

**Complexity and health care: Health practitioner workforce services, roles, skills and training, to respond to patients with complex needs**

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Clinical Education and Training **Queensland**

***Complexity and health care:  
health practitioner workforce services, roles, skills and training,  
to respond to patients with complex needs***



**Queensland**  
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UNIVERSITY



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'For every complex problem  
there is a solution that is  
clear, simple ...and wrong'

H. L. Mencken

(American Writer, 1880-1956)



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## Further information

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## Executive summary

*Complexity has a profound effect on healthcare and outcomes. It is characterised by multiple dimensions, including co-occurring or multifaceted medical conditions, age, frailty, socio-economic realities, culture, environment, behaviour and systems factors.*

This purposive, thematic review describes aspects of health care complexity of relevance to the health practitioner workforce and services, particularly skill development and training. It examines some key factors contributing to complexity and elucidates some of the challenges and potential in responding to patients with complex needs.

The review applies two useful conceptualisations to the topic. First, drawing from management science literature, it identifies health care complexity as a “wicked problem”. This indicates that complex health issues comprise multiple layers and dimensions, that they are associated with fragmentation and that their resolution frequently requires a diversity of players, different levels of response and a variety of methods of response, which in itself adds increasing complexity. Second the review uses the WHO International Classification of Functioning, Disability and Health (ICF) as a way of categorising some of the dimensions of complexity. The ICF depicts a comprehensive bio-psycho-social model of health and functioning and reflects dimensions

and interactions that are influential in health care complexity at individual and systems levels.

On the basis of these conceptualisations, the review elucidates **medical complexity**, with special attention to co-morbid and multi-morbid conditions. Examining aspects of medical, treatment and health service responses, it notes that a history of uni-dimensional treatments, limited categorisation and multiple piecemeal funding mechanisms have not adequately addressed the issue. The review also notes the importance of **situational complexity**. It indicates that the patient’s context, including personal factors (such as gender, culture, and lifestyle), environmental factors (including physical, social, systems and other factors), and their participation in society, relationships, and work, all influence complexity. Importantly, the review goes on to describe aspects of **system complexity**, noting that particular and confounding challenges reside in the interplay of complex health care systems when added to complex health conditions and complex patient circumstances. The review identifies a number of key issues in system complexity, including increasing service fragmentation, unsupportive funding arrangements, failure to engage patients effectively, and health care practitioner thinking and perception.

In reference to the comprehensive bio-psycho-social model of the ICF and the “wicked” nature of health care complexity, the report outlines a number of potential elements of a response to health care complexity.

- Learning oriented responses outline the importance of reflective practice and clinical reasoning, as well as case-based and experiential learning in the response to complexity. Training focused on teams and equipping for capability are emphasised.
- Collaboration-oriented responses to health care complexity emphasise the importance of inter-professional/practitioner collaboration and collaborative teams (sometimes called communities of practice) to developing an adequate response.
- Care-oriented responses outlined in the review emphasise the importance of integrated or coordinated care, the place of

interpersonal processes of care, but mostly the importance of fostering informed and active patients and consumers in a response to complexity.

The review acknowledges that a number of initiatives which are potentially important elements of a response to complexity in health care are already underway in Queensland Health. These include a number of research initiatives, training activities and workforce changes, such as extending scope of practice, building workforce flexibility, and promoting new models such as consultancy and case management.

The review concludes that complexity is a vital consideration for the future of health care, and specifically for the clinical education of current and future practitioners. Recognising that, at present, the health care provided by practitioners and systems is limited by existing conceptualisations and understandings of complexity, it recommends a multifaceted, collaborative approach, involving all stakeholders, including practitioners, patients and policy makers.



## **Chapter 1.**

### **Introduction**

#### ***The topic under review: health care complexity***

Health care complexity is an important emerging construct that is understood in many ways, making its definition problematic (Valderas, Starfield, Sibbald, Salisbury, & Roland, 2009). Currently, there is 'no widely accepted conceptualisation that portrays the numerous influences that together make a [health care situation] more or less complex' (Safford, Allison, & Kiefe, 2007, p. 384). Some relatively narrow definitions link health care complexity with multiple co-occurring medical conditions (Nardi et al., 2007; Safford, et al., 2007) or diagnostic dilemmas (Gask, Klinkman, Fortes, & Dowrick, 2008), while other definitions are broad, acknowledging that morbidity burden is influenced by multiple factors including health-related characteristics (age, frailty), socioeconomic, cultural and environmental characteristics, as well as patient behaviour (Valderas, et al., 2009). Emerging fields such as complexity science or systems theory are increasingly being used to inform contemporary definitions and conceptualisations of health care complexity. They recognise that health care complexity comprises 'multiple, dynamic components interacting in non-linear, unpredictable ways' (Katerndahl, Parchman, & Wood, 2010, p. 1003).

Medline, PubMed, CINAHL and Web of Science were selected as appropriate databases because of their focus on health literature. However, as with searches of similar conceptual issues, our initial searches resulted in the retrieval of numerous “manifestly irrelevant articles” (Booth, 2006). To reduce the number of tangential articles, we (a) conducted database searches using key words extracted from reference documents, (b) identified articles in the reference lists of these documents, and (c) utilised the ‘Related Articles’ feature on electronic databases to ensure that key issues were included in our review (see Appendix 1 for a list of key search terms).

is relatively new and that current undocumented clinical practice, which may have emerged in response to health care complexity, does not form a part of this literature. The well-documented gap between published evidence and clinical experience is relevant in this case, particularly for patient experiences of health care complexity<sup>1</sup>. The review was also limited by language and focus (literature from non-English speaking western countries may have contributed to our understanding of health care complexity). Likewise if conducted over a longer period, this review would have been able to deal with different types of information and data more comprehensively, which may have influenced the findings to some degree.

### The review: method

The aim of this review was to elucidate and broaden conceptualisations of health care complexity. We chose a broad review strategy (Booth, 2006), combining empirical and theoretical literature to define concepts, review theories and analyse related issues (Whittemore & Knafl, 2005). Recognising that there are many dimensions to health care complexity, we employed an overarching framework to provide structure for the review. The International Classification of Functioning, Disability and Health (ICF), developed by the World Health Organisation (WHO), was used as a conceptual framework to broadly categorise issues associated with health care complexity (Pawson, Greenhalgh, Harvey, & Walshe, 2005).

A purposive search strategy identified key research reports and publications, with additional snowballing techniques used to explore new concepts as they emerged (Pawson, et al., 2005). In view of the breadth of the topic, the scope of literature was limited by giving preference to (a) articles published in the last 15 years, (b) publications from economically developed countries, (c) issues relating to education and training of health staff (in accordance with the focus of ClinEdQ), and (d) issues of relevance to secondary and hospital settings (a major area of focus for Queensland Health).

This review method provided a sound basis for a relevant yet comprehensive portrayal of health care complexity (Whittemore & Knafl, 2005). Articles were selected if they addressed complex health conditions, complex circumstances, or the challenges that complexity presents for both health care services and practitioners. Through email and regular group meetings, the team discussed and refined the articles included in the analysis according to relevance to the research questions and Queensland Health’s focus (a process which also allowed the identification of emerging regularities and themes). The team synthesised the information extracted from the articles, and created a coherent narrative that defined elements of health care complexity and highlighted potential responses (Jagosh et al., 2011).

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While broad, some limitations of this review are acknowledged. First, it was limited to published, peer reviewed articles and published reports. While this is the most common approach for such reviews, it is also true that the current focus on health care complexity



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### Research questions

1. What are complex health conditions?
2. What factors contribute to complexity?
3. What challenges does health care complexity pose to patients, practitioners and services?
4. What are potential responses to health complexity at various levels (i.e., patient, health care practitioner and health care services)?

### ***The nature and importance of health care complexity***

Health care complexity arises out of the interaction of multiple factors. These include patient factors (e.g. personal, cultural, socioeconomic), health care practitioner factors (e.g. training, expertise), task-related factors (the particular health care task, workflow, available time and technology), team (communication, roles, leadership), environmental (physical and social) and organisational factors (organisational structure, culture, policies and procedures). Health care complexity is implicated in increasing health care costs (co-morbid conditions, the need for more advanced technologies), and may also influence perceived inequity in health care (for example, through recognition of the need to provide services that cater for ethnic, socio-economic, or other differences). Importantly, health care complexity affects the quality and outcomes of care (de Jonge, Huysse, & Stiefel, 2006).

Although the presence of multiple medical conditions is problematic in itself, a fundamental challenge arises when clinical responses to this complexity are guided by the single-disease paradigm that dominates the existing health care system (Jowsey et al., 2009). This paradigm leads to 'incomplete assessment of complexity and failure to modify the clinical approach accordingly' (Safford, et al., 2007, p.

384). Not surprisingly, the fragmented and siloed structure of health care services, the lack of continuity across the continuum, and the lack of integration between health care providers have been shown to be inadequate for the management of patients with complex health care needs (Kodner, 2009). The importance of the relationship between health care complexity and health care services, safety, continuity and health care management is underscored by a recent recommendation from the WHO that understanding systems and the impact of complexity on patient care should be integral to the curriculum for medical schools (WHO, 2009). Issues relating to the interaction between health care complexity and the management of patients with complex health care needs are explored in Chapter 2.

At the individual patient level, services tend to respond to health care complexity in ways that are similarly complex. Patient-level complexity, therefore, may result in care delivery complexity that places additional demands on the health system, (for example, due to the need for

*In the current health care context, cost-effective approaches are essential (Weiss, 2007; Zwar et al., 2006), and there is a great deal of pressure on health care systems to ensure efficacy, quality and accountability, all of which are undermined when health care complexity is not addressed adequately.*

specialised laboratory diagnostic tests, new or expensive medications, multiple specialist consultations and specialised nursing care) (de Jonge, et al., 2006). Health care complexity combined with care delivery complexity drives a need to adjust care plans considerably over time (Safford, et al., 2007), resulting in more costly care. Thus, responding to health care complexity contributes to the escalation of health care costs (Wade, 2011). It necessitates flexible and complex actions from practitioners, increasing the difficulties associated with managing the health workforce. However, failing to address health

care complexity through the delivery of appropriately responsive and complex care, without over providing services, may be even more costly (Ellis & Vidal-Fernandez, 2007). Factors associated with the interaction between health care complexity and complex patient circumstances are explored in Chapter 3.

In the current health care context, cost-effective approaches are essential (Weiss, 2007; Zwar et al., 2006), and there is a great deal of pressure on health care systems to ensure efficacy, quality and accountability, all of which are undermined when health care complexity is not addressed adequately. When medical and situational, or contextual, complexity are combined, they raise significant challenges for the design and delivery of health care systems that meet patient needs, coordinate multiple providers and services, accurately assess need, ensure continuity of care, appropriately monitor health and functional status over time, respond to crises in a timely manner, and support family carers (Kodner & Spreeuwenberg, 2002). Importantly, these essential

health care delivery activities must be performed within existing funding and resource constraints (Kodner & Spreeuwenberg, 2002), usually determined for non-complex circumstances. The challenges associated with how health care services respond to complexity are addressed more fully in Chapter 4.

Appropriate practitioner education, professional development, competency standards and intervention protocols will be required for the health care workforce to facilitate efficient, effective, quality, accountable health care in situations characterised by complexity. In order to do so, departments of health will need to make considerable investments in the design and implementation of appropriate and responsive models of care delivery, foster greater collaboration at many levels, and invest in the training and development of an adaptive health care workforce. This issue is addressed in Chapter 5, and some local examples of responses are noted in Appendix 2.

<sup>1</sup> As a result, it is proposed that a subsequent and strategic phase of this project should include case studies of complexity (e.g. with patients, direct care staff, management, policy makers, etc) in Queensland Health, and in associated agencies/sectors. These studies will further elucidate this issue, harness clinical knowledge, identify relevant problems and highlight innovative strategies for responding to complexity.

## Recognising health care complexity as a 'wicked problem'

A useful conceptualisation of health care complexity can be drawn from the notion of 'wicked problems'. This conceptualisation emerged out of management science in the 1960s and is used to describe a problem that is difficult to solve because of incomplete, contradictory and changing requirements that are often difficult to recognize. Moreover, because of inherent interdependencies within wicked problems, the effort to solve one aspect of the problem may reveal or create other complexities and problems. Complex health issues are like wicked problems in that they comprise multiple layers and dimensions, they are associated with fragmentation and their resolution frequently requires a diversity of players which, in itself, adds increasing complexity (Conklin, 2006). The inter-related nature of complexity in health care is illustrated in Figure 1.

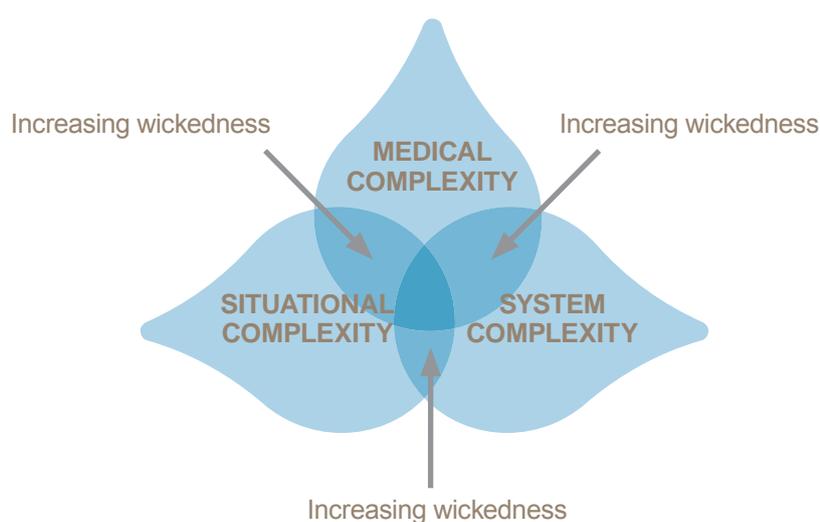


Figure 1: Dimensions of health care complexity and 'wickedness'

Some key elements of wicked problems relevant to health care complexity include:

- Every wicked problem is a symptom of another higher-level problem with multiple interdependencies that are frequently multi-causal.
- Solutions to wicked problems are not true-or-false, but require value judgements (Katlubeck, 2009). Proposed solutions are 'better' or 'worse' or 'good enough', often resulting in ongoing ambiguity for health care practitioners.
- Perversely, wicked problems often cannot be defined until the solution has been found (Katlubeck, 2009), meaning that health care practitioners must work without clear direction.
- Wicked problems have no rule for stopping. Since there is no right answer or ultimate solution, a response to health care complexity is often the best that can be achieved within the limitations of the situation. Hence there is a focus on short-term responses, or trial and error, which further complicates the clinical process.
- There are no criteria against which to judge whether or not all solutions have been considered, making it a matter

of personal judgment in terms of which solutions should be implemented (Katlubeck, 2009).

- Wicked problems are rarely stable.
- Wicked problems are socially complex, require coordinated action from a range of stakeholders, and involve behaviour change.
- The choices that are made about the explanation of the condition can determine the focus of clinical energy. As there are no rules about how to treat wicked problems, the 'correct' explanation may be determined by the beliefs and convictions of the person who has the greatest power in the situation (Australian Public Service Commission 2007; Conklin, 2006; Weber & Khademian, 2008).

When complexity in health care is articulated as a wicked problem, with different dimensions, it is clear that broad multi-method approaches to building and linking knowledge will be required (Australian Public Service Commission, 2007). Similarly, for effective translation of knowledge about health care complexity into policy, interconnectedness and context will be as important as objectivity and detachment. In this review we propose that a comprehensive framework, as well as appropriate broad and multilevel approaches, are required to deal with health care complexity as a wicked problem. The ICF framework that underpins this review provides a starting point for considering some of the features of this wicked problem. It suggests a framework that will assist in identifying major components of health care complexity and in so doing, also provides a basis for identifying multilevel responses.

## A framework for considering complexity: the ICF

A major challenge in seeking to address complexity is that the application of conventional approaches to knowledge, such as reductionism and compartmentalisation, are potentially counterproductive (Martin & Sturmberg, 2009). Although the process of reducing a complex problem into smaller and more manageable components is an inherently sensible strategy that may assist in initially conceptualising the extent of the issue, it can exacerbate the problem of health care complexity. Instead, a comprehensive framework is required which can accommodate the multiple interactions and dimensions that contribute to complexity.

