



# What works in managing complex conditions in older people in primary and community care? A state-of-the-art review

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## Abstract

The number of older people living with complex health conditions is increasing, with the majority of these managed in primary and community settings. Many models of care have been developed to support them, however, there is mixed evidence on their value and they include multiple overlapping components. We aimed to synthesise the evidence to learn what works for managing complex conditions in older people in primary and community care. We carried out a state-of-the-art review of systematic reviews. We searched three databases (January 2009 to July 2019) for models of primary and community care for long-term conditions, frailty, multimorbidity and complex neurological conditions common to older people such as dementia. We narratively synthesised review findings to summarise the evidence for each model type and identify components which influenced effectiveness. Out of 2,129 unique titles and abstracts, 178 full texts were reviewed and 54 systematic reviews were included. We found that the models of care were more likely to improve depressive symptoms and mental health outcomes than physical health or service use outcomes. Interventions including self-management, patient education, assessment with follow-up care procedures, and structured care processes or pathways had greater evidence of effectiveness. The level of healthcare service integration appeared to be more important than inclusion of specific professional types within a team. However, more experienced and qualified nurses were associated with better outcomes. These conclusions are limited by the overlap between reviews, reliance on vote counting within some included reviews and the quality of study reports. In conclusion, primary and community care interventions for complex conditions in older people should include: (a) clear intervention targets; (b) explicit theoretical underpinnings; and (c) elements of self-management and patient education, structured collaboration between healthcare professionals and professional support. Further work needs to determine the optimal intensity, length, team composition and role of technology in interventions.

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## KEYWORDS

ageing, chronic disease management, chronic/long-term conditions, community care, primary care

## 1 | BACKGROUND

With global increases in life expectancy and ageing populations, numbers of older people living with long-term conditions (LTCs) are rising, particularly among those aged 85+. LTCs cannot generally be cured but symptoms can often be controlled by medication or other treatments (Department of Health, 2012), for example type 2 diabetes, chronic obstructive pulmonary disease (COPD), and depression. Of those aged 60+ in the United Kingdom (UK), 58% report living with a LTC and 25% with two or more (multimorbidity), with these percentages rising substantially by age (Department of Health, 2012). Often not included in the LTC figures are other conditions common in older people, such as frailty (11%; Collard, Boter, Schoevers, & Oude Voshaar, 2012), dementia (7%; Prince et al., 2014), Parkinson's disease (1%; Tysnes & Storstein, 2017), or stroke (2%; Bhatnagar, Wickramasinghe, Wilkins, & Townsend, 2016). Although there is no consensus over how a 'complex patient' is defined, definitions typically consist of multiple interacting conditions and contextual factors such as social determinants of health and health systems (Manning & Gagnon, 2017). Within this review we defined complex as older people living with one or more LTCs being managed in primary and community healthcare settings.

Historically, healthcare systems have been structured to diagnose and treat acute conditions, not LTCs, and so do not reflect the needs of ageing populations (World Health Organisation, 2015). Shifting care to primary and community care rather than specialist care settings potentially provides more holistic care closer to home that is also able to draw on multiple professional inputs. Models of care have been developed to manage complex LTCs in primary and community care, such as integrated care, collaborative care and the chronic care model (WHO, 2016). Over the last 20 years, these models have been extensively evaluated in trials and reviews, but show mixed results in older people (van Eck van der Sluijs et al., 2018; Mitchell et al., 2015). Furthermore, these models are often described distinctly, but typically have overlapping elements such as using evidence-based care protocols, encouraging patient self-management and improving collaboration between healthcare professionals. Although it did not identify which components were effective, one overview of reviews found that important elements of existing models of integrated care for older people were: multi-disciplinary team care, comprehensive assessment and case management (Briggs, Valentijn, Thiyagarajan, & Araujo De Carvalho, 2018). Other reviews have focussed mainly on barriers and facilitators to implementation (Threapleton et al., 2017). There are consequently potential commonalities that can be identified in what works across different models. With older people's health increasingly managed in primary care, the aim of this state-of-the-art review is to draw out key messages

### What is known about this topic?

- The number of older people living with one or more long-term conditions is increasing
- This population is often managed in primary and community care settings
- Multiple models of care exist in this setting, however, these have overlapping components and mixed evidence of effectiveness

### What this paper adds?

- Primary and community care models are most likely to improve depressive symptoms and other mental health outcomes.
- Theory-based interventions which include self-management, patient education, assessment with follow-up care procedures and structured care processes or pathways are more likely to be effective
- The extent of team integration appears to be more important than team composition, although more qualified nurses are associated with better outcomes

from systematic reviews of models of primary and community care about what works best in these settings to manage older people with complex LTC needs.

## 2 | METHODS

We undertook a state-of-the-art review of systematic reviews to identify effective components of primary and community management of complex conditions in older people. State-of-the-art reviews focus on narrative synthesis of the most up to date evidence to outline the current state of knowledge and priorities for future research, and do not include formal quality assessment (Grant & Booth, 2009). As we did not intend to assess quality, we only included systematic reviews in order to draw upon their own selection of the highest quality evidence available, and focussed upon systematic reviews completed in the last 10 years on this topic as earlier reviews were likely to be out of date (with older trials included in later reviews) or superseded. Systematic reviews were defined as those using a structured search strategy, screening process, quality assessment and narrative or quantitative synthesis. We identified reviews from searches of Medline, Embase and the Cochrane Database of Systematic Reviews (1

January 2009 to 1 July 2019), using comprehensive search terms based on conditions, primary and community care and intervention types, with database review filters (see Appendix S1 for example).

RF reviewed all titles, abstracts and full texts using Rayyan software (Ouzzani et al., 2016) according to the criteria in Box 1, with 10% independently checked by AW and disagreements resolved through discussion or through consultation with senior team members. RF extracted data from each review in a brief simple form, which included items on review characteristics, whether the relevant section was a whole review or a subgroup analysis, the main condition(s) that were targeted, model(s) of care and comparator(s) covered, a summary of the quality of included studies as reported by the review authors, overall evidence for the care models, and the evidence in each review (where reported) for (a) who should deliver the intervention, (b) intervention contact frequency, duration and intensity, (c) overall intervention duration, (d) contact type (e.g. face-to-face), (e) location of healthcare professionals and fit with local services, (f) multidisciplinary involvement, (g) intervention functions covered,

and, (g) intervention domains covered. Results were tabulated according to model type and condition, with key messages regarding components extracted into tables. We descriptively summarised countries covered, conditions covered, quality of trials included in reviews and volume of evidence available for each model. Evidence was narratively synthesised across reviews to develop key messages regarding consistent evidence for components across reviews, conflicting evidence and evidence of no effect, and drawing upon interventions, conditions and settings to contextualise these.

### 3 | RESULTS

Out of 2,129 unique titles and abstracts, 178 full texts were reviewed and 54 systematic reviews were included (Figure 1). Reviews predominantly included studies from the USA, Canada and Europe, with a small number of included studies from Asia (China, Hong Kong, Japan, India, Singapore) and Australasia in some reviews. Most reviews focussed on studies of people with multimorbidity (commonly a long-term physical condition and depression,  $n = 13$ ) or 'LTCs' including people with one or more LTCs (predominantly diabetes, COPD, cardiovascular disease and depression,  $n = 12$ ). Other reviews focussed on dementia ( $n = 8$ ), frailty ( $n = 7$ ), stroke ( $n = 5$ ), combinations of these ( $n = 4$ ), family carers ( $n = 3$ ) and people at risk of hospitalisation ( $n = 2$ ). Eighteen were subgroup analyses in broader reviews and the remainder were whole reviews. Reviews assessed the quality of included trials; within and across reviews trials were reported to be of variable quality. Only 15 reviews did not limit study inclusion by language – eight restricted to a small number of (usually European) languages; 1 included all languages but restricted studies to high income countries; 23 reviews excluded non-English language papers at search or screening level; and 7 did not report this.

