

General practice — chaos, complexity and innovation

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A systems view of the world is part of the essential literacy of our age.

Ervin Laszlo¹

In a recent editorial, Piterman² depicted the death of general practice, as we know it, and the emergence of a new system of primary health care (PHC). PHC is undergoing major transformation, with a focus on shifting general practitioners' work patterns and remuneration towards integration with multidisciplinary teams and the wider system. The change is challenging the traditional role of the GP, and we need to evaluate and debate the reforms that are currently taking place. In this complex and potentially chaotic environment, we need long-term goals for PHC and general practice in Australia.

Keleher³ has defined PHC and primary care in the following terms:

Primary health care (PHC) incorporates personal care with health promotion, the prevention of illness and community development. The philosophy of PHC includes the interconnecting principles of equity, access, empowerment, community self-determination and intersectoral collaboration. It encompasses an understanding of the social, economic, cultural and political determinants of health.

Primary care is more clinically focused, and can be considered a sub-component of the broader primary health care system. Primary care is considered health care provided by a medical professional which is a client's first point of entry into the health system. Primary care is practised widely in nursing and allied health, but predominately in general practice.

In the past, primary care has been principally provided by GPs, who have demonstrated an ability to adapt to the many scientific medical developments and related changing community needs.⁴ Nurses, allied health workers and other groups are now playing an increasingly expanded role in primary care. While better access to comprehensive integrated community-based care should improve population health and reduce health disparities,⁵ primary care is not yet integrated nor coordinated within PHC,³ having been shaped by fragmented bureaucratic and funding environments.

How can GPs and other primary care providers reshape their roles and goals in the emerging PHC environment? The Australian Government intends to fund Divisions of General Practice to "support GPs and general practices with a changing primary care

ABSTRACT

- Primary health care (PHC) reforms focus on improving access to and effectiveness of general practice services, with greater emphasis on health promotion, prevention and chronic disease management, and integration with population health approaches.
- Currently, reforms are often based on scant evidence from the most accessible and easily known PHC domains and activities, yet most PHC is complex and poorly understood.
- Complexity theory is based on understanding patterns that are not predictable by traditional evidence and social knowledge, within a complex adaptive system.
- Complexity knowledge provides a way of understanding the general practitioner's role in PHC in self-organising local networks, with a capacity to generate new solutions integrated through historical and social connections.
- Complex systems provide a framework for an expanded knowledge base, debate and discussion of reforms and development of PHC goals and strategies.

MJA 2005; 183: 106–109

environment; improve access; encourage integration and multidisciplinary care; focus on prevention and early intervention; better manage chronic conditions; support quality and evidence based care; and ensure a growing consumer focus".⁶ What approaches should inform divisional activities in transforming general practice?

Reforms are typically based on scant evidence from the most accessible and easily known PHC domains and activities, yet most PHC is complex and poorly understood.⁷ A recent editorial⁸ challenged GPs to get more evidence about practice and shift their attention from "theoretical" (inward-looking) activities. However, most practice activities occur in the context of human relationships, which is outside the typical evidence-based domain.⁹

Living systems evolve in variety, resilience and intelligence; they do this not by erecting walls . . . and closing off from their environment, but by opening more widely. . . . They integrate and differentiate through constant interaction, spinning more intricate connection and flexible strategies. For this they require not invulnerability, but increasing responsiveness. Such is the direction of evolution.

Adapted from Joanna Macy¹⁰

According to Glouberman and Zimmerman,¹¹ systems can be understood as being simple, complicated, complex, or chaotic (Box 1). Simple and complicated systems or processes are related to separate entities or discrete activities. Complex systems are based on relationships, and their properties of self-organisation, interconnectedness and evolution are clear and constant.

However, research into complex systems demonstrates that they cannot be understood solely by simple or complicated approaches to evidence, policy, planning and management.¹²

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1 Understanding systems*

Problem types	Knowledge type	Examples of the type of knowledge a GP may seek for various clinical problems
Simple problems , such as following a protocol, may encompass some basic issues of technique and terminology, but once these are mastered, following the “recipe” carries with it a very high assurance of success.	Known	Most efficacious drug treatment for uncomplicated angina
Complicated problems contain subsets of simple problems but are not merely reducible to them. Their complicated nature is often related not only to the scale of a problem like open heart surgery, but also to issues of coordination or specialised expertise. Complicated problems, although their solutions are generalisable, are not simply an assembly of simple components.	Knowable	Most cost-effective treatments for patients with angina, hypertension, arrhythmia, osteoarthritis and depression
Complex problems can encompass both complicated and simple subsidiary problems, but are not reducible to either, as they too have special requirements, including an understanding of unique local conditions. Historical adaptive, self-organisational social networks with observable patterns that are neither predictable nor generalisable, yet can open up numerous possibilities.	Understandable	Best practice complex chronic disease care for a person from a disadvantaged population group who has angina, diabetes and depression, as well as alcohol, legal and family problems
Chaos implies being out of control, with no discernable order. Yet chaos can break old restrictive connections and liberate space for a new order. Retrospective analysis of how chaos is managed and capitalised on is essential evidence for understanding systems.	Not understandable until stabilised	Managing alcoholic binge crises in complex chronic disease care for a person with angina, diabetes, chronic renal failure and depression with family and legal problems in a disadvantaged remote population

* Adapted from Glouberman and Zimmerman.¹¹ GP = general practitioner.

