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Hospitals and Multi-morbid Chronic Conditions

Improving the response of
hospitals to patients with
multi-morbid chronic conditions

Paul Dugdale

Review of the response of
hospitals to the increase in
multi-morbid chronic illness

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White Paper



Contents

Introduction	4
Executive summary	5
Improving the response of hospitals to patients with multi-morbid chronic conditions Paul Dugdale, for the International Hospital Federation	7
1. Current problems	7
2. The policy context	7
3. Toward better management of chronic conditions	8
4. Organisational developments toward patient centred care	9
5. Knowledge developments in multi-morbidity	10
6. Financing developments that encourage continuity of care	11
7. Causes for optimism	11
8. Future directions	12
9. References	13
Review of the response of hospitals to the increase in multi-morbid chronic illness Matthew Kelly and Clare King, for the International Hospital Federation	15
1. Introduction	15
2. Increasing global prevalence of multi-morbid chronic illness and the financial impacts	15
3. Global health system structure and impact response to multi-morbid chronic illness	16
4. The role and response of hospitals to multi-morbid chronic illness	17
5. Review of patient centered models for responding to multi-morbid Chronic illness	18



6. Patient-centered care: the importance of empowerment, self management and information technology	20
7. Implementing clinical pathways or care plans in response to multi-morbid chronic illness	21
8. Obstacles and challenges for hospitals in changing to patient-centered systems	21
9. Conclusions	22
10. References	23



Introduction

Recently, a lot of attention has been given to Non Communicable Diseases, both by the United Nations General Assembly resolution in September 2011 and the World Health Assembly resolution adopted in 2013. While this is laudable, the International Hospital Federation believes that this attention is partly obscuring the major challenge our communities are facing for which a call for action should be made: to mobilize all stakeholders in reshaping health care to serve population needs through people-centered care.

There is no doubt that world population morbidity is evolving from communicable toward non-communicable diseases, that certain risk factors explain a large part of the emerging burden of disease, and that urgent action should be taken to ameliorate these risk factors. However, there is a more immediate concern that should be given similar attention: we need to take better care of all those who now have chronic conditions. The number of these people will grow at a rapid pace in the medium term regardless of the effectiveness of prevention and health promotion programs.

Today the debate is not whether the priority is to respond to infectious disease or non-communicable diseases, but on the need to shift the priority in our health system from a focus on responding to acute conditions toward a focus on improving responses to chronic conditions. For acute conditions, adequate interventions restore health, hopefully back to the patient's full potential. For chronic conditions, people's health will often be affected until the end of their life. The way care is organized will dramatically change the burden of disease, and the cost of healthcare for the population. This is the major challenge for all countries especially when moving to universal health coverage in a context of limitations on public expenditure, economic and financial instability, and great uncertainty about the future.

The key issue is not about responding to a different set of health priorities but the need for a paradigm shift. The emphasis on NCDs, especially the focus on proven interventions that have a high impact, is hiding the major challenge which is in fact a full redesign of our healthcare system. The new paradigm must include new modalities of intervention, dramatic changes in the education of health professionals, changes in the roles and responsibilities of most health professionals and the emergence of new occupational groups.

These are exactly the changes needed when the World Health Organization advocates for people-centered care, and for continuity of care to cope with the rising tide of chronic and multi-chronic conditions. But these changes are not just technical adjustments to the existing paradigm of medicine:

they will require a full reengineering of healthcare and the service delivery system.

This paper is a contribution to push forward this debate. The International Hospital Federation was happy to host Associate Professor Paul Dugdale who has accepted the challenge of summarizing some of the key issues that should be given more attention. We are grateful for the work he has done and hope that it will be echoed by an acceleration of the paradigm change of healthcare.

The IHF as a knowledge broker for healthcare decision makers will continue to support and disseminate any innovations responding to the challenge of multi-chronic conditions, work in collaboration with patient organizations, and support an expansion of the role of hospitals in promoting healthy behavior.

E de Roodenbeke
CEO of the International Hospital Federation



Improving the response of hospitals to patients with multi-morbid chronic conditions



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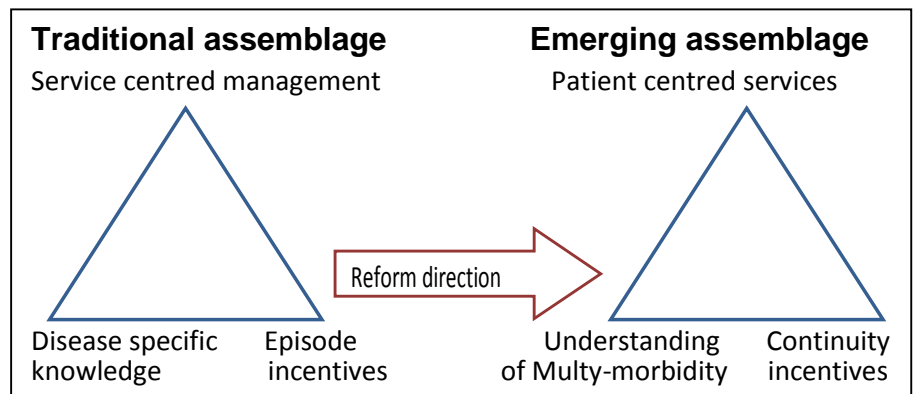
Executive summary

People are living to an older age, but partly because of this they are experiencing more ill health. The growing burden of disease is a major force on the evolution of health systems. This is particularly so when we examine the care of the growing numbers of people with multiple chronic diseases and increasing frailty. Whatever the health system, there are frequent complaints that coordination between hospitals, primary medical care and community services is inadequate.

The UN has adopted a Political Declaration on the Prevention and Control of Non-Communicable Diseases. WHO is likely to embed non-communicable diseases into its post 2015 development agenda, not least because of the way the rising burden of non-communicable diseases can lead to a downward spiral of lower economic growth and deepening inequality. Given the increasing burden of non-communicable disease including multi-morbidity, and the sub-optimum state of health care systems and health care delivery to deal with this, there is widespread potential for health gain through improving the way hospitals and referral based specialties provide services to people with multi-morbidity. In particular, there are important gains to be had through improving the linkages between hospital and referral based care on the one hand, and primary and community based care on the other.

The IHF is attempting to bring back into focus the work done in the Health for All era on the primary health care role of hospitals. Hospitals and their associated health care services will need to maximize their contribution to population health gain for patients with multiple chronic conditions, not just curate their acute support during inpatient episodes. Governments need to lead this reorientation but cannot improve health systems on their own. The importance of mixed public/private health system development is now well recognized, as is the importance of effective regulation by government to optimize health sector contribution to health improvement.

Systems of health services can be understood as an assemblage of organizational forms, particular knowledges and financing arrangements, as well as the relationships between these three things.



The traditional assemblage has much to offer the management of people with multi-morbid chronic conditions. However, it is widely recognized that it has unintended consequences and faces limitations in supporting this work. In parallel with the persistence of the traditional assemblage, there is an emerging assemblage with quite different characteristics, which has significant potential to reorient hospital systems toward holistic care for people with multi-morbidity.

Concerning organizational developments, hospitals are extremely diverse and it is difficult to generalize. Hospital based healthcare organizations now frequently span networks of a teaching hospital, related district hospitals and non-admitting community health services. In some cases, the organizational span includes medical and other health profession training programs and health insurance. This expanded footprint gives such organizations great scope to support primary health care services, and support health promotion efforts in their community.

The most important reorganization of care currently underway is toward patient centred care. This is particularly important for patients with chronic conditions. For patients with multi-morbidity, living with chronic conditions is their life. They



cannot put it on hold. There is often a considerable time burden of the care arranged for them. Hospitals, like other providers involved in coordinating care, need to reorient the goal of their logistical efforts to make care efficient and coordinated from the patient's point of view. Facilitating this is one of the more complex practical challenges facing hospital management at the current time. After a slow start, contemporary developments in the deployment of information technology for patient centred clinical care gives cause for optimism.

Concerning scientific developments, the starting point must be that patients with multi-morbidity frequently move around between service delivery settings. This is one of the key features that underpins the design of the Wagner chronic care model, which has inspired much reform and research, although so far only a small number of randomized controlled intervention studies have been conducted. Many of the developments in optimising care for multi-morbidity are soft technologies – better ways of doing things, of cooperating, new systems of care, improvements in communication. These developments present a series of challenges to researchers. To mention just two: such research usually commences in vivo, in actual service delivery environments which can slow the development of novel concepts; and like all research in human social settings always requires negotiation between the researchers and the researched.

Concerning health system financing, universal health coverage for comprehensive care has strong potential to appropriately fund care for people with multiple chronic conditions. A government supported health coverage system is important to enable healthcare to be accessible when needed for older people and those with chronic conditions, who are too advanced in age to work or their medical condition does not allow them to be gainfully employed. We need to remember too that health financing is closely related to social support and social welfare financing.

