

Improving Knowledge Management between Primary and Secondary Healthcare: an e-Referral Project

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Abstract

Objective: To investigate e-Referrals on improving knowledge management between primary and secondary healthcare by replacing the manual process of paper-based referrals.

Method: A search of the available literature was conducted from 2000 to 2009 using the key words 'electronic referral' 'structured template' 'continuity of care' and 'transfer of care'. Interviews with some experts who are working on e-Referrals were conducted to enhance the author's knowledge of the planned Auckland Regional e-Referral project.

Findings: Some European countries have adopted e-Referrals since the early 1990s; e-Referral systems demonstrated reduced cost, more efficient communication and accurate health information transfer, overall smoother patients' journeys through the community and enhanced health outcomes. However, the uptake has been much slower than expected, except for the Hutt Valley District Health Board in New Zealand.

Conclusion: The benefits of using e-Referrals are promising for the Auckland Region provided the process is planned and handled carefully within micro (individual) and macro (organisational and system) levels, as well as applying the lessons learned from other worldwide e-Referral adopters.

1. Introduction

Primary healthcare is commonly the first point of contact for patients, and as such, plays an important role in facilitating transfer of care to secondary healthcare. Efficient communications, accurate health information transfer and knowledge sharing have the potential to significantly enhance overall health outcomes [1]. To meet these demands, innovation in health service delivery is fundamental. Information and communication technologies (ICT) are progressively being seen as possible solutions to optimise the quality of referrals and patient flow [1]. McKenna [2] claimed that the main drivers for investment in electronic systems and applications were reduction in manual processing paperwork, workflow benefits, and enhanced access to patient information. These factors were closely followed by both cost savings and increased revenue, and more accurate information to enhance decision making. Therefore, e-Referrals from primary to secondary healthcare have become one of the best solutions to replace paper-based referrals, which have little consistency in format and detail, and offer either excessive or insufficient information, with a risk of lost paper and slow acknowledgement and updates. This leads to considerable double handling, re-keying of data and manual handling of referrals, making it difficult to provide a smooth flow of patient information in a timely and structured manner. E-Referrals hold great promise towards the objective of smoothing the mechanisms in the communication and knowledge sharing between practitioners and in doing so, improving the overall effectiveness of the process, resulting in the streamlining of information throughout the community.

2. Method

To identify relevant articles, a literature search was conducted under the following headings, "grey literature", "white literature", "e-Referral", "electronic referral", "electronic referral systems", "knowledge management", "structured template" "designed template", "continuity of care", "transfer of care", "health information transfer" and alternate synonyms in various combinations. These searches were conducted using PubMed, Medline, ProQuest, Business Source Premier, and Google Scholar, IEEE, Scopus and Emerald databases. The literature search focused on peer reviewed English articles from the year 2000, and on articles based on countries with similar healthcare systems to that in New Zealand. These systems are mainly government funded and offer free access to public hospital care where

patients are required to be referred from GPs before entering such care. In addition, experts working on e-Referrals were interviewed and some unpublished documents, such as project descriptions, minutes of meetings and regional and national policies were reviewed.

3. E-Referral and Knowledge Management Definition

While making a referral is a well established practice in health systems, it has no unanimous definition. According to the Oxford English Dictionary [3], referral is an act of referring someone or something for consultation, review, or further action. Specifically in the context of this paper this means:

- the directing of a patient to a medical specialist by a GP
- a person whose case has been referred to a specialist doctor or a professional body.

According to Cole's Medical Practice in New Zealand [4], referral involves transferring all or some of the responsibility for the patient's care, usually temporarily and for a particular purpose, such as additional investigation, care or treatment, which falls outside a practitioner's competence or knowledge. The common factor in all referrals is a communication whose intent is the transfer of care, in part or in whole [14].

Thus a referral occurs when one practitioner wishes to communicate with another practitioner or seek a second opinion, and in doing so requests the services of another practitioner or service provider in the care or treatment of a patient. An e-Referral is an electronically transmitted referral message. Standard e-Referral forms should be used, ensuring all mandatory data fields are captured before the e-Referral is sent.

