

Over-diagnosis and over-treatment in the frail elderly

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Contents

At a glance	1	Section 3: What drives over-diagnosis and over-treatment?	21
Summary	2	Factors that underpin over-diagnosis and over-treatment	22
Introduction	4	Section 4: Leveraging change	25
Data and methods	6	Options for improvement – deprescribing	26
Section 1: Identifying frailty	9	Options for improvement – hospitalisations and ED visits	28
How to identify frail elderly patients	10	Options for improvement – levers for change	30
Are there ethical issues inherent in identifying frailty?	12	References	32
Section 2: What is appropriate care for frail elderly patients?	15	Acknowledgements	36
What is over-diagnosis in the frail elderly?	16		
What is over-treatment in the frail elderly?	18		
Are there sub-groups with heightened vulnerabilities?	20		

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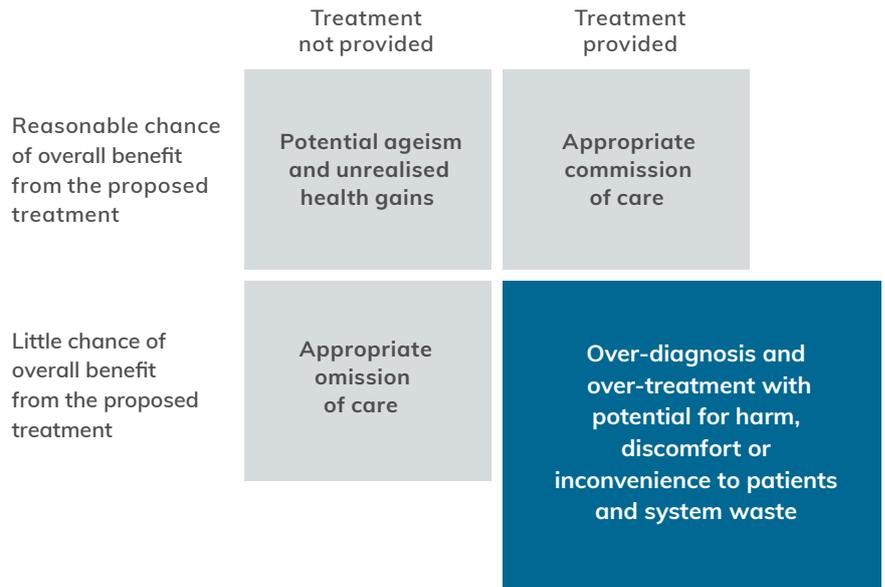
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Over-diagnosis and over-treatment in the frail elderly

At a glance

- Providing appropriate care for frail elderly people is a challenge for healthcare systems.
- Frailty is complex and multi-faceted and varies in onset, progression and recovery.
- Good care requires responsive, patient-centred, evidence-based approaches that distinguish care likely to be beneficial from care with high risk of harm
- Even the term frailty is contested and disliked by older people.



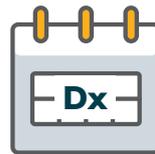
Patient perspectives

Patients reflected on concerns about how frailty is defined, the choices they are given and decision making processes, their quality of life, and varying levels of health literacy.



Polypharmacy or over-treatment

Patients with polypharmacy (≥5 drugs) and hyper-polypharmacy (≥10 drugs) have higher frailty scores.



Over-diagnosed diseases

- Include:
- chronic kidney disease
 - hypothyroidism
 - prostate/breast cancer
 - hyperlipidaemia
 - hypertension
 - dementia



What works?

- Research evidence is limited, but positive effects of deprescribing / other decision support tools
- Experts highlight the importance of shared decision making
- Organisational context, culture and leadership is key

Summary

Frailty is increasingly recognised as a critically important policy and quality of care issue in healthcare systems.

There is clear evidence that frail older people are at increased risk of acute illness; medical instability, slow or incomplete recovery from diseases, surgery and hospitalisation; iatrogenic harm; falls and injuries; and disability, dependency and institutionalisation. These heightened risks mean that frailty is associated with high mortality and high healthcare utilisation. It is a key consideration in clinical decision making.

Frailty is however a contested concept, both in definition and measurement terms. The ACI Acute Care Taskforce developed a working definition of frailty:

A predominantly age-related state of patient fragility or increased vulnerability that results from a compromised ability to maintain homeostasis and limited functional reserves across multiple physiologic systems.

This report draws on scientific literature, empirical data and experiential evidence from patients, carers and clinicians regarding over-diagnosis and over-treatment in frail elderly patients.

Identification of frailty is complex

An approach developed in the National Health Service (NHS) to assess frailty using administrative data (the Gilbert method), when applied to the NSW context, found that on an average day, between 2000 and 2500 patients have a high frailty score. While this screening tool provides insight into the number of patients affected, there are more than 70 measurement tools described in the literature, and there is no consensus about a preferred measurement approach across settings and healthcare systems.

Many tools have limitations in external validity – with head-to-head comparisons used in the same patient population revealing very different prevalence.

There is a growing awareness that the pursuit of a single measurement approach is likely to be fruitless. Frailty is syndromic and highly complex with varying implications for different clinical specialties, treatments and patients. It is likely that a suite of measurement tools is needed to guide decision-making and deliver appropriate care for all patients.

Over-diagnosis and over-treatment are key considerations in the appropriateness of care

Within the broader question of appropriateness of care, issues of over-diagnosis and over-treatment are increasingly garnering attention.

For the frail elderly, there are particular concerns regarding over-diagnosis of chronic kidney disease, indolent cancers, hypertension and hypothyroidism.

In terms of over-treatment, three main topics emerge from the literature:

- non-indicated care (such as drug treatments that provide little or no benefit and potential harm)
- treatment for which therapeutic thresholds are set at inappropriate levels for an elderly cohort (such as blood sugar levels in diabetes and blood pressure control)
- treatment that is provided in contravention to patients' wishes.

Underlying reasons for over-diagnosis and over-treatment identified in the literature span professional, cultural, organisational, health system, patient and carer and technology issues.

What works to reduce over-diagnosis and over-treatment?

A range of interventions to tackle over-diagnosis and over-treatment have been described. Most of the available evidence on their effectiveness is on deprescribing, reducing unnecessary hospitalisations and emergency department (ED) visits, and surgical decision support tools.

Several systematic reviews have evaluated the effects of deprescribing interventions on the total number of prescribed or inappropriate medications, hospitalisations, symptoms and mortality. They include comprehensive and drug-specific medication reviews, education programs for prescribers and patient-specific interventions.

While positive effects have been observed in many primary studies, reviews have been unable to draw definitive conclusions about the relative effectiveness of different deprescribing approaches – primarily because of heterogeneity and poor quality of research evidence in this area.

For hospitalisations, one systematic review found some evidence to support: targeted preventive health checks; care coordination for frail older people, when embedded within integrated health and social care teams; hospital geriatric assessment and orthogeriatric units; community-based rehabilitation services; and better integration of acute and post-acute care through discharge planning and joined up information systems. Leadership, culture and strategic development at the system level were shown to be critical success factors in tackling inappropriate care.

