

Refereed papers

Adoption of information technology in primary care physician offices in New Zealand and Denmark, part 2: historical comparisons

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ABSTRACT

This second paper in a series of five looks at how computing in primary care began and provides background to the driving forces for automation in Danish and New Zealand primary care physician offices. It addresses topics such as government funding support, the role of professional colleges and associations, peer influence, change management,

and comparative cultures. It also highlights the power of a unifying organisation and introduces the concept of a Health Systems Integrator.

Keywords: access and evaluation, computerised, healthcare quality, medical informatics, medical records systems

Introduction

This second paper in a series of five looks at how computing in primary care began and provides background to the driving forces for automation in Danish and New Zealand primary care physician offices.

History and evolution of computing in physician offices

Denmark

In the mid 1980s Danish primary care physicians received a small financial subsidy to send floppy disks of their medical claims to the public health insurance body – this stimulated the purchase of a single administrative computer to use in the physician's office.

This created the early infrastructure for future use of computers for clinical purposes.¹

In the late 1980s a Danish primary care physician – who also worked part time in a hospital biochemistry lab – and a pathologist, who was a professor at the University, convinced the head of information technology (IT) in Funen County that sending clinical messages electronically would be of particular benefit to primary care physicians.

In 1990, the FynCom project was created to connect two primary care physicians on one system with a hospital system and a lab system. The project (later entitled MedCom) went ahead without 'formal' approval and long before it became a part of the Funen County IT strategy. By 1992, lab results and discharge letters were being transmitted electronically to a number of primary care physician practices and the emergence of electronic medical records (EMRs) became a

reality. About the same time electronic prescription transmission from primary care physicians to pharmacies began.²

By 2000, an update to the Danish national health information strategy further increased the emphasis on communication between hospitals, pharmacies and physician offices. At that time, MedCom became a permanent non-profit organisation whose mission became: 'To contribute to the development, testing, dissemination and quality assurance of electronic communication and information in the healthcare sector with a view to supporting coherent treatment, nursing and care'. The MedCom Board is chaired by the Ministry of Health and co-chaired by the Association of Danish Regions; MedCom is funded from a variety of sources and the Ministry of Health covers one-third, as does the Association of Danish Regions (formerly the County Councils Association), while the remaining third comes from other sources such as the Association of Municipalities and the Danish Pharmacy Association.³

New Zealand

During the 1980s a number of New Zealand general practitioners (GPs) had experimented with computer systems within their practices and by the early 1990s some of these GPs had developed their own computer systems and left general practice to focus upon developing them further. By 1993, approximately 30% of general practices already had a computer system although less than 10% were attempting to store clinical information. The most successful early GP systems were Unix based, however, with the advent of Windows, the Unix based systems gradually disappeared. Today 95% are Windows based, while 5% use Apple operating systems.

In 1992, New Zealand's Director General of Health appointed a Deputy Director General for health information, who implemented a number of key strategies. These included creation of a national health identifier database, development of a health information privacy code and an agreement with private sector organisations to develop and deliver information services to the sector. These three strategies combined very effectively to underpin development of New Zealand's e-Health infrastructure.

In 1993, the New Zealand Ministry of Health approved formation of four Value Added Networks (VANs). Among these was HealthLink, then a division of Telecom New Zealand. HealthLink's approach differed from the other three VAN services in that it developed services targeted at primary care rather than the hospital sector. HealthLink introduced pathology

result reporting and this was seen as a major boon by the 10% of general practices that were attempting to store clinical information electronically. It became a feature that encouraged many additional GPs to purchase systems.

In 1995, HealthLink was purchased from Telecom New Zealand by a group of the company's staff. Encouraged by the success of its initial applications, HealthLink began working with groups around the sector to develop further services. An immediate focus was development of discharge letters and specialist letters (reports). Working with groups of healthcare providers across the sector, trials began and over the ensuing decade, electronic transfer of all outbound hospital correspondence and communications between GPs, specialists and ancillary care providers became established in a number of hospitals. New Zealand became the first country in the world to use HL7 based messaging for delivery of pathology and radiology information to general practices and for transmitting referrals and discharge summaries on a widespread basis.

The arrival of the internet posed challenges. Whilst it significantly improved the quality of communications technology available, it also had a potentially disruptive effect upon parties providing VAN services. The arrival of the internet also created security risks and a wider understanding of the importance of health information privacy. HealthLink redeveloped its software in order to connect to its messaging services via any internet connection, whether dial-up or broadband. Public Key Infrastructure (digital signatures) became widely used to authenticate users.