However, the design of payment systems for chronic disease management presents a dilemma. Patients with multiple chronic conditions that have access to hospital care tend to have high rates of admission and frequent involvement of referral based specialist services. Fee for service financing drives access and throughput for both primary care and hospital services, but can provide a powerful incentive to over-service and skew the distribution of health providers toward wealthy communities. Capitation based payments theoretically provide the flexibility to optimize the distribution and arrangement of services, but can undermine access as they provide an incentive to do less. It is likely that payment solutions will need to be specific to the historical and economic realities of each system that they are introduced in, and it is perhaps unrealistic to expect that a front running consensus model that works across a broad range of environments will emerge in the medium term.

More broadly, there is cause for optimism. Hospitals are keenly aware of the need to respond to the burden of chronic disease

in ways that provide some continuity of care. For example, it is now common that they offer specialist rehabilitation programs for patients following myocardial infarction, as well as to patients with CHF and COPD. Efforts continue to improve discharge correspondence and transfer of care arrangements, with information technology now facilitating this. Regional networks drawing hospitals and primary care providers closer have been developing in many parts of the world. Scaling up implementation across a whole health system, or across many health services, is not in any sense straightforward, but is a task now being tackled in many countries.

New organizational forms that facilitate continuity of care, training of health professionals to be comfortable in primary and tertiary care environments, and detailed research of what works for patients all have their part to play. As we strive to reform our organizations, our scientific endeavours, and how we fund health care, we must be engaged with our patients and our communities. Being patient centred means being patient driven in our reform thinking, being committed to a dialogue with all the parts of our community that we provide health care for. At its heart, the health system is nothing more nor less than the way we look after each other as a whole community.



1. Current problems

The landmark publication on the Global Burden of Disease 2010 (Murray et al 2012; IHME 2012) underlined the increase that the world is seeing in the burden of non-communicable diseases. Most of the world's population is living longer and dying at lower rates with the leading causes of death shifting to non-communicable diseases. Worldwide, the number of people dying from non-communicable diseases grew 30% in the 20 years to 2010.

People are living to an older age, but partly because of this they are experiencing more ill health, reflected in an increase in disability in middle- and high-income countries due to diabetes, musculoskeletal disease, depression, cardiovascular disease and stroke. In poor countries the burden of disease is shifting too, with the burden from hypertension and diabetes markedly increased.

The changing burden of chronic disease is a major force on the evolution of health systems. This is particularly so when we examine the care of the growing numbers of people with multiple chronic diseases and increasing frailty. Treatable cancers, which effectively become chronic conditions, are driving a growing proportion of planned hospital admissions, whereas chronic heart and lung diseases are driving a large proportion of emergency hospital admissions (Hernandez et al 2009).

In countries without universal health coverage, those with multiple chronic diseases are often the least able to afford health cover. They may have some access to primary health care, but little access to referral based specialists or inpatient care. Or they may have access to inpatient care only in life threatening emergencies.

Where people with multi-morbidity do have comprehensive access to health services, the obsolete and unhelpful idea that doctors 'own' their patients can cause significant dysfunction. Patients may be caught up in turf battles over whether a general practitioner or a referral based specialist owns the patient. Inter-specialist referrals may fragment care, lead to unnecessary investigations, and reduce the role of primary care physicians. Conversely, there may be conflicts between busy inpatient units with each trying to disown the patient in the emergency department that clearly requires admission.

There are frequently poor linkages between inpatient and outpatient care. Hospitals, as well as the large referral based outpatient care services they operate, often have difficulty transferring the care of patients to more suitable primary care and community service providers. Hospitals, particularly larger elite hospitals, can be quite distant from the communities they serve, and not know which resources exist in the place and community their patients live in. To a large extent, the ability to discharge patients responsibly arises directly from the knowledge of who in the patient's community can take over the care of patients after they leave hospital.

At the level of the health system, hospital-centrism may result in inadequate access to primary health care (WHO 2008). In over-commercialized health systems, people with multi-morbidity are particularly prone to supplier induced demand for unnecessary services. Whatever the health system, there are frequent complaints that coordination between hospitals, primary medical care and community services is inadequate (eg see Royal College of Physicians 2010). Hospital managers observe a huge impact of public health measures and primary care services on the demand for hospital services. This is probably a major factor in explaining regional differences in hospital demand. Taking a wider social and population approach to health improvement rather than a service development focussed approach can help to reduce the economic impact of non-communicable diseases on a community (Suhrcckre et al 2008; Bloom et al 2011).

Multi-morbidity also requires support from sectors other than health. There is a social responsibility to ensure effective connections between health and other social services. Their reliance on carers may put strain on themselves and their carer, and there is potential for abuse. Support for carers is often lacking in health systems, even in high-income countries. Disability support service clients often suffer from multi-morbidity.

People with multi-morbidity can find participation in civil society challenging, and without particular efforts to include them they may be neglected in public discourse, and effectively disenfranchised.

2. The policy context

The central argument of this paper is that given the increasing burden of non-communicable disease including multi-morbidity, and the sub-optimum state of health care systems and health care delivery to deal with this, there is widespread potential for health gain through improving the way hospitals and referral based specialties provide services to people with multi-morbidity. In particular, there are important gains to be had through improving the linkages between hospital and referral based care on the one hand, and primary and community based care on the other. This will require a shift on both sides from episodic care toward coordinated, tracked or managed care. Hospitals and their associated health care services need to maximize their contribution to population health gain for patients with multiple chronic conditions, not just curate their acute support during inpatient episodes. Increasingly, hospitals and community based services including primary health care are managed in regional organisations that have the potential to balance and integrate care between these modalities.

Health financing systems also have their part to play. The availability of funds for healthcare in low- and middle-income countries is expanding, albeit in the face of great need and



competing demands. It has the benefit of driving a virtuous cycle of improving the health status and thus productivity of a population, fuelling economic growth and thus producing further funds for healthcare. Unintended consequences of various financing approaches – activity based funding and fee for service, capitation systems, pay for performance – are now much better understood than when such systems were first introduced. Such side effects can in some cases be avoided, or at least monitored and responded to as appropriate. Specific incentives can be deployed to promote performance of desired forms of care, in both public and private financing systems.

The development of information and communication technology for health gain (eHealth) has been slower than many in either the health or ICT sector expected. However, the infrastructure and standards are now largely available in high- and middle-income countries to support the development of applications (including mobile device apps) in the field of chronic disease management. These include patient registers to track care, medication management programs, clinical decision support and patient social networking sites.

Governments cannot improve health systems on their own. The importance of mixed public/private health system development is now well recognized (Global Social Observatory 2012), as is the importance of effective regulation by government to optimize health sector contribution to health improvement.

This IHF policy paper builds on considerable work already done in the field of health system responses to NCDs. The IHF has participated in a number of conferences and dialogues on responding to the burden of NCDs amongst other pressures on healthcare organizations. The IHF has argued that five trends will cause a complete revamping of hospitals in the near future: concentration on the patient as a whole instead of on individual organs, a multidisciplinary approach, continuous care and system integration, and the search for interventions that are highly effective despite involving minimal resources (de Roodenbeke 2010. At COLUFRAS 2013 'Perspectives in implementing Primary Health Care', the IHF presented on the importance of hospitals and healthcare organizations to the invigoration of the primary health care effort. The IHF is attempting to bring back into focus the work done in the Health for All era on the primary health care role of hospitals (WHO 1981, 1987; Paine and Tjam 1988).

At its 66th session in September 2011, the UN adopted a Political Declaration on the Prevention and Control of Non-Communicable Diseases (A/RES/66/2). While this Declaration did not specifically refer to hospitals, implementation work such as the WHO Europe implementation plan for responding to NCDs notes that the WHO plans to 'document, disseminate and promote best practice in using a patient-centred model to coordinate management of chronic diseases from prevention to palliative care, at all levels of the health system, across institutional boundaries (primary health care, social care in the community, hospital services, emergency care), including

across non-communicable and communicable diseases, and with attention to assessing the distribution of impact across the population' (WHO Europe 2012 p.14). At the global level, WHO is likely to embed non-communicable diseases into its post 2015 development agenda (Alleyne et al 2013), not least because of the way the rising burden of non-communicable diseases can lead to a downward spiral of lower economic growth and deepening inequality (Abegunde and Stanciole 2006).

The Pan American Health Organization promoted the idea of integrated health service delivery networks for the organization of the response to NCDs, particularly through a people centred approach. They recognize the increasing intensity of service delivery needed as NCDs progress and patients acquire multiple diseases, and emphasise the importance of horizontal integration between hospitals, primary health care and community services including social services (PAHO 2011). Integration usually needs to be achieved by collaboration both within and between organizations working in the same community.