#### 3.1 | What works: care models

A large number of primary and community-based care models were evaluated. These are outlined in Table 1 along with the key findings from reviews of each model. There is substantial overlap between many models in their definitions and components. Twenty reviews did not report details of comparators. Where reported, comparison groups typically consisted of usual care or enhanced/augmented usual care (grouped as 'usual care' when referred to in the results as these were frequently grouped in syntheses in original reviews), with some reviews reporting a small number of studies using waiting list control or lower intensity case management. Where comparators were reported, this is specified in the results; where not reported, this was unclear. Across all models, the most promising effects were in relation to mental health (particularly depressive symptoms), with mostly inconclusive effects on physical outcomes and service use.

#### BOX 1 Inclusion and exclusion criteria

Inclusion criteria:

- Review type: English-language systematic reviews focussed on questions of effectiveness, in which the majority of studies (over half of those included) or a clearly reported subgroup were randomised controlled trials (RCTs), in order to focus on high quality evidence
- Population: older people (average participant age in trials over 50 years in order to capture key messages from a broad range of reviews), either as the focus of the review or a defined subgroup, with single LTCs or multimorbidity, or conditions common in older people not typically covered by the term LTCs, for example, frailty, Parkinson's, stroke, dementia, those 'at risk of hospitalisation', or those targeted at family carers.
- Intervention: an overall topic or subgroup analysis of a model of care based in primary or community settings.

Exclusion criteria:

- Population: conditions more common in younger adults or requiring specialist management (e.g. cancer, although if a small number of studies were included on one of these conditions we did not exclude the review if the majority of studies were relevant) or those including too broad a population (e.g. including children).
- Intervention: reviews including too broad an intervention with no clearly defined subgroups (e.g. reviews of non-pharmacological interventions), single interventions (e.g. exercise), educational or diagnostic interventions, non-interventional topics, interventions led by another setting (e.g. residential care).
- Review type: reviews focussed solely on implementation or economic outcomes.

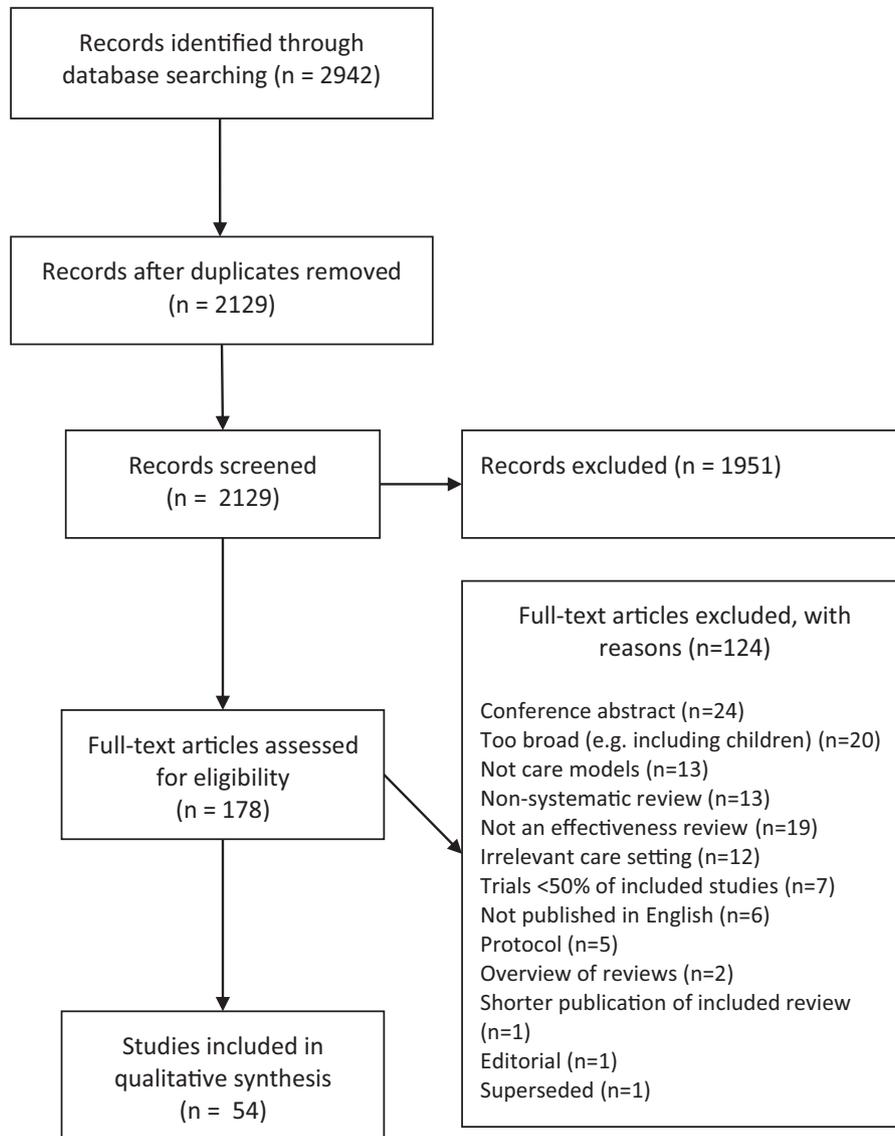


FIGURE 1 Flow diagram of studies included in the review

### 3.2 | What works: theoretical basis

In one review, having a theoretical basis was associated with improved mental functioning in nursing interventions for LTCs compared to controls (details not reported; effect size = 0.331, 95% CI 0.186–0.476,  $n = 13$ ), although only 21% included studies reported being based on a theory (Amo-Setien et al., 2019). A range of theories were reported in primary studies, such as self-management models, the theory of vulnerability and Bandura's self-efficacy theory (Chow & Wong, 2014; Markle-Reid et al., 2006). No particular theory was highlighted as the most effective.

### 3.3 | What works: intervention targets

#### 3.3.1 | Targeting specific outcomes

Having a clear and specific outcome that the intervention targets was associated with improvements in the corresponding outcome

compared to control (usual care in most included trials) (Baker, Grant, & Gopalan, 2018; Reilly et al., 2015; Smith et al., 2016), for example, delaying institutionalisation, reducing depression; apart from in stepped care, where results were mixed in comparison to usual care regardless of target (Maehder et al., 2019). Broader targets (e.g. controlling risks and complications in certain diseases, focussing on autonomy) had mixed outcomes (Boult et al., 2009; Morilla-Herrera et al., 2016).

#### 3.3.2 | Targeting at risk populations

Targeting those with high baseline morbidity was associated with reduced hospital admissions compared to usual care in LTCs (Smith et al., 2017) and improved patient-reported outcomes (Baker et al., 2018). Targeting high utilisers of healthcare services had mixed service utilisation outcomes (Baker et al., 2018; Tricco et al., 2014).

