MULTIPLE CHRONIC HEALTH CONDITIONS IN OLDER PEOPLE

Implications for Health Policy Planning, Practitioners and Patients

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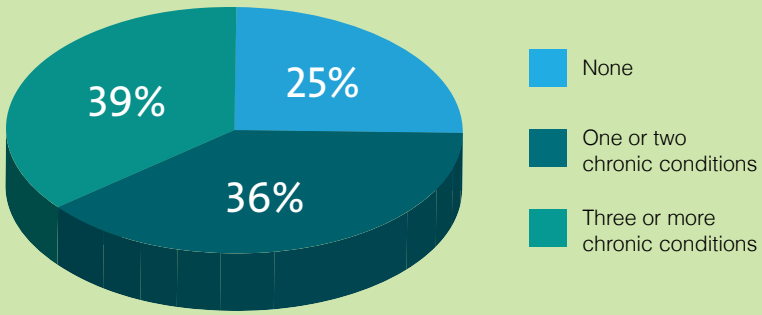
WHY FOCUS ON PEOPLE LIVING WITH MULTIPLE CHRONIC HEALTH CONDITIONS?

Multimorbidity, the coexistence of multiple chronic health conditions in a person, is increasing, both in Australia and world-wide. Current estimates are that 40% of Australian adults have three or more chronic conditions[1], a four-fold rise since the 1980's[2], and expectations are that the numbers will to continue to increase. This has implications for our health system and the way we deliver healthcare. The delivery of health care has evolved from an acute care focus to provide a stronger focus on chronic disease management, however, health care delivery and the health care system is not yet set up to routinely manage care of those with multiple chronic conditions. This report, which has arisen out of our quantitative and qualitative research on management and care of those with multiple chronic health conditions, highlights the extent of the problem in Australia and the chronic diseases most commonly implicated. It details some of the challenges in caring for people with multiple chronic health problems, particularly that of poorer health outcomes and the challenges that arise when the treatment of one disease leads to less than optimal outcomes of a co-existing disease. The report also identifies factors contributing to breakdowns in care and poorer health outcomes. The report concludes with a review of models of care that have been found to be effective in treating people with multiple chronic health conditions and identifies the systems structures that, if developed, would facilitate improvements in care of people with multiple chronic health conditions.

39% of Australian adults have three or more chronic conditions



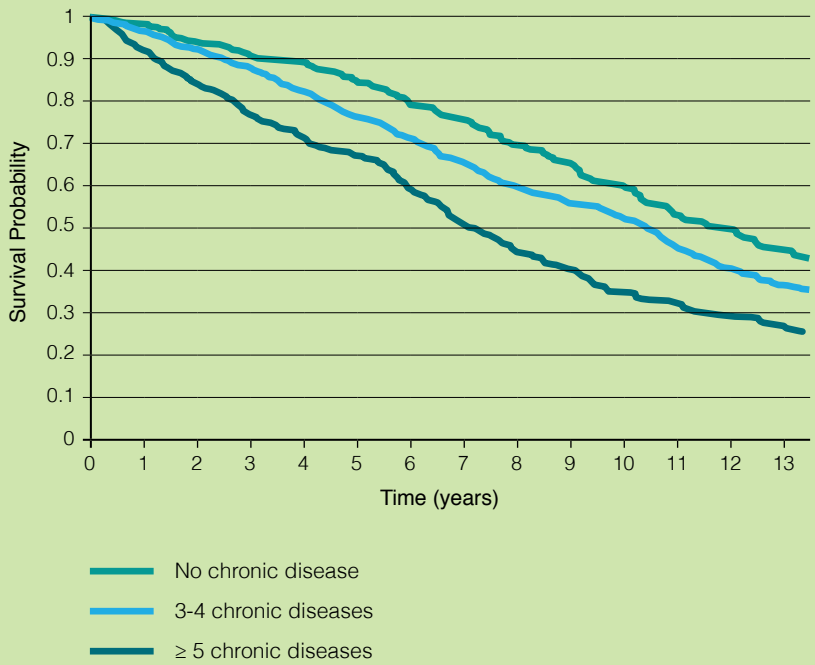
Data source: Australian Bureau of Statistics.[1]

Multiple chronic health conditions contribute to poorer patient outcomes

Multiple chronic health conditions are associated with decreased quality of life, functional decline and mobility.[3] People living with multiple chronic health conditions report poorer health and more difficulty with activities of daily living, particularly those with a mental health problem or cardiovascular disease.[4] The presence of multiple chronic health conditions is also associated with increased psychological distress, hospitalisations, and death.[3] People with three or four chronic conditions have a 25% increased risk of mortality compared to those with no chronic disease; while those with five or more chronic diseases have an 80% increased risk of dying.[4]

People with multiple chronic conditions have poorer life expectancy.

Survival analysis of increasing numbers of chronic conditions and risk of mortality.[4]



Adapted from Journal of Epidemiology and Community Health, 2010;64(12):1036-42 with permission of BMJ Publishing Group Ltd.[4]
Data source: Australian Longitudinal Study of Ageing.

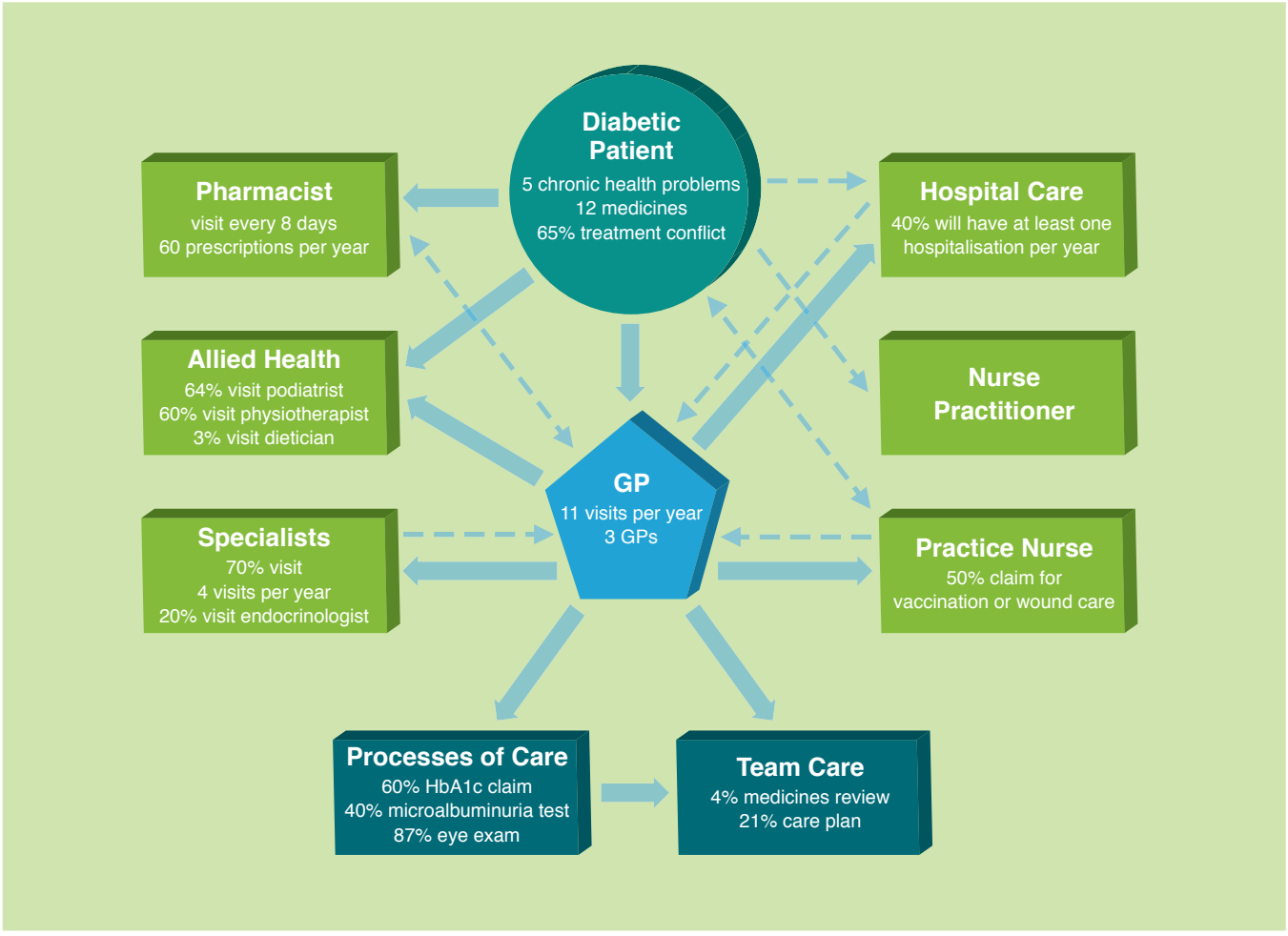
Multiple chronic health conditions lead to complex care patterns, significant health care use and costs

Most patients with multiple chronic health problems interact with seven or eight health professionals and receive more than 80 health services annually in the course of their care.

People with multiple chronic health conditions have high and complex care needs. They are high users of health services and see a lot of different health providers. Within today's health care system, all older people with 3 or more chronic conditions will visit a general practitioner and a pharmacist.

On average, they will see the doctor every month and the pharmacist every eight days. The majority, 80%, will also visit a specialist, usually five times per year; 80% will claim a pathology service, usually 11 claims per year, and 80% will claim a radiology service, usually 5 claims per year. Forty percent are likely to be hospitalised within the year and the majority will also see allied health professionals.[5]

This pattern of care illustrated below is for an older patient with diabetes over a year.[5] The communication pathways between care providers, indicated by the arrows, are often suboptimal and may not be reciprocal. Communication pathways back to the patient are limited. Patients are able to see multiple general practitioners, which may complicate the care pathway further if processes for handover of care are a not in place.



Adapted from Aging Health, 2011;7(5):695-705 with permission of Future Medicine Ltd.[5]
Data source: Department of Veterans' Affairs health administrative database.