One such framework that assists in portraying inter-related constructs is the World Health Organization's International Classification of Functioning, Disability and Health (ICF), published in 2001 (WHO, 2001). The ICF (in its full form) is a unified, comprehensive coding system (consisting of 1454 categories) that provides a standard language for describing human functioning, disability and health. It provides classifications for body functions, body structures, and activities and participation. It also provides classification codes for describing contextual factors (i.e., environmental factors such as social support systems, and personal factors such as personality, age, culture and coping strategies).

More importantly for present purposes, the ICF overview diagram (see Figure 2) depicts a comprehensive bio-psycho-social model of health and functioning that can be used to elucidate interactions that are influential in health care complexity at individual and systems levels. The ICF can be used to inform professional practice and facilitate research. It acknowledges the significance of personal and environmental factors in complexity. The current review focuses on a specific dimension of the environment (the health service environment), which is a crucial contributor to complexity, and therefore also crucial to understanding and addressing health care complexity.

Recognising this potential for facilitating understanding at various levels, the ICF is used here as a framework and reference point for conceptualising complex interactions between multiple factors that contribute to health.

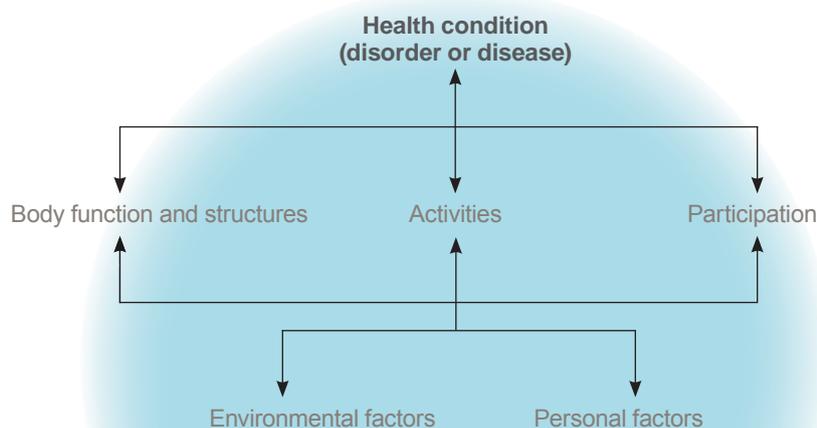


Figure 2: The ICF framework

<sup>2</sup> According to the ICF, the environment dimension comprises not only the natural and human-made environment, including products and technology, but also the psychosocial environment (support, relationships and attitudes), and most importantly, the service environment, systems (e.g. healthcare system, housing system, transport system, legal system) and the policy environment.

## **Chapter 2.**

### **Medical Complexity**

Within the health care system, complexity is often (initially at least) conceptualised as 'medical complexity'. This chapter will identify key definitional issues pertaining to health care complexity, describe features of medically complex conditions, and elaborate on a common example of medical complexity, namely, co-morbid and multi-morbid conditions.

#### **Definition**

As stated in Chapter 1, in many medical settings, health care complexity has primarily been understood as an interaction among disease-related factors, such as diagnosis, severity of condition or symptoms, co-occurring conditions, chronicity, and level of disability (Gask, et al., 2008; Nardi, et al., 2007).

Specific criteria for defining medical complexity have included:

- Severity of the illness. This is a key factor in complexity, however, complex conditions need not necessarily be serious and complex for all patients at all times. Indeed, some complex conditions may be serious and complex for some patients at some points during the course of their disease or disability.
- Presence of multiple co-occurring medical conditions (Safford, et al., 2007).
- Difficulty in determining an accurate diagnosis. Diagnostic complexity is increased when conditions are poorly differentiated and symptoms are unrecognized or not identifiable, particularly in consumers with mental health issues (Gask, et al., 2008).

- Degree of impairment or disability that results from the medical condition (WHO, 2002).
- Level of need for comprehensive care management. Health care complexity reflects not just medical or biological complexity, but the characteristics of the management of the condition, the context of the condition, the interactions between the person and the provider or the service; and the broader environment (WHO, 2002).

However, even at this fundamental level, complex conditions are notoriously hard to define and categories of complexity are not mutually exclusive (Chrvala & Sharfstein, 1999).

### Body functions, structures and complexity

Within the ICF framework (Figure 2), medically complex conditions primarily pertain to 'body functions' and 'body structures'. Body-related factors include a host of biological circumstances and conditions (the full ICF classification<sup>3</sup> comprises thousands of items describing all body functions and structures in detail), which interact with the person's health status in complex ways (de Jonge, Huyse, Slaets, Söllner, & Stiefel, 2005; Safford, et al., 2007; Stineman & Stream, 2010). In particular, complexity arises out of the many interactions that occur between the person's body functions and structures, the activities and participation shaped by the health of those functions and structures, personal factors and engagement with the environment. Some specific examples that illustrate the extent of medical complexity include:

- Conditions that affect multiple organ systems. This category of conditions is what might be traditionally thought of as being medically complex (e.g., HIV/AIDS, cancer, diabetes). The biological and medical factors, as well as the medical management of these conditions, can be highly complex at multiple levels.
- Conditions that require management according to 'tight' physiological parameters. These conditions include those requiring specific, well controlled or demanding

treatments (e.g., anticoagulation therapy, diabetes, kidney failure). In these cases, health care complexity relates to medical management of the condition.

- Conditions that are life threatening. In this category, health care complexity is accentuated by the potential catastrophic consequences of the condition (e.g., cancer, cardiovascular disease, HIV/AIDS).
- Conditions that predict or are associated with severe consequences. Within this category, complexity is accentuated by the (usually) long-term consequences associated with the condition (e.g., hypertension, severe depressions, alcohol and other substance abuse).
- Conditions that cause serious disability without necessarily being life threatening. While not acute, these conditions can be highly complex in terms of day to day management (e.g. brain injury, spinal cord injury).
- Conditions that cause significant pain or discomfort. This type of complexity can mean that conditions are highly complex to manage, or can cause serious interruptions to life activities (e.g., allergies, migraine, arthritis).
- Conditions for which there are risks associated with current treatment regimes. For instance, there are numerous conditions requiring complex drug regimes with significant side effects or new technologies that can have unexpected consequences (Nardi, et al., 2007).
- Conditions which interact with psychological factors (de Jonge, et al., 2005; Nardi, et al., 2007; Stineman & Stream, 2010). For instance, the presence of decreased emotional stability, poor ability to cope or previous psychiatric illness increases complexity, multiplies physical and functional problems, and impacts on treatment response (Stiefel et al., 2006).
- Conditions interacting with neuroticism. The tendency to experience negative, distressing

emotions is a predictor of depression, and is associated with poor physical health, altered symptom perception, and somatisation (de Jonge, et al., 2006).

- Conditions that involve fluctuating or unpredictable symptoms (e.g., rheumatoid arthritis, multiple sclerosis) present unique levels of complexity due to the changing nature of the condition (Gask, et al., 2008; Nardi, et al., 2007).
- Conditions associated with frailty. Such multisystem conditions, often associated with ageing, enhance vulnerability to a range of complex situations (such as weakness, cognitive decline or malnutrition) (de Jonge, et al., 2006).

Medical complexity requires that patients, health care practitioners and health care services will be able to respond to changing parameters, unpredictable outcomes, uncertain trajectories and individual management. One common instance of this type of complexity is co-morbidity. Co-morbid or multi-morbid conditions provide an example of the extent and impact of medically complex conditions.

<sup>3</sup> <http://apps.who.int/classifications/icfbrowser/>

## Health care complexity, co-morbidity, and multi-morbidity

Co-morbidity refers to the situation in which multiple conditions occur simultaneously. There is a lack of clarity about how to define and measure co-morbidity with related constructs, such as frailty, often being used interchangeably. For patients co-morbidity is often associated with (a) decreased quality of life, (b) increased psychological distress, (c) longer hospital stays, (d) more postoperative complications, and (e) higher costs of care (Fortin, Soubhi, Hudon, Bayliss & van den Akker, 2007).

This uncertainty substantially impedes care. Given that patients with multiple coexisting (i.e., co-morbid or multi-morbid) conditions are now the norm rather than the exception in health care (Starfield, 2006), their effective management is critical. For health care services and health care practitioners, co-morbidity creates unique challenges due to (a) complex patient self-care needs, (b) the use of multiple (and sometimes counteracting) medicines, (c) increased use of emergency facilities, (d) difficulties with organisational accessibility, (e) the need for ongoing care coordination with multiple specialists, (f) demands on, and management of, consultations, and (g) difficulty in applying standardised guidelines to individually complex circumstances (Fortin, et al., 2007; Stack, Elliott, Noyce, & Bundy, 2008).

Complex and co-morbid health conditions challenge practitioners' capacity to act on risk factors, to recognise signs and symptoms of illness, and to manage treatments and medications (Jowsey, et al., 2009;

Safford, et al., 2007). Diagnostically, health care practitioners may encounter uncertainty when different conditions interact in unpredictable ways (Soubhi et al., 2010). It can be similarly difficult to diagnose conditions that cause or influence other illnesses, particularly with respect to co-morbidities in aged patients (Turco, Torpilliesi, Morghen, Bellelli, & Trabucchi, 2009). In response, various approaches have been taken to characterise the combined burden associated with co-morbidity or multi-morbidity<sup>4</sup>.

Treatment decisions are further complicated by the competing demands of different conditions (Soubhi, et al., 2010), with treatments indicated for one condition potentially having an antagonistic effect on a coexisting condition (Valderas, Starfield, & Roland, 2007). Difficulties may arise in determining the relative importance of multiple occurring conditions (Valderas, et al., 2007), creating uncertainty in the application of guidelines (Fortin, et al., 2007; Soubhi, et al., 2010). Decisions must be made for prioritising treatments in the absence of clear clinical guidelines about how to manage multiple conditions simultaneously (Turco, et al., 2009). The

### *Complex and co-morbid health conditions challenge practitioners' capacity to act on risk factors, to recognise signs and symptoms of illness, and to manage treatments and medications.*

(Jowsey, et al., 2009; Safford, et al., 2007).

chronology of co-occurring disorders, while impacting on treatment choices, is not necessarily reflected in research and clinical guidelines (Valderas, et al., 2007). For example, a patient with established diabetes who is newly diagnosed with depression may have different treatment needs from someone with depression who is later diagnosed with diabetes. From a research and clinical guidelines perspective, both may be represented as patients with diabetes and depression, leaving health care practitioners without meaningful evidence from which to make decisions (Valderas, et al., 2007). This situation challenges clinical decision making and increases the potential for errors (Soubhi, et al., 2010).

Complexity beyond diagnosis and classification is even more extensive. Selecting management strategies from multiple arrays of multiple options

including chemical measures (e.g., medication), mechanical interventions (e.g., physical therapy or surgery), behavioural interventions (e.g., smoking cessation, diet, exercise), and psychological interventions (e.g., placebo effects, cognitive therapy) is clearly complicated. However, negotiating appropriate treatment plans, supporting the patient's engagement with treatment, incorporating family and social factors, addressing environmental, psychological and social contributors, promoting self-care, and influencing health beliefs (Street, Ward, Gordon, Krupat, & Kravitz, 2005) is even more so.

At the broader systemic level, health care systems are challenged by increased costs, reduced health outcomes and more complicated clinical management that is associated with co-morbidity and complexity (Valderas, et al., 2009). In Australia, growing recognition of the extent of these issues has led to specific initiatives such as the introduction of Medicare Items that fund the management of complex and chronic conditions (Halcomb, Davidson, & Brown, 2010). In some jurisdictions, the demand created by complexity has contributed to calls to restructure the health care system<sup>5</sup>, overhaul policy and funding strategies<sup>6</sup>, or impose structures to manage the interaction between health care costs and clinical implications<sup>7</sup>. Thus, co-morbidity is an important dimension of health care complexity (de Jonge, et al., 2006), and will continue to

challenge health care systems and funding structures. This situation is complicated by the fact that the system consists of multiple funding mechanisms and complex funding matrices. These are inadequate strategies for dealing with complexity because they contribute to fragmentation and compartmentalization of health care responses, thus promoting increased degrees of complexity.



In summary, given that patients with multiple coexisting (i.e., co-morbid or multi-morbid) conditions are now the norm rather than the exception in health care (Starfield, 2006), their effective management is critical. However medical complexity challenges health care practitioners and health care services in many ways. Uni-dimensional treatments, limited categorisation and multiple piecemeal funding mechanisms fail to address the issue. This situation is further accentuated when the complexity of individual patient circumstances are taken into consideration. These situational aspects of complexity are discussed more fully in the following chapters.

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<sup>4</sup> This project is investigating the resources currently available to oral health clinicians in Queensland Health which support an evidence based approach to clinical practice. A systematic literature review has been undertaken to determine what is already known of the information support needs for evidence based clinical practice and how these may be effectively met. The overall aim of this project is to allow the seven professions across the oral health workforce to engage in evidence based practice through appropriate engagement with literature and resources available.

<sup>5</sup> See for example, Department of Health and Ageing (2009), Department of Health and Ageing (2010).

<sup>6</sup> See for example, Queensland Strategy for Chronic Disease 2005- 2015 (Queensland Health 2005), and Making Tracks Implementation Plan 2009-10 to 2011-12 (Queensland Health, 2008).

<sup>7</sup> Such as Adjusted Clinical Groups (ACGs), Diagnosis-Related Groups (DRGs), and Healthcare Resource Groups (HRGs).

## **Chapter 3.**

### ***Situational Complexity***

The ICF framework depicts situational (or contextual) factors as interacting with body functions, structures, activity and participation, as well as with each other, to create an overall health state (Figure 2). Situational complexity has also been acknowledged in the Ottawa Charter as an important focus for global health promotion since even relatively simple medical conditions may become complex as a result of the contextual realities and circumstances within which people live, work and play. In recognising that complexity resides in the personal, social and medical management of a condition, as well as in the underlying biology of that condition, the significance of the compound nature of complexity becomes evident, particularly as it arises in areas of convergence between factors (Figure 1). This chapter briefly describes the contextual or situational factors (environmental and personal) that may contribute to complexity in relation to health care.

#### **Environmental factors**

Environmental factors include the physical and social environment in which people live and conduct their lives (Threats, 2007). They are external to the person and can influence a patient's health condition, functioning and interaction with the health care system either positively or negatively<sup>8</sup>. The ICF framework recognises that a diverse range of environmental factors including housing conditions, social support and relationship factors, as well as workplace, product- and technology-related factors are all able to impact on health conditions and health care complexity.

At the societal level, environmental factors include formal and informal social structures, communication

and transportation services, laws, regulations, attitudes and ideologies, in the community or society (Kuipers, Foster & Bellamy, 2003). Factors such as socio-economic status can impact complex health conditions in multiple ways. For instance, the transport costs associated with poorly coordinated care, or the costs associated with lifestyle modification such as dietary changes may compound the complexity of an individual's condition and treatment (Cutchin, 2007; Shim, 2010). Variation in environmental factors also unequally exposes different groups to factors that damage health in different ways. Thus, people who live in poor regions are likely to experience greater risk of disease, less access to treatment and more complicating circumstances that prevent recovery or effective management (Marmot, 2007). This constellation of circumstances creates a type of complexity that cannot be easily defined or addressed.

Another significant environmental factor that impacts on health care complexity is the health care service itself. The health care service environment has been found to influence health care complexity through its impact on the:

- degree of access that patients have to health care services,
- nature of responses to patient's needs by particular health care practitioners, and
- interaction between patients and the health care service (Epping-Jordan, Pruitt, Bengoa, & Wagner, 2004; Wagner et al., 2001).

Further, once patients are outside the health care system, supporting them to adhere to health care recommendations is even more complex. Factors such as cultural background, family environment, language, occupation, financial capacity and income status interact in non-linear and dynamic ways that influence health care complexity, but are often not readily

amenable to change within the health system (Jeon et al., 2010; Norman, 2009). Instead, these environmental factors exist beyond the health system, requiring regulation by other sectors and higher, cross-sectoral, level policies.