This policy work has built on and encouraged empirical research, eg on continuity of care for patients (Haggerty et al 2003), organization of health services to support chronic care (Coleman et al 2009) and the role of primary health care (Comino et al 2013). The IHF has prepared a background paper highlighting literature relevant to the role of hospitals in responding to the burden of NCDs, particularly for patients with multiple chronic conditions (Kelly & King 2013), and this is a companion piece to the current paper. The broad trend out of disease specific research and toward the emergence of particular knowledge about multiple morbidity and integration of health services is discussed below.

3. Toward better management of chronic conditions

Systems of health services can be understood as an assemblage of organizational forms, particular knowledges and financing arrangements, as well as the relationships between these three things, as depicted in figure 1 (Dugdale 2008)

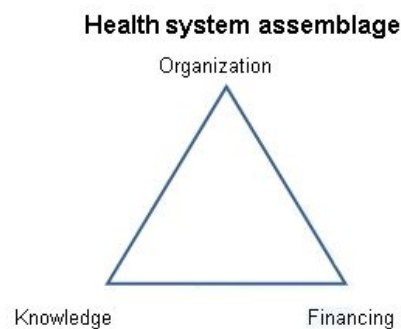
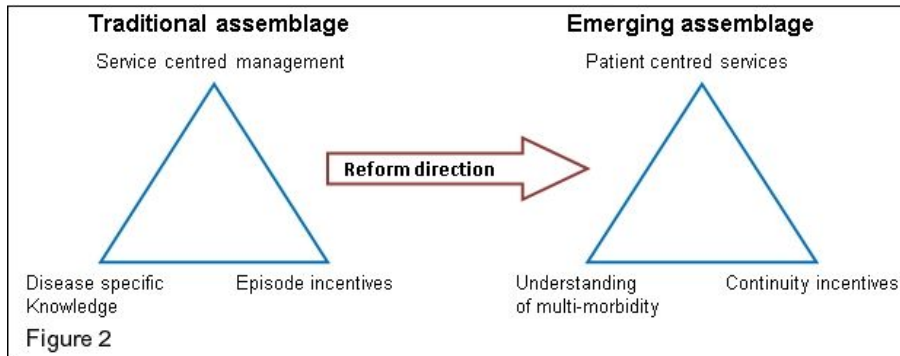


Figure 1

Each of these components of the health system and the relationships between them are constantly evolving, with many

forces at work. For our current topic we can characterize a traditional and an emerging assemblage with the characteristics shown in figure 2.



Many hospital systems are characterized by an assemblage of organ and disease specific service units, which operate within and continue to contribute to a knowledge base centred on specific diseases and physiological functions. Financing mechanisms are extremely diverse, but as a working generalization they tend to focus on driving throughput efficiency by various forms of episode based payment. The traditional assemblage has much to offer the management of people with multi-morbid chronic conditions. However, it is widely recognized that it has unintended consequences and faces limitations in supporting this work. In parallel with the persistence of the traditional assemblage, there is an emerging assemblage with quite different characteristics, which has significant potential to reorient hospital systems toward holistic care for people with multi-morbidity.

4. Organizational developments toward patient centred care

Hospitals are an extremely diverse set of organizations, and it is difficult to generalize about their role in the health system, their financing, their quality, or their likely evolutionary path. The discussion that follows is necessarily inaccurate because of this, and makes some demand on the reader to interpret it in their own context.

In general, high performing hospitals have mastered strategies to efficiently deliver their major functions. However as the demand for hospital services rises, and the total cost per capita for hospitals rises beyond a community's capacity to finance it, the benefit of running highly efficient hospitals will be lost to that community. A service or institution centred approach will thus be unsustainable in an ageing community with increasing morbidity. Because of this constraint (among other reasons), broad health system planning focussed on maximising a community's value from its health care services leads logically to a patient centred approach to care delivery. However this is not easy to put in practice. There is a consensus that the drive toward patient centred care must be supported at all governance levels within the hospital, and be

recognised in the accountability framework of the hospital.

Over the last few decades, leading hospitals in many countries have expanded their operations from a focus on inpatient care with some associated outpatient services, teaching and research, to offer a broader range of services, including non-inpatient referral based specialist services in medicine and allied health, satellite clinics, and community outreach services. Teaching has expanded to include consumer education (in house and on line). Research has expanded from the bench and the clinic to include population studies and the development of registers that support both patient care and research.

Hospitals have become porous, with many ways in and out of them for patients with chronic disease. The geographical footprint of hospital-based services now extend well beyond the grounds of the main hospital and many operate clinics in community settings, with staff moving back and forth between them. Hospital based healthcare organizations now frequently span networks of a teaching hospital, related district hospitals and non-admitting community health services. In some cases, the organizational span includes medical and other health profession training programs and health insurance (eg in the US Academic Medical Centre model).

The expanded footprint of such organizations gives them great scope to support primary health care services, and support health promotion efforts in their community. Individuals are often open to receiving health promotion and lifestyle messages whilst contemplating the problems that brought them in to hospital. Arrangements for community support for lifestyle change can also be made as part of their care planning following contact with hospital services. Hospital facilities can be used for community groups, which in turn can provide low cost ongoing support for patients after hospitalization.

The most important reorganization of care currently underway is toward patient centred care. This is particularly important for patients with chronic conditions. Hospitals have always spent considerable managerial resources on the logistics of arranging care, with the objective of making it more efficient for the services involved. This is no doubt a sensible approach for patients with acute conditions, who are effectively forced to put their everyday lives on hold while they deal with their acute problem. However for patients with multi-morbidity, living with chronic conditions is their life. They cannot put it on hold. There is often a considerable time burden of the care arranged for them (Jowsey et al 2013). Hospitals, like other providers involved in coordinating care, need to reorient the goal of their logistical efforts to make care efficient and coordinated from the patient's point of view. Facilitating this is one of the more complex practical challenges facing hospital management at the current time. This approach to patient centred care places



a central value to the patient's wellbeing and their capacity to enjoy it. This contrasts with a misconstrued approach to patient centred care where the patient is a source of value generation in a for-profit service that commodifies and over-provides care.

The integrated information systems and the human resources which operate across these various settings provide contemporary hospitals with formidable capability. This is applied to a wide range of services of which inpatient care is but one element. Newer models of care, interdisciplinary teamwork and integrated care services are leading a patient focused ethos of service delivery, forming bridges between physiological system specific units, and leading traditional disease based services out from their hospital campus comfort zones and into community based settings.

5. Knowledge developments in multi-morbidity

Scientific research into the natural history and pathophysiology of NCDs has yielded tremendous insight into these conditions. Clinical research, which has been largely disease specific, has offered an effective therapeutic armamentarium to manage symptoms, respond to acute crises within the disease process and prevent complications. For many chronic conditions however, cure has remained elusive, and disease progression can be slowed rather than halted.

Given the tendency to accumulate chronic diseases and the much larger number of people who now live into their seventies and beyond, the number of people living with multiple chronic conditions has dramatically expanded. Research relevant to the understanding and management of multi-morbidity is now gathering pace. The Global Burden of Disease work referenced above has effectively led the way from the early 1990s with an epidemiological analysis of the prevalence of multi-morbidity. Consider five common chronic conditions: symptomatic coronary artery disease (CAD); chronic obstructive lung disease (COLD); diabetes type II; depression; and musculoskeletal disability. The number of people with each combination of two or three of these conditions is large, and has overtaken the prevalence of hundreds of other diseases. Further epidemiological work focuses on the elucidation of the common and interacting risk factors for various combinations of disease (eg diabetes, CAD, renal disease and depression).

Clinical sciences investigation of these common combinations has gathered pace. Clinical pharmacology investigates the interaction of combinations of pharmaceuticals (many of which are now off-patent) used in multi-morbidity. Health services and pharmacy practice research have investigated the role of pharmacist review of prescribing in patients on multiple medications for multiple conditions. Work on overall wellbeing and its correlates among people with multi-morbidity is also important. The use of reliable measures of patient reported

aggregate wellbeing since the 1980s has greatly expanded research into health service configuration, processes of care (including patient self care), in relation to both single and multiple morbidity. Research into the guideline-practice gaps has identified multiple morbidity as a major cause of non-implementation of guidelines, and drives the expansion of guideline work to incorporate co-morbidity, eg through the investigation of how therapeutic goal guidelines for specific conditions should be adjusted for patients with common comorbidities.

Research into the patient experience of health care, and indeed on the burden of care, has also emerged. Patients with multi-morbidity spend a lot more time on managing their health than is commonly recognised by health professionals. Hospitals have always tried to organise care to be better logistically coordinated from the patient's point of view for the inpatient experience. For the outpatient experience, these efforts date back at least to the development of multidisciplinary clinics for particular chronic diseases in the 1970s. The research approaches in use include anthropological and organizational investigations, business process mapping, systems engineering, quality improvement studies and analyses of administrative databases, together with more traditional clinical intervention research.

