

Quality improvement in Australian general practice: a complexity perspective

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**Quality improvement in Australian general
practice:
a complexity perspective**

Barbara J Booth

**A thesis in fulfillment of the requirements
for the degree of Doctor of Philosophy**

UNSW



**School of Public Health
and Community Medicine**

Faculty of Medicine

March 2014

Originality statement

I hereby declare that this submission is my own work and to the best of my knowledge it contains no materials previously published or written by another person, or substantial proportions of material which have been accepted for the award of any other degree or diploma at UNSW or any other educational institution, except where due acknowledgement is made in the thesis. Any contribution made to the research by others, with whom I have worked at UNSW or elsewhere, is explicitly acknowledged in the thesis. I also declare that the intellectual content of this thesis is the product of my own work, except to the extent that assistance from others in the project's design and conception or in style, presentation and linguistic expression is acknowledged.

Signed

A handwritten signature in dark ink, appearing to read "Barbara J. Book". The signature is written in a cursive style with a large initial 'B'.

Date 24/03/2014

Co-authors agreement to submission

This thesis includes four papers to which others have contributed as co-authors, Professor Mark Harris, Professor Nicholas Zwar, Associate Professor Jan Ritchie, Ms Teri Snowden and Dr Ron Tomlins.

On each paper the contribution of the PhD candidate was greater than 50% as stipulated by the faculty requirements. All authors agree to the inclusion of these papers as part of this Doctoral thesis. The specific contributions and authorship declarations are included in Appendix 1.

Supervisor's statement

I hereby certify that all co-authors of the published or submitted papers agree to Barbara Booth submitting those papers as part of her Doctoral Thesis, and that the manuscript 'Booth BJ, Ritchie J, Zwar N and Harris MF. Health policy and complexity in planning for change: the tension between "getting it right" and everyday local interaction in primary care', which was submitted to *Australian Health Review* on 30 October 2013, is of sufficient quality to merit publication.



Signed

Date 23/03/2014

Abstract

Persistent demand for continuous improvement in the quality of health care is fuelled by data on sub-optimal care, changing patterns of illness, rising expectations and escalating costs. The quality improvement research focus has expanded beyond individual professional development to include organisational behaviour, yet reliable prescriptions to implement change in practice remain elusive. This research examined this dilemma in Australian general practice and explored how a complexity perspective on organisational change might enhance understanding of quality improvement.

An embedded qualitative case study at local practice and national policy levels was used to test the fit and explanatory worth of both complexity and traditional approaches against the empirical reality of change for better chronic illness care over eleven years. Data were sourced from document review, direct observation and interviews, both in a single practice selected for its reputation for quality and its potential for learning, and among six key policy informants involved in chronic care reform over the period of interest.

Results revealed considerable re-shaping of general practice at local and national levels in line with research findings and policy initiatives for enhanced chronic illness care. Change was, however, uneven and unpredictable and fitted the pattern envisaged by complexity thinking better than traditional linear models of planned improvement. Key complexity elements of co-evolution, non-linearity, self-organisation, emergence and edge of chaos dynamics were evident in a network of agents and relationships comprising self-aware persons involved in

communicative gestures and responses influenced by power and values-based choices. The changing order of general practice emerged from this local interaction. Complexity theory, interpreted this way through a sociological and psychological lens, offered a more satisfying explanation for the frustrating lack of reliable improvement formulae.

These findings raise awareness of limitations in the current discourse in health care improvement and support a complex responsive processes approach to enhance traditional understanding of organisational change. They offer guidance and encouragement for participant leaders in the challenging business of improving health care. They are themselves a communicative gesture which may elicit new responses and influence the discourse within the ongoing conversation of quality improvement.

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I was fortunate to receive a University of New South Wales Faculty Research Grant to provide support during part of my data collection.

I have valued support and advice from many colleagues and friends in the ups and downs of work, study and family losses. I particularly thank my long suffering sisters Margaret and Susanna for staying with me and sustaining me on the journey.

List of abbreviations

ACIC	Assessment of Chronic Illness Care
ACIR	Australian Childhood Immunisation Register
AGPAL	Australian General Practice Accreditation Limited
AHHRC	Australian Health and Hospital Reform Commission
AMA	Australian Medical Association
BEACH	Bettering Evaluation and Care of Health
BPP	Better Practice Program
CDM	chronic disease management
CIC	chronic illness care
CME	continuing medical education
DHFS	Department of Health and Family Services (later Department of Health and Ageing)
DoGP	Division of General Practice
DoHA	Department of Health and Ageing
EPC	Enhanced Primary Care
FMP	Family Medicine Program
FRACGP	Fellowship of The Royal Australian College of General Practitioners
GP	general practitioner
GPII	GP immunization incentives
IoM	Institute of Medicine (USA)
PIP	Practice Incentives Program
RACGP	Royal Australian College of General Practitioners

UK	United Kingdom
USA	United States of America
VR	Vocational Recognition of general practitioners

Case study participants

A (1 2 3)	assistant doctor at the practice
AH	allied health key informant
BM	business manager at the practice
GB	government bureaucrat key informant
HC	health consumer key informant
OM	office manager at the practice
P (1 2 3)	partner doctor at the practice
PN	practice nurse key informant
PN (1 2)	practice nurse at the practice
Q	question by interviewer
R (1 2 3)	receptionist at the practice

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Chapter 1:

Introduction

Chapter outline

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- 1.2 Researcher position
- 1.3 Initial conceptualisation
- 1.4 Evolution of the research
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- 1.6 References

1.1 Context and rationale for the topic

Every health care practitioner and every health care institution has two major objectives: (1) to provide care of the highest possible quality; and (2) to provide that care at the lowest possible cost (Donabedian, 1989).

In contemporary times the constant endeavour to improve quality in health care seems beyond any need for justification, unless universal high quality care is already assumed. While there may once have been little question that health practitioner training and professionalism was sufficient to assure patients that they were as safe within the health system as modern medical knowledge allowed, that mindset changed dramatically over the past forty or so years for a number of reasons. Medical research grew enormously, continually moving the goal posts for what constituted good, safe care, and expanded its scope into medical education. The effectiveness of traditional continuing education was questioned and new ideas for fostering life-long learning developed.

Simultaneously, the research spotlight was directed towards the reality of safety and quality of health care worldwide, showing that earlier assumptions of good care were mistaken, when tested against the latest research findings. The rise of consumerism also altered the conversation around quality with more informed and empowered patients willing to challenge both unsatisfactory outcomes and processes of care. The very foundations of health care shifted as changing demography presented new illness patterns and demands for treatment. All these influences flowed together to exert unremitting upward pressure on the costs of health care (Institute of Medicine, 2001).

The demand for continual improvement, for better and more efficient health care, has continued to grow. Journal articles on the subject, initially sporadic midway through the 20th century, became increasingly frequent towards its end, requiring dedicated sections of leading journals, then whole journals on the subject of quality and health care improvement. The voluntary nature of professionally motivated programs for practitioners to keep up-to-date has been overtaken by advocacy for mandatory and regularly repeated certification of competency. As the focus of health care improvement activities has broadened beyond practitioners alone to the organisations in which they work, so regulatory procedures have expanded to include health care settings. Consequent to this expansion has been a broadening of academic theorising about improvement from individual education and standards to organisational behaviour, and specifically organisational change. The indissoluble link between improvement and change is now well accepted: *“not all change is improvement, but all improvement is change”* (Berwick, 1996).

1.2 Researcher position

My career had to some extent been interwoven with these changes. I became fascinated by the challenge of quality improvement early in my career as a general practitioner (GP) in Australia, taking an active role in continuing medical education as a registrar during vocational training in the 1980s. Subsequently I worked in the area of quality and standards at The Royal Australian College of General Practitioners (RACGP) during the 1990s. During that time I had a leadership role in the development of both the first mandatory

personal recertification program for GPs and the first national standards for accreditation of general practices in Australia. I had, as well, carried out a qualitative and quantitative research study into the attitudes and responses of Australian GPs to the RACGP Quality Assurance Program.

As I moved into an academic career I continued engagement with the RACGP national quality care committee. Having been engaged in the field during the 1990s, a critical period for quality improvement as an area of academic study, I remained intensely interested in theoretical development of the subject, particularly by the early expansion into the field of organisational behaviour and change theory. Yet I was also aware of the practical reality of the challenge behind the quality improvement rhetoric. This was demonstrated as more and more randomised controlled trials were undertaken, followed in due course by systematic reviews, that consistently reported limited success of any and all quality improvement methods – of the order of 5%–15% (Grimshaw et al., 2006). I began to wonder if this was as good as it gets.

Another consequence of my eight years at the RACGP had been study in leadership and management. Development of an organisational approach to quality improvement brought my acquired work experience and learning together with academic and theoretical interest. This provided motivation to pursue further research in the broad area of quality improvement in general practice, particularly into the way an organisational change perspective might contribute new ideas to the expanding knowledge base, and how it might apply in practice.

My initial exploration of existing literature had included systematic searching and review of medical literature on continuing medical education and quality assurance at the start of my candidacy, but this new approach demanded a crash course in organisational behaviour. Here, in parallel with evolving concepts of continuing education, I found development in thinking about organisations from different perspectives, often represented as metaphors or images (Morgan, 1997), each offering different insights. For example, the more traditional “machine” image of organisations was a reasonable match with the traditional biomedical model and quality improvement methods such as audit and feedback. Other images of organisations as cultures or complex adaptive systems or brains were a less comfortable fit with the medical paradigm but offered different insights into how to improve the quality of healthcare.

I saw how many of these images fitted with general practice and also with evolving quality improvement approaches in medicine as a whole, but all lacked the sort of systematic empirical research base that was expected within the medical sphere. As a consequence, I conceived the overall purpose of this research as contributing to a sounder research base for organisational change theory in quality improvement in general practice.

For a number of personal and work-related reasons my candidacy extended over a prolonged period, and so paralleled evolution in thinking about quality improvement in health care while also enabling considerable opportunity for reflection in response to both theoretical and empirical exploration. This led to a process of evolution in my research purpose and approach from initial conception to final completion.

1.3 Initial conceptualisation

In seeking a more specific and practical focus for study, I was aware of the work of Wagner and colleagues that identified chronic disease management as a topical and pertinent focus for quality improvement in primary care for cogent reasons such as increasing prevalence and less-than-optimal processes of care (Wagner, Austin, & Von Korff, 1996). Subsequent development of Wagner's Chronic Care Model began to provide an evidence based guide to best practice where practice organisation was particularly important in fostering continuing and coordinated care (Bodenheimer, Wagner, & Grumbach, 2002; Wagner, 1998). The research unit in the School of Public Health and Community Medicine at the University of New South Wales, through which I was pursuing my doctoral studies, had completed an analysis of the organisational capacity of Australian general practices to deliver better quality care for a range of chronic conditions according to this Chronic Care Model (Proudfoot et al., 2007).

Following on from this work, my research aimed initially to add to current knowledge of how to improve healthcare for chronic disease in general practice in Australia, by:

1. identifying organisational factors of Australian general practice that may influence the capacity of GPs and their practices to improve healthcare;
2. investigating the prevalence and mechanisms of action of such factors among practices that were trying to improve in line with best practice chronic disease care; and

3. proposing strategies to facilitate quality improvement for chronic disease care in Australian general practice.

With these aims in mind, I had formulated my original research question as:
How and why do organisational factors in Australian general practice influence general practices in their attempts to change how they deliver health care for patients with chronic illness to meet best practice guidelines?

Initially multiple case studies were proposed to identify and correlate organisational factors with more successful arrangements for chronic illness care, using pattern matching logic to map these factors to elements of different organisational theories.

1.4 Evolution of the research over time

As I delved more deeply into organisational behaviour theory as the foundation for the first practice case study, I found that some of the most promising insights came from the newly developing concept of organisation as complex adaptive system. This approach had begun to penetrate into medical literature (Plsek & Greenhalgh, 2001) and offered many correlations with my own experience. As I prepared for, and later conducted, the fieldwork for the first practice recruited for the case studies, I explored the literature and realised that I needed a far deeper understanding of complexity science, particularly as it applied to human organising. Much of the use of complexity theory in the health literature was being criticised for being superficial and faddish, and I wanted to ensure that my understanding was more substantial before using it as a theoretical pattern in the case studies.

My continuing engagement as a member of the RACGP quality care committee had led to a separate focus group project to develop a quality framework for Australian general practice (Booth & Snowdon, 2007), and also offered an opportunity to lead in writing a review article on quality and safety in Australian health care from the viewpoint of general practice (Booth, Snowdon, Harris, & Tomlins, 2008). This proved an opportunity to use writing as a method of inquiry (Richardson, 2000) to clarify the context and begin to lay the detailed theoretical foundations of the research project, while exploring the potential of complexity thinking within this context. It also offered the opportunity for a follow-up article further to clarify and deepen my understanding of complexity science.

Extensive review of literature on complexity in science and business studies led me to the work of researchers at the Centre for Complexity and Management at the University of Hertfordshire. They took scientific principles from complexity sciences in physics, mathematics, ecology and computer modeling, drew analogies from them and interpreted them in terms of scholarly inquiry about human activity. Clarifying this understanding of “complex responsive processes of relating” for later publication (Booth, Zwar, & Harris, 2010) gave me a sounder foundation going back to the practice data, where I found it offered a richer perspective and potential for novel insights than other organisational behaviour discourses. As a consequence I decided to focus on complexity theory alone, not as one among many competing images or theoretical patterns of organisational change. This led to a shift in the purpose of the research away from mapping, identifying, counting and correlating to exploring and learning

for better understanding. It positioned the research at the beginning of a more rigorous approach to the application of complexity thinking in organisational change for health care improvement.

Thus my overall research question became: *How might the new complexity sciences inform understanding of organisational change for quality improvement of chronic illness care in Australian general practice?*

I pursued responses to this question in three stages, through three subsidiary questions:

Stage 1: Theoretical development

What are key elements of the complexity sciences and how might they operate in human organisational change?

Stage 2: Empirical exploration

How apt is complexity theory to describe and explain empirical reality of organisational change for quality improvement in the Australian primary care setting?

Stage 3: Evaluation

What novel insights and implications does this approach offer for future improvement in Australian general practice?

1.5 Structure of thesis

This introduction has provided a brief overview of my research – its context and rationale, my position in relation to the research and theoretical development of

the research over time, culminating in the questions outlined above. The subsequent chapters will expand on the context, detail how I went about answering the questions I had developed, then report my findings and discuss their significance.

The thesis is submitted as a series of publications and additional chapters to present a logically ordered, comprehensive research report on a complexity perspective on quality improvement in general practice.

In **Chapter 2: Research context – health care quality improvement**, I review the research literature on quality improvement in health care. I explain the process for reviewing and synthesising the literature in the field and present the results in Paper 1: Safety and quality in primary care: the view from general practice (2008). At the conclusion I highlight the need for further exploration of the ideas of the new complexity sciences and their potential applicability in the quality improvement field.

In **Chapter 3: Theoretical development – complexity sciences**, I describe the foundation for the move to the new complexity sciences in the search for better understanding or organisational change within management literature. I provide details of how I explored this relatively new field systematically and present the results in Paper 2: A complexity perspective on health care improvement and reform in general practice in and primary health care (2010). I examine both the origins of complexity concepts in the natural sciences and how they have been translated into organisational behaviour and health care improvement.

In **Chapter 4: Methodology**, I argue for the need to attend to my research questions in ways that are coherent with a complexity perspective. I explain the rationale for claims to knowledge based on constructing meaning through interpretation of participants understanding and experience, and thus for my selection of an embedded case study as the research design.

In **Chapter 5: Results**, I present the findings at both levels of the embedded case study. The report from the local practice level of the case is presented in Paper 3: Healthcare improvement as planned system change or complex responsive processes? A longitudinal case study in general practice (2013). The outcomes from the national policy level of the case are detailed in Paper 4: Health policy and complexity in planning for change: the tension between “getting it right” and everyday local interaction in primary care (submitted 2013). At both levels of the case the complexity perspective matched observed patterns of change in general practice and participants’ interpretation of how this came about.

In **Chapter 6: Discussion and Conclusions**, I draw together the research findings and discusses how they address my original research questions, exploring the significance of the findings and their implications for participation in ongoing quality improvement efforts. I also examine the limitations and strengths of the research and propose some final conclusions and suggestions for future research in the area.

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Chapter 2:

Research context – health care quality improvement

Chapter outline

- 2.1 Introduction: basis of literature review and synthesis
- 2.2 Paper 1: Safety and quality in primary care: the view from general practice
- 2.3 Summary

2.1 Introduction

This chapter describes in detail the background to this research as a review of the literature on quality improvement in health care in the first publication:

Booth, B. J., Snowdon, T., Harris, M. F., & Tomlins, R. (2008). **Safety and quality in primary care: the view from general practice.** *Australian Journal of Primary Health*, 14(2), 19-27.

The paper resulted from an invitation through the RACGP national quality care committee which proposed exactly the sort of broad picture of quality improvement in general practice in Australia that was ideally suited to describing the context for my research. I built on extensive awareness of publications in the subject from my prior work experience. My search strategy is presented in Appendix 1. In order to provide an overview suitable for contextualising my research and also fulfil the requirements of the journal, I selected and synthesised key articles from the breadth of theorising and research on the subject, without any intention to present a comprehensive systematic review.

This paper presents the evolution of thinking and research in the growing area of quality improvement in health care, including the dilemma I presented in the introduction that advancing research evidence seemed not to meet expectations for reliable improvement. It grounds this in the Australian context of quality initiatives amid increasing prevalence of chronic illness and rising costs. It also presents a model developed by the RACGP for advancing quality efforts in the increasingly complex world of primary care.

2.2 Paper 1



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Safety and Quality in Primary Care: The View from General Practice

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This article aims to provide a general practice perspective on quality and safety in primary health care. As the health care system has evolved over the past 50 years, so have approaches to ensuring it delivers high quality care. Traditional education has been joined by a range of initiatives from psychological, organisational, marketing, epidemiological and social disciplines. Most of these methods are successful in some situations, but need to be tailored to suit the specific context. There is still imperfect guidance in how to do this. Improvements in performance of 5% to 15% seem to be the best that have been achieved in randomised controlled trials. Quality initiatives in Australian general practice have changed considerably in keeping pace with these developments, moving from an educational paradigm to a more whole-of-system approach. They have been introduced or emerged in ways that are sometimes coherent, sometimes not. Australian general practice is a complex system that is hard to imagine organisationally as a well-oiled machine. The Royal Australian College of General Practitioners has developed a quality framework as a conceptual model to help make sense of the current pattern of quality activities and build a strategic awareness to guide future initiatives.

Key words: Quality improvement, General practice, Education, Medical, Continuing, Complexity, Organisational models

Constant attention to safety and quality in health care scarcely needs justification. Avedis Donabedian (1989) argued that every health care practitioner and every health care institution aims to provide care of the highest possible quality. This sentiment was echoed by the President of the American Academy of Family Physicians at the World Organisation of Family Doctors' Conference in Durban in 2001, when he claimed never to have met a family doctor who aspired to incompetence. The classic example of Dr John Snow—convinced that water was the source of cholera—shows one doctor's commitment to not only improving the health of his individual patients but also that of the community (Vinten-Johansen et al., 2003).

Safety and quality echo the underpinning ethical principles of health care—avoiding harm and achieving health benefits, justly and equitably for all, while respecting the autonomy of patients. In this 30th anniversary year of the Declaration of Alma Ata, it is appropriate to examine how general

practice contributes as part of Australian primary health care to "protect and promote the health of all people..." (International Conference on Primary Health Care, 1978).

In this article we examine quality and safety in Australian general practice; initially looking within the broader focus of medicine worldwide, then narrowing to examine the past 20 years in Australian general practice. We introduce a conceptual model recently designed as an analytical tool for quality initiatives in Australian general practice and suggest some areas for future work.

We use as our definition: "Quality means the best outcomes possible, given available resources, that are consistent with patient values and preferences" (World Organization of Family Doctors [WONCA] 1997). This is consistent with the US National Institute of Health definition, but developed within the context of general practice.

We refer to "quality initiatives" to cover the wide range of evolving ideas of quality improvement

(including quality control/assurance/improvement, continuous quality improvement/total quality management, health care improvement/clinical governance and research into practice/knowledge translation/implementation science). Patient safety is discussed within the overarching concept of quality initiatives.

Background

Over the past 50 years significant change in health care has influenced thinking about quality. Health care has undergone its own "industrial revolution", with individual craftsmen who took responsibility for the whole product being replaced by specialisation and organisation of labour to enhance both efficiency and productivity.

The cost of health care has escalated dramatically. Brook and Lohr (1985) documented how significant resource utilisation could be attributed to wide variability in processes of care, well outside best practice guidelines and not due to differing needs of individual patients. As governments sought to ensure access to health care they became purchasers of care and expected to pay for predictable outcomes based on good evidence rather than mere activity (Sheldon & Borowitz, 1993).

New patterns of illness are evolving, with a shift from predominantly acute and infectious illnesses to long-term conditions. These require increasing numbers of tasks to be completed by an increasingly diverse range of health care providers. This is coupled with a growing evidence base for what types of care can lead to better health outcomes, and therefore a growing demand to translate this evidence into practice.

Furthermore, changing consumer attitudes and new forms of information management herald an era where informed patients expect to be at the centre of care. And when high quality care is available, it is not necessarily available to all, as Julian Tudor Hart, a GP treating Welsh coal miners, identified in the 1960s. Like Dr John Snow, Tudor Hart was keenly interested to observe patterns of illness and to address their root cause. Based on his observations he invented the "inverse care law", which proposed that "the availability of good medical care tends to vary inversely with the need of the population served" (Hart, 1971).

History of quality initiatives in medicine

Early concepts of quality focused on a competent physician (Gonnella, 1979). As a consequence, quality initiatives equated to education—initially undergraduate, then vocational, with some form of assessment and certification, and, finally, continuing education.

This educational paradigm assumed that quality flowed from education, but for many years there was surprisingly little systematic knowledge of how good quality of health care actually was. Even today what we know tends to be "only snapshots of information about particular conditions, surgical procedures and locations of care" (Schuster, McGlynn, & Brook 2005).

Continuing medical education (CME), and its effectiveness to assure quality of care, came under critical scrutiny in the 1980s. Pioneer researchers concluded that most evaluations were limited to attendance, participant satisfaction, or cognitive gain. Those few who attempted to measure performance or patient outcomes rarely managed to demonstrate improvements in these parameters. Given this evidence of limited effectiveness of CME to change behaviour, the next step was to examine interventions that were successful. This showed that sound educational principles—needs analysis, alignment of educational methods with needs and evaluation of outcomes—were associated with improved performance and health outcomes (Abrahamson, 1984; Davis et al., 1984; Haynes, Davis, McKibbon, & Tugwell, 1984).

In the wake of such reviews, the concept of CME began to evolve, moving to a broader definition: "all ways by which physician learning and clinical practice may be altered by educational or persuasive means" (Davis, Thomson, Oxman, & Haynes, 1992). CME under this definition included peer influence, academic detailing, reminders, audit and feedback, and was more likely to be effective than traditional CME (Lomas & Haynes, 1988; Beaudry, 1989; Davis et al., 1992).

Theories of quality assurance in health care also began at this time to evolve from an industrial model based on the work of Walter Shewart, W. Edwards Deming and Joseph Juran in manufacturing industries. These theories came to be known as total quality management and/or continuous quality improvement (Kritchevsky & Simmons, 1991). This development gave birth to processes such as standards, guidelines and

indicators, audit and feedback, control charts, clinical pathways, care protocols. Consistent with this broader perspective, patient safety began to develop a separate identity with a higher priority focus in response to studies such as the Quality in Australian Health Care Study (Wilson et al., 1995), which showed evidence of considerable harm from significant medical errors.

As part of this evolution, the focus for quality initiatives shifted from individuals to the system in which they work. The mental model that helped to shape such thinking is the organisation as a machine (Morgan, 1997) where inputs, components, processes and outputs can be explored and mapped, revealing linear relationships and predictability from system design, leverage and re-engineering.

Experience in Australian general practice

The Royal Australian College of General Practitioners (RACGP) was established in 1958 to “establish and maintain high standards of learning, skills and conduct in the general practice of medicine and surgery...” (RACGP, 2003).

The steps to realising this goal followed the educational paradigm of the day. Initially, the RACGP developed an assessment and certification process leading to Fellowship of the College (FRACGP) in 1967. This was followed in due course by a vocational training program—the Family Medicine Program (FMP, later the RACGP Training Program) in 1973–1974. Then, in 1987, the RACGP formalised its longstanding requirement for members to continue approved postgraduate study while in active general practice through the introduction of its Quality Assurance Program. This offered nine options for satisfactory participation, and those five activities with an educational base were chosen by the vast majority of members in the first triennium of the program (Hays, Bridges-Webb, & Booth, 1993).

In 1989, another initiative of the RACGP to ensure high standards of general practice came to fruition through ongoing advocacy to the Commonwealth Government. Vocational registration of general practitioners provided financial rewards to general practitioners who were specifically trained for that vocation and required ongoing participation in the RACGP Quality Assurance Program. Increased government funding brought a renewed focus on general practice as a significant part of the

health care system. In turn, this led to negotiations between the Commonwealth Department of Health and Family Services (DHFS), Australian Medical Association (AMA) and RACGP, and an evolving General Practice Strategy (DHFS, 1998). This heralded the start of a transition from an educational to a system orientation for quality and safety in Australian general practice.

