et al., 2022](#)). Diagnostic intervals were longest for patients with the most common specific morbidities recorded in secondary care: cardiovascular disease, chronic obstructive pulmonary disease, diabetes, and renal disease. Chronic renal disease and patients with diabetes were associated with the longest diagnostic intervals among colon cancer patients ([Majano et al., 2022](#)). In further multivariable quantile regression analysis higher comorbidity burden was found to be significantly associated with a longer symptom-to-test interval. For instance, colon cancer patients with a Charlson comorbidity score of 2 had an adjusted median interval of 120 days, compared to just 30 days among patients without comorbidities, despite having similar symptoms and socio-demographic profiles ([Majano et al., 2022](#)). Similar findings were observed for test-to-diagnosis and symptom-to-diagnosis intervals. The multivariable logistic regression controlled for symptoms, type of first investigation and socio-demographic characteristics.

Another analysis of patients diagnosed with colorectal cancer between January 2007 and December 2009 using primary care records (UK Clinical Practice Research Datalink) explored 20 conditions and therapies, classified as either 'competing demands' (unrelated to colorectal cancer) or 'alternative explanations' (sharing symptoms with colorectal cancer) ([Mounce et al., 2017](#)). The presence of a single 'competing demand' condition was associated with a 10-day delay in diagnosis (a 13% increase), while a single 'alternative explanation' condition led to a 9-day delay (a 12% increase). Patients with four or more 'competing demand' conditions experienced diagnostic intervals that were 32 days longer (a 41% increase) compared to those without comorbidities. Inflammatory bowel disease—classified as both an alternative explanation for symptoms and a risk factor for colorectal cancer—was linked to a 26-day increase in the diagnostic interval (a 34% rise). Notably, these effects were independent of one another, and approximately one-quarter of patients had both types of conditions. Further analysis compared the effect on diagnostic interval of each condition separately, controlling for age and gender. Out of the 20 studied conditions and therapies four were significantly associated with longer diagnostic intervals ([Mounce et al., 2017](#)). These were inflammatory bowel disease, coronary heart disease, diverticulosis or diverticulitis and anxiety/depression ([Mounce et al., 2017](#)).

4.1.3 Emergency diagnosis

People with cancer and other long-term conditions are more likely to be diagnosed following an emergency presentation.

Emergency cancer diagnosis is associated with advanced cancer stage and poor survival ([Delamare Fauvel et al., 2023](#)). Such emergency presentations are more common among patients with higher comorbidities ([Delamare Fauvel et al., 2023](#); [Newsom-Davis, 2017](#)), including those living with dementia ([Ashley et al., 2023](#); [McWilliams, 2020](#)).

Analysis of England's National Cancer Registry (2011–2015) found that colorectal cancer patients with related symptoms and comorbidities (defined by Charlson comorbidity score and using from

the Hospital Episode Statistics) were more often diagnosed via emergency routes than those without comorbidities (colon cancer: 37% versus 23%; rectal cancer: 19% versus 7%, respectively) ([Majano et al., 2022](#)). The risk of emergency diagnosis was especially high among patients with common comorbidities like cardiovascular disease and chronic kidney disease (cardiovascular disease: 43% versus 27%; renal disease: 45% versus 29%) ([Majano et al., 2022](#)). Further analysis found that the likelihood of emergency presentation increased with higher Charlson comorbidity scores. For colon cancer patient's emergency presentation risk started at 23% in those with no comorbidities, rising to 35% for a score of 1, 33% for a score of 2, and 47% in those with a score of 3 or more. Adjusted odds ratios also reflected this trend, with values of 1.8, 1.7, and 3.0 for Charlson comorbidity scores of 1, 2, and 3+, respectively, compared to those without comorbidities. The risk was notably elevated among individuals with specific conditions, such as cardiovascular disease (43% emergency diagnoses, adjusted odds ratios = 2.0) and chronic renal disease (44%, adjusted odds ratios = 1.5). Among rectal cancer cases, emergency diagnoses were less common, but the same factors increased the risk to a similar extent as in colon cancer ([Majano et al., 2022](#)). The multivariable models included age, sex, deprivation, symptoms, type of first investigation and specific morbidities.

Analysis of England's National Cancer Registry (2005-2013) for patients diagnosed with non-Hodgkin lymphoma found that amongst patients from the same Clinical Commissioning Group (CCG), having multimorbidity was strongly associated with the emergency route to diagnosis ([Smith et al., 2021](#)). Adjusting for age, gender, ethnicity and deprivation and accounting for clustering due to CCG did not explain the relative difference. Patients with diffuse large B-cell had higher odds of diagnosis via emergency route with odds ranging between 1.40 and 1.73. Patients with follicular lymphomas had higher odds of diagnosis via emergency route with odds ranging between 1.45 and 2.23 ([Smith et al., 2021](#)).

4.2 Explanations for differences in cancer diagnosis

4.2.1 Patient factors

People with cancer and other long-term conditions may interpret potential cancer symptoms as being caused by comorbidities or its treatment and therefore delay help-seeking for cancer symptoms (for some cancer sites and comorbidities).

Poor symptom appraisal can prevent help-seeking and lead to delay in the investigation or referral for cancer symptoms. For people with long-term conditions symptom appraisal can be influenced by 'alternative explanations' where patients attribute cancer symptoms to a preexisting condition or its treatment ([Renzi et al., 2019](#)).

Older adults' decisions to seek help are reported to be influenced by how they interpret their symptoms, often attributing them to existing comorbidities ([Jones et al., 2022](#)). For instance, bodily

changes may be normalised and explained as part of their existing medical problems, or as side effects of medication ([Jones et al., 2022](#)). Patients referred to gastroenterology clinics in North East and East of England with symptoms of colorectal cancer reported appraising bodily changes within the context of comorbidities ([Hall et al., 2015](#)).

Comorbidities commonly attributed as the cause of symptoms include osteoarthritis, chronic back pain, chronic obstructive pulmonary disease, cerebrovascular disease, as well as anxiety and depression ([Jones et al., 2021](#)). Smoking status may also further influence symptom appraisal for people with comorbidities. For example, current smokers with one or more chronic conditions (e.g. asthma, chronic obstructive pulmonary disease) report attributing their symptoms to exacerbations of these conditions ([Black et al., 2022](#)).

Specific cancer sites and comorbidity conditions or treatment pairing reported in the literature that offer alternative explanations include irritable bowel syndrome and colon ([Renzi et al., 2019](#); [Mounce et al., 2017](#)) and ovarian cancer ([Renzi et al., 2019](#)), and angiotensin-converting enzyme (ACE)-inhibitor induced cough and lung cancer ([Renzi et al., 2019](#)). Respiratory conditions (chronic obstructive pulmonary disease and asthma) and lung cancer have also been reported ([Rogers et al., 2024](#); [Renzi et al., 2019](#)).

Chronic obstructive pulmonary disease, asthma, chronic fatigue syndrome, and receipt of a prescription for an ACE-inhibitor were explored as alternative explanation conditions in research exploring diagnostic interval for 11870 patients diagnosed with lung cancer in England between 1990 and 2019. Diagnostic interval was longer for patients with "alternative explanation" conditions, by 31 days for those with one condition and 74 days for those with two or more—compared to patients with no other conditions ([Rogers et al., 2024](#)). Similarly, alternative explanation" conditions have been reported to delay diagnosis by 9 days for colorectal cancer ([Mounce et al., 2017](#)). Alternative conditions explored included abdominal pain, rectal bleeding, irregular bowel movement (diarrhoea and/or constipation) and anaemia.

Chronic conditions may present competing demands and distract the patient from appraising and investigating new symptoms that might be due to cancer.

A review exploring mechanisms by which chronic diseases might influence the cancer diagnosis found that chronic conditions that are difficult to manage or seen as especially serious can distract patients from noticing and investigating new, vague symptoms that could be signs of cancer ([Renzi et al., 2019](#)). For example, a population-based survey in England found that having heart problems is reported to reduce help-seeking for change in bowel habits ([Salika et al., 2018](#)).

People with cancer and some chronic conditions (e.g. neurocognitive or neurodevelopmental comorbidities, mental health, hearing problems) may have difficulties recognising symptoms and/or communicating this to carers and health professionals.

People with dementia may not seek help as soon as people without dementia or be able to seek help at all ([Hopkinson et al., 2016](#)). Researchers hypothesise that people living with dementia may struggle to notice new symptoms, recognise them as possible signs of cancer, or understand their seriousness, which can lead to delays in sharing concerns with caregivers or clinicians ([Ashley et al., 2023](#)). Furthermore, it is suggested that when symptoms are reported, they may not be clearly described ([Ashley et al., 2023](#)). Limited evidence from research suggest that people with dementia must rely on their caregivers to initiate investigations for suspected cancer ([Ashley et al., 2023](#); [McWilliams, 2020](#)).

Communication difficulties are also implicated in delayed cancer diagnosis among people with hearing problems and mental health conditions ([Renzi et al., 2019](#)). Similarly, case report evidence suggests people with intellectual disability had cancer pain for several weeks or months before they presented at hospital resulting in late diagnosis with patients diagnosed with extensive metastasis or discovered during autopsy ([Millard and de Knecht, 2019](#)). Limited research suggests these delays could be due to communication issues and caregivers' slow reaction to pain symptoms ([Millard and de Knecht, 2019](#)).

A thematic synthesis of case studies further highlights a consistent pattern of delayed or missed cancer diagnoses in people with serious mental illness, often attributed to diagnostic overshadowing ([Coffey et al., 2022](#); [Hannigan et al., 2022](#)). Delays are commonly linked to factors such as denial, lack of insight, or behaviours associated with mental illness, which may obscure the recognition and reporting of physical symptoms. For instance, one included case involved a man with a longstanding diagnosis of schizophrenia who presented with advanced bladder cancer and brain metastases. The authors of the case report suggest that individuals with mental illness, such as schizophrenia, may be less likely to verbalise pain or related symptoms. The authors of the thematic synthesis point out that the patient had regular contact with healthcare services—including fortnightly mental health clinic visits and a consultation with a primary care provider for a new-onset cough—and propose an alternative explanation: that this case may reflect a failure of the healthcare system to adequately investigate physical health concerns, despite ongoing engagement with services (see 4.2.2) ([Coffey et al., 2022](#); [Hannigan et al., 2022](#)).

People with mental health conditions, smokers, drug users or alcohol misusers may avoid seeking help for possible cancer symptoms due to fear of judgement or fatalistic beliefs.

Patients may avoid seeking help for possible cancer symptoms out of fear of being seen as hypochondriacs, especially if they have a history of mental health conditions ([Renzi et al., 2019](#)).