Experiential evidence

Experiential evidence was collected from clinicians and from consumers and their carers. Clinicians noted that:

- shared decision-making is central to avoiding over- and under-treatment

- valid tools, agreed triggers, adequate time and appropriate training for skilled conversations are required to embed shared decision-making
- identifying frailty and determining levels of appropriate care do not necessarily lead to providing less care
- intention matters – the reasons for determining whether someone is frail will help identify which tools and approaches to use
- organisational models that span primary care, hospital care and aged care sectors are required.

Experiential evidence was also gathered in the form of 'I statements' from people aged 75+ years, and their carers. Many considered frailty to be a pejorative term: "***I don't like the word frailty because it is halfway to being dead.***"

The 'I statements' highlighted issues of importance to patients, including:

- choice and involvement in decisions: "***I don't want to be in a battle when staff change my treatment plans – I want to be part of the discussion.***"
- sensitivity to varying levels of health literacy and numeracy is key in engaging in shared decision-making: "***I expect that people will not assume that I can read and write.***"
- tailoring care to individual needs and expectations: "***I expect that you understand that it might be a small surgery, but it's a big recovery and I can't lay flat for 30 days.***"

Minimising over-treatment and over-diagnosis poses significant challenges at system, organisational and clinical levels. These challenges require a shift towards balanced care that supports realistic expectations and delivery models that are informed by research, empirical and experiential knowledge, and operationalised in a context-sensitive way.

Introduction

People are living longer, and often healthier, lives than ever before. However, increasing longevity has brought with it an increase in the prevalence of frailty – a change that has important implications for how healthcare systems provide care for elderly patients.

There is clear evidence that frail older people are at increased risk of acute illness; medical instability, slow or incomplete recovery from diseases, surgery and hospitalisation; iatrogenic harm; falls, injuries; disability, dependency and institutionalisation. As a result, frailty is associated with high mortality and high healthcare utilisation.

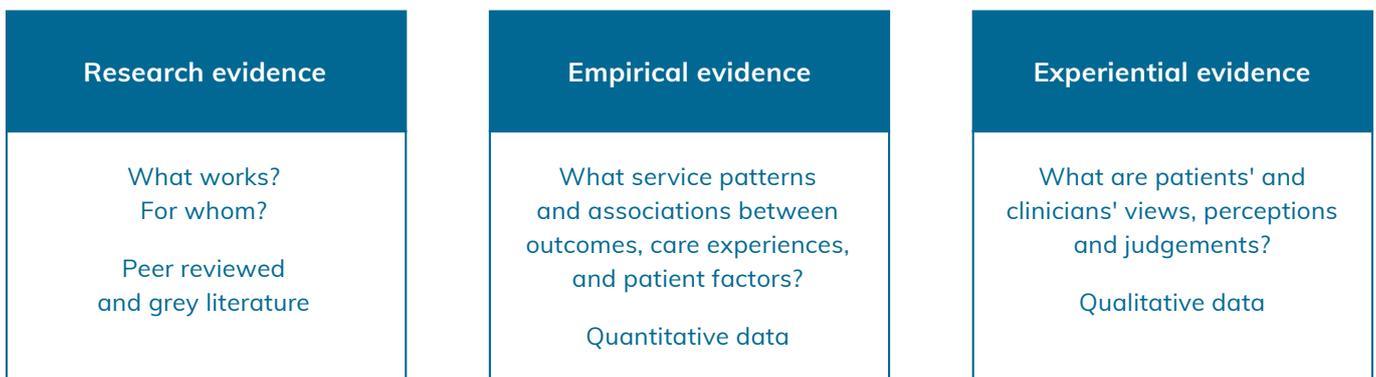
Frailty is a dynamic construct, often considered in terms of a progression or pathway. The pathway is not linear, however, and there are opportunities for patients to return to relative vigour. There are also opportunities – with the use of effective models of care – to keep the heightened vulnerabilities of frailty from being translated into adverse consequences.

This means that there are important questions about appropriateness of care. A fatalistic approach that denies access to therapies on the basis of age or frailty – sometimes called ‘therapeutic nihilism’ – is problematic; but so is an overzealous approach – imposing discomfort, inconvenience and harm on patients for whom there is little chance of meaningful improvement in outcomes and quality of life.

This report provides an overview of three types of evidence regarding over-treatment and over-diagnosis in older people living with frailty (Figure 1):

1. research evidence drawn from a rapid literature review
2. empirical evidence from NSW Health administrative data collections
3. experiential evidence drawn from:
 - patients and their families via 'I statements' gathered in the community and hospitals
 - clinicians via discussions at an expert roundtable meeting in May 2019.

Figure 1. ACI evidence series reports: three types of evidence



About this report

This document summarises the findings of the project's evidence check, providing a high level summary and details about data sources and methods. There are four main sections that align with the sessions for the roundtable:

Section 1: Identifying frailty

- What is meant by frailty?
- Why is it important to identify?
- How to identify frailty?
- What are the ethical issues in identifying frailty?
- Are there unintended consequences?

Section 2: What is appropriate care for frail elderly patients?

- How to consider appropriateness of care from an omission (withholding care that is likely to benefit patients) and commission (providing care for which there is little prospect of benefit and associated risks) perspective
- What is over-diagnosis in older people living with frailty?
- What is over-treatment in older people living with frailty?
- Are there sub-groups with heightened vulnerabilities (e.g. CALD, dementia, dialysis patients)?

Section 3: What drives over-diagnosis and over-treatment?

- What underpins over-diagnosis and over treatment in older people living with frailty?
- What shapes decision making of patients and carers, clinicians and policymakers?

Section 4: Leveraging change?

- What are the levers for change?
 - information and data
 - patient engagement
 - models of care and integration

Bibliographic tables with details about the methods and findings of the studies included in the review are available in a separate document, made available on request.

Data and methods

Four main types of data source were used in the production of this document:

1. Peer reviewed literature

Enter 'frailty' as a search term into the PubMed database and more than 24,000 articles are identified; extend the search to include the terms 'elderly' or 'geriatric', and the number of articles swells to 385,705. For the purposes of this report, searches focused specifically on over-diagnosis and over-treatment in the frail elderly (Table 1).

Using more specific search terms makes the task more manageable, but could mean that important studies – say in over-diagnosis more generally rather than specifically in frail elderly populations – have been missed (Figure 2). In the course of the report's development, we opportunistically gathered broader studies from snowball searches informed by reference lists of key articles and stakeholder advice.

Table 1. Search terms for PubMed (search conducted January 2019)

Search terms (PubMed)	No. of articles
Frail*	24,391
Frailty	11,565
Overtreat* OR overmedicali* OR overprescri* OR overuse OR futil* OR overdiagnosis OR inapprop*	98,742
Overtreat* OR overmedicali* OR OR overprescri* OR overuse OR futil* OR overdiagnosis OR inapprop* AND (frail*)	456
Abstracts retained	242
Included in review	77

* Full annotated table of retained articles is available on request.