A common feature of much of this research is that it takes place across referral based and primary care settings. Patients with multi-morbidity frequently move around between service delivery settings, and this is one of the key features that underpins the design of the Wagner chronic care model (a model which has inspired much reform and research), in which care must be organized and coordinated across hospital, referral based specialists, primary health care and community services (see Coleman et al. for a review of 82 studies on the implementation of the Wagner model). A second feature of this work is that randomized controlled intervention studies form only a small (albeit important) part of it. For example, in a review of interventions to improve access to primary health care for chronic care, episodic care and prevention, 75 studies were identified. Sixty-nine were rated as of high or medium quality, but only ten were RCTs, and none of these were in the chronic care domain (Comino et al 2012). Without commenting on the quality of the studies in this field, it is fair to say that many of them are short term, small scale, uncontrolled or otherwise lack design sophistication, no doubt associated with insufficient resourcing and a lack of aggregation of the research effort. This is probably a feature of the relatively early stage of research into multi-morbidity.

Clinical research into better care for people with multi-morbidity through the use of information and communication technology (ICT) is gathering pace. Injecting coordinated information into the care process, along with a reduction in communication failure, have been shown in many studies as the keys to improvement in patient outcomes. Such studies can be complex, but provide evidence that can influence the direction of health service reform. The whole system



demonstration trial of telehealth in the UK is one such trial, which included a broad class of technology, and a broad range of patients who had heart failure, COPD and/or diabetes. It concluded that 'Telehealth is associated with lower mortality and emergency admission rates' (Steventon et al. 2012).

Many of the developments into care for multi-morbidity are soft technologies – better ways of doing things, of cooperating, new systems of care, improvements in communication. Such developments present a series of challenges to researchers. Research usually commences in vivo, in actual service delivery environments which can slow the development of novel concepts. Research in human social settings always requires two way communication and negotiation between the researchers and the researched. Achieving effective control for the study of interventions is often complex and blinding is usually impossible or unethical. Novel interdisciplinary methods frequently need to be devised spanning the investigation of biology, understanding, communication and culture. Much of the research is not generalizable beyond fairly narrow social settings, and needs to be redone to translate into other settings.

6. Financing developments that encourage continuity of care

Financing hospitals is a major challenge for any community. Financiers include governments, health insurers, religious organizations, NGOs, philanthropists and development agencies. The notional demand for hospital services appears to be almost impossible to satisfy. Hospitals are prone to inefficiency, with average efficiency of around 85% (WHO 2010; Hollingsworth 2008). They are also dangerous places that generate unnecessary investigations and procedures, breed resistant bacteria and cause serious infections, and provoke a range of other adverse events among their patients and staff.

Understandably, there has been a particular emphasis on hospital financing toward incentives for efficiency, particularly efficient throughput. Financers want hospitals to admit people who need admission, but minimize the length of stay, both to prevent adverse events and to open the bed for the next person. However, this can then produce subsequent problems with the quality of throughput, of undesirable admissions. These include unnecessary admissions (eg for investigations that could be done out of hospital), and readmissions following precipitate discharges. This can be addressed through quality monitoring and response. Responses can include tightening criteria for admission (eg the common approach in the US where admissions will not be paid for by insurers unless there is already a diagnosis prior to admission) and penalties (eg no additional payment for patients with preventable complications such as hospital acquired bloodstream infections).

Against this background, financing chronic disease management presents a series of dilemmas. In general, we wish to provide chronic disease care in the community rather than in hospital. For patients with a single chronic condition, care can usually be provided and coordinated from a primary care setting, although occasional support from referral based specialist services may be necessary. However, patients with multiple chronic conditions that have access to hospital care tend to have high rates of admission and frequent involvement of referral based specialist services. Fee for service financing drives access and throughput for both primary care and hospital services, but can provide a powerful incentive to over-service and skew the distribution of health providers toward wealthy communities. Capitation based payments theoretically provide the flexibility to optimize the distribution and arrangement of services, but can undermine access as they provide an incentive to do less.

Health system financing through universal health coverage for comprehensive care (WHO 2010) has strong potential to appropriately fund care for people with multiple chronic conditions. A government supported health coverage system is most important to enable healthcare to be accessible when needed for older people and those with chronic conditions, who are too advanced in age to work or their medical condition does not allow them to be gainfully employed. We need to remember too that health financing is closely related to social support and social welfare financing. For example, if a country has high out of pocket costs for medicines, this will need to come out whatever income or pensions people with chronic disease are subsisting on.

To achieve universal health coverage, countries must put in place mechanisms to obtain the funds for health care, to pool risks across the community, to achieve coverage of the population, and to support health care for those that need it. The way an insurance system pays for services is crucial to optimizing the managerial and incentivisation arrangements for the provision of care. Payment mechanisms tend to separate primary and hospital care and may not encourage integration. There is as yet no clear evidence based consensus on specific service funding arrangements to support the development of appropriate service mix and models of care. It is likely that solutions will need to be specific to the historical and economic realities of each system that they are introduced in, and it is perhaps unrealistic to expect that a front running consensus model that works across a broad range of environments will emerge in the medium term.

7. Causes for optimism

Reform to improve the responses to patients with multi-morbid chronic conditions is a balancing-act to improve the organization of health services, using the knowledge that we have supported by a program of further research, and within



the constraints of the resources available for healthcare and our efforts to optimize how we allocate those resources. Hospitals are keenly aware of the need to respond to the burden of chronic disease in ways that provide some continuity of care. For example, it is now common that they offer specialist rehabilitation programs for patients following myocardial infarction, as well as to patients with CHF and COPD. Efforts continue to improve discharge correspondence and transfer of care arrangements, with information technology now facilitating this. Regional networks drawing hospitals and primary care providers closer have been developing in many parts of the world.

A few examples can illustrate the approaches being taken. The project ICARE4EU has contributed to the innovation of care for European citizens with multiple chronic conditions by increasing and disseminating knowledge of potentially effective and efficient models of integrated care for people with multiple chronic conditions that have been developed and implemented in European countries. The project has described the state of the art in many European countries, evaluated the strengths and weaknesses of integrated care programmes and identified best practices from different perspectives (HOPE 2010; Executive Agency for Health and Consumer Programs 2013).

The Care Management Program at Massachusetts General Hospital demonstrated reduced mortality and hospitalisation costs for patients with several chronic conditions who had been high health service users (McCall et al 2010). However, this program was part of a wider demonstration program that only demonstrated modest gains (McCall and Cromwell 2011). These programs are difficult to design and implement, and do not scale easily.

In response to the growing service demand arising from population growth and ageing in Hong Kong, the local health authority has invested heavily in the development of an integrated medical record system spanning public and private, hospital and primary care settings. It then adopted an integrated, multi service multi- condition approach to managing patients with chronic diseases. Their Community Health Call Centre is one of the key initiatives that brought together innovations from clinicians, statisticians and information technology experts, and is being delivered by a team made up largely of nursing professionals. The service supports patient management in the community through telephone advice, earlier clinic appointments, outreach visits or referrals to care services from other community partners as appropriate. Services provided include telephone support services to post-discharged high risk elderly patients; telephone advice and follow up for patients with Diabetes Mellitus; and a hotline service and proactive outbound calls to support patients with mental illness (Hong Kong Health Authority 2009).

Many other countries are working through the response of their health systems to non-communicable diseases. Responses include aiming for better training of the health workforce about non-communicable diseases in South Africa (eg Puoane et al.

2008 p.81); Ontario's Chronic Disease Prevention and Management framework and research toward improving primary care responses (Ministry of Health and Long-Term Care 2007; CT Lamont Centre 2008); and complementary strategies for diabetes, heart disease and respiratory disease across the hospitals and general practice in Malta (Dept of Health and Information Research 2011).

The care of patients with multi-morbid chronic conditions should be a joint effort by all healthcare providers in a community, including hospital based services (public and private), primary care doctors/ general practitioners, homecare teams, and hospices. To work efficiently, health systems need to develop all these components to a harmonious level of function. This will enable hospitals to focus on patients who need hospitalisation and to support more complex patients who require continuous care. With effective organisation, this focus can allow for care to be delivered closer to home making it more comfortable and accessible. This approach can spread the burden of care away from hospitals, prevent overcrowding and reduce the pressure to build more and more hospitals whilst enabling patients who have to be cared for in hospitals to get timely and appropriate attention.

Many of the approaches discussed above and in the accompanying literature review (Kelly and King 2013) are either policy oriented models for health systems to implement, or small scale implementations. Scaling up implementation across a whole health system, or across many health services, is not in any sense straightforward. Investigation of how to scale up successful local implementations is a major task for health policy and systems research (WHO 2012).