### Personal factors

Personal factors include gender, race, age, cultural circumstances (Safford, et al., 2007), lifestyle, upbringing, life events (Gask, et al., 2008) and educational background (Nardi, et al., 2007; Safford, et al., 2007; Stineman & Stream, 2010). Although not a specific component of a patient's health condition, these factors impact on health status and health care complexity by influencing the way in which people experience their disease (Threats, 2007).

Personal factors represent attributes that existed before the onset of a condition. Although they may or may not have been problematic previously, following the onset of the condition personal factors endure, and may complicate or alleviate the manifestation, and the person's experience of, the condition.

Failing to acknowledge the impact of these factors on a person's health condition omits key variables and unnecessarily exacerbates the complexity of the condition (Ueda & Okawa, 2003). Thus, personal factors are deeply embedded within health care complexity. They are associated with the way in which patients and health care practitioners interact, and the way in which health care information is understood, responded to and acted upon by patients. As with environmental factors, health care practitioners must be able to identify and work with patients in a way that recognises the important personal factors that interact with their medical condition. Carefully identifying and working with these factors influences the activities in which patients engage and the way in which they participate in their own health care.

### Activities and participation

While not typically depicted as part of a patient's situation or context, as reflected in the ICF diagram (Figure 2), patients' usual activities and participation in society, relationships, work and culture also influence health conditions and should be included in any consideration of health care complexity. A person's activities and ability to participate in their own health care, as well as subsequent participation in activities such as learning, applying knowledge, communication, self-care, and domestic life can all be significantly impacted by complex health conditions (Schneider, Hurst, Miller, & Ustun, 2003). Understanding the relationship between an individual patient's complex condition and their life activities and participation can lead to effective treatment and management. Such understanding can also be used at a population level to inform policies that have potential to reduce systemic barriers and improve access to resources and services, thus improving health outcomes, cost-effectiveness and equity.

The interactions among complex health conditions and personal, environmental, activity and participation factors are complex and multi-directional. The nature of the interaction is often unique to each individual and changes the experience of and/or ability to perform usual activities or engage with healthcare and society (Cutchin, 2007). Seemingly similar patients with seemingly similar conditions will therefore experience the condition in a unique way, creating another form of complexity. Acknowledging the uniqueness of each individual's circumstance is essential, but may itself create a sense of complexity with regard to health care management and service provision.

<sup>8</sup> It is important to note that not all factors that contribute to health care complexity are necessarily negative. Some are benign, or even positive, and may be co-opted as part of a healthy care solution. For example, the interaction between particular personality traits and some medical conditions may be obstructive to the delivery of appropriate and timely treatment for some, but may support and enhance treatment for others. One person who is highly goal-driven might set unreasonable targets, and fail to accept that their goals are unattainable given their condition. In this case, the complexity created by the interaction between personality and medical condition is likely to result in failure and despondence about the future (Threats, 2007) and further complexity. Another may demonstrate rapid transfer of new skills into their home environment as a result of their personality traits. The ICF framework provides the impetus to integrate multiple components of complex health conditions into a coherent approach without dichotomising qualities as being either positive or negative.

## **Chapter 4.**

# **Health Care System Complexity**

The interplay between complex health conditions, complex patient circumstances and complex health care systems, contributes to the overwhelming challenge that is currently being faced by health systems in Australia and elsewhere. Health practitioners' resources and skills may be challenged in multiple ways as a result of complexity, for example when making demanding diagnoses and clinical decisions, when planning care for patients with complex needs, and when engaging with the complex situations within which individuals live. Likewise the resources and capacity of health care services are challenged by the fact that there are multiple potential responses to complexity (Cook, Beckman, Thomas, & Thompson 2008; Safford, et al., 2007; Valderas, et al., 2009). Ironically, the health service system itself quickly becomes a source of complexity, and a greater resourcing of that system does not necessarily result in reduced complexity. Sometimes increased services and practitioners can contribute to complexity by creating confusing pathways, uncoordinated responses, duplication and gaps in the health care continuum. To manage such complexity, practitioners and providers require versatile, flexible skills and new ways of thinking.

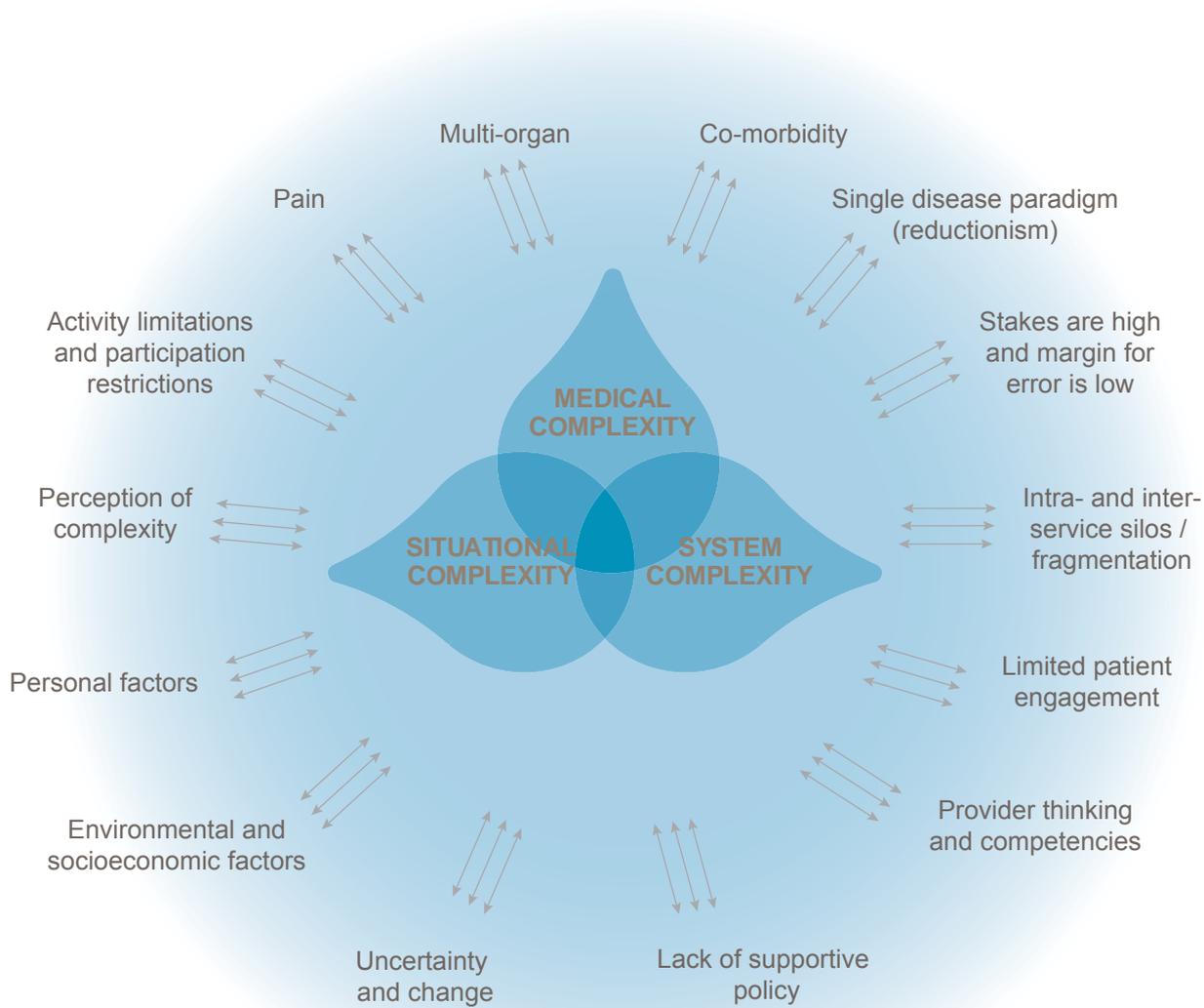


Figure 3: Factors associated with health care complexity and ‘wickedness’

### Referral from primary care

In Australia, general practice is the main entry point to the state and hospital health care system. Within this structure, General Practitioners (GPs) act as gatekeepers, preventing inappropriate or avoidable hospitalisation and monitoring people’s long-term health status (Duckett, 2008; Forrest, 2003). However, the increasingly complex nature of the tasks required to address chronic and complex conditions has dramatically altered the interface between general practice and other parts of the health system. Increasingly, GPs report feeling unable to manage this new environment and the workload it has created (Bodenheimer, 2008). For patients with complex health care needs who require care from

multiple providers and rely on an efficient flow of information over time, a fragmented health system is clearly inadequate (McDonald, Davies, & Harris, 2009). Thus, as primary care services have struggled to manage patients with complex health care conditions, more pressure has been exerted on the hospital system with an increased use of emergency facilities, longer hospital stays (Fortin, et al., 2007; Soubhi, et al., 2010), and more postoperative complications (Fortin, et al., 2007). It is not surprising therefore, that both GPs and patients may be reluctant to manage complex health conditions in the community, preferring to seek the reassurance and structure of the hospital system (Howard et al., 2005; Oldroyd et al., 2003).

## Service fragmentation

The convoluted trajectory by which patients with complex health care needs move through a fragmented health care system is clearly problematic. Complexity is increased when there are a large number of health care practitioners involved in the delivery of health care, particularly when these providers come from different disciplines and backgrounds (Stiefel, et al., 2006). As patients with complex health care needs move between different parts of the health care system or different 'microsystems' (for example from primary to acute care, or to different departments within the acute care system) (Barach & Johnson, 2006), they encounter different structures, roles and responsibilities among health care practitioners, as well as distinct terminologies, cultures and clinical approaches (Kodner & Spreeuwenberg, 2002). As a result, patients and their families may experience this fragmented health care system as cumbersome, unwieldy, unfriendly and opaque (Barach & Johnson, 2006).

Technically, service fragmentation is defined as "the differentiation, specialisation, segmentation and silo mindset deeply embedded in all aspects of the health system (i.e., policy, regulation, funding, organisation, service delivery and practitioner/institutional culture)" (Kodner, 2009, p. 7). Health system fragmentation creates barriers to the effective management of patients with complex health issues (Soubhi, 2007; Swerissen, 2002; Van Raak, Mur-Veeman, Hardy, Steenbergen, & Paulus, 2003) and leads to costly, inefficient care (Fortin, et al., 2007). Fragmentation impacts negatively on health care continuity and appropriate use of care pathways, it limits accessibility of health services and negatively impacts on consultation time (Fortin, et al., 2007).

To complicate this systemic fragmentation, clinical fragmentation is also evident in the compartmentalisation of patient sub-groups or different health conditions, despite underlying commonalities and economies of scale. The prevailing single-disease paradigm leads to "incomplete assessment of complexity and failure to modify the clinical approach accordingly" (Safford, et al., 2007, p. 384). Within a fragmented health care system, patients with complex health conditions must reconcile and integrate the potentially diverse views and inputs of an array of health care practitioners themselves, despite the fact that they are likely to also be managing their own personal and environmental complexity. Ironically, patients may try to manage the fragmented health care system by consulting multiple health care practitioners in search of clarity (Soubhi, 2007). This response may lead to greater confusion, misinformation and eventual inertia.

To address service complexity, multidisciplinary teams, inter-organisational partnerships and intersectoral collaboration are increasingly recommended. However, competing professional identities and organisational structures may precipitate inter-professional or inter-organisational conflicts that impede teamwork and create further complexity (Fitzgerald & Davison, 2008). Potential methods of responding to health care complexity are discussed in Chapter 5.

## Funding

Ineffective and inefficient management of health care complexity is reported to lead to increased costs, reduced health outcomes, and more complicated clinical management (Valderas, et al., 2009). The way in which health care services are currently managed and funded within Australia is inherently complex, comprised of multiple layers and constant change. Included within this complex funding system are public and private hospitals, public, private, primary, community, and specialised health care services, as well as an array of non-government organisations, each funded through different channels (Australian Institute of Health and Welfare 2010). Care for individuals with complex health care needs is therefore, 'hindered by the separate and competing contributions made by the federal and state governments [as well as by] the private sector, to the funding and supply of health services' (Armstrong, Gillespie, Leeder, Rubin, & Russell, 2007, p. 485). Funding and service delivery models in health care are often disconnected between primary care and acute care, and between intermittent medical care and continuing care services (Swerissen, 2002). Thus, in the pursuit of continuous care, the need to manage these different funding streams can exacerbate health care complexity, often creating duplication and gaps in the overall patient experience.

A key strategy for reducing the fragmentation of care and responding to complexity is providing care in a proactive and systemic manner (Harris & Zwar, 2007; O'Malley, Tynan, Cohen, Kemper, & Davis, 2009; Rothman & Wagner, 2003). However, funding systems do not accommodate or incentivise proactive care, instead facilitating a narrow set of responses. Although funding models, such as the Medical Benefits Schedule exist for providing care to patients with complex needs, the way in which funding is accessed is particularly involved and changeable over time (Swerissen & Taylor, 2008). Service delivery systems that must quickly respond to shifting funding incentives and complicated funding rules are likely to contribute to increasing health care complexity.

## Patient engagement

Complex health conditions commonly have profound impacts on a patient, as described earlier, for example, increasing demands on time due to health care appointments or the preparation of special diets, or limiting capacity to work and increasing financial hardship (Jeon, et al., 2010). From a patient perspective, complex health conditions require readjustment of life expectations and development of skills for managing illness and negotiating the health care system (Jeon, et al., 2010).

The complex interface between patients, health care practitioners and health care services contributes to the patient's ability to access appropriate services in a timely manner and complicates the formulation of treatment and management plans. The ability and willingness of patients to adopt treatment decisions and management plans can be compromised if this interface is not responsive to the patient's needs. Unfortunately, there is evidence that health care practitioners often have low expectations of patients' ability to understand and prioritise medical management which affects how practitioners communicate with people in their care (Cook, 2006). In response, patients may react by becoming sceptical of health care practitioners and less forthcoming with important information that could potentially reduce complexity (Shim, 2010). Research also indicates that patients with lower levels of education, the elderly, people from culturally and linguistically diverse backgrounds and most notably, those

with complex chronic disease, are offered a lower degree of engagement by health care practitioners (Volandes & Paasche-Orlow, 2007). In such cases, health care practitioners may be prevented from responding appropriately by failing to grasp the full extent of patients' complex circumstances (Yardley, Sharples, Beech, & Lewith, 2001). In order to reduce disadvantage and respond appropriately to complexity, health care practitioners and patients need to explore ways of working together that develop trust, explore concerns, and reach collective understandings about treatment options and health care decisions.

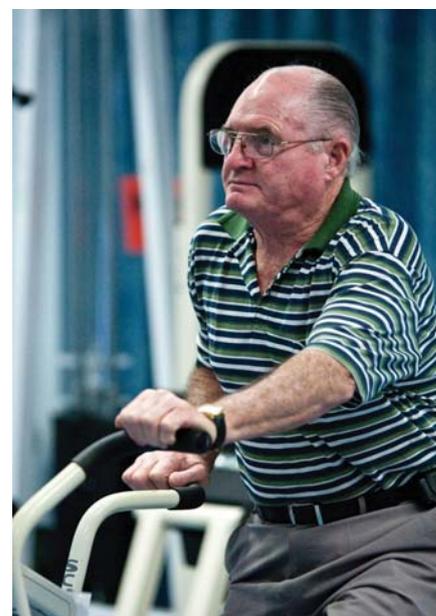
Decision-making in these circumstances frequently requires "trade-off" decisions that are made by considering and comparing perceived and actual efficacy and risks of different treatment options (Kreps, 2009). Understandings of health and illness are usually based on personal experiences, personal beliefs, local information, the interpretation of scientific evidence acquired through media, and 'common sense' (Street, et al., 2005). The ability to acquire and use information or knowledge through these sources has been termed health or medical literacy (Peerson & Saunders, 2009; Shim, 2010). A patient's ability to comprehend a health condition and treatment options (particularly when those conditions and options are complex) depends upon the degree to which they can gather, understand and interpret health information and services (Nielsen-Bohlman, Panzer, & Kindig, 2004). As with other aspects of health care, health-related knowledge, skills and behaviours are influenced by factors

*A patient's ability to comprehend a health condition and treatment options (particularly when those conditions and options are complex) depends upon the degree to which they can gather, understand and interpret health information services.*

such as cultural background, health system demands and prior learning opportunities (Paasche-Orlow & Wolf, 2010). Approaches to increasing patient engagement are considered further in the following chapter.

