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The management of medication information – data collection on a physicians' internet discussion board

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Abstract

The healthcare sector is highly information intensive. Information on patient specific medication is usually essential for clinicians when treating patients. However, information is not always available when required. Electronic patient records (EPRs) have in many cases enhanced the situation but there is often a need for exchanging information across various organisations. In Finland, there is a plan to integrate healthcare providers' information systems into a single national system. To study physicians' perceptions on this forthcoming development, in particular the management of medication information, a data collection was organised on a closed internet discussion board for physicians. The results show that the physicians were not convinced of the usability of the national system because they already have problems with slow EPRs within one organisation. According to them, another basic problem is patients' general lack of knowledge about their own medication regimen. The discussion on the discussion board was not extremely active but the data collection provided fruitful answers and was a useful experiment to keep in mind for possible future data collection.

Keywords: medication information, physicians, Internet discussion board

1 Introduction

The role of information technology (IT) has been widely discussed when planning the means to restrain the growing costs of healthcare organisations, enhancing patient safety and the quality of care. Healthcare organisations with advanced IT are said to have better outcomes. (The Most Wired Team 2008) However, some studies have shown that information systems might not always have positive effects on healthcare organisations' performance. (Nebeker, Hoffman, Weir, Bennett & Hurdle 2005)

Patient specific medication information refers to a current medication regimen e.g. medication history, the generic and commercial name of the drug, the dosage, the use indication, and an individual's medication-taking practices. This information also

covers the available knowledge about the risks related to a patient's treatment, e.g. a patient's drug allergies. The most important part of medication information for physicians is a patient's current medication regimen; what is the medication a patient takes and does he take them according to his physician's orders. (Aarnio & Raitoharju 2008) This is easy to understand because it has been argued that, for instance, in the U.S. more than 1.5 million people are hurt every year by preventable medication errors. (Landro 2009)

Many countries have eHealth strategies that aim at empowering electronic services between different healthcare facilities and of course, between patients and healthcare providers. In Finland, there is a national-level strategy with the objective of creating a paperless document handling system. (Kela's 1 role in the implementation of national e-health services 2008)

In this case, the idea was to ask physicians: What are the current problems related to the acquiring and use of patient specific medication information? How do they see the current and future roles of information systems in the management of medication information? The data collection occurred by collecting postings made on a closed internet discussion board for physicians, which was also executed as an experimental data collection method. Therefore, the aims of this paper are two-fold: first, it studies the needs and perceptions of Finnish physicians on and about the current and future electronic use of patient specific medication information. Second, it describes the process of collecting information from a closed Internet discussion board for physicians.

2 Patient specific medication information and its electronic management

Though medicines are prescribed to improve patients' health and often have positive effects, there are still many risks in the complex process of prescribing them. (Kuperman, Bobb, Payne, Avery, Gandhi, Burns, Classen & Bates 2007) To support physicians' clinical work and especially the management of patient specific medication information, several electronic systems have been developed. To prevent the errors and harm caused by incorrectly taking or prescribing medication information systems supporting decision-making (e.g. computerised provider order entry CPOE with clinical decision support CDS, interaction databases) have been developed. (Gross & Bates 2007; Kuperman et al. 2007) According to some studies, CPOE systems may help to reduce serious medication errors by up to 55 percent. (Lillis 2003)

Also the purpose for using electronic prescriptions is to strengthen patient and drug safety. (Kela's role... 2008) In some e-prescription systems, the software automatically checks a patient's drug history for potential unwanted consequences such as improper dosages, medication allergies and adverse interactions. (Landro 2009) Physicians need as much information on a patient as possible to support their prescribing process. (Aarnio & Raitoharju 2008) That is why information exchange also has an essential role in medication information management.

1 "Kela" is the Finnish Social Insurance Institution.

3 Methodology

There was a project called “Management of Medication Information” that aimed at supporting national-level plans to manage patient specific medication information in a way that the information would always be available in the right place at the right time. One part of the project was to study healthcare professionals’ needs for patient specific data, and the current and future roles of information systems. However, this paper concentrates on the material gained from the discussion board, even though other forms of data collection were carried out in the project.