In 1996, HealthLink began working with government agencies to develop an electronic claiming system and introduced this to 30% of general practices within the first year of operation. Two years later 70% of practices were claiming fees electronically and government put in place incentives that would encourage universal uptake of electronic claiming. In the same year, the New Zealand Government adopted a new standard for secure communication between health providers called the 'Health Intranet' (now more correctly renamed the Health Network). This standard has had varied success and is mostly used for hospital-to-hospital communications. Some health agencies provide online services to GPs using this standard and accordingly a number of GPs have elected to access the internet using the Health Network.

A change of government in 1999 saw the Independent Practitioner Associations (IPAs) replaced by PHOs (primary healthcare organisations); compulsorily non-profit making but still competing with one another. PHOs have a broader focus on community based healthcare delivery than the IPAs.

Driving forces to automating

Government funding support

Unlike many other jurisdictions, there has been very little direct payment to GPs in Denmark to install computer technology in their offices. Negligible assistance was provided to Danish GPs in the mid 1980s to send claims by floppy disk instead of on paper.

In 1998 the New Zealand Government gave many general practices a one-off grant of approximately \$NZ 5000 to purchase computers and it served notice that it would make electronic claiming compulsory. By 2000, more than 95% of GPs used a computerised billing and appointment system and more than 50% used this system for capturing clinical information during patient consultations. Today 100% of GPs have a computerised system (electronic claiming is compulsory) and 75% use the full clinical functionality. Currently almost all electronic messaging in the New Zealand health sector uses services provided by the privately owned company HealthLink. The Government pays HealthLink for the services it uses to communicate with GPs. All other services are paid for by the healthcare providers that use them, i.e. the laboratories, hospitals and general practices. Fees are calculated on a 'user pays' basis.

In New Zealand, HealthLink is the sole provider of these services. It does not have a government granted monopoly to do so. In fact government has been quite active in recent years in trying to encourage formation of competing services.

Professional colleges and associations

Professional colleges and/or medical associations have played an influencing role in both countries, Denmark and New Zealand. The Danish Doctors Association has always supported MedCom and the use of EMRs. Over the years, the negotiated funding for quality assurance in primary care physician clinics has been changed to quality assurance and IT support, acknowledging the critical role that IT plays in quality improvement initiatives.

There are several professional bodies in New Zealand that represent general practice. They include The Royal New Zealand College of General Practice (RNZCGP), the New Zealand Medical Association (NZMA) and the Independent Practitioners' Association Council (IPAC), and they work together under an umbrella group known as the GP Leaders Forum. These organisations work together harmoniously, looking after the interests of the profession and improving the practice of medicine. While each of these organisations has a strong interest in IT, none is specifically focused upon it.

IPAC has had the greatest involvement because of the pivotal role that IT has played in enabling the primary healthcare organisations to perform effectively. The RNZCGP and NZMA tend to be involved in order to promote high-quality standards and all are consulted by government and non-governmental health sector organisations as to their views on any forthcoming IT initiative.

Peer influence

Peer influence – collegial pressure – played a significant part in the Danish primary care physician computer movement. Early adopters often hosted their colleagues to show them how the computer system affected their work life. At the yearly, one-week primary care physician education seminars – referred to as primary care physician days – there were always IT workshops covering topics ranging from basic computer use to advanced use of diagnostic coding.

Peer influence continues to play a significant role in progressing New Zealand's health IT development. New Zealand's general practitioners have always been very interested in all aspects of IT. News of any new or useful innovation or IT development spreads very quickly and uptake of new systems and services is equally rapid.

Comparative culture

Another contributing factor to the Danish success story is the 'comparative culture' of the Danes. MedCom has, since its inception, regularly reported on which counties are leading the way in terms of various aspects of the e-health agenda. Since it is human nature to avoid being at the bottom of the list, the 'competition' has spurred the introduction of IT in Denmark.

New Zealand has not yet embraced the comparative culture philosophy fully but this is one of the things it is learning about from Denmark. However, health IT in New Zealand is extremely competitive. HealthLink has significant competition from other industry players in nearby Australia. Health IT is New Zealand's largest IT software export and there is consequently a very vigorous health IT industry with a number of internationally competitive companies. This means that there is also a very vigorous informal network of IT companies that simultaneously collaborate and compete. The key ingredients of this valuable mix of collaboration and competition are innovation and product development.

Change management

Non-financial support was a significant influence in health IT development in both the Danish and New Zealand jurisdictions.