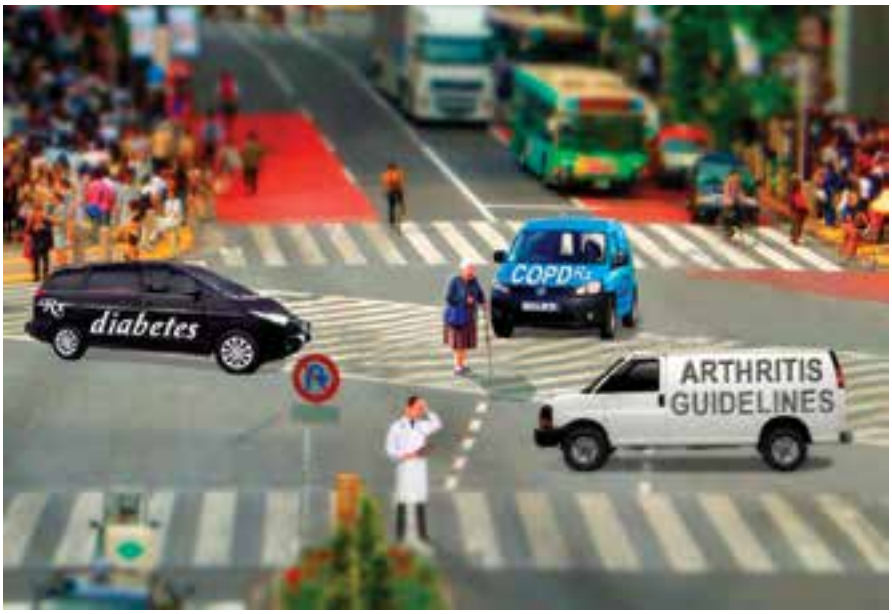
Treating co-existing conditions often leads to treatment conflicts that may cause harm

Half of all patients with multiple chronic health conditions will have conditions that will result in a treatment conflict and make management difficult.

Caring for people with multiple chronic health conditions is complex. At least half of all patients with multiple chronic health conditions will have a condition, the management of which, will conflict with the management of a co-existing condition.[6-8,a]

These treatment conflicts not only make treatment decisions and management difficult, but also have the potential to cause harm. Clinical guidelines don't always help as they often fail to address the treatment of comorbid conditions and only focus on single conditions.[9,10]

In some cases if each disease-specific guideline was followed in a patient with multiple chronic health conditions, care would be both impractical and associated with detrimental effects.[11]



[a]A summary of common treatment conflicts in the older population with multiple chronic health conditions is presented in Appendix 3

Treating multiple chronic health conditions often causes problems with medicine use

Given that the presence of multiple chronic health conditions creates management difficulties, it is not surprising to find that medication-related problems in people living with multiple chronic health conditions are common,[12,13] and that the medication-related problems result in harm and hospital admission.[14,15] A number of studies have shown that of those at high risk of medication misadventure, the majority will have a medication-related problem.[12,16-19] Australian studies found, on average, three to four problems per patient.[16,20]

Medication errors are also common. Thirteen percent of Australians with chronic conditions reported being given the wrong medication or dose in the last 2 years.[21] When lists of medicines deemed inappropriate in the older population are used as the measure of prescribing appropriateness, it has been found that almost a quarter received a potentially inappropriate medication.[6]

Medication-related problems do result in harm. Use of potentially inappropriate medicines is associated with increased hospitalisation, higher mean numbers of inpatient, outpatient and emergency department visits, poorer self-reported health and death.[22,23] Australian data suggests one in three unplanned hospital admissions in the older population are medication-related.[24] Further, the increasing use of medicines associated with the increasing prevalence of chronic disease appears to be increasing the prevalence of medication-related problems. Rates of hospitalisation associated with adverse drug reactions rose five fold in Western Australia between 1981 and 2002.[25] The rising trend also occurred in South Australia and correlated with increasing medicine use.[26]

Many of the medication-related problems are preventable. A systematic review of adverse drug events in the community estimated 21% were preventable.[15] Studies of medication-related problems provide higher estimates of preventability, ranging from 40%[18] to 80%[27]. Studies of medication-related hospitalisations suggest between one-quarter and three-quarters may be preventable if appropriate primary care is received.[24]

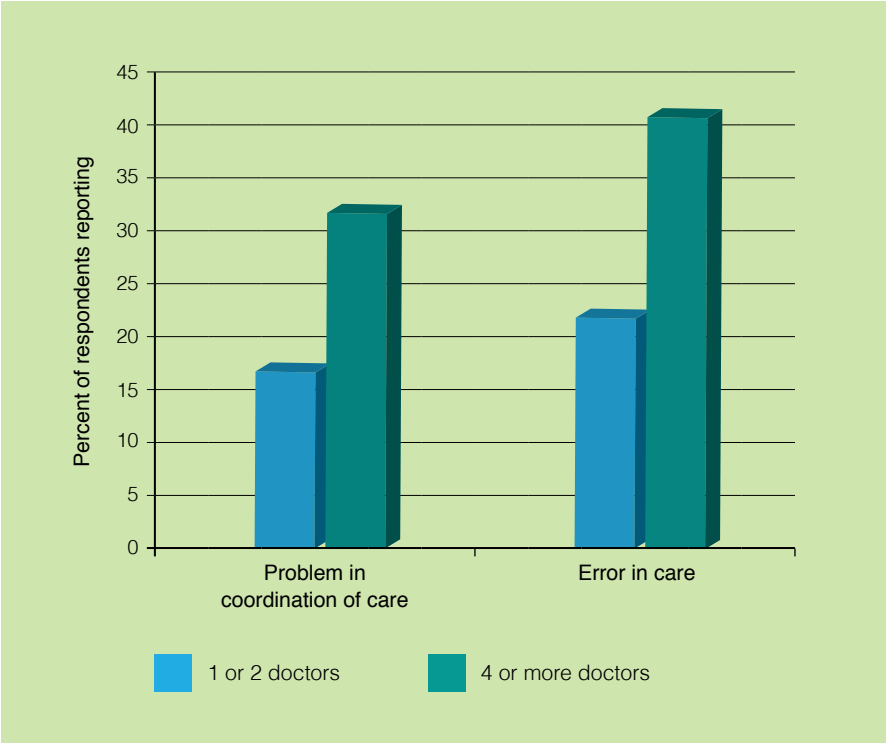
WHAT CONTRIBUTES TO PROBLEMS FOR PEOPLE WITH MULTIPLE CHRONIC HEALTH CONDITIONS?

Failure to coordinate care

"Organising services to coincide with discharge from hospital is really difficult. My father had a domiciliary care occupational therapy assessment, looking at handrails, etc. but they were never put in. It was two years until we heard from them again and by that time my father had passed away at 82 years of age."

A focus group participant[28]

People with multiple chronic health conditions will often receive fragmented, inefficient and ineffective care,[29] as well as uncoordinated care.[21,30,31] The number of health providers a person sees contributes to coordination of care problems. Compared with those who saw one or two doctors, Australian adults with chronic health conditions who saw four or more doctors were more likely to report coordination problems with their care (32% versus 17%) and more likely to report an error in their care in the previous two years (41% versus 22%).[21]



Data Source: 2009 Commonwealth Fund survey of chronically ill adults.[19]

Hospitalisation events are also associated with breakdowns in care. One-quarter of Australians with chronic health conditions reported they did not receive clear instructions about symptoms to watch for and when to seek further care when discharged from hospital.[21] Of more concern was that 15% did not know who to contact for questions about their condition or treatment after discharge.[21]

Problems with care-coordination are not just at the hospital discharge interface, but also occur within primary care. Only 59% of Australians with chronic health conditions reported their regular doctor always gave clear instructions about symptoms and when to seek further care, while only 42% reported they were given a written plan or instructions to manage their care at home.[21]

One-quarter considered their time was often or sometimes wasted because their medical care was poorly organised.[32]

Lack of evidence and lack of guidelines for people with multiple chronic health conditions

Health practitioner participants agreed that these are areas *"where nobody knows what to do"*.

A focus group participant[28]

One of the big challenges in treating people with multiple chronic health conditions is knowing what is the best management strategy. The health system has had a focus on treating single conditions. As a result there is a lack of evidence and a lack of guidance on how to manage older persons with multiple chronic health conditions. The evidence on which most guidelines are developed is from relatively short-term randomised controlled clinical trials of single conditions, where the older population or people with multiple conditions are excluded.[33] Even where research does assess the impact of one treatment on rate of complications in the other, there is very little research where outcomes for both diseases are measured in the one trial. This leads to cases where single disease based clinical guidelines may provide contradictory recommendations for practitioners treating patients with multiple chronic health conditions, some of which, if implemented, would result in harm. A review of 17 Australian clinical guidelines found only two made specific recommendations for patients with multiple chronic health conditions, and only one addressed treatment of older people with multiple chronic health conditions.[34]

"There is often little evidence to support what we do."

A focus group participant[28]

Lack of information and services

Failure to provide adequate information to patients, obtain appropriate information from patients and review their therapy can also contribute to problems in those with multiple illnesses. One in six chronically ill Australian adults reported their test results or medical records were not available at the time of their scheduled medical appointment, 12% thought doctors ordered unnecessary tests that had already been undertaken, and one in five reported their specialist didn't have information about their condition at the time of their appointment.[21] Conflicting medication treatments is also an issue with one in three indicating the pharmacist told them the prescription they were about to fill may be harmful because of other medicines they were taking.

Our qualitative studies showed structural issues in health service provision also make it difficult to care for people with multiple chronic health conditions. The current service structure is typically driven by an acute, problem-focused approach enabling treatment of presenting or immediate problems only. Lack of time for appropriate health practitioner and patient interactions was considered a major barrier to provide optimum care for those with multiple chronic health conditions. While there is some potential to focus on management of chronic diseases through the structures created for funding chronic disease management plans, the templates that support the development of the care plan fail to include the management of the co-existing conditions.

Health practitioners talked about only being able to treat *"presenting problems"* and for some patients or carers this results in feeling as though *"your body is divided up into little bits"*.

A focus group participant[28]

Integration of health services with social services was also problematic. Health practitioners reported they would like to see better ways of organising services to support patients with multiple chronic conditions, but said that they did not know enough about the services or how to access them to assist their patients; again they reported they did not have time to spend in this area.