As part of the General Practice Strategy, divisions of general practice were established during the 1990s with the aim of encouraging GPs to work together with other health professionals at the local level to improve the quality of health service delivery and thereby improve health outcomes. Practice standards and accreditation were also proposed.

Where divisions of general practice evolved autonomously and quite rapidly, the accreditation process was slower and involved parallel strands. The RACGP developed draft entry standards for general practices through several iterations of broad consultation within the profession, and then field tested them in 199 practices (Hays et al., 1998). Concurrently, various incarnations of a consultative group including the broad range of GP professional bodies, consumer groups and government hammered out an agreed process and structure for accreditation of general practices. An independent company, Australian General Practice Accreditation Limited (AGPAL) was established in early 1997 and the first practices were accredited later that year. Subsequently, in 2002, accreditation became the sole entry point for access to a range of payments outside the traditional fee-for-service payment structure (Commonwealth Department of Health and Ageing [DoHA], 2005).

Patient safety has not been as great a focus in general practice as in the wider health system following the Quality in Australian Health Care Study (Wilson et al., 1995). The Australian Council for Safety and Quality in Health Care, which supported numerous safety and quality programs during the past decade, did not engage significantly with general practice. This may, in part, have been due to a relatively lower profile for medical error in general practice, possibly reflecting a lower incidence of errors as reported in one study (Makeham et al., 2006), but also no doubt reflected the higher profile of the hospital sector.

More recent developments

Quality of care

Quality problems remain in all parts of the health care system, overseas and in Australia. The landmark US study Crossing the Quality Chasm documented problems of overuse, underuse and misuse, which were more widespread than safety issues (Institute of Medicine, 2001). In Australia, the National Institute for Clinical Studies (2003, 2005) identified important gaps between evidence of quality care and actual clinical practice. Many of these gaps are relevant to general practice in Australia; for example, advising on smoking cessation, measuring glycosylated haemoglobin in diabetes management, promoting the use of preventers in people with chronic asthma, recognising and managing panic disorder and agoraphobia and achieving optimal control of blood pressure, to name but a few.

Detailed data on the quality of care in Australian general practice still tends to be patchy and related to specific situations; for example, patient perceptions of quality of care (Davis et al., 2004), or quality of diabetes care (Wan et al., 2006). Australia has excellent information about patterns of practice and processes of care in the Bettering the Evaluation and Care of Health (BEACH) Program (Britt et al., 2007); however, quality assessment remains difficult due to poorly developed information systems that impede collation of patient care data at a population level. The study of diabetes care is one of the very few attempts to systematically assess quality of care in Australian general practice (Georgiou et al., 2006; Wan et al.).

One important finding is that the "inverse care law" applies within Australian general practice as it did among Julian Tudor Hart's Welsh coal miners (Furler et al., 2002).

Quality improvement

Appropriate responses to quality problems are better informed by the past decades of research. Recent systematic reviews and meta-analyses provide a picture of a "smorgasbord" of potentially useful methods to improve quality of health care (Grol & Grimshaw, 2003; Grol, Wensing, & Eccles, 2005; Grimshaw et al., 2006). However, while all methods have been successful in some situations, none are effective in all circumstances. These methods, singly or in combination, must be tailored to context, but there is an imperfect evidence

base for how to do this. Where these methods are effective, they achieve improvements in care of between about 5% and 15%.

Grol et al. (2005) have helpfully categorised methods according to different theories of change implementation:

- Adult learning principles – small group learning, local consensus statements
- Marketing and health promotion theories – needs assessment and mass media
- Social learning and innovation theory – outreach visits and the use of opinion leaders
- Epidemiological approach and rational information seeking – guideline development
- Learning theory – audit and feedback, quality indicators
- Organisational and management theories – re-engineering care processes and total quality management
- Economic and behavioural approaches – incentives, regulation and accreditation.

According to this synthesis, there is no single correct approach. What might work for promoting quality prescribing for respiratory infections will be quite different to what is needed to improve outcomes for team care of patients with long-term conditions. Different levels of care (individual doctor, practice, regional care group or national health system) require different approaches—context is crucial.

There are many examples of these different types of approaches in Australian general practice. Educational methods remain the basis for vocational training according to a national curriculum, certification of competence for independent practice and continuing professional development.

The provision of clinical guidelines (e.g., RACGP guidelines for preventive activities in general practice and the Therapeutic Guidelines suite) follows the epidemiological, evidence-based approach, and the government provides universal access to the Cochrane Library.

Practice standards and accreditation, support for practice nurse initiatives and for teamwork in practices follows the managerial and system re-design approach, whereas insurer service items (e.g., care plans, cycles of care) and practice incentives (e.g., after-hours care, IM/IT,

prescribing) are more influenced by the paradigm of control and regulation.

Some quality initiatives adopted from overseas and used in Australian general practice and other parts of the health system use multiple approaches. Breakthrough Collaboratives, developed by the Institute for Healthcare Improvement in the US and used by the National Primary Care Development Team in the UK, have also been implemented in Australian general practice. They use a generic methodology that involves learning skills for improvement, measurement and feedback, plan-do-study-act (PDSA) cycles, peer support and local adaptation (Knight, 2004).

Where to from here?

The Australian health care system continues to become more complex. The challenge of translating research into practice will escalate rather than diminish, a daunting prospect given the current relatively modest capacity for quality initiatives to improve performance. And we must not view quality initiatives solely as addressing evidence–practice gaps. Variability exists not just between providers but between groups in the community; a reality acutely apparent in relation to Indigenous health.

Simplistic approaches to quality improvement seek universal, enduring formulas for predictable results, but they have been shown to be inadequate. They are based on a mechanistic view of the health system, which has provided valuable insights from organisation and systems theory in the past, but which is reaching the limit of its application. Mechanical systems can be clearly defined and have clear borders. Order is created by rational managers outside the system and problems are resolved by better data and analysis. Improved components or processes that work in one machine can readily be transferred to another.

Health care and health systems are not always like this; in particular, Australian general practice, which is difficult to view as a coherent organisation.

The empirical research in quality initiatives challenges this thinking, and some are finding the new complexity sciences (Waldrop, 1992; Stacey, Griffin, & Shaw, 2000) more resonant with the findings of quality improvement research. Health care more nearly resembles a complex adaptive system than the well-oiled machine of an earlier

management paradigm. Complex adaptive systems have fuzzy boundaries, are embedded in other systems and co-evolve with them. Controlling the system to make or examine one intervention is not realistic. In complexity thinking relationships matter, tension and paradox are natural, and non-linearity is the order of the day—large inputs can be disappointingly ineffective, while small changes can have disproportionate outcomes (Plsek & Greenhalgh, 2001; Kernick, 2006).

RACGP quality framework

It is in this environment that the RACGP has recently developed a conceptual framework to try to make better sense of the challenge of quality improvement for Australian general practice (Booth, Portelli, & Snowdon 2005; Booth & Snowdon, 2007). The RACGP quality framework (Figures 1 and 2) identifies:

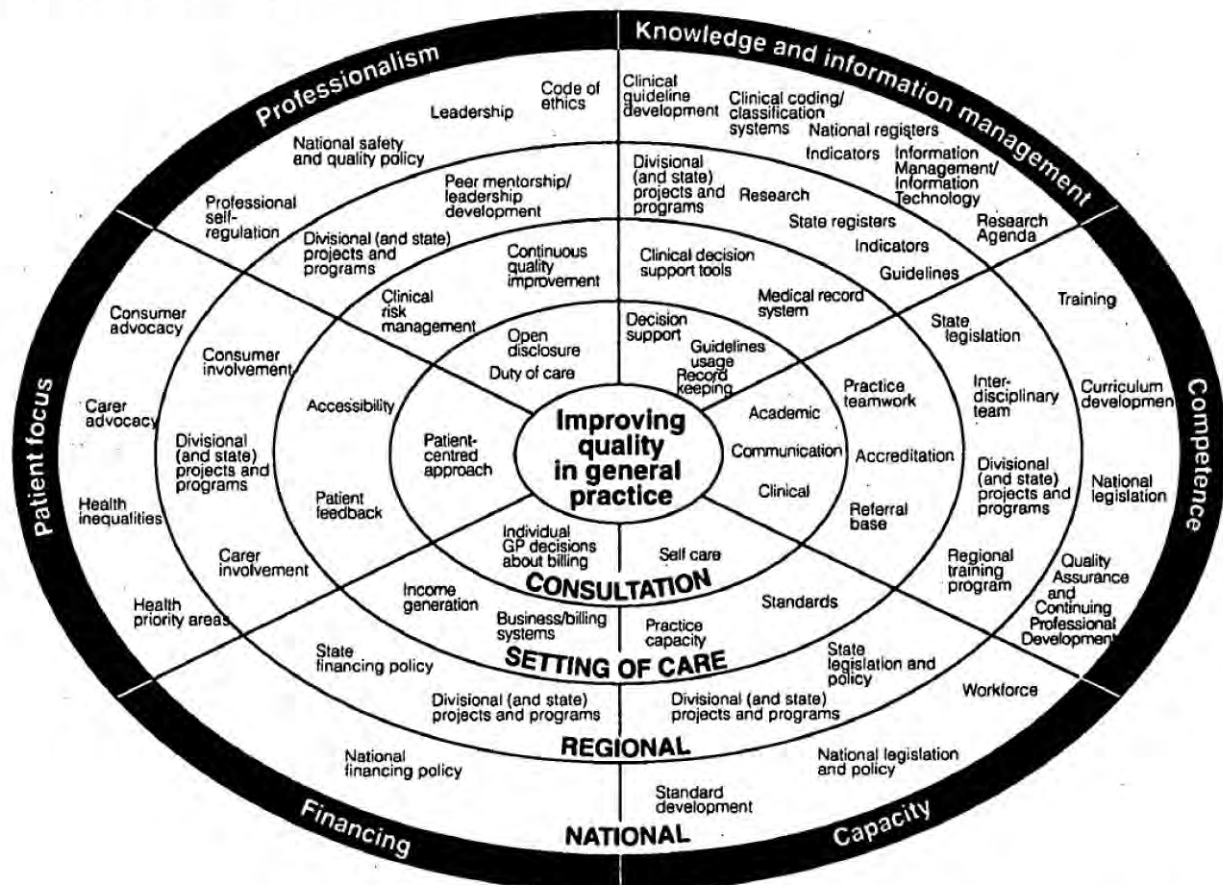
- Four levels of focus for improving general practice care – practitioner; setting of care; region; nation.
- Six domains that influence quality improvement in general practice – professionalism; patient focus; competence; information and knowledge management; capacity; financing.
- Six foundational dimensions of quality – acceptability (including concepts of patient-centred care); accessibility (including concepts of equity); appropriateness (including concepts of evidence-based medicine); effectiveness (including outcome focus); efficiency (including minimising waste); safety (consistent with the ethical imperative “first do no harm”).

An example of how it can be used is the following analysis of the national strategy to improve immunisation rates in Australia that was launched by the then Minister for Health and Aged Care, the Hon. Dr Michael Wooldridge in 1997 (Commonwealth Department of Health and Aged Care [DoHA], 2006). This program achieved remarkable improvement in immunisation rates for children 12–15 months (~84% to 91%) and 24–27 months (69% to 92% [Medicare Australia, 2007]).

Elements of the program that probably contributed to its success, mapped to the RACGP quality framework, include:

- Professionalism – the launch of the program appealed to professionalism and values at national, practice and individual doctor level.

Figure 1: RACGP Quality Framework



Highlighting that immunisation rates in Australia were among the worst in western countries and lower than many Third World countries, "the [then] Federal Minister for Health and Family Services, Dr Michael Wooldridge, called on [GPs] involved in immunising children to make it their personal mission to ensure that Australian children no longer suffered from debilitating and fatal vaccine-preventable disease" (DHFS, 1997).

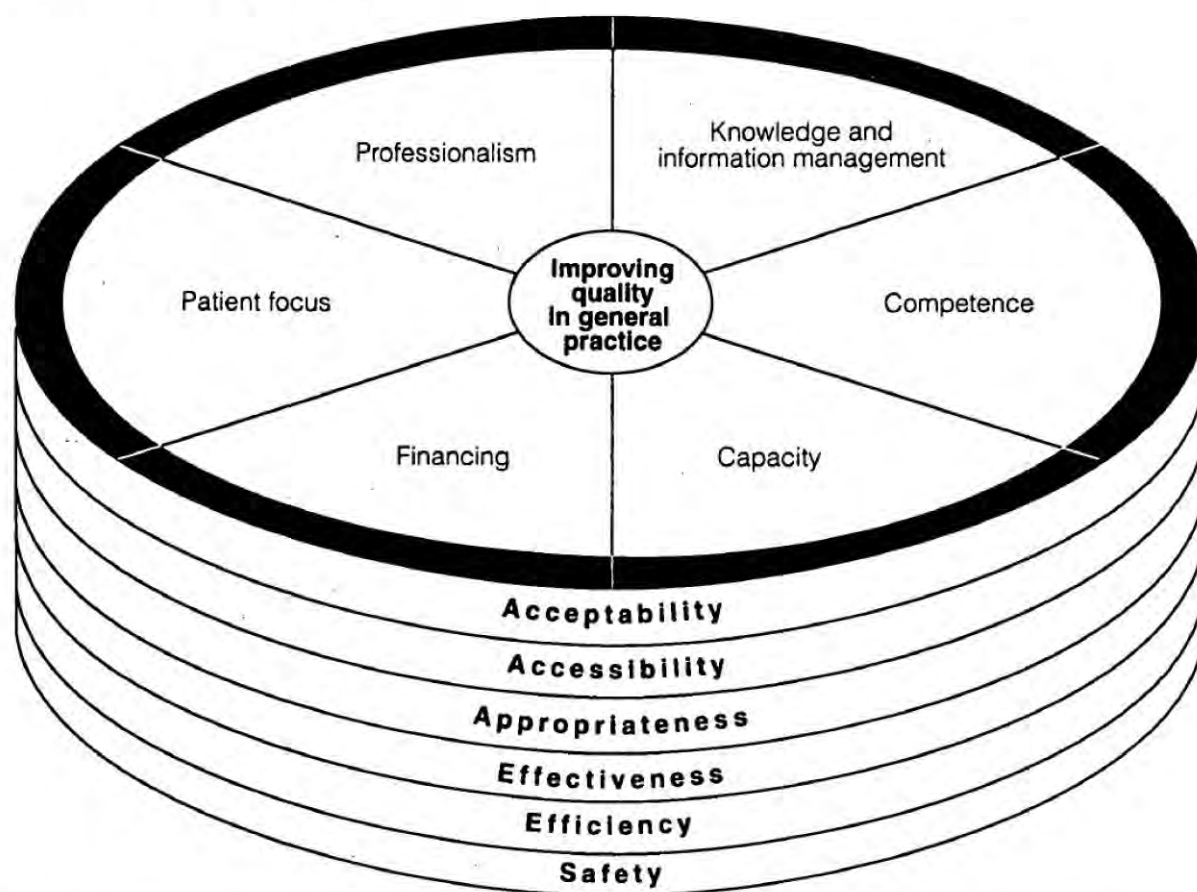
- Financing – appropriate and relatively user-friendly financial incentives backed up this rhetoric, in the form of the General Practice Immunisation Incentives (GPII) Scheme and funding for divisions of general practice to support education, vaccine storage and data collection.
- Patient focus – the provision of the Maternity Immunisation Allowance and Child Care Benefit, coupled with school entry requirements and a community education campaign encouraged patient participation in a way that balanced responsibility between doctor and patients.
- Capacity – support for practice nurses built

capacity in general practices for meeting the challenge, and divisional immunisation officers supported practices in vaccine storage and data management.

- Knowledge and information management – the Australian Immunisation Handbook provided an up-to-date guideline, and immunisation prompts and reminders were incorporated into medical software. National electronic systems were established in the Australian Childhood Immunisation Register (ACIR) to track performance and make feedback available quickly and easily for both the immuniser and immunised.
- Competence – immunisation remained a priority focus of ongoing professional development for GPs and practice nurses, often with divisional support.

Tomlins (2007), in advocating for the development of secure data linkage between practices and ACIR, used the RACGP quality framework prospectively to analyse issues of acceptability, accessibility, appropriateness, effectiveness, efficiency and

Figure 2: RACGP Quality Framework



safety at individual, setting of care, regional and national levels, within the domain of knowledge and information management (p. 29).

The RACGP quality framework was also used in a gap analysis to identify national priority areas in the Australian general practice environment which constituted major barriers to quality initiatives (RACGP, 2006). This exercise identified three main priority areas of workforce (encompassing general practice teams and international medical graduates), development of a primary health care strategy and support for the uptake and use of electronic decision support systems.

A particular feature of a conceptual tool such as the RACGP quality framework is its power to direct thinking into new channels, and away from habitual approaches, to provide a stimulus to "think outside the box". The gap analysis also identified some important priorities in areas less often the focus of quality initiatives. Consideration of the patient focus domain pointed to the need to enhance equitable access to quality care and develop a population approach to quality initiatives.

And thinking about the professionalism domain, which receives the least attention in modern quality thinking, suggested potential benefit from engaging in a national conversation about the values that underpin general practice. Such reflection might well help GP groups and individual GPs navigate the changing organisational environment of 21st century health care.

Conclusion

In this article we have endeavoured to provide the general practice perspective on quality and safety in primary health care. The worldwide development of quality initiatives in medicine has been mirrored by considerable change in Australian general practice, often supported by Australian Government initiatives, often in conjunction with peak professional GP bodies. Some of these developments have been coherent and ordered, some less so. Complexity science suggests that this may be the natural course for attempts to bring about change in such a complex environment. Bearing in mind that "all models

are wrong but some are useful" (Box, 1979), the RACGP quality framework provides a mental model to support mindfulness of important dimensions of

quality, domains of influence and levels of focus for quality improvement in the Australian general practice environment.

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2.3 Summary

This paper outlined how concepts of quality improvement evolved from an individual educational and certification paradigm to embrace an organisational and system focus. It provided an overview of the Australian experience in this area. It also introduced the new complexity sciences and reported their growing popularity in relation to health care improvement. This highlighted the need for considerable further exploration of the detail of complexity thinking and its potential within the field of health care improvement.

Chapter 3:

Theoretical development – complexity sciences

Chapter outline

- 3.1 Introduction: basis of literature review and synthesis
- 3.2 Paper 2: A complexity perspective on health care improvement and reform in general practice and primary health care
- 3.3 Summary

3.1 Introduction

Following the description of growing interest in complexity ideas in health care improvement literature, this chapter presents a rigorous theoretical exploration of complexity thinking in the second publication of the thesis:

Booth, B. J., Zwar, N., & Harris, M. (2010). **A complexity perspective on health care improvement and reform in general practice and primary health care.** *Australian Journal of Primary Health*, 16(1), 29-35.

Since this was not an area of study as familiar to me as quality in health care, I sought initial guidance from local university courses and librarians in the organisational behaviour field. Initially I used basic texts then began to explore management databases, following up citations to build a pattern of core journals and books commonly cited about complexity thinking. More details of my search strategies are in Appendix 2. I selected and synthesised search results to answer my specific research question, “what are key elements of the complexity sciences and how might they operate in human organisational change?” rather than present a definitive or systematic overview of the topic.

This paper traces development of organisational behaviour theory and interest in complexity, then identifies and explains common complexity elements and critiques their use in much of the management and health care literature. It introduces a more rigorous approach to complexity in organisations and briefly compares this to experience in Australian general practice.

3.2 Paper 2

A complexity perspective on health care improvement and reform in general practice and primary health care

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Abstract. Health care improvement is always on the planning agenda but can prove frustrating when ‘the system’ seems to have a life of its own and responds in unpredictable ways to reform initiatives. Looking back over 20 years of general practice and primary health care in Australia, there has been plenty of planning and plenty of change, but not always a direct cause and effect relationship between the two. This article explores in detail an alternative view to the current orthodoxy of design, control and predictability in organisational change. The language of complexity is increasingly fashionable in talking about the dynamics of organisational behaviour and health care improvement, but its popular use often ignores challenging implications. However, when interpreted through human sociology and psychology, a complexity perspective offers a better match with everyday human experience of change. As such, it offers some suggestions for leaders, policy makers and managers in health care: that uncertainty and paradox are inherent in organisational change; that health care reform must pay attention to the constraints and politics of the everyday; and that change in health systems results from the complex processes of relating among those involved and that neither ‘the system’ nor a few individuals can be accountable for overall performance and outcomes.

Introduction

Improving health care remains a priority for many reasons. There are documented gaps (National Institute of Clinical Studies 2003, 2005), even chasms (Institute of Medicine 2001), between the sort of care that research suggests could improve health and what is delivered. As well, the demands on health care services are changing, particularly in primary health care. New patterns of illness in aging populations challenge established ways of doing things. It is more than 10 years since Wagner *et al.* (1996) proposed the need to re-organise care delivery to improve outcomes for patients with chronic disease.

Yet decades of research into health care improvement show variable and often disappointing results. Translating research into practice by education, audit, reminders, marketing, opinion leaders, or combinations of these seems to make a significant improvement only 5–15% of the time (Grimshaw *et al.* 2006). Some argue that the route to improvement comes through system change (Berwick 2003) and researchers are turning to the field of organisational behaviour for insights (Garside 1998; Greenhalgh *et al.* 2004).

The purpose of this paper is to introduce complexity theory and to examine why it may offer a new and valuable perspective on organisational change in primary health care. We argue that orthodox health care improvement and reform initiatives reflect thinking that emphasises design, control and

predictability, but that the complexity perspective provides a closer match with experience. However, it also has challenging implications for how primary health care might continue to evolve to meet the needs of 21st century populations. We draw particularly on the experience of change in general practice over the past 20 years as one major thread being drawn into developing Australia’s first primary health care strategy (Department of Health and Ageing 2009).

This paper starts with a review of the dominant ways of thinking about organisational behaviour and change, and why complexity might offer a new perspective. It examines in detail what is meant by complexity theory and explores some implications for thinking about organisations in this way. It then looks critically at how complexity is used in current literature as either fashionable language or a source for analogies with social and psychological understanding of human interaction. Finally, it examines how the structure and experience of change in general practice in Australia fits with a complexity perspective and reflects on what this might mean for ongoing primary health care reform in Australia.

Understanding organisational behaviour

Early thinking

The beginning of the 20th century saw Frederick Taylor use methods drawn from engineering to study how work got done

in order to improve efficiency (Dunford 1992). His 'scientific management' broke complicated procedures down into smaller tasks to find the most efficient way to do each one. The manager's job was to analyse and direct the work, matching the right worker to the requirements of each individual task. Later, Fayol and Weber translated the same kind of thinking into the study of bureaucratic organisation, leading to task specialisation, hierarchical control, systems procedures, written records and organised career development (Colton 2000).

The impersonal approach of scientific management provoked a reaction in the form of the human relations movement (Drummond 2000). Managers were urged to see organisations as social systems and focus on the contribution of motivation, communication, teamwork and job satisfaction to productivity. Unlike scientific management, workers were to be involved in understanding and studying work processes and their support gained in solving organisational problems.

Images of organisation

As analysts struggle to understand how and why organisations behave as they do, most acknowledge the value of the use of imagery and metaphor (Dunford 1992; Morgan 1997; Drummond 2000). Metaphors stimulate creative thinking about a topic by bringing together two areas of experiences to draw parallels for learning (Kernick 2006). Morgan (1997) claims that all theories of organisational behaviour are founded on images of organisations that pervade our world view, yet can only provide an incomplete picture. Four common images of organisation are described briefly here.

First, thinking of organisations as machines implies well demarcated parts with clearly defined roles, pruned of redundancy and constantly monitored and controlled by rational managers standing outside the system (Morgan 1997). Change is brought about by re-engineering with different levers, or by complete reconstruction – seen by some in the health care context as an exercise of gratification (Braithwaite *et al.* 2005) or redisorganisation (Oxman *et al.* 2005). Second, organisation seen as an organism provides an ecological perspective that includes evolution and fitness, a balance between the needs of individuals and the organisation, and a focus on mutual respect and coordination among members to engender teamwork. Change is incremental and planned to adapt to environmental conditions (Morgan 1997). Third, the picture of organisation as brain fits well in the age of information technology and eHealth. Development as a learning organisation through systems thinking, clarifying and challenging mental models, personal and team learning and building shared vision (Senge 1990) is seen as crucial to enable organisations to change as and when needed. Finally, organisation as culture brings a focus on ideas, values, beliefs, rituals and shared patterns of behaviour and understanding. Changing the organisation requires managers to change the culture. In health care, for example, there is considerable emphasis on creating a culture of openness to acknowledge and learn from errors, and to embrace new

evidence of effective practice, instead of defensiveness and resistance to change (Davies *et al.* 2000; Kirk *et al.* 2007).

Morgan (1997) would argue that use of such imagery stimulates fresh ways of looking at organisational behaviour. He further suggests that multiple images lead to more sophisticated understanding of how and why organisations behave as they do.