8. Future directions

Hospitals will continue to evolve, and this evolution is being shaped by the increasing numbers of people with multiple chronic conditions. This requires careful policy thought on what we should aim to deliver, and careful managerial thought on how we are to deliver it. Pharmaceutical innovations and emerging diagnostic technologies (including genetic elucidation) will continue to deliver health gains in non-communicable disease control. However it is the soft technologies, that ensure the right people get the right services at the right times, that are positioned to have the greatest impact on improving health outcomes for people with multiple chronic conditions. These will include information technology driven enhancements to clinical support systems, patient centred clinical logistics that make care more convenient for patients, and hospital supported community development.

Developments in health system organisation be complemented and supported by movements toward universal health coverage, where the elderly and the chronically ill are given national support for coverage, where the depth of cover is affordable for the community and makes health care affordable for these people, and where the cover includes effective



disease management across disease and organ system boundaries. Health service funding mechanisms need to continue to evolve to support effective, patient centred approaches to chronic disease management, at the same time as encouraging throughput efficiency and access to services. There is no easy approach to this.

Hospital management must continue to improve their collaboration with primary health and community based services. New organizational forms that facilitate continuity of care, training of health professionals to be comfortable in primary and tertiary care environments, and detailed research of what works for patients all have their part to play.

And at the centre of the reforms to our organizations, our scientific endeavours, and to how we fund health care, we must be engaged with our patients and our communities. Being patient centred means being patient driven in our reform thinking, being committed to a dialogue with all the parts of our community that we provide health care for. At its heart, the health system is nothing more nor less than the way we look after each other as a whole community.

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Review of the response of hospitals to the increase in multi-morbid chronic illness



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Abbreviations

CCM: Chronic Care Model

CDSMP: Chronic Disease Self-Management Program

DMP: Disease management programs

ICCCM: Innovative Care for Chronic Conditions Model

IOM: Institute of Medicine

WHO: World Health Organization

1. Introduction

Over the last 20 years there has been a substantial shift in the global burden of disease from communicable, maternal, neonatal, and nutritional disorders, towards non-communicable chronic diseases [Murray CJL et al 2012]. Many people with chronic conditions have more than one illness, referred to as multi-morbid chronic illness [Jowsey T et al 2013]. Global health systems are trying to respond to this crisis through different models of chronic care provision, and have demonstrated the advantages and difficulties in implementing these changes.

This paper is a review of the literature relating to multi-morbid chronic illness. It describes the epidemiology of the shift in disease burden and the changes that have taken place in hospitals and other settings to address this. A brief review of the literature exploring the effectiveness of the interventions is provided. The term hospital in this paper refers to hospitals and their associated services. Without doubt, the primary care sector has a key role to play in addressing multi-morbid chronic illness [Dennis SM et al 2008]. However, the necessary focus of this International Hospital Federation paper is the hospital sector.

The current design of the different health systems, the complex nature associated with multi-morbid chronic illness, the lack of global knowledge on interventions that are effective, and the un-clear role that hospitals play in this issue, make it extremely difficult to create and implement successful strategies to

address multi-morbid chronic illness. This paper highlights many of the reforms and interventions hospitals have taken so far and the challenges they face in shifting their model of care to better manage multi-morbid chronic illness.

2. Increasing global prevalence of multi-morbid chronic illness and the financial impacts

Over the last 20 years there has been a substantial shift in the global burden of disease from communicable, maternal, neonatal, and nutritional disorders, towards non-communicable chronic diseases [Murray CJL et al 2012]. Today, chronic disease is the most common reason for seeking medical care in all OECD countries, and is the largest burden on healthcare systems all across the world.

The prevalence of multi-morbid chronic illness globally is rapidly rising. In European countries, it is estimated that 40% of those over the age of 15 have at least one chronic condition. This increasing prevalence of chronic disease has led directly to an increased financial burden on health systems. It is estimated that between 70% and 80% of European healthcare costs are spent on chronic diseases [Lene O et al 2012]. Likewise in the United States, chronic illnesses account for the expenditure of over 75% of direct health care costs [Thrall JH 2005].



The rise of multi-morbid chronic illness is especially important to address because of the ageing of the global population. It is forecast that population ageing will accelerate over coming decades, with average life expectancy in Europe increasing from 75 years currently to 82 years by 2050. Population growth and ageing of the global population is increasing the burden of disease associated with non-communicable diseases [Murray EJL et al 2012]. The prevalence of chronic disease is also increasing because many diseases that were fatal in the past, such as type I diabetes, acquired immunodeficiency syndrome and some cancers, are now chronic conditions due to medical advancements [Thrall JH 2005].

Health costs for patients with chronic illness can be multiple times the costs for patients without chronic illness. Compared to patients with none, the health expenditure in the United States is 14 times greater for patients with five or more chronic conditions [Huber M et al 2012]. The costs associated with chronic illness include not only health care treatment costs, but the indirect costs due to, for example, work absence, reduced productivity and early retirement [Gemmill M 2008].

3. Global health system structure and impact response to multi-morbid chronic illness

Even though this data shows how prevalent multi-morbid chronic illness is, globally health systems remain primarily made up of organized bodies centered on reactive treatment for acute, episodic illnesses. Dr. Robert Kane, a professor of geriatrics at the University of Minnesota, says, "We're practicing 19th century medicine in the 21st century...we still have a system built around individual care events, like office visits and hospital admissions. The epidemiology is out of synch with the system..." [Smith R].

Despite the increasing prevalence of multi-morbid chronic illness, many health services continue to focus on individual single chronic diseases, with health professionals operating independently in their respective 'silos' [Parekh AK et al 2011]. The importance of care coordination needs to be recognized, and the Institute of Medicine (IOM) in its 2001 reports, *Crossing the Quality Chasm: A New Health System for the 21st Century* warned against designing care around specific conditions [Institute of Medicine, Committee on Quality of Health Care in America, 2011].

The health systems of different countries across the world are working in vastly different ways to address multi-morbid chronic illness. As expected, many of the differences relate to the organization and funding of health services, the roles and responsibilities of health professionals and the relationships between them, in the different countries [Nolte E et al 2008].

Until recently in the United States, treatment for those with chronic illness was handled within individualized programs

funded by public and private insurers. Nearly all (96%) of commercial health insurers in the United States offer different disease-management programs (DMPs) but mainly for leading chronic diseases including diabetes and cardiovascular related conditions [Gemmill M 2008]. However, key ideas from different models and frameworks, such as the Chronic Care Model and the Department of Health and Human Services Strategic Framework for Managing Multiple Chronic Conditions, are reflected in the Affordable Care Act (ACA), the newly established healthcare law in the United States (these frameworks will be discussed in greater detail later). The ACA supports the development of specific care management models, for example, accountable care organizations and home based health services. These new payment and service delivery models align with the Chronic Care Model and Strategic Framework principles of fostering health system change, identifying evidence supported models and financial reform. The ACA also allocates funding to developing interventions that better coordinate care between these new community-based service organizations, primarily for those with multi-morbid chronic illness [Parekh AK et al 2011].

Germany has recently introduced structured disease-management programs (DMPs) similar to the United States, to treat multi-morbid chronic illness. DMPs are funded by the changes to the Risk Structure Compensation Scheme, which helps establish financial incentives for sickness funds to enroll patients. Also, to facilitate coordination between ambulatory and hospital sectors, the Government has removed legal and financial obstacles. DMPs act in partnership with the established primary care network in Germany [Nolte E et al 2008]. More recently in 2012, Germany updated its commitment, outlined in the National Health Targets: Healthy Ageing project, with the development of guidelines to better treat those with chronic illness.

In England, primary support for those with multi-morbid chronic illness is provided by specialist nurses (called Community Matrons) that serve as case managers of individuals with complex needs. Also, through the Quality and Outcomes Framework of 2004, General Practitioners are rewarded for providing quality care and better health outcomes for 10 outlined chronic conditions through 'bonus payments'. This is facilitated through greater use of information technology in General Practice. These changes in the health system were intended to improve quality of care, and reduce emergency department visits and long hospital admissions through prevention or delaying complications [Nolte E et al 2008].

Another country in which nurses play a key role in providing care to patients with multi-morbid chronic illness is the Netherlands. In the 1990s, "transmural care" was implemented, which is intended to bridge the gap between hospital care and alternative care settings for those unable to return to a fully-independent life. It is provided by nurses with specialist training in managing chronic conditions in collaboration with hospital discharge liaison nurses [Nolte E et al 2008]. The Netherlands has also recently introduced disease management



programs with nurse led clinics at their core [Walters BH et al 2012].