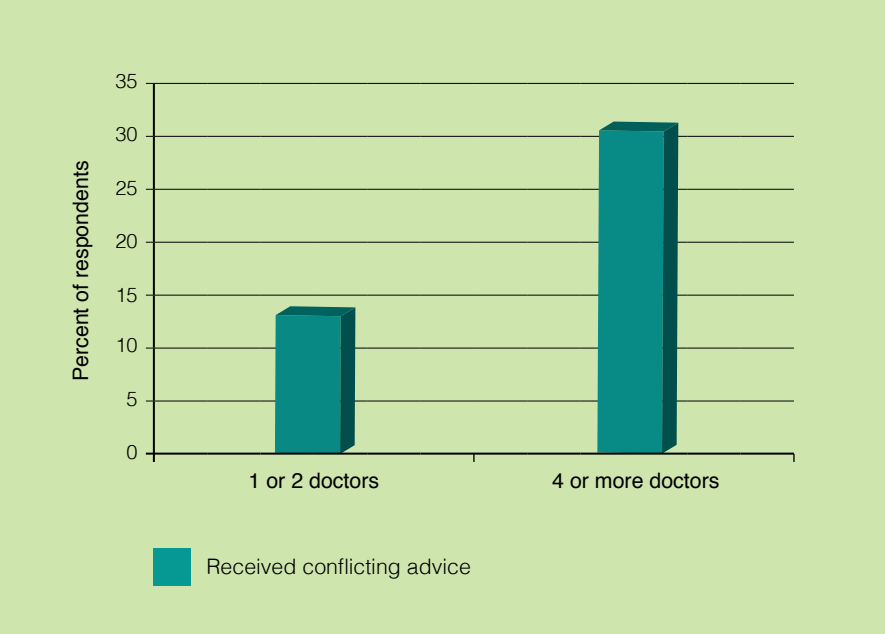
Conflicting preferences for treatment

"My father's GP was doing one thing and the specialist doing another, there was no communication except a referral"

A focus group participant[28]

Conflicting practitioner – practitioner preferences

People with multiple chronic conditions usually see multiple practitioners. This can create problems as the multiple health practitioners who care for patients with multiple chronic illnesses may have different treatment preferences. One-quarter of Australian adults with health problems reported receiving conflicting advice from different doctors or health professionals about their care.[35] Those who saw three or more doctors were more likely to report receiving conflicting information (31% versus 13%),[35] which makes it difficult for patients to know which information they should follow and may mean they don't follow any advice or perhaps follow inappropriate advice.



Data Source: 2002 Commonwealth Fund survey of chronically ill adults.[32]

"When they actually do write to each other (health practitioners), it is a one-way communication not involving any discussion or shared decision-making".

A focus group participant[28]

Conflicting patient – practitioner preferences

Seldom were conversations initiated about how one problem may impact on other areas of health or how people were managing at home.

A focus group participant[28]

Differences in patient and practitioner preferences and beliefs also impact on health care outcomes in those with multiple illnesses. Our qualitative work found health practitioners indicated that they do not routinely elicit patient preferences or initiate conversations about the risks and benefits of medicines. Health practitioners said that they were aware of the risks and benefits of medicines and always try to balance these on behalf of their patients. The reasons given for not initiating these discussions with patients were lack of time, and the view that patients had unrealistic expectations about what medicines could do for them and lacked insight, both into setting goals and comorbidity generally.

Health practitioners stated:
"These ideas are 'alien' to patients"
"Patients are not capable of appreciating what you're on about"

Consumers provided a different perspective:
"I think also that I know myself that the information that you get isn't always the information you should be getting. Especially, I go to the GP, and I'm given medication and it's very rare that he ever actually goes into any real explanation about medication I am taking."

Focus group participants[28]

Failure to elicit patient preferences has implications for successful health-care management. More than one in five chronically ill Australians indicated their doctor recommended treatment the patient thought had little or no health benefit.[21] This has consequence for adherence to treatment plans, with patients much less likely to follow-treatment plans that they think don't work or are unnecessary. A 2007 survey found 19% of chronically ill Australians did not follow the medical advice they had received; the main reasons being that they did not agree with it (17%); that it was too difficult to follow (11%) or that it cost too much (range 11%).[36]

In a 2008 survey only 60% of chronically ill Australians reported the health professional they saw discussed the patients main goals and priorities in caring for their condition.[21] This has implications as patients and practitioners may disagree on which condition has the highest priority for treatment.

A USA study involving primary care providers and their diabetic patients showed that on 72% of occasions, the patient's main concern was also in the top three concerns of the physician, however on 4% of occasions there was no match between patient and clinician concerns. Not surprisingly, patients were more likely to prioritise symptomatic conditions than clinicians. The discordance between patient and clinician preferences rose when patients had multiple conditions, poorer health, were single and had more competing demands.[37] Another USA study examined how patients with hypertension who are at risk of falling prioritise between optimising cardiovascular outcomes and reducing falls risk or medicine adverse events. The study, involving 123 persons, found a fifty-fifty split, with half the participants prioritising cardiovascular health over falls risk and the other half prioritising safety concerns. Those with poorer health and balance problems, were more likely to prioritise falls risk over cardiovascular health.[38]

Circumstances, Conflicts and Changes: Points of vulnerability in care of the people with multiple chronic health problems

The areas where care breaks down for older people with multiple chronic health conditions can be grouped under three main headings of circumstances, conflicts and changes. These issues apply to all levels of healthcare organisation.

The circumstances of the patient, the health professional involved in their care, and organisational or structural circumstances, can all impact on the quality of care received by people with multiple chronic health conditions. For example, a person's educational status, health literacy, socioeconomic circumstances, geographic location, and level of social isolation can all impact on access to and adherence with appropriate treatment. Similarly, the circumstances of the health practitioner, solo versus group practitioner, specialist or generalist, also impact on patient care.

Circumstances	▶ Patient (eg. Health literacy) ▶ Health Professional ▶ Organisational ▶ Structural (eg. Medicare funding)
Conflicts	▶ Disease / Disease contraindications ▶ Patient / Health professional differences in preference ▶ Health professional / Health professional differences in preference ▶ Patient needs / Population needs
Changes	▶ Patient (eg. New disease, new medicines, hospital stay) ▶ Health Professional (eg. Referral to specialist) ▶ Residence (eg Home, Hospital, Rehab or Aged Care Facility)

As described above there are a number of instances where conflicts may arise in the care of older patients with multiple chronic conditions. These may be treatment conflicts, conflicts in practitioner- practitioner preferences both within and across disease treatments, as well as conflicts within and across diseases of patient and practitioner preferences. Finally, there is the conflict between population and individual needs which also may impact on care.

The final major area of vulnerability in care of people with multiple chronic health problems is at time of changes in care, changes in carers, changes in disease status, changes in treatments and changes in residence. For example, errors at the time of admission or discharge to hospital are common, as are adverse events at the time of starting new therapy.[39]

Interventions promoting co-ordination of care and patient self-management are beneficial in those with multimorbidity.

HOW CAN CARE FOR PEOPLE WITH MULTIPLE CHRONIC HEALTH CONDITIONS BE IMPROVED

Interventions in older patients with multiple chronic health conditions

Interventions promoting co-ordination of care and patient self-management are beneficial in those with multimorbidity. A recent systematic review of interventions to improve outcomes in patients with multiple chronic health conditions in primary and community care settings identified 10 studies.[40,b] The interventions were all multifaceted, but could be grouped either as focused on organisation of care delivery, often including the appointment of case-managers and structured visits (six studies)[41-46] or patient-orientated, aiming to improve patient self-management (four studies)[47-51]. Only two of the four organisational interventions were underpinned by theoretical frameworks, while all of the patient focused interventions were. None of the studies were undertaken in Australia.

Organisational interventions

The organisational interventions were all different but common components in most interventions were the involvement of a care coordinator, structured visits, care plans and patient assessments. Some interventions included provider focused education, enhanced multidisciplinary team work, patient focused components supporting self-management, or telephone support services. Of the six organisational interventions, all had a positive effect on at least one of the outcome measures employed. Interventions that targeted management of specific risk factors or management of known patient problems were more likely to be effective compared with usual care. Two of four studies that reported physical health outcomes, (eg blood pressure, glycated haemoglobin and low density lipoprotein cholesterol) reported significant results, as did two of three studies that reported mental health outcomes. Two of the four studies that measured functional improvement were shown to be significant in at least one of the measures studied. Only one of the five studies that assessed impact on health service utilisation reported a significant improvement, although some studies may have been under-powered to detect this difference.

Patient focused interventions

The patient focused interventions were varied and included peer support programs, patient coaches, health education, and programs targeting exercise or problem solving techniques. None of the patient focused interventions targeted provider behaviour. One health professional led intervention that focused on improving patient functional ability was associated with a reduction in mortality. One other patient focused intervention included a measure of physical health outcomes, showing improvements in two of three physical outcomes measured. Only one reported mental health outcomes, showing no effect and only one of the four showed improvements in some of the measures of patient reported functional health outcomes assessed. Only one assessed changes in health service utilisation, showing positive results. The authors concluded the patient focused interventions not linked to the delivery of healthcare were less effective.[48,49]

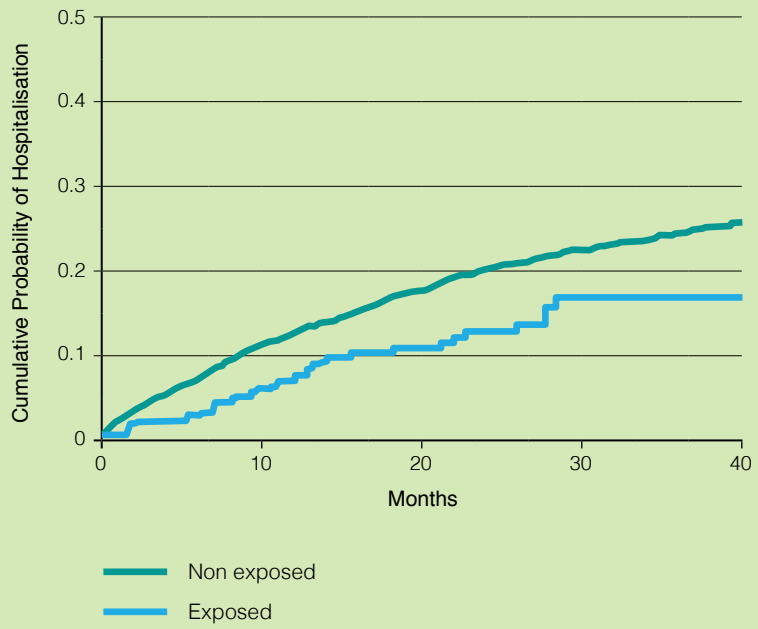
[b]See appendix 4 for summary of studies

Medication reviews

Collaborative home medicines reviews (HMRs) are an Australian service also beneficial in those with multimorbidity. Early trials in Australia showed that collaborative medication reviews were effective in preventing, detecting, and resolving medication-related problems.[27] Medicine reviews that are not collaborative (i.e. involving both a general practitioner and pharmacist) appear less effective.[52]

Our quantitative studies demonstrated that the provision of a HMR in older patients with heart failure (who have on average six comorbid conditions[7]), resulted in a 45% reduced risk of hospitalisation for heart failure.[53] Older patients dispensed warfarin, (average of seven comorbid conditions) also benefited with the chance of a hospitalisation for bleeding between two and six months after the home medicine review reduced by 79%.[54]