The challenge of change

Change offers a particular challenge in understanding organisational behaviour. Early thinking focussed on making organisations systematised and orderly, but this did not prepare them for the fast-changing environment of the second half of the 20th century (Tetenbaum 1998). There is now a consensus that managing change is a core competence for organisational leaders. However, there is little agreement about how best to do this and evidence that many change attempts fail (Kotter 1995; Burnes 2005; By 2005). Some analysts express doubt about the quality of research evidence that informs organisational change practice, with Weick and Quinn (1999) rather gleefully quoting from *The Witch Doctors* by Micklethwaite and Wooldridge (1996, p. 11) that 'the reason American businessmen talk about gurus is because they can't spell charlatan'.

Reviews of organisational change (Weick and Quinn 1999; By 2005) highlight the contested nature of change itself, with differing emphasis on the pace and pattern of change and how change comes about. For example, one model proposes a punctuated equilibrium, where organisations are stable, even inert, for long periods (possibly due to inaction or inattention). They must then respond to the changing environment by radical, whole-of-organisation change. Another describes change that is intentional, gradual and incremental. Many writers advocate planned change, managed by leaders who select from a wide range of strategies proposed by change theorists; others suggest that change growing from the decisions of local managers, from the ground up, is more likely to be successful. A third school of thought argues that strategies – episodic or incremental, imposed or collaborative – are contingent upon the circumstances facing the organisation (Dunford 1992; Weick and Quinn 1999; Burnes 2005; By 2005).

A new image

Within this debate, the organisation as a machine is a pervasive image. It has remained the dominant metaphor for much organisational thinking during the 20th century (Grobman 2005). It underpins Taylor's scientific management and is readily traceable to the world view that grew from the scientific revolution of the 17th century – that 'the world was an exquisite machine set in motion by God – a closed system with a watchmaker father who then left the shop' (Wheatley 2006, p. 19). Newton's laws and those that followed offered the promise of a discoverable and predictable universe, where continuing analysis and study would reveal that 'relationships between cause and effect are simple, clear and linear'

(Tetenbaum 1998, p. 21). Such a mechanistic world view clearly shapes thinking about organisational change in primary health care in Australia when a leading research conference has the title 'Driving Change' with a logo of interleaved cogwheels producing outcomes from their action (Primary Health Care Research and Information Service 2009).

However, this dominant metaphor's foundation in the natural sciences has been overtaken by newer thinking. The image of a clockwork universe that led to major advances in science was insufficient to explain phenomena that could not be reduced to serial cause and effect relationships. It has gradually given way to less orderly views through sciences such as quantum physics and complexity. This shift alone would justify re-examining our images of organisations, but the study of complexity is also leading to interesting ways of understanding change.

Complexity theory

The study of complexity involves weaving together different strands from chaos theory, dissipative structure theory and complex adaptive systems (Stacey *et al.* 2000). Organisational change writers looking to this area emphasise different aspects, but most identify certain core elements (Waldrop 1992; Anderson 1999; Anderson and McDaniel 2000).

Non-linear dynamics

In Newtonian science, dynamic systems exhibit linear relationships. The whole is equal to the sum of the parts, which act independently of each other. This reductionist approach is easy to model mathematically, holding one or more parts constant to examine other parts in isolation. Small perturbations tend to be damped down throughout the system and calculations do not need to account for very small variability. Such dynamics abound in nature and underpin modern engineering and astronomy. In contrast, the complexity sciences are concerned with systems that exhibit non-linear dynamics. Such systems also abound in nature in weather patterns, molecular biology and ecology. In these, the whole is greater than the sum of the parts and mathematical models require computer simulation. Such systems exhibit sensitive dependence on initial conditions (or the butterfly effect) and small perturbations can be amplified throughout the system and 'two entities with very similar initial states can follow radically divergent paths over time' (Anderson 1999, p. 217).

Network of agents and relationships

The system or 'whole' of complexity theory comprises agents and their network of relationships – constraining and facilitating, single and multiple (Waldrop 1992). One concrete way of visualising the behaviour of such dynamic systems is to envision light bulbs in various arrays with connections determining whether the bulbs are on or off. This mental picture describes a Boolean network (Kauffman 1995), which can be studied mathematically, with various numbers of

agents (light bulbs) and relationships (electrical connections) and natures of relationships (whether the connection turns a bulb on or off). Typical networks in real life can include genes, ecosystems, neurones or economies.

Co-evolution

In such dynamic systems, each agent is continually acting and reacting to what other agents are doing. They do not exist or change in isolation, but co-evolve. For example, the state of each light bulb switches, and is switched, on or off by the state of those around, driving the whole system into different patterns of lights. Another familiar example is an ecosystem. An animal's ability to survive and thrive depends on its niche, which is determined in part by other animals in the environment, and their impact on both the original animal and the environment. None of these is static. As one animal or population changes, so others react, changing the environment and causing pressure for further change.

Edge of chaos

Kauffman's (1995) experiments with Boolean networks revealed that sparse numbers of connections between agents create a system where co-evolution rapidly reaches stability – either a static display of bulbs on and off, or a simple cyclical pattern of the same bulbs on and off in turn. These correspond to what are known as attractors – the global patterns of behaviour displayed by a dynamical system (Schneider and Somers 2006). The first instance is a point attractor (only one equilibrium state) and the second a periodic attractor (equilibrium cycling between a limited number of states). On the other hand, in very densely connected networks, co-evolution leads to apparent random blinking of light bulbs that never settles down into any observable pattern – a chaotic or strange attractor (which, when plotted in an abstract mathematical space, can reveal a pattern of unique behaviours over time that are nonetheless bounded in their variability; Wheatley 2006). In between these extremes, with numbers of connections neither too sparse nor too dense, co-evolution produces coherent patterns that propagate, grow, split apart and recombine in an orderly way.

This leads to the concept of the 'edge of chaos', poised between rigid structure and chaotic disorder, where there is also 'complexity: a class of behaviours in which the components of the system never quite lock into place but never quite dissolve, either' (Waldrop 1992, p. 293). There is paradoxical stability and continuous change at the same time.

Emergence

This appearance of complex but coherent, patterned behaviours from simple, local rules is called emergence, and is exhibited 'in an astonishing variety of contexts... The grandest example is the universe itself, the full complexity of which emerges from simple rules plus the operation of chance' (Gell-Mann 1995). A smaller scale example is the flocking behaviour of birds or the schooling behaviour of fish. This has been simulated by a computer model of 'boids' where each

boid is governed by just three rules: maintain minimum distance from other objects in the environment, including other boids; try to match velocities with other boids in its neighbourhood; and try to move toward the perceived centre of the mass of boids in its neighbourhood (Waldrop 1992).

Self-organisation

Self-organisation is the fundamental process underpinning emergence. It is the counterbalance for entropy or increasing disorder in closed systems, and represents the tendency of open networks of agents connected by power relationships to develop coherent structure on the basis of their own internal dynamic when exposed to environmental inputs. The following example provides important insights (Waldrop 1992).

Sand dribbled onto a table forms a pile whose shape remains constant over time, even as sand continues to dribble onto the pile. Each grain of sand is held in place by forces of gravity and friction acting locally. Each is poised in a critical position such that another grain of sand dropping onto it may have no effect, may displace just the one grain, or several, or a cascade that takes away a face of the pile. The overall shape of the pile is maintained by all these responses occurring at different times, following a power law: the frequency of an event is inversely related to some power of its size. More simply put: small displacements occur frequently, large avalanches much less often.

This power law relationship is common in nature and is an important marker of self-organising criticality, which bears some resonance with the edge of chaos.

General implications of complexity theory for studying organisations

Non-linearity and co-evolution challenge reductionist approaches to organisational change. Breaking down the whole into smaller parts for study or manipulation in isolation may provide some result, but misses the potential of the whole. There are no independent variables. Controlling some elements to study others removes important relationships that produce co-evolution and can lead to real change.

Complexity focuses attention onto relationships – facilitating and constraining – as well as individuals. It is the density of these relationships, not their harmony, which produces rigid structure, or chaos, or the edge of chaos where new patterns may emerge without destabilising the whole to the point of disintegration. Striving for a unified culture may perversely stifle capacity for change (Stacey *et al.* 2000; Fonseca 2002), and the edge of chaos is a source of turbulence and tension in the paradox between simultaneous continuity and transformation.

Emergence contradicts the mental model of the objective manager, controlling the system from outside. It is not necessarily clear what is inside or outside the ‘fuzzy boundaries’ of a complex system and its varying levels of emergent order (Plsek and Greenhalgh 2001; Kernick 2006). In the natural sciences and mathematical models, the observer/

designer is separate from the system; in organisations, managers are participants who contribute but do not control. No-one is sufficiently outside the system to take on the role of the machine designer or driver.

Self-organised criticality offers a resolution for the tension between incremental or transformational change, proposing a power law distribution of more frequent small and less frequent large changes, without the need to suggest incompetent management and a period of inertia. Self-organisation also contains the seed of disquieting unpredictability in trying to ‘manage change’. The power law of the sand pile predicts that small, medium and large cascades will all happen at some time, but not which will happen in response to any particular falling grain of sand. Nor does innovation at the edge of chaos promise that the emergent order will be better than what preceded, just that it has the potential to be truly new. Some look at the emergence of managed care in the USA and track the economic forces that might be interpreted as pushing the health system far from equilibrium (Alakeson 2008). Few are likely to claim that there was a clear blueprint guiding development, and the merit of managed care continues to be debated (Anderson and McDaniel 2000).

Use of complexity theory in health care and organisational literature

Complexity concepts have become popular – first in organisational and increasingly in health care literature. The metaphorical view of health (Sturmberg 2007) and health care (Martin and Sturmberg 2009b) as a complex adaptive system is used to challenge both clinical and organisational orthodoxy (Martin and Sturmberg 2009a).

Many writers warn against complexity theory as a fad that offers new jargon for existing management approaches (Maguire and McKelvey 1999; Arndt and Bigelow 2000; Stacey *et al.* 2000). The following are some examples of a common tendency for simplistic and uncritical adoption of terminology from complexity science:

- use of the term ‘attractor’ as a surrogate for shared vision or motivation (Miller *et al.* 1998);
- coding the empowerment or flexibility of a patient group to tailor meeting frequency as ‘self-organisation’ (Leykum *et al.* 2007);
- slogans such as ‘taking the organisation to the edge of chaos’ or ‘managing the input of energy into the system’ that contradict key concepts of emergence and self-organisation (Brown and Eisenhardt 1997; Anderson 1999; Anderson and McDaniel 2000; Grobman 2005); and
- stressing the need for harmonious relationships (Lewin *et al.* 1998) when both constraining and enabling relationships are important in edge of chaos dynamics.

In contrast, some scholars have rejected the simple application of complexity words and concepts from the natural sciences to organisations (Stacey *et al.* 2000; Houchin and MacLean 2005), noting that humans are not simple, rule following agents. They argue against seeing organisations as

complex adaptive systems, used as just 'another loose metaphor among many' (Stacey *et al.* 2000, p. 202).

Complex responsive processes of relating

Researchers at the Centre for Complexity and Management at the University of Hertfordshire (Stacey *et al.* 2000; Streatfield 2001; Fonseca 2002; Griffin 2002; Shaw 2002; Mowles 2008) follow a more disciplined process. They draw analogies from complex adaptive systems theory (in the natural sciences and abstract mathematical models) and interpret them in the light of attributes of human interaction observed in modern sociology and psychology, particularly the thinking of George Herbert Mead (1863–1931) and Norbert Elias (1897–1990). Non-linearity, co-evolution, self-organisation and emergence are translated into a world of human organising, where:

- people are conscious, self-aware, emotional and social beings who engage in communicative interactions with each other;
- interactions are both enabling and constraining, shaped by everyday power relations that include social mores, organisational hierarchy, politics and culture; and
- people's reactions are not determined solely by mechanistic rules but involve choice, based on evaluation of situations and consequences.

From these everyday processes of 'communicative interaction, power-relating and evaluative choice' – what Stacey *et al.* (2000) call 'complex responsive processes of relating' – emerge patterns of shared meaning, identity and order that form, indeed are, organisations.

These complex responsive processes of relating occur in the everyday present. In common with complex adaptive systems, they have paradoxical continuity with past forms at the same time as potential for transformation and novelty, in ways that are simultaneously predictable and unpredictable. Individual difference and freedom makes generalising problematic and no person outside the interactions is designing or controlling the overall pattern or order. Some participants are more influential than others, but this influence is enacted through complex responsive processes of relating.

This perspective is very different from the dominant discourse of organisations as machines described earlier. How does complexity fit with experience of organisational change in one aspect of primary health care – general practice?

Complexity and change in Australian general practice

The early organisation of general practice in Australia was relatively stable for some time after the foundation of the Royal Australian College of General Practitioners in 1958. It has undergone major transformation over the past 20 years with development of vocational recognition, quality assurance, divisions of general practice, practice accreditation, and enhanced primary care (Booth *et al.* 2008). How was this change experienced?

'In 1992, the then Federal Health Minister, Mr Brian Howe, announced a number of 'reforms' in general practice...' (Bollen 1996, p. 212), covering workforce supply and

distribution, accreditation, different funding models, practice amalgamations and improved use of information technology. In response, and after much consultation, a consensus plan was agreed between the Federal Government, the Australian Medical Association and the Royal Australian College of General Practitioners – 'The future of general practice: a strategy for the nineties and beyond' (Bollen 1996). In this process some proposals were explicitly rejected (fundholding), some re-oriented (workforce, accreditation, financing models), and some new ones developed (divisions of general practice). Despite agreement, ongoing consultations and considerable funding, progress was variable and often vexed. In a formal review of this general practice strategy some 6 years later (Department of Health and Family Services 1998), it was found difficult to delineate clearly what was part of the strategy and what was not. Concurrent changes in the environment (such as feminisation of the workforce) were confounding factors. Some elements (divisions of general practice) had progressed faster and more smoothly than others (accreditation), despite clear plans for each. Some matters remained on the agenda (workforce and information technology) while other achievements (opening up of general practice to greater integration with other professionals) were not an explicitly planned part of the original strategy. Another 10 years later, divisions of general practice and accreditation are firmly established, but better use of information technology remains on the reform agenda (Department of Health and Ageing 2009).

Despite clear vision, shared commitment and substantial resourcing, implementation of the general practice strategy did not model a change process characterised by control and predictability. Rather, the 'communicative gesture' of the proposed strategy evoked many responses and conversations and meetings, seeking to make sense of the initiatives and what should be done about them. Some conversations emphasised maintaining the status quo, others urged even further reform and others worked in the tension between the two. The meaning and impact of these proposals emerged in conversations among individuals – in formal consultative committees and working groups, and in private practices. There were, of course, differences in the influence of communicative interactions between government and professional leaders and less powerful individuals. However, the attractor pattern of private primary care in Australia did change from small, single discipline units with similar structures and sparse interconnections toward larger, more varied, interconnected, more multidisciplinary networks. Change happened, but not as a smooth, predictable response in line with policy and funding blueprints. The new pattern emerged from complex responsive processes of relating – for example: in forming or joining divisions of general practice; designing, trialling and taking up accreditation; rejecting alternative funding models or deciding to use new Medicare insurance items – at individual, regional and national levels.

Other countries have introduced more sweeping health reforms, such as the Quality and Outcomes Framework in the

UK. These may have precipitated greater changes, but there is some evidence that these are not as predictable as planned and not in direct proportion to the stimulus (Campbell *et al.* 2007; Mangin and Toop 2007).

Conclusion

In this paper we have claimed that current health care improvement and reform initiatives reflect an image of human organisations as complicated machines run by managers who are removed from day-to-day operations, where they have an objective view of the whole. This perspective leads to an expectation that competent design, control and redesign will produce predictable performance and change where necessary. We propose an alternative perspective, following Stacey *et al.* (2000), that draws analogies from new complexity sciences, interpreted according to sociology and psychology. This way of thinking sees the form and pattern of human organisation emerge from everyday processes of communicative interaction, power relating and evaluative choice. We use the example of Australian general practice in the past 20 years to argue that these complex responsive processes of relating better match the experience of change than does the orthodox view. As Australia embarks on another period of health care reform (Department of Health and Ageing 2009; National Health and Hospitals Reform Commission 2009), what might be the utility of this new perspective?

First, it might alleviate in part the sense of frustration that is often apparent with 'health care systems' that seem to have a life of their own and do not respond readily or predictably to well thought through and resource intensive improvement and reform initiatives.

However, if change is not completely controllable or predictable, what should managers, policy makers and leaders be doing? A second insight is that paradox is inherent in edge of chaos dynamics, where change is predictable (it will occur following a power law distribution) and unpredictable (which specific change will happen at each instant is inherently unknowable). Policy makers and managers are powerfully influential in their communicative gestures and there is a sense where they are 'in control' even when they are also 'not in control' (Streatfield 2001). They may not be designing the future according to blueprint but they are certainly exploring it and participating in creating it, including responding to unanticipated outcomes and emergent patterns. Competent leadership requires continuing to act into these tensions without needing to resolve the paradox to one pole or the other – striving for ever greater control or abdicating responsibility.

Third, if the potential for change arises in complex responsive processes of relating among individual persons, health care improvement and reform initiatives must pay attention to the constraints and politics of everyday reality – how people get their jobs done day-to-day – and not focus predominantly on an idealised future. Change initiatives will need time and support for engagement and participation at the everyday level.

Finally, organisations as patterns formed by complex responsive processes of relating require new ways of thinking about accountability. Neither 'the system' nor individual managers can be held entirely accountable for overall performance and outcomes, while all other participants are inert onlookers. There are ethical implications for individuals at all levels to be responsible and accountable to others, for their own communicative interaction, power relating and evaluative choice.

Conflicts of interest

None declared.

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3.3 Summary

Having traced the development of different complexity perspectives on organisational behaviour and explored their potential in theory and in simple observational comparison, I concluded that complex responsive processes of relating offered potential for enhancing understanding of quality improvement for better chronic illness care. It provided a response to my first research question: *What are key elements of the complexity sciences and how might they operate in human organisational change?*

The next step required intentional investigation of this perspective in practice, to attend to my second research question: *How apt is complexity theory to describe and explain empirical reality of organisational change for quality improvement in the Australian primary care setting?*

However, the radical nature of complexity sciences mandated careful attention to methodology to investigate how well this theory matched the empirical reality of Australian general practice.

Chapter 4:

Research design and methodology

Chapter outline

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4.1 Theoretical considerations

Given the profusion of research approaches over past decades, the choice of one strategy among many must be justified by clear alignment between the purpose of the research and its core question, and the methods ultimately used to collect and interpret empirical data, that is to do the research (Creswell, 2003). The conceptual framework of the nature of reality being investigated is inherent in the research question. This understanding of the nature of existence and how it works (ontology) has implications for how it can be investigated and what we can claim to know about it. Sound research requires that ontology shapes and constrains the stance taken about the nature and scope of knowledge (epistemology). The choice of a position about what are valid knowledge claims must then guide the logic of inquiry. Epistemology therefore informs and guides methodology – the descriptions, explanations and justifications for research actions (Carter & Little, 2007; Creswell, 2003; Minichiello, Aroni, Timewell, & Alexander, 1990). The methodology provides the foundation for formulating justifiable research actions or methods.

To paraphrase Denzin and Lincoln (2000): as researcher approaching the world of organisational change with a set of ideas, an ontological framework conceived as complex responsive processes, I needed to identify a valid knowledge claims position (epistemology) to guide how I would examine this world in specific ways – my methodology. Thus, the paradigm shift from organisation as system/sophisticated machine to organisation as complex responsive processes had profound implications for research design and methodology.

4.2 Theory of complex responsive processes

The ontological framework of complex responsive processes came from extensive review of organisational change and quality improvement literature as reported in Paper 1 (Booth et al 2008) and Paper 2 (Booth et al 2010). In particular it seemed to offer a possibly constructive alternative to the frustration expressed in more traditional quality improvement and change management theory that emphasized design, control and predictability. The theory has been developed over time from the complexity sciences of chaos theory, dissipative structures theory and particularly complex adaptive systems theory in the natural and mathematical sciences (Fonseca, 2002; Griffin, 2002; Shaw, 2002; Stacey et al, 2000; Streatfield, 2001).

Core elements from these source domains have been identified by those seeking to understand organisational behaviour from this perspective (Anderson, 1999; Anderson, & McDaniel, 2000; Waldrop, 1992). The focus is on *networks of agents and their relationships* – constraining and facilitating, single and multiple. One example is a Boolean network, which can be studied mathematically but can also be visualised easily as light bulbs in various arrays with interconnections that determine whether bulbs are on or off. There are various numbers of agents (light bulbs) and relationships (electrical connections) and natures of relationships (whether the connection turns a bulb on or off). In such networks the whole is greater than the sum of the parts. They exhibit *non-linear dynamics*, where there is *sensitive dependence on initial conditions* and small perturbations can be amplified throughout the system, unlike linear systems where one or

more parts can be held constant to examine other parts in isolation and small perturbations tend to be damped down throughout the system.

In complex networks agents do not exist or change in isolation but are continually acting and reacting to what other agents are doing: they *co-evolve*.

Where there is sparse interconnection, co-evolution rapidly reaches stability, but in very densely connected networks, co-evolution leads to chaos (in the light bulb image, apparent random blinking of bulbs that never settles down into any observable pattern). In between, co-evolution produces coherent patterns that propagate, grow, split apart and recombine in an orderly way. This leads to the concept of the *edge of chaos*, poised between rigid structure and chaotic disorder, where there is also complexity: paradoxical stability and continuous change at the same time. The appearance of such complex but coherent, patterned behaviours is termed *emergence*, and it is underpinned by *self-organisation*: simple local interaction between agents without any external design or control.

However, complex adaptive systems are not an adequate mental model for human organising, despite a tendency in management literature to appropriate the terminology of complexity to an existing discourse of external design and control leading to predictability (Anderson, 1999; Anderson & McDaniel, 2000; Brown & Eisenhardt, 1997; Grobman, 2005). A more disciplined approach draws from these models analogies that preserve the key elements above while interpreting them in the light of attributes of human interaction observed in modern sociology and psychology (Mowles, 2008; Mowles, van der Gaag & Fox 2010; Stacey 2010).

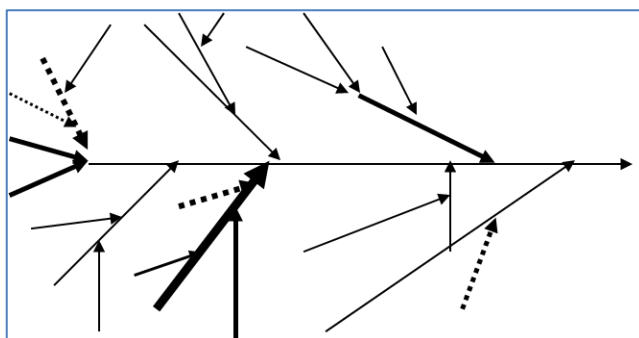
The *non-linear networks* of agents and relationships that make up complex adaptive systems in natural sciences are, in human organisational reality, analogous to groupings of self-aware people (not variables), with their personal and social context, their current emotions and values, interdependent through continual involvement in communicative interactions with each other and broader society. Their relationships are paradoxically enabling and constraining at the same time, reflecting the power of social mores, hierarchies, politics and culture. They need not be harmonious. These relationships *co-evolve*, so that individuals and groups continually both influence, and are influenced by, each other. *Self-organisation* is not mediated by externally pre-set rules but is simply local interaction – processes of *communicative gestures and responses*, *power-relating* and *ideology-based intending, choosing and acting*. Order, what we commonly identify and name as “the organisation”, emerges from these many, many local interactions. Just as the dynamic of richly connected complex systems tends to the *edge of chaos*, so complex responsive processes of human relating exhibit paradoxical qualities of stability and potential for radical transformation.

4.3 The nature of organisational reality and how it is investigated

Had I stayed with my initial conceptualisation of the research question and its associated world view, epistemology and methodology would have followed a familiar medical research pattern. The understanding of organisation as a system or highly intricate machine supports an epistemology that fits well the traditional

scientific method, which emphasises identification and quantification of causes and effects. The whole is equal to the sum of its parts, so, however complicated, it can be analyzed by breaking down into discrete, manageable subunits. Each can be studied separately, then fitted back into the overall model. The causal flow is linear, even if complicated, so multiple independent variables and pathways can be delimited, examined and manipulated, while being controlled to account for and exclude contaminating influences on the dependent variables being studied (see Figure 1).

Figure 1: Complicated linear system



This is accomplished by carefully objective researchers outside the system, whose purpose is to describe, analyze and measure causation in what is going on in order to change it predictably, to build and test hypotheses. Even though some experiments follow a course in time, the spatial aspect is dominant: the fixed pattern of static (albeit complicated) relationships compared between various locations (eg cross-sectional studies) or at pre-determined points in time (eg before and after or randomised controlled trials). This is the idealised template for traditional research in implementation science and knowledge translation. It

follows an explicitly logical positivist epistemology (Colliver, 1996; Creswell, 2003).

Conceiving organisational reality as complex responsive processes mandates very different claims to knowledge. If organisations are complex networks, where both agents and relationships matter and the whole is greater than the sum of the parts, then the analytic method of “cutting up” for the purpose of study destroys what it seeks to understand (Cilliers, 1998). What is being studied must be examined as a whole, with the purpose of finding out and making sense of what is going on. Explanation aims to understand causal links and trace their patterns over time, to interpret actions and events to construct meaning, rather than to isolate and measure probable cause and effect subunits. While some bounding and focus is needed for pragmatic reasons, awareness of the fuzziness and porosity of these boundaries is crucial. There must be constant mindfulness that *nothing is a confounder*, that any influence that is perceived needs reflective attention and not exclusion by control.