**TABLE 1** Care models and supporting evidence

Care model	Definition	Key findings
Care coordination	Purposeful organisation of patient care activities between the patient and one or more care providers to facilitate the appropriate delivery of health care services through organizing personnel and other resources to carry out all necessary required care activities, with information exchange among those responsible for different aspects of care. (synonym Care management) (McDonald et al., 2007)	<ul style="list-style-type: none"> <li>• <i>At risk of hospitalisation</i>: reduces hospital admission in this group (Tricco et al., 2014)</li> <li>• <i>Multimorbidity</i>: reduces depressive symptoms and improves some condition-related outcomes (Baker et al., 2018; Kastner et al., 2018)</li> <li>• <i>Stroke</i>: evidence insufficient to support its use in this group (Graven, Brock, Hill, &amp; Joubert, 2011; Hildebrand, 2015; Salter et al., 2010)</li> </ul>
Case management	Selecting target individuals, assessment and individual care planning, monitoring and adjustment of care plans where necessary (WHO, 2016). May be part of care coordination.	<ul style="list-style-type: none"> <li>• <i>Dementia</i>: case management improves behavioural symptoms in people with dementia (Khanassov et al., 2016), but has mixed evidence for effects upon family carer outcomes and institutionalisation (Eklund &amp; Wilhelmson, 2009; Koch &amp; Iliffe, 2011; Oeseburg, Wynia, Middel, &amp; Reijneveld, 2009) and no impact upon service use (Godard-Sebillotte et al., 2019). For carers, strong evidence it does not impact carer outcomes compared to usual care (Schoenmakers et al., 2010), although case management may increase respite care use (Piersol et al., 2017)</li> <li>• <i>At risk of hospital admission</i>: reduces admissions, whether alone or part of a wider collaborative care approach (Tricco et al., 2014)</li> <li>• <i>Long-term conditions</i>: improves care satisfaction and quality, quality of life, and survival compared to usual care with weaker evidence for functional autonomy and mixed evidence for service use and costs (Boult et al., 2009). Some positive effects upon physical health outcomes and mortality compared to usual primary care (Massimi et al., 2017)</li> <li>• <i>Frailty</i>: no evidence of effects on mortality, hospitalisation or institutionalisation compared to usual care for people with frailty (Van der Elst et al., 2018)</li> <li>• Some effects on service use and functioning compared to usual care across a range of conditions in older people, but this was not consistent across studies (Low et al., 2011)</li> </ul>
Shared care	Joint participation in planned delivery of care by both primary care physicians and specialist care physicians for patients with chronic conditions, with enhanced information exchange beyond routine discharge and referral (Smith et al., 2017)	<ul style="list-style-type: none"> <li>• <i>Long-term conditions</i>: shared care improves depression compared to usual care but has mixed effects upon quality of life and other patient-reported measures and little or no effects on physical health outcomes and service use (Smith et al., 2017)</li> </ul>
Integrated care	Promotion of comprehensive delivery of quality services to meet multidimensional needs across the life course, delivered by a coordinated multidisciplinary team working across settings and care levels (WHO, 2016)	<ul style="list-style-type: none"> <li>• <i>Long-term conditions</i>: limited effects upon clinical outcomes and some effects upon service use and processes compared to usual care (Mitchell et al., 2015)</li> <li>• <i>Frailty</i>: evidence for effects on service use compared to usual care is mixed (Beland &amp; Hollander, 2011). No or limited effects on other outcomes (Berntsen et al., 2019)</li> <li>• Did not improve clinical outcomes in mixed populations compared to usual care, associated with greater use of community and hospital services in some trials (Low et al., 2011)</li> </ul>
Chronic care model	A longitudinal, preventative and community-based approach typically containing six components, including community, health system, self-management support, decision support, delivery system design and clinical information systems (WHO, 2016).	<ul style="list-style-type: none"> <li>• <i>Frailty</i>: Little impact on outcomes compared to usual care (Hopman et al., 2016)</li> <li>• <i>Multimorbidity</i>: improves mental health-related outcomes compared to usual care, but mixed evidence for effects upon HbA1c levels; currently no evidence of effects upon mortality or quality of life (Hopman et al., 2016; Lemmens et al., 2015)</li> <li>• <i>Stroke</i>: improves health-related quality of life but not depressive symptoms or social participation (Graven et al., 2011)</li> </ul>

(Continues)

TABLE 1 (Continued)

Care model	Definition	Key findings
Collaborative care	Based upon an integrated care model, typically including a multidisciplinary approach, evidence-based care protocols for care, enhanced pharmacological and psychological interventions, scheduled follow-up and defined interprofessional communication systems. A case manager usually has a core role in this (Ekers et al., 2013).	<ul style="list-style-type: none"> <li>• <i>Comorbid depression and diabetes</i>: improves depressive symptoms (Atlantis et al., 2014; Huang, Wei, Wu, Chen, &amp; Guo, 2013) and HbA1c (Atlantis et al., 2014) compared to usual care</li> <li>• <i>People with depression and physical LTCs</i>; improves depressive symptoms compared to usual care (van Eck van der Sluijs et al., 2018; Ekers et al., 2013; Watson et al., 2013), with small to moderate effects upon physical outcomes and combined physical and mental illness burden outcomes (van Eck van der Sluijs et al., 2018) and effects upon mental-health related quality of life (Watson et al., 2013). Larger effect sizes in people with depression and physical LTCs than depression alone (but this does not vary according to number of LTCs) (Panagioti et al., 2016)</li> <li>• <i>Frail older people with depression</i>: mixed effects upon mental health outcomes in comparison to usual care, but no effects on physical functioning or service use (Frost, Bauernfreund, &amp; Walters, 2019)</li> <li>• <i>People with coronary heart disease and depression</i>: improves mental health outcomes and short-term risk of major adverse cardiac events compared to usual care (Tully &amp; Baumeister, 2014)</li> </ul>
Other		<ul style="list-style-type: none"> <li>• Nurse-led interventions have mixed effects upon service use in frailty (Liebel et al., 2009), improve mental functioning (which includes vitality, social and emotional functioning and mental health) in LTCs but not other outcomes (Amo-Setien et al., 2019) and has not effect upon depression in stroke (Salter et al., 2010)</li> <li>• Limited evidence that interdisciplinary primary care (a primary care provider plus one or more other healthcare professionals) improves quality of life, functional autonomy and service use compared to usual care (Boult et al., 2009)</li> <li>• None of a wide range of intervention models showed effects on service utilisation in dementia (Godard-Sebillotte et al., 2019) or upon activities of daily living in stroke care (Fens et al., 2013) compared to usual care</li> <li>• Preventative home visits were associated with some improvements in health and service use compared to usual care but not other outcomes (Boult et al., 2009)</li> <li>• Proactive rehabilitation in chronic conditions improves functioning in comparison to usual care but not service use (Boult et al., 2009)</li> <li>• Mixed evidence regarding stepped care for depression and LTCs compared to usual care from a large number of studies (Maehder et al., 2019)</li> <li>• Family support organisation interventions for stroke (advice, information, emotional support and lifestyle changes for secondary prevention, and liaising with the rehabilitation team during discharge planning) produced no differences in depressive symptoms (Salter et al., 2010)</li> <li>• Personalised care planning for LTCs was associated with small positive effects compared to usual care on some physical health outcomes and depression, but not quality of life (Coulter et al., 2015)</li> <li>• Consumer-directed care had few effects on clinical outcomes compared to usual care but improve satisfaction and community service use in older adults with various conditions (Low et al., 2011)</li> <li>• Chronic disease management by lay health workers did not affect general health or quality of life, though had limited evidence for improving some physical health outcomes (Carr et al., 2011)</li> </ul>

### 3.4 | What works: components of care

#### 3.4.1 | Self-management

Having a clear focus on self-management contributed to positive clinical outcomes in LTCs and multimorbidity (Kastner et al., 2018;

Reynolds et al., 2018), social support in LTCs (compared to usual care) (Reilly et al., 2015), and reducing admissions in older people at risk of hospitalisation (Tricco et al., 2014); but did not influence the effectiveness of case management over usual care upon acute hospital use for people with dementia (Godard-Sebillotte, Le Berre, Schuster, Trottier, & Vedel, 2019).

### 3.4.2 | Assessment and proactive care

Models of care including assessment with information provision or active management (actions taken by specific designated health professionals as opposed to recommendations or referrals) reduced nursing home admissions of frail older people compared to usual care, but had no impact upon functioning or service use (Beswick, Gooberman-Hill, Smith, Wylde, & Ebrahim, 2010). Including active procedures (technical activities related to symptom prevention or alleviation such as wound care, specimen collection, resistive exercises or prescribing medication) was associated with greater effects upon mental functioning in nurse-led models of care for LTCs compared to teaching, guiding and counselling (Amo-Setien et al., 2019). One trial in one review found involving frail patients in care planning had more positive outcomes (Eklund & Wilhelmson, 2009).

