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Motivations for the Adoption of Chronic Disease Information Systems in General Practice

Daniel Carbone

School of Rural Health, Faculty of Medicine, Dentistry and Health Sciences
University of Melbourne, Australia
Daniel.Carbone@bigpond.com

Stephen Burgess

Centre for Tourism and Services Research
Victoria University, Australia
Stephen.Burgess@vu.edu.au

Abstract

The purpose of this paper is to highlight the key motivational factors that lead to the successful implementation of Chronic Diseases Information Systems (CDISs) in twenty eight general practices in a case study of a large general practice division network in Australia. The literature identified three major areas of CDIS motivation: patient care gap motivator, internal motivators and external motivators. Patient care emerged as the most important motivation for adopting CDIS, followed by risk management and financial incentives. However, the study also determined that the motivational forces are inter-related and suggests that the decision to adopt CDIS should consider a number of these identified factors.

Keywords

Health Information Systems, Motivational factors, Chronic Diseases, Primary Care, Socio-technical theory,

Introduction

Chronic diseases (CDs) such as cancer and cardio-vascular, diabetic and respiratory conditions are by far the leading cause of mortality in the world and represent 60% of all deaths. Out of the 35 million people who died from chronic disease in 2005, half were under 70 and half were women. Furthermore, 338 million people are expected to die of chronic conditions over the next ten years (WHO 2008b; WHO 2008a; WHO 2008c).

According to the World Health Organisation, many of these diseases can be prevented, but health care systems do not make the best use of their available resources to support the prevention process. All too often, health care workers fail to seize patient interactions as opportunities to inform patients about health promotion and disease prevention strategies. Furthermore, most current health care systems are

based on responding to acute problems, urgent needs of patients, and pressing concerns. The hallmarks of contemporary health care are testing, diagnosing, relieving symptoms and expecting a cure. While these functions are appropriate for acute and episodic health problems, a disparity occurs when applying this model of care to the prevention and management of chronic conditions. Preventive health care is inherently different from health care for

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acute problems, and in this regard, current health care systems worldwide fall remarkably short (WHO 2008b).

The World Health Organisation further suggest that well-designed, locally relevant and sustainable clinical information systems (IS) are essential if the goal of coordinated long-term care is to be achieved. They enable the organization of patient information, tracking and planning of patient care, provision of support for patient self-management, and scheduling of patient follow-up. These systems are especially effective when they encourage communication between clinical team members and patients (WHO 2008c).

However, motivating doctors in primary care settings to implement current clinical best practice and information technology (IT) supported systematic approaches to chronic condition care has so far proven illusive (Grol et al 1998; Department of Health and Aged Care 2003; Gross, Leeder and Lewis 2003; Schuster, MD, MD, MSN, CAC, Debra S. Swayngim, RHIA, CAC and Keith Y. Kohatsu 2003; AIHW 2006; HealthConnectSA 2007; Nader 2007).

In Australia, for example, the last few years have seen strong calls and financial incentives from the Federal Government for the application of technological advances to contain escalating health costs (Health Insurance Commission 2003; Australian Institute of Health and Welfare 2004). These incentives resulted in considerable uptake of computers, but failed to translate in the actual use of those technologies for systematic care (Richards, Bolton, Veale and Quinlan 1999; Littlejohns, Wyatt and Garvican 2003; Sturnberg, Martin and Pittman 2003; Van Der Weyden 2003; Coiera 2004; Lorenzi 2004). In short, technological and financial approaches have failed to motivate a shift in current practice. And although there at least almost fifty theories in use in the information systems field alone (Schneberger and Wade 2006) the motivational forces that lead to successful implementation and adoption of Information systems in health settings for the prevention and management of chronic diseases in primary health care settings are not well known.

This article discusses the motivations behind the implementation of a chronic disease information system (CDIS) in a number of general practices that are part of a particular general practice network in Australia.

Literature Review

An important part of the discussion in this article is an examination of the different approaches to health care.

Evidence-based medicine is a rather young concept that entered the scientific literature in the early 1990s. Its focus is on offering clinicians the best available evidence about the most adequate treatment for their patients. ...Patient-centered medicine, although not a new phenomenon, has recently attracted renewed attention. ... It puts a strong focus on patient participation in clinical decision making by taking into account the patients' perspective, and tuning medical care to the patients' needs and preferences.

