



Australian
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APHCRI Visiting Fellowship

The implications of multimorbidity for health systems internationally

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Executive summary

1. The visiting fellowship involved a series of presentations, seminars and roundtable discussion involving over 300 participants, primarily focused on the epidemiology and implications of multimorbidity.
2. Multimorbidity matters because people with it have worse quality of life and functional status, and higher mortality. They consume a disproportionate share of healthcare resources and are the highest users of healthcare. They experience the most problems with poor integration and lack of co-ordination.
3. There is growing understanding of the epidemiology of multimorbidity. Using data for a representative one third of the Scottish population, we have shown that:
 - a. Multimorbidity increases rapidly with age, and is the norm in older people.
 - b. Although older people have a greater number of conditions, because of the shape of the population pyramid, there are as many people under-65 with multimorbidity as over-65.
 - c. Multimorbidity in middle age is a particular issue in more socioeconomically deprived populations, where multimorbidity happens 10 to 15 years earlier than in the most affluent.
 - d. The implications of multimorbidity depend on the particular pattern of conditions that an individual has, and the identification of common patterns can help set priorities. Mental health problems are commonly present in individuals with physical health problems, and rates increase progressively as the number of physical conditions increases. This matters because the gap between physical and mental health care is very wide in most health systems.
4. There are four broad types of response that health systems can make:
 - a. *Focus on safety-critical high-volume processes*, for example through the introduction of patient safety programmes addressing problems at hospital admission and discharge or high-risk processes in primary care such as anticoagulation management.
 - b. *Focus on specific patterns of multimorbidity* such as co-morbid physical disease and depression or managing cardiovascular risk in people with major mental health problems, or *on problems common to many people with multimorbidity* such as polypharmacy and better medicines management
 - c. *Focus on holistic management and improving care co-ordination* of people with multimorbidity
 - d. *Ensure that health systems retain strong generalism*, for example by designing payment systems to value the exercise of clinical judgement and care co-ordination as highly as technical procedures, or in ensuring that professional training is adequately tailored to the future needs of growing numbers of frail older people
5. Multimorbidity will get more common as the population ages, and as we get more successful at preventing people dying from acute conditions such as heart attacks and strokes and therefore surviving with chronic conditions. From that perspective, multimorbidity is the price of success, but health systems need to respond to the challenges that it poses.

Key activities

Activities included a series of presentations, seminars and roundtable discussions with over 300 attendees and participants, and research capacity building workshops and individual meetings with junior researchers involving 39 participants. Appendix one lists all activities in chronological order.

The main focus of presentations was multimorbidity and polypharmacy, discussing their epidemiology (patterns seen in primary care populations), their implications for health care organisation and training, and how health services might respond to the challenges that they pose. The audience for these presentations included academics, clinicians and policy advisers, and they took place at the Primary Health Care Research Conference in Sydney, the Australian Commission on Safety and Quality in Health Care, academic departments in 6 urban and rural locations, and in a public evening meeting which attracted press publicity including three interviews with local ABC radio stations in Adelaide, Perth and Mount Gambier. Multimorbidity and polypharmacy are further discussed in the next section.

PHC Research Conference Sydney 2013: RACGP workshop: Multimorbidity and general practice—issues and what needs to change



I additionally delivered seminars and roundtable discussions on other topics where I have expertise, including in:

- The implementation of a patient safety collaborative in NHS Scotland (PHS Research Conference), with to the Patient Safety Collaborative Handbook.
- The value of routine data for healthcare research, including the practicalities of ensuring good data governance, careful and transparent definition of conditions and treatments, and analytical considerations (at the University of Melbourne)
- The use of financial incentives to improve the quality of primary healthcare, drawing on the UK experience of implementing large-scale primary care pay-for-performance in the Quality and Outcomes Framework and my experience of being a member of the National Institute for Health and Care Excellence QOF Indicators Advisory

Committee (at the Centre for Research Excellence in the Finance and Economics of Primary Care, University of Technology Sydney).

Workshop on using routine data for healthcare research, University of Melbourne



Research capacity building activity involved the delivery of five seminars/workshops to 33 early career participants, and individual meetings with 6 junior researchers. The workshops discussed academic career pathways, and how to develop a successful career and avoid common pitfalls that can strand individuals at key bottlenecks, drawing on participants' own careers and CVs. The individual meetings additionally discussed each researchers' work and how they could develop it further to support their transition to being an independent researcher leading a programme of work.

Since returning to the UK, I have provided further comment on the ten key principles underlying the RACGP Position Statement on Multimorbidity and on the draft Patient Safety Collaborative Handbook before its handover to the Australian Primary Care Collaborative.