In France, the 2004 Health Insurance Law exempts copayments for patients with specified long term chronic conditions who are being managed according to evidence-based guidelines and clinical pathways proposed by the state [Nolte E et al 2008]. The 2007 Ministerial Plan addresses chronic disease through a 727 million euro investment over five years. Its 15 measures include helping patients understand their illness better, establishing self-efficacy among patients, larger benefit packages for those with chronic illness, as well as research into the needs of patients with chronic illness [Durand-Zaleski I et al 2007].

Canada's health system is one that gives power to the provinces to organize their health service within a national universal healthcare framework. Ontario introduced local Family Health Teams in 2004 as a way of enhancing access to and coordination of chronic care. A year later in 2005, the Local Health Integration Networks were established to plan, coordinate and fund local health services, especially those that prioritize chronic disease management. Quebec has established local service networks, which bring together all care providers in the region, ranging from physicians to community organizations, to develop partnerships and strategies for creating care packages for those with chronic illness [Nolte E et al 2008].

Denmark is very similar to Canada, in that the management of care is decentralized, giving power to the regions or municipalities to decide how to organize care. In 2002 however, Denmark set out a national vision for chronic disease control, emphasizing care coordination, patient-self management and disease management. Denmark has also implemented structural reforms to incentivize better care coordination. For example, healthcare municipalities are required to contribute 20% of total healthcare funding, encouraging them to invest in health promotion and prevention, while developing alternatives to hospital care [Nolte E et al 2008].

Spain also has health system providing universal coverage, but with 17 regional health ministries that organize and provide their own health services. In 2011, the Spanish Ministry of Health, Social Policy, and Equality (MSPSI) launched a national "Strategy for dealing with chronicity for the whole Spanish NHS" after the hospital-led innovative approaches to chronicity that were implemented in several regional health ministries the preceding years gained visibility. Today, 9 different strategies for addressing multi-morbid chronic illness are in place in the 17 regional health ministries. These are mainly disease-oriented strategies, focusing however on organizational restructuring and technological innovation for the benefit of all users of the system [Garcia-Goni M et al 2011].

In Australia, the Enhanced Primary Care scheme was introduced in 1999 and amended in 2005, to improve the coordination of care for patients with chronic diseases and complex needs. It provides a framework for multidisciplinary

care and, along with other schemes, gives financial incentives to General Practitioners to support coordination of care for chronic illness [Nolte E et al 2008]. More recently, Australia has undergone substantial reform in response to factors such as the increased burden of chronic disease. A key component of the reform has been the creation of Local Health Districts to decentralize public hospital management and increase local accountability to drive improvements in performance. The reforms sought to improve transparency, increase clinician engagement, and instill greater responsiveness to local health authorities and create a stronger financial basis for the health system through increased national funding [Anderson T et al]. The establishment of Medicare Locals (independent primary health care organizations) is another key component of the health reform, and these organizations are designed to work with the full spectrum of General Practitioner, allied health and community health care providers, and local hospitals, to improve integration of, and access to care, particularly for patients with chronic diseases. As part of the reform, the national government is taking a greater role in primary health care funding and policy [Australian Government 2010].

4. The role and response of hospitals to multi-morbid chronic illness

The International Hospital Federation (IHf) conducted a survey titled "Hospitals and Multi-Chronic Conditions" [International Hospital Federation 2012] completed by 12 of its member organizations in Australia, Austria, Belgium, Canada, France, Korea, Japan, Philippines, Republic of Moldova, Switzerland, United Arab Emirates and the United States. The survey found that responding to the health needs of chronic illness posed the greatest major challenge for hospitals to overcome in the next decade. Other key findings included:

- Member organizations overall indicated that they were responding adequately to the health needs of patients with multi-morbid chronic illness, but principal elements of weakness identified were fragmentation of care inside and outside of the hospitals and limited efficiency in care.
- More than 50% of the surveyed organizations believe hospital staff, including doctors, are not well trained to meet the needs of patients with multi-morbid chronic illness, despite indicating that they were responding adequately to patient needs.
- Seven of the 12 organizations identified that the continuum of care for those with multi-morbid chronic illness was "erratic", and depended on the practitioner's involvement in the patient's treatment.
- Member organizations identified (from options provided) that the largest area for improvement was in implementing integrated care for those with multi-morbid chronic illness and two thirds of organizations believe that integrated care will reduce readmissions patients with single and multi-morbid chronic illness



- Only 40% of respondents said they had organizational frameworks for treating those with multi-morbid chronic illness.
- 75% of the member organizations surveyed indicated that networks between hospitals and other health organizations in the treatment of multi-morbid chronic illness were inadequate.
- For 80% of the organizations, the payment structure in their health system represented an obstacle for care of patients with multi-morbid chronic illness.
- Three quarters of the organizations responded that they are not playing a large role in supporting patient empowerment.
- The majority of the organizations surveyed indicated that the role of hospitals in the management of multi-morbid chronic illness depends primarily on the organization of their countries health system.

Across the countries surveyed, the role of hospitals in the care of patients with multi-morbid chronic illness depends upon the makeup and structure of the overall health systems. Many hospitals have implemented approaches in conjunction with their leading governmental healthcare organizations and agencies as a part of a national framework. However, numerous other hospitals are forming very innovative approaches separate from their country's health systems [International Hospital Federation 2012].

5. Review of patient centered models for responding to multi-morbid chronic illness

Many of the approaches to addressing multi-morbid chronic illness are based on different established strategic frameworks and models. The first part of this section covers the overarching theoretical frameworks for providing care for people with chronic conditions and the second part summarizes service delivery models or models for delivering selected components of these frameworks. The third part summarizes programs that focus on the prevention of chronic disease. The focus is on a brief description of the models and framework and a summary of the available evidence of their effectiveness. Section six below describes how hospitals may develop and implement care plans or pathways for providing care based on these models for individual patients.

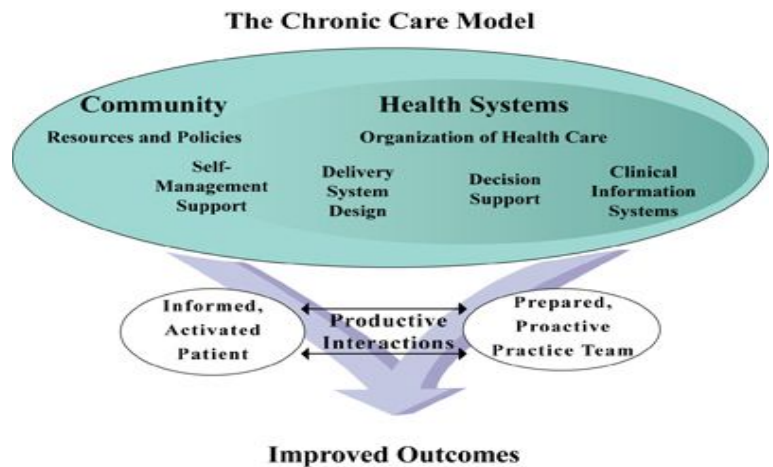
5a. Broad frameworks or models for responding to chronic illness

The Chronic Care Model (CCM), is one of the most globally used and recognized models in dealing with multi-morbid chronic illness. The model was originally established by the MacColl Institute for Healthcare Innovations and later refined by the Robert Wood Johnson Foundation. The CCM was used and extended in the national Improving Chronic Illness Care (ICIC)

program. The six elements that comprise the CCM are the community, the health system, self-management support, delivery system design, decision support and clinical information systems. The CCM is designed to instill effective change across different provider groups, so they can better support evidence based clinical and quality improvement across different health settings. It highlights the need for care between an active, well-informed patient and a knowledgeable health team, using resources from community and healthcare systems [Wagner EH et al 2001].

A meta-analysis of 112 studies concluded that interventions incorporating at least one element of the CCM are associated with improved outcomes and care processes for people with asthma, diabetes, health failure and depression, although only people with heart failure and depressions has consistently improved quality of life. A 2006 review of United Kingdom and international frameworks for improving care for people with long-term conditions concluded that while there is evidence that single or multiple components of the CCM can improve quality of care, clinical outcomes and healthcare resources, it remains unclear whether all components of the model are essential for improving care [Singh D et al 2006].

MacColl Institute's Chronic Care Model



Developed by The MacColl Institute
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Source: Improvingchroniccare.org

Building on the CCM, the World Health Organization (WHO) established the Innovative Care for Chronic Conditions Model (ICCCM), emphasizing the policy and community aspects of chronic disease management. This model focuses on improving care at the micro level (individuals and families), the meso level (healthcare providers) and the macro level (policy). However, there is very little evidence that this model is effective [Singh D et al 2006].

A less well known model for dealing with chronic illness is the Public Health Model. This model stresses three levels of intervention that are required to impact on the burden of chronic conditions - population wide policies, community activities, and preventative and treatment health services. This model



highlights the importance of continuity of prevention and treatment between the three main pillars, as well as major determinants of disease that may inhibit the quantity and quality of care. Like the ICCCM however, there is very little evidence on the implementation and effectiveness of this model [Singh D et al 2006].