Since, in complex responsive processes of relating, the overall pattern of the whole is deemed to emerge from self-organisation – many, many local interactions of communicative gestures and responses, power-relating and ideology-based intending, choosing and acting – the search for meaning must occur within this everyday reality. This cannot be achieved by remote, objective observation from the outside, but from interpretation among participants about what has been, is now and might in future be going on. The researcher, sometimes an actual participant, sometimes an outsider to the specific pragmatic

focus chosen for study, intentionally takes a position as an insider, seeking interpretation among multiple participant meanings (Ritchie, Zwi, Blignaut, Bunde-Birouste, & Silove, 2009). This requires balance between engagement and reflection, what Stacey calls “a paradox of *detached involvement*” (Stacey & Griffin, 2005, p.9, original emphasis), rather than expectation of objectivity in observation and interpretation. Finally, the temporal nature of complex responsive processes as “ongoing patterning of interactions between people” (Stacey & Griffin, 2005, p. 1) emphasises time as an important consideration. Evolution and development over time are part of inquiry – the history of past meaning in the light of present understanding and in anticipation of future possibilities arising in new patterns.

Some of these considerations resonate with existing justifications for qualitative methods in organisational research (Symon & Cassell, 1998). They also fit with the assumptions and knowledge claims of social constructivism and interpretivism, such as the search for understanding, subjective and multiple participant meanings constructed in discussions and interactions, and focus on process of interaction (Creswell, 2003; Schwandt, 2000; Tesch, 1990).

4.4 Strategy of inquiry

Acknowledging a distinction between “what is actually done in research and the way we talk about what is done”, Carter and Little (2007, p. 1317) set out a formal typology of strategies of inquiry or methodologies: grounded theory, narratives, ethnographies, participatory action research, phenomenological

traditions and case study approaches, and these appear broadly supported by other authors (Creswell, 2003; Denzin & Lincoln, 2000). Among these methodologies, case study is very familiar within organisational behaviour studies, though less so within health services research (Crowe et al., 2011). Eisenhardt (1999, p. 532) endorses the value of case study for providing a more robust connection between empirical reality and organisational behaviour theory than the traditional approach of “combining observations from previous literature, common sense and experience”.

Case studies are not essentially qualitative, even though qualitative methods are one of the common ways to investigate the case (Stake, 2000; Yin, 2009). Case studies involve a choice of focus – the case or phenomenon of interest – which can be studied analytically or holistically. While there are a broad range of research approaches, these are not mutually exclusive, but some offer distinct advantages in some situations. Yin (2009, pp. 8-18) argues that case study is suited to complex social phenomena because it can look at everything, not just selected elements, in context, and allows investigators to retain the holistic and meaningful characteristics of real-life events. He lists three conditions that converge to make qualitative case study particularly apt:

- the purpose is explanatory, rather than seeking to describe incidence or prevalence or predict outcomes, so the form of question is how or why, rather than who, what, where, how many, how much?;

- the researcher seeks to understand the phenomenon of interest in context, unlike an experiment, so has no need for control over actual behavior, events or environment; and
- the focus is contemporary so that direct observation and interviews with key participants are possible, rather than requiring an historical approach.

As a consequence Yin defines case study as “an empirical enquiry that: investigates a contemporary phenomenon in depth and within its real-life context; especially when the boundaries between phenomenon and context are not clearly evident” (p.18).

Stake identifies the epistemological question of case study as “what can be learned from a single case?” (2000, p. 436). This is supported by Tesch (1990) who points to case study as suitable when the purpose is comprehension and interpretation of the meaning of words and actions. Anderson, Crabtree, Steele & McDaniel (2005) go further and make a specific connection between case study and complexity thinking, seeing it as uniquely suited to investigate within this perspective. In summary, the attributes of qualitative case study specifically fulfill the epistemological requirements set out in section 4.2 for investigating organisation as complex responsive processes:

- The purpose is to understand and explore meaning;
- The approach is holistic not analytic;
- The interest is in everyday reality rather than a designed experiment; and

- The boundaries of the case are fuzzy, with context a part of the phenomenon of interest, not excluded as confounding.

4.5 Research Design

In designing this case study I used two widely acknowledged authorities on case study: Robert E Stake (2000) and Robert K Yin (2009).

4.5.1 *Type of Case Study*

The broad design of this specific qualitative case study flowed from the methodological concerns outlined above. Stake distinguishes between an *intrinsic case study* (whose particularity in itself warrants interest) and *instrumental case study*, whose purpose is to illuminate a particular matter through the case, which is secondary to the purpose. This latter type may be extended as *collective case study* to several cases across a population where generalisation is of greater concern. This was, in fact, the design intended for the earlier purpose, described in Chapter 1 (1.3: Initial Conceptualisation), of identifying organisational factors that might facilitate quality improvement. It followed a linear approach where variables such as structure, culture, power, leadership, hierarchy, were to be identified in several practices to establish their influence on the capacity for those practices to change for improvement. As my paradigm shifted from organisation as machine/system to organisation as complex responsive processes, I re-examined case study methodology to re-assess the design to satisfy the new epistemological requirements. The choice for a single, instrumental case study fits with Stake's purpose to "provide insight into an issue or to re-draw a

generalisation”. The latter rationale also resonates with one of Yin’s justifications for studying a single case: that it can confirm, challenge or extend orthodoxy and so form a critical case. As a consequence, I judged that a single case was suitable to explore organisation as complex responsive processes in a way that challenged the dominant discourse of planned system change for health care improvement. Yin also draws attention to identifying the unit of analysis. In an *embedded* case study, attention is given to both local and global levels of the phenomenon. This readily fitted the task to explore general practice as the pattern of organising that emerges from self-organisation – interactions of communication, power-relating and ideology-based choosing and responding – at the local practice level in the context of a changing policy environment.

As a consequence, I chose the research design of a single, embedded, instrumental case as a critical case for the purpose of exploring how complexity theory might inform understanding of organisational change for quality improvement in Australian general practice.

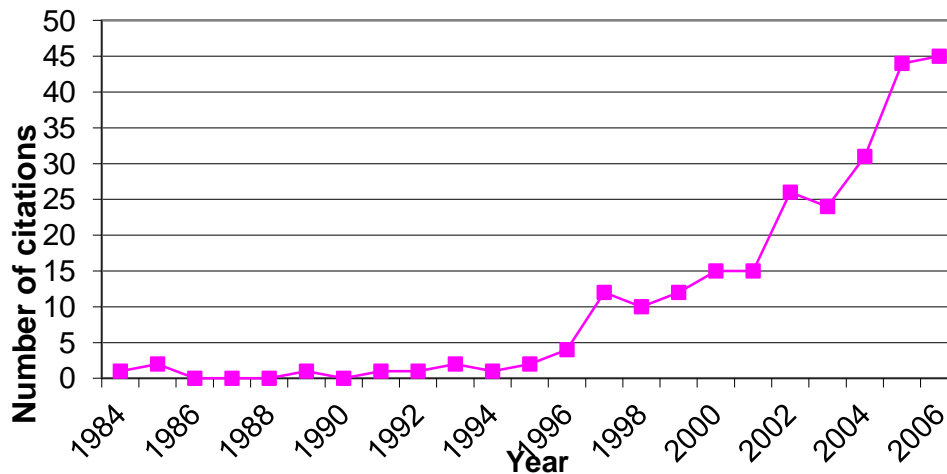
4.5.2 Definition and boundaries of the case

This broader purpose – exploring how complexity theory might inform understanding – remained the primary interest and the actual case was a means to the end of better understanding (Stake, 2000). Yet the actual phenomenon of interest –organisational change for quality improvement in general practice and primary health care – lacked sufficient specificity and boundedness for study as an identifiable case. As outlined in the literature review, chronic disease management was becoming an increasing challenge for general practice

worldwide, due to population pressure from changing demography and documented sub-optimal care. Emerging evidence for how to improve chronic illness care highlighted the potential of organisational change as a means to improving outcomes. It provided a convenient and readily identifiable clinical focus that was both topical and important.

Defining a clinical focus then opened a way to make the strategic decision of how long the case should be studied, that is to establish temporal boundaries for the case. Wagner, Austin and Von Korff's seminal article on organising care for patients with chronic illness was published in 1996 (Wagner, Austin, & Von Korff, 1996). I conducted a simple keyword search of Medline using the phrase "chronic disease management" in 2007 and plotted the number of citations retrieved from 1984 – 2007. The results in Figure 2 confirmed the decade from 1997 – 2006 as a period where increasing interest and pressure for improvement would likely offer the opportunity to learn about how this played out in general practice.

Figure 2: Medline citations using “chronic disease management” as keyword 1984 – 2006, search conducted 16 February 2007.



4.5.3 Settings and selection

The settings for the two levels of analysis of the case were determined as the national policy environment of primary care and the local instance of one general practice. Following the logic of complex responsive processes – that order emerges from local interaction – the research began with data collection and analysis at the practice level, followed by empirical exploration at the national policy level.

Selection is one key area where qualitative case study differs markedly from positivist approaches. Since the primary purpose of the research was to inform understanding, the opportunity to learn was a criterion superior to representativeness (Stake, 2000). Selection was therefore purposive, based on potential for learning. In the practice setting, there would be less to learn from a “normal” practice experiencing modest change to provide “average” chronic

illness care than from one at either extreme of the improvement distribution. However, in seeking a critical case to challenge the orthodox view of improvement, a practice struggling to make any headway in implementing best practice would offer little scope to explore change from either perspective: planned system change or complex responsive processes. As a consequence, the selection criteria for the practice case were that the practice be a leader in delivering good chronic illness care, without being markedly atypical in size, location, history or funding. At the policy level, key informants were sought who were actively involved in national policy on chronic illness care during the period of study, through roles in planning, advising, consulting, lobbying and researching. The potential for learning was enhanced by seeking different participant perspectives: allied health, general practitioner, government bureaucrat, health consumer and practice nurse.

4.5.4 Researcher Position

In qualitative inquiry, the researcher acts as the primary instrument for data gathering and analysis, thus introducing strategic and personal issues into the research process. This can be a positive and useful influence (Creswell, 2003), but also carries some risks (Stake, 2000). In particular, case study, unlike many other qualitative methods, benefits from considerable theory development in advance, which potentially could over-influence processes of data gathering and analysis. It is important to demonstrate methodological rigour by being transparent about how I positioned myself in the research. The earlier epistemological discussion emphasised the importance of interpretation from within the action, the paradox of detached involvement (Stacey & Griffin, 2005),

a balance between insider–outsider positions (Ritchie et al., 2009). The interpretive focus also explicitly rejects any assumption of absolute truth to be discovered objectively and acknowledges that my role influenced both data gathering and analysis.

My background in general practice and experience in quality improvement, both within Australia and internationally, provided considerable insight into the reality of both the practice and policy levels of the case. This enabled an evolutionary approach in design and conduct of the case study, with an initial structured outline but also flexibility to pursue new insights based on theory and empirical perceptions (Yin, 2009). My background and experience was made known to all research subjects. Indeed, I was professionally acquainted with several of the GP participants, though I had no direct involvement with either the practice or the policy formulation selected for the case. I believe that this position offered sufficient outsider detachment and insider awareness both to interpret participants' views and to facilitate a free-flowing interview where mutual understanding was enhanced by awareness of shared professional experience and culture.

The evolution of the research and substantial theoretical refinement outlined in Chapter 1 (1.4: Evolution of the research over time) also shaped the depth of understanding and flexibility that I could bring to data collection. Yin emphasises the need for an inquiring mind during data collection, and both Yin and Stake attribute great importance to bringing a questioning, exploring intellect with a firm grasp of the issues being studied into “the thick of what is

going on” in the case study (Stake, 2000, p. 445). This enables both informed observation and reflection and allows interpretation between informants and researcher and also between data and researcher.

4.5.5 Data sources and collection

Case study seeks information from many sources according to Stake (2000), drawing from the nature of the case, its context, history, physical setting and from informants through whom the case can be known. Yin (2009) lists six potential data sources: documents, archival records, interviews, direct observation, participant-observation and physical artifacts. Both argue for gathering empirical observations from multiple sources. Redundancy in data collection enhances the likelihood of rich and credible interpretation, so that the case is more likely to provide insights into the human condition, even as its particularity remains readily apparent.

At the practice level, I observed directly the daily patterns of work as well as more formal meetings, I reviewed documents such as procedures manuals and accreditation reports, and even reflected on the physical structures of building layout and decor to enhance my perspectives on the pattern of organising and the nature of everyday practice reality. At the policy level, archival material from the Commonwealth Department of Health and Ageing Media and Speech Archive provided the chief source for the policy narrative, supplemented by formal policy documents, educational and promotional materials, editorial comments in medical journals and medical newspaper articles. At both levels,

however, the crucial interpretive element came from interviews with key participants in the action.

Flowing from the interpretive approach for the purpose of exploring the identified phenomenon of interest, I chose in-depth, semi-structured interviews as the interview method. This method acknowledges pre-existing theoretical development and logic of inquiry, unlike completely unstructured interviews which bring few suppositions *a priori*. On the other hand, it encourages more egalitarian roles within the interview than structured interviews, which act more like an oral survey where consistency is essential for validity. In-depth interviews with minimal structure focus less on the researcher's perspective and more on the informant's account presented in language that is natural to them (Minichiello et al., 1990). They encourage more of a conversational approach with broad, open-ended questions and include a focus on the process of interaction, which fitted exactly within the paradigm of complex responsive processes. Thus, I developed interview guides for each level of the case (Appendices 4 & 5) to provide a general outline of the issues which were to be the focus, without either fixed wording or fixed ordering of the questions.

Following the argument in the previous section it was important that I conducted all the interviews, bringing together theoretical understanding of the issues and interviewing ability honed in teaching and practising clinical communication. I also brought willingness and ability to adapt the interview outline both during interviews and between interviews. With this background I was able to start basic data analysis during data collection, making connections

and getting to a level of abstraction that allowed me to respond to emerging themes and test these in subsequent interviews.

4.5.6 Data analysis and use of NVivo

Yin (2009, p.127) notes that “analysis of case study evidence is one of the least developed and most difficult aspects of doing case studies”. Where the research purpose includes understanding causal links and their pattern over time, explanation building tends to occur as narrative and cannot be precise. Internal rigour is enhanced when the analytic strategy has been developed early in the inquiry rather than designed as a descriptive framework from collected data. The theoretical propositions outlined in the literature review and formulated in the research purpose and question required elaboration in practical terms as one or more explanations to compare to the empirically based pattern of the case. Yin presents such pattern matching logic as the most desirable data analysis strategy in case study, arguing that it provides a systematic sense of what is worth analyzing and how it should be analysed.

In this case, theoretical perspectives of planned system change and complex responsive processes of relating were used to anticipate potential rival explanatory patterns in data analysis. I used NVivo Qualitative Research software (QSR International) to assist in coding, comparison and analysis of ideas. I entered interview and meeting record transcription, field notes, practice documents, archival materials and photographs into this database, then set up initial basic tree codes of “planned system change” and “complex responsive processes” from the rival explanatory frameworks identified a priori. Within

these, I established subsidiary codes for key elements from each theoretical framework (for example “design” and “predictability”, and “communicative interaction” and “values”). I also did extensive free coding of blocks of text (for example “lots of things changing” at the practice, or “getting it right” among policy informants). I then re-arranged and consolidated codes into the existing and two new tree codes – “pattern of change” and “chronic disease management”.

Following the same rationale for conducting the data collection, I also analysed all the interview recordings, transcripts, field notes, documents and archival materials. I regularly discussed my coding structure, sample coding decisions and developing findings with my supervisors, but did not pursue any check-coding (Miles & Huberman, 1994) for reliability due to the fluid nature of coding throughout data collection and the contextual and interpretive nature of the analysis. Morse (1997) argues strongly that coders without the comprehensive understanding gained from context and prior interpretation cannot readily discern the significance of each piece of text from objective definitions of each coding category, which must necessarily be kept simple but consequently also superficial.

4.6 Ensuring rigour

Good quality case study faces the same sorts of challenges as all empirical investigations in providing confidence that the findings are useful for the purpose of the research.

4.6.1 Justification of methodology

Firstly, the overall construct should demonstrate clear alignment between the operational research measures and the concepts being studied (Carter & Little, 2007; Yin, 2009). I have presented the logical consistency of using an embedded case study to construct from multiple participants' meanings a social understanding of organisational change from a complexity perspective.

4.6.2 Dependable interpretation

Secondly, it is important to demonstrate that interpretations garnered from this design are dependable, that they are neither imagined nor spurious. Both Yin and Stake emphasise for this concern the value of using multiple sources of evidence to build understanding of what is going on, to address rival explanations and to report contrary findings. I used documents, observations, archives and interviews from multiple participant perceptions to provide what Denzin and Lincoln (2000, p. 4) term a 'bricolage' of different types of data that do not give precisely angled perspectives but offer a richer pattern of meaning. Rival explanatory frameworks were an explicit part of the design and reporting of results, which included the finding that these rival explanations were not, as had been anticipated, mutually exclusive.

4.6.3 Generalisability of single case study findings

Thirdly, a key issue in any research design is how the findings can be meaningful and useful beyond the immediate case examined. Case selection must be justified to fit the purpose of the research – in this instance seeking a single case as an instrument from which to learn and to challenge orthodoxy in organisational

change thinking, as outlined on pages 51–52. Characteristics and findings of the case must be provided in sufficient detail to allow the opportunity for vicarious involvement so others identify resonance with their own experience, what Stake terms “naturalistic generalisation” so that even though the people and circumstances reported are not statistically representative of some universal whole, people find “certain insights into the human condition, even while being well aware of the atypicality of the case”. (Stake, 2000, p. 442–443) Both Stake and Yin emphasise that relating the specifics of the case to broader theory enhances this process and that case study aims to expand and generalise theory, what Yin terms “analytic generalisation” as opposed to statistical generalisation to other populations. I purposively selected a practice at the forefront of quality improvement in chronic illness care that was not atypical in size, location, history or business structure, while developing the theoretical issues in advance and clearly exemplifying the relations between theory and observations.

4.6.4 Robust procedures

Finally, good research must document what was done to offer confidence that the actual procedures followed were appropriate to the theoretical considerations and methodology followed, ensuring that data were collected and recorded systematically, stored and retrieved reliably, so they could be accounted for and considered in analysis. In the following Chapter 5 I detail the actual methods followed to maintain the “chain of evidence” for the data used in the analysis within the two publications that present my research results.

4.7 Ethics

The research was approved by the Human Research Ethics Committee of the University of New South Wales: HREC05052–Improving Care: Case studies of organisational change in general practice.

The purpose and processes of the research and the data collections were open to all participants, and each gave informed consent. All participants were over 18 year of age. For the practice, after initial contact with one of the principals, consent was sought from all members of the practice at a practice meeting. Subsequently, individual informed consent was sought from each member of the practice prior to interview. At the policy level, key informants were approached by email with a full information sheet and consent form attached. Information sheets and consent forms for both practice staff and key informants are in Appendices 6 & 7. Recordings and transcripts were kept in secure computer and physical storage during analysis. Confidentiality was maintained during publication by making and explicitly reporting slight alterations in details where these did not affect the logic of analysis or reporting.

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Chapter 5:

Results

Chapter outline

- 5.1 Introduction
- 5.2 Paper 3: practice level of the case
- 5.3 Paper 4: policy level of the case
- 5.4 Summary

5.1 Introduction

This chapter presents, in two publications, the results of my empirical investigation in response to my second research question: *How apt is complexity theory to describe and explain empirical reality of organisational change for quality improvement in the Australian primary care setting?*

Paper 3 presents the results at the local, practice level of the case:

Booth, B. J., Zwar, N., & Harris, M. F. (2013). **Healthcare improvement as planned system change or complex responsive processes? a longitudinal case study in general practice.** *BMC Family Practice*, 14, 51

The article traces how one practice developed good chronic illness care and compares this empirical reality with patterns and explanations predicated on the dominant planned system change discourse of health care quality improvement and the different perspective of complex responsive processes of relating.

Paper 4 presents the results of the national policy level of the case:

Booth BJ, Ritchie J, Zwar N & Harris MF. **Health policy and complexity in planning for change: the tension between “getting it right” and everyday local interaction in primary care.** Submitted to *Australian Health Review* October 2013.

This article examines policy implementation relating to chronic illness care over ten years in Australia. It relates the pattern of responses and outcomes, and key policy informants' experience and interpretation of them, to the two different perspectives of planned change and complex responsive processes.

5.2 Paper 3

Booth et al. *BMC Family Practice* 2013, **14**:51
<http://www.biomedcentral.com/1471-2296/14/51>



RESEARCH ARTICLE

Open Access

Healthcare improvement as planned system change or complex responsive processes? a longitudinal case study in general practice

Barbara J Booth^{1*}, Nicholas Zwar² and Mark F Harris¹

Abstract

Background: Interest in how to implement evidence-based practices into routine health care has never been greater. Primary care faces challenges in managing the increasing burden of chronic disease in an ageing population. Reliable prescriptions for translating knowledge into practice, however, remain elusive, despite intense research and publication activity. This study seeks to explore this dilemma in general practice by challenging the current way of thinking about healthcare improvement and asking what can be learned by looking at change through a complexity lens.

Methods: This paper reports the local level of an embedded case study of organisational change for better chronic illness care over more than a decade. We used interviews, document review and direct observation to explore how improved chronic illness care developed in one practice. This formed a critical case to compare, using pattern matching logic, to the common prescription for local implementation of best evidence and a rival explanation drawn from complexity sciences interpreted through modern sociology and psychology.

Results : The practice changed continuously over more than a decade to deliver better chronic illness care in line with research findings and policy initiatives – re-designing care processes, developing community linkages, supporting patient self-management, using guidelines and clinical information systems, and integrating nurses into the practice team. None of these improvements was designed and implemented according to an explicit plan in response to a documented gap in chronic disease care. The process that led to high quality chronic illness care exhibited clear complexity elements of co-evolution, non-linearity, self-organisation, emergence and edge of chaos dynamics in a network of agents and relationships where a stable yet evolving way of organizing emerged from local level communicative interaction, power relating and values based choices.

Conclusions: The current discourse of implementation science as planned system change did not match organisational reality in this critical case of improvement in general practice. Complexity concepts translated in human terms as complex responsive processes of relating fit the pattern of change more accurately. They do not provide just another fashionable blueprint for change but inform how researchers, policymakers and providers participate in improving healthcare.

Keywords: General practice, Quality improvement, Complexity, Organisational change

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Background

Changing population demographics, evolving disease patterns and new research findings, exert unremitting pressure for change in health care, demanding reliable ways for continual improvement. General Practice, for example, which evolved in response to acute, episodic illness, must now respond to increasing prevalence of chronic illness and to research suggesting better outcomes when primary care is organized according to a chronic care model [1]. The quest for a quality improvement “magic bullet” [2] has been accelerating for 20 or more years and the source domain for effective change methods has broadened from education (undergraduate, vocational and continuing) to include social theory (peer influence and opinion leaders), cognitive approaches (guideline development) and organizational management theory (total quality management, system change) [3-5]. A number of policy-level “think-tanks” have been held and reported in major medical journals [6-8]. Even naming this area is contested: implementation science, adoption, quality improvement, dissemination, complex intervention and knowledge translation [9-11]. Yet the intense research and publication activity has not resulted in reliable prescriptions for success [12-14]. There has been little advance on the “modest to moderate improvements in care” observed in systematic review of different strategies for implementing change which led to the conclusion that there is an “imperfect evidence base” available to guide efforts for improving care [15].

This paper seeks to challenge the dominant discourse in this area of interest. We look at one common prescription for local implementation of best evidence and offer another perspective on how change might occur, then examine real-life experience to test both explanations. As we do this, we also seek to explore what can be learned by thinking within a complexity paradigm about change and improvement in the organisational context of general practice.

The dominant discourse in healthcare improvement: planned system change

Implementation science promotes methods influenced by systems thinking [16], particularly cybernetic systems, developed in the 1950s: “self-regulating, goal-directed systems adapting to their environment” [17]. The first step is to focus on one area where there is evidence for better practice – the desired “state” for “the system” – and to identify any “evidence – practice gap” in structures, processes or outcomes [18]. The next steps identify existing and potential barriers and facilitators for change in the desired direction [19]; design and implement an intervention (simple or multi-factorial); and then monitor and evaluate achievement towards closing the “evidence – practice gap”. Plan-Do-Study-Act cycles [20] are one example of a small scale quality improvement technique based on systems approaches of organizational learning.

The thinking is linear, where multiple variables contribute differentially in measurable ways to determine a measurable outcome. It is also analytic, to explore these independent variables to build up a picture of what comprises “the system” and how these interactions work; and reductionist, by focusing on specific and measurable parts. Once identified and understood, component parts and their interactions are assumed to remain constant (controlled) while others are modified so that predictable results of interventions can be expected. This mental model leads to mechanistic ways of speaking. For example, Shojania and Grimshaw [21] talk about identifying factors driving provider and organisational change, while Leykum et al. [14] speak of designing interventions to leverage improvement. Overall, the goal is to incorporate research into routine practice in a timely and reliable fashion. The key elements of the method are design, control and predictability: understanding the design and changing it in controlled ways in order to achieve predictable outcomes. This is done by objective “managers” from outside “the system”.