2. Grey literature

Internet searches using key terms; targeted searches of key organisations including: the Organisation for Economic Co-operation and Development (OECD), The National Institute for Health and Care Excellence (NICE), National Institute for Health Research (NIHR), Cochrane Library, King's Fund, Health Foundation, the Canadian Institute for Health Information (CIHI), Health Quality Ontario, the Agency for Healthcare Research and Quality (ARHQ), and state departments of health within Australia.

3. Health and healthcare databases and analysis

Quantitative data were drawn from the NSW Ministry of Health datasets accessed via Secure Analytics for Population Health Research and Intelligence (SAPHaRI).

4. Experiential evidence

Two types of experiential evidence were collected from clinicians and from consumers.

Experiential evidence from clinicians was gathered during a roundtable meeting of 35 experts. Their discussion was summarised by the project team and fed back for validation.

Experiential evidence from consumers and patients was gathered in the form of 'I statements' from people aged 75+ years (n = 39) and their carers (n=3) between 8 April 2019 and 24 April 2019. There were two facilitators for all consultations.

Facilitated discussions explored people's experiences, preferences and needs for high quality healthcare and were recorded as a series of first-person 'I statements'. People over the age of 75 years living with frailty were targeted.

For Aboriginal people the life expectancy is lower, therefore Aboriginal people over 50 years old were included in this sample.

The following definition was used to inform recruitment:

People who are living with frailty can experience three or more of the following: unintentional weight loss, exhaustion, weakness, slow walking speed and low physical activity.

There were four facilitated discussions in the following metropolitan and rural settings:

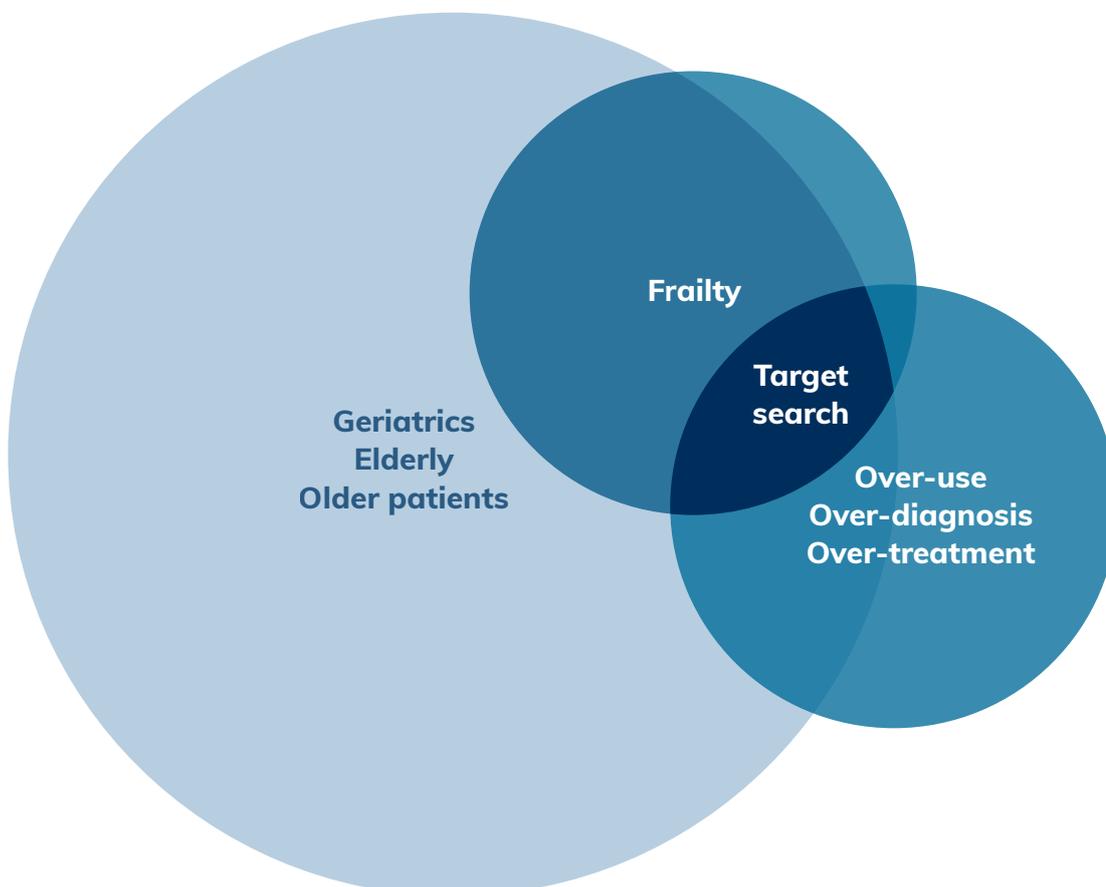
- Aboriginal Community Health Services (metropolitan, n= 20)

- Multipurpose Service (rural, n = 5)
- Residential Aged Care Facility (metropolitan, n = 6)
- Aged Care and Rehabilitation Service (metropolitan, n = 6).

Individual facilitated discussions occurred in one aged care specialist service (metropolitan, n = 2).

All participants received an information sheet and provided written or verbal consent.

Figure 2. Schematic of the frailty literature and the focus of this document



Section 1: Identifying frailty

The way that frailty is conceptualised has evolved over the past 40 years.¹

Measurement of frailty has also seen a marked change – from a focus on physiological phenotype², through models based on the accumulation of deficits³, to broader approaches that also acknowledge the importance of psychological elements, wellbeing, quality of life and social elements in assessment.⁴

This shift has coincided with developments in thinking about outcomes. The overriding focus on mortality, the increased likelihood of death, and avoidance of so-called 'futile' care that predominated 20 years ago has broadened to include considerations of quality of life as well as quantity of life.

Frailty remains a contested concept, in definition measurement and practical terms.

The ACI Acute Care Taskforce has developed a working definition:

A predominantly age-related state of patient fragility or increased vulnerability resulting from a compromised ability to maintain homeostasis and limited functional reserves across multiple physiologic systems.

Patients' and carers' perspectives

"I don't want you to use frailty because I don't know what the word means."

"I don't want to be called frail. It is not a good word and I am not frail."

"I am not ready to die yet. Using that word [frailty] makes me feel like that"

"I don't like the word frailty because it is halfway to being dead."

"I expect that you won't call me frail."

"I want to not be known as frail."

"I can't hear so well, so sometimes I miss what the doctor says."

"I want people to know that you can't see the level of pain I am in."

"I want people to know my balance isn't good but my mind is okay."

"I don't class myself as frail because I can still use my hands."

"I expect that my doctor knows about all my health conditions."

"I expect staff to know about me and my story."

How to identify frail elderly patients

Frailty is increasingly recognised as a critically important policy and quality of care issue in healthcare systems.

There is no doubt that frailty has a pervasive impact on health and the outcomes of care. However, there is no consensus around how to detect and quantify frailty.