Qualitative interviews with high-risk individuals—current/former smokers, aged 40+ years, with serious lung comorbidity (i.e., chronic obstructive pulmonary disease) and living in highly deprived areas—highlight important barriers to seeking medical help. Participants reported feeling judged or unworthy of medical care due to their perceived social status or lifestyle particularly when their

tobacco or alcohol use was linked to past trauma or difficult life experiences ([McCutchan et al., 2019](#)). These feelings often discouraged them from seeking help. Additionally, fatalistic beliefs—such as viewing lung cancer as an inevitable consequence of lifestyle or community experiences and doubting the effectiveness of treatment—also contributed to delays in seeking help. Participants reported reluctant to act on potential signs of lung cancer, unless symptoms became painful or there was a need to inform family members ([McCutchan et al., 2019](#)).

Poor health status associated with multimorbidity may prevent people undergoing cancer investigations.

Fatalism from multimorbidity and poor health can discourage patients from pursuing invasive cancer tests ([Renzi et al., 2019](#)). For example, evidence from case reports of people with serious mental illness suggest that terminal illness can trigger PTSD symptoms—such as anxiety, anger, denial, avoidance, and distrust of authority—leading to poor treatment adherence or refusal of treatment ([Coffey et al., 2022](#); [Hannigan et al., 2022](#)).

For some people with long term conditions, positive experiences, and familiarity with healthcare providers due to their chronic disease may improve self-efficacy and facilitate help-seeking and communication regarding other health concerns.

Ongoing care for chronic illnesses can improve patients' self-efficacy and confidence in communicating with healthcare providers, making it easier to raise other health concerns ([Renzi et al., 2019](#)). Patients with chronic illnesses often develop a deep familiarity with their condition, enabling them to notice subtle changes in symptoms that differ from their usual experience, which may prompt them to seek medical help ([Renzi et al., 2019](#)). Positive past experiences, such as receiving effective treatment, can also encourage timely help-seeking when new symptoms arise ([Renzi et al., 2019](#)).

4.2.2 Clinician factors

People with cancer and other long-term conditions are vulnerable to delayed referrals, as comorbidities can overshadow cancer symptoms or lead clinicians to prioritise chronic disease management (for some cancer sites and comorbidities).

Alternative explanations can impact clinicians as well as patients. For patients with long-term conditions, clinicians may incorrectly attribute cancer symptoms to the preexisting condition or its treatment ([Renzi et al., 2019](#)). Furthermore, doctor-patient interactions may reinforce these alternative explanations ([Renzi et al., 2019](#)).

The 2014 English National Cancer Diagnosis Audit found that 26% of patients had three or more pre-referral consultations ([Swann et al., 2018](#)). Symptoms suggestive of a different initial diagnosis ($n = 1684$, 11%) or comorbidity 'blurring the picture' ($n = 851$, 5%) were the most common

recorded reason cited for three or more consultations. Alternative explanations where patients attribute cancer symptoms to a preexisting condition or its treatment are discussed in 4.2.1.

Clinicians may prioritise the treatment of chronic conditions leading to delays in investigating new symptoms that might be due to cancer ([Renzi et al., 2019](#)). Furthermore, investigations performed for chronic disease monitoring may provide false or over reassurance to clinicians ([Renzi et al., 2019](#)).

A thematic synthesis of case studies reports that delayed or missed cancer diagnoses in people with serious mental illness are often attributed to patient factors such as denial, lack of insight, or behaviours associated with mental illness, which may obscure the recognition and reporting of physical symptoms (see 4.2.1). However, the authors use a case report to propose an alternative viewpoint. The case included a man with a longstanding diagnosis of schizophrenia who presented with advanced bladder cancer and brain metastases. The case suggested this was likely to be due to the man being less likely to verbalise pain or related symptoms. However the authors of the thematic synthesis point out that the patient had regular contact with healthcare services—including fortnightly mental health clinic visits and a consultation with a primary care provider for a new-onset cough—and propose an alternative explanation: that this case may reflect a failure of the healthcare system to adequately investigate physical health concerns, despite ongoing engagement with services ([Coffey et al., 2022](#); [Hannigan et al., 2022](#)).

Healthcare professionals may be less likely to investigate or refer people they deem to be frail or cognitively impaired.

A systematic review found that older adults deemed by healthcare professionals to be frail or in poor health were less likely to be investigated or referred for potential cancer symptoms ([Jones et al., 2021](#)). Furthermore, healthcare professionals are often informally assessing frailty and making assumptions about the impact of frailty ([Jones et al., 2021](#)). For example, frailty can be overestimated for care home residents and thus impact investigation and referral for cancer symptoms ([Jones et al., 2021](#)).

Similarly, the presence of cognitive impairment has been found to influence healthcare professionals' decision to investigate or refer ([Jones et al., 2021](#); [Ashley et al., 2023](#)). Reasons for non-referrals include healthcare professionals perceiving that people with cognitive impairment may be distressed during examinations and that a cancer diagnosis might offer limited benefit ([Jones et al., 2021](#)). However, some healthcare professionals also highlight that people with cognitive impairment may be physically fit, and investigation warranted ([Jones et al., 2021](#)).

Whilst non referral may be appropriate due to valid, well-balanced considerations (e.g. low benefit, high risk of investigation), or patient preferences ([Jones et al., 2021](#)), it creates a '*hidden group*' with important implications for care and research ([Ashley et al., 2023](#)). For example, without a confirmed

cancer diagnosis access to specialist care, cancer charities and cancer statistics and research may all be reduced ([Ashley et al., 2023](#)).

4.2.3 System factors

Regular health care associated with some long-term conditions (e.g. chronic obstructive pulmonary disease) may offer a ‘surveillance effect’ presenting opportunities for earlier diagnosis.

Conditions requiring regular monitoring may provide opportunities to report cancer symptoms during routine healthcare visits ([Renzi et al., 2019](#)). For example, hypertension and chronic urinary diseases have been associated with more prompt help-seeking for possible cancer symptoms, such as rectal bleeding or cough ([Renzi et al., 2019](#)). When individuals attribute new or changing symptoms to existing health conditions regular medical appointments for managing these chronic issues may help offset delays in seeking care. For example research by ([Kaushal et al., 2020](#)) using an online cross-sectional vignette survey, found that participants with respiratory conditions were more likely than those without to interpret symptoms like a new or worsening cough or breathlessness as related to their existing condition. However, these individuals were also more likely to seek medical help promptly. The authors suggest that this timely help-seeking may be facilitated by their routine engagement with healthcare services for ongoing condition management.

Incidental findings from investigations during regular monitoring for chronic conditions may also provide health care providers with opportunities to evaluate the possibility of cancer ([Renzi et al., 2019](#)). For example, annual chest checks for chronic obstructive pulmonary disease have also been linked to the earlier identification of lung cancer ([Jones et al., 2021](#)).

Primary care consultation time constraints may limit the communication of symptoms by patients with complex comorbidities.

Limited consultation time is reported as a potential barrier to sharing potential cancer symptoms by both patients and GPs, especially for people with frailty, multiple health conditions, and cognitive challenges ([Jones et al., 2021](#)).

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5. Cancer Treatment

5.1 What is the impact of multimorbidity on cancer treatment?

5.1.1 Treatment offered or initiated

Patients with cancer and other long-term conditions are less likely to receive cancer treatment or receive treatment that deviates from treatment guidelines compared with patients without comorbidities (for some cancer sites).

A narrative evidence review covering multiple cancer types reports that individuals with multiple comorbidities may have a lower likelihood of receiving surgical intervention, radiation, and chemotherapy compared with patients without comorbidities ([Dotan et al., 2024](#)). Similarly, a systematic review found that for older adults increased age and increased comorbidities correlate with significantly lesser likelihood of treatment initiation ([George et al., 2021](#)).

Reviews of evidence focused on specific cancer types also highlight disparities in treatment for individuals with comorbid conditions. For example, people with kidney cancer who are older and have more comorbidities are more likely to receive conservative treatment such as ablation or active surveillance ([Beyer et al., 2021](#)). Evidence reviews focused on specific cancer types also report that patients with both cancer and comorbidities may receive treatment that deviates from treatment guidelines. For example, in colorectal cancer, comorbidities and physical frailty are reported to be key factors influencing decisions made by multidisciplinary teams (MDTs), often resulting in these patients being less likely to receive guideline-recommended treatments ([Holden et al., 2020](#)). Similar patterns have been observed in other cancers; for instance, comorbidity has been associated with lower receipt of guideline-based care in ovarian cancer ([Pozzar and Berry, 2017](#)), and breast cancer ([Meneses et al., 2015](#)).

Reviews of evidence focusing on individuals with serious mental illness also report gaps in cancer treatment. Compared to the general population, they are less likely to receive standard cancer treatments ([Grassi et al., 2025](#)) including reduced access to care that matches the stage of their cancer ([Charlesworth et al., 2023](#); [Massa et al., 2021](#)). Evidence reviews focusing on individuals with both mental illness and breast cancer report that they are less likely to receive treatments recommended by clinical guidelines ([Elliott et al., 2025](#); [Kisely et al., 2023](#)). Similar treatment disparities are observed among people living with dementia. Evidence reviews report that, compared to individuals without dementia, people living with dementia are more likely to receive no cancer treatment/supportive only care or less intensive treatment across various cancer types and modalities, including surgery, chemotherapy, and radiation ([Ashley et al., 2023](#); [Caba et al., 2021](#); [McWilliams, 2020](#); [Hopkinson et al., 2016](#)). Survey studies using hypothetical cases also show that health care professionals view moderate to severe cognitive impairment as a major factor leading to more conservative cancer treatment decisions ([Ashley et al., 2023](#)).

The Scottish Routes from Diagnosis project ([Public Health Scotland and Macmillan, 2022](#)) analysed the four most common types of cancer found in Scotland: breast, prostate, colorectal and lung, using national datasets from 2007 and 2012. Analyses explored the impact of comorbidities, as determined by Charlson Comorbidity Index (CCI), on treatment type received in 2012. Key findings include:

- People with any comorbidity prior to cancer diagnosis were considerably less likely to receive chemotherapy within their cancer treatment for breast, colorectal and lung cancer than those without comorbidities.
 - Breast: more than a third with no CCI score had Systemic Anti-Cancer Therapy (SACT) within their treatment compared to less than a fifth with a CCI score of 1 or 2. 5% of those with severe comorbidities (CCI 3 or more) received SACT.
 - Colorectal: 41% of those with no CCI score received SACT compared to just 11% of those with severe comorbidities.
 - Lung: Over a third of people with lung cancer and no CCI score received SACT compared to around 12% for those with any Charlson comorbidity.
- People with any comorbidity were also less likely to have surgery within their cancer treatment pathway than those without any comorbidities for breast and colorectal cancer.
 - Breast: 43% of people with severe comorbidities received surgery compared to 90% of people with no CCI score.
 - Colorectal: 51% of those with severe comorbidities had surgery compared to 78% of those Published November 2022 24 with no CCI score.
 - For prostate and lung cancer there was not a clear relationship between surgery and CCI score.
- The proportion of patients who received no treatment was higher for people with any CCI comorbidity (score of 1 or more) than those with no CCI score or a zero CCI score for those diagnosed with breast, colorectal or lung cancer.
 - Breast: 1% of women with a diagnosis of breast cancer and no or zero CCI score received no treatment in comparison to 9% with severe comorbidities.
 - Colorectal: 11% of those with no CCI score received no treatment compared to 41% for those with severe comorbidities.
 - Lung: 36% of those with no CCI score received no treatment compared 58% for those with severe comorbidities.