(Bensing, 2000: 17)

Binsing (2000) goes on to add that evidence-based medicine is *disease-oriented*, not *patient-oriented*. The other major difference is that general practitioners (GPs) build capacity on the treatment of diseases by evidence from large clinical trials, not necessarily from building experience by treating patients themselves (although obviously the two are not mutually exclusive).

The advent of evidence-based medicine, as opposed to acute care models, and in particular the production of best practice clinical guidelines, has been a significant recent advance in medical practice. However, a consistent finding in health services research is the gap between the evidence and actual medical practice (Bodenheimer 1999). Studies show that 30 to 40% of patients do not receive care according to current scientific evidence, while approximately 20% of the care provided is not needed or is potentially harmful (Grol et al 1998; Schuster et al. 2003). Research into the barriers to uptake of evidence identifies such barriers to be multifactorial: professional (knowledge, skills,

medico-legal concerns), social (peer influence) and organisational (time constraints, complexity, financial) (Grol and Grimshaw 2003).

This premise begs the questions: what are these clinical ‘shifts’? How can information systems support them? The health literature tells us that the adoption of technology-supported systematic approaches in primary (direct to patient) care require a major shift in current medical care approaches (Chew and Van Der Weyden 2003; Rust and Cooper 2007). Wagner, a prominent chronic diseases care advocate, suggests that the effective interventions tend to fall into one of five areas (Wagner, Austin and Korff 1996; Wagner 2000):

1. *The use of evidence-based, planned care:* An information systems implementation could easily provide the necessary evidence to clinicians, extracting medical data from their electronic health records (if available) in a usable form, and presenting the clinician ‘evidence’ for the need to alter medical treatment based on internationally valid medical protocols developed for the care of chronic disease sufferers. The planned care can easily be organised in an automated and systematic way through the use of electronic recall and reminders (White 2000; Grimshaw, Thomas, Maclellan and et al 2004; Mittman 2004).
2. *Reorganization of practice systems and provider roles:* the use of team approaches in chronic disease information systems (CDIS) care is well documented in the health literature, providing and supporting specific roles to nurses, practice managers and administrative staff so that all make a contribution to the patient’s care (Ash 1997; White 2000; Schuster et al. 2003; Lorenzi 2004; Oldroyd, J. Proudfoot, F. Infante, G. Davies, T. Bubner, Chris Holton, J. Beilby and Harris 2003).
3. *Improved patient self-management support:* CDIS can produce instant electronic management plans and supporting care-educational literature to support the patient outside the practice (Grimshaw et al. 2004).
4. *Increased access to expertise:* CDIS should be able to provide easy access to referral templates for clinicians to use to refer patients to the appropriate specialist as well as ready made decision support systems for diagnosis, prevention and management of CDs (Schuster et al. 2003).
5. *Greater availability of clinical information:* CDIS should be able to efficiently collate all the relevant clinical patient information for the clinician as required (Mittman 2004).

In this article we are interested in the motivations for general practices to adopt information systems that support the use of evidence-based, planned care. A discussion of the motivations is particularly crucial if we take into account that the central assumptions of the evidence-based medicine paradigm *may not be shared* by all general practitioners, making its application in general practice a particular challenge (Tomlin, Humphrey and Rogers 1999; Department of General Practice 2001). Some GPs regard clinical evidence as a ‘square peg to fit in the round hole’ of the patient’s life (Freeman and Sweeney 2001)

Motivational factors driving change in general practice

The literature suggests that affecting change in any organisation is at best extremely difficult. Logical reasons for change do not appear to automatically translate into change in behaviour or practice for a variety of reasons and this is just as true in primary health care settings (Grol and Grimshaw 2003 ; Liaw and Humphreys 2006; HealthConnectSA 2007). The literature also suggests that although a number of ‘business’ models for information systems in primary care have existed for a while, the focus of implementations has mainly been on the advantages that the technology brings to general practice. Hence, development and implementation models for general practice have been ‘*technology driven*’; traditionally tending to see the implementation process as a technical matter removed from organizational dynamics (Coiera 2004). Nevertheless, it is generally accepted that the traditional technical approaches are not adequate to understand the process of implementation of information systems (Alter 1999). There is substantial agreement that the success of implementing information

systems is determined by more *socio-technical* factors (Skidmore and Eva 2004; Mumford 2006; Noyes and Baber c1999); even though it is less clear what these factors are (Aarts, Doorewaard and Berg 2004). This is all in addition to the difficulties that can be faced when trying to implement an *evidence-based* system as described in the previous section.

The following sections identify different motivators for the adoption of CDIS in general practices.