Background

This report details the key activities carried out during the visiting fellowship, which focused on multimorbidity and its implications, drawing on both the wider literature and recent Scottish research examining:

- The epidemiology of multimorbidity;^{1,2}
- The difficulties experienced by patients living with multimorbidity and the professionals caring for them;³⁻⁵
- The impact of multimorbidity on health service use;⁶
- The implications for professional education and training, for health services organisation and for research;^{1,7-9}
- Ways in which health services might respond, for example in managing mixed physical and mental health co-morbidity⁹ and in redesigning guidelines to better account for multimorbidity.¹⁰

There is increasing recognition of the importance of multimorbidity, partly driven by the rapid ageing of populations across the developed (and increasingly the developing) world.^{1,11,12} Ageing populations and multimorbidity pose significant challenges for all health services, not least because virtually all research, professional training, and health service organisation is predominately single disease focused, which is ill suited to caring for people with multiple conditions who are the most frequent users of health services. However, until relatively recently, most research in this area took a narrow 'co-morbidity' perspective, examining the implications of a small number of co-existing conditions for the care of particular diseases. Although a valuable perspective, such an approach does not adequately address the extent or implications of multimorbidity.

WHAT IS MULTIMORBIDITY?

Valderas et al provide the clearest definition of co-morbidity and multimorbidity.¹³ Both typically mean the co-existence of two or more conditions in one individual, but co-morbidity perspectives typically start from a primary interest in one index condition, with the impact of other co-existent conditions then being considered. Co-morbidity is therefore more consistent with a specialist, disease orientated view of the world. Multimorbidity perspectives do not pre-specify a single condition as being of primary interest, since the dominant problem that a person has is likely to depend on the relative severity of each, and to change over time. Multimorbidity is therefore more consistent with a generalist, person orientated view of the world. Valderas et al also propose that as well as conditions, it will often be important to consider an individual's broader physical and mental function, and their family and social context.¹³

There is now a growing literature examining multimorbidity and its implications which the fellowship presentations drew on,^{11,13-25} but I particularly drew on recent research carried out in Scotland as part of the Scottish School of Primary Care Multimorbidity Research Programme.^{1-10,26}

WHY DOES MULTIMORBIDITY MATTER?

Multimorbidity matters because it is associated with higher mortality, worse functional status and quality of life, and high and expensive health services use.

Mortality

Much co-morbidity research has been concerned with examining if mortality from some index condition is increased in the presence of other conditions. Multimorbidity is associated with higher mortality.²⁷⁻³⁰ As an example, mortality in women with early breast cancer is significantly determined by co-morbid conditions,²⁸ and the strong association with mortality is an important rationale for the widespread use of the Charlson Index for case-mix

adjustment and outcome prediction.³¹ The Charlson index is multimorbidity count of 19 conditions, which has been weighted to better predict mortality and health service resource use. In the original validation cohort, mortality was 8% for those with a Charlson score of 0 (ie none of the specified 19 morbidities), 25% with a score of 1, 48% with a score of 2 and 59% for those scoring ≥ 3 .^{31, 32}