The phrase web-based discussion board refers to a socio-technical system. The system involves interaction between individual users, user groups, and the systems. (Lee, Cheung, Lim & Choon 2006) Participants in online communities ask questions, pose problems, and provide answers and solutions through a behaviour that has been called “storytelling”. (Johnson & Ambrose 2006; Muniz Jr. & O’Guinn 2001) Web-based discussion boards have been used for information seeking and information dissemination on a great variety of issues. These include, for instance, the investigation of cross-cultural differences in electronic word-of-mouth (Fong & Burton 2008), the study of the role of message boards in spreading information about self-injurious practices and their influencing of help-seeking behaviour (Whitlock, Powers & Eckenrode 2006), and the achieving of learning objectives (Sautter 2007). According to Lee et al. (2006), the reasons for customer knowledge sharing included the enjoyment of helping others and expected reciprocity. For instance, 30% of Americans that have participated in online groups have been reported as participating in healthcare related groups. There are also communities for professionals, in this case for physicians, and researchers have stated that the use of them provides continuous access to high quality information and interaction with other professionals. The benefits achieved include the enhancement of the quality of patient care and the professional life of physicians. (Johnson & Ambrose 2006)

Data collection from a web-based discussion board was organised to avoid any time specificities related to the tight schedule of the physicians. The idea for the data collection came from a physician who was participating in a medication information related IS project. The discussion board was provided exclusively for physicians and the information was held behind a password provided by the administrator. The author of this paper posted an introduction and some propositions for discussion. They included propositions on searching for information from other organisations’ information systems, even though that would take more time, and asking for information on how a patient’s medications and a patient’s risk information should be provided in the information systems, and about how to coordinate a patient’s medication regimen. In the introduction, the participants were also informed of the confidentiality and research use of the discussion.

In general, the discussion board used in this case was not extremely active, a total of seven different physicians posted comments, some of them more than once, but all the answers were very fruitful for the project. Since the data collection method was quite new, at least among physicians, concentrating only on this data provides a better overview for those interested in the method. The participants included a professor emeritus and several docents, which meant that groups other than physicians at the early stage of their career were reachable through the internet discussion board. Therefore, despite the quite small number of participants, the value of this paper also comes from

findings regarding the data collection itself. As the original idea for the data collection was to generate an interactive discussion between the physicians, the data was analysed based on the themes arising from the discussion. The postings were analysed according to the chronological order of the discussion.

3.1 Research context

The healthcare system in Finland is universal and mostly financed via taxes. Finland has a system of hospital districts, which are usually municipal federations consisting of one main hospital and several regional hospitals. In the same region, municipal health centres also provide primary care to the population of the municipality or other fixed areas and patients are referred to specialised hospital care, if needed, from primary care. (Engeström 1995) The private sector provides 1/3 of the specialised outpatient services and around 8% of the inpatient services. Municipalities also acquire services from the private sector but most of the patients using private healthcare pay the costs themselves. Part of the private sector fee is in many cases reimbursed by The Social Insurance Institution. (Centre for Pharmacology Therapy 2008)

Prescription drugs are sold in privately owned, strictly regulated pharmacies. The Social Insurance Institution also reimburses part of the cost of prescription drugs depending on the severity and chronic nature of the disease. (Ministry of Social Affairs and Health 2008) Furthermore, it is already possible to change a medication to a cheaper one that contains the same active agents. This "generic substitution" has confused some patients though. (Aarnio & Raitoharju 2008; Heikkilä 2009)

The first Finnish national eHealth strategy was drawn up in 1996. (Hämäläinen, Reponen & Winblad 2009) In many Finnish primary healthcare organisations electronic patient records (EPRs) have been in use from the late 1990's. (Mäkelä 2006) All the hospital districts and almost all primary healthcare centres had an EPR as a primary tool for patient data in 2007. (Reponen, Winblad & Hämäläinen 2009) However, there was a lack of coordination in the implementation of the systems over the past decades and therefore the systems are fragmented and mostly non-interoperable. (Teperi, Porter, Vuorenkoski & Baron 2009)