The Continuity of Care Model, conceptualized in the 1990s, highlights how chronic conditions occur in response to different risk factors within the community and suggests areas to intervene to prevent and treat these chronic conditions. An observational study undertaken in an Australian Extended Care Center in the 2000s, found that the model was associated with shorter length of stay, and that there was higher morale in the workplace [Walker A et al 2001]. However, more rigorous evidence to support the model appears to be lacking [Singh D et al 2006].

Building on elements identified in these models, and expressing them as a set of action orientated national level strategies, the United States Department of Health and Human Services (DHHS) issued a strategic framework for managing multiple chronic conditions in 2011. The framework aims to maximize care coordination and improve health and quality of life for individuals with multi-morbid chronic illness. It highlights four main goals, including fostering healthcare and public health system changes, maximize self-care management, provide better tools and information to healthcare workers, and facilitate research to fill knowledge gaps about multi-morbid chronic illness and the interventions and systems that can best support them [Parekh et al 2011].

Also, one of the most globally recognized frameworks that focuses on self-management is Lorig's Chronic Disease Self-Management Program (CDSMP). This program incorporates three major components for patient education including medical management, role management, and emotional management. Medical management is being able to properly adhere to a specific medical protocol, for example, knowing when to check blood sugar levels for patients with diabetes. Role Management is being able to adapt or change existing life roles to meet the needs of the condition. Emotional management is being able to cope with the different emotions that arise from having the condition. A randomized controlled trial found that the CDSMP was associated with significantly less hospitalizations and days spent in the hospital, and improved health status and health behaviour [Lorig KR et al 1999]. these findings were replicated in a 'real world' setting, in a cohort study, which demonstrated that one year after exposure to the program, most patients experienced statistically significant improvements in a variety of health outcomes and had fewer emergency department visits [Lorig KR et al 2001].

5b. Service delivery models for managing chronic illness

There have been many formally recognized chronic care models that are based on how best to deliver healthcare services. Three well recognized models are Evercare, Kaiser

and Pfizer, which have in common a proactive case management approach to providing care to patients with chronic illness. United Healthcare's Evercare model and the Pfizer model both target the elderly at the highest risk of hospitalization.

In the Evercare model, Advanced Primary Nurses (similar to Community Matrons) work as case managers, providing social and health care to meet the individual's needs. An individual care pathway is developed for each patient. Through better coordination of care, the aim is maintain health, intervene early, prevent unnecessary admissions and facilitate early admissions when they occur [Singh D et al 2006]. There is some evidence from the United States that the Evercare model is associated with a reduction in hospitalizations and length of hospital stay, and substantial cost savings [Kane RL et al 2003]. Studies outside of the United States providing longer term information about potential reductions in hospitalizations are not yet available. There is some concern that in the United Kingdom, Evercare programs may not be enrolling patients who are frequently admitted to hospital, and may be identifying unmet need and increasing demands on health services [Singh D et al 2006].

The Pfizer model is similar to the Evercare model but also uses telephone case management. Evidence from the United States shows that the Pfizer model is associated with reduced hospitalizations and improved coordination of care. The model has not yet been widely introduced into the United Kingdom [Singh D et al 2006].

The Kaiser Permanente Model is different to the Evercare and Pfizer models in that is intended to be used in patients at all stages of illness and as a preventative population wide tool. The approach is based on the Chronic Care Model (CCM) mentioned in section 4a above, and the focus is on integrating organizations and disciplines. The model is organized into a three-tiered pyramid ranging from low-intervention patients on the bottom to high intervention patients at the top. Doctors from primary and secondary care share the same budget and work within multi-specialty centers alongside nurses, pharmacists, radiology staff and others. Similar to the Evercare and Pfizer models, there is evidence from the United States that the Kaiser model is associated with reduced hospitalizations and improved coordination of care. In the United Kingdom, nine primary care trusts are applying the Kaiser model to integrate services. Case studies are suggestive of positive outcomes [Singh D et al 2006].

The Strengths Model was developed in the early 1980s as an alternative to traditional case management in mental health, but has been proposed as a model that can be applied to service delivery for patients with other chronic conditions. It focuses on helping people and their communities recognize their talents and priorities, and connecting them with resources they require to achieve their goals. In the field of mental health there is some evidence that the Strengths model can improve satisfaction and quality of life, there does not appear to be



studies of the effectiveness of this model as a framework for chronic care service delivery [Singh D et al 2006].

The PACE (Program for All-Inclusive Care) model, used in the United States, focuses on integrating both acute and long term care services and primary and specialist medical care. This approach, combined with the use of multidisciplinary teams, allows patients to receive care from one source. One comparative analysis suggests that this model of care is associated with reduced hospital admissions, but increased use of nursing homes [Singh D et al 2006].

The United States Guided Care model is another emerging service delivery model, which mainly targets those with multi-morbid chronic illness. Guided Care is provided by a team that includes a specially trained registered nurse, two to five physicians and office staff from a primary care practice. This team provides eight clinical services to 50-60 of the practice's older patients who are likely to require the most services [Boult C et al 2011]. A comprehensive assessment of each patient takes place, which is followed by an individualized care plan that emphasizes healthy lifestyles, coordination of care, a support network for the patient, and the importance of self-management. Although there is evidence of physician satisfaction with the model [Marsteller JA et al 2010] and possible improvements in patient quality of life, high quality evidence of a reduction in health service use is lacking [Boult C et al 2011 & Singh D et al 2006].

There are other strategic frameworks and models implemented by hospitals and health systems all over the globe, but most of them are similar to the ideas and principles already provided in this paper.

5c. Programs focusing on the prevention of chronic illness

Aside from the specific frameworks and models for the management of chronic conditions, there have been many programs implemented by health systems and hospitals that specifically emphasize the prevention of chronic disease. One of Finland's provinces, North Karelia, engaged in a project in 1972 to better manage the increase in heart disease. This project focused on behaviour change in the population, reducing risk factors such as smoking and poor diet through a provincial wide cooperation between health services, community groups, schools, non-government organisations, supermarkets and other relevant companies. From 1972-2002, the average cholesterol levels were reduced by 18% and deaths from coronary heart disease declined by 87% over this same time period, compared with a decline of 75% in the entire country [Lene O et al 2012].

In Abu Dhabi, a screening prevention programme was launched in 2008 to combat the high rates of obesity and diabetes. The screening program gives patients personalized reports on results of their screening, as well a guide for reducing their risk of developing obesity and diabetes. A later evaluation revealed a 40% improvement in blood glucose

levels and a 45% improvement in lipid levels. This screening prevention program was seen as such a success not only because of its significant results, but because the program cost less than US \$20 per person per year [Lene O et al 2012].

6. Patient-centered care: the importance of empowerment, self management and information technology

All of the successful, innovative approaches discussed that hospitals are taking in dealing with multi-morbid chronic illness emphasize moving towards a more comprehensive, patient-centered care system. Relevant to patient-centered care are the terms, empowerment and self management. Empowerment is broadly defined as an enabling process through which individuals or communities take control of their lives and/or environments. In the health care context, it begins with information and education but ultimately involves active participation in treatment decisions [Lau DH 2002]. Patients must have the information, skills, and confidence to make best use of their involvement with care givers. Effective self management support helps to motivate and inform patients and families to better cope with the stresses of living with and treating chronic illness. Mounting evidence shows health care providers need to move from traditional models of patient education that are based purely on knowledge acquisition and didactic counseling, to models which improve patients' confidence and skills in managing their conditions. This involves the patient being involved in setting goals for improving the management of their illness, identifying barriers and developing a plan to address these barriers [Wagner EH et al 2001].

Empowerment is especially important for healthcare providers to understand because it highlights the need for more public responsibility in healthcare management. Hospitals must make the necessary changes to move away from the traditional biomedical model of care. The biomedical model of care involves a patient obedient to an all-knowing physician's directives. In the empowerment model, there is mutual, joint-responsibility between the doctor and the patient in achieving a desired health outcome. Patients are respected by their physicians and assisted in making decisions that they feel they had a voice in [Lau DH 2002].

Health care information technology has an important role to play in empowering patients and supporting the transition from the biomedical model of care to one in which the patient is informed, has choices and is involved in the decision making process. Previously, information technology developments were focussed primarily on addressing the needs of health care providers and hospitals. However, there has been a shift towards the development of patient-centred applications which are defined as systems that enable a partnership among practitioners, patients and their families (where appropriate) to



ensure that procedures and decisions respect patients' needs and preferences. Examples include internet based applications, mobile devices, and telehealth applications [Demiris G et al 2008].