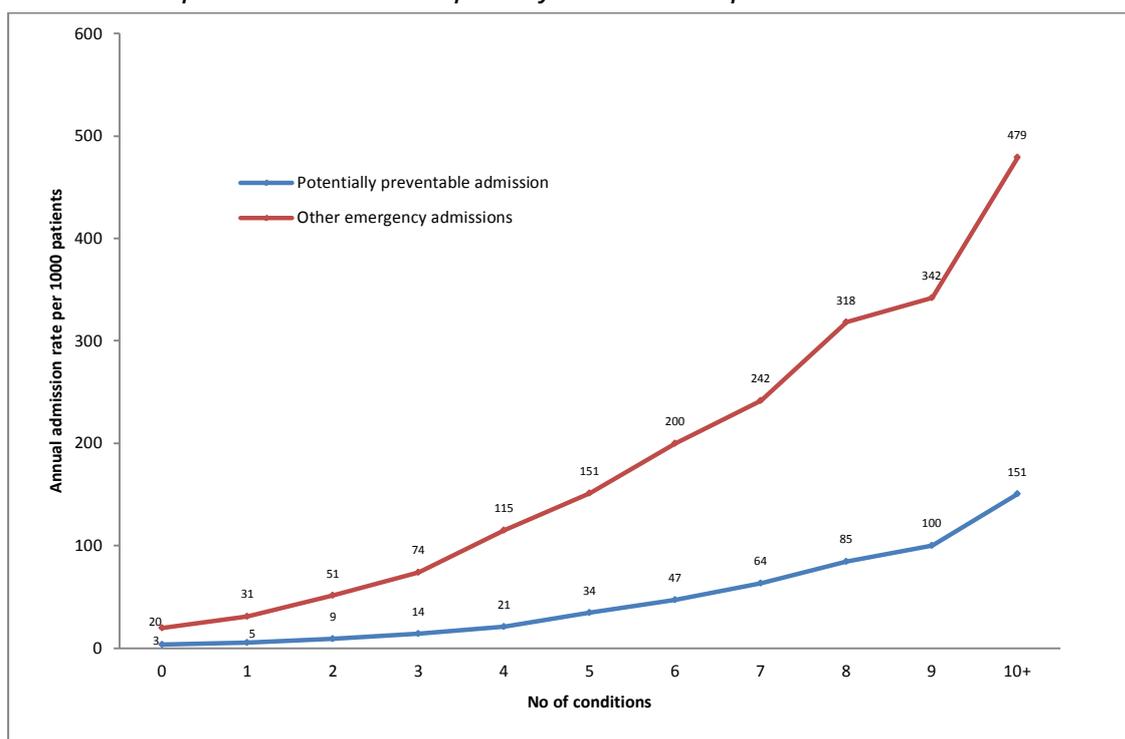
Functional status and quality of life

The more conditions that someone has and the more severe those conditions are, the worse their functional status on average (for example, their ability to carry out activities of daily living).³³⁻³⁹ There are similar associations between multimorbidity and reduced quality of life, which are consistently found despite differences in how both multimorbidity and quality of life were defined and measured in different studies.¹⁸ There is an additional interaction between multimorbidity and socioeconomic status, with multimorbidity having greater negative impact on quality of life in people living in more deprived areas.⁴

Health service use and healthcare quality and safety

Unsurprisingly, people with multimorbidity make greater use of health services.^{24, 27, 32, 40} About a quarter of people in the US are estimated to have multimorbidity, but they are responsible for approximately two thirds of health care spending. .Clearly need is greater in people with multimorbidity,²⁴ but at least some of this spending is because of poor co-ordination^{41, 42} and the impact of adverse drug events arising from complex prescribing regimes and other at least partially avoidable complications of treatment.^{43, 44} Additionally, health services resource use is concentrated in the final two years of life, which in some people reflects a failure to consider whether palliative care approaches are more appropriate than aggressive 'curative' treatment.^{40, 45} As an example, figure 1 shows admission rates with potentially preventable admissions and all other emergency admissions in Scotland by number of conditions, showing a 50 fold increase in potentially preventable admissions as the number of conditions that an individual has increases, which mirrors similar findings in the USA.⁴⁰

Figure 1: Potentially preventable* and other emergency admission rates in 226,593 patients in 40 Scottish practices with linked primary care and hospital admissions data⁶



* 'Potentially preventable' admissions as defined by NHS Scotland (similar set of ICD codes as used to define 'ambulatory care sensitive admissions' in other studies).⁴⁰

Despite this, large studies have usually shown that quality of care is better in people with multimorbidity compared to those with single conditions, which is partly explained by more frequent use of healthcare.^{46, 47} Other studies have found lower receipt of guideline recommended cancer care in people with cancer and significant co-morbidity,²⁷ and of worse blood pressure control or depression management in the presence of co-morbid conditions that create competing demands that may restrict the attention given to all the problems an individual has.^{48 49} However, these studies typically measure particular care processes and intermediate outcomes which largely ignore care integration, co-ordination and continuity, all of which are highly valued by people with multimorbidity.⁵⁰ Given the paucity of good standardized measures of these aspects of care, patient surveys are a useful method for understanding how well care is integrated and co-ordinated. The Commonwealth Fund surveys are a rare source of comparative international data, and show that co-ordination and safety problems are more common in people with multiple conditions, being experienced by approximately one in three people with multimorbidity, with safety problems increasing dramatically with the numbers of doctors seen (being experienced by 22% of Australian adults with chronic conditions seeing 1 or 2 doctors in the last 2 years compared to 41% seeing 4 or more doctors).⁵¹

Summary

Multimorbidity matters because people with it have higher mortality, worse functional status and quality of life, and are the largest users of healthcare and the highest consumers of healthcare resources. Health services therefore need to be designed to better serve the needs of people with multimorbidity.¹²