### 3.4.3 | Patient education

Although the type of education provided to patients was rarely reported in detail, there was conflicting evidence as to its influence upon outcomes. When included in care coordination interventions for multimorbidity along with self-management, subgroup analyses found effects upon depression and HbA1c in comparison to usual care but increased use of mental health services (Kastner et al., 2018). In those at risk of hospitalisation, patient education reduced admissions (Tricco et al., 2014). However, intervention characteristics including education had no effect upon use of acute hospital services for people with dementia compared to usual care (Godard-Sebillotte et al., 2019). Teaching patients in nurse-led interventions did not impact upon mental functioning (which includes vitality, social and emotional functioning and mental health) in LTCs (Amo-Setien et al., 2019).

### 3.4.4 | Psychological support

Collaborative care interventions which focused mainly on providing psychological support in depression and diabetes (Ekers et al., 2013) and those where the collaborative care model provided psychotherapy in addition to monitoring (van Eck van der Sluijs et al., 2018) produced similar effect sizes compared to usual care in meta-analyses upon illness burden and physical and mental health to those that did not.

### 3.4.5 | Lifestyle management

Lifestyle management interventions for secondary stroke prevention were effective in producing positive lifestyle changes (e.g. physical activity), improving quality of life and improving physical health outcomes such as blood pressure, although the overall number of trials were limited (Lawrence et al., 2012). Removing studies targeting lifestyle risk factors reduced effects upon depression and HbA1c

in comparison to usual care to non-significance (Atlantis, Fahey, & Foster, 2014).

### 3.4.6 | Medication management

There were no differences in service use between case management interventions including or excluding medication management compared to usual care or lower intensity case management (Tam-Tham et al., 2013).

### 3.4.7 | Carer support

Including carer support was associated with delayed nursing home moves and improved quality of life in comparison to usual care in people with LTCs (Boult et al., 2009).

### 3.4.8 | Combinations of components

Five reviews looked at combinations of different elements. Comprehensive approaches including greater numbers of different components were more effective at reducing HbA1c in LTCs (Coulter et al., 2015) and were associated with a greater impact upon disability in frailty (Liebel et al., 2009). However, there appeared to be a ceiling effect of three components across models (Ekers et al., 2013; Reynolds et al., 2018). The greatest potential impact appeared to be in studies which included patient support (self-management and/or education), professional support (clear care pathways and/or decision support) and some form of care coordination (e.g. case management) (Coulter et al., 2015; Kastner et al., 2018; Reynolds et al., 2018).

## 3.5 | What works: Intervention intensity

Intervention intensity varied widely in how it was defined across reviews, limiting comparability. Seven reviews quantified it purely in terms of frequency, defining high intensity as one or more contacts a month for more than 3 months (Coulter et al., 2015), six or more face-to-face contacts a week (Fens et al., 2013), six or more home visits (Hildebrand, 2015), more than 14.4 contacts per 12 months (Backhouse et al., 2017) or one or more visits a month (Baker et al., 2018); and one used number of sessions in a meta-regression (Ekers et al., 2013). Three reviews scored intensity according to multidisciplinary input, number of scheduled visits and duration (Beswick et al., 2010) and caseload, patient complexity, frequency of visits and range of services provided (Corvol et al., 2017) or a combination of 18 different criteria (Somme et al., 2012). A final review simply used the authors' subjective judgement (Low et al., 2011).

Intervention intensity had mixed influence upon effectiveness, showing effects in reviews upon some conditions and outcomes

but not others. More intense interventions appeared to have little effect on frailty in comparison to usual care (Beswick et al., 2010). However, for carers, older people with mixed LTCs and following stroke, higher intensity was associated with greater effectiveness over usual care for HbA1c levels (Coulter et al., 2015), quality of life (Fens et al., 2013), health-related quality of life, depression and anxiety (Hildebrand, 2015), caregiver outcomes (Corvol et al., 2017) and more positive outcomes overall (Low et al., 2011). Evidence was conflicting for dementia, finding no effects upon hospitalisation, institutionalisation or mortality (Backhouse, Dickens, Richards, & McCabe, 2015) and some positive effects on clinical outcomes (Somme et al., 2012); and for multimorbidity, for which there were mixed effects upon depression (Baker et al., 2018; Ekers et al., 2013). Given the wide variation in definitions and across conditions, no clear conclusions can be drawn overall as to whether more intense interventions are more beneficial to older people with complex conditions.

The effect of length of intervention was influenced by outcome type in LTCs. Shorter interventions led to better mental functioning scores (Amo-Setien et al., 2019); longer interventions improved HbA1c levels but not blood pressure (Berntsen et al., 2019). Longer case management interventions in dementia were associated with reduced institutionalisation (Pimouguet et al., 2010), but not for other care models compared to usual care (Godard-Sebillotte et al., 2019).

### 3.6 | What works: Staffing

#### 3.6.1 | Specific professional roles

The largest volume of research focused on the role of nurses. Few directly compared intervention delivery by different professionals. Across a range of outcomes, there were few significant differences between nurse-led primary care and primary care physicians and social workers in LTCs and dementia management (Backhouse et al., 2015; Health Quality Ontario, 2013b; Pimouguet et al., 2010; Somme et al., 2012). More qualified, trained and experienced nurses were associated with better outcomes for disability in frailty (Liebel et al., 2009) and reducing diastolic and systolic blood pressure and HbA1c in LTCs (Massimi et al., 2017). Trained case managers were a key component of a successful integrated intervention in one review (Oeseburg, Wynia, Middel, Reijneveld, et al., 2009).

Regarding other health professionals, evidence suggested that there was little effect on outcomes from including the following in care teams: social workers (Stokes et al., 2015), patient navigators (Tricco et al., 2014), direct physician contact (Beswick et al., 2010) and occupational therapists (OTs) (Hildebrand, 2015). The only outcomes affected by professional type were potential effects upon depression and increased respite service use from OT-led case management in stroke (Hildebrand, 2015; Piersol et al., 2017) and reduced costs from inclusion of a pharmacist (Kane & Shamliyan, 2011). In team combinations, there were no differences

upon illness burden or physical or mental health outcomes in collaborative care delivered by a case manager collaborating with a GP compared to one collaborating with a physician and psychiatrist in comparison to usual care (van Eck van der Sluijs et al., 2018). Likewise, replacing physician tasks with another healthcare professional showed some improvements in functioning, quality of life, costs and morbidity but had no clear patterns in team types and outcomes (Kane & Shamliyan, 2011).

#### 3.6.2 | Multidisciplinary teams

There was limited and mixed evidence that a multidisciplinary approach in primary care may improve outcomes (Boult et al., 2009; Liebel et al., 2009; Smith et al., 2016; Tricco et al., 2014), with some effects on quality of life and functional autonomy in LTCs (Boult et al., 2009) and reduced hospital admissions in those at risk of hospitalisation (Tricco et al., 2014). One review concluded there may be an impact only upon care processes rather than patient clinical outcomes (Kane & Shamliyan, 2011). There were few differences in effect sizes for MDT case management and a single case manager (compared to usual care or no case management) apart from short-term improvements in mortality and self-rated health for those managed by a MDT (Stokes et al., 2015). Few clear conclusions could be drawn from reviews on this topic as team composition varied substantially and MDT approaches were sometimes subsumed under wider headings including, for example, organisational changes.

#### 3.6.3 | Integration

The integration of teams appeared to be more important than composition. Greater integration of case managers was associated with better care quality for people with dementia when classified according to links within the patient care team and with wider acute and long-term care structures (Somme et al., 2012) and better outcomes in frailty when narratively assessed as good communication and close cooperation between case managers and healthcare professionals (Oeseburg, Wynia, Middel, & Reijneveld, 2009), although not for carers of people with dementia when integration was assessed based on case managers' links with other types of care (Corvol et al., 2017). Removing studies described as integrated diabetes care from a meta-analysis led to null effects upon depression and HbA1c levels in collaborative diabetes and depression care (Atlantis et al., 2014).