## Provider thinking & health care complexity

Health care complexity presents some unique challenges for practitioners. Rather than following clear, predictable causal chains, complexity often results in non-linear, unpredictable outcomes, where events are not always linked to a cause (Katerndahl, 2005). At a basic cognitive level, humans do not easily grasp the systemic and variable relationships that exist between components of a complex health care issue or problem. Likewise, it is difficult to fully appreciate the delayed impact of decisions, actions or other events on a complex health problem (Barach & Johnson, 2006).



As health practitioners seek to respond to health issues in the context of complexity, they are faced with ambiguous situations in which there is no clear best solution, and in which the potential to rely on evidence-based decision-making is limited (Molleman, Broekhuis, Stoffels, & Jaspers, 2008). These factors are expanded in the following chapter however it should be noted that the impact of ambiguity, and the limited value of research-based evidence in the face of health care complexity, necessitates a substantial shift in skills, thinking and reasoning on the part of health care practitioners. Responding effectively to health care complexity requires practitioners to consider multiple perspectives and options.

Beyond decision making, the translation of knowledge to practice is also problematic in the face of complexity. The 'knowing–doing' gap (that clinicians often know what to do, but fail to do it, or fail to do it correctly) (Glasziou, Ogrinc, & Goodman, 2011) is pertinent. Whether it arises from a lack of knowledge about the detail of what should be done in a complex situation, or uncertainty about how it should be done, in the context of complex health care concerns, the flow-on effects of the knowing–doing gap are substantially amplified. Relatively minor concerns or obstacles in day to day care may become catastrophic in the context of the ambiguity that may result from health care complexity. This reality highlights the point noted above, that solving complex problems requires an ability to think broadly and systemically (Barach & Johnson, 2006). Yet health care practitioners are rarely provided with education or training that adequately

equips them to respond effectively with the multi-level reasoning and problem-solving required by health care complexity.

### **Innovation and health care complexity**

Paradoxically, innovation in healthcare technology, which may be initiated in response to complexity may add to, rather than diminish, health care complexity, confronting health care practitioners with a greater range of alternative treatment options and information requirements (Clancy & Delaney, 2005). Similarly, the unprecedented access to information resulting from advances in information technology may complicate rather than simplify health care (Clancy & Delaney, 2005). Health care innovation has also contributed to ongoing shifts in health care towards increasing specialisation. The resultant fragmentation increases system complexity, and runs counter to the holistic, generalist care required in complex situations. Further, the burden of increasing documentation necessitated by system complexity, results in greater workload for health practitioners, reduced

*Solving complex problems requires an ability to think broadly and systemically (Barach & Johnson, 2006). Yet health care practitioners are rarely provided with education or training that adequately equips them to respond effectively with the multi-level reasoning and problem-solving required by health care complexity.*

time with patients and increasing job frustration (Clancy, Delaney, Morrison, & Gunn, 2006). Thus, although technology advances health care, it may also have the effect of increasing health care complexity on a number of levels.

### **Perception of health care complexity**

To some extent, part of the conceptual problem around health care complexity is the way in which 'complexity' is perceived by practitioners. For example, in situations of organisational change or stress when access to services is restricted, practitioners are likely to perceive the situation as increasingly complex. Paradoxically, strategies designed to remediate such changes and enhance service provision, such as practice improvement strategies, can also increase the perception of care complexity due to heavier and unfamiliar workloads (Katerndahl, et al., 2010). Such perceptions highlight the importance of responding to health care complexity by facilitating health care practitioners to actively engage with, and participate in, addressing issues to avoid any notions of imposition.





## ***Chapter 5. Potential responses to health care complexity***

Complexity impacts on patients, services, patient-practitioner relationships, the role of practitioners, the type of skills and reasoning required, and the nature of training and education necessary to develop those skills. Given the 'wicked' nature of health care complexity, it is unsurprising that attempts to create over-arching 'one size fits all' solutions have not succeeded (Woods, Patterson, & Cook, 2008) and that, in general, top-down attempts to exert control over or regulate complex systems have not led to positive outcomes (Baxter, 2010). Having identified key concerns and challenges relating to complexity, potential responses can now be considered.



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In light of the concerns and challenges described in previous chapters, this chapter links ClinEdQ functions and capacities with potential responses to health care complexity (see Figure 4) thus:

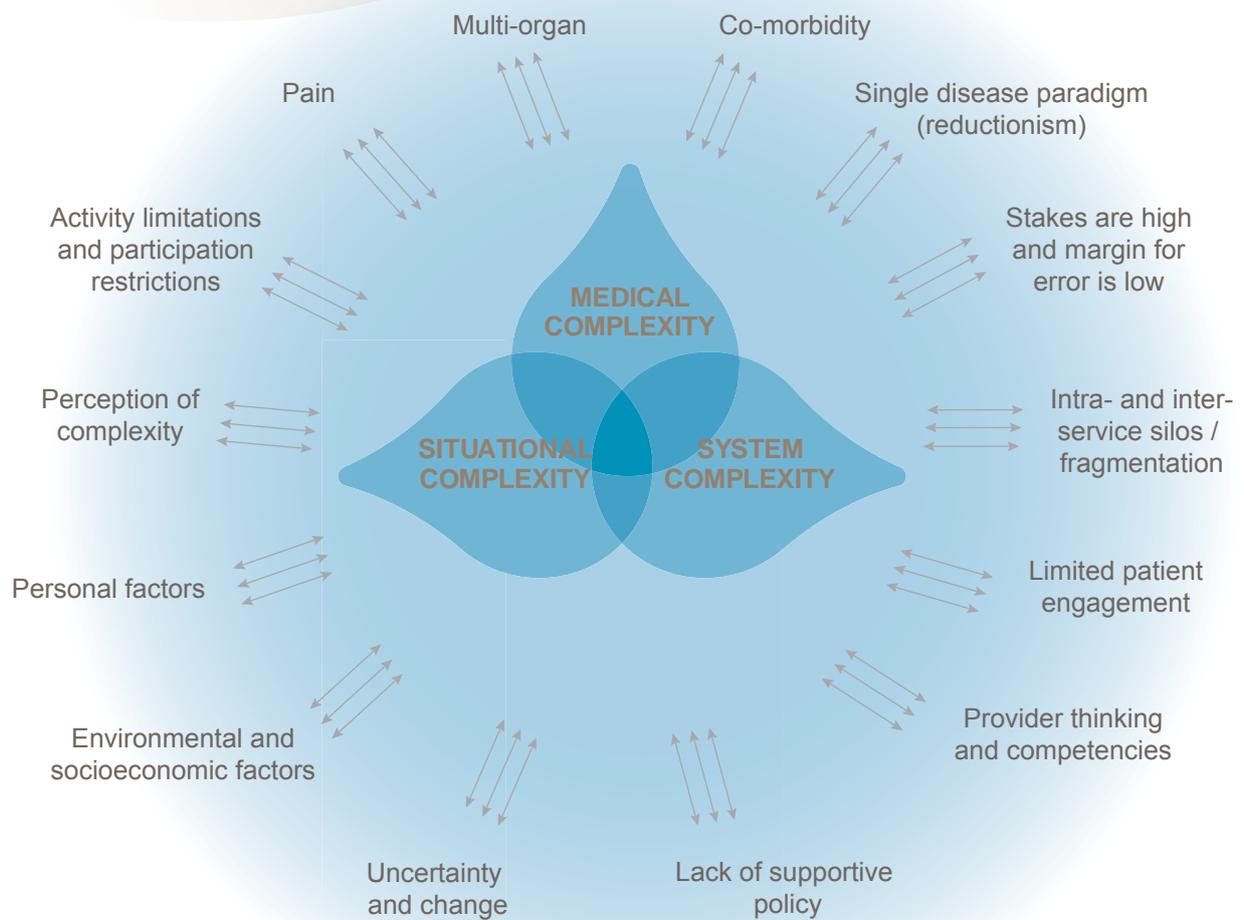
- Recognising the role of ClinEdQ to build clinical education by advancing a multi-professional perspective, **learning and training responses** to health care complexity are identified.
- Noting the ClinEdQ priority to coordinate and facilitate innovation and collaboration between stakeholders across the clinical professions, education and health service providers **collaboration-oriented responses** to health care complexity are outlined.
- Responding to the ClinEdQ focus on achieving improvements in the capacity and quality of care in Queensland Health, **care-oriented responses** to complexity are proposed.
- Acknowledging the ClinEdQ emphasis on practical strategies, workforce responsiveness and facilitation of clinical development and knowledge management across the clinical professions, **practical examples** currently employed actions that may be further optimised in the response to complexity are presented (Appendix 2).

### Learning-oriented responses:

- Reflective practice
- Clinical reasoning and evidence-based practice
- Case-based learning and problem-solving
- Experiential Learning
- Equipping providers - Capability
- Equipping teams to respond to health care complexity
- Organisational learning through Quality Improvement
- Organisational learning through research

### Collaboration-oriented responses:

- Inter-professional/practitioner collaboration
- Collaborative teams (Communities of practice)
- Inter-sectoral collaboration
- Collaborative policy development



### Care-oriented responses:

- Informed and active patients and consumers
- Interpersonal processes of care
- Integrated / coordinated care

### Some local practical responses:

- Workforce flexibility
- Extending scope of practice
- Consultant & case management approaches
- Workforce education
- Technological approaches
- Training health care practitioners
- Reconceptualising outcomes
- Resilience

Figure 4: Responses to factors associated with health care complexity

## Reflective practice

The tendency and ability to reflect, and the processes used to do so, are highly variable across individual health care professionals (Mann, et al., 2009), however reflection facilitates practitioners to explore new possibilities when dealing with complexity. Reflective practice enables health care practitioners to gain meaning from complex clinical problems and situations (Mann, et al., 2009). Schön's reflective practitioner and Kolb's experiential learning models<sup>9</sup> are examples of reflective strategies that enable practitioners to constructively contend with health care complexity. Such strategies are based on the understanding that health practitioner practice is largely based upon tacit knowledge that becomes established as practice becomes more stable and routine. Over time practitioners become selectively inattentive to phenomena that do not fit the established categories and miss opportunities to think innovatively about what they are doing.

In contrast, 'reflective practitioners' notice emerging phenomena that challenge their existing categories and concepts. They have the skills to define a problem within the dynamics of the situation and identify (a) the decisions to be made, (b) the ends to be achieved, and (c) the means to be chosen (Mamede & Schmidt, 2004). By analysing previous decisions, considering scenarios and examining consequences, reflective practitioners consider new alternatives (Mamede & Schmidt, 2004). Such strategies emphasize the role that experience plays in the process of learning (Kolb, Boyatzis, & Mainemelis, 1999) and contribute to adaptive processes of thinking, enabling successful negotiation of complex and changeable environments (Kolb & Kolb, 2005). Reflective practice can assist health care practitioners to understand not only their own experiences and responses, but also those of their patients who are living with complex health care issues (Kolb & Kolb, 2005).

## Clinical reasoning and evidence-based practice

Evidence-based practice is frequently promoted as a means of responding to health care complexity by improving outcomes for discrete medical conditions and fostering standardisation of practice (Leff et al., 2009). However, only a fraction of current research is designed in such a manner that it will provide evidence that might change practice (Glasziou, et al., 2011), and even a smaller portion is relevant to complex health care settings (Greig, Entwistle, & Beech, 2011). The assumptions that evidence for best practice should be determined through reductionist methods, that best practice can be applied across multiple individuals in diverse settings, or that imported solutions can be translated across complex healthcare settings, have recently been questioned (Greig, et al., 2011).

Likewise, the application of evidence-based practice in health care complexity is akin to using 'authoritative strategies' to resolve wicked problems (Australian Public Service Commission, 2007). Although credible in themselves, efficient and often timely, authoritative strategies are also commonly overly narrow in

*Opportunities need to be created whereby health care practitioners can experience new ways of working, observe the outcomes, reflect on the experience and build their capability to respond to health care complexity.*

application and disconnected from eventual outcomes and consequences (Australian Public Service Commission, 2007). As practitioners seek to respond to complex and wicked health issues, they are usually faced with ambiguous situations in which there is no clear 'best' solution, and in which the potential to rely on evidence-based decision-making is limited or even non-existent (Molleman, et al., 2008). In situations such as these, too great a reliance on guidelines and protocols will not be constructive (Abbasi, 2005).

Health care complexity highlights the need to balance consistent and generic evidence-based guidelines with the need to respond to the unique requirements of each situation. Beyond a strong evidence foundation, decision making and reasoning in situations of complexity requires capacity for coping with uncertainty, ability to incorporate multiple perspectives and trans-disciplinary approaches, and awareness of the wide variety of personal and environmental factors that surround each person (Lessard, 2007).

Clinical reasoning is a cognitive process that supports a holistic response by health care practitioners, enabling them to take 'wise' action by considering the contexts and circumstances of their patients (Higgs & Jones, 2008). Clinical reasoning is one way of making implicit knowledge more explicit, and occurs as a result of input from multiple sources, including other practitioners, patients and family members. For present purposes, it is noteworthy that clinical reasoning which is applied as a form of collaborative, reflective practice is akin to the collaborative strategies outlined as the most effective for dealing with wicked problems (Australian Public Service Commission, 2007).

Recognition that clinical reasoning is derived, in part, from experience and ongoing reflection necessitates human resource management processes that can foster and maintain experiential 'wisdom' within the health workforce (Baxter, Blackburn, Hussey & Nicklin, 2009). Retaining experienced health care practitioners who are capable of exercising reflective reasoning and working at the full scope of their professional qualifications is an additional consideration in responding to health care complexity.

<sup>9</sup> <http://www.learningandteaching.info/learning/reflecti.htm>

### Case-based learning and problem-solving

Although many health care practitioners are adequately trained and have the capacity to solve complex problems within their sphere of training, they are less able to develop solutions when faced with complex problems that extend beyond the limits of that sphere (Barach & Johnson, 2006). A number of strategies can be employed to promote creative problem-solving and innovation in health care. First, there is evidence that case presentation and role plays are useful strategies; stories and cases aid the memorization of clinical knowledge more effectively than learning discrete facts (Fraser & Greenhalgh, 2001). Exposure to appropriately complex case histories with multiple acceptable solutions (Cook et al., 2008) builds the capacity of health care practitioners to respond to complex situations in future. Similarly, simulations using modelling of complex situations to provide practice in unfamiliar contexts (Fraser & Greenhalgh, 2001), with repeated experiences and evaluations over time (Batalden & Davidoff, 2007) are useful. Case-based rather than concept-based discussions are beneficial (Batalden & Davidoff, 2007; Fraser & Greenhalgh, 2001), presumably because this approach encourages the integration of multiple concepts.

Second, research indicates that problem-solving capacity can be enhanced through capability training which is focussed on teamwork and collaboration, building awareness of one's individual problem-solving style, and fostering an appreciation of the styles of other team members (Treffinger, Selby, & Isaksen, 2007). This approach emphasises the need for small group, problem-based

learning, in which case histories are used as a basis for the co-creation of treatment plans (Fraser & Greenhalgh, 2001). By combining case-based learning and capability training, interventions can bring about integration both at the individual level, and across disciplines.

Experiential learning is an effective vehicle for promoting the working knowledge (i.e., the 'how to') that is implicit in developing and maintaining a capable health care workforce (Batalden & Davidoff, 2007). In light of the ambiguity associated with health care complexity, health care practitioners benefit from educational experiences that are reflective of real life contexts. Opportunities need to be created whereby health care practitioners can experience new ways of working, observe the outcomes, reflect on the experience and build their capability to respond to health care complexity (Batalden & Davidoff, 2007).

The principles of experiential learning favour a focus on expert coaching rather than knowledge transfer from experts, and an emphasis on the acquisition of reflective skills rather than the memorization of content (Batalden & Davidoff, 2007). Thus, the capacity for reflection is an essential element of experiential learning and reflective practice is mediated by collaboration with others who have similar goals (Fraser & Greenhalgh, 2001).