How would a practice develop better chronic disease management using planned system change?

Evidence for a better way of doing chronic illness care [1,22] would prompt an evaluation of the practice using an instrument such as the Assessment of Chronic Illness Care (ACIC) developed for this purpose [23]. Next, one or several clearly defined aspects of care would be chosen as the focus for change, based on explicit criteria such as seriousness of the gap, potential for health gains, political priority, or being more amenable to change. This bounded area of practice would be examined in detail to explore barriers and facilitators for change, looking at matters of staffing, information systems, culture, financial resources etc. Next would be planning one or a sequence of interventions, including specifying activities, personnel, timelines, accountabilities, measurable milestones and performance targets. Activities might include education (using a broad range of methods such as feedback and peer influence), financial incentives, new staffing and role changes, even sanctions. The final stage would involve implementation, with monitoring achievement of milestones and final evaluation of outcomes. The steps would be designed and managed from “outside” the system, whether by external change agents or researchers or members of the practice taking on an “objective planner” perspective.

An alternative paradigm: complex responsive processes of relating

Complexity concepts have become popular in offering a different view of organizational reality that is relevant to healthcare and how its pattern of organizing is changing within the broader sociopolitical environment [24-27], but are used in a variety of ways with more or less

looseness in their application. Elsewhere, we have described in detail the fundamentals of complexity thinking in relation to general practice and primary healthcare organization, particularly core elements from the study of complexity in the natural sciences: non-linear dynamics; networks of agents and relationships; co-evolution; self-organisation; emergence; and edge of chaos dynamics [28-30] (see Additional file 1 for expanded explanations). At the same time we also critiqued loose translation of complexity concepts into human organizing, (such as self-organisation as empowerment, or edge of chaos as a pejorative description of poor management) and argue against the tendency to image organizations directly as complex *systems*. This merely offers new jargon for approaches based on the dominant discourse of organization as system, an *object* with properties represented by *variables* [31]. Rather, we follow Stacey and others from the Centre for Complexity and Management at the University of Hertfordshire, who draw analogies from complexity sciences in the light of modern pragmatist sociology and psychology, in order to understand organisational reality as complex responsive processes of human relating [32-35].

The non-linear networks of agents and relationships that make up complex adaptive systems in natural sciences are, in human organisational reality, analogous to groupings of self-aware people (not *variables*), with their personal and social context, their current emotions and values, interdependent through continual involvement in communicative interactions with each other and broader society. Their relationships are paradoxically enabling and constraining at the same time, reflecting the power of social mores, hierarchies, politics and culture. They need not be harmonious. These relationships co-evolve, so that individuals and groups continually both influence, and are influenced by, each other. Self-organisation is not mediated by externally pre-set rules but is simply local interaction – processes of *communicative gestures and responses*, *power-relating* and *ideology-based intending, choosing and acting*. Order, what we commonly identify and name as “the organisation” (and, indeed, society as whole or part), emerges from these many, many local interactions. Just as the dynamic of richly connected complex systems tends to the *edge of chaos*, so complex responsive processes of human relating exhibit paradoxical qualities of stability and potential for radical transformation.

How would development of good chronic illness care in a general practice be understood as complex responsive processes?

Importantly, there might be no clear blueprint with readily identifiable components or stages to match against the experience of change (though plans for change may well be part of conversation in the practice). It might be hard to identify discrete planning and implementing activity, let alone objective planners, who are located outside the

network and who are observing, making changes and assessing impacts. Clear boundaries of the network of agents and relationships involved in practice-level change would be hard to define, since communicative interactions both within and outside the practice would influence the pattern of organizing. Both enabling and constraining relationships would be identifiable and seen to influence change. The whole would be difficult to sub-divide into clearly defined parts for study and manipulation in isolation from the rest. Instead, we could expect changes in one area to influence other areas, with potential for reinforcement or opposition providing examples of disproportion between cause and effect. There might be evidence of values-based choices that identifiably influence responses to communicative gestures, and so shape the pattern of working that emerges as the practice “organisation”. Change would be paradoxically predictable – it would occur in any dynamic network – but unpredictable – the trajectory and detail would be unknowable into the future, and only readily discernible with hindsight.

Purpose of this research

In proposing complex responsive processes as a new explanation for how change might occur in general practice and primary health care, it is important to test how theory matches real life. We also need to explore whether this way of thinking and speaking offers useful insights in an environment of continual health care improvement and reform.

Methods

Research design

Exploring change from a complexity perspective has implication for research design, implicitly rejecting detached observation. The phenomenon of interest can best be investigated from within the action in ways that are inherently subjective and interpretive [36]. Further, a reductionist approach would restrict the scope of enquiry where the whole is greater than the sum of the parts and would eliminate co-evolution. Most research into healthcare improvement and organisational change makes claims for knowledge based on a post positivist stance [37], where causes are studied as determinants of effects and reduced to smaller subsets of ideas for testing. Objective measurement is crucial and the purpose is to develop, test and refine theory. Exploring how complexity thinking might inform our understanding of organisational change demands different claims to knowledge. This study takes a pragmatic and constructivist approach which seeks understanding of everyday reality from multiple participant meanings.

We used the qualitative approach of case study, “an investigation of a contemporary phenomenon within its real-time context, when the boundaries between the phenomenon and context are not clearly evident and multiple sources of evidence are used” [38]. The case was

instrumental in providing insights into an issue, [39] in this instance organisational change for better chronic disease management in general practice, and the purpose was to explore the single case as a critical case to challenge the dominant discourse. This purpose was served by using pattern-matching logic [38] to compare an empirically based pattern with two alternative predictions (planned system change or complex responsive processes) defined prior to data collection and articulated in the Background section of the paper. We determined that the phenomenon of interest – organisational change – required examination at both local and national levels of analysis, so used an embedded, single case study design. This paper presents the results of the local level of the case. Given this rationale, selection was determined by the potential for learning rather than representativeness [39] according to two simple criteria: that the practice deliver good chronic illness care, without being markedly atypical in size, location, history or funding. Sampling was therefore purposive and convenience based through word of mouth. A mid-sized practice with a reputation for well-established chronic illness care was recruited and visited over a six month period in 2007.

Data collection and methods

Multiple sources of data were used to examine the quality of chronic illness care and to explore the understanding of participants in how this evolved. Purposive sampling was also used to determine the period of interest for the case, when awareness of an evidence-practice gap in chronic illness care might arise. Medline was searched for articles using the term “chronic disease management” and annual counts made to determine the period over which it became prominent (Figure 1). Government initiatives during this time were tabulated from Australian Government Department of Health archives to provide a clear policy context [40,41] (see Additional file 2). In-depth, semi-structured interviews were conducted with all practice staff (Table 1), guided by an outline covering a description of the practice, how it was organized, and how it had changed in the period of interest, particularly with respect to organisation of chronic illness care. As well there was direct observation over multiple visits of work processes, facilities and interactions, and two practice meetings were observed and recorded. All recordings were transcribed in full. Practice documents (accreditation reports, policy and procedures manual, recall register, appointments schedules) were also examined.

Data analysis

The ACIC provided a descriptive framework to validate selection of the practice and to identify aspects of good chronic illness care whose evolution warranted exploration. Pattern matching logic was used to compare the

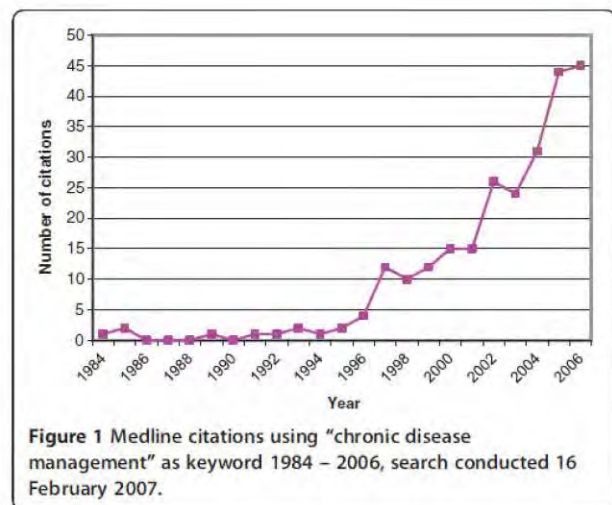


Figure 1 Medline citations using “chronic disease management” as keyword 1984 – 2006, search conducted 16 February 2007.

reality of how change occurred to the two rival theoretical propositions outlined earlier in operational terms: planned system change or complex responsive processes. Transcriptions, field notes, documents and photographs were entered into N’Vivo qualitative research software (QSR International) for exploration in depth. Basic tree codes were developed for the rival explanatory frameworks (planned system change and complex responsive processes). Transcripts were coded using these tree codes plus extensive free coding of any concepts related to change and chronic disease care at the practice. These were consolidated and merged into the existing and two new tree codes – pattern of change and chronic disease management. Initial coding was done by one author

Table 1 Staff of the practice at the time of the case study: their roles and characteristics

	Role	Age	Gender	Length of service
P1	Partner	>=40	male	>10 yrs
P2	Partner	>=40	male	>10 yrs
P3	Partner	>=40	female	>10 yrs
A1	Associate	>=40	female	>10 yrs
A2	Associate	>=40	female	>10 yrs
A3	Associate	>=40	female	5-10 yrs
R	Registrar	<40	female	< 5 yrs
BM	Business Manager	>=40	male	< 5 yrs
PN1	Practice Nurse	>=40	female	5-10 yrs
PN2	Practice Nurse	>=40	female	< 5 yrs
OM	Office Manager	>=40	female	< 5 yrs
R1	Receptionist	<40	female	< 5 yrs
R2	Receptionist	<40	female	< 5 yrs
R3	Receptionist	<40	male	< 5 yrs
R4	Receptionist	<40	female	< 5 yrs

(BJB) and samples were reviewed by and discussed with MFH and NZ.

Ethics

The study was approved by the University of New South Wales Human Research Ethics Committee. All participants gave their informed consent to participate.

Results

In order to protect confidentiality, some practice and personal details have been changed where they are not crucial to the exploration of the case study. Initially, we describe the practice and how chronic illness was managed at the time of the study – “the present”. We then examine the “past” 23 year story of the practice, focusing on the development of the elements of good quality chronic illness care. Finally, we return to the “present” of 2007 and explore the participants’ understanding of how change occurred/occurs and describe current patterns of interaction at the practice.

The practice and chronic illness care: the present

The practice is located in an inner city suburb with a demographic of ageing working class immigrants and recent influx of younger middle class professional families. It has five full-time equivalent GPs (three of whom own the practice in a legal partnership), one full-time equivalent practice nurse, a part-time business manager, full-time office manager, and two full-time equivalent reception staff. All staff consistently identified core values of the practice – good quality care, ethical professional practice, and patients come first – while also judging it to be a democratic and friendly place to work. They saw clearly that these values outweighed financial interests, but acknowledged that this had been a source of tension at times.

Chronic illness care according to key elements of ACIC is an *explicit priority focus* at the practice. The doctors are aware of the burden of illness in their ageing patient population and describe how these patients need new ways of working, such as risk management, planned care and follow-up, and patient self-management. Practice nurses play a key role as care coordinators. They have their own appointments, conduct health assessments, help to prepare care plans, maintain registers, arrange reminders and conduct reviews. They also undertake preventive, clinical and organisational tasks.

Financial and *administrative arrangements support chronic illness care*. The business manager (BM) promotes use of Medicare items for chronic illness care and works with the office manager and nurses on appropriate care processes. The different members of the practice team have a reasonably clear and shared understanding of their own and each others’ roles, which generally corresponds to the organisational chart in the practice manual, with the three partners clearly in the senior management role.

Arrangements for delivery of care are reviewed as needed at the monthly practice meeting.

The practice doctors *utilize community resources*, public and private, to provide multi-disciplinary care. There is an intentional process to maintain awareness of the role and quality of such community-based services, including visiting new services and discussion at the practice meeting. Practice members participate in their local Division of General Practice (indeed, PN1 is used by the Division as a resource for education about chronic illness care) and numerous professional networks.

Doctors and nurses work together to provide education *to help patients understand and participate in their own management*. Practice staff describe a strong culture of patient-centeredness and clinical staff emphasize the need to engage patients with chronic illnesses in learning how to participate in their own care (although with variable success). The doctors are aware of a broad range of up-to-date *guidelines for management of chronic illness*, although have some reservations about the plethora of materials and the robustness of the sources. They all participate in continuing professional development. The practice meeting is explicitly used to share individual learning and the meetings observed revealed both wide knowledge and critical appraisal in the area of chronic illness care.

The practice uses a blended paper and electronic medical record system, with a *register of patients with chronic illness* used to provide patient reminders. At the time of data collection, they did not routinely evaluate their chronic illness care through regular record audit. Two principals (P1 and P3) were aware that this was desirable and occurred in other practices.

Within the Australian context [42], this level of development in all aspects of the Chronic Care Model validates the practice’s reputation for good quality chronic illness care.

Chronic illness care: how it developed

In this section we present both a chronological history of change within the practice and exploration of how and why it happened this way from the memories and interpretation of the participants involved in the action. Table 2 shows a detailed timeline of key developments at the practice correlated with key developments in the policy environment of general practice in Australia.

Foundation of the practice: the first ten years

In 1985, P1 bought the practice, selecting this one among many because of its ethos that earning capacity was not the primary consideration. P2 and P3, sharing the same values, joined over the following five years and the partners acquired, renovated and moved into purpose designed premises in 1994. P3 came from an overseas medical school with a progressive primary care program, and was seen as an agent for change. The initial joining of

Table 2 The story of the practice

Practice history	Year	Public context
P1 buys into practice	1985	
	1986	
P2 buys out remaining partner	1987	
	1988	
	1989	
P3 joins as associate, then partner	1990	
	1991	
	1992	GP Strategy
	1993	Better Practice Program, Divisions of GP, GP Research Program
Move to new premises	1994	
Record audit	1995	
Ceased bulk billing	1996	
	1997	Immunization strategy
PN1 starts	1998	
	1999	Enhanced Primary Care (EPC)
Accreditation	2000	
	2001	Asthma 3+ Plan
	2002	
Re-accreditation	2003	"Red Tape" report, Medicare Plus, nurse rebates, simplified EPC
BM starts	2004	
OM starts	2005	
	2006	
Case study	2007	

the three principals, partly by chance but with shared values, led to a continuing intention towards delivering the best quality of care in the practice, which made them open, even eager, to change:

P3: the theme of change and improvement ... has always been there... I mean P1 and P2 ... if they knew there was a better way, they wouldn't actually choose for conservative, to stay the way they are. If there was a better way, they would go the better way.

PN1: they like to be seen to be a bit more cutting edge ... They like to be up front and like to be seen to be progressive...

BM: ...a very strong values system ... that was non-negotiable ... always at the cutting edge of doing things differently ... this place was always leading the charge."

The fact that P3 had trained overseas meant that she

had no existing referral networks among the local specialists, so she visited them to help establish her in a new place. As a consequence, however, she thought that this brought her (and the practice) to notice and meant that they gained a reputation as interested and progressive, leading to her being approached to participate in a quality improvement research project that was an early initiative in Australian general practice reforms.

"Lots of things changing": the next five years

This research project was seen by all three partners as highly significant – each referred to it when asked how the practice had developed into a leader in chronic illness care. It came not long after the move in 1994, among many other memorable changes, some related to the research project – directly or tenuously – and others apparently unrelated. The research involved a record audit of preventive care, including Pap smear, immunization and HbA1c. The results revealed rates lower than their anticipated excellence and this disturbed the partners. Having identified suboptimal care, the project explored possible remedial actions, particularly setting up recall and reminder systems. This played out differently in each of the three preventive care areas.

Setting up a Pap smear register and reminder system proceeded reasonably smoothly. Cervical screening was topical and an area of interest for P3 and the research team, and a way forward seemed clear:

P3: so '94 we didn't have computers. Reflecting on what we had to do we had to have computers

So, in 1996, the practice introduced computers for clinical work, well before the 1999 Australian Government incentives for electronic management of clinical information in general practice.

The response to diabetes management through HbA1c testing was a different story. Although P1 reported a personal revelation about the different requirements for managing patients with chronic illness, there was little change in the pattern of how the practice delivered their care.

P1: I can give you the major change ... the agenda of the consultation [in chronic illness patients]

Q: What happened? One day did you just think "Hmm, there's a lot more chronic illness, I've got to have my own agenda when patients come in"?

P1: Yes! There was actually a revelation ... it's that sort of dis-ease, the discomfort that you live with when you think that you're not doing things well

Q: Mmm, so how does something like [planned care] fit into that ...was all that changed? – you just saw things in a different way?

P1: Yes!

Q: Did it just work immediately?

P1: No! (laughter).

The practice did, however, take action towards the end of this period on the third focus area in the research project – immunization – but this was in response to other influences in addition to the audit. At the same time as there was growing tension in the practice about financial matters (*P2: ...we got fed up with, um, constantly feeling like we were battling to make any kind of living ... practicing the sort of medicine we did ...*), the Australian Government introduced a new immunization strategy that included incentive payments for general practice as well as social marketing to encourage immunization. At the practice, improving immunization became important both to re-affirm their value of leadership in quality of care and, at the same time, to provide some relief from their financial stress. They also felt that the task might not be too difficult, since the issue might be in the recording, rather than actual immunizations delivered.

The first practice nurse

As a consequence, in 1998, PN1 joined the practice, initially to update the immunization records. The employment of PN1, a senior nurse with some hospital management experience, was seen by P1, P2 and P3 as pivotal to many of the changes that subsequently led to better chronic illness management. However, there were slightly different interpretations from each of the principals and from PN1 herself as to how this came about. She was, in fact, the wife of P2, and according to him, flexible, part-time work at the practice was an ideal opportunity for her to “get out of the house” [P2]. It was a fortunate coincidence that someone who understood medical terminology and could find the way around a medical record was available to help update the immunization data. And then one thing led to another:

PN1: ...it was then, oh no, no, we don't want a nurse. And then ... do you know how to work the ECG machine? oh yeah, I can do that. ... oh do you want to work another day? oh, well, you know, all right, for a few hours... then what's this Medicare change? I'll read it and I'll let you know. So my role sort of went from just doing the immunisations until ... making sure things were done for PIP and then accreditation came and it was like, do you know what this means. And I said I'll give it a go

However, PN1's gradual increase in responsibilities was not easy for some of the doctors.

P1: I remember distinctly, when PN1 started, and, she started to do more I was very resentful. It was a huge issue for me and I'm sure for a couple of the other doctors of letting go. You know?

Enhanced primary care and accreditation

As practice accreditation was gaining momentum, the Australian Government launched the Enhanced Primary Care (EPC) Program that provided insurance rebates for planned chronic illness care – health assessments, case conferencing and written care plans – outside the traditional fee-for-service structure of episodic, reactive, time-based consultations. PN1 was invaluable as the practice decided to undertake its first accreditation and began to work out how to use the new item numbers. Being one of the first practices to be accredited was consistent with the practice's “ahead of the pack” culture:

Q: How did you decide to get accredited? One of the first practices...

P2: I think we just felt like it was our duty to do it yeah, I don't know. Well it was tied up with PIP payments and all that kind of thing as well so we thought, good practices do it, we should you know, maintain some sort of objective standard I suppose.

Accreditation was a key turning point for both PN1 and many of the processes for chronic illness care. It gave PN1 a pivotal and important role, and it involved considerable “tidying up” of existing processes. It was disruptive and met with some resistance, but the end result was a sense that the practice had gained quite a lot and PN1 was secure in a valued role for helping make changes happen smoothly in the practice.

Q: who ... brings things in from the outside or comes up with new ideas?

A2: PN1, ... she gets a lot of information sent to her on new things ...through the [local Division of General Practice] ...

The practice was now well placed to respond to further government refinements of the EPC program, such as incentive payments for achieving more steps in the cycle of care for chronic illness and including mental health within the program. The next four years were ones of incremental changes, refining the use of EPC and easily navigating the second accreditation cycle.

Attending to business

Despite this, the practice remained under financial pressure during 2000 – 2004. In particular, P3, as a female GP with an interest in women's health, tended to have longer and more complicated consultations, but these did not receive proportionally higher Medicare rebates, limiting the fees that could be charged.

P1: P3 more than all of us, ... was making the least amount of money for the effort she was putting in, ...

but all of us had noticed that our incomes had not done very well in the previous 3 or 4 or 5 years and P3 was the one who was feeling it most...

P3: you know it wasn't sort of working for us financially, and that was a bit uncomfortable, ... We were actually not making money, ... you know, here you are working day in, day out ...

As a consequence, the practice brought in a small business consultant, the cousin of P3's husband, to review the financial situation. His analysis identified some ways to improve cash flow, but he also suggested more extensive changes to work processes and staffing to improve business viability and efficiency. He was subsequently engaged as an external, part-time business manager. He negotiated new remuneration arrangements with the GP associates and reviewed how the front office worked, encouraging more responsibility among the receptionists. His stated aim for both was to change the management style to improve teamwork:

BM: the non-clinical staff – there was all care, but no empowerment ... and the big change I've had is ... to empower the staff to become more involved and ... seeing themselves as ... a critical part of the whole team from start to finish.

It was a time of rapid change and discomfort, both for staff and the partners.

BM: when I first came in, to introduce those changes, they happened in a very short period of time and there was a lot of pain about that and there was a lot of reluctance [by partners] ... to let go of decision-making...

Subsequent steps were to appoint an office manager and second practice nurse, and to more clearly delineate their roles to free the practice nurses from administrative tasks. This allowed greater priority to be given to chronic illness care, with more intentional and systematic use of the EPC items, which carried significantly higher rebates. The office manager and practice nurse then worked together to refine processes to make this new staffing structure work.

OM: the staff out the front ... they didn't know what all these things were and that, ... care plans sometimes took 45 minutes or an hour ... It was chaos, it was chaos, ... so yeah it was like "no hang on a minute, we're just getting into a mess here"....it wasn't like a formal meeting, it was more just "PN1 have you got 10 minutes?", you know, "this isn't working".

And the process seemed to be successful.

BM: So that's a significant change ... you can actually ... empower and give them the tools to make their decisions, ... then you start to see the improvements.

You ...start to see productivity increase and you start to see happier people and we've got a very happy workforce here.

A3: ... at the time we were all really cranky. I was really cranky, I was you know about to leave really cranky you know that sort of thing. And now I'm really happy, ...

R3: Everyone here sort of tries generally speaking to do their best to ... cooperate in getting what needs to be done, done....I did work for another medical practice before this one ... here ... we work with the medical staff rather than for them.

At the end of this period, the practice was effectively in the form it was during the case study.

Participants understanding of change

The participants struggled to explain how their good chronic illness care came about. They all described plenty of change, but no-one could readily point to a planned, targeted strategy for chronic illness care (although there were several examples of planning, trialling and implementing improvements for more discrete problems, such as handling pathology results). Some (A2, R1 and R2) seemed content to focus on their personal story and how things worked in the present. Most skipped about within the history of the practice and across clinical areas, making connections and identifying key events or turning points in the way chronic illness care developed. BM related a process of planning and change to bring financing and staffing more in line with modern business practice, and this had a significant impact on chronic disease management through increasing use of the EPC items. Financial incentives were important but not as a simple lever: there were several nuanced understandings of how they influenced change.

P1: I think that by far the biggest force for change has been money, you know ... incentives, ... So if somebody says you're going to get an extra \$300 to achieve 98% immunisation rate rather than 95%, I think the \$300 is not all that important but it becomes an interesting exercise to see if you can achieve it. Because you know that's an area that you should be going, because it's an important thing to do, so if somebody else recognizes that it's an important thing to do I think...umm ...it can drive it in chronic disease management.

Q: So why did you decide to get involved in EPC in the first place then?

P2: Um I don't know, well I can personally see the advantages, ... it um sits well with me ideologically that the government is trying to do chronic care properly and, and de-emphasise the acute reactive kind of medicine. So for a start I thought the principles were fine."

A3: ...actually getting the nurses involved in that process, ... and able to ... write a sensible care plan

Q: So who made that happen?

A3: BM essentially ...because it was a money making exercise ... I mean it's useful for us because care plans are a useful thing. But I think it was a financially driven decision in many ways.

The financial incentives allowed for new way of organising.

Q: Did the money make a difference?

P1: Yes! ... not so much for the income but for the fact that you feel you can support the appointment of a nurse. That's become important. ... I mean, virtually all our money goes into the employment of a nurse, that we get from those extra items, ...umm, but that's useful, yes.

Change in action: communication and planning

The dynamic of the practice meeting revealed the pattern of organizing that fostered change and improvements over the years. Matters were discussed according to an agenda that began to be defined when the practice meeting was scheduled. A dedicated space on a whiteboard in the staff room was left for the meeting agenda, open to any staff member to add an item they felt at the time was important to discuss. At the meeting, the person who had added the item opened the discussion, and others joined in as they wanted. There were no formal minutes, but if an item related to a problem, and it remained unresolved at a subsequent meeting, it was raised again for further discussion. Everyone at the meetings spoke freely and were listened to with interest and respect, and clearly accepted that some matters would be decided at the subsequent partners' meeting.