Approaches to understanding complex systems developed by Kurtz and Snowden¹³ for IBM international e-business management have been successfully applied with frontline health care providers.¹⁴ They categorise activities on four levels of knowledge and organisation — described as the known, the knowable, the complex and the chaotic (Box 2). Each is governed by a particular evidence and decision-making mode: the *known* (analytical/reductionist evidence-based care); the *knowable* (potentially ascertainable by application of evidence-based methods) and the *complex* (non-predictable, but potentially understandable by pattern observation) knowledge domains. The known and knowable refer mainly to simple and complicated knowledge, while complex knowledge is based on understanding dynamic system patterns in which the whole is greater than the sum of the known and knowable parts. True chaos represents a major system failure and requires charisma or dictatorship to stabilise. Yet there may be emergent patterns in chaos that replace old patterns and allow innovation to arise.

We argue that GPs’ generalist role in the PHC setting is more often than not dealing with decision-making in a complex systems environment. In contrast, specialisation typically involves simple or complicated evidence-based decision-making around defined diagnoses with discrete interventions.

The concept of a principal diagnosis [is not transferable to] general practice, where multiple problem management is the norm rather than the exception. . . . [T]he range of problems managed at the encounter often crosses multiple body systems and may include undiagnosed symptoms, psychosocial problems or chronic disease.¹⁵

General practices are locally run complex systems interconnected with communities, bureaucracies and other practices.¹⁶ The complexity of activities will increase with greater networking and interdependencies within the PHC system.

The preoccupation with evidence-based medicine and evidence-based policy is a predictable response of policy-makers, funders and administrators to shift PHC from a knowable to a known domain, thus gaining control over the activities under their jurisdiction.¹⁷ As a corollary, they look much more favourably at efforts that lead to additional simple evidence or complicated evaluations.

Complicated approaches frame questions such as: What reforms and behavioural change mechanisms do we put in place to integrate multiple guidelines and multiple provider inputs for best practice approaches to comorbidity in patient care?; What general practice and team structures do we need to ensure guideline adherence and better outcomes?; Complex questions ask: How do patients and providers perceive PHC knowledge models and best practices?; Are PHC system goals congruent with the “real world” as experienced by patients and providers?; How can we help GPs to self-organise in practices, teams and communities?; How can GPs and other PHC professionals build on their simple, complicated and complex knowledge, historical strengths and relationships to improve quality by innovation?

Improving chronic disease care integration, promoting timely availability of services and reducing sociocultural barriers to health care access¹⁸ are PHC goals that are not only or even best addressed with simple evidence from the known and knowable domain. Financial incentives, especially when associated with bureaucratic “red tape” — such as the Enhanced Primary Care and Practice Improvement Payments¹⁹ — have limited impact on the integration of general practice care into the broader sphere of PHC.²⁰ Highly trained and experienced GPs work with complex patterns of patient and disease knowledge, referral systems and multifaceted roles and responsibilities in chronic illness care. Complex multifaceted system interventions that