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- The proportions of those diagnosed with prostate cancer and receiving no treatment³ was relatively similar across the CCI groups (between 20% and 27%).

The Scottish Routes from Diagnosis analyses did not adjust for age or tumour characteristics at diagnosis, therefore differences in the distributions of age and stage at diagnosis for people with comorbidities could also have had an impact on treatment types ([Public Health Scotland and Macmillan, 2022](#)).

In England, an increased number of comorbidities is associated with decreasing chemotherapy alone and chemotherapy and radiotherapy combined rates. Analysis of English National Cancer Registry data (2013–2014) for patients with stage four lung, oesophageal, pancreatic, and stomach cancer found that age at diagnosis largely influenced the use of chemotherapy and radiotherapy, although non-trivial associations with comorbidity were also observed ([Henson et al., 2018](#)). In adjusted models (sex, age at diagnosis deprivation, and ethnicity stratified by cancer site) increasing Charlson comorbidity index was generally associated with decreasing chemotherapy and chemotherapy and radiotherapy combined rates. No association was found between comorbidity and radiotherapy alone, except for a positive association with small cell lung cancer among patients with a comorbidity index of three or more ([Henson et al., 2018](#)). Similarly, pan-cancer analyses, of the associations between 109 pre-existing conditions and cancer treatment patterns across 19 adult cancers in England between 1998 and 2020, found that patients with comorbidity were less likely to receive chemotherapy and multimodality treatment ([Chang and Lai, 2024](#)). Comorbidity was defined as the presence or absence of a particular condition (i.e., with heart failure vs. no heart failure) and the association between comorbidity and cancer treatment was adjusted for age, sex, socioeconomic status, tumour grade, tumour stage, tumour count and multimorbidity count.

A large retrospective population-based study, of patients diagnosed with stage three or four non-small cell lung cancer in England between 2014 and 2017, found that older patients aged 75 years and older were more likely to have their treatment modified because of comorbidities and their doses reduced compared to younger patients ([Pilleron et al., 2023](#)). An earlier population-based study of patients diagnosed with non-small cell lung cancer in England in 2012 found strong evidence that the comorbidities 'congestive heart failure', 'cerebrovascular disease' and 'chronic obstructive pulmonary disease' reduced the receipt of surgery in early stage patients ([Belot et al., 2019](#)).

³ Watchful waiting and active surveillance are included in no treatment.

Patients with cancer and other long-term conditions may be more likely to receive palliative/non-curative treatment than those with cancer and no comorbidities.

The Scottish Routes from Diagnosis project ([Public Health Scotland and Macmillan, 2022](#)) examined the impact of comorbidities on cancer treatment and found that, at the time of diagnosis, more than half of the individuals with severe comorbidities across all four cancer cohorts were assigned palliative or non-curative treatment intent. For breast cancer, the contrast was especially pronounced: fewer than 15% of individuals with no comorbidities (CCI score of 0) had a palliative treatment intent, compared to 52% of those with severe comorbidities (CCI of 3 or more). Analyses on treatment intent did not adjust for stage at diagnosis therefore differences in the distributions of stage at diagnosis may have also have an impact.

A large population-based study, analysing all patients with high risk and locally advanced prostate cancer diagnosed between 1 April 2019 and 31 March 2020 in the English National Health Service, found that those with two or more comorbidities were less likely to receive curative treatment ([Han et al., 2024](#)). Similarly, a registry-based, prospective cohort study of patients with locally advanced rectal cancer (LARC) and locally recurrent rectal cancer (LRRC) referred to a specialist regional multidisciplinary team in North East England between 2015 and 2019, found severe comorbidity were associated with non-surgical palliative treatment ([Harji et al., 2022](#)).

In England and the wider UK, women with breast cancer and other long-term conditions may be less likely to start adjuvant chemotherapy or trastuzumab, and more often treated with non-surgical options like primary endocrine therapy instead of surgery compared with patients without comorbidities.

Analysis of English National Cancer Registry data for women diagnosed with HER2-positive invasive breast cancer between 2012 and 2017 found that in both early and metastatic disease, trastuzumab receipt was less likely in older women with more comorbidities ([Norris et al., 2024](#)). Similarly, a separate analysis using National Cancer Registry data showed that for women newly diagnosed with HER2-positive early invasive breast cancer (2014–2017) initiation of adjuvant chemotherapy and trastuzumab declined as comorbidity burden increased ([Gannon et al., 2020](#)).

Data from the English and Welsh National Cancer Registry (2014–2017), covering women aged 50 or above with unilateral stage 1–3A ER-positive early invasive breast cancer, found that that the likelihood of not receiving surgery increased significantly with age, especially in women aged over 70 who had high comorbidity (Charlson Comorbidity Index score 2 or more) or severe frailty. In women with no co-morbidity or frailty, the increase in the proportion of women with ER-positive disease not having surgery was less marked, particularly among women with high-risk disease ([Jauhari et al., 2021](#)).

A large prospective cohort study including 2854 women over the age of 70 with primary operable breast cancer recruited from 56 UK breast units between 2013 and 2018, found that higher rates of

comorbidity (as assessed by the Charlson Comorbidity Index) were associated with lower rates of surgical treatment ([Morgan et al., 2021](#)). An earlier study using the same cohort from 57 UK breast units between 2013 and 2018 found higher rates of omission of axillary surgery seen in patients with increased levels of comorbidity and frailty ([Morgan et al., 2020](#)).

People with breast cancer who also have long-term conditions may be more likely to undergo mastectomy compared with patients without comorbidities, and there is some evidence suggesting they are less likely to receive immediate breast reconstruction afterward.

A study involving 2854 women over the age of 70 with primary operable breast cancer, recruited from 57 UK breast units between 2013 and 2018 found, that comorbidity, frailty and dementia were all linked to higher rates of mastectomy ([Morgan et al., 2020](#)). Similarly, earlier research examining women treated in English hospitals between 2008 and 2009 showed that those with comorbidities were less likely to receive breast-conserving surgery and more likely to undergo mastectomy ([Mennie et al., 2016](#)). However, while comorbidities were associated with increasing mastectomy rates, they were found to have little effect on reconstruction rates unlike age ([Mennie et al., 2016](#)).

More recently, the 2021 annual report from the UK National Audit of Breast Cancer in Older Patients (NABCOP) found that women aged 70 and over were less likely to receive immediate breast reconstruction following mastectomy compared to younger women, with comorbidities identified as an important contributing factor ([Lee et al., 2022](#)). There is also some international evidence that supports this, showing that both older age and the presence of comorbidities are associated with reduced likelihood of undergoing immediate reconstruction after mastectomy ([Lee et al., 2022](#)).

In England, patients undergoing minimally invasive colorectal surgery such as laparoscopic and robotic colorectal surgery typically have lower comorbidity.

A large population-based, retrospective observational study analysing all adults having elective colorectal resectional surgery in England between 2006 and 2020 found less comorbidity was one factor associated with increased minimally invasive colorectal surgery ([Morton et al., 2023](#)). Similarly, an earlier study of adults undergoing elective laparoscopic and open colorectal cancer surgery in the English NHS between 2002 and 2012 found that whilst laparoscopy rates rose from 1.1 to 50.8% during the study period, patients undergoing laparoscopic surgery had lower comorbidity than those having open procedures ([Byrne et al., 2018](#)).

5.1.2 Delayed treatment

Patients with cancer and comorbidities including serious mental illness may experience longer waits for treatment.

A meta-analysis of four observational studies found that delay to adjuvant chemotherapy initiation was more likely in colorectal cancer patients with worse comorbidity status. The analysis found that comorbidity status was associated with a 47% increased likelihood of delayed treatment (OR = 1.47; 95% CI: 1.14–1.90; $p = 0.003$), albeit significant study heterogeneity existed ([Malietzis et al., 2015](#)). Comorbidity status was defined using the Charlson comorbidity score (Charlson score 0–1 vs. >1).

Evidence from two systematic reviews report that people with serious mental illness had longer wait-times for guideline recommended adjuvant chemotherapy ([Kisely et al., 2023](#); [Massa et al., 2021](#)). The findings are both based on adjusted results from a single US study by Iglay et al. (2017).

5.2 Explanations for differences in cancer treatment

5.2.1 Patient factors

Comorbidity related diagnostic disparities such as diagnosis via emergency presentation and advanced disease diagnosis can reduce therapeutic options, especially for treatments with curative intent.

Diagnostic disparities related to dementia are likely play a role in the observed differences in cancer treatment, as individuals with dementia are more prone to emergency presentations and later-stage diagnoses, which can limit the availability of curative treatment options ([Ashley et al., 2023](#)). Similarly, delayed diagnosis is a concern for individuals with serious mental illness (SMI), who are more likely to present with advanced-stage disease and receive lower-quality specialized care ([Grassi et al., 2025](#)).

People with cancer and other long-term conditions are more likely to decline treatment or choose less aggressive treatment.

Declining treatment is well-documented in cancer care, with refusal rates for chemotherapy in colorectal cancer patients ranging from 7.8% to 41.5% ([Moodley et al., 2022](#)). A variety of factors have been linked to patients declining treatment, including age, race, gender, disease stage, and marital status ([Moodley et al., 2022](#)). Evidence from reviews reports that comorbid conditions are also commonly cited as contributing to declining treatment, including among older adults with cancer ([Dias et al., 2021](#)) as well as people with breast ([Malcolm et al., 2024](#)) and colorectal cancer ([Moodley et al., 2022](#)). Declining treatment and the selection of less aggressive treatments is highlighted for specific comorbidities such as dementia ([Caba et al., 2021](#)) and serious mental illness ([Coffey et al., 2022](#); [Hannigan et al., 2022](#)).

A qualitative systematic review exploring factors influencing older women's decision-making related to treatment of operable breast cancer found that some choose not to have cancer treatment because they see other health problems as more serious or life-threatening. Others

worry that surgery could make their existing conditions worse, or feel that breast cancer is less of a concern compared to their other ongoing health issues ([Malcolm et al., 2024](#)). For people with cancer and dementia, findings from qualitative studies suggest that they tend to prefer less aggressive care and give higher priority to quality of life over life expectancy ([Caba et al., 2021](#)).