Patient motivator

As described earlier, *this motivator* for the adoption of CDIS is concerned with the identification of a CD care problem or evidence of a gap in care. There is growing evidence that there are serious problems with the quality of care that patients with chronic conditions receive; with some studies suggesting that only 20 to 50% of people with common chronic conditions are under adequate control (Institute of Medicine 2001; Solberg 2003; Veale 2003). There appears to be often little 'translation' of the problem from the world of academic research to the practice level. This is also supported by the literature where it is estimated that it can take up to 17 years for clinical evidence to be put into practice at the GP level (Balas and Boren 2000). Thus, the chance to introduce a system which could be seen to streamline this process would be seen as being desirable.

Patient Needs motivator

In an Australian study, GPs believed that some patients want them to take overall control of their condition, listen to and help them deal with their problems (not just treat their symptoms), educate them, and, for older patients, provide social contact. Patients also want their GP to ensure they have an adequate quality of life. GPs felt that this placed great pressure on them (Oldroyd et al. 2003). There are new social expectations of health care, scientific cures and technological advances (Kearley K., Freeman G. and Health A. 2001; Sturnberg et al. 2003); as well as ageing populations and less community cohesion and social support (Gross et al. 2003; Sturnberg et al. 2003; Jack, Boseman and Vinicor 2004). Even the Internet has become a challenging medium often used by patients to question GPs on possible diagnosis and treatments.

Interestingly, some GPs believe that the patient will not change their unhealthy behaviour (Ward 1991). They have described how patient compliance, motivation and capacity influence the type of care given: 'In chronic care, you need the cooperation of the patient; it's a team effort involving the practice and the patient.' Factors such as the severity of the patient's condition, his/her social situation, level of education and attitude towards the illness all need to be taken into account (Oldroyd et al. 2003).

Internal motivators

Internal motivators are present when the push for the adoption of a CDIS is from within a practice or GP network. Typically, these motivators are based on the personal values and beliefs of GPs, since they are typically the ones to make strategic decisions at this level. At the centre of general practice is the fundamental principle of patient care. Oldroyd et al (2003), in a study of Australian GPs' perception of chronic care, found that GPs saw themselves as coordinators of care as well as advocates for patients; including educating them about their illness, helping them to understand specialist recommendations and working in partnership with them. Some GPs talked about a tension between the GP as a businessperson, the GP as a patient support and the GP as an evidence-based clinician. Some even indicated they try to avoid chronic-disease care and to dissuade prospective patients with chronic diseases from coming to the practice (Oldroyd et al. 2003). On the other hand, GPs also felt that chronic care was rewarding because it enabled them to get to know their patients better, they could prevent complications and their patients appreciated them and felt happier. Patients also seem to come to terms better with the seriousness of their illness (Oldroyd et al. 2003). Also, a GP 'business' does not subscribe to the bottom line alone. Thus, decisions about processes within the practice are also influenced by 'clinical level' strategic decisions. These are well recognised in the health literature; for example, Ralph Audehm, a well known GP, academician at Melbourne University (Australia) and clinical systems promoter, outlines a number of researched strategic questions that GPs will ask themselves to make sense of the challenges at hand. For example, some of these are (Audehm 2004):

- Is it important? (Burden of illness)

- Am I likely to be effective? (Role, impact)
- Can I make the outcome visible? (Feedback, observable/measurable)
- What will assist getting a quick return (reward/reinforcement)
- Is it desirable (win-win, all stakeholders)
- Is it doable? (Realistic)
- Can we make it a routine part of practice? (Sustainable).

These multiple ‘bottom lines’ must be taken into account within the motivational framework to be able to effectively motivate GPs (Sturnberg et al. 2003; Lorenzi 2004).

Another important factor to take into account is that GPs can be very wary of investing resources into their practices, and sometimes with good reason. Much of what is ‘pushed on them’ by external bodies (including Governments) is not necessarily of benefit to them. For example, many of the benefits of the introduction of information technology in general practice accrue to *other sectors* of the health system, such as hospitals and pathology companies, rather than directly to the practice (Richards et al. 1999).

However, GPs are not the only players to influence strategic decision making and developing awareness at the internal level, for example, ‘Local champions’, such as practice managers in larger practices, are an important feature of systems in the literature, who must also actively and enthusiastically promote the system, build support, overcome resistance, and ensure that the system is actually installed and used (Ash 1997).

A possible key motivator for GPs might be the use of CDIS to avoid litigation caused by inefficiencies, such as ineffective recall systems (Jessee and Morgan-Williams 1987). Effective CDIS can put backup systems in place that patients are reminded about being screened for the existence of chronic conditions at suitable intervals.

