

Status of IT in Dutch Hospitals in 2011

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Abstract—The IT-monitor gives an overview on the use and implementation of information technology (IT) in general and university hospitals in the Netherlands. Using the questionnaire, earlier applied in Germany and Austria, all Dutch hospitals were requested to participate, of which 20% responded. The results show that the introduction of IT is realised in various activities in several departments of the hospitals. Examples are the Electronic Health Record (EHR), electronic medical correspondence and diagnostic tests such as radiology. Desktops are most commonly used, but laptop and notebook are also used. On the other hand, IT use for medical guidelines, clinical pathways and clinical reminders are not generally introduced. Five reasons are named as barriers for the introduction: lack of financial support, shortage of staff, inadequate suppliers, lack of support by doctors and difficulties in showing the return of investment. With a larger budget available, hospitals will increase the development of IT on various areas in the hospital departments in the near future towards a more eHealth orientated Dutch healthcare.

Keywords: Dutch hospitals; IT implementation; barriers

I. INTRODUCTION

In January 2006, the Dutch government implemented major reforms to their health care system. With an increase in care, changing care demands, and shortage of personnel, a system of regulated competition was introduced. In an attempt to reduce rapidly rising costs, an eHealth oriented attitude was suggested as well. The use of IT in health organizations can help to make healthcare safer, more effective, and more efficient for the patient, at lower costs [4].

IT studies in health organizations focus on a range of topics, all with the aim to bring satisfied, safer, more effective and more efficient care to the patient at lower cost [8][14][16]. However, the use of IT can also degrade the safety and quality of patients' care [5] and can lead to higher costs [1][2][11][12]. Furthermore, a recent study reports that an increase in IT in Dutch healthcare organizations does not necessarily lead to an increase of adequacy of information management [10].

Research indicates that a number of barriers, which are also interrelated with each other, limits the implementation of IT in hospitals. These barriers can have legal, organizational, financial or technical support features [1] [4] [5][15][16], but also depend on psychological or social factors such as acceptance, usefulness, content [2][14][17].

Various methods have been suggested on how to deal with these barriers, in order to improve care and manage costs for specific health organizations, such as more and better research before IT introduction, more financial and IT support and more standardization [1] [10][11].

Research on IT in healthcare has been categorized into three levels: macro, meso and micro [9]. On micro-level, IT is investigated within one hospital. For instance, the effects of adaptation using IT innovations are investigated. Research on meso-level focus on one country or one region in this country. For example, in the Netherlands, in 2001 and 2009, research on IT use was focused on the electronic transfer process for nurses [6][7][18]. A clear picture of the IT use in hospitals on macro-level, that is multi-national and bi-national, was recently investigated by the EC [3]. Here, for 27 European countries and three other countries (Croatia, Iceland, and Norway) it was found that university, and large hospitals, have better IT implemented in healthcare than smaller, non-university hospitals.

In our research, we focus on the results on meso level, and try to discover today's use of information technology in Dutch hospitals. Besides research on the IT usage by nurses (not discussed here), we also investigate various IT aspects in the hospitals such as the amount of IT implementation in the various departments, for a number of activities, the possible barriers for implementation, the available hardware etcetera.

In this paper, after we explain the method used for our questionnaire, we describe the IT department, where IT is used and how far it is implemented in the departments and in various activities. This is followed by the results on the amount of IT implementation of the EHR and the electronic signature. We describe the hardware used, and mention some barriers named by the respondents. We finish with some ideas for improvements and future research.

II. METHOD

We translated and adjusted the German survey 'Informationstechnologie im Krankenhaus 2011' [13], which focus on the chief information officer (CIO) in the health organization. The survey covered a number of categories related to IT in hospitals such as IT usage, IT department, IT priorities, finance, electronic signature and documents management, finance, and of the usage of Clinical Pathways, cooperation, and EHR's.

The translated questionnaire was implemented in an electronic questionnaire tool and distributed by a web link to 129 members of three Dutch health organizations related to ICT (the Dutch association of hospitals NVZ, the association of informatics and healthcare VlenG, and the association of university hospitals AcZie) working both in university and public acute hospitals. Because of the number of respondents, frequency analyses were executed to report on the situation of IT in hospitals in the Netherlands.

III. RESULTS

A. General information

We received 20 useful questionnaires back (response rate 20.9%) from 16 general and 4 university hospitals. We compared the hospitals who responded to the non-responsive hospitals on three characteristics i.e. academic versus general hospitals, number of beds, and location. 15 % of the general hospitals responded and 50% of the university hospitals. 10 % of the non-respondent hospitals have less than 150 beds, 82% 150 until 999 beds, and 8% more than 1000 beds. The hospitals in this study scored 0%, 90% and 10%. Most hospitals in the Netherlands are located in the western part of the country. Indeed, most hospitals who returned the questionnaires are located there. Based on these results, we concluded that we deal with a representative random sample of the Dutch hospitals.