#### 3.6.4 | Communication

Clinical information systems to organise patient and population data have been considered in few studies but these indicate professional and patient benefits, while decision support based on evidence and patient needs improved professional outcomes but not patients' (Reynolds et al., 2018).

### 3.6.5 | Electronic support

For LTCs, e-tools in care coordination had mixed effects upon outcomes compared to usual care; the only trial showing positive effects upon hospitalisations, length of stay and emergency department visits was an electronic lab report for PCPs linked to guidelines (Health Quality Ontario, 2013a). Studies in this area were very limited however. There were some promising effects of technology on a limited range of outcomes in shared care LTC interventions in comparison to usual care, mainly electronic decision support (limited to effects upon smoking and aspirin adherence), shared electronic health records (no effects on service use but improvements in care processes and physical health outcomes) and an IT platform (improvements in some knowledge and physical health outcomes) (Kooij et al., 2017).

### 3.6.6 | Delivery

In collaborative care for depression and LTCs, there were no significant differences in effect sizes compared to usual care between studies using some in-person follow-up and telephone only follow-up (Ekers et al., 2013). Adding tele-mental health into a collaborative care model for older adults found improved depressive symptoms and quality of life compared to usual care, but was only assessed in one study (Gentry & Lapid, 2019).

## 4 | SUMMARY OF EVIDENCE

There was a strong evidence base to suggest that models of care contained overlapping components and were most likely to impact positively upon depressive symptoms and other mental health outcomes, regardless of condition. This may partly reflect the large number of reviews targeting interventions for depression and LTCs. Interventions with clear targets were more likely to demonstrate an impact upon the target outcome, and those with a clear theoretical underpinning were more likely to be effective at improving mental functioning. Interventions including self-management, patient education, assessment with follow-up care procedures and structured care processes or pathways were associated with greater evidence of effectiveness using a range of clinical outcomes. Those including more than three components were not likely to be more effective. With regards to staffing, the level of integration appeared to be more important than specific healthcare professionals. More highly qualified and experienced nurses were associated with better outcomes.

Weaker evidence suggested that carer support may reduce moves to long-term care and improve quality of life, and that lifestyle management may be effective in improving a range of clinical outcomes. On current evidence, psychological support and medication management do not appear to improve effectiveness for clinical outcomes and service use respectively. There was weak evidence

that having good clinical information systems and using technology to support this may also be associated with better outcomes.

## 5 | COMPARISON TO OTHER LITERATURE

Common elements of integrated care models include multi-disciplinary team care, comprehensive assessment, and case management, with many interventions focussing on upon micro-level service changes (Briggs et al., 2018). One realist review suggested that care coordination interventions are likely to work through using a structured approach to comprehensive care, establishing formal provider roles, address multiple conditions through MDT management and providing specific communication processes (Kastner et al., 2019). Our review confirms the need for support for professionals (e.g. training, decision support), structured collaborative care processes and integrated care. Greater integration is likely to be achieved at team level through co-location, integrated information systems, having a simple engaging vision that encourages staff to feel involved in the service, clear outlines of roles and collaboration rules and good leadership (Threapleton et al., 2017). Small, more focussed teams are thought to potentially facilitate implementation of integrated care, as well as shared values/goals and policy and governance that enables integration (Threapleton et al., 2017).

While a theoretical basis was highlighted as an effective component (Amo-Setien et al., 2019), Amo-Setien et al's included studies reported a wide range of theories and there no evidence to support the use of one particular theory over another. Self-management approaches and focussing on patient priorities in disease management were also highlighted as key aspects of care coordination interventions in a realist review (Kastner et al., 2019), but these are sometimes paid less attention in models of care (Briggs et al., 2018). Our review highlighted the need to give clear emphasis to patient-level components, including self-management, patient education and potentially carer support and lifestyle changes, particularly in influencing depressive symptoms. Few interventions in this review, however, had consistent and clear effects upon functioning or quality of life, which may be due to care models excluding components with clear evidence of benefit upon these outcomes, for example, strength and balance exercise, dyadic interventions for people with dementia, home modifications (Gine-Garriga, Roque-Figuls, Coll-Planas, Sitja-Rabert, & Salva, 2014; Laver et al., 2016; Stark et al., 2017).

## 6 | LIMITATIONS

The evidence presented in this review is largely derived from high income Western countries, predominantly the USA. The majority of included reviews had at least some language restrictions, which may lead to publication bias. Given the system-level changes required for some of these interventions, they may not translate well to other settings, particularly those outside an insurance-based system.

Some concepts, for example, team changes, active procedures, were not always clearly explained within included reviews. Typically, reviews were limited in how well they analysed the effectiveness of interventions according to components. Furthermore, the processes used to draw conclusions about effectiveness within the reviews included in this state-of-the-art review sometimes relied heavily on vote counting (rather than subgroup meta-analyses or meta-regression) and sufficient primary study reporting. Few reviews explicitly analysed any process data on whether the interventions were delivered as intended.

This review has clear limitations. We did not assess the quality of included reviews or trials. Whilst this is not a usual step within a state-of-the-art review, some reviews were clearly of higher quality than others. There is also substantial overlap in the source trials which the reviews summarise, which supports our confidence that we have covered the evidence base currently available, but some trials were likely to have been double-counted. As we were not undertaking an overview of reviews, we did not formally assess trial overlap. We included reviews which included a broader range of studies or conditions where the majority of the review or a clear subgroup was focussed upon our research question, in order to extract key messages. Reviews did not always report intervention characteristics or primary study data clearly, making some comparisons difficult. We did not include reviews of individual components (e.g. medication review or self-management) as the topic of interest was how these components functioned as part of wider interventions rather than in isolation. This did however limit our ability make clear recommendations about these components. Conclusions varied in their consistency across different LTCs (van Eck van der Sluijs et al., 2018; Ekers et al., 2013; Massimi et al., 2017).

## 7 | FUTURE RESEARCH DIRECTIONS

Designing collaborative interventions targeting less disease-specific outcomes (e.g. many studies measured HbA1c) and outcomes more widely applicable to multimorbidity, such as functioning or quality of life (Ferrucci et al., 2004), is needed. Areas still open to further research include the optimal role for technology, intervention length and intensity and team composition. Direct comparisons of different professionals, particularly non-nursing professionals, would also be valuable, as it is possible that disciplines such as physiotherapy or OT could have an important influence upon outcomes such as functional independence (e.g. some OT-led interventions show promise of effectiveness; Smallfield & Heckenlaible, 2017). New interventions should include components with evidence of effectiveness where possible and study in more depth the effects of combinations of components. Clearer intervention component reporting and consistent outcome measures are needed to facilitate future analyses of complex primary and community care interventions.

## 8 | CONCLUSION

Currently, most models focus on particular diseases, despite sharing many components and affecting similar outcomes. This review suggests that a movement towards focusing on integrated models of care for multimorbidity is likely to offer some positive effects over usual care, such as reduced depressive symptoms, particularly if models have a theoretical basis, are comprehensive (including patient education, self-management structured interprofessional collaboration and professional support) and are targeted at those with high morbidity.

