

# ClinEdq

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**  
Government



**Griffith**  
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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## 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).

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).

*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).*

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

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.



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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.

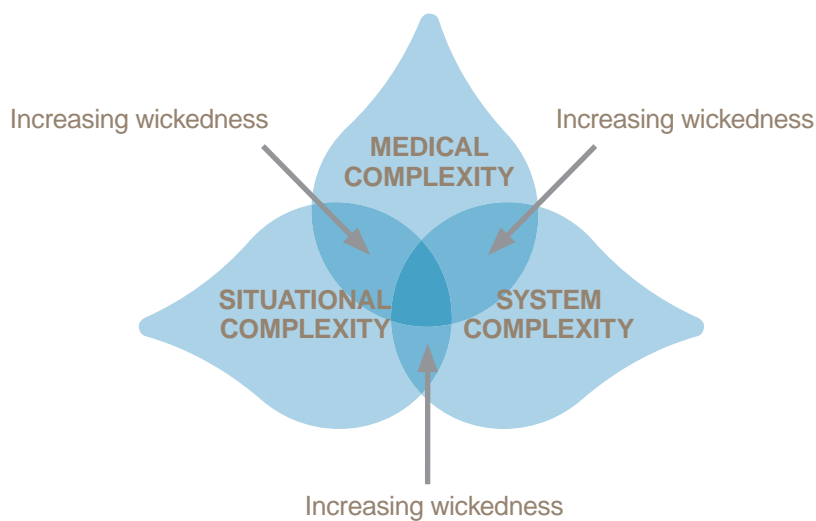


Figure 1: Dimensions of health care complexity and 'wickedness'

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.

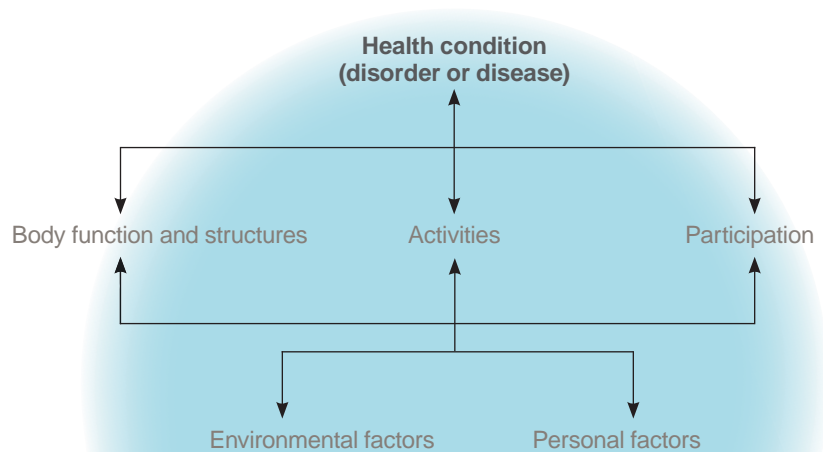


Figure 2: The ICF framework

<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.