There is a national level plan in Finland to guarantee the smooth exchange of patient information between different types of healthcare sector organisations and provide real-time access to patient information. A law that came into effect in 2007 makes it mandatory to incorporate public healthcare units and private units, that do not use paper based archives, into an electronic archiving system. (Reponen et al. 2009) The Finnish Social Insurance Institution is responsible for the overall coordination, operation and maintenance of the information systems. (Hämäläinen et al. 2009) There are also two other organisations; The National Research and Development Centre for Welfare, and The Health and National Authority for Medicolegal Affairs, which are responsible for the national code server and licensing of healthcare professionals and the operation of authentication services. (Kela's role... 2008) Healthcare providers have to achieve the functionality of the systems by 2011. (Teperi et al. 2009)

The three main elements of the Finnish eHealth development will be an ePrescription system, an eArchive and eAccess. (Kela's role... 2008) Those elements are being developed separately, but within the same project. (Alapekkala 2009) The providers will access the system's patient archives through an index service. (Teperi et al. 2009)

In the ePrescription system, a physician will send prescriptions electronically to a prescription centre. All the pharmacies will have electronic access to this centre and the ePrescriptions can then be dispensed in any pharmacy. The information on a patient's e-prescriptions and medicine delivery data should also be available for physicians. (Kela's role... 2008) After 30 months in the centre e-prescriptions will be moved to an archiving database where the information is archived for 10 years. (Raunio 2009) The eArchive is a system that provides possibilities for the searching and archiving of patient records. (Kela's role... 2008) Healthcare providers will have their own patient record archive but compared to the current situation, the structure of the archives will be uniform and they will be maintained by the Social Insurance Institution in a single system. (Teperi et al. 2009) The piloting of the eArchive should start next year. The eAccess system will allow citizens to view their personal medical information in the archive. In May 2009 will open a service called Kanta.fi where citizens can access their information by using online banking identification or an electronic ID card. The information will appear as the organisations start using the e-prescription system. (Raunio 2009)

It has been argued, that there is still no exact description of the forthcoming eHealth services or their hoped for function, even at this point of the development. (Hyppönen 2009) The ePrescription system and the data archive for EPRs are long overdue but the systems are still under development and being tested. (Raunio 2009; Teperi et al. 2009) The completed archive will be one of the biggest archives in the world. (Alapekkala 2009) There have been some doubts as to whether e-prescription will provide healthcare units with accurate medication information. For instance, nurses will not have the right to use information in an ePrescription archive. Patients will also have the right to refuse to use the proposed electronic prescription service. (Heikkilä 2009)

4 Results

To encourage the discussion on the internet discussion board, some propositions for discussion were posted by the author. Most of the participants commented on those and built their answers based on all or some of the propositions. Some of the propositions were based on the national eHealth development issue and others on the management of patient specific medication information in general. Also, some propositions further developed the possibilities provided by electronic access to a patient's own information, for instance the portal for the patients' medication self-reporting. This chapter is organised based on the themes arising from the discussions.

4.1 The electronic use of medication information from other organisations

The first proposition was as follows: *I would search for patient specific medication information from some other place than from my own organisation's electronic patient record, even though it would consume more time.*

The participants commented on the fact that in practice there will be no time for searching for information from another organisation's archives or a national system because the systems work too slowly. They built their claims on the fact that the systems that are currently used only within one organisation delay the work at clinics. Therefore, they believe that searching for information from a national level system will be so slow that they will not have any time for patient care. They were also suspicious

about the accuracy of the information that could be achieved from a national level centralised archive.

4.2 Presenting medication information on a national eArchive

Two of the propositions were closely related to issues related to the national eArchive: *Patients' medication should be presented on the national archive according to the commercial name. The national archive should have a separate patient specific list of risks including suspected, mild and serious adverse effects.*

The physicians thought that the name of the medication should be presented as it is presented on the package because that is the only name the patient might remember. The risk list was found to be useful; however, it was hoped that the list would not be an all-the-time-appearing pop-up warning that needs to be clicked off each time. The reason why this was mentioned, was the current situation where they get a warning almost every time when treating a patient receiving heart medications.

The coordination of patient medication means that the prescribing physician is responsible for a patient's entire medication regimen after the prescribing.