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## REFERENCES

- Amo-Setién, F. J., Abajas-Bustillo, R., Torres-Manrique, B., Martín-Melón, R., Sarabia-Cobo, C., Molina-Mula, J., & Ortego-Mate, C. (2019). Characteristics of nursing interventions that improve the quality of life of people with chronic diseases. A systematic review with meta-analysis. *PLoS One*, 14(6), e0218903. <https://doi.org/10.1371/journal.pone.0218903>
- Atlantis, E., Fahey, P., & Foster, J. (2014). Collaborative care for comorbid depression and diabetes: A systematic review and meta-analysis. *British Medical Journal Open*, 4(4), e004706. <https://doi.org/10.1136/bmjopen-2013-004706>
- Backhouse, A., Dickens, C., Richards, D., & McCabe, R. (2015). Key components in models of community-based interventions coordinating care in dementia: A mixed studies systematic review protocol. *Systematic Reviews*, 4, 156. <https://doi.org/10.1186/s13643-015-0143-y>
- Backhouse, A., Ukoumunne, O. C., Richards, D. A., McCabe, R., Watkins, R., & Dickens, C. (2017). The effectiveness of community-based coordinating interventions in dementia care: A meta-analysis and subgroup analysis of intervention components. *BMC Health Services Research*, 17(1), 717. <https://doi.org/10.1186/s12913-017-2677-2>
- Baker, J. M., Grant, R. W., & Gopalan, A. (2018). A systematic review of care management interventions targeting multimorbidity and high care utilization. *BMC Health Services Research*, 18(1), 65. <https://doi.org/10.1186/s12913-018-2881-8>
- Beland, F., & Hollander, M. J. (2011). Integrated models of care delivery for the frail elderly: International perspectives. *Gaceta Sanitaria*, 25(Suppl 2), 138-146. <https://doi.org/10.1016/j.gaceta.2011.09.003>
- Berntsen, G., Strisland, F., Malm-Nicolaisen, K., Smaradottir, B., Fensli, R., & Røhne, M. (2019). The evidence base for an ideal care pathway for frail multimorbid elderly: Combined scoping and systematic intervention review. *Journal of Medical Internet Research*, 21(4), e12517. <https://doi.org/10.2196/12517>

- Beswick, A. D., Gooberman-Hill, R., Smith, A., Wylde, V., & Ebrahim, S. (2010). Maintaining independence in older people. *Reviews in Clinical Gerontology*, 20(2), 128–153. <https://doi.org/10.1017/S0959259810000079>
- Bhatnagar, P., Wickramasinghe, K., Wilkins, E., & Townsend, N. (2016). Trends in the epidemiology of cardiovascular disease in the UK. *Heart*, 102(24), 1945–1952. <https://doi.org/10.1136/heartjnl-2016-309573>
- Boult, C., Green, A. F., Boult, L. B., Pacala, J. T., Snyder, C., & Leff, B. (2009). Successful models of comprehensive care for older adults with chronic conditions: Evidence for the Institute of Medicine's "retooling for an aging America" report. *Journal of the American Geriatrics Society*, 57(12), 2328–2337. <https://doi.org/10.1111/j.1532-5415.2009.02571.x>
- Briggs, A. M., Valentijn, P. P., Thiagarajan, J. A., & Araujo De Carvalho, I. (2018). Elements of integrated care approaches for older people: A review of reviews. *British Medical Journal Open*, 8(4), e021194. <https://doi.org/10.1136/bmjopen-2017-021194>
- Carr, S. M., Lhussier, M., Forster, N., Geddes, L., Deane, K., Pennington, M., ... Hildreth, A. (2011). An evidence synthesis of qualitative and quantitative research on component intervention techniques, effectiveness, cost-effectiveness, equity and acceptability of different versions of health-related lifestyle advisor role in improving health. *Health Technology Assessment (Winchester, England)*, 15(9), 1–284. <https://doi.org/10.3310/hta15090>
- Chow, S. K. Y., & Wong, F. K. Y. (2014). A randomized controlled trial of a nurse-led case management programme for hospital-discharged older adults with co-morbidities. *Journal of Advanced Nursing*, 70(10), 2257–2271. <https://doi.org/10.1111/jan.12375>
- Collard, R. M., Boter, H., Schoevers, R. A., & Oude Voshaar, R. C. (2012). Prevalence of frailty in community-dwelling older persons: A systematic review. *Journal of the American Geriatrics Society*, 60(8), 1487–1492. <https://doi.org/10.1111/j.1532-5415.2012.04054.x>
- Corvol, A., Dreier, A., Prudhomme, J., Thyrian, J. R., Hoffmann, W., & Somme, D. (2017). Consequences of clinical case management for caregivers: A systematic review. *International Journal of Geriatric Psychiatry*, 32(5), 473–483. <https://doi.org/10.1002/gps.4679>
- Coulter, A., Entwistle, V. A., Eccles, A., Ryan, S., Shepperd, S., & Perera, R. (2015). Personalised care planning for adults with chronic or long-term health conditions. *Cochrane Database of Systematic Reviews*, 3, CD010523. <https://doi.org/10.1002/14651858.CD010523.pub2>
- Department of Health. (2012). *Long term conditions compendium of information* (3rd edn). Retrieved from [http://webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_4100717%5Cn](http://webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4100717%5Cn)
- Ekers, D., Murphy, R., Archer, J., Ebenezer, C., Kemp, D., & Gilbody, S. (2013). Nurse-delivered collaborative care for depression and long-term physical conditions: A systematic review and meta-analysis. *Journal of Affective Disorders*, 149(1–3), 14–22. <https://doi.org/10.1016/j.jad.2013.02.032>
- Eklund, K., & Wilhelmson, K. (2009). Outcomes of coordinated and integrated interventions targeting frail elderly people: A systematic review of randomised controlled trials. *Health & Social Care in the Community*, 17(5), 447–458. <https://doi.org/10.1111/j.1365-2524.2009.00844.x>
- Fens, M., Vluggen, T., van Haastregt, J. C. M., Verbunt, J. A., Beusmans, G. H., & van Heugten, C. M. (2013). Multidisciplinary care for stroke patients living in the community: A systematic review. *Journal of Rehabilitation Medicine*, 45(4), 321–330. <https://doi.org/10.2340/16501977-1128>
- Ferrucci, L., Guralnik, J. M., Studenski, S., Fried, L. P., Cutler, G. B., & Walston, J. D. (2004). Designing randomized, controlled trials aimed at preventing or delaying functional decline and disability in frail, older persons: A consensus report. *Journal of the American Geriatrics Society*, 52(4), 625–634. <https://doi.org/10.1111/j.1532-5415.2004.52174.x>
- Frost, R., Bauernfreund, Y., & Walters, K. (2019). Non-pharmacological interventions for depression/anxiety in older adults with physical comorbidities affecting functioning: Systematic review and meta-analysis. *International Psychogeriatrics*, 31(8), 1121–1136. <https://doi.org/10.1017/S1041610218001564>
- Gentry, M. T., Lapid, M. I., & Rummans, T. A. (2019). Geriatric telepsychiatry: Systematic review and policy considerations. *American Journal of Geriatric Psychiatry*, 27(2), 109–127. <https://doi.org/10.1016/j.jagp.2018.10.009>
- Gine-Garriga, M., Roque-Figuls, M., Coll-Planas, L., Sitja-Rabert, M., & Salva, A. (2014). Physical exercise interventions for improving performance-based measures of physical function in community-dwelling, frail older adults: A systematic review and meta-analysis. *Archives of Physical Medicine and Rehabilitation*, 95(4), 753–769.e3. <https://doi.org/10.1016/j.apmr.2013.11.007>
- Godard-Sebillotte, C., Le Berre, M., Schuster, T., Trottier, M., & Vedel, I. (2019). Impact of health service interventions on acute hospital use in community-dwelling persons with dementia: A systematic literature review and meta-analysis. *PLoS One*, 14(6), e0218426. <https://doi.org/10.1371/journal.pone.0218426>
- Grant, M. J., & Booth, A. (2009). A typology of reviews: An analysis of 14 review types and associated methodologies. *Health Information and Libraries Journal*, 26(2), 91–108. <https://doi.org/10.1111/j.1471-1842.2009.00848.x>
- Graven, C., Brock, K., Hill, K., & Joubert, L. (2011). Are rehabilitation and/or care co-ordination interventions delivered in the community effective in reducing depression, facilitating participation and improving quality of life after stroke? *Disability and Rehabilitation*, 33(17–18), 1501–1520. <https://doi.org/10.3109/09638288.2010.542874>
- Health Quality Ontario. (2013a). Electronic tools for health information exchange: An evidence-based analysis. *Ontario Health Technology Assessment Series*, 13(11), 1–76. <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med9&NEWS=N&AN=24194799>
- Health Quality Ontario. (2013b). Specialized nursing practice for chronic disease management in the primary care setting: An evidence-based analysis. *Ontario Health Technology Assessment Series*, 13(10), 1–66.
- Hildebrand, M. W. (2015). Effectiveness of interventions for adults with psychological or emotional impairment after stroke: An evidence-based review. *The American Journal of Occupational Therapy*, 69(1), 1–9. <https://doi.org/10.5014/ajot.2015.012054>
- Hopman, P., de Bruin, S. R., Forjaz, M. J., Rodriguez-Blazquez, C., Tonnara, G., Lemmens, L. C., ... Rijken, M. (2016). Effectiveness of comprehensive care programs for patients with multiple chronic conditions or frailty: A systematic literature review. *Health Policy*, 120(7), 818–832. <https://doi.org/10.1016/j.healthpol.2016.04.002>
- Huang, Y., Wei, X., Wu, T., Chen, R., & Guo, A. (2013). Collaborative care for patients with depression and diabetes mellitus: A systematic review and meta-analysis. *BMC Psychiatry*, 13, 260. <https://doi.org/10.1186/1471-244X-13-260>
- Kane, R. L., Shmilyan, T. A., & McCarthy, T. (2011). Do geriatric health-care teams work? *Ageing and Health*, 7(6), 865–876. <https://doi.org/10.2217/ahe.11.68>
- Kastner, M., Cardoso, R., Lai, Y., Treister, V., Hamid, J. S., Hayden, L., ... Straus, S. E. (2018). Effectiveness of interventions for managing multiple high-burden chronic diseases in older adults: A systematic review and meta-analysis. *CMAJ*, 190(34), E1004–E1012. <https://doi.org/10.1503/cmaj.171391>
- Kastner, M., Hayden, L., Wong, G., Lai, Y., Makarski, J., Treister, V., ... Straus, S. E. (2019). Underlying mechanisms of complex interventions addressing the care of older adults with multimorbidity: A realist review. *British Medical Journal Open*, 9(4), e025009. <https://doi.org/10.1136/bmjopen-2018-025009>
- Khanassov, V., Vedel, I., Khassanov, V., & Vedel, I. (2016). Family physician-case manager collaboration and needs of patients with dementia and their caregivers: A systematic mixed studies review. *Annals of Family Medicine*, 14(2), 166–177. <https://doi.org/10.1370/afm.1898>