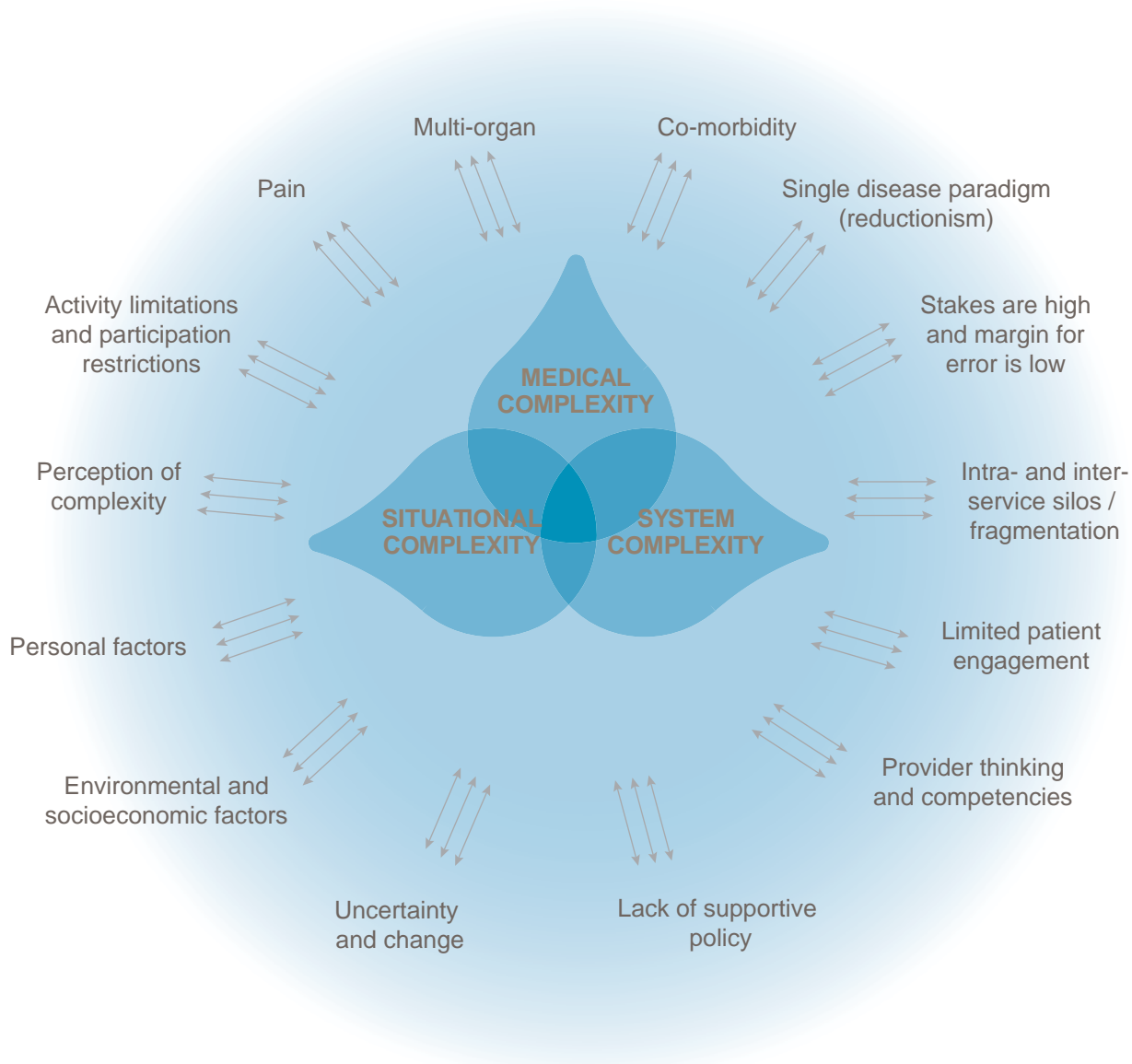


Figure 3: Factors associated with health care complexity and 'wickedness'

### 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.

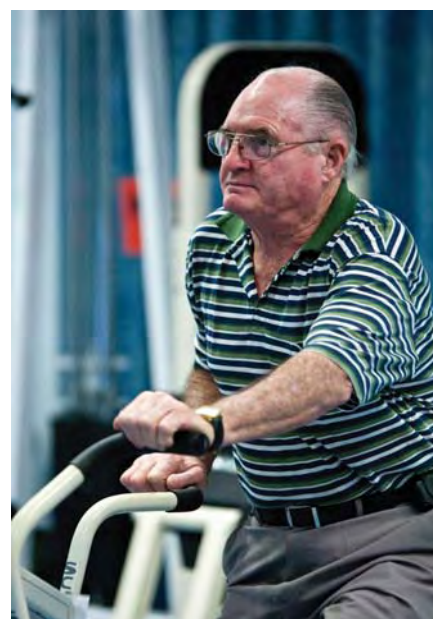
Decision-making in these circumstances frequently requires "trade-off" decisions that are made by considering and comparing perceived and actual efficacy and risks of different treatment options (Kreps, 2009). Understandings of health and illness are usually based on personal experiences, personal beliefs, 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-Bohman, 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

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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.