### Equipping providers to respond to health care complexity - capability

Within this uncertain, evolving environment, the need for health care practitioners to develop capability as well as competence is crucial (Fraser & Greenhalgh, 2001). Competence is understood as involving conceptual knowledge ('knowing that'), whereas capability implies the acquisition of working knowledge ('knowing how') (Batalden & Davidoff, 2007). This ability to modify behaviours based on experiences, or 'transformational learning', enables individuals to adapt to or co-evolve with new situations, thereby supporting the transition from individual competence to personal capability (Fraser & Greenhalgh, 2001). Implicit in the notion of capability is the individuals' ability to create new knowledge, to adapt existing knowledge, to engage in continuous improvement through reflection, and to be flexible to change (Fraser & Greenhalgh, 2001).

The ability to think creatively is seen as an effective response to health care complexity, both as a function of the problem-solving process (Mumford & Baughman, 1995; Runco, 2004) and as a component of flexibility (Flach, 1990). It encompasses processes such as analysis, evaluation, synthesis, and the transformation of information to create new knowledge (Runco, 2004). Creative thinking can be defined as 'the connecting and rearranging of knowledge in the minds of persons who allow themselves to think flexibly to generate new ideas (Plsek, 1999). This style of thinking is characterised by free-flowing problem-solving where many solutions are possible. This ability affords practitioners the capacity to cope with changes inherent in complex systems such as health systems (Runco, 2004).

### Equipping teams to respond to health care complexity

The notion of capability applies not just to individuals, but also to teams of health care practitioners, who are required to collaboratively resolve complex problems and design care strategies. Soubhi and colleagues (2010) described the need for 'collective capability', which refers to the ability of health care practitioners to learn from each other when collectively solving complex problems (Soubhi, et al., 2010). Implicit in this notion is an acknowledgement of the emergent knowledge created when teams of health care practitioners collaborate over time. Training for capability is not limited to formal educational contexts, but should be an ongoing goal within work environments and a tenet of ongoing professional education.

## Organisational learning through Quality Improvement

Traditional approaches to quality improvement can be quite rigid, so patterns which might lead to new insights often go unrecognised (Leviton, 2011). What is needed to meet the challenges associated with health care complexity is an innovative new approach to quality improvement that accommodates unpredictability and variety, in which practitioners are free to use their ingenuity to address quality improvement problems (Leviton, 2011).

One example of such an approach is the Plan-Do-Study-Act (PDSA) cycle of quality improvement, which can be used to understand and deal with aspects of complexity. PDSA has been used by teams of health care practitioners to longitudinally and iteratively create cycles of rapid improvement in managing chronic illnesses (see, for example, Glasgow et al., 2002; Wagner, 2004). PDSA is a scientific method for implementing and testing the effects of change on performance within the health care system (Speroff, James, Nelson, Headrick, & Brommels, 2004). This approach may be appropriate for assisting groups of health care practitioners to participate in, reflect on and experientially learn from activities that aim to respond to health care complexity (Walley & Gowland, 2004).

When used as an organisational review strategy across an entire service, these approaches can inform and improve organisational responses to health care complexity. However, if used in a short-term or superficial way, they will likely be insufficient and ineffective to achieve organisational learning (Mowles, et al., 2010).

## Organisational learning through research

As with practitioner concerns over evidence based practice, it appears that many health care practitioners feel constrained by research that does not acknowledge health care complexity (Leviton, 2011). When research is defined by narrow limitations, excludes multiple conditions, or fails to engage patients and the complex variables that impact on them, its' capacity to address complexity is equally limited (Fortin et al., 2006).

In contrast, useful paradigms which accommodate complex health care needs of individuals are now entering the mainstream (Scuffham, Nikles, Mitchell, Yelland, Vine, Poulos et al, 2010). In a recent local example, Scuffham and colleagues found that they could achieve cost savings when they sought to identify optimal treatment in patients for whom disease management was uncertain. Their design accommodated patient perceptions and values, and supported patients and doctors to persist with optimal treatment. By conducting research as a collaborative process, engaging patients in the process, they found that patients were more likely to adhere to treatment, to gain a greater understanding of their disease (and the treatment), and have an improved relationship with their healthcare practitioner.

To develop a research agenda that addresses health care complexity, the choice of methodology, topic and the breadth of research should be carefully selected to be consistent with the key issues. Based on our review, research goals should include:

- Building collaboration, and co-opting health care practitioners and patients as researchers (de Jonge, et al., 2006; Edgren, 2008; Fortin, et al., 2007; Mowles, et al., 2010).
- Using a methodology which can deal with complex environments (for example, drawing from Complex Adaptive Systems methods, Plsek & Greenhalgh, 2001).
- Seeking clarity about the nature of social and other contexts and their effect on health outcomes.

## Collaboration-oriented responses to health care complexity

### Inter-professional/practitioner collaboration

Interdisciplinary or inter-professional collaboration specifically describes cooperation amongst health care practitioners from different disciplines. Because of the multiple dimensions of medical and social factors present, the array of professional disciplines involved, and the workforce factors, problem-focussed and patient-focussed inter-professional collaboration, is a highly important mechanism for responding to health care complexity (Petri, 2010).

There is an assumption within inter-professional collaboration that 'the achievement of desired outcomes would not be possible if each discipline was acting independently' (Petri, 2010, p. 76). It involves shared objectives, mutual responsibility, collective ownership of goals and shared decision-making (Petri, 2010), but with a degree of professional independence (Gray, 1989, cited in Kinnaman & Bleich, 2004).



## Collaborative teams (Communities of practice)

Consistent with issues raised in the previous section, another mechanism for responding to health care complexity is to engage key individuals in collective learning and action. Such teams or 'communities of practice' can be defined as 'a group of people who share a passion about a topic, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise by interacting on an ongoing basis' (Wenger, 2002 cited in Soubhi, et al., 2010). Active communities of practice can inform strategy, solve problems, transfer best practices, and develop practitioner skills (Wenger & Snyder, 2000). Within health care, they can contribute to defining common goals, co-creating care plans, and engaging in reflective learning (Soubhi, et al., 2010).

In addition to including practitioners from disparate disciplines, communities of practice should recognise patients and families as a vital part of the care team. In a team, patients and family members can support treatment programmes and add to collective knowledge about patient care (Soubhi, 2007). However recognising the potential for boundaries to form when individuals from different professional and socio-cultural perceptions come together (Dopson & Fitzgerald, 2006), managers should adopt a problem-solving, goal oriented approach, and emphasise reflection. They should support the development of a common space and time (on-line or in person), promote the understanding that patient and family member perceptions are part of clinical care, and use narrative to communicate and share knowledge (Robinson & Cottrell, 2005).

### Inter-sectoral collaboration

Inter-sectoral collaboration has been identified as crucial in the response to wicked or complex health problems, since by definition, these problems cannot be effectively addressed in isolation or within a single sector (Bilodeau, De, Andrade, Baretta, & et al., 2005). Inter-sectoral collaboration can be as straightforward as sharing information or as advanced as the development of joint intervention programmes or strategic frameworks. It can occur at planning and strategic levels, policy level, in service delivery, in monitoring and in research. The common factor, however, is recognition that complex health issues

require collaboration across traditional boundaries to achieve common goals that would otherwise have been difficult or impossible to achieve.

Effective inter-sectoral collaboration depends on: supportive structures and processes, supportive culture and skills base, common goals, appropriate budget and accountability mechanisms (Australian Public Service Commission, 2007; New Zealand Ministry of Health, undated). It also depends in large part on information management systems that support cross boundary working, since shared information leads to innovation (Bilodeau, et al., 2005).

Although the benefits of inter-sectoral collaboration appear clear, it is also time consuming and transaction costs are high. As a result, and often due to lack of management support, many collaborative initiatives dissipate within the first two years (New Zealand Ministry of Health, undated). The evidence that collaborative initiatives can address complexity remains limited, largely due to the difficulties associated with measuring such initiatives. Recognising that complex health issues span numerous sectors, this would appear to be a high priority for future research.

### Care-oriented responses to health care complexity

In order to respond appropriately to complexity in a way that reduces rather than increases the impact of these factors on individual health outcomes, it is essential that the care delivery system is characterised by individuals, relationships and networks that can accommodate complexity. These characteristics are usually associated with the level of understanding and engagement among individuals involved in the processes that define the relationship, and the coordination that exists between stakeholders.

For patients with complex care needs, inter-professional collaboration is associated with more responsive and timely services (Brown, Tucker, & Domokos, 2003; Coxon, 2005; Scragg, 2006), improved access and better information exchanges (Brown, et al., 2003). For health professionals, collaboration is associated with increased job satisfaction, greater team working, development of a shared culture, improved communication, and enhanced cooperation with other agencies (Coxon, 2005; Hultberg, Glendinning, Allebeck, & Lönnrothet, 2005), all of which are vital in the response to complexity. From a staff development perspective, when collaboration results in establishing agreed roles and responsibilities, it can alleviate conflict (Hudson, 2005; Stewart, Petch, & Curtice, 2003), and improve understanding of other disciplines (Scragg, 2006).

Despite these benefits, inter-professional collaboration remains limited in practice and many patients experience resulting sub-optimal outcomes (Schoen et al., 2004 cited in McDonald, et al., 2009). Acknowledging that this is partially due to management difficulties in working with multifaceted teams (Wagner, 2000), it is evident that deliberate and active management support is required.

Effective collaboration stems from successful inter-practitioner education, appropriate role awareness, and interpersonal relationship skills (Petri, 2010). It requires the clarification of roles, and the investment of required resources (Campbell & McLaughlin, 2000). Ongoing maintenance of collaboration requires clear standards for measuring the effectiveness of integrated teams and attention to reflective analysis (Bronstein, 2003).

## Informed and active patients and consumers

It is within the relationship established in the clinical encounter that health care practitioners are able to shape (positively or negatively) the ability of individuals to respond to complexities associated with their health (Shim, 2010). Beyond the influence that health care practitioners have over patients, their level of medical knowledge, skills, and attitudes significantly affect the quality of their clinical encounter (Shim, 2010). It is vital that health care practitioners recognise and respond to the interaction within the patient encounter in a way that most actively informs and engages patients in complex health care. In instances where health literacy is poor, patients are less knowledgeable about health, receive less preventive care, have worse chronic illness control, poorer physical and mental health function and have higher emergency department and hospital utilisation (Hibbard, Peters, Dixon, & Tusler, 2007). They are typically not provided with optimal care, which in turn affects outcomes (Shim, 2010). The resulting disengagement of patients is exacerbated because practitioners are less likely to appreciate the complexity of their circumstances and respond appropriately, resulting in further disadvantage (Shim, 2010).

In contrast, in addition to the informational and self management benefits of their engagement, engaged patients are rewarded through informative and supportive interactions with health care practitioners (Street, et al., 2005). Informed and active patients, in combination with proactive health care teams, are central to a model of health care that can appropriately respond to health care complexity

(Wagner, et al., 2001). Informed and active patients require information about their health care, the skills to access and apply the information, and the confidence to continue to access and apply that information and those skills (Wagner, et al., 2001). Health literacy, self-management support, motivation, goal-setting, and decision making are important for enabling patients to become informed and active.

**Health literacy** is foundational to each of these concepts because it relates to the ability to access, interpret and make decisions based on information, make sound health decisions and assume greater responsibility for health care (Peerson & Saunders, 2009). In the context of complexity, health literacy is essential for understanding and acting on information and instructions from health practitioners, seeking additional information, and sharing in decision-making (Peerson & Saunders, 2009). While it is true that health literacy is heavily influenced by fixed realities such as the patient's background and their prior learning opportunities (Paasche-Orlow & Wolf, 2010), it is also influenced by the social capital emerging from the health care encounter (Hawe & Shiell, 2000; Shortt, 2004; Shim, 2010). Health care practitioners can therefore provide interpersonal support for health enhancing behaviour, health-related knowledge and the ability to access services (World Bank Group, 2011; Abel, 2008).

**Self-management** is a key component of many models of complex and chronic care, and is a priority in almost every call for care reform. However, the mechanisms involved in delivering the necessary supports to promote self-management are poorly understood (Thorne, Paterson, & Russell, 2003). Self management involves engaging in processes that foster people's opportunities to apply problem-solving skills, experience self-efficacy and apply their knowledge in real-life situations (Coleman & Newton, 2005). It is based on information provision, skill development, collaborative planning and goal setting.

**Goal setting** is a complementary strategy that can assist patients to respond to complex health issues (Bodenheimer, Lorig, Holman, & Grumbach, 2002; Funnell & Anderson, 2005; Langford, Sawyer, Gioimo, Brownson, & O'Toole, 2007; Lorig &

Holman, 2003). Goal setting enhances rapport, and builds alliances, motivation and coordination (Wade, 2009), as well as improving the quality of health information that is shared during the exchange (Schulman-Green et al., 2005).

## Interpersonal processes of care

In the context of health care, there is a need to match case complexity (e.g., morbidity, symptoms, contextual realities, etc.) with comprehensive care (which includes appropriate processes of care) (de Jonge, et al., 2006, Bayliss 2003 cited in Fortin, et al., 2007). There is also a need for high quality and integrated interaction between the health care practitioner and the patient.



An appropriate response to complexity includes greater 'congruence' in the patient-practitioner relationship (Safford et al., 2007), such as that described in 'person-centred practice' (Mead & Bower, 2000). This includes:

- an openness to the moving beyond physical problems, including to develop a full understanding of the patient's personal experience and meaning that is attributed to illness,
- a willingness to share power and responsibility,
- the building of an emotional context within which motivation, understanding and confidence can be fostered, and
- a recognition of the importance of self-awareness in their interactions with people who have complex health-related needs.

Such an approach recognises the reciprocal influence of patients and health care practitioners upon each other. It is based on an understanding that health care practitioners can induce certain kinds of patient behaviour, and substantially contribute to the patient's capacity to deal with the complex reality of their health issues (Turco, et al., 2009).

As reflected in figures 1 and 2, it is in the interactions between illness, personal and environmental factors (or medical, situational and systems domains), that health care complexity resides. Understanding and incorporating such factors requires partnership with the patient. The implications of this reality are that the interpersonal processes which characterise the clinical or hospital encounter require a new set of skills

and shared goals (communication skills, building partnership and trust, and an interpersonal style which promotes collaborative decision making).

### Integrated / co-ordinated care

Responding to health care complexity by minimising fragmentation through the coordination and integration of health care services is widely regarded as a key strategy for increasing effectiveness of care, reducing costs, and optimising patient outcomes (Maslin-Prothero & Bennion, 2010). These models focus on issues such as process management and workflow. Examples of integrated services include strategies such as co-locating health and social care teams in a specific neighbourhood, or developing city wide services to address specific health issues through dedicated lead workers (Maslin-Prothero & Bennion, 2010).

In keeping with other responses identified in this review, the literature indicates that successful integrated care requires:

- Policy level initiatives, that include (a) co-location of services (Kodner & Spreeuwenberg, 2002; Leutz, 1999; Maslin-Prothero & Bennion, 2010; Powell Davies et al., 2006), (b) pooled budgets to facilitate working across agency boundaries, and (c) inter-sectoral planning, and transparent governance arrangements (Irving, Dobkin, & Park, 2009; Keast, Mandell, Brown, & Woolcock, 2004; Maslin-Prothero & Bennion, 2010; Minkman, Ahaus, Fabbrocotti, Nabitz, & Huijsman, 2009).
- Management commitment and support, which includes (a) leaders with a clear vision of integrated care (Ouwens, Wollersheim, Hermens, Hulscher, & Grol, 2005), (b) support for teamwork (Kodner & Spreeuwenberg, 2002; Minkman, et al., 2009), and (c) joint care planning (Kodner & Spreeuwenberg, 2002).
- Development of shared culture and purpose (Maslin-Prothero & Bennion, 2010; Ouwens, et al., 2005), as well as a clear understanding of roles and tasks (Minkman, et al., 2009; Ouwens, et al., 2005).

- Effective knowledge sharing through information systems (Maslin-Prothero & Bennion, 2010), and common decision-support tools (Kodner & Spreeuwenberg, 2002).
- Professional development (Ouwens, et al., 2005).
- Regular patient/family contact and ongoing support (Kodner & Spreeuwenberg, 2002), and a patient-centred approach (Minkman, et al., 2009; Powell Davies, et al., 2006; Suter, Oelke, Adair, & Armitage, 2009).