Table 2. Selected frailty measurement approaches

Instrument	Constructs	Scale	Data collection
Phenotype approach Fried's Frailty Scale	Weight loss, exhaustion, physical activity, muscle strength, walking speed	0 problems: robust 1-2 problems: pre-frail 3+ problems: frail	Physical examination, performance-based measures
Deficit accumulation model Frailty Index	Deficit count and proportion of potential deficits that a person has accumulated	Range 0-10 (<0.25 robust or pre-frail)	Comprehensive geriatric assessment
Clinical frailty scale	Single descriptor guided by flashcard	Nine point scale ranging from very fit (1) to severely frail (9)	Clinical judgement
Edmonton frail scale	Cognition, general health, functional independence, social support, medication use, nutrition, mood continence, functional performance	Five point scale from not frail (1) to severe frailty (5)	Self-report and observation of function
FRAIL scale	Fatigue, resistance (climb stairs), ambulation (walk one block), illnesses (>5), loss of weight (>5%)	Not frail (0) Intermediate (1-2) Frail (3+)	Self-report
Criteria for Screening and Triaging to Appropriate Alternative care (CriSTAL)	age ≥65; deterioration; frailty index; early warning score; selected comorbidities; nursing home placement; cognitive impairment; emergency hospitalisation or ICU readmission; ECG; proteinuria	Score 0 - 14	Collected in routine practice, or in medical records; does not require specialist clinical judgement
Hospital frailty risk score (Gilbert score)	International Statistical Classification of Diseases and Related Health Problems (ICD-10)	Score stratified into three categories Low risk (<5); intermediate (5-15); high risk (>15)	Hospital information systems and administrative datasets

Adapted from Victoria Health: www2.health.vic.gov.au/hospitals-and-health-services/patient-care/older-people/frailty/frailty-identifying

Wide ranging reviews have identified between 67⁵ and 79⁶ different frailty measurement instruments in the scientific literature. Instruments vary in terms of metrics assessed, scales and strata, and methods of data collection (Table 2).

There is also considerable variability in the identification of frailty. Afilalo et al compared seven commonly used tools to assess a group of cardiac patients and found that frailty varied from 26% to 68% depending on which tool was used.⁷

The assessment of frailty is often used to construct and apply predictive models to guide clinical decision-making – most notably in oncology, cardiology and surgery. However, a 2012 systematic review found insufficient evidence to recommend application of any of the available prognostic models for older adults.⁸

Considering the range of tools that are available and the lack of a dominant approach or consensus about measurement suggests that a universal tool to gauge frailty is an unachievable goal. The literature suggests there is a need for a range of tools for different purposes.

Given the syndromic nature of frailty, a single tool is unlikely to apply universally across diseases and risk factors.⁹

The development of stepped approaches to identification with consistent criteria and data definitions would move the field forward.

One option to emerge recently involves the use of routine administrative data for first-line assessment of frailty. Gilbert et al published a method that can be used wherever ICD-10 coding systems are in place.¹⁰ The method can be implemented into hospital information systems, removing the inter-operator variability and implementation burden associated with manual scoring systems. The Gilbert method was applied to NSW data on four 'marker days' during 2017. The analysis shows the number of hospitalised patients aged 85+ years who were deemed to be frail or 'high risk' ranged from 2111 in April to 2444 in July (Table 3).

Table 3. Number and proportion of patients in 'high risk' frailty category in NSW using the Gilbert method

	30 January 2017	30 April 2017	30 July 2017	30 October 2017
Total number of overnight acute patients	31,920	24,283	25,895	33,058
Total number of overnight acute patients aged 85+ years	4190	3770	4405	4222
Total number of patients aged 85+ years identified as 'high risk'	2146	2111	2444	2255
Percentage of hospitalised patients aged 85+ years who are 'high risk'	51%	56%	55%	53%

Source: HoPeD

Are there ethical issues in identifying frailty?

Identifying frailty allows for more tailored or personalised healthcare which responds to patients’ needs and expectations – encompassing medical care, exercise, cognitive training, nutritional advice and social support.

It can inform clinical and shared decision making in areas of relative risks and prognosis; and it facilitates policy and system-level considerations for this important groups of patients.

In many healthcare systems and organisations, there has been increasing use of frailty screening tools to inform and trigger discussion around end-of-life care. This raises a number of practical and ethical issues: Where should people be screened? In the emergency department? In primary care? On hospital wards? At what interval? Should screening be done unobtrusively through automated data analytics? What is the response to positive screens? Are the key ethical principles of autonomy, beneficence, non-maleficence, and justice embedded in the process?

The issue of inappropriate care towards the end of life – that is, care provided despite a perception that it conveys no net benefit – challenges care providers, patient and their families and carers.

Several studies have considered screening for frailty in terms of the seminal work of Wilson and Jungner on the principles for disease screening (Table 4).^{11,12}

Table 4. Wilson and Jungner principles for disease screening

1. The condition sought should be an important health problem.
2. There should be an accepted treatment for patients with recognised disease.
3. Facilities for diagnosis and treatment should be available.
4. There should be a recognisable latent (asymptomatic) or early symptomatic stage.
5. There should be a suitable test or examination.
6. The test should be acceptable to the population.
7. The natural history of the condition, including development from latent to declared disease, should be adequately understood.
8. There should be an agreed policy on whom to treat as patients.
9. The cost of case-finding (including diagnosis and treatment of patients diagnosed) should be economically balanced in relation to possible expenditure on medical care as a whole.
10. Case-finding should be a continuing process and not a “once and for all” project.

Source: Wilson and Jungner 1968

Wilson and Jungner argue that it is incumbent on healthcare providers to determine the appropriate management of borderline cases in order to avoid causing more harm than good.¹²

A number of papers discuss the ethical and legal implications of frailty screening. They juxtapose the potential benefits and dis-benefits (Table 5).

Table 5: Potential benefits and dis-benefits of frailty screening

Benefits of screening	Dis-benefits of screening
<ul style="list-style-type: none"> • Promotion of healthy ageing by targeted provision of appropriate care and preventive interventions • Better alignment of social and medical responses with patients' needs and expectations • Prevention of harm to frail older adults from excessive and inappropriate medical interventions that are insensitive to the implications of frailty • Potential beneficence and non-maleficence • Avoids potential harms of leaving individuals who lack sufficient decision making capacity to decide 	<ul style="list-style-type: none"> • Potential for maleficence – the risk of harming frail older adults through omission of beneficial care • Medicalisation of frailty may divert attention from social determinants or reinforce stigmatisation of vulnerable groups • Compromise patients' autonomy through stereotyping; and legitimising proxy decision-makers • Legitimising denial of care – may be perceived as 'rationing' or ageism • Frailty is considered by some to be a pejorative concept. Screening or case finding could expose a larger number of older adults to pejorative attitudes • Self-stigmatisation can have a corrosive effect on patients' physical and cognitive function and self-image • Screening can impair informed decision making – undermining meaningful choice

Section 2: What is appropriate care for frail elderly patients?

Appropriateness refers to the extent to which patients receive services that respond to their health needs, social circumstances and their reasonable expectations about how they want to be treated and cared for. Appropriate healthcare means that people receive the right care, in the right way and in the right amount.

Appropriateness of care is of particular importance for frail elderly people. There is the potential for under-treatment (errors of omission), when appropriate treatment that may support or increase a person’s quality of life is not provided, and the potential for over-treatment (errors of commission), when the care provided is unlikely to translate into benefit in the last year of life (Table 6).