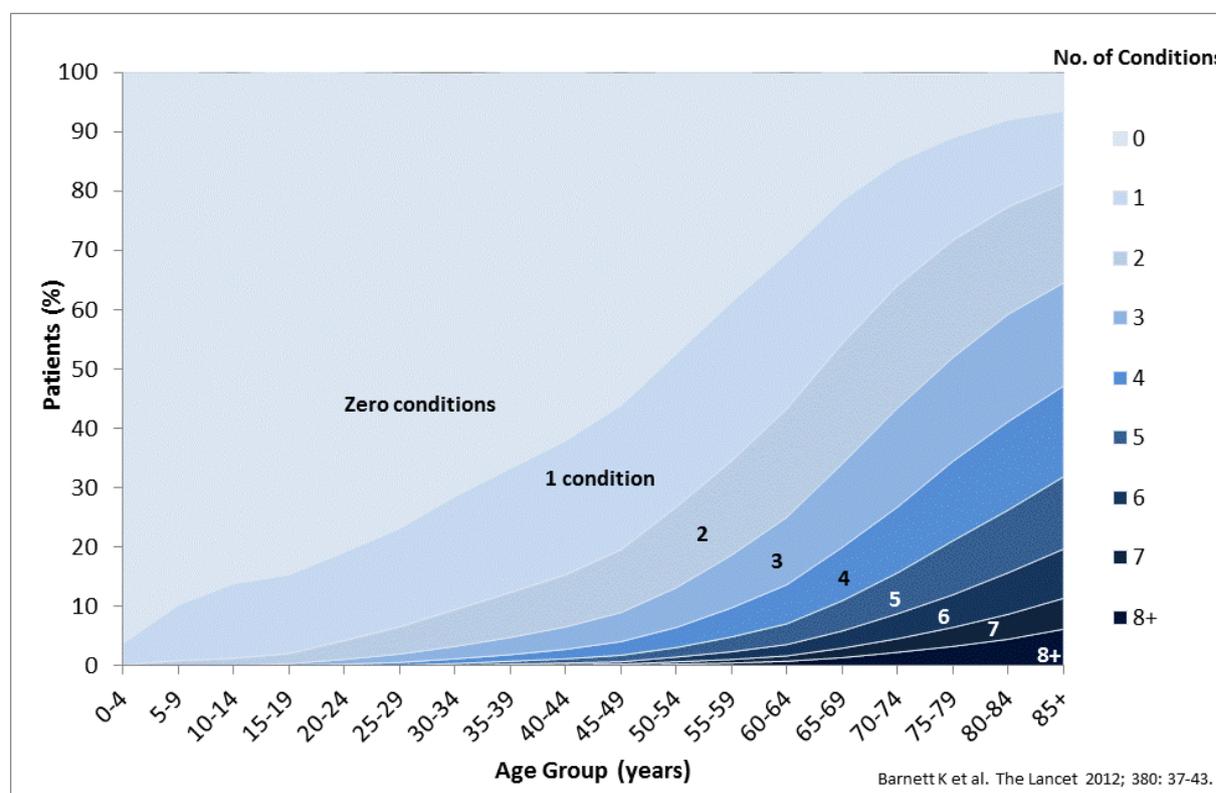
THE EPIDEMIOLOGY OF MULTIMORBIDITY IN SCOTLAND

The presence of disease, and therefore of multimorbidity, can be assessed using patient self-report of various kinds, detailed face to face assessment of patients, and from examination of routinely recorded clinical data. Each method has pros and cons, but using routinely recorded clinical data has the advantage of being able to be applied at very large scale for representative groups of patients. We therefore chose to use routine GP electronic data to measure the presence of 40 chronic conditions in 1.75 million people in Scotland. Choices that have to be made in such studies include the number and nature of the conditions counted, with many previous studies examining relatively few conditions and focusing on chronic physical conditions which reduce life expectancy.²⁵ A weakness of such studies is that some of the most quality of life reducing conditions are excluded (such as depression, dementia and musculoskeletal conditions).^{4, 14, 15, 25} The 40 included conditions therefore covered both physical and mental health, and conditions with implications for length of life, quality of life or both.