For some people with serious mental illness declining treatment may not be because they lack the ability to understand their options, but instead because of mental health symptoms—such as strong fixed beliefs about being doomed or thinking that doctors can read their thoughts ([Coffey et al., 2022](#); [Hannigan et al., 2022](#)).

People with cancer and other long-term conditions may experience significant treatment burden, which can influence decisions about the type of treatment they choose, as well as their engagement with and adherence to care.

A systematic review examining factors influencing men's decisions to choose and adhere to active surveillance for low-risk prostate cancer found that a higher Charlson Comorbidity Index was generally associated with a preference for active surveillance ([Kinsella et al., 2018](#)). However, one study within the review reported that men with cardiovascular disease were more likely to opt for radiation therapy rather than active surveillance.

Qualitative research involving colorectal and prostate cancer survivors in Northeast Scotland found that comorbidities added to the overall treatment burden, which in turn affected decisions regarding cancer treatment and follow-up care ([Adam et al., 2023](#)). A survivor reported disengaging with monitoring and follow-up appointments ([Adam et al., 2023](#)). Another survivor reported that the increased burden from cancer on top of having to do insulin five times a day resulted in the decision of surgery over more conservative options to avoid the burden associated with monitoring such as blood tests and medication.

A qualitative systematic literature review exploring the experiences of everyday life among people with cancer and comorbid serious mental illness (SMI) found that managing both conditions simultaneously was often difficult ([Glasdam et al., 2023](#)). As a result, one diagnosis—either the SMI or the cancer—typically took precedence, often overshadowing the other.

A literature review on cancer care for people with dementia identified qualitative studies which suggest that dementia increases the complexity and burden of the challenges and workload involved in the experience of patients who have cancer ([Ashley et al., 2023](#)). Patients with cancer and dementia face significant challenges, including difficulties understanding, retaining, and appraising new and often complex information. They also experience practical challenges such as making multiple journeys to and navigating unfamiliar hospital departments, and monitoring and reporting side effects outside of appointments ([Ashley et al., 2023](#)). The combination of cancer-related demands with the ongoing cognitive and emotional impacts of dementia can result in a

substantial cumulative treatment burden for individuals living with both conditions ([Ashley et al., 2023](#)).

Physical and cognitive impairments in patients with cancer and other long-term conditions can pose barriers to adherence.

Lower adherence to oral treatment is reported for cancer patients with comorbidities across various cancers including breast, prostate, and blood cancers. Higher comorbidity burden, measured using Charlson comorbidity index is associated with lower adherence of treatment with adjuvant endocrine therapy in female breast cancer patients ([Yussof et al., 2022](#)). Higher comorbidity (Charlson comorbidity index more than 2) is also reported to be a factor associated with nonadherence of oral oncolytic treatments in multiple myeloma ([Naser et al., 2022](#)).

A review of adherence with oral anticancer therapies in prostate cancer patients found that physical limitations and cognitive decline associated with advancing age is reported to be a barrier to adherence with oral anticancer therapies for prostate cancer ([Higano and Hafron, 2023](#)). The review reported that limitations included discomfort and difficulty with swallowing pills, difficulty opening pill bottles due to decline in manual dexterity, difficulty reading medication due to visual impairment, poor mobility and lack of transportation and impaired cognitive function due to aging (e.g., poor memory) and/or disease treatment.

There is some evidence that comorbid mental disorders are associated with non-adherence and completion of cancer treatment.

A scoping review by [Bourgeois et al., \(2024\)](#) identified mental health challenges—such as depression, anxiety, and uncontrolled psychiatric illness—and active substance use as significant comorbidities that hinder adherence to cancer treatment schedules, and resulting in some patients stopping their treatment before the recommended completion point. This relationship is further supported by cancer specific reviews. For example, comorbid mental disorders from chronic diseases are reported to be a barrier to adherence with oral anticancer therapies for prostate cancer ([Higano and Hafron, 2023](#)). Similarly, a narrative review of anxiety and depression in patients with oesophageal cancer found some evidence that psychiatric and psychosocial illness can affect compliance with surveillance and treatment ([Housman et al., 2021](#)). However, a systematic review and meta-analysis on breast cancer treatment disparities in patients with severe mental illness reported mixed findings for the discontinuation of hormonal therapy. The review identified one study that found patients with depression and bipolar disorder were 3.15 times more likely to have an early discontinuation compared to controls, while in another there were no significant differences between groups ([Kisely et al., 2023](#)).

A disbelief in the efficacy of treatment is reported to be a reason for non-compliance with cancer treatment in depressed cancer patients ([Housman et al., 2021](#)).

5.2.2 Clinician factors

Healthcare professionals' treatment decisions may be influenced by their subjective perceptions of the patient, including the patient's medical history, as well as their own assessment of the potential benefits and risks of treatment.

Healthcare professionals' treatment decisions are often shaped by their subjective perceptions of the patient, including personal interpretations of the patient's history and the perceived balance between treatment risks and benefits ([Chang and Lai, 2024](#)). Although clinical factors such as cognition, frailty, and functional status are commonly used to inform these decisions, they are frequently assessed in a subjective manner, leaving room for observer bias ([Chang and Lai, 2024](#)). Decisions may be based more on clinicians' perceptions than objective assessments ([Pinker et al., 2025](#)). While structured tools like geriatric assessment exist to support more structured evaluations of clinical factors, their use is often limited due to healthcare professionals' unfamiliarity with them or concerns about the time and effort required ([Pinker et al., 2025](#)).

Despite these challenges, evidence indicates that patients with poor performance status⁴ may still benefit from treatment ([Chang and Lai, 2024](#)). However, early palliative care has also been shown to enhance quality of life, underscoring the importance of balancing survival benefits against the advantages of palliative care in treatment decisions ([Chang and Lai, 2024](#)).

Decisions made by clinicians—such as deeming patients unsuitable for surgery due to comorbidities—may not always reflect patients' own values or preferences. A qualitative study of 28 women over 70, mainly from North West England, with operable breast cancer who received primary endocrine therapy found that, in cases where surgeons deemed surgery inappropriate, many participants expressed concern about their cancer diagnosis and were keen to prolong their lives ([Sowerbutts et al., 2015](#)).

Patients with serious mental illness (SMI) and cancer often receive conflicting assessments of their decision-making capacity. For example, differences have been observed between psychiatric and cancer care settings with case studies showing how psychiatrists and cancer physicians may disagree on a patient's ability to make cancer treatment decisions ([Glasdam et al., 2023](#)). Furthermore, where patients' perspectives or comprehension were seen as hindering their adherence to recommended treatments, cancer physicians might label them as 'difficult' or 'unsuitable' for treatment, which might influence their everyday lives and treatments ([Glasdam et al., 2023](#)).

⁴ A patient's level of functioning in terms of their ability to care for themselves, daily activity, and physical ability (walking, working, etc.).

Lack of information concerning comorbidities as well as complexity of comorbidities can present challenges to healthcare professional making decisions.

Decision-making in multidisciplinary (MDT) cancer meetings is reported to be impaired when cases involve comorbidities, with difficulty reaching clinical decisions ([Soukup et al., 2016](#)) and decisions less likely to be made ([Stairmand et al., 2015](#)). Difficulties in decision-making are thought to be because the MDT has a lack of information on comorbidity impeding the ability of MDT members to make treatment recommendations, and for those recommendations to be implemented among patients with comorbidity ([Stairmand et al., 2015](#)). Difficulties are also due to standard management options not being appropriate due increased case complexity and decisions needing further effort by the team such as discussion with family and relatives.

For people with dementia, the MDT meetings often occur before the team has met the patient ([McWilliams et al., 2018](#)). Discussions with the patient themselves and family members' has been highlighted as important to treatment planning for people with cancer and dementia ([McWilliams et al., 2018](#)). The presence of dementia typically adds to both the number and complexity of considerations involved in evaluating the costs and benefits of treatment ([Ashley et al., 2023](#)). These include additional physical comorbidities, the patient's ability to manage the behavioural demands of treatment (such as staying still during procedures, tolerating hospital stays, or avoiding interference with medical devices), and the availability of caregiver support to handle potential side effects at home safely ([Ashley et al., 2023](#)).

Some health professional experience ethical challenges in providing cancer care to people living with dementia.

Qualitative studies find that providing cancer care for people living with dementia presents complex ethical and emotional challenges for clinicians, often causing worry and guilt about decision-making. ([Ashley et al., 2023](#); [Griffiths et al., 2020](#)). Ethical challenges relate to issues with key ethical principles around nonmaleficence (doing no harm), beneficence (doing net good), patient autonomy, and justice (fairness) ([Ashley et al., 2023](#)).

Ethical concerns about the cognitive capacity of people living with dementia to meaningfully engage in treatment decision-making processes are expressed by some clinicians ([Halpin et al., 2024](#); [Griffiths et al., 2020](#)). Concerns relate to the potential for cancer treatment to exacerbate dementia-related symptoms and impair functioning ([Ashley et al., 2023](#)). Furthermore, qualitative studies report that people living with dementia may forget cancer-related information or their treatment plans, which can result in repeated emotional distress each time they are re-informed of their diagnosis or confronted with physical changes from treatment ([Ashley et al., 2023](#); [Ashley et al., 2021](#)).

Achieving positive outcomes for people living with dementia is complicated by the challenges involved in evaluating the costs and benefits of cancer screening, diagnosis, and treatment ([Ashley](#)

[et al., 2023](#)). This population requires a heightened focus on outcome measures that prioritise holistic quality of life—an aspect that is inherently more complex to assess than survival, especially in the context of cognitive impairment ([Ashley et al., 2023](#)).

People with both cancer and dementia often rely heavily on support from family to access, navigate, and undergo cancer treatment. Without this support, their ability to receive appropriate care may be limited, and healthcare professionals may judge treatment to be unfeasible or unsafe.

Providing cancer treatment becomes particularly challenging—and may even be considered unfeasible or unsafe—when people with dementia lack a supportive family carer who knows them well and can accompany them to hospital appointments and assist with related care at home ([Ashley et al., 2023](#)). Similarly, the availability of a patient’s social support has been frequently cited in research on older people with cancer as a factor influencing healthcare professionals’ cancer treatment decisions ([Pinker et al., 2025](#)).

Ethnographic research conducted in England concludes that the most important factor for staff, when balancing safety and right to cancer treatment for people with dementia, was whether the person had a support network ([Farrington et al., 2023](#)). Having a support network was seen by staff as being crucial to safety both in the outpatient department and at home, and to enabling the person to proceed with treatment.