The participants in the discussion found it completely impossible that a physician, probably a different one every time, would be responsible for a patient's entire medication regimen. The reason for that is, according to them, that patients do not usually remember the medication they use, or the dosages. Therefore physicians cannot be responsible for something that some other person has prescribed. It is possible that those medications are not part of a physician's speciality or that the medication has been wrongly recorded into the EPR. A lack of time during a patient's visit was also mentioned as one of the main reasons for not reconciling all the medications at the time of prescribing new medication. This was especially relevant when the patient has several different illnesses and several different medications had been prescribed by different physicians and the visit was for e.g. rhinitis. In such cases there is not enough time for reconciliation.

The participants mentioned the example that physicians working for occupational healthcare do not commit themselves on specialists' decisions since the specialist usually is responsible for those medicines.

4.3 Patients managing their medication information

The forthcoming eAccess will make it possible to view patients' own information in the eArchive. The discussion proposition related to those solutions was as follows: *Patients should be able to complete their medication information, e.g. over-the-counter medicines, to a portal or similar, in order that the information could be used to support the clinical work.*

The physicians were not convinced of patients' capabilities to use a portal. According to them, most of their patients that use several different medications, especially the aged, did not even know what the word "portal" meant. Therefore they believe that the patients themselves would not be the best possible users of a medication portal. They think that it should be a nurse or a physician who would record the information to ensure the completeness and accuracy of the list, but that would require more workers, especially nurses. Generally, the idea of a healthcare professional recording the

vitamins, over-the-counter drugs or herbal products taken by a patient was found to be a good idea.

The participants in the discussion mentioned several times that their patients rarely knew, what the medicines they used were. One private sector physician described the situation that his secretary tells each patient, that anamnesis is highly important and guides them to visit their web pages. The patients are directed to bring all the previous prescriptions and statements, etc. with them for their first, one-hour visit. Despite the fact that the patients pay for private sector services, more than a half of the patients come to the visit without any knowledge of the medicines they use or have taken previously. Emphasising the importance of the medication information does not usually help and the often the patients do not have the information on the next visit either. Public sector physicians experience the same problems and so do those working in the field of psychiatry. In addition to those patients who do not know their medication, there are also patients that, for whatever reason, do not even want to give the name of the medication they are taking.

4.4 Other themes arising from the discussion

Patients lacking knowledge of their medication was the most often mentioned topic in the discussion, even though it was not mentioned in the discussion propositions. It was also mentioned that an updated version of the medication recording part of the electronic patient record would be helpful for the electronic management of patient specific medication information. Again, physicians were suspicious of the influence of the new reference price system that allows a patient to choose from medicines in the same generic group of medication. The reference pricing system was seen as making the situation, from a patient's point of view, even more vulnerable to error. Some physicians even thought that there might be patients possibly taking even triple dosages of the same drug because of the misunderstandings caused by the pricing systems. The different generic options were said to be difficult to follow even for physicians and even more difficult for nurses. With regard to individual practices among physicians, not all the physicians who refer patients to another physician include medication information in the referral.

4.5 The internet discussion board as a data collection method in relation to physicians

The internet discussion board data collection was organised to supplement the other data collections in the project and the aim was not to build the whole data collection on the discussion. It was meant to be more like an innovative experience aimed at increasing knowledge about the possibilities offered by a closed discussion board targeted at professionals. In this case, the data collection was not extremely successful but provided useful comments. A couple of participants appeared immediately when the discussion started and their answers were interesting and seemed to be sincere in the sense that the discussion board allowed the participants to also express negative comments on the themes. As a matter of fact, most of the participants had quite a negative attitude to the current situation of electronic management of patient specific medication information and this came through in their suspicion towards the forthcoming national-level eHealth solutions. Though one could wonder why the discussion board activated only those

physicians with negative experiences, the postings were in line with the interviews conducted earlier in the project.

It may also be important that the timing of the data collection was not perfect, as it started in the middle of the summer holiday season. However, it should be kept in mind that most of the health centres and hospitals also provide services during the summer. After the first peak of postings, the discussion came to an end. Then, after a couple of months, it became evident that there had been a coding error and that the board was not easily visible for the physicians. That error was then put right. However, only a few physicians were activate enough to post new comments. That could also be a correlative of the general activity of the discussion board.