Knowledge management (KM) is a very broad concept. A general goal of KM is to enhance the systematic handling of knowledge and potential knowledge within the organization [5]. Knowledge management (KM) is a process that emphasises generating, capturing, sharing information and knowledge; this knowledge is integrated into business practices and decision making for greater organizational benefit [6]. E-Referral can generate, capture and share patients' information between primary and secondary health providers for integration into patient care in the secondary health sector in a timely manner, resulting in improved patient health outcomes.

The Health Information Strategy for New Zealand describes the vision of e-Referrals as: "Patients are referred to the right practitioner with the right information and receive the right response" [7]. This is consistent with knowledge management theory of "supply-side" knowledge sharing and integration, which is associated with two well-known phrases as described by McElroy [8]: a) it's all about getting the right information to the right people at the right time, and b) it's all about capturing, codifying, and sharing valuable knowledge. These two phrases neatly sum up the essence of supply-side KM, which has also come to be known as first generation KM.

On the other hand, second-generation KM introduces "demand-side" KM which instead of focusing on the supply of existing knowledge to people who need it, seeks instead to enhance their capacity to produce knowledge. The new KM includes both "supply-side" knowledge integration and "demand-side" knowledge production, focusing on the whole knowledge life cycle [8].

An e-Referral system bridges the gap between primary healthcare by supplying information and secondary healthcare by demanding information which creates smooth communications and knowledge sharing between practitioners. As a result, e-Referrals balance knowledge integration and knowledge production. It improves the overall effectiveness of the process and patients could be treated in a timely and structured manner.

4. International Review

Health innovation by e-Referral has been acknowledged worldwide as a promising way to optimise patient flow and to facilitate patients' care between primary and secondary healthcare [12]. Many were hopeful that this would enhance overall health outcomes and be of significant economic benefit.

Finland was the first country to introduce an e-Referral project (Table 1), launched in Helsinki in 1990. There were three university hospitals and 200 General Practitioner (GP) practices with one million residents in the initial project. In 2002, 67,000 e-Referral messages were sent in total. This covered approximately 60,000 patients transferred between the Helsinki University Hospitals and primary care [9]. However it must be noted that it took twelve years to reach this level. Wootton [9] claimed that the e-referral system in Helsinki could allow more patients to be treated at a lower cost, increase productivity threefold and also improve access to health services, continuity of care and chronic disease management.

Denmark was the second country to implement e-Referrals. A project called MedCom was established to develop and implement the nationwide Danish Health Care Data Network [10]. E-Referral was part of this project. In 2004, 41 percent of referrals were sent electronically, resulting in savings of approximately €1 million per year and a “significant improvement in access to care, quality of care, efficiency and productivity of the health sector” [10]. Although Denmark has successfully implemented electronic communication in healthcare since the late 1980s and today ranks among the leading countries in electronic communication [11], e-Referral has had a slower uptake than most other MedCom health messages. In June 2008, an interventional solution called the “referral hotel” was launched and rolled out in full scale over a three month period. Using this “hotel” is compulsory for GPs. GPs fill out the e-Referrals in their electronic health record (EHR) system and send referrals as an Electronic Data Interchange (EDI) message to a repository. The percentage of GPs using e-Referrals has increased dramatically. By November 2008, 63 percent of referrals were sent electronically. A study focussing on cost benefits in Denmark [10] concluded that widespread implementation of e-Referrals would be of significant benefit to the national economy, saving approximately €3.5 million each year.

In many of the early initiatives, including the Norwegian ones, the uptake of e-referrals at regional and national level has been much slower than expected. In Norway, the use of e-Referral commenced in 1996, after a decade in use, the volume of e-Referral remained low. In January 2009, the take up of e-referrals in Norway was markedly slower than Finland and Denmark, less than 25 percent of referrals sent electronically [12].