Multimorbidity increases with age

The majority of people with any chronic condition in Scotland have multiple chronic conditions, emphasising that multimorbidity is more the norm than an exceptional situation. Figure 2 shows that multimorbidity in Scotland rapidly increases with age, with a majority of over 65s having two or more conditions, and a majority of over 75s having three or more. However, although older people have more conditions, because there are relatively fewer older people, there are as many people aged under 65 with multimorbidity as over 65, a finding echoed in Australian data.⁵²

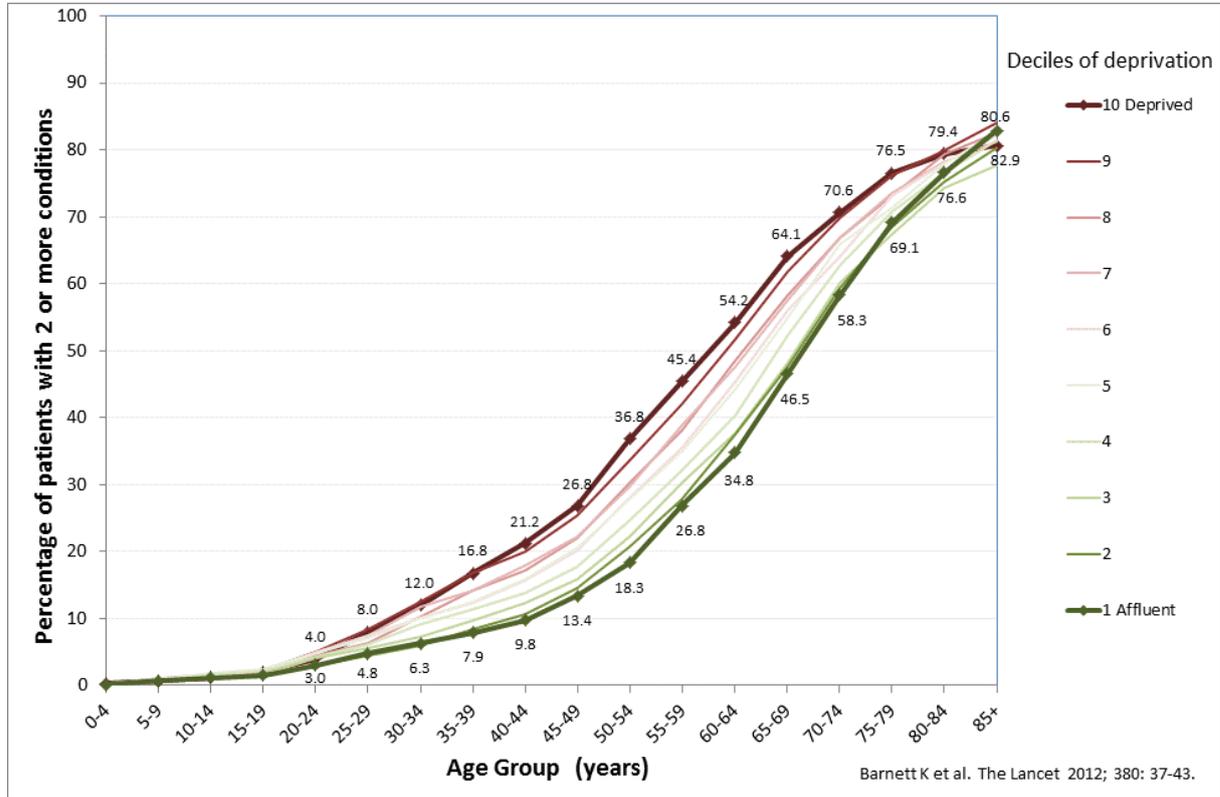
Figure 2: Multimorbidity and age¹



Multimorbidity is strongly associated with socioeconomic deprivation

Age is the characteristic most associated with the prevalence of multimorbidity, but figure 3 shows that prevalence is strongly socially patterned. People living the most deprived 10% of areas of Scotland have approximately double the rate of multimorbidity in middle age than that of people living in the most affluent 10% of areas. Put another way, in middle age the most deprived develop multimorbidity 10-15 years before their more affluent peers, with the gap opening in early adulthood.