During the 58 minutes of one practice meeting the following matters were dealt with: lunch; personal and collegial networking; administrative matters; clinical organising around a new government screening program; review of new community linkages; discussion of clinical information from continuing professional development; finance procedures; and prescribing audit results. Although improving chronic illness care was nowhere explicit, the

discussions attended to community resources, management guidelines, reminder processes and care outcomes across a range of chronic conditions.

Discussion

The pattern and process of change

The overall pattern of change at the practice does not reflect planned system change, either through incremental continuous quality improvement nor the episodic transformation that might be anticipated from wholesale redesign. Rather, it resembles a punctuated equilibrium, more consistent with the power law of edge of chaos dynamics where small changes occur frequently, larger changes more rarely. In retrospect, it was possible to identify key times of change and the influences at work at the time. Apart from the Pap smear register and staffing review, there was no obvious architect nor blueprint for much of the change that occurred. But it was not simply random. It emerged in the interplay of intentions, communicative gestures and responses, power relating and values-based choices and actions of the partners, practice staff and policy makers in a range of areas, including chronic illness care.

How does the dominant discourse of planned system change match the story of the practice as it improved its chronic illness care?

The research audit clearly identified evidence–practice gaps that stimulated improvement activity, with prioritisation of Pap smears according to interest, political priority and amenability to improvement. There was analysis of underlying causes and a planned way forward – computerisation and establishment of registers. There was considerable influence from the external research team, which was able to provide both objectivity and resources. Similarly, financial viability was identified as a need, particularly for P3, and that stimulated clear, planned improvement activity. BM, external to the practice, facilitated change by identifying contributing factors, then formulating and executing planned changes in staffing, remuneration and office procedures. BM continues to sit largely “outside” the practice in a part-time, off site role, providing review of financial data and processes, with the ability to intervene through regular meetings and discussions. Both these change processes occurred in areas that were quite easily “bounded” – they could be analysed and altered without too much interference from other aspects of the practice (even though both had considerable flow-on effects to chronic illness care). Other parts of the story fit the dominant discourse model less well. The response to the audit results for immunization rates, for example, involved rectifying a recording problem rather than strategies to improve immunization rates, although this flowed on to have profound effects for chronic illness care. In contrast,

the specific results that showed poor chronic illness care, sub-optimal HbA1c recording, made the partners want to respond and improve, without any specific planning or improvement activity resulting.

How is the story of the practice understood as complex responsive processes of human relating?

Co-evolution is an important complexity element in the story. Key aspects of good chronic illness care developed as a consequence of efforts in unrelated areas – both clinical and business. Robust linkages with community services developed in large part because a new doctor in the practice felt the need to establish a referral network to manage patients' episodic care. An unrelated consequence was involvement in the research audit, which did not stem from a specific plan for improvement. Computerisation and capacity for patient registers arose initially from efforts to improve Pap smear rates. Electronic records and registers were refined in seeking better data on immunization to qualify for incentives, which also led to employment of a practice nurse, whose role and status grew through her management of accreditation. The need to improve financial viability through modernising business practices led to re-structuring administrative and financial processes to give priority to chronic illness care.

Non-linearity is also apparent. Participants themselves could not identify a clear pathway leading to improved processes for chronic illness care. Yet they clearly remembered a will and intent for change in this and could, in retrospect, identify the contributing influences to their current state. Sensitive dependence on initial conditions is evident from the pervasive influence of the foundational values of the practice partners, which have remained clearly articulated and understood throughout their story. As Crabtree et al. also concluded from their 15 year program of research [27] another practice in similar demographic setting with similar size and makeup could clearly take a very different trajectory over 25 years' of evolution. Disproportion between cause and effect is demonstrated in the profound impact on chronic illness care from hiring a practice nurse to clean some data and provide convenient employment for a partner's wife at a particular stage of family life.

The network of agents and relationships of which the practice is part is somewhat difficult to define, with communicative interaction between staff at the practice but also with local, regional and national general practice institutions. Policy initiatives also form part of the communicative interactions to which members of the practice are responding. In complex adaptive systems, the richness of relationships is an important factor in movement to the edge of chaos where transformational change and emergence of new order become more likely.

Power-relating, both constraining and enabling at the same time, was evident in the paradoxical tensions felt within the practice by the employment and expanding role of the practice nurse. P1's response to a perceived threat may well have been constrained by PN1's relationship to P2, opening up potential for PN1 to take on new roles and responsibility. Similarly, there was tension in the circumstances of employing BM and the changes this brought, but the constraining needs of P3 and her relationship with BM may have facilitated this rather intrusive and difficult period of change. As well, the ethos of democracy communicated by the partners intentionally facilitates open communicative interaction among all staff.

Ideology-based choice was evident as an important influence in *self-organisation* in two main areas. Firstly, the response to the research audit results reflected the value of seeking to be at the forefront of quality. The response of doctors in other practices without this ethos might well have been denial or indifference. Secondly, the attitude to financial incentives is informative. Both P1 and P2 interpret the financial incentives in government policy initiatives as "communicative gestures". They are powerful gestures, carrying significant advantages for the practice, as acknowledged, somewhat equivocally, by the partners. But they also communicate commitment and government values, which appeals at another level. The response of the practice partners is to respond to the values-based communication, while appreciating the benefits largely realised by the business manager's somewhat different response. Other doctors, in other practices, with different values, might respond quite differently.

Conclusions

This empirical comparison of the everyday reality of long-term change, in which one general practice developed good quality chronic illness care, confirms the conclusion of Suchman [43] that the dominant discourse of planned, step-wise change in strategically targeted areas of practice activity provides an inaccurate explanation of healthcare improvement. Complex responsive processes of relating, where communicative interaction, power-relating and ideology-based intending, choosing and acting produce patterns of organizing that are paradoxically stable and changing, helps to make sense of the evolution of the practice in ways that were not random, but also not according to a conventional linear blueprint for improvement. However, these different understandings of change are not an either/or dichotomy, as even the analytic method of pattern matching logic would suggest. Both are visible and not mutually exclusive in the change and improvement in this practice.

This study looks at organisational change for healthcare improvement at the practice level over a longer time frame than most empirical studies. This did not appear to challenge the recall of participants and was sufficient to

discern the pattern of change to test the common prescription for how improvement should occur. The depth of exploration in all its particularity also reveals commonalities to help in broader understanding and learning.

What are the implications of understanding organisational change as complex responsive processes of human relating?

At the local level, those in general practice who strive to respond to constant calls for improving care may find both reassurance and encouragement from the complexity-based conclusion of Westley, Zimmerman and Patton [44] that innovation "demands simultaneously that we set a course, move to action and relinquish the idea that we can control the outcome" (p223). Reassurance, since the complexity lens validates real efforts that did not seem to reach the desired goal; encouragement, because non-linear dynamics always hold the potential for transformation. Understanding co-evolution acknowledges the need for flexibility of improvement plans in response to everyday reality, at the same time promoting awareness of both collateral benefits and unintended consequences. The inherent unpredictability of the trajectory of future change focuses attention on ethical dealing in the everyday present, which should not be subordinated to uncertain future goals.

Leaders and researchers need also to reflect on such implications. As they plan and act to foster healthcare improvement, they are simultaneously "in control" and "not in control" of general practice [45]. There is no suggestion to abandon planning, policy-making or researching, but there could be benefits in a shift in emphasis to allow more tolerance for local adaptation. Evaluation should take account of collateral benefits, unintended consequences and what has been learned along the way, not only enumeration of discrete achievements along a pre-specified trajectory. Time lines may need to be longer to allow for co-evolution and the multiple attempts and circuitous routes that non-linear dynamics suggest. Drawing analogies from complexity sciences and interpreting them through modern sociology and psychology as complex responsive processes of relating can enrich understanding of policy and funding initiatives. They are communicative gestures that will evoke a wide variety of responses, based on power relationships and values-based choice, in general practices across the country. Ensuring and making clear the alignment between principles and purpose of the gesture, and its inherent power (such as financial incentives, regulations or sanctions), may influence the responses from which will emerge changing patterns of organizing.

A complexity perspective inherently precludes outlining any alternative prescription for implementing research findings in general practice to replace the dominant discourse. It does, however, suggest shifts in thinking and speaking about how health care in general practice might improve to meet changing needs and research findings.

The current discourse can lead to frustration with the lack of anticipated progress and escalating intensity to seek ways to ensure certainty of outcomes. Understanding and learning from a complexity perspective helps to make experience of healthcare improvement more intelligible and less anxiety-provoking for leaders, researchers and participants.

Additional files

Additional file 1: Expanded explanations of key complexity elements from natural sciences [31-33].

Additional file 2: Key Commonwealth (National) Health Policies relevant to chronic illness care in Australian General Practice [40,41].

Abbreviations

A (1 2 3): Associate doctor at the practice; ACIC: Assessment of Chronic Illness Care; BM: Business Manager at the practice; EPC: Enhanced Primary Care; OM: Office manager at the practice; P (1 2 3): Partner doctor at the practice; PIP: Practice Incentives Program; PN (1 2): Practice nurse at the practice; Q: Questions by interviewer; R (1 2 3): Receptionist at the practice.

Competing interests

The authors declare that they have no competing interest.

Authors' contributions

BJB designed the study, carried out the practice visits and interviews, analyzed the data and drafted the manuscripts. NZ and MFH participated in the design of the study, reviewed coding and data analysis and critically reviewed sequential drafts of the manuscript. All authors read and approved the final manuscript.

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5.2.1 Paper 3 additional file 1: Expanded explanations of key complexity elements from natural sciences

Non-linear dynamics

Dynamic systems exhibiting linear relationships, where the whole is equal to the sum of its parts, which act independently of each other, are easy to model mathematically. One or more parts can be held constant to examine other parts in isolation, and small perturbations tend to be damped down throughout the system, so calculations do not need to account for very small variability. In systems that exhibit non-linear dynamics, the whole is greater than the sum of the parts and mathematical models require computer simulation. Such systems exhibit *sensitive dependence on initial conditions* and small perturbations can be amplified throughout the system. Examples from natural sciences are found in weather patterns, molecular biology and ecology.

Network of agents and relationships

The focus across complexity thinking is on agents and their network of relationships – constraining and facilitating, single and multiple. One example is a Boolean network, which can be studied mathematically but can also be visualised easily as light bulbs in various arrays with interconnections that determine whether bulbs are on or off. There are various numbers of agents (light bulbs) and relationships (electrical connections) and natures of relationships (whether the connection turns a bulb on or off). Typical networks in natural sciences can include genes, ecosystems, neurones or economies.

Co-evolution

In such a network, each agent is continually acting and reacting to what other agents are doing. They do not exist or change in isolation, but co-evolve. The state of each light bulb switches, and is switched, on or off by the state of those around, producing different patterns of lights. Another example is an ecosystem. An animal's ability to survive and thrive depends on its niche, determined in part by other animals in the environment, and their impact on both the original animal and the environment. None of these is static. As one animal or population changes, so others react, changing the environment and causing pressure for further change.

Edge of chaos

Experiments with Boolean networks revealed that sparse numbers of connections between agents create a system where co-evolution rapidly reaches stability, but in very densely connected networks, co-evolution leads to chaos (in the light bulb image, apparent random blinking of bulbs that never settles down into any observable pattern). In between, co-evolution produces coherent patterns that propagate, grow, split apart and recombine in an orderly way. This leads to the concept of the *edge of chaos*, poised between rigid structure and chaotic disorder, where there is also complexity: paradoxical stability and continuous change at the same time.

Emergence

The appearance of complex but coherent, patterned behaviours from simple, local rules is termed *emergence*. Another example is the flocking behaviour of birds, which has been simulated in computer modelling by giving artificial “boids” just 3 rules: maintain minimum distance from other objects in the environment, including other boids; try to match velocities with other boids in its neighbourhood; and try to move towards the perceived centre of the mass of boids in its neighbourhood.

Self-organisation

Self-organisation is the fundamental process of local interaction underpinning *emergence*. A further example provides important insights. Dribbling sand onto a table forms a pile whose shape remains constant over time, even as sand continues to dribble onto the pile. Each grain of sand is held in place by gravity and friction, poised such that another grain of sand dropping onto it may have no effect, may displace just the one grain, or several, or a cascade. The overall shape of the pile is maintained by local interaction, and all these responses occur at different times, following a power law where small displacements occur frequently, large avalanches much less often.

5.2.2 Paper 3 additional file 2:
Key Commonwealth (National) Health Policies relevant to chronic illness care in Australian General Practice

Medicare

Medicare is Australia's publicly funded, universal health insurance scheme that provides rebates to patients for services billed by private general practitioners according to a government schedule of service items – the Medicare Benefits Schedule.

General Practice Strategy 1992 – 1996

Successive budgets provided funding for programs in areas of Quality, Workforce, Integration and Financing, which included:

- Vocational Registration (VR) of general practitioners (introduced 1989)
- Accreditation of general practices
- General Practice Evaluation Program (GPEP): grants for research and evaluation in general practice to improve quality of care
- Divisions of General Practice (DoGP): locality-based organisations to foster integration of health services
- Grants for trials of co-ordination of care
- Better Practice Program (BPP): financial payments to supplement fee-for-service for defined services

National policy initiatives 1997 – 2007

1997 Immunisation strategy

1998 Review of General Practice Strategy

- 1999 Replacement of Better Practice Program with Practice Incentives Program (PIP), with incentives for information management, after-hours care, rural and remote practice, clinical performance targets
- 1999 Enhanced Primary Care (EPC) item numbers added to the MBS targeted at better care for chronic illness
- 2000 self-management initiatives, both as part of EPC and demonstration grants
- 2001 funding for DoGP to support care for chronic and complex conditions; new Medicare items for chronic and complex conditions, Asthma 3+ visit plan
- 2003 Productivity Commission Report to simplify PIP and EPC, Medicare Plus restructure including rebates for services by nurses in general practices
- 2004 access to Medicare rebates for allied health under EPC
- 2005 diabetes & asthma service incentives and Better Outcomes in Mental Health program
- 2005 EPC simplified in response to “red tape” report with new items for chronic illness care
- 2006 EPC extended with further items and conditions
- 2007 Medicare items for geriatric assessment

5.3 Paper 4

Health policy and complexity in planning for change: the tension between “getting it right” and everyday local interaction in primary care.

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Competing interests

None

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Abstract

Objective

This study challenges the health care improvement paradigm of planned system change by exploring the aptness and value of complexity thinking for policy formulation for better chronic disease management in primary care.

Methods

This paper reports the national policy level of an embedded qualitative case study of organizational change over eleven years. We used document review and interviews to explore the pattern and understanding of intentions and responses to targeted policies, then compared the empirical findings to alternate explanatory frameworks of planned system change or complex responsive processes.

Results

The Enhanced Primary Care package exhibited careful planning and deliberate implementation, but did not result in a predictable trajectory of anticipated results. There was a sense of disappointment despite significant change occurring. Complexity elements such as non-linearity, co-evolution, edge of chaos dynamics and self-organization were readily apparent. The overall picture was less a controlled system re-design and more an ongoing conversation where providers responded to communicative gestures of incentives and guidelines. New patterns of organising emerged from this interplay of policy intentions and everyday local interaction.

Conclusions

Understanding primary care as complex responsive processes of relating among participants makes sense of everyday reality and offers both challenges and opportunities for policy formulation.

What is known about the topic?

Policy makers face constant pressure to improve health care due to changing population needs, new research and rising costs; but reliable strategies remain elusive, giving rise to escalating demands for better design and control of policy initiatives to ensure predictable outcomes.

What does this paper add?

This paper demonstrates the aptness of complex responsive processes as a way of understanding what is going on in human organising, such as primary care, and challenges the expectation that idealized planning can provide a predictable, universal trajectory to successful outcomes, rather seeing new order emerging in the interplay of intentions and the everyday reality of local interaction.

What are the implications for practitioners?

In the constant process of health care improvement, policy makers need courage and tenacity to remain engaged, whilst broadening the scope of evaluations beyond measurable outcomes that can be determined in advance.

Introduction

As the stock-take begins on the results of the Health and Hospitals Reform Commission (Bennett, 2013; Commission, 2009) and National Primary Health Care Strategy (Government, 2010; Jackson, 2013), it is timely to reflect on the understanding of organizational change that underpins health policy formulation. In primary care, especially general practice, the continuing search for improvement comes in part from increasing chronic illness, which requires anticipatory, coordinated care to avert costly duplications and omissions from fragmented, reactive care (Harris & Zwar, 2007). The situation is not unique to Australia. It leads many countries to undertake substantial policy reforms, for example pay-for-performance in the United Kingdom (S. Campbell et al., 2007), the patient centred medical home in the United States (Nutting et al., 2011) and a decade of incremental reform in Canada (Hutchison, Levesque, Strumpf, & Coyle, 2011).

The dominant discourse for translating knowledge into practice increasingly colours policy formulation, with calls for evidence-informed policy and better research for transforming health care (Grimshaw, Eccles, Lavis, Hill, & Squires, 2012; Michie, van Stralen, & West, 2011). Recognition that this approach evolved from simple interventions such as drug evaluations has led policy-makers to explore complexity thinking. The UK Medical Research Council developed a framework to design and evaluate complex interventions (M. Campbell et al., 2000; Craig et al., 2008) and the US Institute of Medicine introduced complexity theory in its report *Crossing the Quality Chasm* (Institute

of Medicine, 2001). These were followed by an expanding literature on health care as a complex adaptive system (Crabtree et al., 2011; Kernick, 2006; Plsek & Greenhalgh, 2001; Stroebel et al., 2005; Sturmberg, O'Halloran, & Martin, 2010).

Recently this “appropriation of complexity” has been challenged by the argument that the UK framework deals with *complicated* interventions, where causal contributions of multiple variables can be analysed for better design and predictable results. Processes remain linear and mechanistic rather than *complex* and the dominant paradigm remains unchallenged (Paley, 2010; Rickles, Hawe, & Shiell, 2007; Shiell, Hawe, & Gold, 2008). Yet these critiques persist with viewing health care as a system – a sophisticated machine. They ignore personal and social attributes of the agents and relationships in human organizing.

More persuasive is the complex responsive processes approach, which draws on sociology and psychology to interpret analogies from complex adaptive systems theory to enhance their explanatory value for human organising (Booth, Zwar, & Harris, 2010; Mowles, van der Gaag, & Fox, 2010; Shaw, 2002; Stacey, 2010; Stacey, Griffin, & Shaw, 2000; Suchman, 2011). Organizational reality comprises *non-linear* networks of self-aware people, in their social, emotional and ideological context, participating in many relationships. These always involve power, both enabling and constraining, through social mores, hierarchies, politics and culture. People and relationships influence, and are in turn influenced by, each other: they *co-evolve* in ways that are *sensitive to initial conditions*. Order *emerges* from *self-organisation*, the many, many local interactions

of communicating and responding. Such order demonstrates *edge of chaos* dynamics, showing paradoxical stability and potential for radical transformation, inherently *unpredictable*. We explain this in more detail elsewhere and report how it helped to make sense of quality improvement in one practice (Booth et al., 2010; Booth, Zwar, & Harris, 2013).

This study aims to test the explanatory value of these ideas against experience, and to explore their implications and usefulness in policy formulation, in one particular instance. So our research question is: how might understanding organizational change as complex responsive processes inform the improvement of chronic illness management in primary care in Australia?

Methods

Researching complexity requires a different method from positivist design predicated on an objective, reductionist approach controlled by eliminating extraneous influences. To best pursue the exploratory purpose we used the qualitative method of case study: “an investigation of a contemporary phenomenon within its real-time context, when the boundaries between the phenomenon and context are not clearly evident and multiple sources of evidence are used” (Yin, 2009). We used an embedded design of both local practice and national policy levels to maximise what could be learned about the phenomenon of interest – organizational change for health care improvement in chronic illness care. Potential for learning rather than representativeness was the basis for purposive sampling for both the period of interest (1996–2007, based on

simple citation counts for the phrase *chronic disease management*) and the general practice, which we report in detail elsewhere (Booth et al., 2013). This paper presents the findings at the policy level of the case.

Data sources

Multiple data sources were used. Government media releases and reports (Ageing) were surveyed to produce a timeline of initiatives for better chronic illness management in primary care. Medical editorials were canvassed for their responses and further interpretation was sought from six purposively selected key informants from a range of stakeholder interests: allied health (AH), government bureaucrat (GB), general practice (GP), health consumer (HC), and practice nursing (PN). These were identified through word of mouth based on their engagement with the identified policy initiatives during the period of interest. All those approached agreed to participate. There were four females and two males and all had been working in primary care policy for at least ten years.

Data collection and analysis

Semi-structured interviews were conducted by telephone from December 2011 – February 2012 by one author (BJB). Each informant received a copy of the policy timeline as an aide memoire. The interviews followed a broad outline to confirm each participant's relevant experience, understand their perceptions of past change and explore their ideas about future development. Pattern matching logic was used to test the explanatory value of the dominant paradigm of planned system change against complex responsive processes by comparison to the empirical reality. Each interview was transcribed in full, then analysed using

both codes developed at the local level of the case plus extensive free coding of concepts relevant to the policy perspective. Coding was undertaken by one author (BJB), with extensive discussion to test emerging themes and insights with the other authors: MFH and NZ as key participants in primary care policy; and JR for independent review of methodological soundness.

Ethics

The study was approved by the University of New South Wales Human Research Ethics Committee. All participants gave their informed consent to participate. To ensure personal confidentiality, views and comments are identified according to stakeholder perspective.

Results

For clarity we present the policy narrative as an initial framework, followed by interpretation of what had happened and what might happen in future.

The Policy Story

In November 1999 Commonwealth Department of Health and Ageing launched the Enhanced Primary Care (EPC) package for chronic illness and continued adding to it and fine tuning it over some eight years (Table 1). The first step introduced specific GP rebates for health assessments, case conferences and care planning, in addition to existing consultation-based items. Subsequent guidelines (RACGP, 2000) provided both a basis for educating GPs and standards against which use of the new items could be held accountable. A separate track supporting patient self-care was added. Local Divisions of General Practice,

already key facilitators of GP education, were specifically recruited to support EPC and incentives were introduced to encourage preparation of care plans, not just conduct of health assessments. A structured program for asthma care was also introduced.

Table 1: Policies for improved chronic illness care in primary care 1996 – 2007

1999	EPC: new Medicare Benefit Schedule items for patients with chronic illness, hailed as a success after 12,000 health assessments in the first four months.
2000	RACGP standards and guidelines kit for EPC items; self-management initiatives introduced: “Sharing Health Care” demonstration grants.
2001	Divisions funded to support practices in improving chronic illness care and using EPC items; incentive payments (within the pre-existing Practice Incentives Program for accredited practices for reaching targets for Care Plans; Asthma 3+ visit program for structured asthma care.
2002	“Red Tape” Review: Productivity Commission review of administrative and compliance costs for GPs resulting from policies relating to incentives and EPC (as well as to other government policies and programs).
2003	“Red Tape” report recommends simplifying incentives and EPC programs.
2004	EPC rebates accessible to allied health; simplification of administrative requirements for EPC.
2005	Continued funding for incentive payments for diabetes & asthma, for Divisions’ support for EPC and for improving mental health care using care planning; further simplification of EPC with new MBS items replacing originals.
2006	EPC extended to group allied health activities; review of mental health care plans.
2007	Items for geriatric assessments

These changes and associated regulations came on top of other government administrative requirements and led to considerable protest. There were calls from the Australian Medical Association (AMA) to scrap EPC altogether, although other national GP organizations disagreed. The government referred matters to the Productivity Commission, which recommended simplification. The item numbers were revised to work more simply and administrative requirements were eased, which, along with public endorsement of the thrust of EPC by many GPs, prompted a re-assessment by the AMA (Liondis, 2003). Allied health professionals gained access to EPC rebates and incentives and Divisional support continued. Care planning was extended to primary care mental health, and fine tuning continued through 2007.

All that change! Are we there yet?

Review of the policy story evoked acknowledgments from all informants at the volume of change: *“there’s been so much change” (GP)*; *“so much around chronic disease...” (GB)*; *“no wonder everyone feels a bit tired” (GP)*. Yet this was inevitably followed by paradoxical disappointment – that things were still far from ideal: *“no real reform...just tinkering around the edges” (HC)*; *“frustrated...things could have been better” (GP)*; *“you hope that something sticks” (GB)*. Their reactions were echoed in editorials in medical journals throughout the period (Jackson, 2006; Van Der Weyden, 2001). Looking back, the informants traced what had helped and what had hindered, but often nominated policies that pre-dated or were outside the scope of EPC (Table 2).

Table 2: Policies not specifically targeted at chronic illness and/or primary care with major impact on EPC

1975	Introduction of Medibank, later Medicare, health insurance, private fee-for-service model, opening opportunity for influence of general practice through funding arrangements
1975	Establishment of Commonwealth funded GP vocational training program, enabling later influence on GP workforce
1989	Vocational recognition of GP training through controlling access to higher rebates, strengthening Commonwealth influence on GP workforce.
1992	GP Strategy introduced practice accreditation (new focus on practice organisation) with subsequent practice incentive payments; regional Divisions for support, networking, coordination with state level health services; program to improve information management and technology.
1996	Coordinated care trials, arising from Commonwealth–State discussions to save resources by better coordination of care for individuals with complex health needs from both jurisdictions, though not specifically targeted at primary care.
1997	Immunization strategy, unrelated to chronic illness but providing a powerful model of “successful” multi-component policy intervention in GP.
2003	Practice grants and rebates for practice nurses to mitigate GP workforce shortages, particularly in rural areas, but enabling practices to build teamwork for care planning.