Ethnographic research conducted in England demonstrates the essential yet unofficial role families often play in supporting people with dementia to access and navigate cancer treatment and care ([Ashley et al., 2021](#); [Surr et al., 2020](#)). Family networks coordinated logistics, communicated medical information, offered emotional support, and managed treatment-related symptoms ([Ashley et al., 2021](#)). However, the ability of families to provide this support varied depending on factors such as network size and availability, logistical constraints, understanding of the patient’s wishes, family dynamics, and the patient’s willingness to accept help ([Surr et al., 2020](#)). In cases where no family support was available, providing adequate care became more complex due to an absence of available services to fill this gap, potentially compromising access to treatment ([Surr et al., 2020](#)).

In parallel, interviews with healthcare professionals revealed a routine reliance on informal caregivers to monitor and manage treatment side effects, assist with practical aspects of care, and ensure medication adherence ([McWilliams et al., 2018](#)).

5.2.3 System factors

Older people and people with frailty and comorbidities are underrepresented in clinical trials, meaning there is a lack of evidence-based guidelines to aid treatment decisions.

A review by [Corbett and Bridges \(2019\)](#) highlights that, although complex information about chemotherapy for advanced cancer is often communicated to older patients and their families,

age-related concerns and outcomes are rarely addressed during clinical consultations. The authors suggest this gap may stem from the limited evidence available to support treatment decisions for this population.

Clinical trials are essential for developing new cancer treatments, but their usefulness in guiding physician decision-making depends on adequate representation of diverse patient groups ([Dotan et al., 2024](#)). However, older adults—particularly those with frailty or comorbidities—remain significantly underrepresented in such trials ([Hanvey et al., 2024](#); [Corbett and Bridges, 2019](#)). Notably, performance status is commonly used as a trial eligibility criterion, with an analysis of 600 randomized controlled trials revealing that 88% applied a performance status cut-off ([Chang and Lai, 2024](#)). This underrepresentation has contributed to uncertainty about the safety and effectiveness of cancer treatments for older adults and people living with dementia ([Ashley et al., 2023](#)).

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6. Experience of illness and quality of life after treatment

6.1 What is the experience of illness and quality of life after treatment for people with cancer and other long-term conditions?

6.1.1 Health status

People with cancer and other long-term conditions are more likely to report worse health status compared to people with cancer and no comorbidities.

A scoping review suggested that comorbidity was associated with poorer quality of life (QOL) and lower health-related quality of life (HRQOL) scores among cancer survivors with at least one of ten specified cancer types ([Ahmad et al., 2023](#)). Pre-existing cardiovascular disease and diabetes were specifically linked to poorer quality of life among survivors of breast, prostate, and colorectal cancer. The authors of the scoping review note that terms like health status, health-related quality of life, quality of life are often used interchangeably. They also found that a range of validated tools were used to assess health status ([Ahmad et al., 2023](#)).

Further evidence reviews have also reported an association between comorbidity and poorer health status, including poorer quality of life for home-dwelling cancer patients aged 80 years and older ([Hjelmeland et al., 2022](#)), and poorer health-related quality of life among prostate cancer patients ([Odeo and Degu, 2020](#)), meningioma patients ([Jonas et al., 2024](#)), and renal cancer patients ([Rossi et al., 2018](#)). Heterogeneity in instruments used to assess health status is also noted.

Findings from the UK ColoREctal Wellbeing (CREW) study found that comorbidities are linked to poorer quality of life, reduced functioning, and more severe symptoms in the five years after colorectal cancer surgery ([Wheelwright et al., 2020](#); [Cummings et al., 2018](#)). Conducted across 29 UK cancer centres between 2010 and 2012 the study gathered self-reported comorbidity status from participants based on a list of 12 individual physical and mental health conditions or disease groups. Participants indicated whether they had been diagnosed with each condition by a doctor and whether it limited their typical daily activities, rating the degree of limitation on a 1–7 Likert scale. Longitudinal multivariable regression models, that adjusted for age and time since surgery (from baseline to 60 months), showed that the presence of any limiting comorbidities was significantly linked to poorer outcomes in global health status/quality of life, symptoms, and functioning across all domains ([Cummings et al., 2018](#)). Specifically, participants with limiting comorbidities experienced more fatigue, pain, urinary and bowel symptoms, and lower levels of physical, role, emotional, cognitive, and social functioning. In contrast, non-limiting comorbidities were only significantly associated with increased pain and reduced physical functioning ([Cummings et al., 2018](#)). The authors suggest the findings underscore the importance of evaluating whether

comorbidities interfere with daily life, as these can have a greater, negative impact on health and well-being during recovery from colorectal cancer. Further analyses that adjusted for the most common individual comorbidities confirmed that limiting conditions remained consistent predictors of poorer outcomes across quality of life, symptom burden, and functioning ([Cummings et al., 2018](#)). The only exception was emotional functioning, where depression and anxiety emerged as the key influencing factors. Among reported conditions, arthritis and heart failure were the most limiting, with over 50% of affected participants reporting significant daily activity limitations. Stroke, myocardial infarction, and angina were limiting for over 40% of those affected, while more than 35% of participants with depression/anxiety and lung disease also found them limiting. High blood pressure was the most frequently reported condition but was the least likely to limit daily life, and only 14% of those with diabetes reported it as limiting.

The HORIZONS UK national cohort study explored factors associated with quality of life in women with gynaecological cancers at diagnosis and one year later. The study recruited 1222 women with a confirmed diagnosis of endometrial, ovarian, cervical, or vulvar cancer from 82 UK NHS hospitals who agreed to complete questionnaires at baseline, three and 12 months. Comorbidities which participants reported limited everyday life (activities they did on a typical day) was identified as a key risk factor for poor quality of life at diagnosis and 12 months later ([Glasspool et al., 2022](#)). The most common reported comorbidity which impacts everyday life was osteoarthritis, followed by depression (as diagnosed by a health professional) and asthma.

A multicentre cohort study in the West Midlands, England reports that comorbidity has a significant influence on health-related quality of life at the time of diagnosis for patients with bladder cancer ([Yu et al., 2019](#)). A survey of bladder cancer survivors found survivors with co-existing long-term conditions were more likely to report poorer health-related quality of life across generic, cancer-generic and cancer-specific domains ([Mason et al., 2018](#)). Multivariable analysis was not possible due to small number of respondents in some subgroups and the lack of information on important variables ([Mason et al., 2018](#)).

A small prospective cohort study at St Thomas' Hospital (2011–2015) including 136 patients found that comorbidities were linked to poorer health-related quality of life before esophagectomy ([Backemar et al., 2020](#)). After adjustments for potential factors that may influence recovery (age, sex, tumour stage, tumour histology, neoadjuvant treatment, operation type, postoperative complications, smoking status and other comorbidities) all patients were found to deteriorate in several aspects of health-related quality of life during the period before and 6 months after surgery. Patients with two comorbidities and three or more comorbidities showed clinical but not statistical significant declines in overall quality of life six months after surgery ([Backemar et al., 2020](#)).

A cross-sectional survey of head and neck cancer survivors in three Scottish health regions during 2011 found that after controlling for clinical and socio-demographic factors having a greater number of comorbidities was an independent predictor of reduced cancer-specific and generic quality of life in head and neck survivors ([Wells et al., 2016](#)).

Analysis of a sample of women's free-text comments on their quality of life collected as part of the Standardisation of Breast Radiotherapy (START) trial quality of life study found that comorbidities and psychosocial problems had a negative effect on many individual experiences of cancer and quality of life outcomes ([Mills et al., 2018](#)).

People living with cancer often experience more severe common side effects—such as reduced physical function, pain, and fatigue—when comorbid conditions are also present.

A systematic review exploring upper limb function in women after breast cancer surgery found higher number of comorbidities is associated with decreased upper limb function in women after breast cancer surgery ([De Groef et al., 2022](#)). Similarly, a systematic review exploring the impact of age on physical functioning after treatment for breast cancer found that older age and comorbidities are reported to be associated with more physical functioning declines ([Robins et al., 2024](#)). However, findings from sub-groups (breast cancer stage, treatment type and time post-treatment) lacked concordance so it is not possible to determine if stage, treatment type and time since treatment had any influence ([Robins et al., 2024](#)).

Fatigue has also been linked to comorbidities among cancer survivors. Comorbidities are reported to be a risk factor of fatigue among breast cancer survivors. Notably, diabetes has been identified as a strong predictor of fatigue in this group ([Ruiz-Casado et al., 2020](#)). In-depth qualitative interviews conducted with people living with and beyond cancer with comorbid conditions in Scotland found that complex fatigue was the most commonly reported issue ([Cavers et al., 2024](#)). This fatigue was not tied to a single condition but was made worse by the increased burden from having multiple conditions.

UK studies focusing on head and neck cancer patients report an association with comorbidities and greater levels of fatigue. A cross-sectional study including 349 patients treated for oropharyngeal cancer at two UK cancer centres between 2010 and 2020 found that a higher number of comorbidities was independently associated with mental and general fatigue severity ([Iyizoba-Ebozue et al., 2025](#)). Similarly, an analysis of patients newly diagnosed with head and neck cancer at 76 NHS hospitals across England, Scotland, and Wales (April 2011–December 2014) found that those with comorbid conditions were significantly more likely to experience cancer-related fatigue over the following 12 months ([Sharp et al., 2023](#)). Pain has also been associated with comorbidities in head and neck cancer survivors, further highlighting the multidimensional impact of coexisting conditions ([Byrd and Kohutek, 2024](#)).

Other symptom domains are also affected. In women with ovarian cancer, cardiovascular comorbidities—as well as anxiety and depression—have been associated with increased psychosexual morbidity ([Logue et al., 2020](#)). An analysis of electronic patient-reported data from lung cancer patients at the Christie NHS Foundation Trust (January 2019–December 2020) found that those with more comorbidities (ACE-27 scores of 2–3) had significantly worse symptoms and quality of life compared to those with fewer or no other health conditions (ACE-27 scores of 0–1) ([Crockett et al., 2023](#)). In particular, they reported more problems with breathlessness, coughing up blood, nausea, mobility, and self-care ([Crockett et al., 2023](#)).

People living with cancer and psychological and psychiatric conditions are more likely to report worse health status.

Evidence reviews show a link between psychological or psychiatric conditions and poorer overall health status. Depression has been shown to directly reduce quality of life in patients with gliomas ([Hu et al., 2022](#)) and can persist even after treatment for glioblastoma multiforme, continuing to negatively affect quality of life ([Mugge et al., 2020](#)). In adults with meningioma, psychological impairment is also identified as a key factor influencing health-related quality of life ([Jonas et al., 2024](#)). A systematic review and meta-analysis found that presurgical psychological wellbeing plays a critical role in shaping how breast cancer patients experience recovery after reconstruction surgery—those with psychological or psychiatric comorbidities had significantly lower postoperative patient-reported outcomes scores (BREAST-Q) compared to those without ([Foppiani et al., 2025](#)).