An example of an integrated care approach is the Chronic Care Model (CCM) (Wagner, et al., 2001; Barr et al., 2003) which seeks to integrate the elements of the health care organisation, self-management support, decision support, delivery system design, clinical information systems, as well as community resources and policies (Barr, et al., 2003; Swerissen & Taylor, 2008; Wagner, et al., 2001). While not widely adopted in practice (Coxon, 2005), the CCM seeks to create productive interactions and relationships between prepared proactive teams and informed activated patients (Barr, et al., 2003; Wagner, et al., 2001).



M. TOMAS 'H'

Healthcare professional name tag

## **Chapter 6.**

### **Conclusion:**

### ***Implications for skill development and training***

Complexity is a vital consideration for the future of health care, and specifically for the clinical education of current and future practitioners. The health care provided by practitioners and systems is limited by current conceptualisations and understandings of complexity. This review has identified the ICF as a potential framework for interpreting health care complexity in a meaningful way. It has also underscored the importance of recognising different dimensions of health care complexity, and noted the 'wicked' nature of interactions between these dimensions. It has suggested that health care practitioners and health care systems need to find new ways of responding to the wicked problem of health care complexity.

This review has described elements of the extent of medical complexity, noting an array of types of medical complexity, numerous complex conditions and the way interactions between conditions further amplify complexity. Noting that medical complexity is only one aspect of complexity in health care, the review has emphasised two further dimensions which substantially contribute to the degree of wickedness of these issues. Situational complexity (environmental, personal, and participation factors) and health care system complexity (including fragmentation, service silos, lack of patient engagement, and related factors) interact with medical complexity in unique ways.

In recognising health care complexity as a wicked problem, this review has emphasised that behavioural change will be part of the solution, and that collaborative strategies will be vital to achieving sustainable change. The review has highlighted that a response to complexity will also include assisting individuals, groups of health care professionals (e.g., multidisciplinary groups or narrowly focussed teams of health care professionals), or specific providers of health care (e.g., tertiary health care providers) to move beyond their traditional scope of experience and practice. Developing solutions at multiple levels of health care provision, in multiple policy domains and across multiple levels of government will be key, though it is likely to be complicated by conflicting policy objectives and disagreement among stakeholders regarding the appropriateness of proposed solutions.

The review notes that engaging multiple stakeholders in developing solutions will be essential to ensure that knowledge, rather than mere information, is transferred between stakeholders in a way that allows problem-solving strategies to be employed to address issues comprehensively, rather than from the perspectives of one individual. Thus, an important response to dealing with the wicked problem of health care complexity is to adopt a purposeful, reflective approach to professional practice that increases the capacity of health care professionals to collaborate with multiple stakeholders across the multiple levels of care.

The implications for education and training, which are noted at a number of points throughout this review include:

- The importance of fostering skills for reflective practice.
- Recognition of the place of clinical reasoning as core to evidence based practice.
- The importance of equipping providers and teams through capability training, case based learning and problem solving, as well as by prioritising appropriate quality improvement and research paradigms which address issues relating to complexity.

- The central importance of training and equipping health practitioners, managers and policy makers in collaboration at many levels (inter-professional collaboration, team collaboration and particularly inter-sectoral collaboration).
- The foundational importance of new approaches to patient care which address some of the consequences of complexity (fostering health literacy, self management and goal setting to assist patients to become informed and engaged in health care, building interpersonal skills to promote partnership with patients, and applying relevant models of integrated and coordinated care to address fragmentation at the patient level).



## **Chapter 7.**

### **References**

- Abbasi, K. (2005). Simplicity and complexity in health care: what medicine can learn from Google and iPod. *J R Soc Med*, 98(9), 389.
- Abel, T. (2008). Cultural capital and social inequality in health. *Journal of Epidemiology and Community Health*, 62(7), 13-e13.
- Armstrong, B. K., Gillespie, J. A., Leeder, S. R., Rubin, G. L., & Russell, L. M. (2007). Challenges in health and health care for Australia. *The Medical Journal of Australia*, 187(9), 485-489.
- Australian Bureau of Statistics. (2008). Adult Literacy and Life Skills Survey. Summary results.
- Australian Capital Territory Health. (2009). A systematic review of the literature. Extended Scope of Practice: Radiation Therapy Final Report. Retrieved from <http://www.health.act.gov.au/c/health?a=sendfile&ft=p&fid=1749817964&sid>.
- Australian Institute of Health and Welfare.(2010). Stroke in Australia. Retrieved 15 July 2010, from <http://www.aihw.gov.au/cvd/stroke.cfm>
- Australian Public Service Commission. (2007). Tackling wicked problems: A public policy perspective.
- Barach, P., & Johnson, J. K. (2006). Understanding the complexity of redesigning care around the clinical microsystem. *Quality & Safety In Health Care*, 15 Suppl 1, i10-i16.
- Barr, V. J., Robinson, S., Marin-Link, B., Underhill, L., Dotts, A., Ravensdale, D., et al. (2003). The expanded chronic care model: An integration of concepts and strategies from population health promotion and the chronic care model. *Hospital Quarterly* 7(1), 73-82.
- Batalden, P., & Davidoff, F. (2007). Teaching quality improvement: the devil is in the details. *JAMA*, 298(9), 1059-1061.
- Baxter, T., Blackbourn, S., Hussey, D., & Nicklin, L. (2009). Developing the local workforce: Is work-based learning the solution? *The British Journal of Occupational Therapy*, 72, 411-415.

- Baxter, G. (2010). White paper: Complexity in health care. Unpublished manuscript, London.
- Bilodeau, A., De, S., M., Andrade, L., Baretta, I., & et al. (2005). Regional and local level inter-sectoral collaboration. *Promotion & Education, L'intégration de la promotion et de la...*(Journal Article), 20-22.
- Bodenheimer, T. (2008). The future of primary care: transforming practice. *The New England Journal of Medicine*, 359(20), 2089.
- Bodenheimer, T., Lorig, K., Holman, H., & Grumbach, K. (2002). Patient Self-management of Chronic Disease in Primary Care. *JAMA: The Journal of the American Medical Association*, 288(19), 2469-2475.
- Booth, A. (2006). "Brimful of STARLITE": toward standards for reporting literature searches. *Journal of the Medical Library Association : JMLA*, 94(4), 205-429.
- Bronstein, L. R. (2003). A model for interdisciplinary collaboration. *Social Work*, 48(3), 297-297.
- Brown, L., Tucker, C., & Domokos, T. (2003). Evaluating the impact of integrated health and social care teams on older people living in the community. *Health & Social Care in the Community*, 11(2), 85-94.
- Campbell, J., & McLaughlin, J. (2000). The 'joined up' management of adult health and social care services in Northern Ireland: lessons for the rest of the UK? *Managing Community Care*, 8(5), 6-13.
- Charlson, M. E., Pompei, P., Ales, K. L., & MacKenzie, C. R. (1987). A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. *Journal of Chronic Diseases*, 40, 373-383.
- Chrvala, C. A., & Sharfstein, S. S. (1999). *Definition of serious and complex medical conditions*. Washington, DC: National Academy Press.
- Clancy, T. R., & Delaney, C. (2005). Complex nursing systems. *Journal of Nursing Management*, 13(3), 192-201.
- Clancy, T. R., Delaney, C. W., Morrison, B., & Gunn, J. K. (2006). The Benefits of Standardized Nursing Languages in Complex Adaptive Systems Such as Hospitals. *JONA: The Journal of Nursing Administration*, 36(9), 426-434.
- Cleak, H., & Williamson, D. (2007). Preparing Health Science Students for Interdisciplinary Professional Practice. *Journal of Allied Health*, 36(3), 141-141.
- Coleman, M. T., & Newton, K. S. (2005). Supporting self-management in patients with chronic illness. *American Family Physician*, 72(8), 1503-1510.
- Conklin, J. (2006). *Dialogue Mapping*. Chichester: John Wiley and Sons.
- Cook, D. A., Beckman, T. J., Thomas, K. G., & Thompson, W. G. (2008). Introducing resident doctors to complexity in ambulatory medicine. *Medical Education*, 42(8), 838-848.
- Cook, S., Drum, M. L., Kirchoff, A. C., Jin, L., Levie, J., Harrison, J. F., et al. (2006). Providers' assessment of barriers to effective management of hypertension and hyperlipidemia in community health centers. *Journal Of Health Care For The Poor And Underserved*, 17(1), 70-85.
- Cox, R. J., Amsters, D. I., & Pershouse, K. J. (2001). The need for a multidisciplinary outreach service for people with spinal cord injury living in the community. *Clinical Rehabilitation*, 15(6), 600-606.
- Coxon, K. (2005). Common Experiences of Staff Working in Integrated Health and Social Care Organisations: A European Perspective. *Journal of Integrated Care*, 13(2), 13-21.
- Cutchin, M. P. (2007). The need for the "new health geography" in epidemiologic studies of environment and health. *Health & Place*, 13, 725-742. doi:10.1016/j.healthplace.2006.11.003
- de Jonge, P., Huyse, F. J., Slaets, J. P., Söllner, W., & Stiefel, F. C. (2005). Operationalization of biopsychosocial case complexity in general health care: the INTERMED project. *The Australian And New Zealand Journal Of Psychiatry*, 39(9), 795-799.
- de Jonge, P., Huyse, F. J., & Stiefel, F. C. (2006). Case and care complexity in the medically ill. *Med Clin North Am*, 90(4), 679-692.

- Department of Health and Ageing. (2009). Primary health care reform in Australia: report to support Australia's first national primary health care strategy (No. 1741869374, 1741869366, 9781741869378, 9781741869361). Woden, A.C.T.: Dept. of Health and Ageing.
- Department of Health and Ageing. (2010). A National Health and Hospitals Network for Australia's Future – Delivering better health and better hospitals. Retrieved from [http://www.health.gov.au/internet/yourhealth/publishing.nsf/Content/report/redbook/\\$File/HRT\\_report3.pdf](http://www.health.gov.au/internet/yourhealth/publishing.nsf/Content/report/redbook/$File/HRT_report3.pdf).
- Dopson, S., & Fitzgerald, L. (2006). The role of the middle manager in the implementation of evidence-based health care. *Journal of Nursing Management*, 14(1), 43-51.
- Duckett, S. J. (2008). The Australian health care system: reform, repair or replace? *Australian HealthReview* : a publication of the Australian Hospital Association, 32(2), 322-329.
- Edgren, L. (2008). The meaning of integrated care: a systems approach. *International Journal of Integrated Care*, 8(4).
- Ellis, R. P., & Vidal-Fernandez, M. (2007). Activity-based payments and reforms of the English hospital payment system. *Health Economics, Policy and Law*, 2(4), 435-444.
- Epping-Jordan, J. E., Pruitt, S. D., Bengoa, R., & Wagner, E. H. (2004). Improving the quality of health care for chronic conditions. *Quality & Safety In Health Care*, 13(4), 299-305.
- Fitzgerald, A., & Davison, G. (2008). Innovative health care delivery teams: learning to be a team player is as important as learning other specialised skills. *Journal of Health Organisation Management*, 22(2), 129-146.
- Flach, F. (1990). Disorders of the pathways involved in the creative process. *Creativity Research Journal*, 3, 158-165.
- Fleury, M. J. (2006). Integrated service networks: the Quebec case. *Health Services Management Research*, 19(3), 153-165.
- Forrest, C. B. (2003). Primary care gatekeeping and referrals: effective filter or failed experiment. *British Medical Journal*, 326, 692-695.
- Fortin, M., Bravo, G., Hudon, C., Lapointe, L., Almirall, J., Dubois, M. F., et al. (2006). Relationship between multimorbidity and health-related quality of life of patients in primary care. *Quality of Life Research*, 15(1), 83-91.
- Fortin, M., Soubhi, H., Hudon, C., Bayliss, E. A., & van den Akker, M. (2007). Multimorbidity's many challenges. *BMJ*, 334(7602), 1016-1017.
- Fraser, E., & Pakenham, K. I. (2008). Evaluation of a resilience-based intervention for children of parents with mental illness. *Australian and New Zealand Journal of Psychiatry*, 42(12), 1041-1050.
- Fraser, S. W., & Greenhalgh, T. (2001). Coping with complexity: educating for capability. *BMJ*, 323(7316), 799-803.
- Funnell, M. M., & Anderson, R. M. (2005). Patient Empowerment. In F. J. S. T. C. Skinner (Ed.), *Psychology in diabetes care* (2nd edn.). West Sussex: John Wiley and Sons.
- Gask, L., Klinkman, M., Fortes, S., & Dowrick, C. (2008). Capturing complexity: the case for a new classification system for mental disorders in primary care. *European Psychiatry*, 23(7), 469-476.
- Glasgow, R. E., Funnell, M. M., Bonomi, A. E., C., D., Beckham, V., & Wagner, E. (2002). Self-management aspects of the improving chronic illness care breakthrough series: implementation with diabetes and heart failure teams. *Annals of Behavioral Medicine*, 24, 80-87.
- Glasziou, P., Ogrinc, G., & Goodman, S. (2011). Can evidence-based medicine and clinical quality improvement learn from each other? *BMJ Quality & Safety*, 20(Suppl 1), i13-i17.
- Gooberman-Hill, R., & Fox, R. (2011). What can qualitative approaches bring to trauma outcome research? *Injury*, 42(4), 321-323.
- Greenfield, S., Sullivan, L., Dukes, K. A., Silliman, R., R., D. A., & Kaplan, S. H. (1995). Development and Testing of a New Measure of Case Mix for Use in Office Practice. *Medical Care*, 33(4), AS47-AS55.

- Greig, G., Entwistle, V. A., & Beech, N. (2011). Addressing complex healthcare problems in diverse settings: Insights from activity theory. *Social Science & Medicine*, In Press, Corrected Proof.
- Halcomb, E. J., Davidson, P. M., & Brown, N. (2010). Uptake of Medicare chronic disease items in Australia by general practice nurses and Aboriginal health workers. *Collegian (Royal College of Nursing, Australia)*, 17(2), 57-61.
- Hannold, E. M., Hanjian, J. M., Jordan, M. M., Roach, M. J., & Velozo, C. A. (2008). Using veterans' perspectives to enhance rehabilitation outcome measures: Value of qualitative methods. *Journal of Rehabilitation Research and Development*, 45(1), XI-XIII.
- Harris, M., & Zwar, N. (2007). Care of patients with chronic disease: the challenge for general practice. *The Medical Journal of Australia*, 187(2), 104-107.
- Hawe, P., & Shiell, A. (2000). Social capital and health promotion: a review. *Social Science & Medicine* (1982), 51(6), 871-885.
- Hibbard, J. H., Peters, E., Dixon, A., & Tusler, M. (2007). Consumer Competencies and the Use of Comparative Quality Information. *Medical Care Research and Review*, 64(4), 379.
- Higgs, J., & Jones, M. A. (2008). Clinical decision making and multiple problem spaces. In J. Higgs, M. A. Jones, S. Loftus & N. Christensen (Eds.), *Clinical reasoning in the health professions* (3rd ed., pp. 3-18). Sydney: Elsevier.
- Howard, M. S., Davis, B. A., Anderson, C., Cherry, D., Koller, P., & Shelton, D. (2005). Patients' perspective on choosing the emergency department for nonurgent medical care: a qualitative study exploring one reason for overcrowding. *Journal of Emergency Nursing: JEN : official publication of the Emergency Department Nurses Association*, 31(5), 429-435.
- Hudson, B. (2005). Grounds for optimism. *Community Care*, 1601, 34-35.
- Hultberg, E.-L., Glendinning, C., Allebeck, P., & Lönnroth, K. (2005). Using pooled budgets to integrate health and welfare services: A comparison of experiments in England and Sweden. *Health and Social Care in the Community*, 13(6), 531-541.
- Irving, J. A., Dobkin, P. L., & Park, J. (2009). Cultivating mindfulness in health care professionals: A review of empirical studies of mindfulness-based stress reduction (MBSR). *Complementary Therapies in Clinical Practice*(Journal Article).
- Ishani, A., Greer, N., Taylor, B. C., Kubes, L., Cole, P., Atwood, M., et al. (2011). Effect of Nurse Case Management Compared With Usual Care on Controlling Cardiovascular Risk Factors in Patients With Diabetes. *Diabetes Care*, In Press.
- Jagosh, J., Pluye, P., Macaulay, A. C., Salsberg, J., Henderson, J., Sirett, E., et al. (2011). Assessing the outcomes of participatory research: protocol for identifying, selecting, appraising and synthesizing the literature for realist review. *Implementation Science*, 6(1), 24.
- Jeon, Y. H., Jowsey, T., Yen, L., Glasgow, N. J., Essue, B., Kljakovic, M., et al. (2010). Achieving a balanced life in the face of chronic illness. *Australian Journal of Primary Health*, 16(1), 66-74.
- Jowsey, T., Jeon, Y. H., Dugdale, P., Glasgow, N. J., Kljakovic, M., & Usherwood, T. (2009). Challenges for co-morbid chronic illness care and policy in Australia: a qualitative study. *Aust New Zealand Health Policy*, 6, 22.
- Kaplan, R. M., Bush, J. W., & Berry, C. C. (1976). Health status: types of validity and the index of well-being. *Health Services Research*, 11(4), 478-507.
- Katerndahl, D. (2005). Is your practice really that predictable? Nonlinearity principles in family medicine. *J Family Practice*, 54(11), 970-977.
- Katerndahl, D., Parchman, M., & Wood, R. (2010). Trends in the perceived complexity of primary health care: a secondary analysis. *Journal of Evaluation in Clinical Practice*, 16(5), 1002-1008.
- Keast, R., Mandell, M. P., Brown, K., & Woolcock, G. (2004). Network Structures: Working Differently and Changing Expectations. *Public Administration Review*, 64(3), 363-371.
- Katlubeck, L.A. (2009). Wicked problems: Development of a new operational definition and heuristic selection tool. *Human Information Processing Scholar series*. 42-48