Clinical information systems are important for ensuring health care providers have organised approaches to collecting, summarising and reviewing individual or aggregate patient data to facilitate care. For example, at the practice or health care facility level, disease registries have the potential to facilitate the delivery of planned care and the implementation of reminder systems [Wagner EH 2001 et al]. Disease registries, particularly at a central level, can facilitate benchmarking and quality improvement across institutions [Evans SM et al 2011].

As is the case with many other chronic disease management interventions, the evaluation of patient centred information technology applications is complex. Teasing out the independent contribution of the technology and recruiting sufficient numbers of patients for studies to be adequately powered to detect differences is difficult. A variety of outcomes are important to assess including patient and clinician usability and acceptance, workforce impacts, clinical outcomes (for example, hospital admission and emergency department presentation rates, quality of life indicators) and economic factors. Initial investigations are promising, but large scale, rigorous, longitudinal experimental studies and economic evaluations are required to yield conclusive evidence of their effectiveness applications [Demiris G et al 2008].

7. Implementing clinical pathways or care plans in response to multi-morbid chronic illness

Many of the chronic care models and frameworks already discussed in section four of this paper provide the foundations of the clinical pathways that are used in hospitals and other settings to deliver care to individual patients. This section described some practical steps that hospitals might take to develop and implement clinical pathways or care plans.

Clinical pathways map the steps in a patient's journey through the entire health system, from prevention through to acute care and rehabilitation. They can be disease specific or cover a group of conditions with similar treatment requirements [Cavlan O et al 2011].

To move toward a more patient-centered model that incorporates home-based care, as recommended by many of the chronic care models discussed in this paper, hospitals, along with the primary care sector, need to help provide patients with a smooth, coordinated journey throughout the entire system. The continuum of care must be considered from the patient's point of view. This approach requires skills

mapping, development of the workforce, and continuing education of a multi-disciplinary team [Scottish Government 2010].

In implementing clinical pathways, hospitals need to address the social care and support needs of their patients, which can be done through closely-linked clinical networks characteristic of many of the chronic care models. Examples of staff included in clinical networks include general practitioners, specialists, nurses, physiotherapists, community groups, social workers and pharmacists. With such a network, leadership and governance is important to ensure accountability for outcomes and costs. To maximize the success of the clinical pathway, there should be a well-managed register with a recall and reminder system. This system must be standardized across the entire network of the hospital [Scottish Government 2010].

Care pathways can enable health systems to make evidence based decisions about where to focus improvement efforts. They assist with identifying gaps in service delivery, as well as the reconfiguration of services to help achieve the hospital's goals in chronic disease management. Hospitals need to define the appropriate stages of the pathway, and then add interventions that should be included in each stage. Each intervention should be identified by existing detailed guidelines, expert opinion, and peer-reviewed literature. For each intervention, consideration needs to be given to the likely costs and benefits in the relevant patient population. Consideration of the most relevant clinical outcomes is important. The effectiveness of the intervention in the real world setting, not just a clinical trial, needs to be considered. The setting that the intervention is going to be implemented needs to be considered, along with the required accompanying services and structures [Cavlan O et al 2011].

8. Obstacles and challenges for hospitals in changing to patient-centered systems

Hospitals across the globe are adopting new models of, or approaches to, health care delivery with the aim of achieving better coordination of services across the continuum of care for patients with chronic conditions. Chronic diseases require a complex response, over a protracted time period, coordinating inputs from a variety of providers, medications and monitoring systems, all of which is ideally situated within a system that promotes patient empowerment [Nolte E et al 2008]. It remains a challenge, particularly for patients with multi-morbid chronic illness, and leads to greater risks for these patients, such as medication errors. It can also be difficult for these patients to remember and understand information provided by their care giver, and participate in the process [Vogeli C et al 2007]. One of the largest issues that hospitals face is the lack of evidence to support transforming their systems to be based on a patient-centered model, as highlighted by the experiences of



eight countries described in a European Observatory on Health Systems and Policies series [Nolte E et al 2008] and others [Vogeli C et al 2007]. This lack of evidence relates to a variety of factors. In many cases, evaluations of models or program haven't been performed because staff are not skilled or confident in performing the evaluation, particularly the quantitative aspects. Limited access to the relevant data or information technology can also hinder evaluations. In other cases, the research or evaluation that has been undertaken does not demonstrate that the interventions are clinically or cost-effective. This may or may not be a result of the study design or quality. The evaluation of chronic care models and frameworks is complex because of factors including:

- The difficulty teasing out the independent contributions of the various components of the intervention. For example, in exploring the effectiveness of the Chronic Care Model, it is difficult to ascertain whether all components of the framework are essential for improving chronic care.
- In practice, not all components of a framework or model may be implemented consistently. They are interpreted and applied in varying ways.
- The context in which they are implemented influences outcomes, and other interventions that may be in place in different settings may contribute to outcomes [Singh D et al 2006].

The lack of an electronic health record is cited as an impediment not only to evaluation but to effective care coordination [Nolte E et al 2008].

A related issue is the focus that executives and politicians can have on efficiency and their expectation that programs will deliver very tangible outcomes (for example, reduction in hospitalizations) in a short-time frame. Patient-centered models require patients and healthcare professionals to establish positive, continuing relationships, which take time to develop. There are many reasons why governments and hospitals may resist moving towards greater provision of care in community based facilities rather than hospitals, including the structural and financial barriers described below. The closure of hospitals or reduction in funding provided to them is not easy to 'sell', particularly when hospitals can provide outcomes that are easier to demonstrate in shorter-time periods [Nolte E et al 2008].

Structural impediments to implementing patient centered systems are significant, mostly because, as described earlier, most health systems are still designed to deliver acute, episodic care. There are divides between health and social services and between ambulatory and hospital care that hinder optimal care coordination and quality of care. In countries with more than one level of government, the federal - state divide can create conflicting policy priorities and lead to patients being managed in sub-optimal settings because of 'cost-shifting'. For example, patients with non urgent medical problems associated with their chronic conditions attending emergency departments rather than General Practices. There may not be sufficient resources provided to implement national

policies at the local level. Other financial barriers include the way health systems are structured in many countries, with the fee for service model not rewarding ongoing, multi-disciplinary chronic disease management [Nolte E et al 2008] and not being conducive to the provision of patient education and preventative activities [Thrall JH 2005].

Workforce changes are required to implement chronic care models and improve care coordination. The associated challenges include a reluctance of some staff to work in multi-disciplinary teams and a reluctance to engage with chronic disease management and adhere to national guidelines. Not having enough staff or having existing staff already busy with responding to acute medical problems can be detrimental to the implementation. A lack of clarity surrounding changed roles, a reluctance to take on new roles and a lack of suitably trained staff to fulfill these roles can be impediments [Nolte E et al 2008]. The disease management programs that have been implemented in many countries are focused on single chronic diseases, which may un-intentionally undermine the coordination of care for patients with multi-morbid chronic illness [Vogeli C et al 2007]. Some disease management programs may also focus on medical roles, which undermines multi-disciplinary care provision [Nolte E et al 2008].

The challenges relating to implementing information technology applications that improve patient self management and education include further developing the evidence base for their clinical and cost effectiveness and ensuring patient privacy and equitable access to these applications [Demeris G et al 2008]. The challenges associated with clinical information systems that assist clinicians in tracking and coordinating the care provided to patients and conducting quality assurance activities also relate to patient privacy, and the governance and policies surrounding their use, particularly when systems are used by multiple jurisdictions.

9. Conclusions

This literature review has limitations. It was not a systematic appraisal of all of the literature. Rather it focused on readily available literature. However, the review still demonstrates a lack of high quality, well designed, large scale, long terms studies examining the effectiveness and cost-effectiveness of models and interventions to address multi-morbid chronic illness. Although their benefits are intuitive and definitely patient orientated in their design, the evidence that is sought after is not available for a variety of reasons as outlined in section eight. To some extent, the implementation of electronic health records may help accelerate clinically important research in this field. National guidance on how to interpret the limited available evidence in this field has been called for, and has guidance on how to carry out the required evaluations [Nolte E et al 2008].

Nonetheless, there is some evidence that programs which aim to implement the Chronic Care Model can have an impact on patient quality of care and some clinical and resource



outcomes. Similarly, there is some evidence that specific chronic care service delivery models may have a positive impact on health of care and healthcare resources, although most of the evidence comes from the United States [Singh H et al 2006].

Improvements are being made in the approach being taken by hospitals to multi-morbid chronic illness. Systems are changing from being built around individual care events to focusing on the continuum of care and the right of patients to be informed pro-active partners in their care is being recognized. Electronic health developments are occurring to support these changes. Dr. Robert Kane's statement that "We're practicing 19th century medicine in the 21st century...we still have a system built around individual care events, like office visits and hospital admissions. The epidemiology is out of synch with the system..." [Smith R, 2013] may soon be out-dated.

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