The nature of Medicare, with limited influence through insurance rebates, was a fundamental flaw from some perspectives (GB, HC), and different arrangements such as contracts would have offered greater control and more chance for successful reform. The GP perspective noted that, whilst vocational training and specialty recognition of general practice had provided the foundation for a primary care focus to improve chronic illness management, these policies had also been used to limit GP numbers to contain costs, so GP workforce was stretched to add new EPC activities to consulting tasks. One response to alleviate

workforce pressures was to provide grants to support practice nurses, which proved crucial to enable teamwork for better chronic illness care (GP, PN).

Adding to the sense of change fatigue, EPC was one outcome of a review of the decade-long GP Strategy (General Practice Consultative Committee, 1992; GP Strategy Review Group, 1998), which introduced practice accreditation and incentive payments, and the establishment of Divisions to facilitate regional support for general practice and interaction with other parts of primary care. Both of these were seen, however, as crucial foundations for improving chronic illness care through EPC. Less obvious was the contribution of the Coordinated Care Trials. Though seen as unsuccessful in achieving aims of cost saving through reducing fragmentation (Esterman & Ben-Tovim, 2002; Gardner & Sibthorpe, 2002) and as largely bypassing general practice, they provided learning that helped design EPC and changed the primary care environment:

And what I particularly recall at that time ... it was actually a very hard engagement process ... a lot of rejection, a lot of practices not interested, the uptake was pretty low.

What I find now, when we are going to discuss things with general practice around chronic care ... it's an easier entry to the discussion. You know, it's not a new idea, or a new discussion. (GB)

Also unrelated to chronic disease management was Immunise Australia, but it was raised by two informants (GP, PN) and figured noticeably in the practice level of the case. Its comprehensive strategy (Booth & Snowdon, 2007) was seen as successful and so raised expectations: “*when they introduced, for example, the diabetes and the asthma I thought yep okay we’re going to go for the same kind of model*

that we had with immunisation” (PN). This served, however, to accentuate disappointment with chronic illness programs: *“it was very bits and piecey and all over the place umm the chronic disease management stuff” (PN),* even though immunisation was acknowledged as simpler. By contrast, initiatives to transform information technology in general practice had started years before EPCThey were seen as vital for successful chronic illness care but remained incomplete and this was another source of disappointment: *“it’s all over the place, our systems don’t really talk to one another ... it’s not actually working yet” (GP).*

Further basis for the negative stock-take was a range of unintended consequences, for example:

neglect of health problems not specifically targeted for incentives (HC, GB);
empowering corporatisation of general practices through attempts to foster
amalgamation for greater team capacity and practice incentives to balance fee-for-service care (GP, HC); and
budget blow-outs from health assessments that did not flow on to planned care (GP, GB).

There was also, however, acknowledgment that unintended consequences could be beneficial: *“sometimes... you come up with ideas you mightn’t have thought of if you were going to be highly structured about how you were going to roll something out...”* (PN). And overall, there was a very clear awareness that primary care was operating very differently in 2007 than it had in 1996.

Everyday reality: money, power & politics

Every informant noted the role of money. Whilst acknowledging leadership from other organizations involved in education, support, consultation and advocacy, they looked to the Commonwealth for leadership because *“the financial remuneration of general practice is probably one of the most powerful drivers”* (GP). Yet there were reservations that health insurance rebates lacked precision:

“consistently paid people to write plans” (GB) rather than *“a funding model... that rewards outcomes rather than planning”* (GP). Nor were they comprehensive. The fragmented nature of health jurisdictions between Commonwealth and States restricted each one’s policy perspective to what was paid for and the funding model emphasised the transactional nature of the relationship, devaluing *“the virtuous side of people wanting to do the right thing”* (GB).

Power was another constant theme, but with a marked difference in interpretation among the various perspectives. Each tended to identify the power of others. Nursing, allied health, consumers and bureaucrats identified general practice as powerful, pointing explicitly to the gate-keeper role and the freedom to take up or ignore incentives. All health professional perspectives saw primary care as less powerful than secondary and tertiary care. They identified the power of government ministers, whilst also noting that power was open to influence from lobby groups:

“if you’re a minister you have to be seen to be doing something...chronic disease is offered to you as, as an area ... where there is opportunity to, to take action ... you know one should never underestimate the power of umm of the lobby groups ... be they disease focus

groups or population focus groups or even professional groups ...I think ...that those ideas that get adopted are not always necessarily the best... (GB);

“we’ve got a system where you can lobby ...so you lobby, lobby, lobby that’s it” (PN).

Bureaucrats were also seen as influential but their potential was frustrated by their transience, which undermined advocacy and consultation between stakeholders and government.

Getting it right

Looking forward, all informants became more positive and keen to articulate a successful future path. Each one, at some point, said *“if we could just get ...[it]... right”*. However, there was considerable difference of opinion about what “it” might be. For some, it was to get the fundamentals right – the underlying funding model and appropriate incentives. They disagreed on detail. From the GP perspective, the ideal was fee-for-service that provided *“a viable business and that the government believed in them”* (GP) with *“incentives that really work”* (GP). Others wanted more direct power, arguing that *“...if system is designed properly it will do what it ought to do”* (GB). Another ideal was to get the whole system in the room. Having all the players consulting together, with a unified vision, would greatly enhance capacity for successful change (GP, PN). But everyone wanted someone to take charge, someone with sound vision (GP, PN), who was objective and non-partisan (GB, HC), decisive (GB), but above all with power and authority (PN, HC, GB).

Yet, clearly, all were well aware of the unreality of this yearning for ideal, universal solutions, revealed in the interviews by hesitations, self-deprecating laughter and immediate provisos that acknowledged everyday reality:

“sometimes people want to hear an idealized thing... not the gritty reality” (GB)

“general practice is so varied there is no single truth...” (GB)

“one size doesn’t fit all... there’s lots of models of chronic disease management...” (HC)

“I think we never realised ... at the time of putting these things in place that they might work in some environments and not in others” (GP)

“you know, I don’t think we actually have a ... conventionally [recognizable] system... it’s actually thousands of individual providers responding to incentives” (GB)

Discussion

Pattern of policy

On the surface, the policy story matches the dominant discourse of planned system change. The increasing prevalence of chronic illness required re-design of primary care. Traditionally insular GPs reacting to episodic care should become leaders in provision of planned, proactive team care according to evidence-based practice. New multi-faceted EPC mechanisms were designed in consultation with key stakeholders, then introduced in stepwise fashion with financial incentives to leverage changed patterns of practice, with guidelines and standards for added control. The clear expectation inherent in this paradigm was that the re-engineered system would perform as predicted, echoed by the key informants

insistence on “getting it right”. Because the reality over a decade did not match this vision there was a general sense, and sometimes a public judgment, of failure, despite clear awareness of significant change in chronic illness care over the same period. This dissonance resulted in frustrations and disappointments among the informants.

However, complexity elements were also evident throughout the story. The path was *not linear*, but involved many influences and actions that often cycled back to reinforce or divert. *Sensitivity to initial conditions* was noted as prior policies and patterns of organising affected how new initiatives for better chronic illness care were conceived by planners and received by participants. *Co-evolution* was evident in impact of a workforce initiative to fund practice nurses on chronic disease management, and in the constraint of slow progress with information technology. Policy leaders experienced *edge of chaos dynamics* in the paradox of being in control but also not in control, of experiencing change fatigue and also frustration with lack of change. And *self-organization* leading to *emergence* of new ways of organizing primary care was evident in the pattern of responses and ongoing actions of individual providers, policy makers and health consumers.

Healthcare reform as complex responsive processes of relating

Seeing the policy story as this interplay of policy intentions and local interaction among the many participants in primary care is the perspective of complex responsive processes. It provides a better match to empirical reality than mechanical re-design. The intention of national policy leaders to influence chronic illness care in accord with growing evidence was expressed in the

powerful communicative gestures of financial incentives for new ways of working, aligned with explanatory rhetoric and educational support. GPs, allied health professionals, nurses, consumers and bureaucrats in regional jurisdictions responded, both enabled and constrained by the power inherent in all relationships, choosing and acting according to their personal ideologies and values. As new patterns of organising emerged, this “conversation” (Shaw, 2002; Suchman, 2011) of gesture and response evolved and took on a life of its own. Leaders continued to make highly influential communicative gestures without any actual ability to control responses, all the while responding in turn to the varied reactions of acceptance, rejection, distortion or ongoing lobbying. All informants were clearly aware of this everyday reality of the interplay of leaders’ policy intentions and local interaction. They readily identified the complexity elements in the narrative. Yet they also held the paradoxical, idealised view that it should be possible to “get it right”. This dissonance has potential consequences for policy leadership.

The sense of failure and frustration is stressful and unhelpful in itself. Policy leaders need courage and persistence to continue to participate in the interplay of intention and local interaction and live with the paradox of leadership without control (Streatfield, 2001). A sense of failure can also lead to premature closure of programs and initiatives, a communicative gesture that denies the agency of those responding positively and participating in change. The conversation sours. If one looks at all initiatives as communicative gestures among people rather than mechanical driving and leveraging of components in a system (Shaw, 2002), the overall tenor of policy discourse matters. Attempts to deny co-

evolution in the interest of clarity of focus can miss opportunities to harness developments in unrelated areas and overlook unintended consequences, both positive and negative. Evaluation needs an expanded repertoire (Shiell et al., 2008) beyond pre-defined process targets and idealized outcomes, through reviewing overall direction and timeline, seeking indicators of change outside a pre-determined trajectory and naming learning as an important outcome.

This case study is an early exploration into the aptness and value of seeing human organising in the search for healthcare improvement as complex responsive processes of relating. Our intent is to open up further conversation rather than to provide some new blueprint for achieving successful change. The focus is on one instance of policy reform for better chronic illness care from a range of perspectives, and not every issue raised nor depth of detail could be reported here. Yet from this particularity it is possible to glean insights into the human situation within primary care, even while being aware of the atypicality of the case (Stake, 2000).

Conclusions

The dominant way of talking about policy reform for healthcare improvement affirms design, control and predictability, even in the face of awareness that “getting it right” remains elusive. Understanding human organising as complex responsive processes of relating encourages a different discourse. Planning and policies are valuable communicative gestures, but everyday reality sees new patterns of practising emerge in the interplay of policy intentions and local

interaction: the power-relating and values based choosing, responding and acting of the many, many participants in primary care.

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5.4 Summary

At both practice and policy level there was change in line with recommendations for better chronic illness care. Key complexity elements were evident in each narrative. Participants experience and interpretation of what happened fit better with complex responsive processes of relating than with planned, systematic and predictable change.

Chapter 6:

Discussion and conclusions

Chapter outline

- 6.1 Introduction
- 6.2 Key complexity elements and human organisational change
- 6.3 Validity and utility of complexity theory in quality improvement
- 6.4 Insights and implications for ongoing improvement efforts
- 6.5 Robustness of findings
- 6.6 Conclusions
- 6.7 References

6.1 Introduction

The broad purpose of this research has been to enhance understanding of organisational change for quality improvement in primary care. I provided the rationale and context for such a purpose by reviewing the health care improvement literature – the development of traditional continuing medical education and the introduction of quality improvement and organisational change approaches from the business management sector. I noted that these evolved within a mechanistic paradigm based on the sciences of certainty – evidence-based practice and planned system change. Despite rapidly expanding research in the area, improved outcomes remained persistently modest, and I observed a sense of frustration that such a range of techniques did not seem to offer reliable prescriptions for predictable improvement. This had led some in the field to suggest the potential of a different, complexity perspective, which, though initially popular, seemed to require more rigorous exploration. As a consequence, I formulated my research questions to clarify what was relevant from the complexity sciences and how this concept might apply to quality improvement, to test its theoretical possibilities against reality, and to explore what novel and useful insights a complexity approach really offered.

In summary, the answers to these research questions were:

1. What are the key elements of the complexity sciences and how might they operate in human organisational change?

Paper 2 identified these as non-linear networks of agents and relationships exhibiting co-evolution to the edge of chaos, with emergence of order from

self-organisation, operating in human organising as complex responsive processes.

2. How apt is complexity theory to describe and explain empirical reality of organisational change for quality improvement in the Australian primary care setting?

Paper 3 and Paper 4 demonstrated that it is highly apt – complexity elements were readily evident and the theory of complex responsive processes added important explanatory value to understanding organisational change for quality improvement at both practice and policy level of Australian primary care.

3. What novel insights and implications does this approach offer for future improvement in Australian general practice?

An approach which views organisational change for quality improvement in Australian general practice as complex responsive processes (1) challenges the current emphasis on managing change; (2) encourages focus on communicative interaction and relationships in participatory leadership for improvement efforts; (3) highlights inherent unpredictability of outcomes from quality initiatives and so encourages constancy of purpose; (4) affirms the importance of awareness of the broad context in planning, implementing and evaluating quality initiatives; (5) validates the precarious position of participant leaders while emphasizing ethical dealing; and (6) offers a new perspective on change that can still value stability.

In the remainder of this final chapter I will expand in more detail on how my findings addressed these research questions and consider their significance within this context and purpose. I will examine the robustness and relevance of the research and where it might lead in future, then draw final conclusions in Section 6.6 to answer my overall research question: how might the new complexity sciences inform understanding of organisational change for quality improvement of chronic illness care in Australian general practice.

6.2 Key complexity elements and human organisational change

In the move by some scholars away from the foundational image of organisations as machines towards a new complexity perspective, I found considerable convergence in the literature about what were, in fact, the key elements of the complexity sciences. On the other hand, I also detected considerable divergence about how they might be used in talking about human organisational change.

Most writers identified common core elements (P. Anderson, 1999; R. A. Anderson & McDaniel, 2000; Kernick, 2006; Miller, McDaniel, Crabtree, & Stange, 2001; Plsek & Greenhalgh, 2001; Waldrop, 1992). The focus of complexity theory in organisational behaviour was on *networks of agents and relationships*. Relationships, both enabling and constraining, were important, making the whole greater than the sum of its parts. These networks exhibited *non-linear dynamics* where, unlike serial cause and effect arrays, small variations in initial conditions could amplify over time. Agents were continually acting and reacting with each other and with the whole – there was *co-evolution*, so parts of any network could not sensibly be

examined in isolation. The networks tended to be poised at the *edge of chaos*, where there was paradoxical stability and continuous change at the same time. Here, self-organised criticality and its power law of frequent small changes and occasional very large changes offered resolution of any false dichotomy between incremental change and whole system redesign, while introducing a disquieting unpredictability as to what response might occur to any specific stimulus. *Emergence*, the process by which complex but coherent patterned behaviours appeared from local interactions based on simple rules, contradicted ideas of mechanistic systems where objective planners designed and controlled the organisation from outside. Emergence was underpinned by the fundamental process of *self-organisation*, the tendency of such networks to develop coherent structure on the basis of local interaction, a process crucial to this way of understanding human organising.

Although these elements were commonly used in the literature of both organisational change and health care improvement, I observed considerable variation in how they were applied. The new and stimulating image of organisation as complex adaptive system seemed to resonate with experience, making it possible, even inviting, to draw fairly general parallels between complexity concepts and descriptive reviews of past change. Many writers tended to appropriate the new language to existing ideas, but in ways that missed the radical challenge inherent in the elements that I have outlined above. For example: exhortation for leaders to take an organisation to the edge of chaos to stimulate change contradicted the concept that the order and shape of the whole emerges solely from local self-organisation; and claims for the necessity for harmonious work relationships ran counter to the potential formative role of constraining relationships (Grobman,

2005; Lewin, Parker, & Regine, 1998). A recent review of complexity thinking in general practice literature revealed this tendency towards simple, even implicit, correlation between complexity ideas and descriptions of early developments in how general practice was conceived and differentiated as a medical discipline (Sturmberg, Martin, & Katerndahl, 2014). While many such approaches have been somewhat theoretical and transitory, a group of researchers in the United States elaborated and refined the metaphorical correlation between complexity sciences and improvement efforts in general practice more rigorously over a 15-year development program of empirical research (Crabtree et al., 2011; Nutting et al., 2011; Stroebel et al., 2005).

My concern for the loose application of complexity words and concepts has been echoed by other academics, who noted the spreading application of complexity thinking within health care in epidemiology, organisation, general practice and the clinical encounter, biomedicine and physiology and health social sciences (Rickles, Hawe, & Shiell, 2007). They have advocated precise usage of complexity concepts according to their originating mathematical and physical disciplines, while resisting the temptation to “psychologise” them (Paley, 2010). Yet in returning to meticulous usage of concepts in the original sciences they use terminology, such as objects, units and subunits, states, and variables, which seems to me to revert to a mechanistic image of organisations as mathematically determined dynamical systems. The human element is missing. The agents in health care networks are not simple, rule-following variables.

I found that a third way opened up in the correlations between the new complexity and well established social sciences (Byrne, 1998) which identified the potential of merging complexity thinking with existing knowledge of human interaction. This was the value I identified in the approach of researchers at the University of Hertfordshire Centre for Complexity and Management, which brought together both rigour in application of complexity science and appropriateness to human activity based on modern pragmatist sociology and psychology (Griffin, 2002; Shaw, 2002; Stacey, 2010; Stacey, Griffin, & Shaw, 2000). In drawing analogies from complexity sciences, they maintained the challenging behaviours of the key elements I had identified. In interpreting them through modern sociology and psychology they offered a more thorough and relevant understanding of human organizing. I therefore followed their approach and expanded on how key complexity science elements might operate as *complex responsive processes of relating*, where the agents in the networks were conscious, self-aware, emotional and social people. Their relationships, both enabling and constraining at the same time, were shaped by power inherent in social mores, hierarchy, politics and culture, including financial systems. They were engaged in ongoing communicative interactions where ideology and values shaped their intentions, choices and actions rather than predetermined, mechanistic rules. This local interaction, which retained all the unpredictability and paradox of edge of chaos dynamics, was the self-organisation from which emerged the order that was commonly named as the organisation. For example, what I identified as general practice in Australia was the pattern that emerged from such local interactions among many thousands of GPs, policy makers, practice staff and health consumers.

This more rigorous approach had resonated on a descriptive level with past experience of change in Australian general practice as I reported in Paper 2 (Booth, Zwar, & Harris, 2010). Other health care scholars have also begun to take up this merger of complexity elements with sociology and psychology, promoting the theory of complex responsive processes from a nursing perspective (Davidson, 2010) and challenging the metaphor of organisations as machines with a new metaphor of organisations as conversations (Suchman, 2011). Beyond simple descriptive correlation, Mowles, van der Gaag, and Fox (2010) used this theoretical approach prospectively and reported what happened over a two year service improvement intervention in the UK National Health Service. They set up reflective learning groups, in which health service staff and consultants were co-participants. Members considered their own experience of local communicative interaction and power-relating along with information from more systematic ways of looking at how the service was operating, for example clinical audits and patient surveys. The groups were explicitly not intended to propose solutions or plans for change, but were expected to help participants gain new insights into everyday work which might open up new possibilities for working differently.

This approach also revealed some of the challenges I saw as inherent in a more radical interpretation of complexity thinking within health care. Firstly, the complexity paradigm risked provoking immediate dissonance, due to its fundamental difference from the accepted cause and effect approach in health care that has, over many years, led to significant and positive advances in biomedical knowledge and medical treatments. Secondly, language from the social sciences in complex responsive processes of relating added to the unfamiliarity of this approach

and insisted on clear attention to the personal and political, rather than abstracting from the everyday fray using apparently objective and impersonal “tools” of quality improvement. Finally, the greatest drawback of this perspective on organisational change seemed to me that it was unequivocally not predictive within an industry that was explicitly seeking better blueprints for reliable success. Such a mismatch risked automatic rejection of its value in the context of this research into health care improvement. On the other hand, a very different perspective opened the possibility of a way around the impasse described in the introduction of increasing research effort without the expected improvement in outcomes. As a consequence, I concluded that *complex responsive processes of relating* provided a potentially illuminating response to my first research question: how key elements of the complexity sciences might operate in human organisational change.

6.3 Validity and utility of complexity theory in quality improvement

Having identified how complexity theory might operate in practice, I aligned my empirical investigation with the principles of this paradigm and pursued an interpretive exploration within local interaction in one general practice and among key participants at the national policy level of primary care. The embedded case study design was well suited to examining how change was occurring amid sustained quality improvement efforts for better chronic illness care in Australian general practice. It enabled explicit comparison with patterns predicated on complex responsive processes of relating and with more traditional quality improvement models, which emphasised systematic analysis of problems and their

causes, assessment of barriers and facilitators to change, and selection of one or more strategies from a range of improvement models based on effectiveness and context (Campbell et al., 2007; Grimshaw, Eccles, Lavis, Hill, & Squires, 2012; Helfrich et al., 2010; Kitson & Straus, 2010; Wensing, Bosch, & Grol, 2010).

At both practice and policy levels there was a mix of frequent smaller and occasional larger changes, typical of *edge of chaos* dynamics. I saw little evidence of steady continuous improvement in targeted areas, the typical pattern expected, for example, from Plan-Do-Study-Act cycles (Knight, Caesar, Ford, Coughlin, & Frick, 2012) nor of the clear cut, large scale system redesign advocated by others (Best et al., 2012; Doebbeling & Flanagan, 2011). While policy makers and practice GPs designed and implemented plans to improve chronic illness care, their actions were catalysed, diverted or even stymied by prior decisions or unrelated programs, making *co-evolution* readily observable. Quality improvement efforts did not occur in isolation from ongoing work in general practice and those involved in planning and implementing improvement efforts were also participants in the changing network, its relationships and local interactions. I reported evidence of *non-linearity* in the disproportion between actions and effects, with unpredictable trajectories from similar starting points. For example, the research audit at the practice led to dramatic improvement in Pap smear rates but little change in HbA1c, while at the national level Immunise Australia, EPC and IMIT all started with significant planning and political commitment but very different courses and outcomes. In these findings, I observed the sort of descriptive correlation between observation and complexity theory that was found by Crabtree et al. (2011) in their 15 year

program of research, that led them to understand general practices as complex adaptive systems.

Yet I found that *complex responsive processes of relating* – seeing new order emerge in this complex network of agents and relationships from local communicative interaction, power-relating and values based choosing and responding – added significant explanatory value to my observations and interpretations of the case study. The foundational ideologies of the practice partners influenced their responses to the audit data that showed suboptimal care. These values coloured their response to the new EPC items, though both GPs and the business manager also acknowledged the financial power of Medicare funding. Key policy informants speculated about the role of different values in shaping the responses of other practices to government incentives. The policy informants also readily identified power in relationships as a crucial factor in the evolution of primary care, though who had what power, and how much, was perceived differently from different stakeholder perspectives. The power inherent in all relationships, enabling and constraining at the same time, was more subtly evident in how the practice nurse became accepted and valued.

My findings about the new EPC item numbers and incentive payments provided a helpful focus to illuminate the different explanatory stances of planned health care improvement and complex responsive processes. The former perspective emphasised mechanistic design, often speaking of a range of improvement “tools” to “leverage” change (Ferlie & Shortell, 2001; Hutchison, Levesque, Strumpf, & Coyle, 2011; Rosenthal, Fernandopulle, Song, & Landon, 2004). If financial

incentives were conceived as one such lever to change the operation of the primary care system, then outcome assessment that showed little change implied poor design. The managers who assessed the system must have inaccurately analysed the current operation, the barriers and enablers for a new way of working, that would have allowed them to target the incentive correctly – to insert a correctly sized lever into the most efficacious position. This seemed to have two important consequences. First was an assessment of failure, so clearly reflected in the disappointment of the key policy informants that so much change had not resulted in an ideal system. I noted the same reaction in improvement literature – disappointment with persistently modest effects from an increasing range of improvement activities, followed by judgement that the design tool, in this case the evidence base for improvement, was inadequate (Alexander & Hearld, 2011; Grimshaw et al., 2012). The second consequence was often starting over with renewed commitment to “get it right”, preferably after more research and so a better evidence base, though with the corollary noted among the policy informants that this often involved cessation of the prior funding.

By contrast, incentives envisaged as “communicative gestures” were both more flexible and more nuanced, carrying considerable financial power but also inherent frailty. They could be ignored or rejected so easily. They were introduced into the ongoing “conversation” of primary care, the everyday local interaction between many participants with different values and power relations, as one communicative gesture among many. This perspective explained the variety of responses and the persistent limited effect size of most improvement activities, without postulating poor planning and failure. It also held open the potential for ongoing influence on

the “conversation” by continued engagement rather than withdrawal. New ways of organizing primary care for chronic illness emerged from this interplay of intentions, communicative gestures and responses, power-relating and values-based choices and actions of GPs, policy makers, practice staff and health consumers, both in one practice and nationally. Indeed, at the policy level of the case, one government bureaucrat essentially described emergence when noting spontaneously that primary care is not so much a system as thousands of health professional responding to incentives.