Determining appropriate care for frail patients entails judgements about the potential impact of care and the likelihood of different outcomes. It requires a robust engagement and enablement process where patients, their families and carers can make appropriate choices based on an understanding of prognosis, potential effectiveness of treatments and the associated benefits of therapeutic options.

Patients' and carers' perspectives

“I want to have a good sleep and not be in pain.”

“I want you to understand that the medication is horrible for my stomach and I get sick from it.”

“I only want tests if it will benefit me.”

“I expect that doctors will understand that having lots of tests is hard and tiring.”

“I expect that nurses won’t do things to me while I am asleep in the hospital bed.”

“I want my problems tended to by the relevant specialist.”

Table 6. What is appropriate care?

	Treatment not provided	Treatment provided
Reasonable chance of overall benefit from the proposed treatment	Potential ageism and unrealised health gains	Appropriate commission of care
Little chance of overall benefit from the proposed treatment	Appropriate omission of care	Over-diagnosis and over-treatment with potential for harm, discomfort or inconvenience to patients and system waste

What is over-diagnosis in the frail elderly?

Over-diagnosis or ‘unwarranted diagnosis’ is the formulation and application of a label – generally of a disease or condition – that can lead to psychological distress or patient harm from unnecessary overtreatment.¹³

Over-diagnosis comprises two key elements. First, overdetection or the identification of abnormalities that were never going to cause harm, and second, overdefinition – the use of low threshold for treatment without evidence that it helps people feel better or live longer.¹⁴

Over-diagnosis is associated with over-medicalisation, and over-treatment.

Over-diagnosis is associated with negative effects of unnecessary labelling, harms of unneeded tests and therapies, and the opportunity cost of wasted resources that could be better used to treat or prevent genuine illness.^{14,15}

A wide range of diseases have been identified as over-diagnosed in the elderly (Table 7). The widely used definition of ‘chronic kidney disease’ identifies around half of all older people, yet many of them will never experience related symptoms. Commonly used diagnostic criteria for specific diseases derived and validated in younger populations may not apply to older individuals.¹⁶

Table 7. Diseases and conditions potentially over-diagnosed in older patients

- Acute myocardial infarction (among patients >70 years with high levels (>14.0 ng/L) of highly sensitive troponin T testing)
- Breast cancer
- Dementia/Alzheimer’s
- Chronic kidney disease
- Chronic obstructive pulmonary disease
- Hypertension
- Osteoporosis
- Parkinson’s disease
- Prostate cancer
- Pulmonary embolism
- Heart failure
- Hyperlipidaemia
- Stroke and transient ischaemic attack
- Thyroid cancer
- Urinary tract infection*

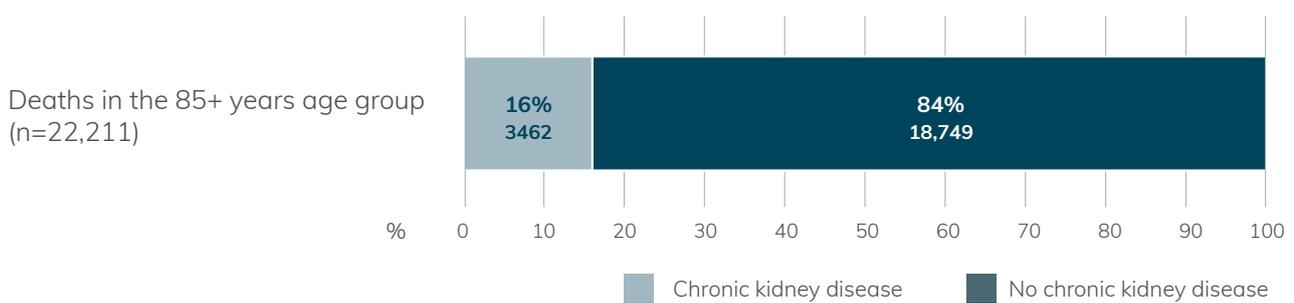
There is a growing criticism of the notion of 'pre-diseases' – for example asserts that too many people are being given diagnostic labels such as 'pre-diabetes' and 'pre-osteoporosis'.¹⁷ The implications of these concerns with respect to the identification of 'pre-frailty' – as featured in assessment tools such as the Fried and Deficit Accumulation models – are yet to be addressed.

Preliminary analyses of data from NSW show that among the 22,211 people aged 85+ years who died during 2016-17, there were 3462 people with at least one hospitalisation with a diagnosis of chronic kidney disease in the year preceding their death (Figure 3). Of these, 1560 (7%) had a diagnosis of chronic kidney disease stage 1-3 (generally regarded as non-clinically significant) noted on a hospital admission in the 12 months prior to their death.

There were 247 decedents (1%) who had at least one hospitalisation with diagnosis of hypothyroidism, and 3626 with at least one hospitalisation with a diagnosis of osteoporosis noted (3604 were secondary diagnoses).

Determining the extent to which these hospitalisations represent over-diagnosis requires further analysis and exploration.

Figure 3. People hospitalised at least once for chronic kidney disease in the 12 months preceding death, aged 85+ years, 2016-17



What is over-treatment in the frail elderly?

There are three main categories of over-treatment: treatment that is not indicated; treatment for which therapeutic goals are set inappropriately high for the elderly cohort; and treatment that is provided in contravention to patients' wishes.

Treatment that is not indicated

A wide range of pharmaceuticals are featured in lists of potentially inappropriate medications – including Beers¹⁸, STOPP/START¹⁹, and STOPPFrail²⁰ (Table 8).

Frail older adults tend to receive more drugs than robust older adults and more medicines that increase the risk of falls. An Australian study has shown that patients with polypharmacy (>/ 5 frugs) and hyper-polypharmacy (>/ 10 drugs) had higher frailty scores.²¹

A systematic review conducted by Cardona-Morrell et al found that about one-third of patients near the end of life received non-beneficial treatments (such as dialysis, radiotherapy, and non-beneficial antibiotics).²² The prevalence of non-beneficial ICU admission was 10%; and of chemotherapy in the last six weeks of life was 33%. Subsequent work by the same team identified underlying reasons for non-beneficial treatments spanned system, social and family factors.²³

Table 8. Summary of the STOPPFrail list

The STOPPFrail list comprises 27 treatments to consider deprescribing in frail older individuals who have a poor one-year survival prognosis. The criteria were developed by Delphi consensus of an expert panel of academic geriatricians, clinical pharmacologists, palliative care physicians, old age psychiatrists, general practitioners and clinical pharmacists. It includes:

- any drug that the patient persistently fails to take or tolerate despite adequate education and consideration of all appropriate formulations
- any drug without clear clinical indication
- lipid lowering therapies
- alpha-blockers for hypertension
- anti-platelets
- antipsychotics
- memantine
- proton pump inhibitors
- alpha blockers
- muscarinic antagonists
- diabetic oral agents
- ACE-inhibitors/angiotensin receptor blockers for diabetes
- H2 receptor antagonists
- antispasmodics
- theophylline
- leukotriene antagonists
- calcium supplements
- osteoporosis treatments
- long-term oral NSAIDs
- long-term oral steroids
- 5-Alpha reductase inhibitors
- systemic oestrogens for menopausal symptoms
- multi-vitamin combinations and nutritional supplements
- prophylactic antibiotics.