Analyses from the UK ColoREctal Wellbeing (CREW) study that was adjusted for the most common individual comorbidities found that depression/anxiety was the most significant individual predictor of poorer health and well-being outcomes (with the exception of urinary symptoms) in colorectal survivors for up to five years ([Cummings et al., 2018](#)). Participants who had both limiting comorbidities and depression/anxiety had outcome score differences that were roughly twice as large for domains such as fatigue, pain, and physical, role, and social functioning.

The HORIZONS UK national cohort study explored factors associated with quality of life in women with gynaecological cancers at diagnosis and one year later. Poor mental health was identified as a key risk factor for poor quality of life at diagnosis and again 12 months later, while self-efficacy emerged as a key protective factor ([Glasspool et al., 2022](#)). Similarly, a UK study examining recovery over two years following colorectal cancer surgery found that pre-surgery levels of self-efficacy and depression were strong predictors of quality of life, health status, and personal wellbeing—even after accounting for other key factors such as disease characteristics, presence of a stoma, anxiety, and social support ([Foster et al., 2016](#)).

6.1.2 Psychological impact

People with cancer and comorbidities report higher levels of emotional distress and anxiety and depression.

Emotional distress is a common and expected response to a cancer diagnosis; however, for some individuals, this distress can progress into significant anxiety or depression, affecting their quality of life and ability to cope ([Milligan, 2022](#)). The presence of comorbidities can amplify this emotional burden.

Evidence shows that people with cancer who also have other health conditions tend to experience higher levels of anxiety and depression ([Huang et al., 2024](#)). A systematic review examining distress in older cancer patients identified multiple comorbidities as a key risk factor for depression and anxiety. Conditions such as cardiovascular disease, stroke, sciatica, diabetes, respiratory disease, muscular disorders, and urinary problems were particularly associated with depression. Additionally, higher pain levels—whether cancer-related or due to other health issues—were also linked to increased anxiety and depression ([Silva et al., 2022](#)).

Several reviews reinforce these findings across specific cancer types. Comorbidities have been shown to predict anxiety and depression in colorectal cancer patients ([Cheng et al., 2022](#)), and thyroid cancer survivors where people with additional health conditions reported more stress and anxiety, leading to lower quality of life ([Alexander et al., 2023](#)). A history of mental illness prior to a cancer diagnosis has also been associated with increased risk of suicide ([Massa et al., 2021](#)). Even in the absence of pre-existing mental health conditions, a cancer diagnosis alone has been identified as a risk factor for suicide ([Milligan, 2022](#)).

The psychological impact of comorbidity extends across cancer populations. Among female breast cancer survivors, both comorbidities and prior mental health problems have been associated with increased psychological distress ([Syrowatka et al., 2017](#)). Similarly, comorbidities are linked to emotional distress in testicular cancer survivors ([Smith et al., 2018](#)) and in those with lymphoma ([Tan et al., 2023](#)).

In the UK across England, Scotland, and Wales a large analysis of 8,438 women diagnosed with breast cancer between 2006 and 2010, found a strong association between multimorbidity and depression. This association remained even after accounting for sociodemographic factors (including age, ethnicity, socioeconomic status, education, marital status), and cancer-related (including time since diagnosis, and cancer recurrence) confounding factors. The association became more pronounced as the number of comorbidities increased: women with two conditions had between 1.6 to 2.8 times higher odds of depression, while those with five or more conditions had between 3.6 to 10.1 times higher odds ([Foster and Niedzwiedz, 2021](#)).

Further illustrating this pattern, the Life After Prostate Cancer Diagnosis national survey (2015–2016) found that 9.4% of men reported feeling "socially distressed" after their diagnosis. Multivariable logistic regression analysis found that having three or more comorbidities was significantly linked to distress across all domains, but particularly affecting everyday living ([Wright et al., 2019](#)). Similarly, a 2011 survey of head and neck cancer survivors in Scotland revealed that a higher number of comorbidities was associated with increased distress, unmet needs, and ongoing concerns ([Wells et al., 2015](#)).

6.2 Explanations for differences in experience of illness and quality of life after treatment

6.2.1 Patient factors

Personal resources that support self-management—like health knowledge, physical capacity, organisational skills, and self-efficacy—vary among people with cancer and comorbidity, affecting their ability to manage their care independently.

A systematic review and synthesis of qualitative studies examining self-management in older adults living with cancer and multiple chronic conditions found that managing health required the coordination of various practical activities such as medication adherence, lifestyle modifications, and symptom monitoring ([Corbett et al., 2020](#)). Physical limitations and mobility issues were reported to hinder effective symptom management and make accessing care more difficult. However, for some individuals, prior experience with managing long-term conditions appeared to enhance their capacity to self-manage. Rather than facing an overwhelming accumulation of complexity, these individuals had developed coping strategies and familiarity with navigating the healthcare system before their cancer diagnosis. As a result, cancer care became integrated into their existing routines and skill sets, enabling more effective self-management.

A UK-based qualitative study involving eight older adults and two informal caregivers examined self-management among older individuals living with cancer and multiple long-term conditions, revealing notable variations in the resources available to support health management ([Corbett et al., 2022](#)). Participants identified a range of internal resources, including health knowledge, organisational skills, physical ability, intrinsic motivation, coping strategies, and self-efficacy, which contributed to their capacity to manage their health. Cognitive capacity was also seen as a critical factor in enabling effective self-management, and education and health literacy emerged as key influences on participants' ability to use external resources. Those with higher levels of health literacy were more confident in articulating concerns to healthcare professionals, demonstrating a greater sense of control over their health and the ability to manage it effectively.

Additional research suggests that comorbidities are associated with reduced internal resources. For instance, a systematic review of health literacy in cancer care found that all five included studies

addressing comorbidities reported an association between multiple long-term conditions and limited health literacy ([Ryman et al., 2024](#)). Similarly, findings from the UK ColoREctal Well-being (CREW) study found that people with comorbidities are more likely to report lower self-efficacy scores ([Grimmett et al., 2017](#)).

People with cancer and comorbidity may lack economic (e.g. financial capacity) or social external resources (e.g. support networks) that can help with access to care and work associated with self-management.

A systematic review and synthesis of qualitative studies on self-management in older adults living with cancer and multi-morbidity found that when individuals felt their burden exceeded their capacity, they were often reluctant to seek help from others within their social networks—particularly due to a desire not to burden others with requests for help, such as attending medical appointments or managing household chores ([Corbett et al., 2020](#)). The review also found that many participants also lacked supportive connections beyond their immediate families, limiting potential sources of assistance. Some participants expressed a desire to engage with broader community-based support but were unaware how to access such resources.

Similar themes emerged in a UK-based qualitative study involving eight older adults and two informal caregivers, which examined self-management in the context of cancer and multiple long-term conditions ([Corbett et al., 2022](#)). Participants commonly relied on family support networks to assist with the demands of managing their health. However, not all individuals had access to such support, and even when help was available, some expressed discomfort in drawing upon it. A desire to maintain independence was expressed, with many participants unwilling to ask for assistance unless they felt confident, they could reciprocate, often viewing help as a form of “debt” that must be repaid. Supporting this, data from the UK ColoREctal Well-being (CREW) study found that participants with co-morbidities were more likely to report lower and declining levels of social support over time ([Haviland et al., 2017](#)).

[Corbett et al. \(2022\)](#) also identified financial capacity as a key factor in enabling independence. Individuals with greater financial resources had more autonomy in their healthcare decisions, including the ability to choose between public and private services. They were also able to afford paid support—such as cleaners or gardeners—and make practical adaptations, like using taxis, which reduced their reliance on informal networks.

Some people with cancer and comorbidity may actively disengage with self-management.

Actively choosing to disengage with healthcare practices was highlighted in a systematic review and synthesis of qualitative studies focusing on self-management in older people living with cancer and multi-morbidity ([Corbett et al., 2020](#)). Older adults reported disengaging from healthcare practices they felt compromised their quality of life, particularly those perceived as overly complex, ineffective, or disruptive to daily routines. Concerns included polypharmacy, side effects, threats to

independence, and negative past treatment experiences. Some believed the self-management strategies of the different multiple conditions conflicted. In such cases, individuals tended to prioritise the management the condition with the greatest negative impact on independent living assumed, sometimes meaning their cancer was a low priority. Similarly, a qualitative systematic review by [Glasdam et al., 2023](#) examining the everyday experiences of people with cancer and serious mental illness (SMI) found that managing both conditions simultaneously was often difficult. Cancer can worsen psychiatric conditions, and vice versa, complicating treatment decisions and priorities. As a result, one condition—either the SMI or the cancer—typically took precedence, often overshadowing the other. Some patients deprioritise cancer care due to the dominance of SMI, while others only revisit mental health once cancer is under control.

An integrative review examining the barriers and facilitators of pain self-management in individuals with cancer found that psychological stressors, including anxiety and depression, negatively impacted both the perception of pain and patients' ability to manage it effectively ([Almasri and McDonald, 2023](#)). Some patients with cancer and anxiety and depression believed that their pain could not be relieved and interpreted these psychological symptoms as impending death, hindering their engagement in pain self-management.

The type and functional impact of co-occurring conditions rather than the diagnosis or number of co-existing conditions influences self-management and health-related quality for people with cancer and other long-term conditions.

A narrative review exploring multimorbidity in older adults living with and beyond cancer reports that the type of co-occurring conditions can influence self-management and health-related quality of life ([Corbett and Bridges, 2019](#)). Conditions perceived as limiting or burdensome are more strongly linked to reduced health-related quality of life rather than the number of conditions alone. The review highlighted a study of older cancer survivors by Pergolotti et al., 2017, that found individuals with diabetes, but no activity limitations reported better physical health-related quality of life than those without diabetes, highlighting the role of functional impact over diagnosis alone. Patients in the study who stated that the diabetes limits their activity reported significantly decreased health-related quality of life.

In-depth qualitative interviews conducted with people living with and beyond cancer with comorbid conditions in Scotland found that the impact of multiple health conditions on individuals was less about the number of diagnoses and more about the cumulative burden of symptoms ([Cavers et al., 2024](#)). While some people with well-managed conditions experienced minimal disruption, others faced ongoing symptoms—such as from poorly controlled chronic illnesses or side effects of cancer treatment—that significantly affected daily life. For individuals with a heavy burden of symptoms this led to significant adaptations to daily living and, for some, increased social withdrawal and isolation.

A systematic review by [Corbett et al. \(2020\)](#) identified several limitations in qualitative research involving people with cancer and comorbidities. They noted that such studies often focus on individuals with specific characteristics—most commonly Caucasian women with breast cancer. The review also points out that patients with cancers like breast and prostate typically report a lower comorbidity burden compared to those with other types, such as leukaemia, colorectal, oral, or bladder cancer, which may involve more disabling side effects. To address these limitations, the authors recommend recruiting more diverse samples in future research, including participants with a broader range of cancer types and treatment stages.