Figure 3: Multimorbidity and socioeconomic deprivation¹

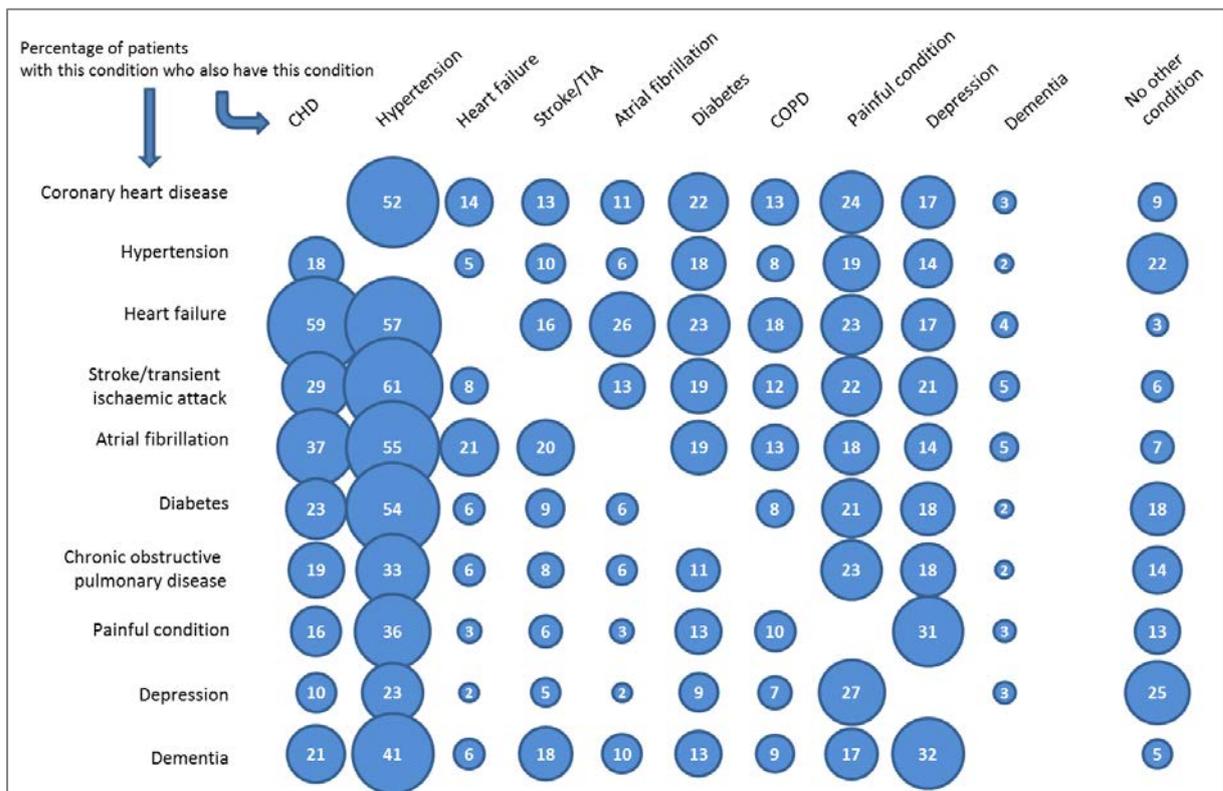


Patterning of common conditions

For an individual, the implications of having multimorbidity depend on what combination of conditions they have. Put crudely, the implications for an individual with mild eczema and hay fever which are entirely self-managed are different than for someone with depression and severe heart failure. For selected common chronic diseases, figure five shows the frequency of co-morbidity with the remaining 39 conditions included in the analysis. Several features are noteworthy.

- > No more than 25% of people with any of the listed conditions *only* have that condition.
- > Some conditions are relatively rarely co-morbid with others. For example, dementia is relatively rarely a co-morbidity with any of the listed conditions, although people with dementia very often have multiple other conditions that will need managing. In contrast, depression and somatic pain are very commonly co-morbid with almost all of the listed conditions, indicating that all specialists need to be aware of them and their potential negative impact on the outcomes and management of whichever disease they happen to be focused on.
- > Some conditions which are commonly co-morbid are closely related to each other. Piette and Kerr consider such conditions *concordant* in that much of their management is the same or similar.⁵³ From this perspective, clustering of coronary heart disease, hypertension, and diabetes presents relatively few issues since the management of future vascular risk is central to all. Other combinations such as heart failure with chronic obstructive pulmonary disease (COPD) or depression are *discordant* in that management is unrelated with risks of contradiction and high treatment burden.^{5, 54}

Figure 5: Frequency of co-morbidity of selected common physical and mental health conditions¹



- > Physical and mental health conditions are typically the most discordant, since physical and mental health care are the least integrated parts of most healthcare

systems. There is a linear relationship between the number of physical conditions a person has and the presence of any mental health condition, rising from 7.0% of those with no physical conditions to 38.9% of those with five or more physical conditions, with a strong social gradient where those living in more deprived areas had higher prevalence of any mental health conditions at all levels of physical morbidity.¹ The same relationship between the number of physical conditions and the presence of depression has also been shown in Australian data.⁵⁵

HOW CAN HEALTH SERVICES RESPOND?

Multimorbidity is complex, and there is therefore no simple response to it. However, there are four broad types of response that will plausibly improve care for people with multimorbidity, who are the highest users of healthcare.