Source: Lavan et al 2017

Administrative data show that in NSW in 2017, there were 36,586 deaths among people aged 75+ years – of these 16,028 or 44% had three or more hospitalisations and 32% had three or more ED visits in their last year of life (Table 9). However if a prospective approach is used, considering all people aged 75+ years in NSW, in 2016-17 there were 37,470 people who had three or more overnight hospitalisations and two-thirds of those patients survived longer than a year from the time of their first admission. Predicting which patients will benefit from care is not straightforward.²⁴

There are particular concerns regarding the transfer of patients from nursing homes to hospital.²⁵ A systematic review found that residents of aged care facilities often present to ED as severely unwell with multi-system disease, underwent invasive interventions and experienced high rates of complications.²⁶ They concluded that based on available evidence, it is not clear if benefits of in-hospital emergency care outweigh potential adverse complications of transfer.

Table 9. 'Fact of death' analyses, utilisation of services in last year of life, NSW 2016-17

Starting point of analyses = all deaths in the 75+ age group in NSW (retrospective – 'fact of death' analyses)	
In 2017, the number of deaths in people aged 75+ population	36,586
The number (%) who had 3+ hospitalisations* in the last year of life	16,028 (44%)
The number (%) who had 3+ ED visits in the last year of life	11,515 (32%)
The number (%) who received palliative care (1+ episodes with either a Z code or palliative care type)	9,196 (25%)

Overly stringent therapeutic targets

The physiology of older adults means that general targets set for diseases such as hypertension and diabetes are too stringent and there is a need for clear guidance about appropriate targets; and frailty-informed treatment decisions with relaxed targets for surrogate markers such as HbA1c.²⁷⁻³⁰

Treatment that goes beyond patients' wishes

In a Canadian audit of mismatches between patients' and family members' expressed preferences for care and orders for life-sustaining treatments, Heyland et al found that among patients who preferred not to have CPR, 35% had orders to receive it.³¹ Patients who were frail were however less likely to be over-treated; patients who did not have a participating family member were more likely to be over-treated.

Table 10. High users of hospital and emergency departments; and subsequent deaths, NSW 2016-17

Starting point = all people aged 75+ years in NSW (prospective)	
In 2016-17, the number of people aged 75+ years	474,612
The number (%) who had 3+ overnight hospitalisations	37,470
Of those with 3+ overnight hospitalisations, the number (%) who died within 12 months of first admission	10,204 (27%)

Are there sub-groups with heightened vulnerabilities?

There are concerns that within the frail elderly population there are sub-groups that are at heightened vulnerability, such as patients from culturally and linguistically diverse (CALD) groups and those with dementia.

The literature review found that across a range of countries, there is a greater prevalence of frailty in immigrant groups/CALD communities.³²⁻³⁴

An Australian study of mortality among frail older inpatients showed that the ability to speak English was a significant factor, but place of birth was not.³⁵ A Canadian study showed that recent immigrant decedents were more likely to die in ICU; and in last six months of life they experience more ICU admissions; hospital admissions; mechanical ventilation; dialysis, percutaneous feeding tube placement; and tracheostomy (highlighting the effect of acculturation or potentially language proficiency).³⁶

Note on renal supportive care: Offering haemodialysis indiscriminately to patients has resulted in a situation where a significant number of frail elderly patients are potentially harmed from overly aggressive treatment near the end of life. An earlier generation's worry about ageism has been replaced by an equally paternalistic failure to offer or discuss risks, benefits, and alternatives to haemodialysis such as renal supportive care.³⁷

Section 3: What drives over-diagnosis and over-treatment?

The research literature focuses on clinical factors that lead to over-diagnosis and over-treatment. The need to provide a viable and coherent alternative models of care are increasingly recognised as an essential element in providing appropriate care.

Experiential evidence highlights the important role that shared decision-making plays in establishing appropriate and patient-led care.

The expert roundtable acknowledged that:

1. Identifying frailty and reaching good decisions about care are not about providing less, but rather about better and more appropriate treatment for the frail elderly.
2. Identifying frailty in elderly individuals is important for their care but there are cautions. There is no single frailty screening tool that is one-size-fits-all; only low-level evidence exists about prognostic accuracy, and frailty screening has risks as well as benefits.
3. A balance needs to be struck between acknowledging the progressive nature of ageing and frailty and the need for this to be honestly explained to patients, as well as retaining the 'positive' aspects of frailty assessment, for example in identifying vulnerabilities and enabling tailored treatments.
4. Shared decision-making with frail patients and their families is central to both determining appropriate care, as well as avoiding unwarranted over- and under-treatment.
5. Intention matters: why do we want to know if someone is frail? This will determine appropriate assessment tools but also how risks and benefits of intervening are understood in discussion with patients.
6. Good tools, agreed triggers, adequate time, and appropriate training for skilled conversations are the necessary elements to embed shared decision-making.

Patients' and carers' perspectives

"I expect that the different doctors looking after me aren't on different wavelengths."

"I expect that people will not assume that I can read and write."

"I want time so I can consider what is best for my situation."

"I want my husband's views respected."

"I expect that people will listen."

"I expect people to understand that I am old and have creaky bones, but I can still make decisions."

"I want to be cared for at home and die at home."

"I want to be in control."

I want choice over surgeries."

"I expect to ask questions and get answers."

"I expect to have the right to make decisions."

"I want to make sure decisions are made that are worthwhile for me."

"I would rather live in pain than have surgery on my spine."

Factors that underpin over-diagnosis and over-treatment

In developed healthcare systems there is a growing concern with over-diagnosis and over-treatment. There have been a number of reviews that focus on generic drivers, rather than those specific to frailty. They include culture, system, technological and stakeholder factors (Table 11).

While generic drivers are relevant to over-diagnosis and over-treatment in the frail elderly, there are some particular issues to consider.

For example, there is an imperative to have available alternative models of care if active treatment is not pursued – options to refer patients to palliative care; or watchful waiting; and engagement with family and carers.³⁸ Providers and patients are less comfortable with advice about what should not be done, without support for what should be done.³⁹

There are few guidelines available that are explicit about the treatment of frail patients with multiple comorbidities, and frail patients are seldom recruited into treatment studies. This means that published guidance is not always relevant or appropriate. In the absence of population-specific evidence-based guidance, decision-makers have to rely on expert opinion and diagnostic reasoning to individualise treatment. This can result in under- and over-treatment.^{40,41}

In emergency situations, there can be particularly strong drivers for over-treatment. For example, when patients with active cancer present to surgeons with an emergency bleed, obstruction or perforation, decision-making can be particularly difficult with limited time to discuss and consider options.⁴²

Clinicians' mental models⁴³ and cognitive biases⁴⁴ have been shown to result in over-diagnosis and over-treatment. These biases include 'omission regret bias', which is based on a desire to avoid experiencing a sense of regret (or loss) at not administering an intervention which could have benefited at least a few recipients.