In summary, internal motivators are one of the keys to creating effective awareness of the issues at the strategic level. A user of the framework must be able to understand those forces and situations to gain an insight into the practice’s readiness for change.

External motivators

External motivators are present when an external body provides incentives or direction for the introduction of CDIS. The offer of financial incentives (by health authorities) for the completion of pre-determined cycles of care to individual chronic disease sufferers can be important. For example, if an Australian GP performs a six month and a one year review of a diabetic patient, by way of taking certain measurements and performing certain blood tests to control the disease, the GP gets an extra amount of money on top of the normal consultation. These Practice Incentive Payments (PIPs) promote integrated delivery systems through the use of practice guidelines; preventive care interventions and disease management programs (Department of Health and Aged Care 2003).

Another important external factor involves other professional bodies, which can play a determinant role in motivating practices to act on perceived shortcomings. Bodies like the Australian General Practice Accreditation Limited (AGPAL) are providers of quality improvement that support primary care practice teams to increase efficiency, reduce risk and stay current with trends and best practice (AGPAL 2005). Practices seek accreditation as a way of showing their customers (patients) that there is an appropriate standard of care at their practice.

As already suggested, government forces can also influence adoption of information systems in general practice. The Australian federal government encourages larger practices through its Link program as a means of achieving modernisation, economies of scale and co-location of health services. In 1998/99, an incentive payment to encourage mergers between small practices was introduced (Wooldridge 1998).

In Australia, General Practice Networks have been instrumental in commencing the attitudinal and cultural shifts necessary at the local level for general practitioners to comprehend the potential uses of information technology (Richards et al. 1999; Health Insurance Commission 2002; Department of

Health and Ageing 2004; Department of Health and Ageing 2005). The establishment of these networks (previously known as ‘divisions of general practice’) has helped to break down the historical isolation of general practitioners from other parts of the health system (and from each other). Through these networks, general practitioners are able to explore the benefits of information sharing within the context of emerging team approaches to the care of individuals and communities, and to address issues of confidentiality, privacy and consent (Richards et al. 1999).

Methodology

In order to examine the motivational factors outlined in the previous section, a case study approach has been adopted – with an Australian general practice network being the foundation of the case. This approach allows collected data to be analysed, either to build up or to validate or theories, typically through collection of textual data through interviews (Burns 1990; Nereu, Kock, McQueen and Scott 2000; Yin 2003). The data collection technique used in this study was primarily semi-structured interviews. In this specific instance the analysis involved a comparison of the views of 28 general practices in the network as to the motivations behind their adoption of CDIS, which were subsequently compared back to the literature.

Research approach

This study involved a socio-technical exploratory approach to identify potential motivating factors for the adoption of CDIS via a literature review (as already identified) (Stahl 2007). In this study, preliminary interviews were carried out with practice managers in 10 general practices within the general practice network region, where at least one CDIS had been used for more than three years. A second, larger data collection phase, then examined the views of different stakeholders in addition to practice managers: GPS, nurses and staff. The population characteristic of the practices and individuals tested in the study is shown in Table 1.

Table 1: Demographics of data collection

Number of Practice in General Practice Network	38
Number of practices examined	28 (75% of network)
Number of practice managers interviewed	13
Number of doctors interviewed	10
Number of nurses interviewed	6
General staff interviewed	7
Total interviews	36 (average 1.3 interviews per practice)

Results

In the preliminary data collection phase, ten practice managers were asked about their motivations for the adoption of their CDIS. In this question they were asked to rate (from 1 (important motivator) to 6 (lowest motivation)):

- One patient care gap motivator (patient care)
- Three internal motivators (risk management, insurance to minimise risks and involving staff), and
- Four external motivators (the support of the general practice network, the need to be accredited, general government influence and financial incentives for adoption).

The average ratings of their responses are shown in Table 2.

Table 2: Ratings for CDIS motivators

Motivator	Classification	Average Rating
Patient care	Patient needs	1.67
Risk management	Internal motivator	2.00
General practice network support	External motivator	3.56
Accreditation issues	External motivator	4.33

Wanted to involve/ include staff	Internal motivator	4.78
Financial incentive (PIP)	External motivator	5.22
Government influence	External motivator	5.67
Insurance incentive (to minimise risk)	Internal motivator	5.78

The two clear motivators from the preliminary phase of the study were patient care (the one 'patient needs' motivator listed) and the need for risk management (an internal motivator). The other factor considered (on average) to at least be of 'some importance' was support by the general practice network itself. It was interesting to the authors that, even though practice managers were not GPs, they still rated patient care so highly even though they were generally employed to manage the 'business' side of the practice.