5 The limitations of the study

Because of the low response rate, a generalisation of the results is not possible. Therefore this study should be seen as an experiment to find other means to reach the physicians for the purposes of data collection. Since the activity of the discussion board and the willingness of the physicians' to participate in the data collection was a question mark from the beginning of the organising process, it is possible that some of the physicians perceived discussion boards to be for other purposes than this type of "serious" discussion. A discussion board is probably not seen as a formal setting for a discussion centred on Finnish eHealth development. The lack of participation may also reflect the physicians' attitude to the fragmented and partially prolonged process of developing and implementing healthcare information technology. Also the occasional inoperability of the IS within their own organisation's might have decreased their interest in participating in any discussions.

There are not a lot of scientific papers available on the current status of eHealth development in Finland. The majority of the papers and reports are written by the same group of eHealth experts with access to national level information and the possibility to conduct data collection under an assignment of, for instance, the Finnish Ministry of Social Affairs and Health. The most up to date information is available in newspaper articles or in presentations randomly available on the internet. Therefore, for instance, physicians have probably a less crystalised picture of the current status of eHealth development or on government led policy decisions, and they only become knowledgeable about the innovations for the first time when the systems are being implemented. That was noticed when interviews were conducted among physicians and nurses and was found e.g. that they did not have any information on the future ePrescription development. However, as these are still only plans, most of the physicians are probably not motivated enough to participate in the discussion.

6 Discussion

The data collection was organised to study the issue of medication information management from the physicians' point of view. As mentioned earlier, the healthcare sector is becoming more and more electronic. A lot has been written about technology acceptance and healthcare professionals' resistance to electronic patient records but now that the information systems have been in use for years, it is a good time to think about the pros and cons related to this development. If the physicians are already dissatisfied

with the performance of the information systems they use within one organisation, it is easy to understand that their attitude to even more complex systems is fairly negative.

Though it would be ideal that one physician was responsible for a patient's entire medication regimen, it might be difficult to organise in practice. However, the forthcoming nationwide systems might help at least to check for adverse effects and double dosing cases that are caused by a patient's confusion regarding the same medication that has different commercial names.

Patients have, in many cases, a lot more responsibility for their own medication information than they know. Therefore a functional information system and well-managed medication information could be a significant advantage for health facilities attempting to attract both physicians and patients. As many human factors are involved in electronic management and the exchange of medication information, because there is more to it than just the recording of it, there are a lot of very complex issues to manage certainly more than just the exchange of electronic versions of patient records.

7 Conclusions

The major problems related to the management of patient specific medication information identified here were the current situation of the slow information systems being used and the patients' poor knowledge about their medication. Those two reasons were mainly responsible for physicians not really being convinced of the value of the forthcoming possibilities to search for information in another organisation's archives, or from national, centralised e-archives. Since they also did not believe in all their patients' ability to remember their medication or manage it, they were also suspicious of portals targeted at patient self-reporting. Due to the unreliability of current sources of information and an unwillingness to intervene in specialists' treatment decisions, the coordination of a patient's entire medication regimen was seen as impossible. On the issue of data collection from among physicians, a closed discussion board probably did not facilitate the best possible answers. Also, the discussion was not extremely active; although it did provide interesting material and participants from different specialist areas and at various phases of their career. Thus, based on the quality of the answers, a closed discussion board can be said to be a useful way to collect data from professional groups, providing that the discussion board is active enough and maintained by an established organisation.

References

- Aarnio, Eeva, Raitoharju, Reetta (2008): The use of data sources of medication information - a Finnish primary care organization in the light of national e-Health scenarios, "IFIP International Federation for Information Processing. Towards Sustainable Society on Ubiquitous Networks. ", Oya, M. et al., Springer, Boston.
- Alapekkala, Outi (2009): KanTa - the national electronic healthcare architecture. eHealth Europe. March 2009, No. 75, electronically available: <http://www.ehealthurope.net/news/newsletters.cfm?ID=672>, retrieved 5.5.2009.
- Centre for Pharmacology Therapy (2008): Health care in Finland. Electronically available: http://www.rohto.fi/index_en.php?k=5509, retrieved 27.1.2009