- Kinnaman, M. L., & Bleich, M. R. (2004). Collaboration: aligning resources to create and sustain partnerships. *Journal of Professional Nursing*, 20(5), 310-322.
- Kodner, D. L. (2009). All together now: a conceptual exploration of integrated care. *Healthcare Quarterly*, Special Issue 13, 6-15.
- Kodner, D. L., & Spreeuwenberg, C. (2002). Integrated care: meaning, logic, applications, and implications-- a discussion paper. *International Journal of Integrated Care*, 2, e12.
- Kolb, D. A., Boyatzis, R. E., & Mainemelis, C. (1999). *Experiential Learning Theory: previous research and new directions*. 2011, from <http://www.d.umn.edu/~kgilbert/educ5165-731/Readings/experiential-learning-theory.pdf>
- Kolb, D. A., & Kolb, A. Y. (2005). Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of Management Learning & Education*, 4(2), 193-212.
- Kreps, G. L. (2009). Applying Weick's model of organizing to health care and health promotion: Highlighting the central role of health communication. *Patient Education and Counseling*, 74(3), 347-355.
- Kuipers, P., Foster, M. & Bellamy, N. (2003). Incorporation of environmental factors into outcomes research *Expert Reviews of Pharmacoeconomics and Outcomes Research*, 3(2), 125-129.
- Kuipers, P. (2011). *Innovative learning for new contexts: Virtual patient e-learning to equip allied health professionals for inpatient emergency and medical assessment units (Research Proposal)*. Brisbane: PA Hospital.
- Langford, A. T., Sawyer, D. R., Gioimo, S., Brownson, C. A., & O'Toole, M. L. (2007). Patient-centered goal setting as a tool to improve diabetes self-management. *The Diabetes Educator*, 33 Suppl 6(139S-144S), 139.
- Leff, B., Reider, L., Frick, K. D., Scharfstein, D. O., Boyd, C. M., Frey, K., et al. (2009). Guided care and the cost of complex healthcare: a preliminary report. *American Journal of Managed Care*, 15(8), 555-559.
- Lessard, C. (2007). Complexity and reflexivity: Two important issues for economic evaluation in health care. *Social Science & Medicine*, 64(8), 1754-1765.
- Leutz, W. N. (1999). Five laws for integrating medical and social services: lessons from the United States and the United Kingdom. *The Milbank Quarterly*, 77(1).
- Levack, W. M. M., Kayes, N. M., & Fadyl, J. K. (2010). Experience of recovery and outcome following traumatic brain injury: a metasynthesis of qualitative research. *Disability and Rehabilitation*, 32(12), 986-999.
- Leviton, L. (2011). Reconciling complexity and classification in quality improvement research. *BMJ Quality & Safety*, 20(Suppl 1), i28-i29.
- Linn, B. S., Linn, M. W., & Gurel, L. (1968). Cumulative illness rating scale. *Journal of the American Geriatrics Society*, 16(5), 622-626.
- Lorig, K. R., & Holman, H. R. (2003). Self-management education: History, definition, outcomes, and mechanisms. *Annals of Behavioral Medicine*, 26(1), 1-7.
- Mamede, S., & Schmidt, H. G. (2004). The structure of reflective practice in medicine. *Medical Education*, 38(12), 1302-1308.
- Mann, K., Gordon, J., & MacLeod, A. (2009). Reflection and reflective practice in health professions education: a systematic review. *Advances in Health Sciences Education: Theory and practice*, 14(4), 595-621.
- Marmot, M. (2007). Achieving health equity: from root causes to fair outcomes. *Commission on Social Determinants of Health. Lancet*, 370(9593), 1153-1163.
- Martin, C. M., & Sturmberg, J. P. (2009). Perturbing ongoing conversations about systems and complexity in health services and systems. *Journal of Evaluation in Clinical Practice*, 15(3), 549-552.
- Maslin-Prothero, S. E., & Bennion, A. E. (2010). Integrated team working: a literature review. *International Journal of Integrated Care*, 10, e043.

- McAllister, M., & McKinnon, J. (2008). The importance of teaching and learning resilience in the health disciplines: A critical review of the literature. *Nurse Education Today*, 29(4), 371-379.
- McCormack, B. (2003). A conceptual framework for person-centred practice with older people. *International Journal of Nursing Practice*, 9(3), 202-209.
- McDonald, J., Davies, G. P., & Harris, M. (2009). Interorganisational and interprofessional partnership approaches to achieve more coordinated and integrated primary and community health services: the Australian experience. *Australian Journal of Primary Health*, 15(4), 262-269.
- Mead, N., & Bower, P. (2000). Patient-centredness: a conceptual framework and review of the empirical literature. *Social Science & Medicine* (1982), 51(7), 1087-1110.
- Minkman, M., Ahaus, K., Fabbrocetti, I., Nabitz, U., & Huijsman, R. (2009). A quality management model for integrated care: results of a Delphi and Concept Mapping study. *International Journal of Quality Health Care*, 21(1), 66-75.
- Miskulin, D. C., Athienites, N. V., Yan, G., Martin, A. A., Ornt, D. B., Kusek, J. W., et al. (2001). Comorbidity assessment using the Index of Coexistent Diseases in a multicenter clinical trial. *Kidney International*, 60(4), 1498-1510.
- Molleman, E., Broekhuis, M., Stoffels, R., & Jaspers, F. (2008). How health care complexity leads to cooperation and affects the autonomy of health care professionals. *Health Care Analysis*, 16(4), 329-341.
- Mowles, C., van der Gaag, A., & Fox, J. (2010). The practice of complexity: review, change and service improvement in an NHS department. *Journal of Health Organisation Management*, 24(2), 127-144.
- Mumford, M., & Baughman, W. (1995). Process-Analytic Models of creative Capacities: Operations Influencing the Combination-and-Reorganization Process. *Creativity Research Journal*, 8(1), 37-62.
- Nardi, R., Scanelli, G., Corrao, S., Iori, I., Mathieu, G., & Cataldi Amatrian, R. (2007). Co-morbidity does not reflect complexity in internal medicine patients. *European Journal of Internal Medicine*, 18(5), 359-368.
- Newhouse, R. P., & Spring, B. (2010). Interdisciplinary evidence-based practice: moving from silos to synergy. *Nursing Outlook*, 58(6), 309-317.
- New Zealand Ministry of Health. Intersectoral collaboration. Retrieved from [http://www.moh.govt.nz/moh.nsf/0/2e26af5ebbb10afbcc256c240079b14b/\\$FILE/intersectoralcollaboration.pdf](http://www.moh.govt.nz/moh.nsf/0/2e26af5ebbb10afbcc256c240079b14b/$FILE/intersectoralcollaboration.pdf).
- Nielsen-Bohlman, L., Panzer, A. M., & Kindig, D. A. (2004). *Health Literacy: A Prescription to End Confusion* (Vol. Health Literacy: A Prescription to End Confusion ...): National Academies Press.
- Norman, C. D. (2009). Health promotion as a systems science and practice. *Journal of Evaluation in Clinical Practice*, 165(5), 868-872.
- O'Malley, A. S., Tynan, A., Cohen, G., Kemper, N. M., & Davis, M. M. (2009). Coordination of care by primary care practices: strategies, lessons and implications. 12. from <http://www.rwjf.org/pr/product.jsp?id=42269>
- Oldroyd, J., Proudfoot, J., Infante, F. A., Powell Davies, G., Bubner, T., Holton, C., et al. (2003). Providing healthcare for people with chronic illness: the views of Australian GPs. *The Medical Journal of Australia*, 179(1), 30-30.
- Ouwens, M., Wollersheim, H., Hermens, R., Hulscher, M., & Grol, R. (2005). Integrated care programmes for chronically ill patients: a review of systematic reviews. *International Journal of Quality in Health Care*, 17(2), 141-146.
- Paasche-Orlow, M. K., & Wolf, M. S. (2010). Promoting Health Literacy Research to Reduce Health Disparities. *Journal of Health Communication*, 15(Journal Article), 34-41.
- Pawson, R., Greenhalgh, T., Harvey, G., & Walshe, K. (2005). Realist review - a new method of systematic review designed for complex policy interventions. *Journal of Health Services Research & Policy [NLM - MEDLINE]*, 10 Supplement 1(Journal Article), 21.
- Peerson, A., & Saunders, M. (2009). Health literacy revisited: what do we mean and why does it matter? *Health Promotion International*, 24(3), 285-296.

- Petri, L. (2010). Concept Analysis of Interdisciplinary Collaboration. *Nursing Forum*, 45(2), 73-82.
- Philippon, D. J., Pimlott, J. F. L., King, S., Day, R. A., & Cox, C. (2005). Preparing health science students to be effective health care team members: the InterProfessional Initiative at the University of Alberta. *Journal of Interprofessional Care*, 19(3), 195-195.
- Plsek, P. E. (1999). Innovative thinking for the improvement of medical systems. *Annals of Internal Medicine*, 131(6), 438.
- Plsek, P. E., & Greenhalgh, T. (2001). Complexity science: The challenge of complexity in health care. *BMJ*, 323(7313), 625-628.
- Powell Davies, G., Harris, M., Perkins, D., Roland, M., Williams, A., Larsen, K., et al. (2006). Coordination of care within primary health care and with other sectors: a systematic review. UNSW: Research Centre for Primary Health Care and Equity, School of Public Health and Community Medicine.
- Price, B. (2006). Exploring person-centred care. *Nursing standard (Royal College of Nursing (Great Britain))* : 1987), 20(50), 49.
- Queensland Health. (2005). Queensland strategy for chronic disease 2005-2015. Retrieved from <http://libcat.library.qut.edu.au/record=b2771698&searchscope=8>.
- Queensland Health. (2008). The Queensland Plan for Mental Health 2007-2017. Retrieved from [www.health.qld.gov.au/mentalhealth](http://www.health.qld.gov.au/mentalhealth).
- Queensland Health. (2010). Making Tracks towards closing the gap in health outcomes for Indigenous Queenslanders by 2033 – implementation plan 2009 – 2010 to 2011 – 12. Retrieved from [http://www.health.qld.gov.au/atsihealth/documents/makingtracks/making\\_tracks\\_plan.pdf](http://www.health.qld.gov.au/atsihealth/documents/makingtracks/making_tracks_plan.pdf).
- Robinson, M., & Cottrell, D. (2005). Health professionals in multi-disciplinary and multi-agency teams: Changing professional practice. *Journal of Interprofessional Care*, 19(6), 547-547.
- Rothman, A. A., & Wagner, E. H. (2003). Chronic Illness Management: What Is the Role of Primary Care? *Annals of Internal Medicine*, 138(3), 256-261.
- Runco, M. A. (2004). Creativity. *Annual Review of Psychology*, 55, 657-687.
- Safford, M., Allison, J., & Kiefe, C. (2007). Patient Complexity: More Than Comorbidity. The Vector Model of Complexity. *Journal of General Internal Medicine*, 22(0), 382-390.
- Schluter, J., Seaton, P., & Chaboyer, W. (2011). Understanding nursing scope of practice: A qualitative study. *International Journal of Nursing Studies*, In Press.
- Schneider, M., Hurst, R., Miller, J., & Ustun, B. (2003). The role of environment in the International Classification of Functioning, Disability and Health (ICF). *Disability Rehabilitation*, 25(11-12), 588-595.
- Schulman-Green, D. J., Naik, A. D., Bradley, E. H., McCorkle, R., Bogardus, S. T., & . (2005). Goal setting as a shared decision making strategy among clinicians and their older patients. *Patient Education and Counseling*, 63(1-2), 145-151.
- Scragg, T. (2006). An Evaluation of Integrated Team Management. *Journal of Integrated Care*, 14(3), 39-48.
- Scuffham, P., Nikles, J., Mitchell, G., Yelland, M., Vine, N., Poulos, C., et al. (2010). Using N-of-1 Trials to Improve Patient Management and Save Costs. *Journal of General Internal Medicine*, 25(9), 906-913.
- Shim, J. (2010). Cultural health capital: A theoretical approach to understanding health care interactions and the dynamics of unequal treatment. *Journal of Health and Social Behavior*, 51(1), 1-15. doi:10.1177/0022146509361185
- Shortt, S. E. D. (2004). Making sense of social capital, health and policy. *Health policy (Amsterdam, Netherlands)*, 70(1), 11-22.
- Sinha, S. K., Bessman, E. S., Flomenbaum, N., & Leff, B. (2011). A systematic review and qualitative analysis to inform the development of a new emergency department-based geriatric case management model. *Annals of Emergency Medicine*, 57(6), 672-682.
- Soubhi, H. (2007). Toward an Ecosystemic Approach to Chronic Care Design and Practice in Primary Care. *Annals of Family Medicine*, 5(3), 263-269.