In the main data collection stage, further interviews were conducted and the different stakeholders were asked again rate the different motivations for adopting CDIS. All of the other categories of stakeholders (GPs, nurses and general staff) rated patient care as the most important motivation. Different reasons for ranking patient care. For instance, one GP suggested that it is embedded in the practice:

My first ranking would patient care because it was fragmented and buried within the practice... so that's number one.

Another GP suggested that patient care is rated so highly because:

...what you're trying to do is do the best for your patient with chronic condition...

Once again, the second highest rated response was Risk Management. This comment from a GP highlights the possible threat of litigation.

I don't really recall that our practice took a different view on more assertive Cervical Screening than it took to more assertive CD management in general. Maybe conversely if there was a driver it was owning our own recall systems, the driver was the Medical defence industry and MDAV in particular and their risk management programs highlighting cervical screening systems as being one of the more evident causes of medical litigation.

At this point it could possibly be argued that 'risk management' actually is an external motivator – as the threat of litigation does come from outside of the practice.

After the main data collection occurred, financial incentives rated higher overall than it did just for practice managers. One GP actually rated financial incentives higher than patient care. It was also rated highest by a practice manager. One general staff member commented:

Financial of course, they are Doctors aren't they?

The need for accreditation was the next highest rated motivation.

However, some of the comments suggested that the task of rating or ranking the motivations is not quite as simple as it might seem. Here, although a GP rated patient care as the most important factor, there is a rider...

Number one is patient care, I mean...it has to be a good idea and it has to be plainly demonstratively good for the patient, there is no point in doing anything if it is not good for the patient, in conjunction to that it has to be of benefit to me...taking on a new initiative costs me a bucket of money and not be rewarded I am not going to do it.

These comments from a GP and a nurse highlight the interrelationships:

I guess back then it was driven by risk management issues, financial incentives, which gets back to accreditation but then all integrates into patient care but I think you have got to be convinced that something is worth doing and basic things like these are worth doing

I think it's a bit of each (on the list of motivators) For me... from my point ...of the clinic, I think we need consistency, so that if the patient sees one doctor and then see another doctor we can be more consistent...sure for accreditation purposes we want to keep our information up-to-date, but I think we really need to make sure we're screening...I think we need get them

all so we can treat them to the best of our ability and make sure they're getting the best of care...and if we do it across the board so everyone... (gets the care)

In summary, the data collected suggests that the motivational forces tend to be inter-related. However, a much higher influence is asserted by patient care. This was well supported across all practice types and different stakeholders. However, interviewees were very clear to point out that patient care must conform to financially sustainable models and be facilitated by workforce and infrastructure factors.

There are two points to make here: one is that an approach to implementing a chronic disease information system in general practice must be able to tap into these motivational forces as a complete solution, catering to the perceived needs of stakeholders. The second is that evidence based analysis is crucial to create awareness in individuals of the 'gaps' in care affecting chronic disease patients.

Conclusion

This article identified different categories of motivators and a defined ranking of their strength to affect the adoption of Chronic Disease Information systems in general practice. Following a literature review of known motivators, thirty-six participants (representing, doctors, nurse, practice managers and staff) from twenty-eight practices were interviewed to examine the relevance of these factors. The findings suggested that the *key*, and highest ranked, motivational factor identified in this study for the adoption of CDIS was gaps in patient care (Patient Care) as a motivational force. However, another important factor that rated highly in the study was the need to introduce CDIS as a means of minimising the risk of legal threats (risk management), predominantly as a means of avoiding patient litigation. Other prominent motivations for the introduction of CDIS were the benefits of financial incentives and increased likelihood of gaining or maintaining accreditation with accreditation bodies. Another important finding was the need to consider the relationship between these motivational forces when adopting CDIS. For instance, even if CDIS is adopted for the purpose of improving patient outcomes, it should still be done so in an environment that allows for improved financial outcomes, or at least no deterioration of the financial situation.

In essence, any information systems implementation would be better accepted if the main drivers or motivators are understood before the implementation takes place; and the implementation itself caters for their solutions as part of the overall system. Furthermore, no single motivator should be seen to be the *only* driver, a multi-pronged approach that strengthens all identified motivators equally should be used to satisfy the multiple needs of those affected by the introduction.

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