In terms of nursing home transfers to hospital and emergency departments, a UK study identified clinical assessment, patient and carer preferences, medico-legal concerns, communications, capability of nursing homes and GP workload as factors underpinning hospital admission decisions.⁴⁵

Trahan et al found that nursing factors, physician factors, facility/resource factors, family factors and health system factors all played a role in of avoidable or unnecessary transitions of nursing home residents to emergency departments.⁴⁶

Table 11. Factors identified as drivers of over-diagnosis and over-treatment

	Over-diagnosis	Over-treatment
Professionals	<ul style="list-style-type: none"> Commercial and professional vested interests Fear of litigation Fear of missing disease Lack of confidence Lack of training Cognitive bias 	<ul style="list-style-type: none"> Guidance is lacking or hard to access Mental models and use of heuristics Ethical concerns Reluctance to discuss death and dying Lack of training about end of life care/geriatric pharmacology Guidance focuses on single diseases rather than multimorbidity Perceived lack of alternatives Lack of time or skills to explore options, risks and benefits Lack of confidence Cognitive biases
Culture	<ul style="list-style-type: none"> Intolerance of uncertainty Medicalisation of normal physiological processes A pervasive assumption that new is better 	<ul style="list-style-type: none"> Intolerance of watchful waiting 'conveyor belt' to intensive care Clinical specialisation rather than whole person care Scepticism about non-pharma treatment
Health system	<ul style="list-style-type: none"> Fee for service payments Quality measures Guidelines do not cover variation for patient sub-groups 	<ul style="list-style-type: none"> Fee for service payments Access and timeliness pressures Guidelines not available or not applicable for cohort Lack of end of life care
Patients, carers and the public	<ul style="list-style-type: none"> Expectation that clinicians will do something Over-reliance on tests 	<ul style="list-style-type: none"> Expectation of patients and carers Fear of death Unrealistic expectation about what medicine can achieve Lack of trust of generalists
Industry and technology	<ul style="list-style-type: none"> Increased sensitivity – detecting ever smaller abnormalities Commercial incentives Media reporting 	<ul style="list-style-type: none"> Commercial incentives Marketing Media reporting

Section 4: Leveraging change

There is a wide variety of levers that are used to secure change in healthcare systems.

1. In brief:
2. Cognitive levers provide awareness and understanding
3. Mimetic levers provide information about the performance of others to encourage emulation
4. Supportive levers provide facilitation, implementation tools or models of care to actively support change
5. Formative levers develop capabilities and skills through teaching, mentoring and feedback
6. Normative levers set performance against guidelines, standards, certification and accreditation processes
7. Coercive levers use policies, regulations incentives and disincentives to force change
8. Structural levers modify the physical environment or professional cultures and routines
9. Competitive levers attract patients or funders.⁴⁷

A key step in leveraging change is identifying frailty. However, this is a complex task with over 70 measurement tools available and no consensus about the best way to define and measure frailty (see p 10). There is instead, growing recognition of the need for a range of tools for different purposes and circumstances.

This section focuses on evidence about other approaches to leverage change - particularly in de-prescribing and avoiding unnecessary ED visits and hospitalisations.

Options for improvement

Deprescribing

Multifaceted pharmaceutical approaches for improving the appropriate use of polypharmacy in older people leads to some benefits in terms of Medication Appropriateness Index scores and number of Beers medications.⁴⁸

However, evidence collated in this Cochrane review about the impact on hospital admissions and medication-related problems is inconsistent.⁴⁹

A second Cochrane review concluded that interventions to optimise prescribing for older people living in care homes may lead to fewer days in hospital, a slower decline in health-related quality of life, identification and resolution of medication-related problems, and improved medication appropriateness, but may make little or no difference to adverse drug events or mortality.⁵⁰

Several systematic reviews have evaluated the effects of deprescribing interventions (including comprehensive and drug-specific medication reviews, education programs for prescribers, and patient-specific interventions) on the total number of prescribed or inappropriate medications, hospitalisations, symptoms and mortality (CRD). While positive effects were observed in many primary studies, reviews were unable to draw definitive conclusions about the relative effectiveness of different deprescribing approaches – primarily because of heterogeneity and poor quality of research evidence in this area.

In its review of reviews, the Centre for Reviews and Dissemination concluded that interventions are often complex and it can be unclear how best to organise and implement these to achieve a reduction in inappropriate polypharmacy.

Table 12. Key articles on what works to improve over-diagnosis and over-treatment

Article	Method	Main findings
Centre for Reviews and Dissemination 2017 ⁵¹ Reducing harm from polypharmacy in older people.	Review of reviews	<p>Positive (but inconsistent) effects of deprescribing interventions have been observed.</p> <p>Patient and practitioner decisions about stopping medications are influenced by social influences, expected consequences, and factors such as consultation length.</p> <p>Practitioners said their own knowledge and skills, plus beliefs about the capabilities of patients could influence their decisions.</p> <p>Patients said their emotions, treatment goals, and willingness to experiment could also influence their decisions.</p> <p>A multifaceted person-centred coordinated care approach, as advocated in NICE clinical guidelines and by the 'House of Care' model, should underpin efforts to reduce harm</p>

Article	Method	Main findings
Tija et al 2013 ⁵² Studies to reduce unnecessary medication use in frail older adults: a systematic review. Older adults: a systematic review.	Systematic review Included 36 articles 15 randomised controlled trials, 4 non-randomised trials, 6 pre-post studies, and 11 case series. Control groups were used in over half of the studies (n=20).	Most (25) interventions were led by or involved pharmacists. Four used academic detailing, two used audit and feedback reports targeting prescribers, and five involved physician-led medication reviews. Overall intervention effect sizes could not be determined due to heterogeneity of study designs, samples, and measures. Very little rigorous research has been conducted on reducing unnecessary medications in frail older adults or patients approaching end of life.
Thompson et al 2019 ⁵³ Tools for deprescribing in frail older persons and those with limited life expectancy: a systematic review.	Systematic review and narrative description of tools. Included 15 tools: those that assessed tools (n = 2) that described a model or framework for approaching deprescribing (n=2), tools that outlined a deprescribing approach for the entire medication list (n=9), and tools (n = 4) that provided medication-specific advice (n=4).	Only four of the 15 tools have been tested in clinical practice (in very low-quality studies). It is unclear whether using these tools is likely to result in a meaningful reduction in inappropriate medication use and improve outcomes, or even cause harm. Lack of clinical outcome data and inconsistency in outcome measurement have also been highlighted as limitations in deprescribing studies. A 2018 systematic review evaluating deprescribing interventions in older persons found that few studies measured clinical outcomes and that none were adequately powered to detect differences in clinical outcomes between intervention and control groups. A number of deprescribing tools have been developed in recent years, but they remain largely untested.
Mangin et al 2018 ⁵⁴ International Group for Reducing Inappropriate Medication Use & Polypharmacy (IGRIMUP): Position statement and 10 recommendations for action.	Outlines current strategies to reduce inappropriate medication use, provides evidence for their effect, and then proposes recommendations for moving forward with 10 recommendations for action	This narrative review describes a range of approaches including: Computer-assisted digital tools Explicit tools and lists such as the Beers criteria and the Screening Tool of Older Persons' potentially inappropriate Prescriptions/Screening Tool to Alert to Right Treatment (STOPP/START). Implicit approaches such as comprehensive geriatric assessment, medication appropriateness index, the prescribing optimisation method, the SMART (Specific, Measurable, Acceptable, Realistic and Time-framed) tool; Patient-focused drug surveillance; CRIME (CRIteria to assess appropriate Medication use among Elderly complex patients); the PATH (Palliative and Therapeutic Harmonization) program with frailty owing to multiple; the 10-step discontinuation Guide; and the Good Palliative Geriatric Practice Algorithm.
Cooper et al 2015 ⁴⁹ Interventions to improve the appropriate use of polypharmacy in older people: a Cochrane systematic review.	Cochrane systematic review Included 12 articles	The included interventions demonstrated improvements in appropriate polypharmacy based on reductions in inappropriate prescribing. However, it remains unclear if interventions resulted in clinically significant improvements (e.g. in terms of hospital admissions).