- Koch, T., & Iliffe, S. (2011). Dementia diagnosis and management: A narrative review of changing practice. *British Journal of General Practice*, 61, e513–e525. <https://doi.org/10.3399/bjgp11X588493>
- Kooij, L., Groen, W. G., & van Harten, W. H. (2017). The effectiveness of information technology-supported shared care for patients with chronic disease: A systematic review. *Journal of Medical Internet Research*, 19(6), e221. <https://doi.org/10.2196/jmir.7405>
- Laver, K., Dyer, S., Whitehead, C., Clemson, L., & Crotty, M. (2016). Interventions to delay functional decline in people with dementia: A systematic review of systematic reviews. *British Medical Journal Open*, 6(4), e010767. <https://doi.org/10.1136/bmjopen-2015-010767>
- Lawrence, M., Kerr, S., McVey, C., & Godwin, J. (2012). The effectiveness of secondary prevention lifestyle interventions designed to change lifestyle behavior following stroke: Summary of a systematic review. *International Journal of Stroke*, 7(3), 243–247. <https://doi.org/10.1111/j.1747-4949.2012.00771.x>
- Lemmens, L. C., Molema, C. C. M., Versnel, N., Baan, C. A., & de Bruin, S. R. (2015). Integrated care programs for patients with psychological comorbidity: A systematic review and meta-analysis. *Journal of Psychosomatic Research*, 79(6), 580–594. <https://doi.org/10.1016/j.jpsychores.2015.07.013>
- Liebel, D. V., Friedman, B., Watson, N. M., & Powers, B. A. (2009). Review of nurse home visiting interventions for community-dwelling older persons with existing disability. *Medical Care Research and Review*, 66(2), 119–146. <https://doi.org/10.1177/1077558708328815>
- Low, L.-F., Yap, M., & Brodaty, H. (2011). A systematic review of different models of home and community care services for older persons. *BMC Health Services Research*, 11, 93. <https://doi.org/10.1186/1472-6963-11-93>
- Maehder, K., Lowe, B., Harter, M., Heddaeus, D., Scherer, M., & Weigel, A. (2019). Management of comorbid mental and somatic disorders in stepped care approaches in primary care: A systematic review. *Family Practice*, 36(1), 38–52. <https://doi.org/10.1093/fampra/cmz122>
- Manning, E., & Gagnon, M. (2017). The complex patient: A concept clarification. *Nursing and Health Sciences*, 19(1), 13–21. <https://doi.org/10.1111/nhs.12320>
- Markle-Reid, M., Weir, R., Browne, G., Roberts, J., Gafni, A., & Henderson, S. (2006). Health promotion for frail older home care clients. *Journal of Advanced Nursing*, 54(3), 381–395. <https://doi.org/10.1111/j.1365-2648.2006.03817.x>
- Massimi, A., De Vito, C., Brufola, I., Corsaro, A., Marzuillo, C., Migliara, G., ... Damiani, G. (2017). Are community-based nurse-led self-management support interventions effective in chronic patients? Results of a systematic review and meta-analysis. *PLoS One*, 12(3), e0173617. <https://doi.org/10.1371/journal.pone.0173617>
- McDonald, K., Sundaram, V., Bravata, D., Lewis, R., Lin, N., Kraft, S., ... Owens, D. (2007). Care coordination. In K. Shojania, K. McDonald, R. Wachter, & D. Owens (Eds.), *Closing the quality gap: A critical analysis of quality improvement strategies* (Vol. 7). Rockville, MD: Agency for Healthcare Research and Quality.
- Mitchell, G. K., BurrIDGE, L., Zhang, J., Donald, M., Scott, I. A., Dart, J., & Jackson, C. L. (2015). Systematic review of integrated models of health care delivered at the primary-secondary interface: How effective is it and what determines effectiveness? *Australian Journal of Primary Health*, 21(4), 391–408. <https://doi.org/10.1071/PY14172>
- Morilla-Herrera, J. C., Garcia-Mayor, S., Martin-Santos, F. J., Kaknani Uttumchandani, S., Leon Campos, A., Caro Bautista, J., & Morales-Asencio, J. M. (2016). A systematic review of the effectiveness and roles of advanced practice nursing in older people. *International Journal of Nursing Studies*, 53, 290–307. <https://doi.org/10.1016/j.ijnurstu.2015.10.010>
- Oeseburg, B., Wynia, K., Middel, B., & Reijneveld, S. A. (2009). Effects of case management for frail older people or those with chronic illness: A systematic review. *Nursing Research*, 58(3), 201–210. <https://doi.org/10.1097/NNR.0b013e3181a30941>
- Ouzzani, M., Hammady, H., Fedorowicz, Z., & Elmagarmid, A. (2016). Rayyan – A web and mobile app for systematic reviews. *Systematic Reviews*, 2(5), 210. <https://doi.org/10.1186/s13643-016-0384-4>
- Panagioti, M., Bower, P., Kontopantelis, E., Lovell, K., Gilbody, S., Waheed, W., ... Coventry, P. A. (2016). Association between chronic physical conditions and the effectiveness of collaborative care for depression: An individual participant data meta-analysis. *JAMA Psychiatry*, 73(9), 978–989. <https://doi.org/10.1001/jamapsychiatry.2016.1794>
- Piersol, C. V., Canton, K., Connor, S. E., Giller, I., Lipman, S., & Sager, S. (2017). Effectiveness of interventions for caregivers of people with Alzheimer's disease and related major neurocognitive disorders. A systematic review. 7105180020p1–7105180020p10. *American Journal of Occupational Therapy*, 71(5), <https://doi.org/10.5014/ajot.2017.027581>
- Pimouguet, C., Lavaud, T., Dartigues, J. F., & Helmer, C. (2010). Dementia case management effectiveness on health care costs and resource utilization: A systematic review of randomized controlled trials. *Journal of Nutrition Health & Aging*, 14(8), 669–676. <https://doi.org/10.1007/s12603-010-0314-4>
- Prince, M., Knapp, M., Guerchet, M., McCrone, P., Prina, M., Comas-Herrera, A., ... Salimkumar, D. (2014). *Dementia UK: Update*. Alzheimer's Society. Retrieved from [alzheimers.org.uk/dementiauk](http://alzheimers.org.uk/dementiauk)
- Reilly, S., Miranda-Castillo, C., Malouf, R., Hoe, J., Toot, S., Challis, D., & Orrell, M. (2015). Case management approaches to home support for people with dementia. *Cochrane Database of Systematic Reviews*, 1, CD008345. <https://doi.org/10.1002/14651858.CD008345.pub2>
- Reynolds, R., Dennis, S., Hasan, I., Slewa, J., Chen, W., Tian, D., ... Zwar, N. (2018). A systematic review of chronic disease management interventions in primary care. *BMC Family Practice*, 19(1), 11. <https://doi.org/10.1186/s12875-017-0692-3>
- Salter, K., Foley, N., & Teasell, R. (2010). Social support interventions and mood status post stroke: A review. *International Journal of Nursing Studies*, 47(5), 616–625. <https://doi.org/10.1016/j.ijnurstu.2009.12.002>
- Schoenmakers, B., Buntinx, F., & DeLepeleire, J. (2010). Supporting the dementia family caregiver: The effect of home care intervention on general well-being. *Aging & Mental Health*, 14(1), 44–56. <https://doi.org/10.1080/13607860902845533>
- Smallfield, S., & Heckenlaible, C. (2017). Effectiveness of occupational therapy interventions to enhance occupational performance for adults with Alzheimer's disease and related major neurocognitive disorders. A systematic review. *American Journal of Occupational Therapy*, 71(5), 7105180010p1–7105180010p9. <https://doi.org/10.5014/ajot.2017.024752>
- Smith, S. M., Cousins, G., Clyne, B., Allwright, S., & O'Dowd, T. (2017). Shared care across the interface between primary and specialty care in management of long term conditions. *Cochrane Database of Systematic Reviews*, 2, CD004910. <https://doi.org/10.1002/14651858.CD004910.pub3>
- Smith, S. M., Wallace, E., O'Dowd, T., & Fortin, M. (2016). Interventions for improving outcomes in patients with multimorbidity in primary care and community settings. *Cochrane Database of Systematic Reviews*, 3, CD006560. <https://doi.org/10.1002/14651858.CD006560.pub3>
- Somme, D., Trouve, H., Drame, M., Gagnon, D., Couturier, Y., & Saint-Jean, O. (2012). Analysis of case management programs for patients with dementia: A systematic review. *Alzheimer's and Dementia*, 8(5), 426–436. <https://doi.org/10.1016/j.jalz.2011.06.004>
- Stark, S., Keglovits, M., Arbesman, M., & Lieberman, D. (2017). Effect of home modification interventions on the participation of community-dwelling adults with health conditions: A systematic review. *American Journal of Occupational Therapy*, 71(2), 7102290010p1–7102290010p11. <https://doi.org/10.5014/ajot.2017.018887>
- Stokes, J., Panagioti, M., Alam, R., Checkland, K., Cheraghi-Sohi, S., & Bower, P. (2015). Effectiveness of case management for “at risk”