Early e-Referral adopters, including the Netherlands, may have not paid enough attention to the interrelation between technology and its social environment [12]. To achieve the free flow of information not only technical but also inter-organisational business processes should be created. According to Berg [1], socio-technical approaches aim to increase understanding of how new information systems and communication techniques are developed, introduced and become a part of social practice. In addition, the largest challenge for the socio-technical approach is how to interrelate the nature of healthcare work with the characteristics of formal tools. If technology cannot be seen as useful for the parties involved, the solution will not work in practice.

The introduction of health innovation requires both organisational and cultural change. Bamford [13] declared that the organisational change process needs to be managed in a way that is sensitive to the impact of a whole organisation and individuals within it, through effective and positive leadership, as well as by clear statement through effective and consistent communication channels. In Norway and Denmark, culture change was the most time-consuming and difficult to manage. Although fewer steps were involved in processing an e-Referral than a paper referral, it takes time to develop acceptable procedures for processing them.

Some GPs were reluctant to adopt e-Referrals due to a lack of confidence in the system; they showed some hesitancy in using e-Referral systems for fear of the possibility of technology failure [10]. It is human nature to make an effort to control system complexity and uncertainty. People feel secure when the situation is under control. They feel a lack of control in the process and a change of perception is required to instil confidence. The same discomfort and insecurity caused by uncertainties, applies to all organisations.

Table 1 – Summary of countries adopting e-referrals

Country adopting e-Referral system	Start date (Approx)	Number of GPs	No. of e-Referrals per year	References
Finland (Helsinki)	1990	200	67,000 (by 2002)	[9]
Finland (Oulu)	1991	10	2,000 (by 2002)	[9]
Denmark (MedCom – EDI*)	1995	2024	41% (by 2004)	[10]
Denmark	1995	2024	63% (by Nov 2008)	[10]
Norway (ELIN**)	1996	N/A	< 25% (by Jan 2009)	[12]
Netherlands (ZorgDomai)	2001	100	5000 (by Dec 2004)	[12]
Netherlands	2001	2000 (by 2008)	N/A	[12]
Australia	Jun 2009	30	N/A	[14]
New Zealand (Hutt Valley)	2007	34	>90% (by Jan 2009)	[16]

* EDI – Electronic Data Interchange

** ELIN – Electronic Information Exchange

Due to the above reasons, the e-Referral workflow development is still immature. In some countries, like Finland and Norway, participants were more familiar with the process of paper-based referrals which have been refined over many years and were reluctant to move outside their “comfort zone”. Consequently it took time to manage the change process.

In recent years, New Zealand and Australia also introduced e-referrals. Australia initiated an e-referral system in early June 2009 [14]. More than 30 GPs across the Australian Capital Territory (ACT) region used the system to refer to more than 60 specialists in outpatient services. Plans are already underway to expand to additional services at the Canberra Hospital (TCH) and several hundred GPs within the ACT and nearby regions [14]. There has been no result published as the newly started project has yet to be evaluated.

5. E-Referral success at Hutt Valley, New Zealand

The New Zealand Hutt Valley District Health Board (HVDHB) appears to have gone against the trend. The Hutt Valley e-Referral project aligned with the Health Information Strategy for New Zealand, Action Zone 8. The e-Referral strategy is to “provide complete and relevant referral information electronically and make it available to practitioners involved in the patient’s care to allow prompt and appropriate clinical decision-making” [15]. The Hutt Valley DHB has been acknowledged as the implementation lead for e-Referrals by the Ministry of Health (MOH) in New Zealand [7].

The e-Referral project in Hutt Valley DHB was launched in 2007 and took just over one year to reach operational stability. By January 2009, more than 90 percent of referrals were sent electronically. Urgent and semi-urgent referrals were processed three days faster than before and productivity improved by 40 percent [16]. In order to maximise usage of the e-referral system and increase the familiarity of practitioners with e-referral, Hutt Valley DHB has used a philosophy of “minimal change to the process”.

The key to making HVDHB e-referral project a success was the agreement with practitioners (GPs and specialists) on the content of the referral forms being used [15]. A large percentage of the information is provided on one core form. The GPs and hospital specialists use the same standardised e-Referral forms, ensuring that the appropriate quantity of information is passed on to the specialist, allowing them to make an appropriate clinical decision.