1. Focus on safety-critical high-volume processes
2. Focus on specific problems that are common and important to people with multimorbidity
3. Focus on holistic management and care co-ordination
4. Ensure that health systems retain strong generalism

It is beyond the scope of this report to systematically review these, since each is itself highly complex, but each is briefly discussed below.

Focus on safety-critical high-volume processes

A feature of work to improve patient safety has been to focus on high-volume processes which large numbers of patients use every day, and where lack of reliability leads to harm. Examples of such processes include those related to hospital admission and discharge such as medicines reconciliation, or the way in which general practices manage anticoagulation monitoring or the safe handling of test results and hospital letters. Since people with multimorbidity are the highest users of healthcare, they are the most likely to be harmed if these processes are unreliable, and will gain the most benefit from them being improved.⁵⁶⁻⁵⁸ In Scotland, the Scottish Patient Safety Programme has been a national effort to improve patient safety in acute hospitals which has largely focused on high-volume processes, and it has been recently extended to primary care.⁵⁹⁻⁶¹ There is similar activity in Australia, including the work of the Australian Commission on Safety and Quality in Health Care, and the planned introduction of a Patient Safety Collaborative in primary care.

Focus on specific common and important problems

One reason for better understanding the epidemiology of multimorbidity is to identify common patterns of co-morbidity with important implications. A clear example of this is that depression is a very frequent co-morbidity of physical health problems, gets more common the more physical conditions people have, and is associated with worse outcomes of both the physical conditions and the depression.^{1, 55, 62} Recognition of this has led to specific studies of collaborative care for co-morbid depression and diabetes or coronary heart disease, and the creation of guidelines for the management of depression in people with physical health disease.⁶³⁻⁶⁵ Priorities should of course be set according to different country's circumstances, but other important patterns include the very high excess of cardiovascular death in people with major mental health problems,^{2, 9} and the high prevalence of often poorly treated chronic pain in people with most chronic diseases.

As well as approaches that focus on particular common combinations of conditions, it is also important to recognise that issues like polypharmacy affect many people with multimorbidity, partly driven by the increasing influence of clinical guidelines that recommend drugs for each condition without explicitly considering multimorbidity.^{5, 10} Polypharmacy is not wrong in itself, but is often problematic because of high treatment burden, poor adherence, unrecognised drug interactions and adverse drug effects.^{10, 54, 66-68} As the population ages

and as multimorbidity increases, then health systems need better ways of ensuring that individuals with complex problems receive treatments which appropriately balance benefit and harm. Although their effectiveness needs examining in research, approaches to improving guidelines to better account for multimorbidity, and the incentivising and structuring generalist review of complex medication regimens to improve safety and quality are likely to be useful.^{10, 69, 70}

Focus on holistic management and care co-ordination

Recognising that people with multimorbidity are the most likely to experience problems with care co-ordination and the management of boundaries and gaps in healthcare, there have been multiple interventions tested in research studies and partly implemented to improve integration. These include the use of comprehensive geriatric assessment and hospital discharge planning,⁷¹ and case or care management in people with particular high needs or high risk of hospital admission.⁷²⁻⁷⁷ There is some evidence for the effectiveness of such approaches, although an interesting feature of most of them is that they are often not that well integrated with existing primary medical care, which potentially creates a new and potentially problematic boundary for patients and professionals to negotiate.

Ensure that health systems retain strong generalism

Increasing specialisation and sub-specialisation has been a feature of most developed world healthcare systems over the last 50 years. There are many benefits to specialisation, especially in terms of delivering technical procedures where specific skills are required for safe delivery of better outcomes. However, for the growing numbers of people with multimorbidity, then access to specialists has to be balanced by access to well-trained generalists who take an overview of the individual patient rather than focus on a particular condition they happen to have, and who has clear responsibility for co-ordination and integration of care.^{78, 79} Although there are many clinical disciplines with valuable skills and knowledge who can contribute to the care of people with multimorbidity, most healthcare systems are currently designed so that a physician is implicitly or explicitly responsible for overall care. At present, an individual with multimorbidity seeing several specialists and a generalist physician is likely to suffer from what Balint described as the “collusion of anonymity” in the 1950s,⁸⁰ where generalists cede authority to specialists, with the consequence that no-one takes responsibility for the whole individual.