B. IT Department

All hospitals have an IT department. Most hospitals (57.9%) have more than 20 staff; 20% has between 21 and 25 employees and 15% has 41 until 65 employees. University hospitals have between 135 until 230 workers (20%).

Almost all hospitals (94.4%) have an IT-budget for recent and future IT expenses. Management decides, together with the IT department (38.9%) or with the requesting department (38.9%) on the investments. In most hospitals (55.6%) the IT budget has increased from 2009-2010. For a smaller group (38.9%) the budget remained the same and in one hospital (5.6%) the IT budget decreased.

C. IT usage

The usage of IT in the hospitals is illustrated by the amount of implementation or a plan to implement specific parts of IT usage. In Figure 1 we see that IT is well implemented in clinical documentations, especially in medical correspondence (83.3%) and in the operating room (OR) documentation (77.8%). Also nursing files and medicine usage is available electronically (in almost 70% in more than one department or in the whole hospital). In 5.9% of the hospitals there is no plan to implement electronic nursing records or electronic intensive care (IC) documentation (10.5%) or in medical documentation (5.9%).

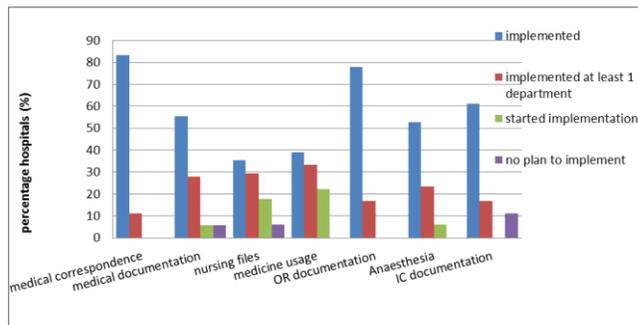


Figure 1. IT Usage in Dutch hospitals

When we look at the IT usage in administration (Fig. 2) we see that the IT usage is highly implemented in the hospitals administration. Only the electronic administration about the costs of medicine is behind other administrative duties, but there is progress (5.6%).

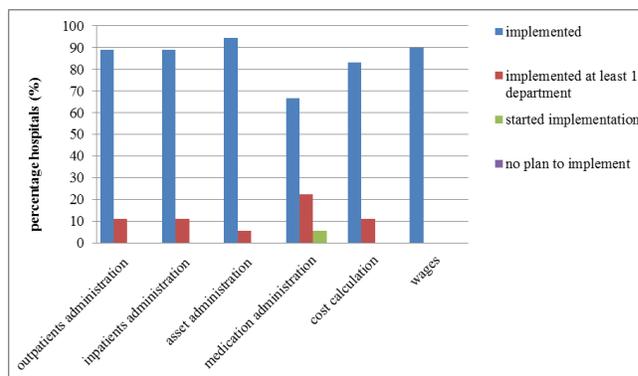


Figure 2. IT in administration

Similar positive results are found in the IT implementation in diagnostic disciplines such as radiology (in 94.4% implemented), laboratory results (in 77.8% implemented), in the management department for example for making duty rosters (in 100% implemented), in patient registration systems for example for patient administration (in 94.4 % implemented),min patient identification (in 64.7% implemented) or in quality management (in 70.6% implemented).

Figure 3 illustrates the introduction of the electronic health record (EHR). In 36.8 % of the hospitals the EHR is completely operational, 35% has started to install EHR. A small amount has already contracts with suppliers (5.3%), or has a plan to implement an EHR system (5.3%). Also, there are still hospitals that have not started to make plans to introduce EHR (5.3%).

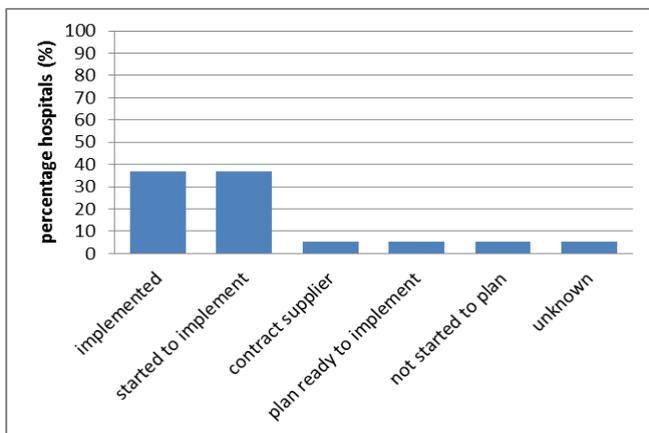


Figure 3. Electronic Health Record

The electronic signature is hardly used in Dutch hospitals. As shown in Fig 4, hospitals do have plans to introduce the electronic signature (33.3%), whereas 22.2% have no plans at all.