However, setting planned change against complex responses of relating would create a false dichotomy. None of my observations invalidated thoughtful planning and intending about how to improve chronic illness care. Rather, understanding human organising as complex responsive processes extended theories of change for improvement, both challenging the tightly focused, linear causal path of design, control and predictability, while enlarging understanding of organisational change as the broad interplay of intentions and very many local interactions.

Some scholars in the health care field have tended to converge, by somewhat different pathways, on the need to expand the scope and focus of research in change and improvement. Advocates of systematic translation of evidence into practice, in noting similar effect sizes across different interventions, have acknowledged the role of context as an explanation (Grimshaw et al., 2012). Others, influenced by the descriptive correlation between health care and complex adaptive system, have recommended explicitly investigating and reporting context in improvement studies, and using broader synthesis strategies for compiling the results of such

studies (Best et al., 2012; Tomoaia-Cotisel et al., 2013). Yet these approaches implicitly maintain the predictive, causal link that this new way of talking, researching and reporting should result in more reliable paths to intended improvements – that it remains possible to “get it right”.

My findings, however, reinforced the unpredictability of change. The informants themselves, while almost yearning for the possibility of “getting it right”, acknowledged this was not realistic, in line with the rigorous application of complexity principles. Non-linearity made sense of the practice partners’ inability to identify a clear pathway leading to their high quality chronic illness care, despite their clearly remembered will and intentions for such change. Co-evolution accounted for the intrusion of apparently unrelated events such as childhood immunisation into improvement efforts for management of older patients with long term conditions. The paradox of edge of chaos dynamics helped to understand the dissonance of participants feeling swamped by change while frustrated at not getting it right. Complexity science interpreted as complex responsive processes of relating provided a more theoretically sound basis to reconcile the frustrations and dilemmas that were persistently reported in efforts for continuous quality improvement. It explained why there were no magic bullets.

6.4 Insights and implications for ongoing improvement efforts

My exploration of the explanatory value of complexity science in the everyday reality of general practice revealed a number of significant insights, with implications for future action.

Firstly, complexity used as trendy jargon or loose metaphor is unhelpful – it adds little new to current understanding. And while more thorough theoretical and empirical development based on primary care as a complex adaptive system offers important insights, it still tends to persist with the idea of successfully managing change (Best et al., 2012; Crabtree et al., 2011), with its seductive corollary of “getting it right”. My findings, on the other hand, reveal the best fit with everyday reality is the more radical interpretation as complex responsive processes of relating, which challengingly refutes the claim that change can be managed. It seems to me to offer real newness. I would argue, therefore, that the complexity sciences should be interpreted through the existing depth and breadth of knowledge of individual and social human behaviour, that is sociology and psychology, as complex responsive processes of relating, in order to be useful to those engaged in quality improvement efforts for better chronic illness care in Australian general practice.

Secondly, attention is directed differently in this new way of thinking and speaking. Complex responsive processes of relating demands mindfulness of the relationships that make the whole greater than the sum of the parts. It is insufficient to focus on GPs or practice nurses or consumers or policy makers in isolation, ignoring or glossing over the power inherent in their daily interactions. Nor are they individual versions of generic categories – not variables, but persons in diverse social contexts holding particular values. This difference in discourse matters. This implies that researchers, policy makers, improvement champions and participants should give explicit consideration to the power and politics and ideologies that they both bring to, and find in, the local interaction of improvement efforts. Making these more

explicit can influence the tenor of the conversation at all levels and inform participation in ongoing quality efforts.

This is a significant departure from dominant ways of considering improvement activities, where there is considerable focus on developing instruments that enhance objectivity in decision making solely according to scientific evidence (Grimshaw et al., 2012). On the other hand, other researchers have begun to advocate the need for reflective space and facilitation to allow attention to relationships, diversity and holism (Crabtree et al., 2011; Stroebe et al., 2005). Taking this implication further, Mowles et al (2012) used learning groups that were facilitated to encourage explicit reflection on just such considerations in their complex responsive processes approach to a service improvement consultancy.

Thirdly, unpredictability is uncompromisingly central to any complexity approach, and is explicit in complex responsive processes of relating. Non-linearity and edge of chaos dynamics explain why practice nurse initiatives or conducting an audit or new Medicare items are not reliable levers to drive all the cogs in the primary care machine to change in predictable ways. This does not mean that the future is fixed, merely unknown. It does not imply that doing anything is as good as doing nothing, as the dominant discourse might interpret this approach (Grimshaw et al., 2012). In the ongoing conversation of communicative gestures and responses in general practice, practice nurse initiatives or clinical audits or new Medicare items are new voices or conversational facilitators or opening gambits which always offer the potential for radical change. For anyone trying to improve chronic illness care, even when there seems no immediate effect from policy or practice initiatives, this

offers encouragement to continue to fine tune communicative gestures, perhaps attending differently to both values and power in new gestures and responses, and to stay in the conversation. It supports the experienced-based principle of “constancy of purpose” proposed by one of the founders of modern quality improvement, W Edwards Deming (1986).

Fourthly, increasing interconnections in Australia between general practice and, for example, nursing and allied health professions, and federal and state funded health services, amplifies the scope of co-evolution. Traditional improvement efforts advocate a clear and specific focus, ignoring or intentionally countering the fuzziness of boundaries inherent in complex networks, in order to aid feasibility. However, too exclusive an emphasis on precise targeting takes away the context and ignores important parts of the network and relationships that can influence or be influenced by, what is going on. It can blind practice leaders, policy makers or researchers to possible tangential benefits and unintended consequences, or to seemingly unrelated actions that might need attention to facilitate progress (Shiell, Hawe, & Gold, 2008). Those involved in trying to improve should consciously seek to maintain peripheral vision when focussing on the area of interest and remain flexible in planning in response to everyday reality. Evaluations of policy or change efforts require an expanded repertoire beyond pre-determined process targets and outcomes. Randomised controlled trials are more helpful if they also include and report qualitative exploration of what is going on along the way to the measurable end-points (Tomoaia-Cotisel et al., 2013), and meta-analysis is expanded and enhanced by meta-narratives like that of Crabtree et al (2011) or by alternate methods such as realist review (Best et al., 2012).

Fifth, leadership in improvement is not by objective, powerful people removed from the fray but by participants in primary care networks as practitioners, consumers, policymakers and researchers who are concerned for improving chronic illness care. Such leaders are in an uncomfortable, precarious position, with influence and responsibility but no assurance of getting it right. Yet good leadership should include willingness to live in this tension of being in control and not in control at the same time. The inherent unpredictability of edge of chaos dynamics offers a caveat to the benefit of being strongly outcome focused, when specific results cannot be guaranteed. Attention should also focus on ethical dealing in the everyday present with no confidence that the end might justify dubious means. The leadership challenge of trying to improve involves balancing constancy of intentions with attention to local interaction. It is graphically presented by Westley, Zimmerman and Patton as exploration into an unknown future, where the leader is “going-forward-toward” the general vision of the destination, all the time alert for, and handling, more immediate concerns as well as possible, “sometimes neatly, but more often with a most precarious feeling of makeshift.” (2007, p.224)

Finally, complexity theory offers a new perspective on change. In both organisational behaviour and health care improvement literature, the dominant discourse seeks reliable prescriptions for change for improvement, with overtones that resistance to change is a negative force to be overcome. There is little reflection on the impact of constant change, nor what work might be like if highly reliable change formulae could be applied whenever research suggested that new ways of working were needed. The concept of edge of chaos challenges this value. The potential for new and coherent patterns at the balance point can tip over into

incoherent chaos. More is not always better with change. There is value in stability without resignation to inertia.

6.5 Robustness of findings

My findings have both strengths and limitations in answering the research question and stimulating some reflections on future actions and further investigations. The research question was intentionally couched in broad and somewhat tentative terms to match the exploratory nature of the work within what was, and still is, a relatively new theoretical field. My purpose was explicitly to contribute to an ongoing conversation and to enrich and inform understanding. I had no intention to offer any new kind of blueprint for more effective quality improvement, which would have contradicted fundamental elements of the complexity sciences. I developed my methodology for the empirical investigation to allow specific exploration of key complexity elements within the action to see how they might operate in human organising, in comparison with more traditional explanatory frameworks, rather than the more common comparison of complexity ideas with external observation of organisational change, as reported in Sturmberg et al's review (2014).

I would argue that the longitudinal, multi-level, multi-perspective exploration from within the experience of organisational change for quality improvement, for all its particularity, reveals commonalities which offer persuasive insights that have challenging implications for any participants in general practice who would like to exert influence for better chronic illness care. As with all qualitative research,

generalisability of those studied was not intended. Selection of both practice and key informants was purposeful and according to potential for learning. Yet the practice was not atypical in size, location, history or business structure. The key informants had at least ten years experience in primary care policy and spoke from a range of stakeholder interests. No-one was excluded and none of those approached refused to participate. While the case covered organisational change for quality improvement in general practice over a longer duration than many studies, this did not appear to challenge the recall of study participants but did offer sufficient time to discern the pattern of change. I would contend that it is not unreasonable to find commonalities with the participants, their experience and interpretations, and to learn from them.

6.6 Conclusions

I believe that this research has offered significant and challenging responses to my overall research question of how the new complexity sciences might inform understanding of organisational change for quality improvement of chronic illness care in Australian general practice. It has highlighted the limitations of the current improvement paradigm and explained unpredictable, often disappointing, outcomes after considerable and sustained efforts in local practice, national policy and research contexts.

I would argue that it has also offered insights and implications that open up new ways forward for participant leaders trying to improve chronic illness care. It has suggested diverting understanding of change away from idealised planning models,

easing frustrations with improvement efforts that do not reliably achieve what was wanted and potentially ameliorating anxiety about “getting it right”, in both practice and research. It has expanded attention and brought to notice the interplay of improvement intentions and everyday local interaction of communicative gestures, power relations, personal values, choices and responses of the many participants in Australian general practice. While it offers no formula for new ways of doing things to primary care, it does open up possible new ways of doing things within primary care.

Further research is needed to help to illuminate these possibilities. My insights about the importance of context in learning about quality improvement and change underline the value of case study as a method, since it so explicitly takes a wide-angled view. Looking at multiple practices that are making progress in changing how they deliver care to improve chronic illness management might help to discover commonalities between cases, while exploring practices struggling to make headway in attempts to change might reveal how and why they are stuck in older patterns of working. Particular areas in such explorations that might benefit from attention include the role of reflective capacity within practices and among participants, and explicit inquiry about power relations among different participants with different roles and stakeholder perspectives, such as nurses, allied health professionals and consumers.

A further step would be to undertake prospective studies of facilitation of reflective practice. I would argue, however, that my findings underline the value of using facilitators who understand and support complex responsive processes of relating,

ahead of simple correlation with complex adaptive systems theory. An intermediate but potentially useful research strategy would be to add intentional qualitative investigation and interpretation to prospective, intervention trials to explore contextual and relational factors of power, politics and values within the everyday local interaction as participants respond to the communicative gestures of the proposed quality improvement activities.

6.7 References

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Appendices

Appendix 1: Authorship declarations for published and submitted papers

University of NSW Authorship Declaration

In the case of the paper ***Safety and Quality in Primary Care: The View from General Practice***, contributions to the work involved the following:

Name	Contribution (%)	Nature of contribution
Barbara J Booth	80%	Overall responsibility for conception, literature review and successive drafts of paper
Teri Snowdon	10%	Contribution to conception, provision of data, contribution to revision of paper
Mark F Harris	5%	Contribution to revision of paper
Ron Tomlins	5%	Contribution to revision of paper


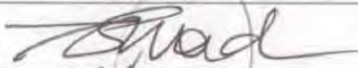
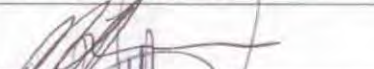

Declaration by co-authors

The undersigned hereby certify that:

- 1) they meet the criteria for authorship in that they have participated in the conception, execution, or interpretation, of at least that part of the publication in their field or expertise;
- 2) they take public responsibility for their part of the publication, except for the responsible author who accepts overall responsibility for the publication;
- 3) there are no other authors of the publication according to these criteria;
- 4) potential conflicts of interest have been disclosed to (a) granting bodies, (b) the editor or publisher of journals or other publications, and (c) the head of the responsible academic unit; and
- 5) the original data are stored at the following location(s) and will be held for at least five years from the date indicated below:

Location(s)

Centre for Primary Health Care and Equity

Name	Signature	Date
Barbara J Booth		24 /10 /13
Teri Snowdon		14/10/13
Mark F Harris		2/10/13
Ron Tomlins		17.10.13

University of NSW Authorship Declaration

In the case of the paper *A complexity perspective on health care improvement and reform in general practice and primary health care*, contributions to the work involved the following:

Name	Contribution (%)	Nature of contribution
Barbara J Booth	80%	Overall responsibility for conception, literature review and successive drafts of paper
Nicholas Zwar	10%	Contribution to revision of paper
Mark F Harris	10%	Contribution to revision of paper

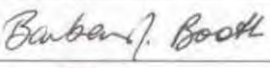
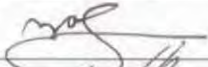

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- 5) the original data are stored at the following location(s) and will be held for at least five years from the date indicated below:

Location(s)

Centre for Primary Health Care and Equity

Name	Signature	Date
Barbara J Booth		24/10/13
Nicholas Zwar		2/10/13
Mark F Harris		2/10/13

University of NSW Authorship Declaration

In the case of the paper *Healthcare improvement as planned system change or complex responsive processes? a longitudinal case study in general practice*, contributions to the work involved the following:

Name	Contribution (%)	Nature of contribution
Barbara J Booth	80%	Overall responsibility for conception; design, analysis and interpretation of the data; and successive drafts of paper
Nicholas Zwar	10%	Contribution to conception, interpretation and revision of paper
Mark F Harris	10%	Contribution to conception, interpretation and revision of paper

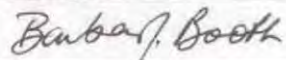
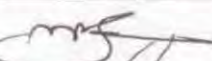

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- 5) the original data are stored at the following location(s) and will be held for at least five years from the date indicated below:

Location(s)

Centre for Primary Health Care and Equity

Name	Signature	Date
Barbara J Booth		24/10/13
Nicholas Zwar		2/10/13
Mark F Harris		2/10/13

University of NSW Authorship Declaration

In the case of the paper **Health policy and complexity in planning for change: the tension between “getting it right” and everyday local interaction in primary care**, contributions to the work involved the following:

Name	Contribution (%)	Nature of contribution
Barbara J Booth	70%	Overall responsibility for conception; design, analysis and interpretation of the data; successive drafts of paper
Jan Ritchie	10%	Contribution to interpretation and revision of paper
Nicholas Zwar	10%	Contribution to conception, interpretation and revision of paper
Mark f Harris	10%	Contribution to conception, interpretation and revision of paper

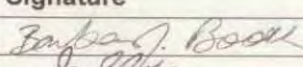
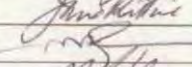
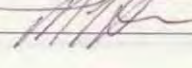

Declaration by co-authors

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- 1) they meet the criteria for authorship in that they have participated in the conception, execution, or interpretation, of at least that part of the publication in their field or expertise;
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- 5) the original data are stored at the following location(s) and will be held for at least five years from the date indicated below:

Location(s)

Centre for Primary Health Care and Equity

Name	Signature	Date
Barbara J Booth		29/10/13
Jan Ritchie		29/10/13
Nicholas Zwar		29/10/13
Mark F Harris		29/10/13

Appendix 2: Search strategy for literature review – health care quality improvement

Databases searched

Medline (biomedical)
EMBASE (biomedical)
CINAHL (nursing & allied health)
PsycINFO (psychology, medicine)
Cochrane Library (evidence-based medicine)

Search terms

Related to health care quality improvement

quality – assurance, – improvement. – management
CQI – continuous quality improvement
TQM – total quality management
knowledge translation, research dissemination, implementation science
audit, guidelines, indicators
education – continuing, – medical

Related to health care organisation

organizational/organisational – innovation, – culture
professional – practice, – management
health care – reform, – policy
physician practice patterns
health services research

Appendix 3: Search strategy for literature review – organisational change and complexity sciences

Databases searched

ABI/INFORM Global
Business Source Premier
ProQuest Central
WORKLIT

Search terms

Related to organisational behaviour

organization*/organisation* – behaviour, – science, – theory
organization*/organisation* – change, – innovation, – learning
health care organization/organisation
management

Related to complexity sciences

complex*
complexity – sciences, – theory, – theories
complex adaptive systems
complex responsive processes

Appendix 4: Practice level interview outline

Description of Practice

- physical characteristics
- patient characteristics – size, population characteristics, expectations
- history – how it started and evolved
- values

Organisation of Practice

- organisational structure – draw organisational chart
- group behaviour, dynamics
 - cohesiveness, autonomy, trust
- culture
 - orientation (business, staff, consumers, science, quality)
 - openness, attitude to change, innovativeness
- leadership, sense of vision

Organisational change 97–06 in CDM

- organisation for CDM – values, priorities, funding, role of government, professional organisations, DoGPs
- self-management support – attitudes, skills, resources
- delivery system design – who does what, reactive vs planned
- decision support – reminders, guidelines, expert advice, EBM
- clinical information systems – reminders, registers, performance monitoring
- community resources and linkages – programs and relationships

Appendix 5: Policy level interview outline

Introduction

In discourse (government, academic, professional) about improving healthcare, people talk about needing “system change”. In this project I’m seeking better understanding of this process of organizational change in general practice and primary health care in Australia. So far, I’ve been exploring this at the level of the individual general practice. Now I want to look at the broader perspective of the national policy context.

One of the main reasons behind this felt need for improvement is the increasing burden of chronic illness in our population, so my focus is the organizational changes suggested for better chronic disease management from about 1996, when an exponential increase in articles about chronic disease management heralded interest in “best practice” in the area. When I confirmed the time for this interview, I sent you a brief list of some key policy initiatives over this period to help anchor the discussion in this timeframe.

Description of involvement in GPPHC

Everyone has a different breadth and depth of engagement with GPPHC during this time, so would you start by giving me a brief outline of your role and experience in the period from about 1996?

Organizational change in GPPHC – the past

Now I want to hear your impressions about how general practice and primary health care has changed in relation to managing chronic illness 1996 to the present. For example, one current popular model is Wagner’s model:

organisation for CDM – values, priorities, funding; self-management support – attitudes, skills, resources; delivery system design – who does what; decision support – reminders, guidelines, expert advice, EBM; clinical information systems – reminders, registers, performance monitoring; community resources and linkages – programs and relationships.

What sense did you have of a plan to transform general practice / primary health care in line with this model or others like it aimed at improving chronic disease management? Who seemed to be planning this change, what elements were most influential or successful?

Organizational change in GPPHC – the future

Now I want to look to the future, which is still highly motivated by the challenge of the burden of chronic illness. What might be critical for success? How do you see that evolving?

Particular focus areas to stimulate discussion:

- integration of care between commonwealth and state eg aged care, community care, GPPHC
- multidisciplinary / multi-professional care within practices eg practice nurses,
- multidisciplinary / multi-professional care across providers eg allied health, community linkages
- better information management
- enrolment of patients with chronic illness
- safety and quality, cost reduction

We've talked a bit about what should happen – do you think it is going to happen like this?

Appendix 6: Practice level information and consent forms

THE UNIVERSITY OF
NEW SOUTH WALES



SCHOOL OF PUBLIC HEALTH &
COMMUNITY MEDICINE

Improving Care: Case studies of organisational change in general practice
Investigators: Dr Barbara Booth, Professor Mark Harris, Prof Nick Zwar

Participant Information Statement

You are invited to participate in this study of how and why practices find it easier or harder to change how they deliver care for chronic illness in order to improve outcomes for their patients. Your practice was selected because of its reputation for innovation and high quality care.

Dr Booth is undertaking this research for the degree of Doctor of Philosophy at the University of New South Wales, supervised by Professor Harris. We hope it will help develop better understanding of quality improvement efforts within the real-world general practice context in Australia.

The research will involve several visits by Dr Booth to your practice at times arranged to suit you and cause least disruption. There are several purposes for the visits:

- Interviews with staff to explore how the practice works and how you are responding to the current environment of public focus and government initiatives in the area of chronic illness management. Each interview will take about 30–45 minutes.
- Observation of the practice – its systems, documents and procedures – to get a feel for how it works in addition to the formal interviews.
- Observation of staff meetings and any discussions about chronic disease management in the practice.

With your permission, the interviews and practice meetings will be recorded on audio-tape, but these will be destroyed after making careful notes. All the discussions and observations will be confidential and will be disclosed only with your permission or except as required by law. If you give us your permission by signing this document, we plan to publish the results in journals and present them at conferences. We will ensure that such publications do not contain any information that could identify you or your practice.

We will provide reimbursement to your practice for the costs of staff time spent in participating in this research, up to \$1000 (GST included) per practice.

If you would like more information, feel free to contact Dr Booth – telephone 02 9385 3502, email bj.booth@unsw.edu.au, who will be happy to answer your questions.

Your decisions whether or not to participate will not prejudice your future relations with the University of New South Wales. If you decide to participate, you are free to withdraw your consent and to discontinue participation at any time without prejudice.

Complaints may be directed to the Ethics Secretariat, University of New South Wales, SYDNEY, 2052, Australia (phone 02 9385 4234, fax 02 9385 6648, email ethics@unsw.edu.au)

You will be given a copy of this form to keep.

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Improving Care: Case studies of organisational change in general practice
Investigators: Dr Barbara Booth, Professor Mark Harris, Prof Nick Zwar

Consent form

1. I.....of.....
.....agree to take part in the study described in the Participant Information Statement.
2. I acknowledge that I have read and understood the Participant Information Statement, which explains why I have been selected and the aims of this investigation. I confirm that the statement has been explained to me to my satisfaction.
3. Before signing this consent form, I have been given the opportunity to ask any questions relating to the study. I have received satisfactory answers to any questions that I have asked.
4. I understand that my decision to participate is voluntary and that I am free to withdraw at any time without prejudice to my relationships to the University of NSW.
5. I agree that the research data gathered from the results of the study may be published provided that my name and the organisation that I work for are not identified in any way.
6. I understand that if I have any questions relating to my participation in this research I may contact Dr Barbara Booth, School of Public Health and Community Medicine, University of New South Wales, Sydney 2052. email: bj.booth@unsw.edu.au
7. I acknowledge receipt of a copy of this Consent Form and the Participant Information Statement.
8. Complaints may be directed to the Ethics Secretariat, University of New South Wales, SYDNEY 2052, Australia (phone 02 9385 4234, fax 02 9385 6648, email: ethics.sec@unsw.edu.au)
9. Please PRINT name of participant:.....
10. Signature of participant: Date:
11. Please PRINT researchers name:
12. Signature of researcher: Date:

Appendix 7: Policy level information and consent forms

THE UNIVERSITY OF
NEW SOUTH WALES



Centre for Primary Health Care
and Equity

*Improving Care: Case studies of organisational change
in general practice and primary health care
Approval number: HREC 5052*

Investigators: Dr Barbara Booth, Professor Mark Harris

Participant Information Statement

You are invited to participate in this study of how and why practices find it easier or harder to change how they deliver care for chronic illness in order to improve outcomes for their patients. You were selected as a key informant in the current Australian General Practice and Primary Health Care environment because of your position as

Dr Booth is undertaking this research for the degree of Doctor of Philosophy at the University of New South Wales, supervised by Professor Harris. We hope it will help develop better understanding of healthcare improvement and reform efforts within the real-world Australian context.

The research will involve an in-depth interview conducted by Dr Booth at a place and time convenient to you. The interview will last approximately one hour. It will be conducted in person or by phone, depending on your availability and logistic constraints.

With your permission, the interview will be digitally recorded, but will be erased after making careful notes. All the discussions and observations will be confidential and will be disclosed only with your permission or except as required by law. If you give us your permission by signing this document, we plan to publish the results in journals and present them at conferences. We will ensure that such publications do not contain any information that could identify you individually.

If you would like more information, please do not hesitate to contact Dr Booth – telephone 0409 778 175, email bj.booth@student.unsw.edu.au, who will be happy to answer your questions.

Your decisions whether or not to participate will not prejudice your future relations with the University of New South Wales. If you decide to participate, you are free to withdraw your consent and to discontinue participation at any time without prejudice.

Complaints may be directed to the Ethics Secretariat, University of New South Wales, SYDNEY, 2052, Australia (phone 02 9385 4234, fax 02 9385 6648, email ethics.sec@unsw.edu.au)

You will be given a copy of this form to keep.

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*Improving Care: Case studies of organisational change
in general practice and primary health care*

Investigators: Dr Barbara Booth, Professor Mark Harris

Consent form

1. I.....of.....
agree to take part in the study described in the Participant Information Statement.
2. I acknowledge that I have read and understood the Participant Information Statement, which explains why I have been selected and the aims of this investigation. I confirm that the statement has been explained to me to my satisfaction.
3. Before signing this consent form, I have been given the opportunity to ask any questions relating to the study. I have received satisfactory answers to any questions that I have asked.
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5. I agree that the research data gathered from the results of the study may be published provided that my name and the organisation that I work for are not identified in any way.
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9. Please PRINT name of participant:.....
10. Signature of participant: Date:
11. Please PRINT researchers name:
12. Signature of researcher: Date:

The University of New South Wales
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