In the UK and Australia, the two largest groups of generalist physicians are general practitioners and geriatricians, but both are historically relatively marginalised and undervalued. In the longer term, ensuring that both remain strong should be a priority for policy, for example, in terms of designing payment systems to value the exercise of clinical judgement and care co-ordination as highly as technical procedures, or in ensuring that GP training adequately reflects their necessary role in providing generalist medical care to growing numbers of frail older people.¹ It is also important to recognise that there are large numbers of people with multimorbidity who are aged less than 65 and for whom the GP is the only medical generalist, and that this is particularly true in more socioeconomically deprived or marginalised populations.

CONCLUSION

Multimorbidity is common rather than exceptional, and is the norm for older people with chronic disease. Multimorbidity is associated with a wide range of adverse outcomes, and people with it are both the highest users of healthcare and those most likely to experience poor co-ordination and harm from healthcare. Multimorbidity is very complex, but there are a number of ways in which health systems can respond to improve care for people with multimorbidity.

Appendix 1: chronological details of key activities

Wednesday 10th July - Sydney

Presentation at Australian Commission on Safety and Quality in Health Care. *Multimorbidity and polypharmacy: emerging challenges in primary care.*

Research Policy Conversation

Thursday 11th July - Sydney

Presentation at PHC Research Conference: CRE in PHC Microsystems Symposium - Safety and quality of care in general practice: patient and consumers views. *Improving patient safety in primary care through Collaboratives in Scotland.*

APHCRI Research Capacity Building Workshop focusing on building a successful research career. Early career researchers (12 participants).

Friday 12th July - Sydney

Contribution to presentation and meeting at Australian Commission on Safety and Quality in Health Care: Development of a Patient Safety Collaborative for APCC.

APHCRI Research Capacity Building Workshop focusing on building a successful research career. Mid-career researchers (9 participants).

Presentation at PHC Research Conference: Workshop: Managing patients with multimorbidity. *The rising tide of multimorbidity and polypharmacy.*

Presentation and roundtable discussion at the Centre for Research Excellence in the Finance and Economics of Primary Care, University of Technology, Sydney. *The role of financial and other incentives in improving the quality of UK primary health care.*

Monday 15th July - Melbourne

University of Melbourne capacity building workshop with research higher degree students and junior researchers focusing on building a successful research career (8 participants).

Contributed to Mental Health Program Meeting

Presentation to academic audience. *Use of routinely collected clinical data for research in general practice and primary care – the Scottish Experience*

Round-table discussion with key stakeholders on use of routinely collected health information for research.

Tuesday 16th July - Warrnambool

Meeting with CRE Group on patient safety collaborative, including Dr Dale Ford from APCC, to discuss draft Patient Safety Collaborative Handbook.

Capacity building discussion with three junior researchers focused on developing a successful research career and developing a research programme (3 participants)

Presentation to academic and clinical audience. *Multimorbidity and polypharmacy: emerging challenges in primary care.*

Wednesday 17th July – Mount Gambier

Presentation to academic and clinical audience. *Responding to the rising tide of multimorbidity and polypharmacy.*

Thursday 18th July - Adelaide

Meeting with Professor Paul Worley, Dean of Medicine, Flinders University, Adelaide.

Grand Round, Flinders Medical Centre. *Responding to the rising tide of multimorbidity and polypharmacy: a suggested clinical approach to address the issues and burden of disease.*

Discussion and suggestions for change in the RACGP Position Statement on multimorbidity with Associate Professor John Litt (Discipline of General Practice, Flinders University) and Dr Evan Ackerman (RACGP).

Evening open public meeting to clinical, academic, policy and public audience. *Allies in research, policy and practice: what can we do about multimorbidity?*

Friday 19th July - Adelaide

Presentation to academic audience, School of Population Health, University of Adelaide. *Multimorbidity and polypharmacy: emerging challenges in primary care.*

Capacity building meeting with junior researchers to discuss their research and future plans (5 participants)

Monday 22nd July – Alice Springs

Orientation visit to Remote Primary Health Care and Aboriginal Health Services

Tuesday 23rd July – Alice Springs

Capacity building discussion with three junior researchers focused on developing a successful research career and developing a research programme (3 participants)

Seminar for Centre for Research Excellence in Rural and Remote Primary Health Care. *Responding to the rising tide of multimorbidity and polypharmacy: a suggested clinical approach to address the issues and burden of disease.*

Other activity

I had informal discussion with a range of academics, clinicians and policy makers including Mark Booth (First Assistant Secretary Primary and Ambulatory Care Division Department of Health and Ageing) and Chris Carlile (Primary and Ambulatory Care Division Policy Performance and Quality Branch), and was interviewed by three local ABC radio stations (Adelaide, Perth and Mount Gambier).

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