Time to hospitalisation for heart failure following a HMR

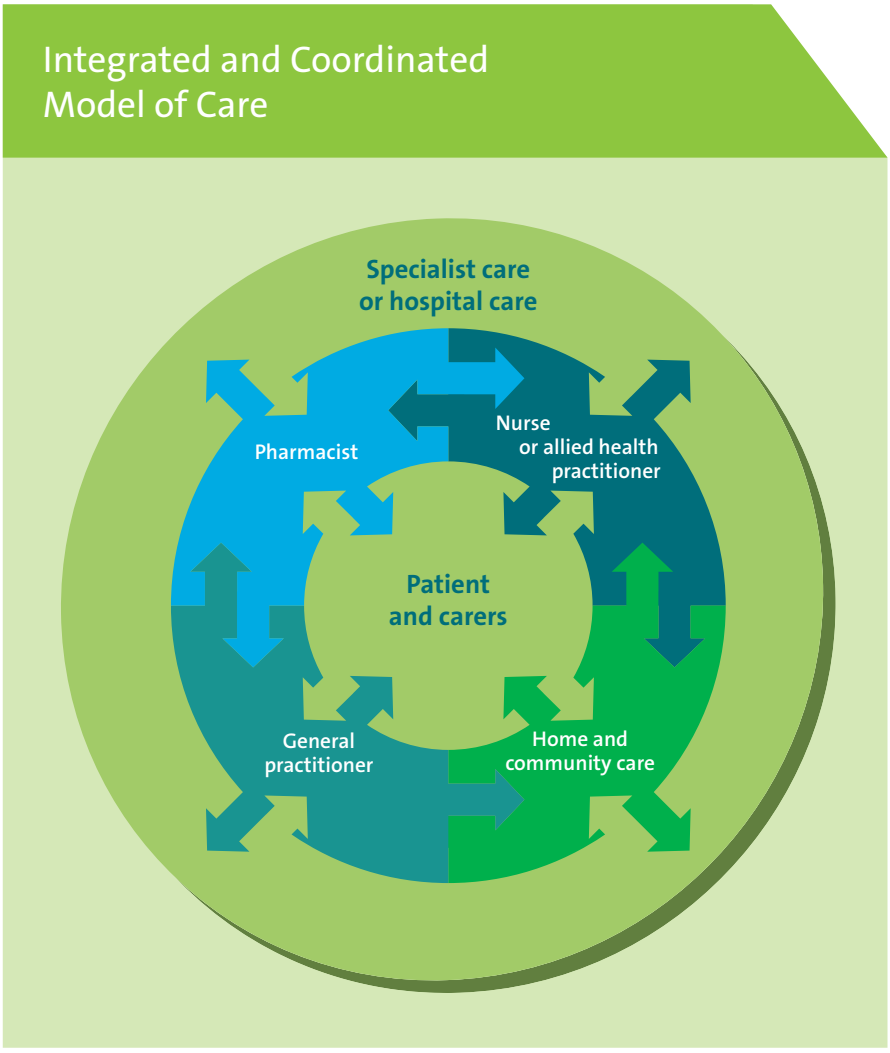


Reproduced from Circulation: Heart Failure, 2009;2(5):424-428 with permission of Wolters Kluwer Health.[53]
Data source: Department of Veterans' Affairs health administrative database.

THE WAY FORWARD

A multidisciplinary patient centred practice model

Models of practice need to be developed that support people living with multiple chronic illnesses. These models need to address the three critical elements identified within the care of those with multiple illnesses; circumstance, conflicts and changes, across multiple providers, multiple diseases, multiple treatments. The model of practice needs to ensure the patient is at the centre of care, that health care is integrated with social care and communication pathways flow in a two way direction between all parties enabling agreed care pathways that take account of patient and practitioner preferences.



Adapted from Aging Health, 2011;7(5):695-705 with permission of Future Medicine Ltd.[5]

Key Elements of a Model of Care for people with multiple chronic health problems

In building new models of practice to care for those with multiple chronic health problems, a number of elements have been identified as important components of effective chronic disease care models, which may be adaptable to those with multiple chronic health problems.[55-57] These include:

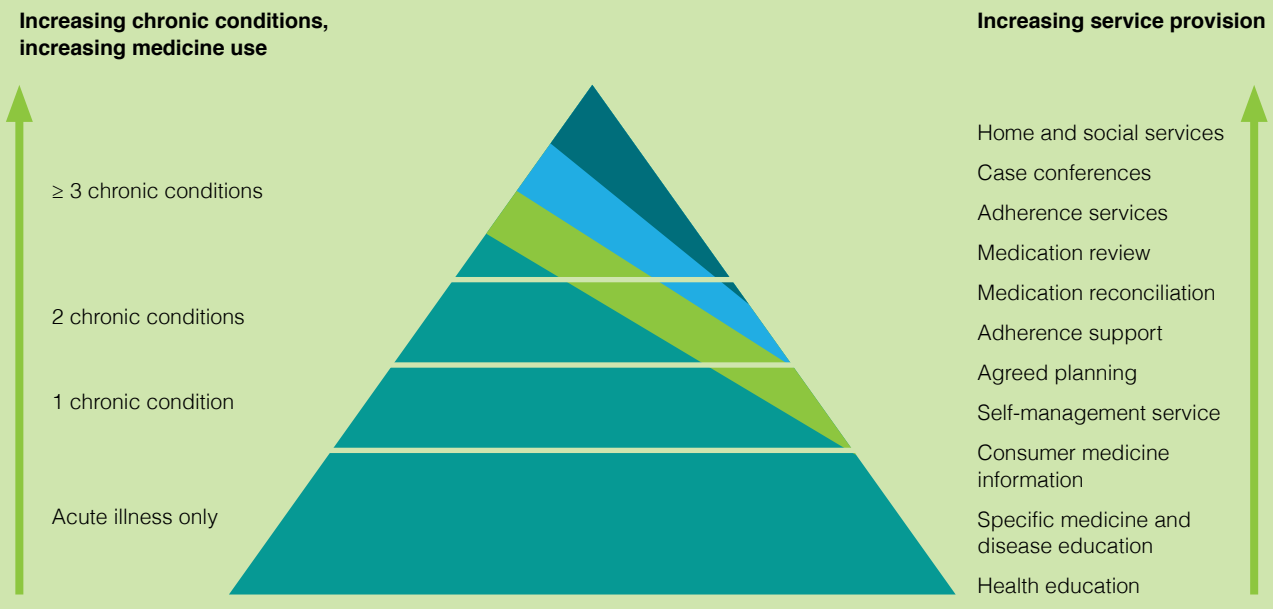
- organisational structures that lead integration at strategic, administrative and service delivery levels
- organised provider networks with standardised referral procedures, service agreements, joint training, shared information systems including community resources
- multidisciplinary care
- comprehensive patient assessment (that includes all conditions present, patient's diseases, social situation and preferences)
- individualised evidence-based care management and care coordination (that includes routine monitoring and evaluation)
- support and promotion of the patient and caregiver engagement through self-management and education.

These elements can be built in models of practice for patients with multiple chronic health conditions. The practice model will need to provide continuity of care, which can be further defined as; provider continuity which ensures the relationship between a patient and provider over time, information continuity, which ensures the availability and use of data from prior events during current consultations, and management continuity, which ensures coherent delivery of care in each episode of care.[58] Improving provider continuity has been associated with a significant decrease in hospitalisation and emergency visits and increased patient satisfaction.[58] While less well studied, improvements in information continuity have also been shown to be associated with decreased emergency room length of stay.[58] Increasingly, a nominated person will be required to co-ordinate the care of those with multiple chronic health conditions and so promote provider continuity. There is likely to be a need for flexibility in which practitioner takes on this role, which, depending on the health system, patient preferences and practitioner preferences, could be any of the practitioners delivering primary care services. Medication information continuity will be improved with shared medical records, particularly through centrally or personally held e-health records, but may also require regular medication reconciliation services provided by the pharmacist, particularly where people see multiple prescribers.

The new model of practice will require patient and clinician preferences to be accommodated and agreed. However, much development work needs to be undertaken to include patient preferences and competing clinician preferences into care planning and decision making, including decision making around medicines. While there is clear evidence of differences in patient practitioner preferences,[37] the incorporation of patient preferences in treatment planning is not routine. It is also complicated by differences in patient willingness to participate, with not all patients wanting to be involved in decision making[59] and in patients lack of understanding of treatment conflicts that arise from having multiple illnesses.[60] One approach suggested for patients with multiple chronic health conditions is for clinicians to ask patients to prioritise the outcomes amongst a set of outcomes that are most important for patients to avoid or achieve, with the clinician then deciding on the course of action most likely to deliver those outcomes.[61] This recommendation arose from a qualitative study that demonstrated it was easier for patients to prioritise outcomes than to understand the complexities of the risk-benefit ratios for multiple treatments and diseases.[61] Presenting information in terms of global health outcomes for patients, such as symptom relief, mobility, or survival, rather than disease-specific outcomes, is likely to be required so patients can identify their most desired outcome.[62] How to best elicit and incorporate competing priorities and patient preferences into agreed care plans between health practitioners and patients has not been explicitly investigated and requires further research.

In developing a new model of practice it needs to be recognised that the majority of people develop new diseases over time and so progress from being well, with occasional acute illness, to development of a chronic disease (with and without episodes of acute illness) and subsequently to multiple chronic health conditions. Service delivery and the level of care required are greater with increasing numbers of chronic conditions. Models of service delivery and care need to incorporate this increasing complexity, if care is to be improved for those with multiple chronic health conditions. As shown in the figure below, for those with acute illness, general education as well as disease and medicine specific education is required, with the aim that all people have developed adequate health literacy skills before they become chronically ill. For those with one chronic condition, advanced and ongoing disease specific and treatment specific education and adherence support is required, while for those with multiple chronic health conditions, advanced multidisciplinary services are likely to be necessary, including care-coordination, care planning, case conference, medicine review, adverse event monitoring, treatment adherence services and social services.

Relationship between the provision of primary care services and chronic disease



Adapted from Aging Health, 2011;7(5):695-705 with permission of Future Medicine Ltd.[5]

Developing the supportive environment

A new model of primary care practice does not develop in isolation and will require concurrent development of the supportive environment, consistent with behavioural and public health theories of successful health promotion and diffusion of innovation.[63] The evidence presented above showed significant structural elements were missing, including the evidence base and guidelines to support people with multiple chronic health conditions, other resources and supports also need to be developed. This section highlights the supportive resources that will be required to successfully translate new models of care into practice.

Policy development and implementation

Policy development and implementation is required at national, state, organisational and practice level. The management of multiple chronic health conditions should be incorporated into all of Australia's National Health Priorities and "A National Action Plan for the care of people with multiple chronic health conditions" should be developed. Initial and ongoing consultation and engagement with all key stakeholders will be a critical process in the establishment of the action plan.[8] Advisory Groups and Working Parties which include all key stakeholders should be part of the process to develop the action plan.