This success at HVDHB can be attributed to the following factors [16]:

- Clinician leadership with management support resulting in minimal surprises.
- Commitment from senior management.
- Agreement of all participants on core information requirements and on terminology used.
- Use of multi-disciplinary implementation groups.
- Testing built into the system at every step of the way, rather than testing at the end.

6. Lessons for the planned Auckland regional E-Referral Project

A pilot of the Auckland regional e-Referral project will commence in Mid 2011 [17]. This project aligns with the Regional Information Systems Strategic plan (RISSP) as well as supporting elements of the Auckland regional individual strategic plans. The MOH recently announced its intention to remove duplication, and reinvention of the wheel across the existing twenty-one DHBs, by creating “single” solutions, particularly in the area of ICT [18]. One third of New Zealand’s population lives on the Auckland region [19].

Auckland’s three DHBs (Auckland, Waitemata and Counties Manukau) have agreed on working together to improve communications and knowledge sharing with General Practices in order to smooth patient flow through the community. The objectives of the Auckland regional e-Referral project are as follows [20]:

- Improve patient care and experience.
- Improve the efficiency and effectiveness of the referral process.
- Reduce / avoid error associated with paper based referrals.
- Improve communication between health care providers.
- Ability to aggregate referral data for management and reporting purposes.

In order to facilitate the implementation, the Auckland regional e-Referral project is to be divided into the following three phases, minimising risk and maximising benefits in a timely manner [20]:

- Primary Referrals: electronically send elective primary care referrals to secondary care services
- Referral workflow: automated processing for each referral
- Decision support: enhance workflow via automation of specific business rules.

New Zealand's status as a global leader in integrated healthcare IT has been confirmed in a landmark ten-country study naming New Zealand as the second most integrated advanced country in this field after Denmark [11]. There is a demand for an e-referral system from some primary healthcare providers who are confident with an electronic health system. However, in order to avoid barriers faced by early adopters of e-Referrals, a careful planning process is underway in relation to the technology, as well as organisational and cultural environments. Healthcare information systems are complex; they raise unique technical, administrative, and security challenges. Introducing new technologies into a complex system requires extensive changes on micro (individual) and macro (relationships and business processes) levels, the co-called "socio-technical" aspects of change [21].

Therefore, when phase one rolls out, standardised and structured e-Referral forms will be used to transmit patient referrals to referral offices at hospitals in the Greater Auckland region. A prompt acknowledgement will be sent back once the e-Referral has been received, and these received e-referrals will be printed out and managed in the current hospital process. During phase one the change management component will focus mainly on primary healthcare to ensure primary healthcare providers receive the immediate benefit of using e-Referrals. The planned process intends to break down to granular level, enabling learning from previous efforts or through collaboration, rather than a big bang approach. Orr claimed [22] that it needs to build solid foundations of SMART (Specific, Measurable, Acceptable, Resourced, and Timelined) and SAFE (Scalable, Affordable, Flexible, and Equitable) projects and then try some stepping-stone projects involving some system or process change, but never attempting to change too much at once.

Using the experience of the HVDHB e-Referral project, and that of Northland and Canterbury DHBs (where e-Referrals is currently being evaluated) the Auckland regional e-referral project, with careful process planning, holds the promise of success. Such a knowledge management project attempts to do something useful with knowledge to accomplish organizational objectives through the structuring of people, technology and knowledge content [23].

7. Conclusion

The e-Referral system has demonstrated reduced cost, efficient communications and accurate health information transfer, overall smoothing the patient's journey through the health community. However, the uptake has been much slower than expected for most reviewed countries. The barriers for utilizing e-referrals are: immature workflow development and confidence issues. Hutt Valley DHB's success has overcome these barriers in their project where e-Referrals balanced knowledge integration and knowledge production. It improves the overall effectiveness of the process. Therefore, the benefits of using e-referrals are promising for the planned Auckland regional e-Referral project if the process has been planned and handled carefully within micro (individual) and macro (organisational and system) levels, appropriate organisational socio-technical management, as well as learning lessons from worldwide e-Referral adopters.

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