- Engeström, Yrjö (1995): Objects, contradictions and collaboration in medical cognition: an activity-theoretical perspective. *Artificial Intelligence in Medicine* Vol. 7, No. 5, pp. 395-412.
- Fong, John, Burton, Suzan (2008): A cross-cultural comparison of electronic word-of-mouth and country-of-origin effects. *Journal of Business Research* Vol. 61, No. 3, pp. 233-242.
- Gross, Peter A., Bates, David W. (2007): A Pragmatic Approach to Implementing Best Practices for Clinical Decision Support Systems in Computerized Provider Order Entry Systems. *Journal of the American Medical Informatics Association* Vol. 14, No. 1, pp. 25-28.
- Hyppönen, Hannele (2009): KanTa-palvelujen arviointiyhteistyö ja sen hedelmät. *Monitori Seminar 2009*, National Institute for Health and Welfare, Helsinki.
- Hämäläinen, Päivi, Reponen, Jarmo, Winblad, Ilkka (2009): "eHealth of Finland. Check point 2008." National Institute for Health and Welfare, Helsinki.
- Johnson, Grace J., Ambrose, Paul J. (2006): NEO-TRIBES: THE POWER AND POTENTIAL OF ONLINE COMMUNITIES IN HEALTH CARE. *Communications of the ACM* Vol. 49, No. 1, pp. 107-113.
- Kela's role in the implementation of national e-health services. (2008) *InterSystems Nordic Symposium*, Helsinki, June 4. Electronically available: http://www.intersystems.fi/FI/proweb/images/isc_uploaded/5a%20%20KanTa.pps, retrieved 27.1.2009.
- Kuperman, Gilad J., Bobb, Anne, Payne, Thomas H., Avery, Anthony J., Gandhi, Tejal K., Burns, Gerard, Classen, David C., Bates, David W. (2007): Medication-related Clinical Decision Support in Computerized Provider Order Entry Systems: A Review. *Journal of the American Medical Informatics Association* Vol. 14, No. 1, pp. 29-40.
- Landro, Laura (2009): Incentives Push More Doctors to E-Prescribe. *The Wall Street Journal* January 21, 2009.
- Lee, Matthew K. O., Cheung, Christy M. K., Lim, Kai H., Choon, Ling Sia (2006): Understanding customer knowledge sharing in web-based discussion boards: An exploratory study. *Internet Research* Vol. 16, No. 3, pp. 289-303.
- Lillis, Karin (2003): Automated Dosing. *Health Management Technology* Vol. 24, No. 11, pp. 36-37.
- Muniz Jr., Albert M., O'Guinn, Thomas C. (2001): Brand Community. *Journal of Consumer Research* Vol. 27, No. 4, pp. 412-432.
- Mäkelä, Kari (2006): "Terveystietotekniikka - Terveystietojen ja hyvinvoinnin sovellukset". *Talentum*, Helsinki.
- Nebeker, Jonathan R., Hoffman, Jennifer M., Weir, Charlene R., Bennett, Charles L., Hurdle, John F. (2005): High Rates of Adverse Drug Events in a Highly Computerized Hospital. *Archives of Internal Medicine* Vol. 165, No. pp. 1111-1116.

- Reponen, Jarmo, Winblad, Ilkka, Hämäläinen, Päivi (2009): Status of eHealth Deployment and National Laws in Finland. *Finnish Journal of eHealth and eWelfare* Vol. 1, No. 1, pp. 53-58.
- Sautter, Pookie (2007): Designing Discussion Activities to Achieve Desired Learning Outcomes: Choices Using Mode of Delivery and Structure. *Journal of Marketing Education* Vol. 29, No. 2, pp. 122-131.
- Teperi, Juha, Porter, Michael E., Vuorenkoski, Lauri, Baron, Jennifer F. (2009): "The Finnish Health Care System: A Value-Based Perspective". *Sitra Reports* 82, Helsinki.
- Whitlock, Janis L., Powers, Jane L., Eckenrode, John (2006): The Virtual Cutting Edge: The Internet and Adolescent Self-Injury. *Developmental Psychology* Vol. 42, No. 3, pp. 407-417.