Key Points for considerations:

- Policies to support care of those with multiple chronic health conditions
  - The documents under the National Health Care Reform Agenda recognise and address management of multiple chronic health conditions
  - The documents of the National Health Priorities recognise and address management of multiple chronic health conditions
  - The National Medicines Policy and the National Strategy for Quality Use of Medicines address management of multiple chronic health conditions

Facilitation and coordination

Facilitation, coordination and integration of initiatives at the National, State and local levels to support care of people with multiple chronic health conditions will be critical. The approach will need to ensure the close involvement of the broader community where management of multiple chronic health problems most commonly occurs, and organisations that develop professional standards of practice in these areas, as well as policy makers and care providers.

A National Service Improvement Framework that provides guidance to facilitate and coordinate "equitable, timely and effective care for all Australians with multiple chronic health conditions" should be developed. The National Service Improvement Framework document should articulate a set of principles which must place the needs of individuals and the community as central to care delivery, ensuring access to services for all groups in the community, across the continuum of care from prevention to tertiary care and rehabilitation supported by evidence-based practices. Facilitators to assist with the implementation of the framework should be considered.

Key Points for considerations:

- Key planning and background documents in place
  - A National Service Improvement Framework to achieve consistent high quality care to all members of the community.
  - A process should be developed for facilitating and coordinating integration with activities of organisations such as:
    - NPS MedicineWise, Australian Commission on Safety and Quality, National Institute of Clinical Studies, Australian Consumers Association and Consumer Groups; all of which are developing and delivering resources, services and research relevant to this initiative.
    - Professional Organisations and Registering authorities which are responsible for and are currently delivering professional practice standards, guidelines, continuing professional development programs and monitoring professional competencies.
  - A process should be developed for facilitating and coordinating ongoing support for existing activities which have been developed and funded to support quality use of medicines and have relevance to this initiative.
  - Consumer self-help groups should be supported to develop a range of resources and services to offer people with multiple chronic health conditions.
  - Health Workforce Australia should consider planning for the appropriate health workforce, in terms of numbers and competencies, to deliver the new model of care.

Objective information

The evidence base and guidelines for managing multiple chronic health conditions are lacking. While it is unlikely that guidelines will be able to be developed for all combinations of chronic conditions, there is an urgent need to prioritise development of the evidence base for multimorbidity and include multimorbidity within all guideline developments. Information for both practitioners and consumers will be required that is credible, informed by evidence, based on agreed standards, available in a timely manner, accessible and understandable by users, independent and relevant to the needs of users (conscious of the heterogeneity of the Australian population). This implies that any developed materials will need to involve all stakeholders in the development and be evaluated for usefulness.

Australia has a range of mechanisms in place to help develop and disseminate objective information and practice guidelines; for example the National Institute of Clinical Studies (NICS), Therapeutic Guidelines, the Australian Medicines Handbook, Australian Prescriber, NPS MedicineWise. These groups need to be supported to include management and care for people with multiple chronic health conditions in their materials.

Key Points for considerations:

- Evidence-based information
  - Practice support resources that provide guidance for the management of people living with multiple chronic health conditions. The highest priority should be for treatment of concurrent conditions where optimal treatment of one condition exacerbates the other condition. Currently there are no national evidence-based guidelines in this area. The data required to develop these evidence-based recommendations are lacking and need to be developed.
  - Ensuring consistency in the messages to consumers and health practitioners in the information and materials produced is critical.

Education, Training, Services and Interventions

Health professional education needs to extend from chronic disease management to holistic management of people living with multiple chronic health conditions. Training in eliciting patient and practitioner preferences, as well as training in reaching negotiated and agreed treatment plans and consensus based prescribing, is required at all levels of health care training (under-graduate, post-graduate, continuing professional education) and across all health professions.

Current service provision that supports chronic disease needs to be extended to encompass multiple chronic health conditions. Care planning documents need to include approaches for managing multiple chronic health conditions and specialty services for those with multiple chronic illnesses implemented. Practice guidelines for managing multiple chronic health conditions need to be developed.

Key Points for considerations:

- Education & training
  - An active credible national, state and local network of education and service provision organisations is in place: This network should be supported to ensure coordination, consistency and appropriate breadth of activities in this area.
  - Undergraduate and graduate training for health professionals in multidisciplinary team care, eliciting patient preferences, negotiating agreed treatment plans, and consensus prescribing.
  - The educational provision should build on existing programs such as;
    - NPS MedicineWise health professional and consumer initiatives,
    - Health professional organisations support and training activities (eg RACGP guidelines),
    - Professional registering authorities initiatives.
- Services and interventions
  - The funding of strategies to achieve consumer accessibility to services and treatment options not currently covered by PBS or Medicare (eg allied health, life-style interventions and social supports).
  - Strategies to break down the current silo approach to services including medical care, pharmacy services, medicines, physical therapies, social support services, physical support services and lifestyle interventions.
  - Multiple activities, services and inter-ventions tailored over the spectrum of health care needs from those who are currently free of disease to those requiring high level care, incorporating multidisciplinary care.
  - Practice improvement strategies, such as Audit and feedback, Academic Detailing, Opinion Leader education and Peer led education and training (eg Medicine Information Persons).

Strategic research, evaluation and routine data collection

The evidence for improving care of patients with multiple chronic health conditions is limited. A strategic research program is required to offer opportunities for research activity from all stakeholder groups. The research will necessarily have to embrace different paradigms and a range of methods if it is to improve understandings of topics as diverse as consumers' experiences with seeking information and care for their health problems, to the efficacy of complex mixed treatment strategies to manage multiple chronic health conditions. Methods adapted from the social sciences such as Focus Group, Nominal Group and Participatory Action Research, emerging quasi-experimental methods needed for practice-based research through to randomised control trials must carry equal weight when utilised in the planning, development, implementation and evaluation of interventions.

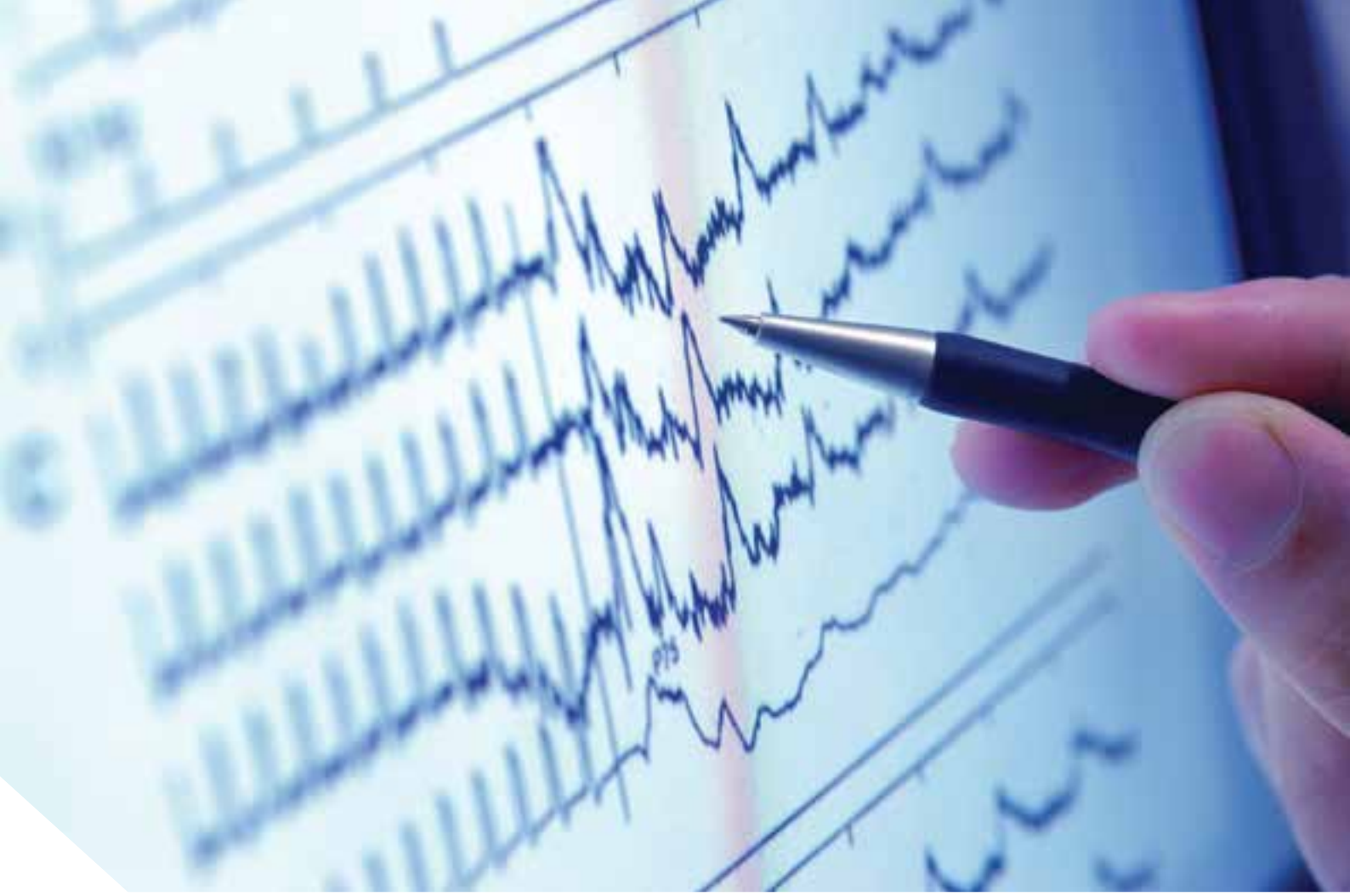
To support the strategic research program, a national database of details of studies being conducted in the area should be established. Researchers should be encouraged to register their work so that funding bodies, people interested in the outcomes of research and other researchers can see what studies in their area of interest are currently underway and the results of completed studies. This will help avoid duplication of effort by allowing researchers to better target key questions that have yet to be addressed with research evidence.

The implementation of a national framework to support people living with multiple chronic health conditions will require evaluation and routine data collection. Evaluation should sit within a quality improvement framework. Routine data collection on a set of carefully constructed indicators from the outset of the initiative will enable both measurement of the achievement of the goals of the initiative and data to provide feedback to those involved in implementation, uptake and utilisation of activities associated with initiative strategies. The Manual of Indicators to measure the Quality Use of Medicines component of Australia's National Medicine Policy[64] provided a useful model for the preparation of suitable indicators. Potential indicators to monitor the implementation of a strategy to improve multimorbidity are included in Appendix 5.