- Soubhi, H., Bayliss, E. A., Fortin, M., Hudon, C., van den Akker, M., Thivierge, R., et al. (2010). Learning and Caring in Communities of Practice: Using Relationships and Collective Learning to Improve Primary Care for Patients with Multimorbidity. *Annals of Family Medicine*, 8(2), 170-177.
- Speroff, T., James, B. C., Nelson, E. C., Headrick, L. A., & Brommels, M. (2004). Guidelines for appraisal and publication of PDSA quality improvement. *Quality Management in Health Care*, 13(1), 33.
- Stack, R. J., Elliott, R. A., Noyce, P. R., & Bundy, C. (2008). A qualitative exploration of multiple medicines beliefs in co-morbid diabetes and cardiovascular disease. [Article]. *Diabetic Medicine*, 25(10), 1204-1210.
- Starfield, B. (2006). Threads and Yarns: Weaving the Tapestry of Comorbidity. *Annals of Family Medicine*, 4(2), 101-103.
- Stewart, A., Petch, A., & Curtice, L. (2003). Moving towards integrated working in health and social care in Scotland: from maze to matrix. *Journal of Interprofessional Care*, 17(4), 335-335.
- Stiefel, F. C., Huysse, F. J., Sollner, W., Slaets, J. P., Lyons, J. S., Latour, C. H., et al. (2006). Operationalizing integrated care on a clinical level: the INTERMED project. *Med Clin North Am*, 90(4), 713-758.
- Stineman, M. G., & Stream, J. E. (2010). The Biopsychosocial Paradigm: A foundational Theory for Medicine. *Physical Medicine & Rehabilitation*, 2(11), 1035-1045.
- Street, R. L., Ward, M. M., Gordon, H. S., Krupat, E., & Kravitz, R. L. (2005). Patient Participation in Medical Consultations. *Medical Care*, 43(10), 960-969.
- Suter, E., Oelke, N. D., Adair, C. E., & Armitage, G. D. (2009). Ten key principles for successful health systems integration. *Healthcare Quarterly*, Special Issue 13, 16-23.
- Swerissen, H. (2002). Toward greater integration of the health system. *Australian Health Review*, 25(5), 88-93.
- Swerissen, H., & Taylor, M. (2008). System reform and development for chronic disease management (F.o.H.S. Australian Institute for Primary Care, Trans.) La Trobe University.
- Thorne, S., Paterson, B., & Russell, C. (2003). The Structure of Everyday Self-Care Decision Making in Chronic Illness. *Qualitative Health Research*, 13(10), 1337-1352.
- Threats, T. (2007). Access for persons with neurogenic communication disorders: Influences of Personal and Environmental Factors of the ICF. *Aphasiology*, 21, 67-80.
- Treffinger, D. J., Selby, E. C., & Isaksen, S. G. (2007). Understanding individual problem-solving style: A key to learning and applying creative problem solving. *Learning and Individual Differences*, 18(4), 390-401.
- Turco, R., Torpilliesi, T., Morghen, S., Bellelli, G., & Trabucchi, M. (2009). Clinical complexity and Occam's razor: navigating between Scylla and Charibdy of the geriatric practice. A case of secondary hypertension in a very old patient. *Journa of the American Medical Directors' Association*, 10(4), 281-282.
- Ueda, S., & Okawa, Y. (2003). The subjective dimension of functioning and disability: what is it and what is it for? *Disability and Rehabilitation*, 25(11-12), 596-596.
- Valderas, J. M., Starfield, B., & Roland, M. (2007). A research priority in the UK. *BMJ*, 334(7604), 1128.
- Valderas, J. M., Starfield, B., Sibbald, B., Salisbury, C., & Roland, M. (2009). Defining Comorbidity: Implications for Understanding Health and Health Services. *Annals of Family Medicine*, 7(4), 357-363.
- Van Raak, A., Mur-Veeman, I., Hardy, B., Steenbergen, M., & Paulus, A. (2003). Integrated care in Europe. Description and comparison of integrated care in six EU countries. Maarssen: Elsevier Gezondheidszorg.
- Volandes, A. E., & Paasche-Orlow, M. K. (2007). Health literacy, health inequality and a just healthcare system. *The American Journal of Bioethics : AJOB*, 7(11), 5-10.
- Von Korff, M., Gruman, J., Schaefer, J., Curry, S. J., & Wagner, E. H. (1997). Collaborative management of chronic illness. *Annals of Internal Medicine*, 127(12), 1097-1102.
- Wade, D. (2009). Goal setting in rehabilitation: an overview of what, why and how. *Clinical Rehabilitation*, 23(4), 291-295.
- Wade, D. (2011). Complexity, case-mix and rehabilitation: the importance of a holistic model of illness. *Clinical Rehabilitation*, 25(5), 387-395.

- Wagner, E. H. (2000). The role of patient care teams in chronic disease management. *BMJ*, 320(7234), 569-572.
- Wagner, E. H. (2004). Effective teamwork and quality of care. *Medical Care*, 42(11), 1037-1039.
- Wagner, E. H., Austin, B. T., Davis, C., Hindmarsh, M., Schaefer, J., & Bonomi, A. (2001). Improving chronic illness care: translating evidence into action. *Health Affairs (Project Hope)*, 20(6), 64-78.
- Walley, P., & Gowland, B. (2004). Completing the circle: from PD to PDSA. *International Journal of Health Care Quality Assurance*, 17(6), 349-358.
- Weber, E. P., & Khademian, A. M. (2008). Wicked Problems, Knowledge Challenges, and Collaborative Capacity Builders in Network Settings. *Public Administration Review*, 68(2), 334-349.
- Weiss, K. B. (2007). Managing complexity in chronic care: an overview of the VA state-of-the-art (SOTA) conference. *Journal Of General Internal Medicine*, 22 Suppl 3, 374-378.
- Wenger, E. C., & Snyder, W. M. (2000). Communities of practice: The organizational frontier. *Harvard Business Review*, 78(1), 139-139.
- Whittemore, R., & Knaf, K. (2005). The integrative review: updated methodology. *Journal of Advanced Nursing*, 52(5), 546-553.
- World Bank Group. What is social capital, 2011, from <http://go.worldbank.org/C0QTRW4QF0>
- WHO. (2001). International classification of functioning, disability and health., from <http://www.who.int/classifications/icf/en/>
- WHO. (2002). Towards a common language for functioning, disability and health: ICF from <http://www.who.int/classifications/icf/training/icfbeginnersguide.pdf>
- WHO. (2009). WHO Patient safety curriculum guide for medical schools. World Alliance for Patient Safety, from [http://www.who.int/patientsafety/information\\_centre/documents/who\\_ps\\_curriculum\\_summary.pdf](http://www.who.int/patientsafety/information_centre/documents/who_ps_curriculum_summary.pdf)
- Woods, D. D., Patterson, E. S., & Cook, R. I. (2008). Behind Human Error: Taming Complexity to Improve Patient Safety.
- Yardley, L., Sharples, K., Beech, S., & Lewith, G. (2001). Developing a Dynamic Model of Treatment Perceptions. *Journal of Health Psychology*, 6(3), 269-282.
- Zwar, N., Harris, M., Griffiths, R., Roland, M., Dennis, S., Powell Davies, G., et al. (2006). A systematic review of chronic disease management. UNSW: Research Centre for Primary Health Care and Equity, School of Public Health and Community Medicine.

## **Appendix 1.** **Search terms**

Complexity OR Complex condition  
OR Complex patients OR aComplex  
healthcare OR Complex needs

AND/OR

Comorbidity

Multimorbidity

Frailty

Chronic disease AND Determinants of  
health

Health AND Complex AND Social AND  
Isolation

Cultural AND Capital AND Health

Complex AND Health AND Geography

Organisation OR Organization AND Silo

Social environments

Ethnicity

Socio-ecological model

Social norms

Coping behaviour

Health/care seeking behaviour

Decision-making

Integrated care OR Integration

Collaboration OR Intersectoral  
collaboration OR Multidisciplinary OR  
Interdisciplinary

Provider OR Service OR Allied Health

Resources OR Skills OR Capacity

Training AND Education

Challenges OR Barriers

## **Appendix 2. Practical workforce implications and examples that may be co-opted in response to health care complexity**

Some of the responses identified in this report imply major changes in framework and ethos in order to respond to complexity. While the extent and influence of complexity in health care is such that it warrants a significant shift in health practitioner workforce, services, roles, skills and training, the response will obviously occur at many different levels and in many ways. Nevertheless, several strategies and actions are currently being successfully employed for managing complexity in a variety of settings within Queensland Health.

Some specific examples include the following:

- There are a number of current projects aimed at 'sharing and developing unique [service] solutions.....throughout the State', which while strongly driven by workforce issues (productivity, retention) are underpinned by the notion of improved patient outcomes.
- Complexities associated with chronicity of health problems and service delivery requirements are recognised as factors contributing to the need for change in the current Nursing and Midwifery Models of Care Project.
- Shifts towards the introduction of intermediate level health practitioners (such as the expanded use of Allied Health Assistants), and shifts in skills mix, are intended to enable advanced health practitioners to respond to more complex health concerns.
- Mental health care in general is strongly focused on complexity with numerous mental health service

enhancements outlined in the latest Queensland Plan for Mental Health 2007 – 2017 (Queensland Health 2008). These include ‘Service Integration Coordinator’ positions, and emphasis on supporting those with complex needs in the community and a focus on inter-sectoral collaboration.

- The Child and Youth Mental Health Service (CYMHS) is currently conducting a state-wide, database oriented project, exploring dimensions of complexity in their patient group and identifying key factors.

However, there are also a number of other broad strategies which relate to the workforce concerns of ClinEdQ, which may be relevant as strategies in the response to complexity (see Figure 4).

### Workforce flexibility

The existing roles of health care practitioners have evolved historically and are oriented to standardisation (treatment regimes, meal times, doctor’s rounds, and staff shift times). Although logical, this approach impedes flexibility. In order to manage complexity, the workforce must be able to respond flexibly to individual patient health care needs. In Queensland Health, as in other departments, incremental workforce reform and innovation is ongoing, towards a more flexible and functional workforce that is better equipped to cope with complexity. A key concern in this reform is ensuring that relevance to complexity remains a central concern.

### Extending scope of practice

Supporting health care practitioners to practice to full scope is one means of increasing the capacity of the workforce to deal with health care complexity. The approach, currently being implemented in many contexts in Queensland Health, recognises that more highly educated and experienced health care practitioners should deal with the more complex clinical questions whilst junior health care practitioners and support staff should focus on the more routine work (Schluter, Seaton, & Chaboyer, 2011). In order for health care practitioners to work at full scope and

address complexity more adequately, they must relinquish routine tasks. However not all health care practitioners necessarily aspire to, nor are they suited to dealing with health care complexity (Australian Capital Territory Health, 2009). Workforce structures which adequately reward and support those who deal with health care complexity, but also allow them to work to their ability are required.

### Broadening evidence based practice

As noted above, a holistic response to complexity requires health care practitioners to consider multiple perspectives and options in diagnosis and treatment planning, to adopt a collaborative approach and to seek individualised, rather than blanket solutions (Plsek & Greenhalgh, 2001).

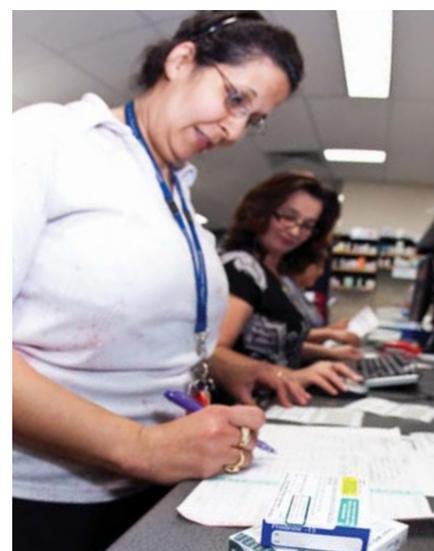
Within Queensland Health such strategies are currently being investigated and applied with the emerging ‘ACE’ approach (Action based on Clinical reasoning and Evidence approach) being proposed by ClinEdQ (Allied Health). For such strategies to be viable, all practitioners should be exposed to reflective learning through inquiry, and provided with frameworks for doing so.

### Consultant approaches

The expert health care practitioner, who specialises, or super-specialises in a certain diagnostic area seeks to manage complexity through detailed knowledge derived from repetition and volume of patients in their specialist area. Whilst this might be beneficial for the few patients with access to the super-specialist, it is not a model which is scalable to meet all patients’ needs. Alternatively models of practice being applied in Queensland Health and elsewhere, include a consultant specialist and skilled generalist practitioners who are able to gain advice, build skills, and manage condition-specific complexity (Cox, Amsters, & Pershouse, 2001) This however is only useful to the extent that generalists can apply this to the context of their own practice and that of their patients (Cox, et al., 2001).

### Case management approaches

In some models (including in Queensland Health ambulatory care settings), a more holistic case management approach has been adopted to manage complexity (Ishani et al., 2011; Sinha, Bessman, Flomenbaum, & Leff, 2011). The oversight role of the case manager helps to overcome the siloed nature of health care provision. Patients with multiple issues and multiple providers have at least one health care practitioner who is abreast of their complex condition and circumstances and can coordinate care, and also advocate for the patient as they navigate the complexities of the health care system.



<sup>10</sup> Queensland Health Electronic Publishing Service <http://qheps.health.qld.gov.au/ocno/content/mnm.htm>

<sup>11</sup> [http://www.health.qld.gov.au/cunninghamcentre/html/ah\\_prof\\_support.asp](http://www.health.qld.gov.au/cunninghamcentre/html/ah_prof_support.asp)

## Technological approaches

There is clearly some promise in the use of technology to address aspects of health care complexity. For example, electronic decision support systems assist with health-related decision making, and can assist in the context of health care complexity (Abbasi, 2005). As these support systems become more accessible and provide health care practitioners with concise, evidence-based, up-to-date information, and—crucially— as they incorporate individualized and contextually relevant information, they will become increasingly useful (Abbasi, 2005).

*From a staff training perspective, virtual patient strategies have the potential to introduce health care practitioners to many of the dimensions of complexity in health care. Such approaches hold promise as tools that can support integrated care, inter-professional collaboration, reflective practice and active patient participation.*

Likewise, individualised electronic patient records provide an opportunity to record and integrate information, enhance inter-professional practice around complex medical conditions and ensure that pathways and treatments are optimised. Within a service or region, these records can be used to develop contextually specific service models that enable both health care practitioners and policy makers to depict, analyse, evaluate and reflect on a wide array of factors impacting on health care complexity.

From a staff training perspective, virtual patient strategies (including those currently being researched in Queensland Health by team members (Kuipers, 2011), have the potential to introduce health care practitioners to many of the dimensions of complexity in health care. Such approaches hold promise as tools that can support integrated care, inter-professional collaboration, reflective practice and active patient participation. However, if used inappropriately, they can also contribute to reductionist tendencies of health care systems that may hinder effective responses to health care complexity.

## Training health care practitioners

Clinical education and training will have a fundamental role in enabling the health practitioner workforce to respond to health care complexity. It will be crucial to new roles that will emerge in response to complexity, to the expansion of existing roles or to the adoption of new approaches such as trans-disciplinary practice. Reiterating many of the themes identified in this report, such training will:

- Reinforce communication skills and active listening skills (McCormack, 2003), build capability for patient partnerships and participatory management planning (Von Korff, Gruman, Schaefer, Curry, & Wagner, 1997), and promote interpersonal styles which incorporate collaborative decision making (Price, 2006).
- Foster flexibility as a key feature of practitioner practice (Duckett, 2008).
- Enhance health care practitioner capability rather than training for narrow competencies (fostering reflection for practice improvement, and the ability for integrative, collaborative working (Batalden & Davidoff, 2007; Fraser & Greenhalgh, 2001; Plsek, 1999).
- Utilise transformational learning (Fraser & Greenhalgh, 2001) through adapting existing competencies to a new situation with different types of input.
- Promote relational learning (Fraser & Pakenham, 2008) through emphasising relationships between parts, making conceptual links between areas which appear unrelated.
- Support non-linear learning (Katerndahl, 2005) through training scenarios which reflect the unpredictable reality faced by health practitioners, and which encourage non-linear learning.

Key to many of these approaches are teambuilding exercises which focus on the group, rather than individual performance, and which focus on process rather than prescriptive content (Fraser & Greenhalgh, 2001).

## Workforce education

Despite concerted attempts to introduce interdisciplinary concepts and content into the programmes of undergraduate health care practitioners (Cleak & Williamson, 2007; Philippon, Pimlott, King, Day, & Cox, 2005), training is still predominantly conducted in professional silos (Newhouse & Spring, 2010). This adversely impacts upon the ability of young practitioners to think broadly and to appreciate the skills of practitioners from other disciplines in tackling complexity.

It also indicates that inter- and trans-disciplinary capability must be taught on-the-job. This might be best achieved through role modelling and mentoring. While mentoring approaches are mostly conceptualised as one-to-one, it is evident that where health care practitioners work in functional, robust multidisciplinary teams, they can develop depth of understanding of the attributes of practitioners from other disciplines. This may be key to improving outcomes in cases of complexity. In Queensland there are a number of initiatives which are consistent with this approach. The emphasis on peer group supervision and mentoring in a number of settings is noteworthy in this regard, as is some advanced clinical skill training.

## Reconceptualising outcomes

A potential workforce consideration in the face of 'wicked' complexity is the recognition that there are never complete solutions, but 'better' or 'worse' or 'good enough'. In complex circumstances, expectations of outcome should accommodate relative and/or partial success. The role that clinical education and training has in promoting clinical and service outcome measures is important. Standard outcome measures might not be suited to recording relative success. Therefore alternate metrics may be required in order to validate the practitioner investment that health care practitioners make in complex cases. Increasingly, more subtle, qualitative or subjective measures may be needed (Goberman-Hill & Fox, 2011; Hannold, Hanjian, Jordan, Roach, & Velozo, 2008; Levack, Kayes, & Fadyl, 2010).



## Resilience

Finally, health care complexity requires certain workforce responses to mitigate potential consequent stress for health care practitioners. Adequate workforce training and structures for peer/professional supervision and support, as well as time and space for critical reflection are needed (McAllister & McKinnon, 2008). Under these circumstances it may be possible to view health care complexity as a positive challenge for the well prepared and motivated health practitioner.