2 Knowledge framework to understand general practice issues in primary care systems*

Knowledge state	Main organisational approach	Scientific organisational paradigm	Attending issues relevant to general practice and PHC development
Known Cause and effect relations are repeatable, perceivable and predictable	Process engineering	<ul style="list-style-type: none"> • Legitimate best practice with standard operating procedures • Reductionism/analysis 	<ul style="list-style-type: none"> • Care and research is focused and driven by evidence-based guidelines • Aspects of chronic disease care are targeted using teams and guidelines • Simple financial incentives and/or penalties drive compliance • Simple economic and measurable health indicators drive service • Based on entities and activities, not relationships • Ignores complexity or reduces it to simple problems • Top-down application
Knowable Cause and effect separated over time and space; complicated but linear	Complicated systems thinking	<ul style="list-style-type: none"> • Analysis/reduction lends itself to more research with planned approaches 	<ul style="list-style-type: none"> • Research is focused on providing more rules and guidelines for disease management and health care organisation • Organisational model based on predictability, which may be spurious • Narrow focus ignores or reduces the complex • Evidence is generally lacking or inconclusive • Top-down application
Complex Cause and effect are organic, nonlinear patterns that are only coherent in retrospect and non-repeating; understandable	Complex adaptive social systems	<ul style="list-style-type: none"> • Evolution of new order, new evidence, innovation • Key stakeholder participation • Pattern, structure, historical and process identification 	<ul style="list-style-type: none"> • GPs self-organise new clinical and population roles; leadership connectivity within primary care and PHC • Patient and community participation and governance central • Research concerned with holism/synthesis and understanding of <ul style="list-style-type: none"> • the multiple facets of the illness experience, health and disease • emerging solutions to individual and community care • adaptive organisations that lead to effectiveness and efficiency • Research not developed or widely available • Bottom-up application; takes time to evolve
Chaotic No cause and effect relationships perceivable	Crisis management	<ul style="list-style-type: none"> • Stability-focused intervention • Enactment tools • Retrospective analysis of chaos management • Potential for radical emergent outcomes 	<ul style="list-style-type: none"> • Disintegration of general practice collapses health care system • Patients lose trust in health care providers and PHC • Disintegration of the delivery system, non-participation, strikes • Ideology rather than insight controls health services • Parallel and competing programs and program deliverers • Financial blow-outs and rigid top-down management

*Adapted from Kurtz and Snowden.¹³ GP = general practitioner. PHC = primary health care.

support incentives such as Enhanced Primary Care would seem most appropriate.

We argue that identifying underlying patterns of functioning systems allows simple and complicated evidence to be more effectively applied. Applying simple or even complicated solutions to complex general practice problems creates unintended negative consequences.²¹ Ignoring the historical highly developed roles of GPs, for example, could lead to the irreversible decline of the unique contribution of general practice. GP non-participation may result in chaos — boycotts by medical graduates, GP strikes and crisis management and emergency solutions would destabilise PHC.

Current reform movements may precipitate a state of confusion for some of the medical profession. Nonetheless, they offer the unique opportunity to redefine the GP's role. It is clearly advantageous to stay in the realms of a complex system solution to address challenges associated with moves to new models of PHC. However, all is not lost if chaos ensues, as radical new solutions may emerge. Unfortunately, such solutions may not include general practice in its current central role (Box 2).

Two challenges in the evolving new PHC environment can be broadly grouped as (i) *knowledge*⁷ (how to develop complex knowledge, how to increase still scant knowledge in known and knowable domains,²⁰ how to translate complex and other evidence into daily practice and systems interventions and maintenance); and (ii) *self-organising leadership* (how to reconstruct our roles and responsibilities around patient needs and new knowledge, how to truly engage with key stakeholders in our practices and communities, how to engage with policy- and decision-makers, how to lead and sustain innovations in health service delivery and organisation).

New complex knowledge solutions include “meta-narrative” systematic literature reviews in contrast to simple and complicated systematic meta-analyses.²² “Meta-narrative” is the overarching scientific storyline that drives research within each research tradition: What are the main theories and explanations? What are the main methods of study? What is the “storyline” of unfolding research?

Whether the small business general practice model will eventually disappear is open to debate, but one thing is certain

— it will change. How it will adapt depends to a considerable extent on general practice self-organisation. The risk of imposed non-complex solutions has been demonstrated in Ontario, Canada, where the provincial government promoted a voluntary Family Health Network model featuring blended payment/capitation, extended hours and funding of nurse practitioners in accordance with best evidence. It proved bureaucratic and slow to take on.²³ Subsequently, a different method of practice payments was introduced to extend practice hours and improve care for patients, while maintaining historical practice patterns, relationships and fee-for-service remuneration. This model, called Family Health Groups, had much less “red tape” and proved very popular.²⁰ More recently, family health teams with GPs, nurse practitioners, nurses and other providers (not necessarily GP-led) are being funded to provide extended primary care services.²⁴ While proving popular, there is an ongoing focus on the job redefinition of roles and responsibilities in primary care and primary health care.

Complexity is the science of the 21st century. The catch is that we may have to wait decades to see it applied.

Albert-László Barabási²⁵

Understanding the complex and chaotic phases of PHC and the role of general practice in PHC renewal requires further development. Before research and policy are implemented, it is critical to understand health system patterns and take advantage of adaptive opportunities in the disruption of change.

The 2003 WONCA Conference in Kingston, Ontario, defined the focus of general practice as primary care morbidity, individual and community values and the health care system,²⁶ and called on general practice internationally to redefine itself in response to new demands and challenges and to shape its own research and clinical future. Complexity approaches provide an organising framework to create new roles, knowledge and possibilities for general practice with long-term goals and strategies for PHC in Australia.

Competing interests

None identified.

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(Received 13 Dec 2004, accepted 26 May 2005)

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