To assist program evaluation, efforts to establish a national health database that includes administrative claims data should be established. Ideally this database should have patient specific information linked to health service utilisation, diagnoses, test results and medication use. There are however significant hurdles to overcome before such a national database of this nature could be established in Australia. Until these hurdles are overcome evaluation will rely on indicators and the data collected from specific studies or programs of research. An important outcome of our research, which used administrative health claims data to inform much of the research reported here, was the development of research capacity, in terms of both personnel and methods, in this area. Research capacity in the field of multiple chronic health conditions and use of linked health databases needs further development in Australia.

Key Points for considerations:

- Funding for strategic research program in the area of multiple chronic health conditions
- Policy to support the development of a national, linked health data set
- Blueprint for nation-wide surveillance of chronic diseases and associated determinants in Australia
  - Demographics of people with multiple chronic health conditions
  - A picture of current patterns of care and treatment for people living with multiple chronic health conditions
- Development of performance indicators for multimorbidity (see Appendix 5)
- Processes for discussion and dissemination of research findings (eg national workshops)



In implementation this platform of activity, consultation and engagement with all key stakeholders will be critical. Consumers' knowledge and experience in managing chronic conditions is critical in all stages of implementation and evaluation of this initiative. Similarly health professionals, government, the pharmaceutical industry and the media will have a range of needs and experiences that must be understood for effective implementation and evaluation planning. This is important on many levels. In terms of communication theory, it is recognised that understanding the needs, current issues in meeting those needs, attitudes and beliefs of all stakeholders must be recognised and acknowledged in implementation plans.[63] Moreover, a successful consultation and engagement process provides stakeholder groups with a sense of ownership, and by creating some mutual appreciation of all stakeholders' needs and issues, unexpected and unintended responses to the initiative are less likely. This of course relies on clear reporting back of the consultation process to all stakeholders and the opportunity for review by stakeholders.

There are many quality and effective support organisations and activities already in the environment. Building on existing activity is important; disenfranchising a respected resource organisation or group will have a counterproductive influence. Gaps in the range of existing strategies and resources however need to be addressed. Creating supportive environments is important if barriers around extending existing services and access to services are to be reduced. The low uptake of formal care planning and Team Care Arrangements indicate that the environment in which these best-practice initiatives are being implemented is not supportive.

Research will be necessary in a broad range of areas. Some immediate priorities appear to be: needs assessments in key stakeholder groups to identify issues such as poor access to information or services, barriers to team care and other evidence-based strategies for better caring for people with chronic diseases, new funding models in primary care and acceptability of establishing national linked databases for people with chronic disease who wish to participate.

Policy development

- Develop a National Action Plan for improving care of people living with multiple chronic health conditions
- Ensure integration with:
  - National Health Priority Areas
  - National Health Care Reform Agenda
  - National Medicines Policy and National Strategy for Quality Use of Medicines

Objective information

- Develop the evidence base for outcomes in people with multiple chronic health conditions
- Incorporate recommendations for treating those with common or conflicting comorbidity in disease based guidelines
- Tailored to the varied groups

Services and interventions

- Trial and implement effective models for care
- Implement strategies proven to improve care of complex patients including:
  - Discharge liaison services
  - Medication Management Services and case conferencing
- Where evidence is strong, incorporate service delivery into accreditation standards
- Develop practice support resources that
  - Facilitate holistic care of multiple chronic health conditions
  - Highlights treatment options for people with multiple chronic health conditions
  - Promotes consensus decision making
  - Promotes agreed treatment plans
  - Incorporates validated alert checking systems
  - Incorporates proven protocols

Facilitation and co-ordination

- Develop a National Service Improvement Framework
- Develop a facilitator network for implementing new models of care
- Process to facilitate and coordinate activities of groups including;
  - Australian Commission for Safety and Quality in Health Care, National Institute for Clinical Studies, NPS MedicineWise
  - State and Territory governments
  - Medicare Locals
  - Professional Organisations
  - Consumer Organisations

Education and training

- Ensure education and training, includes:
  - Challenges of caring for people living with multiple chronic health conditions
  - Eliciting preferences and negotiating agreed treatment plans
  - Care strategies that enable holistic care
  - Consensus prescribing
  - Training in practices, use of resources and systems that promote safer patient care

Strategic research, evaluation and routine data collection

- Develop strategic research program
- Establish national database
- Develop a national evaluation framework
- Routinely monitor and feedback
- Develop research capacity

CONCLUSION

The delivery of health care is changing in light of recognition of changing health needs, however, in most countries the health system has emerged from a time when the majority of health care needs were for the managing acute conditions. In the late 20th century the focus changed to management of chronic conditions, but the predominant focus was on management of single conditions. In Australia, this resulted in the establishment of national health priority areas all of which focused on chronic diseases, but which did not recognise to any great extent the problem of coexisting morbidity.[65] This same issue is evident in the development of guidelines, which again are predominantly single condition focused.[34]

Since 2000 there has been increasing recognition that individual conditions need to be managed within the context of multiple chronic health conditions.[3] Thus, a whole of patient approach is required. However, added into the complexity of developing a whole of patient approach to care is the increasing number of providers who are involved in the care of people living with multiple chronic health conditions. This is a particular challenge for medicine use, where new prescribers are emerging in many health systems, including nurse practitioners and allied health professionals who are being given prescribing roles.[66,67]

Care of people with multiple chronic illnesses will require a model of practice to be developed that enables more appropriate communication and coordination between health providers themselves and between health providers and patients. The model of practice will need to encompass the many providers, the many diseases, the many medicines, the many non-pharmaceutical treatments and the many preferences involved in achieving holistic care for people living with multiple chronic health conditions.

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Most patients
with multiple chronic health
problems interact with seven or eight
health professionals and receive more
than 80 health services annually in
the course of their care.

APPENDIX 1: OUR RESEARCH PUBLICATIONS

The extent of multimorbidity in Australia

- Caughey, G., Vitry, A., Gilbert, A., Roughead, E.E. Prevalence of comorbidity of chronic diseases in Australia. BMC Public Health. 2008; 8(1):221.

Developing measures of comorbidity for use in Australia

- Vitry A, Wong SA, Roughead EE, Ramsay E, Barratt J. Validity of medication-based comorbidity indices in the Australian elderly population. Aust N Z J Pub Health. 2009; 33:126-130.

Guidelines and multiple chronic health conditions

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Management of those with chronic illness and the impact of multimorbidity on management

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APPENDIX 2: OUR RESEARCH METHODS

Our qualitative work

As part of this program of work we conducted qualitative studies to gain a greater understanding of the issues of living with multiple chronic health conditions in addition to caring and treating people with multiple chronic health conditions. We formed two focus groups: a consumer and a health practitioner group, each consisting of eight members. The consumer group members all had multiple chronic health conditions or had experience in caring for someone with multiple chronic health conditions. The health practitioner group included GPs, medical specialists and pharmacists. Semi-structured interviews were also developed from the key themes that emerged from the focus groups and conducted with 20 patients and health practitioners. Iterative thematic analysis was used to identify the key emergent themes, which were then presented to the focus groups to test content validity. A total of 35 people participated in this part of the study. We also developed detailed case studies of care pathways and issues for consumers with multiple chronic health conditions. A national stakeholder workshop was held to further understand stakeholder views and to provide insight into ways to improve care (detailed below).

Our quantitative work

We also conducted quantitative studies using the following datasets.

The Australian Longitudinal Study of Ageing (ALSA) is a large prospective multidisciplinary population-based study of human ageing. It began in 1992 with the primary sample randomly selected from the South Australian Electoral Roll, and stratified by gender, domicile and five year cohorts aged 65-69, 70-74, 75-79, 80-84 and 85 years or older. The study comprises of eleven waves of data collection, baseline (wave 1, September 1992-March 1993 with 2087 subjects), with subsequent waves of data collection at approximately 12-18 month intervals. Data were collected by full interview (2 hour home interview followed by clinical assessment 2 weeks later), and in alternate waves by telephone interviews only. (http://www.flinders.edu.au/sabs/fcas/alsa/)

Australian Department of Veterans' Affairs (DVA) health claims database contains details of all prescription medicines, medical, allied health services and hospitalizations subsidized by DVA. In the dataset, medicines are coded according to the Anatomic, Therapeutic and Chemical Classification (ATC), and the Pharmaceutical Benefits Schedule (PBS) item codes. Hospitalizations are coded according to the International Classification of Diseases, version 10, Australian modification (ICD-10-AM). The DVA also maintains a client file, which contains information on gender, date of birth, date of death, and family status. The dataset was available from the period January 2000 to present. The treatment population was 330 000 veterans at the start of the data set.

Our stakeholder engagement

National Workshop on Management and Care of Older People living with multiple chronic health conditions

As part of this project, we conducted a national workshop focusing on the management and care of older people with multiple chronic health conditions, which was held in Adelaide on 11 February 2011. The purpose of this workshop was to gain further insight in to the major issues around caring for people with multiple chronic health conditions from multiple key stakeholder perspectives and to seek validation of themes identified from our consumer and health practitioner reference groups. More specifically the three main objectives of the workshop were to:

- Bring together key stakeholders involved in the management and care of older people with multiple chronic conditions
- Identify the key issues and challenges from all stakeholder perspectives about the management and care of older people with multiple chronic conditions
  - Identify areas of care that we currently do well
  - Identify areas where care breaks down
- Identify potential solutions and strategies for improving care for older people with multiple chronic conditions, that are practical and acceptable to all stakeholders

The workshop was a significant gathering of people with an interest in the management and care of older people with multiple chronic health conditions and a total of 61 participants attended the workshop from a range of key stakeholders, including consumers and consumer representatives, health care practitioners, residential aged care, health care policy and government agencies. A full report of the workshop can be requested from the project team.

3.1 Identification Where Care is Done Well

The workshop began with the identification of key areas within Australia's healthcare system where care is done well for patients.

This included:

- Certain organisations and agencies are handling education well (e.g. National Prescribing Service, Department of Veterans' Affairs (DVA))
- Quality of and access to medicines
- Well organised for acute care
- Identification and documentation of individual conditions
- Professional services at a high standard
- Increasing integration with primary health care

3.2 Identification of Where Care Breaks Down

The key areas where care breaks down for people living with multiple chronic health conditions were then identified, and were grouped under perspectives from key stakeholder groups.