Options for improvement

Hospitalisations and ED visits

Frailty is associated with increased hospital admissions due to falls, confusion and loss of mobility, and once admitted to hospital, frail patients often have long stays.⁵⁵

There is a considerable interest in identifying interventions which are effective in reducing avoidable hospital admissions and in reducing the length of stay amongst frail older people. A systematic review found some evidence to support: targeted preventive health checks, care coordination for frail older people when embedded within integrated health and social care teams, hospital geriatric assessment and orthogeriatric units, community-based rehabilitation services and better integration of acute and post-acute care through discharge planning and joined up information systems.⁵⁶

A well conducted UK study focused on differences in providers' approaches to reduce unplanned admissions among patients aged 85+ years concluded the most striking difference between improving and deteriorating sites was not the presence or absence of specific services, but the extent to which integration within and between types of service had been achieved.⁵⁷ There were overwhelming differences in leadership, culture and strategic development at the system level.

For emergency department, a systematic mapping review found contradictory evidence about the identification of and management for frail older people in ED.⁵⁸ The Geriatric Emergency Department Intervention (GEDI) model – developed in Queensland resulted in fewer admissions, shorter length of stay and lower costs.⁵⁹

Table 13. Key articles on what works to reduce hospitalisations and emergency department presentations

Article	Method	Main findings
Wilson et al 2015 ⁵⁷ Establishing and implementing best practice to reduce unplanned admissions in those aged 85 years and over through system change [Establishing System Change for Admissions of People 85+ (ESCAPE 85+)]: a mixed-methods case study approach. NIHR report.	Mixed-methods study using routinely collected data, in-depth interviews and focus groups. Data were analysed using the framework approach, with themes following McKinsey's 7S model. Six study sites were selected based on admission data for patients aged 85 years and above from primary care trusts: three where rates of increase were among the most rapid and three where they had slowed down or declined. A total of 142 respondents were interviewed.	Between 2007/8 and 2009/10, average admission rates for people aged 85 years and over rose by 5.5% annually in deteriorating sites and fell by 1% annually in improving sites. During the period under examination, the population aged 85 years and over in deteriorating sites increased by 3.4%, compared with 1.3% in improving sites. In deteriorating sites, there were problems with general practitioner access, pressures on emergency departments and a lack of community-based alternatives to admission. However, the most striking difference between improving and deteriorating sites was not the presence or absence of specific services, but the extent to which integration within and between types of service had been achieved. There were overwhelming differences in leadership, culture and strategic development at the system level.

Article	Method	Main findings
Philp I et al 2013 ⁵⁶ Reducing hospital bed use by frail older people: results from a systematic review of the literature.	Systematic review included: 48 studies 11 meta-analyses, 9 systematic reviews, 5 structured literature reviews, 8 randomised controlled trials and 15 other studies. Inclusion dates 2007-2013	Found evidence for effectiveness: In the prevention of admission to hospital – care coordination, preventive health checks and care home liaison In reducing length of stay within the hospital setting – geriatric assessment units and orthogeriatric units targeting frail older people In reducing length of stay and preventing readmission – services which linked hospital- and community-based care through discharge planning, information sharing and rehabilitation services provided in the person's home No evidence of impact on hospital bed use from multi-factorial falls prevention services, day hospital services, medication reviews, exercise programs in the community, nutritional enhancement in hospital and nurse-led transitional care units.

Emergency department

Article	Method	Main findings
Preston et al 2018 ⁵⁸ What evidence is there for the identification and management of frail older people in the emergency department? A systematic mapping review.	Systematic mapping review of interventions to identify frail and high-risk older people in the ED; interventions to manage older people in the ED; and the outcomes of these interventions - examining whether or not there is any evidence of the impact on patient and health service outcomes. Includes evidence from 103 peer-reviewed articles and conference abstracts and 17 systematic reviews published from 2005 to 2016.	Of the 90 included studies, 32 focused on a frail/ high-risk population and 60 focused on an older population. Studies reported on interventions to identify (n = 57) and manage (n = 53) older people. The interventions to identify frail and at-risk older people, on admission and at discharge, utilised a number of different tools. There was extensive evidence on these question-based tools, but the evidence was inconclusive and contradictory. Service delivery innovations comprised changes to staffing, infrastructure and care delivery. There was a general trend towards improved outcomes in admissions avoidance, reduced ED reattendance and improved discharge outcomes.

Options for improvement

Levers for change

The research literature includes numerous descriptions of a range of levers for change. The levers are operationalised in hospitals, clinics, local health districts and systems and include models of

care, information and guidance, incentives and organisational culture change programs (Table 14). None of these interventions are supported by strong evidence.

Table 14. Types of interventions to address over-diagnosis and over-treatment

Category of intervention	Examples
Over-diagnosis	
Guidance/knowledge	Definitions of disease (reduce over-diagnosis) ^{15,17}
Over-treatment	
Models of care	GP led hospital at home models (reduce hospitalisations) ⁶⁰ Social care in the community (reduce hospitalisations) ⁶¹ Care home liaison ⁵⁶ Geriatric assessment units and orthogeriatric units (reduce length of stay) ⁵⁶ Linked hospital- and community-based care through discharge planning, information sharing and rehabilitation services provided in the person's home (prevent readmission and reduce length of stay) ⁵⁶ Clinical ethics support teams ⁶² Geriatric ED interventions/pharmacist review in ED; geriatrician in the ED (reduce ED visits/hospitalisations) ⁵⁹
Guidance/knowledge	Deprescribing lists – STOPPFrail ⁶³ Guidance for comorbidity ⁶⁴ Asia-Pacific Clinical Practice Guidelines for the Management of Frailty ⁶⁵ Deprescribing protocol CriSTAL tool for ICU care ⁶⁶
Care processes	Preventive care (prevent hospitalisation) ⁵⁶
Funding	Incentives to manage polypharmacy ⁶⁷
IT/data	Telephone support (reduce hospitalisations) ⁶⁸ Electronic tool for emergency treatment escalation plans (less non-beneficial treatment/resuscitation) ⁶⁹ Computer assisted decision tools ⁵²
Organisational context	Integration of care, culture, leadership and strategic development (reduce unplanned readmissions) ⁵⁷

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