6.2.2 Clinician factors

Knowledge gaps among healthcare professionals can hinder cancer care for individuals with comorbid conditions, as primary care providers may lack cancer-specific expertise, while oncologists often have limited experience in managing chronic illnesses.

The role of primary and secondary care is identified as a key theme impacting the experience of cancer and comorbid illness in a qualitative systematic review and evidence synthesis exploring living with and beyond cancer with comorbid illness ([Cavers et al., 2019](#)). The review found that oncologists often did not consider the management of comorbidities to be within their role or area of expertise. In contrast, general practitioners (GPs) were more likely to view holistic management as part of their responsibility and supported a patient-centred, integrated approach. However, GPs also reported feeling less confident in managing complex cancer-related symptoms, which may contribute to a disjointed and fragmented care experience. A further systematic review supports this finding, highlighting that patients perceive primary care providers as lacking knowledge regarding cancer ([Hohmann et al., 2020](#)).

Research also indicates that oncology staff often face knowledge gaps when treating patients with both cancer and dementia, largely due to limited training in dementia care ([Halpin et al., 2024](#); [Ashley et al., 2023](#); [Ashley et al., 2021](#)). As a result, they may lack an understanding of the different forms, symptoms, and progression of the condition ([Ashley et al., 2023](#)). Knowledge gaps concerning dementia also extend to inadequate awareness of legal proxy decision-making by family carers ([Ashley et al., 2023](#)). Oncologists often have a reliance on informal caregivers to provide essential health information to fill gaps in knowledge ([Halpin et al., 2024](#)).

6.2.3 System factors

People with cancer and long-term conditions often experience fragmented and poorly coordinated healthcare, which they report not only fails to ease their burden but actively adds to workload of managing their care.

A systematic review examining patient perspectives on the coordination between primary and oncology care in the context of multiple chronic conditions found that individuals living with both

cancer and other chronic illnesses consistently expressed a need for better communication—both with their healthcare providers and among the professionals managing their various conditions ([Hohmann et al., 2020](#)). Patients generally perceived communication with their providers as inadequate, often citing poor coordination between primary and oncology teams. Patients expressed a desire for greater assurance that their healthcare providers were effectively communicating to manage their conditions collaboratively. Similarly, people with cancer and serious mental illness (SMI) report having to navigate two often disconnected healthcare systems, creating challenges for care coordination, decision-making, and communication ([Glasdam et al., 2023](#)).

Insights from in-depth qualitative interviews in Scotland with individuals living with and beyond cancer and comorbidities reported a general preference for specialist care, perceived as more knowledgeable about specific conditions ([Cavers et al., 2024](#)). However, participants expressed a desire for better coordination, along with greater acknowledgment of coexisting chronic illnesses by healthcare professionals. Many reported that specialists often overlooked or failed to discuss other health issues, placing the burden of managing multiple conditions and medications—often involving polypharmacy—on the patients themselves ([Cavers et al., 2024](#)). Earlier qualitative research by ([Corbett et al. 2022](#)), involving interviews with eight older individuals and two informal caregivers in the UK living with cancer and multi-morbidity found participants frequently described the healthcare system as fragmented and challenging to navigate, which increased rather than alleviated their burden. Frustrations stemmed from poor communication and lack of coordination across services. For example, uncertainty around appointment timings, such as waiting for district nurse visits without a clear schedule, often disrupted daily life and reduced the ability to maintain normal, valued routines.

People with cancer and long-term conditions experience limited support from healthcare professionals to help with self-management restricting opportunities to potentially reduce their health-related workload and reduce burden.

The contribution of formal healthcare services to supporting self-management is described as relatively peripheral in a systematic review and synthesis of qualitative studies focusing on self-management in older people living with cancer and multi-morbidity ([Corbett et al., 2020](#)). The research found that participants expressed a strong desire for timely, appropriate information delivered by approachable and trusted healthcare providers, along with opportunities to ask questions and voice concerns. While participants believed that healthcare professionals could play a significant role in reducing their health-related burden and supporting self-management, some felt that clinical encounters often failed to meet these expectations. For instance, older adults reported that their concerns were dismissed or downplayed, and that healthcare professionals made assumptions based on pre-existing conditions, rather than addressing the specific issues they raised. A separate systematic review by [Hohmann et al. \(2020\)](#) supports this finding, and highlights

that individuals with cancer and other chronic illnesses seek patient-centred, easily accessible information about their care.

A UK-based qualitative study involving eight older adults and two informal caregivers explored self-management among older individuals living with cancer and multiple chronic conditions. The study found that participants perceived the responsibility for managing both new and existing health issues as being held solely by them, rather than being a shared effort with healthcare professionals ([Corbett et al., 2022](#)). While support from healthcare providers was described as strong during active cancer treatment—allowing individuals to relinquish some control and appreciate not having to manage their health alone—this level of support significantly declined post-treatment. As a result, many participants reported difficulties in transitioning back to independent self-management after becoming accustomed to the structured support received during treatment.

Further qualitative research involving eight breast cancer survivors from the UK and Ireland similarly highlights the difficult transition from treatment to survivorship. One participant described the experience as "being pushed into sea from shore on a boat with no oars" ([Deery et al., 2023](#)), conveying a sense of abandonment and lack of guidance following the structured support of active treatment. The participant developed a treatment related comorbidity and expressed frustration at having to independently seek further investigation, rather than receiving continued support from the treatment team.

People with cancer and other chronic conditions face challenges managing multiple medications due to poor communication between healthcare providers, increasing their vulnerability to harmful effects of polypharmacy.

People living with and beyond cancer and multimorbidity are vulnerable to adverse effects of polypharmacy, where inappropriate medication use can contribute to persistent symptoms, increased frailty, and reduced physical functioning ([Corbett and Bridges, 2019](#)).

A qualitative systematic review and evidence synthesis on living with and beyond cancer alongside other chronic illnesses found that, although only a few studies addressed it, managing multiple medications at the same time was a significant challenge for patients ([Cavers et al., 2019](#)). Patients reported having to monitor for potential drug contraindications as communication between primary and secondary care—or across different specialists—was sometimes lacking. As a result, individuals frequently had to advocate for their own care ([Cavers et al., 2019](#)).

Healthcare professionals and patients highlight challenges with managing cancer and multi-morbidity in the context of busy healthcare services.

The standard 15-minute primary care appointment has been identified by primary care professionals as a barrier to effectively managing cancer alongside multiple chronic conditions,

according to a systematic review and evidence synthesis on living with and beyond cancer in the context of comorbid illness ([Cavers et al., 2019](#)). Additional evidence from a second systematic review of qualitative studies reveals that patients perceive healthcare professionals to have high demands placed on them and often hesitate to raise concerns for fear of adding to that burden ([Corbett et al., 2020](#)). Participants emphasised the importance of being able to speak with someone who had time to listen, communicated clearly, and understood the unique perspective of an older adult managing multiple health issues. However, the constraints of short appointments forced them to prioritise concerns, sometimes leading them to withhold symptoms—even those that negatively affected their quality of life—unless they judged them to be severe enough to warrant discussion.

The concept of a “one-stop shop” generalist clinic was positively received in qualitative interviews with people living with and beyond cancer with comorbid conditions in Scotland ([Cavers et al., 2024](#)), as it was seen as a way to address their needs more holistically. Despite this, many participants doubted the feasibility of such a model within the current healthcare context and suggested this would be difficult to coordinate in times of busy, overstretched health services.

Concerns around appointment length are especially pronounced for individuals living with both cancer and dementia, who face challenges related to communication and the complexity of care. A literature review by [Ashley et al. \(2023\)](#) highlights that standard appointment durations are often inadequate for individuals with cancer and comorbid dementia, due to communication challenges, complex treatment decisions, limited evidence on outcomes, and the need to consider multiple perspectives. A scoping review ([Halpin et al., 2024](#)) adds that patients with advanced dementia may forget their cancer diagnosis, requiring repeated explanations and resulting in longer consultations creating conflict with the clinician’s time restraints. Ethnographic research from England ([Griffiths et al., 2020](#)) suggests that extended, flexible, and additional appointments may be necessary to adequately support shared decision-making in this population.

People with cancer and dementia often encounter difficulties navigating a healthcare system that is not adapted to meet the needs of those with dementia.

A literature review by [Ashley et al. \(2023\)](#) reports that hospital environments are often not dementia-friendly in their design—issues include inadequate signage, long waits in overstimulating or unengaging waiting areas, challenges with parking, and hospital transport systems that do not always accommodate caregivers as escorts. Furthermore, the review highlights that delivering cancer treatment to individuals with dementia often requires substantial and tailored adjustments to standard practice. The review found that qualitative studies report adaptations such as scheduling appointments at times suited to the patient, ensuring continuity of care by assigning familiar staff, offering remote consultations to reduce hospital visits, and enabling caregivers to provide verbal reassurance during procedures like radiotherapy via loudspeaker.

A UK ethnographic study exploring the experiences of people with both cancer and dementia in two NHS Trusts found that newly built or refurbished oncology units typically did not appear to have been designed with consideration of dementia-friendly design principles for hospital environments ([Surr et al., 2021](#)). Prolonged waiting times in oncology departments were made more challenging by the presence of comorbid dementia. Emotional and behavioural responses of individuals with cancer and dementia were influenced by boredom and the fatigue resulting from weeks of ongoing daily treatment. Caregivers often found it challenging and stressful to keep the person engaged and calm in waiting areas that were not suited to the needs of those with dementia ([Surr et al., 2021](#)). Family members were reported to be relied on heavily to support patient with dementia navigate cancer appointments ([Surr et al., 2021](#)). In the absence of family members oncology staff were key in coordinating care, working flexibly, and supporting those attending alone.

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7.1 What next: Macmillan's emerging focus areas in supporting people with cancer and other long-term conditions

We know that most people with cancer, around 70%, also have a least one other long-term condition, and this literature review has consolidated multiple sources of existing evidence to paint a picture of the impact this is having on people across the UK. Having cancer and other long-term conditions impacts the speed at which cancer is diagnosed and the treatment options available, and often results in poorer experience of care and quality of life. At Macmillan, we believe we have a role to play in improving treatment outcomes, experience and quality of life for people with cancer and other long-term conditions by:

- Providing people with the right information and support, delivered at the right time in the right way, to empower them to manage their conditions well
- Enabling healthcare professionals to access the knowledge and skills they need to support people with cancer and other long-term conditions effectively
- Transforming health and care systems to meet the needs of people with cancer and other long-term conditions effectively
- Improving the data and research that exists on the impact of cancer and other long-term conditions across the UK.