Aged Care

- The aged care system is too complex for consumers and their carers to understand and navigate
- Difficulties around balancing consumer desires, risk taking and duty of care

Consumers

- The healthcare system is too complex for consumers and their carers to understand and navigate
- Disadvantaged groups (e.g. low socio-economic, rural, culturally and linguistically diverse, Indigenous) often lack knowledge and skills to access appropriate care
- Lack of knowledge and education about chronic conditions
- Transport for rural, remote and regional people where distance is an issue
- Medical specialists no bulk billing funding disincentive
- Information flow – specialist ⇔ GP ⇔ aged care facility; post discharge, medicines, follow-up care, information to GP, coordination back to local care team
- Lack of education – consumers and health professionals
- Lack of emotional support for patients

Government / Policy

- Absence of points of coordination for complex 'cases' within the right model
- Issues of quality of prescribing for new prescribers (ie nurse practitioners)
- Boundary / structural disconnects for one person with lots of needs; handover issues – information, medications, GP ⇔ hospital ⇔ residential aged care
- Guidelines are not based on comorbidities. Worse when performance is judged against guideline and payments; needs a more appropriate model of care
- Need for awareness raising within Government

Health Professionals

- Lack of over-arching responsibility
  - fragmentation of funding for small services and checklist driven services (each does own small bit)
  - who owns the patient?
- Lack of evidence about best care in older people with multiple diseases and medicines
- Communication between providers no integration of platforms; sending information; sharing information
- Competition, conflict and lack of coordination between multiple prescribers (nursing staff, GP, pharmacist, hospital, specialist, allied health)
- Mental Health Service doesn't deal with older people very well

3.3 Key Recommendations from Workshop

A significant part of the workshop was the development of potential solutions and strategies for improving care for older people with multiple chronic conditions. Key recommendations to improve care for older people with multiple chronic health conditions were developed based on the six building blocks from Australia's Strategy for Quality Use of Medicines[68] as a framework for potential solutions (Figure 3.1). Clear strategic directions were developed within each of the building blocks and endorsed by the participants as practical and acceptable to all stakeholders.

Figure 3.1 The six building blocks of Australia's strategy for quality use of medicines

1. Policy Development and Implementation

Recommendation One

Develop a specific policy framework for the management and care of older people with multiple chronic health conditions.

Recommendation Two

Fund a Committee of all stakeholders to drive the development and implementation of the policy framework into all relevant Government policies.

Recommendation Three

Establish a Department of Ageing.

2. Facilitation and Coordination

Recommendation Four

Develop and define a new model of care for people with multiple chronic health conditions that is patient centred and recognises the roles of all health professionals.

Recommendation Five

Fund GPs to develop and refine the delivery of the new model of care and the specialised roles involved.

3. Objective Information

Recommendation Six

Empowerment of consumers in the self-management of their medical conditions.

Recommendation Seven

Collection and analysis of data on patient management in General Practice, similar to the MATES Program.

Recommendation Eight

Education of (older) consumers and carers about the management of their illnesses and the medications that they are taking.

Recommendation Nine

Communication (in appropriate language), about the appropriate use of medicines by people with multiple chronic health conditions, through the use of multiple media.

Recommendation Ten

A coordinated national approach to the provision of information about the management of multiple chronic health conditions.

4. Education and Training

Recommendation Eleven

For consumers, increase health literacy around working well with health professionals, advanced directives and self-management

- Use of public health and health promotion strategies (e.g. National Prescribing Service)
- Increase in peer education programs (COTA)
- Increase in support to existing support groups
- Support Peak Bodies (Arthritis Foundation etc) and Non-Government Organisations (NGOs) to provide consumer education and resources
- Provide base level funding to fund infrastructure for sustainable functioning
- Funding for disseminating and monitoring compliance with Consumer Participation Framework

Recommendation Twelve

Increase health professionals' interprofessional competencies (teamwork, role respect and recognition, collaboration, respectful communication).

At the undergraduate level:

- Australian Health Ministers' Advisory Council (AHMAC) directs accrediting agencies to include inter-professional education as mandatory, within health professional's education
- Increase undergraduate inter-professional education experiences of working and learning together
- Increase the inclusion of authentic consumer input in health professional education
- Increase learning of health literacy and inclusive communication

At the post-graduate level:

- Increase continuing professional development education to influence inclusion of inter-professional education
- Increase the range of continuing professional development activities that embed inter-professional education

5. Services and Interventions

Recommendation Thirteen

- Following on from the definition of a new model of care for people living with multiple chronic health conditions, define funding models for allied health, pharmacy, nursing and community services, apply standards and principles and use e-health to integrate the information and management systems.

6. Strategic Research, Evaluation and Routine Data Collection

Recommendation Fourteen

Develop and fund an Ageing, Chronic Disease Research Study that includes research on current comorbidity issues and research on preventing progression to chronic states.

APPENDIX 3: TREATMENT CONFLICTS IN THE OLDER POPULATION WITH MULTIMORBIDITY

Of those with chronic heart failure, over 95% had a comorbid condition that caused a treatment conflict, with 55% having three or more, highlighting the complexity in caring for this population. Of those with heart failure, 24% will have chronic airways disease, 17% will have gout, 16% will have diabetes, 12% will have glaucoma[7] and perhaps as many as 50% will have osteoarthritis.[10] Comorbid osteoarthritis may complicate management of heart failure where a non-steroidal anti-inflammatory agent is indicated as the latter may exacerbate heart failure. Management of chronic airways disease with corticosteroids may also exacerbate heart failure. Similarly, management of gout with either a non-steroidal anti-inflammatory agent or corticosteroid may exacerbate heart failure, while the co-existence of diabetes prevents the use of a thiazolidinedione, which has been associated with heart failure. Topical beta-blockers for glaucoma may also present problems in those with heart failure.[7]

Similarly, more than 60% of those with diabetes will have a coexisting health problem that makes management difficult.[6] Of those with diabetes, 20% will have heart failure, 19% will have airways disease, 13% will have gout[6] and 51% will have osteoarthritis.[10] Management of osteoarthritis with a non-steroidal anti-inflammatory agent may precipitate renal failure or cause hypertension. Management of chronic airways disease with a corticosteroid may raise blood sugars and reduce time to diabetes complications. Our studies have demonstrated the harm associated with these treatment conflicts; treatment with an average dose of corticosteroids or greater, over 10 months or more (≥0.83 DDD /day) in a 12 month period from commencing diabetes-medications in those with diabetes and comorbid chronic obstructive pulmonary disorder (COPD), was associated with a 92% increased likelihood of hospitalisation for a diabetes-complication.[69] Management of gout with either a non-steroidal anti-inflammatory agent or corticosteroid may exacerbate diabetes, as would use of corticosteroids for any of the other inflammatory diseases such as rheumatoid arthritis.[6] Comorbid conditions not only pose treatment conflicts but can also impact on receiving appropriate therapeutic management. In our studies of older diabetic patients the presence of unrelated comorbid conditions (i.e. those conditions that do not share the same pathophysiology) was shown to slow therapeutic progression in diabetes, possibly delaying appropriate management.[70]

Multimorbidity has been shown to be associated with depression[71] and concurrent depression further complicates management, with more than 80% of those on antidepressants having a complicating comorbidity.[72] This is predominantly due to the high prevalence of comorbid cardiovascular disease, which requires management with anti-hypertensives, the use of which may increase the risk of falls, particularly when concurrent with antidepressant therapy. Management is also complicated by the high prevalence of comorbid mental health conditions including anxiety, dementia or psychosis, the treatment of which may exacerbate cognitive impairment particularly with concomitant antidepressant use in an elderly cohort.[72] The presence of depression in patients with comorbid chronic conditions is associated with poorer health outcomes, including increased mortality, hospitalisations and complications.[73,74] The presence of depression impacts on a patients' ability to manage other comorbid conditions present and poorer self-care behaviours, including compliance with medications.[75,76] As an example, patients with diabetes and depression are up to three times more likely to be non-adherent with anti-diabetic, lipid-lowering and cardiovascular medications, compared to those with diabetes alone.[75-77] In our study of older diabetic patients, use of an anti-depressant at the time of commencement of anti-diabetic medications was associated with a 42% increased likelihood of discontinuation of diabetes medications (SHR 1.42, 95% CI 1.37-1.47, $p<0.001$), by comparison to those who did not receive an anti-depressant. This study provided further evidence that depression may be contributing to non-compliance with medicines for diabetes and highlights the need to provide additional services to support appropriate medicine use in those initiating diabetes medicines with comorbid depression.[78]

Table 1. Common treatment conflicts in the older population

Risk Population	Prevalence	Treatment Conflict	Reason for Treatment Conflict
Diabetes			
Diabetes and Arthritis	20-50%	NSAIDs	Impair renal function, increase fluid retention and may exacerbate hypertension.[79]
Diabetes and COPD	20%	Corticosteroids	Can increase blood glucose potentially increasing risk of hyperglycaemia[80] but are part of treatment recommendations for chronic airways disease.[81]
		ß-blockers	Can increase blood glucose potentially increasing risk of hyperglycaemia[80] but are part of treatment recommendations for chronic airways disease.[81]
Diabetes and Gout	13%	NSAIDs Corticosteroids	Both NSAIDs and corticosteroids can increase blood glucose potentially increasing risk of hyperglycaemia[80] but are part of treatment recommendations for gout.
Diabetes and Inflammatory diseases (ie RA, psoriasis)	5-10%	Corticosteroids	Can increase blood glucose potentially increasing risk of hyperglycaemia.[80]
Diabetes and Heart Failure	20%	Thiazolidinediones	Increased fluid retention and expansion of plasma volume leading to peripheral and pulmonary oedema.[82]
		NSAIDs	Increased risk of fluid retention with both NSAIDs and thiazolidinediones in an already at risk population.
Heart Failure			
Heart Failure and COPD	24%	Corticosteroids	May worsen heart failure due to adverse effects of increased sodium, fluid retention and hypertension[83] but are part of treatment recommendations for COPD.[84]
Heart Failure and Arthritis	30-40%	NSAIDs	Impair renal function, increase fluid retention, may negate effects of diuretics and ACE inhibitors and may exacerbate hypertension and heart failure.
Heart Failure and Depression	20%	TCAs	TCAs may prolong QT interval, increase risk of arrhythmia, cause orthostatic hypotension and should be avoided in HF.[85,86]
Heart Failure and Gout	16%	NSAIDs Corticosteroids	NSAIDs and corticosteroids are recommended for the symptomatic treatment of gout but both are recommended to be avoided in HF (as detailed above).[85]
Heart Failure and Glaucoma	12%	Topical ß-blockers	Addition of a topical ß-blocker with a systemic ß-blocker should be avoided due to potential for increased risk of systemic adverse effects including hypotension and bradycardia.[85,87]