Support from the counties was a key influence in Denmark. Since 1992, the counties have been providing primary care physicians with a diskette of all their patients when they first start their practice. In 1998, Funen County introduced a 'data consultant' scheme on a trial basis. The scheme – with general practice as its primary target group – had an overall aim of strengthening the use of computers for quality development. By 2001, data consultants became a permanent fixture in all 14 counties. The counties also fund 'practice co-ordinators' for each specialty (general practice, psychiatry, general surgery, etc.). These physicians work for two to three hours per month and coordinate the wishes of their colleagues with those of hospitals, and vice-versa. The physician IT agenda moves forward through them.

The aims of the data consultant are to strengthen the use of computers in general practice and in particular the use of electronic communication to attain greater coherence in patient treatment through the exchange of necessary data during the progression of a patient. They also strengthen quality development work in individual medical practices and at the individual primary care physician level, partly by using data extraction in medical practices.

A typical data consultant working for a county regularly visits primary care physicians in their own practices at least twice a year and talks to them about the use of their EMR system. They also demonstrate the possibilities available – especially opportunities to extract data from their systems and use the data for quality monitoring. They reassure the primary care physicians that 'You are not on your own – help is readily available'.

In New Zealand the PHOs and IPAs have played a key role in assisting practices with their automation. These organisations have dedicated IT staff and clinical staff with IT training who work with EMR vendors and practices to develop and implement IT systems to assist with management of healthcare initiatives.

A further key success factor has been the effort put in to build primary healthcare practice support organisations. Initially support was provided by the IPAs, GP owned groups that undertook patient fundholding and took on the role of organising primary care for their member practices. Operating on a competitive basis, these high-profile organisations employed IT staff and played a very significant role in the automation of primary care. Many of these organisations used new funding sources to develop initiatives that depended on IT, such as electronic clinical decision

support for the management of cardiovascular disease and diabetes.⁴ These initiatives were very popular and further encouraged GPs to invest in IT. New Zealand has had a lengthy interest in primary care decision support software and there exist a number of decision support packages that PHOs purchase on behalf of their members. Integrated with the practices' EMR software and delivered via the internet, these decision support systems enable practices to perform screening programmes and they are becoming extremely important to delivery of health care.

Collaboration amongst the EMR vendors, HealthLink and various regional and national government agencies has played an important role in pushing the agenda forward. In 2005 a national child immunisation register was developed and deployed nationally. National diabetes management programmes and regional hepatitis B screening programmes have likewise played a key role in funding infrastructure and implementation at all levels across the sector.

A high passion for innovation and a collaborative/competitive zeal amongst EMR vendors has without doubt played a key role in the development of the overall infrastructure.

GPs themselves are quick to embrace new technology and they see immediate benefit in improving personal and practice productivity.

The power of a unifying organisation

Denmark's MedCom now has 14 staff and an annual budget of 15 million DKK (€2 million) of which 50% covers the basic costs of running the organisation. The remaining 50% is used towards specific projects, contracts, external advisers, training courses and meetings (including paying physicians for participating). When fulfilling a contract, if the solution is implemented on time, the counties and the software companies receive a financial bonus from MedCom.

The majority of electronic communications within the New Zealand health sector are made via HealthLink which remains privately owned and operated and employs 50 people. The company provides a support desk and implementation service and it has a software team designing and developing new services. HealthLink is a utility service set up specifically to deliver electronic messaging and communications and related services. It develops messaging software, as well as core infrastructure and services used to securely exchange healthcare messages.

Conclusion

HealthLink plays a very similar role to that played by MedCom in Denmark. Both organisations began their existence as VANs. HealthLink now views itself as what might be called a health system integrator (HSI), a specialised information technology company or division of an international IT company that has expertise in integrating and supporting messaging, online communications and security systems. The same definition could be equally applied to MedCom.

A key benefit that an HSI brings is a clear, unambiguous and direct interest in increasing the use and value of e-health services across the sector. In both countries, HSIs are required to support use of all national data-communications standards, to interconnect with other HSIs and to defer to a national governance framework. In New Zealand HSIs can have their accreditation withdrawn if they fail to meet a range of government imposed and monitored safety and security standards.

Key benefits of an HSI approach include:

- bringing to bear focused, specialised expertise to solve a series of complex and demanding issues
- an explicit contractual commitment to standards and external governance, minimising risk and providing reassurance to patients and health professionals
- reduced investment risk to governments
- potential to create a competitive environment driving innovation.

Are these lessons to be learned by jurisdictions that lack the power and influence of a single unifying body of some type?

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CONFLICTS OF INTEREST

None.

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