The literature review, along with our broader work in this area, has highlighted the following key areas where change is needed and where Macmillan will work with healthcare professionals, health and care systems leaders, and decision makers and those who influence them to design and deliver services that reflect the complex realities of living with cancer and other long-term conditions.

7.1.1 Supporting people

- **Increasing uptake and use of needs assessment and care planning** – ensuring everyone diagnosed with cancer has access to personalised, holistic needs assessment and care planning that reflects their personal circumstance and complex health and wellbeing needs, providing the right support at the right time for them.
- **Supporting self-management through information and resources** – including improving the availability and accessibility of data to enable people to understand the impact that different treatments could have on their survival and their quality of life, and developing resources to support people to manage their cancer and other conditions well.
- **Improving treatment adherence through navigation support** – understanding the additional burden created through managing multiple conditions, some people may require additional support from a care navigator, for example, who could assist them in navigating multiple systems of treatment, care and support.
- **Enabling good quality conversations and shared decision making** – given the evidence that people's preferences are not always being considered or weighed appropriately in

conversations around treatment options, for example, we will work to develop and encourage the use of tools to facilitate better conversations for people and healthcare professionals and create the conditions for systems to be responsive to individual needs and preferences, at all stages of their cancer journey.

- **Improving symptom management through online tools, for example** – using online platforms to enable people to access and offer peer support to people with cancer and other conditions, as well as advocating for systematic collection and use of patient reported outcome and experience measures to inform service design and delivery.
- **Tailoring information to those with particular needs** – given the evidence that older people and people with neurocognitive or neurodevelopmental conditions or mental health concerns are having poorer experiences and difficulties in accessing appropriate support, particular attention should be paid to ensuring information and resources are appropriately tailored to meet their needs.

7.1.2 Enabling healthcare professionals

- **Optimising multi-disciplinary working** – working to support the design and delivery of effective models of communication and decision making to meet the needs of people with cancer and other long-term conditions, at all stages of the cancer pathway.
- **Understanding diagnostic overshadowing and reducing subjectivity bias** – improving guidance on routes to referral by raising awareness of the impact of diagnostic overshadowing for particular patient groups, as well as focussing on reducing avoidable delays in referrals and achieving the earliest possible diagnosis for people with multiple conditions.
- **Addressing knowledge gaps** – improving the range of resources and support available to both cancer and non-cancer specialists to enhance their understanding of the complexities of managing cancer and other long-term conditions.
- **Supporting and developing acute oncology** – advocating for effective models and transitions in health and care settings that reduce reliance on emergency care and better meet the needs of people with cancer and other long-term conditions.

7.1.3 Transforming systems

- **Addressing the treatment burden and lack of co-ordination of healthcare services** – identifying ways in which healthcare professionals can join up the delivery of care and treatment decisions and systems can access and share information to streamline support for people with cancer and other long-term conditions. This will include consideration of where care can be delivered or co-ordinated outside acute hospital settings.
- **Investigating the impact of polypharmacy** – undertaking work to understand the impacts of polypharmacy on people with cancer and other long-term conditions and working with

governments and professional bodies to identify where improvements can be made to deliver optimal medicines management.

- **Supporting system navigation** – identifying ways in which people can be offered support when it is needed to navigate multiple and complex systems of care and support, to ensure they can access the best treatment and have improved experiences. Approaches could be based in community or acute settings but must be able to access all of the systems and processes needed to streamline patient experiences and decision making.
- **Improving the quality of conversations in primary care** – understanding what tools could support better quality conversations and removing the barriers that exist to delivering primary care which is tailored and responsive to individual needs and circumstances. This would support people with multiple conditions who may struggle to communicate all of their needs in the time-limited opportunities they have within primary care settings.
- **Advocating for on the inclusion of people with other long-term conditions in the development of cancer clinical trials and personalised medicines** – given the systematic issues with the representativeness of clinical trials, working with governments and clinical researchers to include a greater representation of people who are frail or have multiple conditions, to improve their potential access to innovative and personalised treatments.
- **Delivering support through neighbourhood health** – working with governments across the UK to deliver on the promise of moving care closer to home through both influencing and developing innovative approaches to neighbourhood health. This should be based on preventing delayed referrals for diagnosis and treatment and improving access to holistic care, treatment and support for people with cancer and other long-term conditions.

7.1.4 Improving data and research

- **More research on experience across the UK, and better linkage of relevant datasets** - encouraging research that covers the full range of long-term conditions and multimorbidity. To understand all types of long-term conditions requires increased data linkage across primary care, secondary care and other sectors as well as additional primary data collection. These datasets need to be accessible to researchers, policy makers and system providers to enable decision making based on the evidence around both prevalence and needs.
- **Support increased analysis and publication of the impact of specific long-term conditions on cancer outcomes such as survival, quality of life and patient experience** – this would allow healthcare professionals and people living with cancer to have the information they need to make decisions based on other people in similar circumstances, and to be explicit about the impact of cancer treatment on other health conditions. It would also allow policy makers and service providers to target support on populations most at risk of poor outcomes.
- **Understanding the complex interactions between multimorbidity, inequities and unwarranted variation in treatment and care** - the impacts of multimorbidity will vary

based on other factors including age, deprivation, health inequities, access to services, etc. High quality linked data on these factors, and research focus, is needed to understand these interactions and develop services that support those most at risk of poorer outcomes and experiences.

8. Appendices

8.1 Appendix 1 – Summary of scope of review

Framing the review		
	Included	Excluded
Population	Adults (over 18) AND a diagnosis of cancer (or living beyond cancer) AND at least one other long-term condition (including frailty)	- Children - Carers
Outcomes	Impact of cancer and multimorbidity on: - Cancer diagnosis - Cancer treatment* - Experience of illness and QoL	- Prevalence - Survival, Prognosis, Mortality
Scope		
	Included	Excluded
Evidence types	- Reviews - Research studies (UK only)	- Protocol studies - Case studies - Commentaries - Conference abstracts - PhD theses
Language	English language only	
Date restrictions	2015 onwards.	
Search sources and locations		
Bibliographic databases	- MEDLINE - Social Policy and Practice - HMIC	
Grey literature	The HMIC database will be searched which includes grey literature relevant to UK health and social care management. Scoping searches have reviewed specific grey literature websites such as National Cancer Research Institute (NCRI), Cancer Research UK, NatCan, however only the Scottish Routes from Diagnosis project was identified. This will be included but specific organisational websites will not be searched.	
Search terms		
See Appendix 2 for example search strategy		

*Specific drugs and treatment and research focusing on efficacy and safety excluded.

8.2 Appendix 2 – Example search strategy (MEDLINE)

1	Neoplasms/	539141
2	Cancer*.ti,ab.	2477119
3	(Tumour* or tumor* or Oncolog* or Neoplasm* or Malignan*).ti,ab.	2764452
4	Cancer Survivors/	11479
5	cancer survivor*.ti,ab.	28334
6	living with and beyond cancer.ti,ab.	223
7	1 or 2 or 3 or 4 or 5 or 6	4190229
8	exp Comorbidity/	133604
9	(Multimorbid* or multi-morbid* or Co-morbid* or Comorbid*).ti,ab.	309604
10	8 or 9	380409
11	7 and 10	50508
12	Delayed Diagnosis/	9054
13	(late adj2 diagnos*).ti,ab.	11778
14	(delay* adj2 diagnos*).ti,ab.	34938
15	Diagnostic overshadow*.mp.	158
16	Treatment overshadow*.mp.	6
17	12 or 13 or 14 or 15 or 16	50244
18	Treatment Delay/	81
19	(delay* adj2 treatment*).ti,ab.	21872
20	stage appropriate treatment.mp.	39
21	*Decision Making/	48386
22	Treatment decision*.mp.	32878
23	treatment option*.mp.	178043
24	cancer treatment.mp.	88619
25	18 or 19 or 20 or 21 or 22 or 23 or 24	360273
26	Quality of Life/	302269
27	Quality of Life.mp.	521829
28	Attitude to Health/	85588
29	((life or patient* or liv* or personal or health* or illness) adj3 (experience* or perspective* or attitude*)).ti,ab.	352098
30	Patient Satisfaction/	94141
31	Quality of Health Care/	79252
32	Patient satisfaction.ti,ab.	52328
33	Patient Experience.ti,ab.	10664
34	quality of care.ti,ab.	71602
35	care quality.ti,ab.	11390
36	patient information.ti,ab.	11172
37	Health Services Accessibility/	92275
38	("Access to Health Care" or "access to healthcare").ti,ab.	15573
39	Health Services Needs and Demand/	56058
40	Needs Assessment/	33316
41	Delivery of Health Care/	124747

	("unmet needs" or "health care needs" or "health services needs and	
42	demand").ti,ab.	18635
43	needs assessment.ti,ab.	8670
44	care need*.ti,ab.	21586
45	information need*.ti,ab.	9746
46	Patient-Centered Care/	24559
47	Continuity of Patient Care/	21266
48	Holistic Health/	8156
49	Holistic Nursing/	3361
50	self-management/	6685
	("Patient-centred care" or "Patient centred care" or "Patient-centred" or "Person-	
51	centred" or "Patient centred" or "Person centred").ti,ab.	14533
52	(coordination adj3 care).ti,ab.	9668
53	((holistic adj3 care) or (holistic adj3 support)).ti,ab.	5972
54	(emotional adj3 needs).ti,ab.	2836
55	(support adj3 needs).ti,ab.	8979
56	self-management.ti,ab.	29731
57	Polypharmacy/	7415
58	(polypharmacy or poly-pharmacy).ti,ab.	12537
59	(manag* adj medic*).ti,ab.	4266
60	exp "Treatment Adherence and Compliance"/	353590
61	Medication Adherence/	20787
62	Patient Compliance/	61892
	26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or	
	39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51 or	
63	52 or 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 or 61 or 62	1681524
64	Self Efficacy/	26730
65	("Self-efficacy" or "Self efficacy").ti,ab.	47044
66	("Health behaviour" or "Health behavior").ti,ab.	15827
67	("Help-seeking" or "Help seeking").ti,ab.	9366
68	exp Health Inequities/	45719
69	exp Health Services Accessibility/	143239
70	(health* adj2 inequal*).ti,ab.	12413
71	(health* adj2 inequit*).ti,ab.	8136
72	(health* adj2 disparit*).ti,ab.	26230
73	(health* adj2 equit*).ti,ab.	14478
74	(health* adj2 equalit*).ti,ab.	553
75	64 or 65 or 66 or 67 or 68 or 69 or 70 or 71 or 72 or 73 or 74	292859
76	17 or 25 or 63 or 75	2167938
77	11 and 76	13030
78	limit 77 to (yr="2015 - 2025" and english)	8395

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