- patients in primary care: A systematic review and meta-analysis. *PLoS One*, 10(7), e0132340. <https://doi.org/10.1371/journal.pone.0132340>
- Tam-Tham, H., Cepoiu-Martin, M., Ronksley, P. E., Maxwell, C. J., & Hemmelgarn, B. R. (2013). Dementia case management and risk of long-term care placement: A systematic review and meta-analysis. *International Journal of Geriatric Psychiatry*, 28(9), 889–902. <https://doi.org/10.1002/gps.3906>
- Threapleton, D. E., Chung, R. Y., Wong, S. Y. S., Wong, E., Chau, P., Woo, J., ... Yeoh, E. K. (2017). Integrated care for older populations and its implementation facilitators and barriers: A rapid scoping review. *International Journal for Quality in Health Care*, 29(3), 327–334. <https://doi.org/10.1093/intqhc/mzx041>
- Tricco, A. C., Antony, J., Ivers, N. M., Ashoor, H. M., Khan, P. A., Blondal, E., ... Straus, S. E. (2014). Effectiveness of quality improvement strategies for coordination of care to reduce use of health care services: A systematic review and meta-analysis. *Canadian Medical Association Journal*, 186(15), E568–E578. <https://doi.org/10.1503/cmaj.140289>
- Tully, P. J., & Baumeister, H. (2014). Collaborative care for the treatment of comorbid depression and coronary heart disease: A systematic review and meta-analysis protocol. *Systematic Reviews*, 3, 127. <https://doi.org/10.1186/2046-4053-3-127>
- Tysnes, O. B., & Storstein, A. (2017). Epidemiology of Parkinson's disease. *Journal of Neural Transmission*, 124(8), 901–905. <https://doi.org/10.1007/s00702-017-1686-y>
- Van der Elst, M., Schoenmakers, B., Duppen, D., Lambotte, D., Fret, B., Vaes, B., & De Lepeleire, J. (2018). Interventions for frail community-dwelling older adults have no significant effect on adverse outcomes: A systematic review and meta-analysis. *BMC Geriatrics*, 18(1), 249. <https://doi.org/10.1186/s12877-018-0936-7>
- van Eck van der Sluijs, J. F., Castelijns, H., Eijsbroek, V., Rijnders, C. A. T., van Marwijk, H. W. J., & van der Feltz-Cornelis, C. M. (2018). Illness burden and physical outcomes associated with collaborative care in patients with comorbid depressive disorder in chronic medical conditions: A systematic review and meta-analysis. *General Hospital Psychiatry*, 50, 1–14. <https://doi.org/10.1016/j.genhosppsych.2017.08.003>
- Watson, L. C., Amick, H. R., Gaynes, B. N., Brownley, K. A., Thaker, S., Viswanathan, M., & Jonas, D. E. (2013). Practice-based interventions addressing concomitant depression and chronic medical conditions in the primary care setting: A systematic review and meta-analysis. *Journal of Primary Care & Community Health*, 4(4), 294–306. <https://doi.org/10.1177/2150131913484040>
- WHO. (2016). Integrated care models: An overview. Health Services Delivery Programme, 42. Retrieved from <http://www.euro.who.int/en/health-topics/Health-systems/health-services-delivery/publications/2016/integrated-care-models-an-overview-2016>
- World Health Organisation. (2015). *World report on ageing & health*. Geneva, Switzerland: World Health Organisation. Available from: [https://apps.who.int/iris/bitstream/handle/10665/186463/9789240694811\\_eng.pdf;jsessionid=7CEEABB2B2F02F8A2D9264F3888F05AB?sequence=1](https://apps.who.int/iris/bitstream/handle/10665/186463/9789240694811_eng.pdf;jsessionid=7CEEABB2B2F02F8A2D9264F3888F05AB?sequence=1)

## SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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