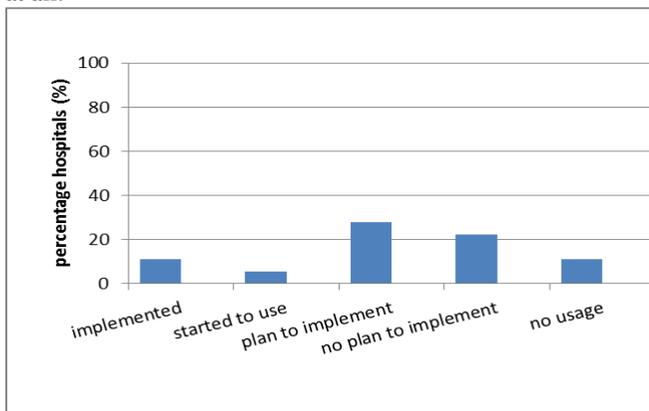


Figure 4. Electronic signature

Also the results on IT usage and guidelines are less positive. Figure 5 shows that the hospitals have only started to implement IT in medical guidelines and clinical pathways, (47.1%), clinical reminders (29.4%) and alerts (35.3%). A small percentage of the hospitals indicate that no plans are made.

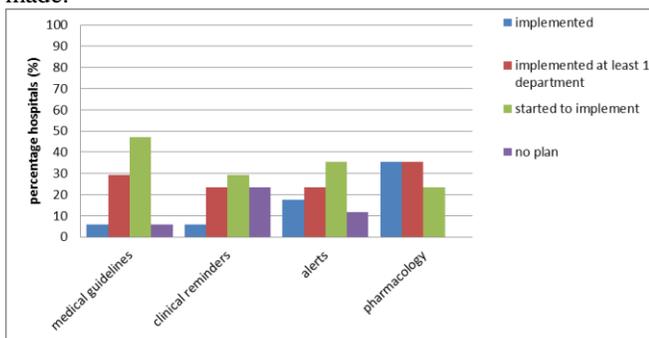


Figure 5. IT and guidelines

Figure 6 shows that hospitals have the opportunity to use modern electronic devices such as laptop (70%), notebook (60%), tablet (25%) or I-Pad (20%), beside pc's (95%) and bedside terminals (4%).

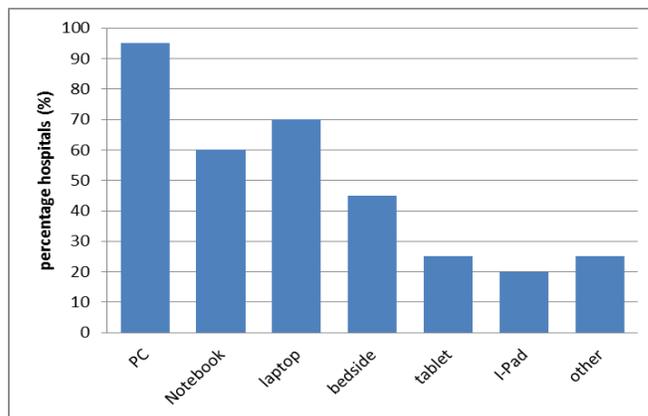


Figure 6. Use of modern electronic devices

Barriers to implement IT successfully in the hospitals are mentioned by 83.3% of the hospitals. Three hospitals (16.7%), i.e. two university hospitals, mention no barriers at all.

Only five of the possible fourteen barriers suggested by the literature are mentioned by the hospitals. The lack of financial support is reported as the most important barrier (38.9%), followed by a shortage of staff in the IT department (16.7%), and inadequate suppliers (16.7%). Also, a lack of support by doctors (5.6%) and difficulties to show the return of investment of IT (5.6%) are named as possible barriers.

IV. DISCUSSION

The study has some limitations. In particular the total number of 20 respondents (roughly 20% of the hospitals in the Netherlands) is rather small. On the other hand, this is quite common for questionnaires, and looking at other parameters like size, location and academic versus general hospital, the study reveals that it is a representative sample.

Another issue could be the questionnaire. If that is implemented the first time, it usually leads to some questions not easy answered. However, the use of the German questionnaire and cross translation and validation ensured that the base quality could be considered adequate. We did not get feedback about the quality of questions or questionnaire. On the other side, this might be a reason for non-response. Also, this study did not concern any technical aspects of health IT.

V. CONCLUSION AND FUTURE WORK

The results show that the information given by the hospitals is a representative sample of the country. The results further show that the introduction of IT is realized in Dutch hospitals, but there are some areas where progress is needed.

Whether hospitals will make progress, will depend on the financial situation and the priority that IT gets. Besides money and means, IT systems must be worthwhile in order to get the support it needs. Government, hospitals and various branches show positive signs to support further introduction.

In order to see whether or not the suggested plans have been executed, and progress has been made, another questionnaire will have to be executed in the near future. Furthermore, in order to get a broader view of the IT use in European countries, i.e. research on macro level, more results on separate countries, i.e. on meso level are needed. At the moment, our results are being compared with the results of Germany and these results will be published in the coming months.

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