Risk Population	Prevalence	Treatment Conflict	Reason for Treatment Conflict
Depression			
Depression and CVD	40%	TCAs	TCAs can cause increased heart rate, orthostatic hypotension and conduction abnormalities and are considered relatively contraindicated in IHD.[86,88]
		Anti-hypertensives (↑falls risk)	Increased risk of orthostatic hypotension and falls with concomitant use of anti-hypertensive medicine particularly in older patients.[89]
Depression and Diabetes	11%	TCAs	TCAs can increase blood glucose potentially increasing risk of hyperglycaemia.[86,88]
Depression and Osteoporosis	12%	Anti-hypertensives (↑falls risk) SSRI	Increased risk of hypotension and falls, particularly with concurrent anti-depressant use, in an at-risk population for bone fracture.[89] SSRIs can reduce platelet serotonin, are associated with increased risk of upper gastro-intestinal bleeding that may be potentiated by concomitant use of NSAID or aspirin.[88-90]
Depression and Arthritis / Pain	20-25%	Opioids	Increased risk of serotonin toxicity with concomitant use of opioids, in particularly tramadol.[88,89,91]
		NSAIDs (interaction SSRI)	SSRIs can reduce platelet serotonin, are associated with increased risk of upper gastro-intestinal bleeding that may be potentiated by concomitant use of NSAID or aspirin.[88-90]
Depression and Anxiety / Sedation	37%	Benzodiazepines (↑falls risk)	Concomitant use of benzodiazepines may result in increased sedative effects leading to an increased risk of falls, particularly for older patients, risk increased with use of multiple benzodiazepines or long-acting.[89,92]
Cardiovascular Disease			
CVD and Arthritis	25-55%	NSAIDs	Impair renal function, increase fluid retention, may negate effects of diuretics and ACE inhibitors and may exacerbate hypertension and CVD.
CVD and Osteoporosis	10%	Anti-hypertensives (↑falls risk)	Increased risk of hypotension and falls, in an at-risk population for bone fracture.[89]
Chronic Obstructive Pulmonary Disease (COPD)			
COPD and Osteoporosis	10-15%	Corticosteroids	Corticosteroids are recommended for treatment of COPD but can cause osteoporosis.

*nb disease listed first is 'index' condition; prevalence presented is that of comorbid condition in those with the index disease
NSAIDs, non-steroidal anti-inflammatory drugs; COPD, chronic obstructive pulmonary disease; MI, myocardial infraction; SSRI, selective serotonin reuptake inhibitors; TCA, tricyclic anti-depressant.

Half of all patients with multiple chronic health conditions will have conditions that will result in a treatment conflict and make management difficult.

APPENDIX 4: SUMMARY OF STUDIES TO IMPROVE CARE IN PATIENT WITH MULTIMORIBIDITY

(adapted from Smith et al 2012)[40]

Study	Study participants	Duration / follow-up	Intervention elements	Outcomes	Results of Intervention
Predominantly organisational interventions					
Bognor 2008[45]	Aged >50, depression and hypertension (n=64)	Intervention 6 weeks, follow-up 2 weeks	Care manager, structured visits, telephone contact, and patient care plans	Depression scores, systolic blood pressure, drug adherence	Improved depression scores, systolic blood pressure, adherence to antidepressants and anti-hypertensives ($p \leq 0.006$)
Boult 2011[41]	Aged >65, multiple conditions, high service use (n=904)	Intervention 18 months, follow up at 6 & 18 months	Guided care nurses, enhanced multidisciplinary team, home assessments, monthly monitoring, patient care plans & self-management support	Health service use (hospital admissions, nursing facility use, physician visits)	No effect on health service utilisation
Hogg 2008[42]	Aged >50, ≥ 2 conditions, at risk of experiencing adverse outcome (n=241)	Intervention 15 months, follow-up completion intervention	Multidisciplinary team with structured home visit, drug review, and patient care plans	Primary outcome: chronic disease management score.	Improvement in chronic disease management score
Katon 2010[46]	Depression and diabetes or coronary heart disease, or both (n=214)	Intervention 12 months, follow-up at 12 months	TEAMcare nurses, structured visits, patient care plans, treatment targets, weekly team meetings, electronic registry to track patient progress, patient support for self-care	Depression scores, glycated haemoglobin, systolic blood pressure, low density lipoprotein. Medicine adjustments, quality of life, satisfaction with care	Improved depression scores glycated haemoglobin, systolic blood pressure, low density lipoprotein. More likely to have medication adjustments, improved quality of life and satisfaction with care
Krska 2001[43]	Aged >65, ≥ 2 conditions (n=332)	Intervention 3 months, follow-up 3 months	Structured visit, medication review, practice team	Pharmaceutical care issues	Improvement in number of medication issues ($p<0.001$)
Sommers 2000[44]	Aged >65, ≥ 2 conditions (n=543)	Intervention 2 years, follow-up 12 months	Multidisciplinary team including social worker, home assessment, patient care plans, training of care coordinators	Hospital admissions, physician visits, home care & nursing home visits. Patient social activity count, quality of life, depression scores, drug adherence	Reduced number of hospital re-admissions and physician visits. Increase in number of social activities

Study	Study participants	Duration / follow-up	Intervention elements	Outcomes	Results of Intervention
Predominantly patient oriented					
Eakin 2007[47]	≥ 2 conditions (n=175)	Intervention 16 weeks, follow-up 6 months	Structured visits, telephone contact. Self-management support, diet, exercise intervention by health educator	Dietary behaviour, support for healthy lifestyles, physical activity	Improved dietary behaviour, support for healthy lifestyle, improved physical activity (p>0.5)
Gitlin 2006[48]	Aged >70, multiple conditions, difficulties with activities of daily living (n=319)	12 month intervention, four year mortality follow-up	Occupational therapy, physiotherapy home based intervention, problem solving techniques	Activities of daily living, mobility, self-efficacy. Mortality at 4 years	Improved ability to complete activities of daily living, self-efficacy. Increased survival by 3.5 years (not significant)
Hochhalter 2010[50]	Aged >65, ≥ 2of seven chronic conditions (n=79)	Intervention 3 months, follow-up 3 months	Patient engagement intervention led by "coaches"	Patient activation measure, self-rated health	No significant difference
Lorig 1999[51]	Aged >40, ≥ 2 heart disease, lung disease, arthritis, or stroke (n=536)	Intervention 7 weeks, follow-up 6 months	Self-management, trained volunteer led weekly community meetings in peer support	Hospital admissions, physician visits	Reduced number of hospital admissions

(adapted from Smith et al 2012)[40]

APPENDIX 5: INDICATORS

Building Block 1: Policy Development and Implementation

National Action Plan	
Process Indicator	Is there a national action plan for multimorbidity?
Process Indicator	Are there action plans at state level for multimorbidity?
Process Indicator	Do all Australia's National Health Priority Area (NHPA) documents include multimorbidity?

Building Block 2: Facilitation & Coordination

National Service Improvement Framework	
Process Indicator	Is there a National Service Improvement Framework?
Process Indicator	Is there a mechanism to coordinate activity between existing groups?

Building Block 3: Objective Information

Treatment Guidelines	
Process Indicator	Do treatment guidelines for patients with multiple conditions exist?
Process Indicator	Do treatment guidelines for patients with multiple conditions quantify both the benefits and risks of treatment?
Impact Indicator	What proportion of national guidelines include comorbidity?
Decision aids	
Process Indicator	Are there decision aids for people with multiple chronic health conditions?
Consistent, objective information for people with multiple chronic health conditions	
Process Indicator	Is objective information for management strategies for multiple chronic health conditions available for consumers?

Building Block 4: Education and Training

Training of all health care providers to work within multi-disciplinary teams	
Process Indicator	Do health care professionals receive training to work within a multidisciplinary team?
Impact Indicator	What proportion of health care professionals have training working in a multidisciplinary team?
Process Indicator	Do under- and post- graduate health care students receive education to work within a multidisciplinary team?
Impact Indicator	What proportion of students receive education to work within a multidisciplinary team?
Training of all health care providers to incorporate patient preferences	
Process Indicator	Do health care providers have training to identify and incorporate patient preferences?
Process Indicator	Do under- and post- graduate health care students receive education to include patient preferences?
Impact Indicator	What proportion of under- and post- graduate health care students receive education on eliciting and managing patient preferences?
Education of consumers about potential treatment conflicts	
Process Indicator	Is education and counselling available for patients with multiple chronic health conditions regarding potential treatment conflicts and what to do in response to side effects?
Impact Indicator	What proportion of patients with multiple chronic health conditions are educated about potential treatment conflicts and what to do in response to side effects?
Education of consumers about talking to healthcare providers	
Process Indicator	Is education available for consumers on talking to their health care providers about the management of multiple chronic health conditions?

Building Block 5: Services & Interventions

Identified care coordinator	
Process Indicator	Is there an individual identified as the 'care coordinator' for a patient with multiple morbidities?
Patient advocate to be involved in the care planning and coordination	
Process Indicator	Is there capacity for a nominated 'patient advocate' to be involved in the care planning process and coordination?
Care planning to include multiple chronic health conditions	
Process Indicator	Does the care plan include the management of multiple chronic health conditions?
Impact Indicator	What proportion of care plans include comorbidity management?

Inclusions of patient preferences in treatment and care strategies	
Process Indicator	Are patient preferences documented and agreed treatments included in care plans?
Impact Indicator	What proportion of health care plans include documented patient preferences and agreed treatments?
Clinical handover processes to be included in all situations of care transfer	
Process Indicator	Is clinical handover available within the community for patients with multiple chronic health conditions?
Case conferencing in multi-disciplinary teams to include payment for all involved	
Process Indicator	Is there funded case-conferencing of multidisciplinary teams for patients with multiple chronic health conditions?
Multi-disciplinary, co-localised care setting to be accessible for older people with multiple conditions	
Process Indicator	Is multidisciplinary care co-localised and accessible for older people with multiple chronic health conditions?
Software to flag patients with multiple chronic health conditions and treatment conflicts	
Process Indicator	Does decision support software for health practitioners have the ability to identify patients with multiple chronic health conditions and their treatment conflicts?
Collaborative medicines reviews for patients with multiple chronic health conditions	
Process Indicator	Are multiple chronic health conditions a criteria for collaborative medicine reviews?
Impact Indicator	What proportion people of with multiple chronic health conditions receive a collaborative medicine review?
Peer support and self-management programs for multiple chronic health conditions	
Process Indicator	Are peer-support and self-management programs available for people with multiple chronic health conditions?
A single portal of information on all community and health services	
Process Indicator	Is there a comprehensive single portal of information regarding community services.

Building Block 6: Strategic research, evaluation & routine data collection

Monitoring a routine evaluation of indicators of care for people living with multiple chronic health conditions	
Process Indicator	Is there a system to routinely monitor and evaluate care of patients with multiple chronic health conditions?
Multimorbidity research	
Process Indicator	Is there a research initiative to support multimorbidity research in Australia?
Evaluation of models of care for patients with multiple chronic health conditions including GP super clinics, care plans, shared care, nurse practitioners	
Process Indicator	Are there established mechanisms to evaluate models of care for people with multiple chronic health conditions?

The complexity of multiple chronic conditions