Change Management for Implementation of Health Informatics Programs in Serbia

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ABSTRACT - *A successful Health Informatics program is the product of careful planning, sound management, dedicated healthcare professionals and support staff, and a commitment to appropriate funding to support capital purchases and on-going operations. Also, it requires the fusion of multiple technologies such as medical devices, network computing, video conferencing, software and telecommunications, into a seamless system.*

Nevertheless, all new technical implementations impact the social system of which they become a part. This is particularly true of Health Informatics systems .The technological innovation and the desire to diffuse it into the medical profession of the project region, must strategically engage stakeholders within its project scope, and be sensitive to cultural beliefs and the local values system. Effective change requires that people not only believe that change is necessary but understand how change will come about and what the consequences will be. Consequently, the design of the Health Informatics System needs to include both a priori Organizational Change effort to overcome latent resistance within the social system and an early-on and continuing evaluation component to assure accurate feedback of utilization rates on a continuing basis. Of fundamental importance is a clearly articulated and hierarchically supported purpose that facilitates the change process.

Objective of this research is to define appropriate methodology for organizational change interventions for implementation in Health Informatics - telemedicine projects. As a case study we are presenting telemedicine program "THYRONET "developed in Serbia.

Background and significance

Breakthrough medical technologies have already raised life expectancies quickly and dramatically even in poor countries without much health infrastructure. *Human Development Report 2001* (Oxford University Press, 2001) commissioned by the United Nations Development Program (UNDP) argues that information and communications technology and biotechnology can actually make major contributions to reducing world poverty. "Ignoring technological breakthroughs in medicine, agriculture and information will mean missing opportunities to transform the lives of poor people". Advanced medical technologies provide an important solution to providing high quality health care and controlling costs. They can save money, improve quality, increase economic productivity, and save lives. Medical technology is enabling diseases to be diagnosed faster and more accurately, health care providers to be more efficient, patients to recover faster and with improved quality of life, and nations to create greater productive wealth.

Health Informatics systems have a great potential to improve healthcare through the use of information technology, but at he same time they influence social systems of which they become a part [22,9,1]. Appropriate organizational interventions need to be designed into the health informatics projects to overcome inertial resistance to change, monitor utilization, and proactively ensure cost-effective systems implementation. [3,6,8].Continuous feedback loops maximizes stake-

holder input, enhances the recognition for the need to change and indicate level of commitment to the process.

Information and Communication Technology (ICT) and health

Information and Communication Technology can be of great assistance to healthcare professionals in the process of diagnosis, treatment, monitoring, medication prescription, referral, information retrieval and communication, documentation and transactions. Innovations from the information technology industry, applied to health care, can be grouped into the following categories:

- *Public information on health*: health care services and providers, health care policies, legislation, news/information about health and medicine
- *Health information exchange for administrative purposes* between organizations, patients, patient-health insurance, hospitals, clinics; health authorities
- *Telehealth / Telemedicine*: investigation, monitoring, management of patients using remote access to patient data and information provider to provider or provider to patient

Over the years the terminology in health related information technology has changed and continues to change. The World Health Organization (WHO) has addressed this issue with an alternative idiom, Health Telematics, (2) which is a composite term defined as:

- "health-related activities, services and systems, carried out over a distance by means of information and communications technologies, for the purposes of global health promotion, disease control and health care, as well as education, management, and research for health."

Information and Communication Technology (ICT) and change management

Change management is about people, not about changing technology or processes. For change to work, it needs participation from all sides. It should involve all stakeholders, but the message, the training and the involvement should be tailored to the needs of each individual group. For change to last, it has to be reinforced. And the more control people feel they have over the change, the less stressed they become [33] . According to Bashshur (1997):

"When technological innovations are not accepted or implemented properly, generally the failure may be traced to a poor fit between the nature of the innovation and the vested interests, resources, and expectations of its major gatekeepers."

The importance of managing organizational change effectively has compelled a growing number of organizations to incorporate the discipline into major initiatives of all sorts, from the introduction of IT software packages to business process and organizational structure changes. The contribution of effective change management/leadership to the achievement of positive results is quite evident. Statistics Canada has reported that Canadian firms have achieved performance improvements of 46 percent for process innovation, 32 percent for product innovation and 25 percent for productivity improvement, when combining of innovative Human Resource Management (HRM) practices with information and communication technologies (ICT), in change initiatives. When firms do not include, or use only low levels of HRM practices, and only rely on high ICT for

benefits, the resulting productivity improvements were noticeably smaller: 24 percent for process innovation, 14 percent for product innovation and 9 percent for productivity improvement [28].A large number of ICT programs are actually more predominately change programs, or service improvement programs, with the implementation of technology being only part of the solution [17]. Furthermore, concentrating on the technological aspects of these programs can lead to less effective results.

Research methodology

Previously, we have reported a development of cost-effective, highly efficient electronic Thyroid consultation and referral system from primary care to secondary and tertiary institutions in Serbia " THYRONET SERBIA" [23].

Research on quality improvement in health care shows that there are some areas of organizational development that are particularly important [32].Firstly, cultural change ensures that the underlying beliefs and values of the organization support the open, constructive reflection required for effective clinical governance. Secondly, "technical" development ensures that people have the skills to undertake such work, and, thirdly, structural development of committees and systems is necessary to coordinate and monitor quality improvement work. In addition, effective organizational development requires determined leadership. Those responsible for the development of clinical governance will need a clear understanding of what is being introduced and why.

From the literature review we have found that following approaches have been considered to be essential for successful implementation of health information technology [4,34] :

Leadership- health informatics projects need three kinds of leaders: one (or more) physician champion(s), a senior management commitment and a skilled project manager.

Detailed planning. -All project managers have to be trained in developing detailed project plans.

Managing expectations.- Careful consideration has to be given to the scope and benefits of the projects so that user expectations are kept realistic

Ensure that clinicians are an integral part of the initiative. Where appropriate, project sponsors have to be lead clinicians and both project steering groups and working groups consisted of multidisciplinary groups. Members of both working and steering groups have to include clinical staff from a wide variety of backgrounds, e.g. physicians, nurses, administrative staff and allied health professionals.

CASE STUDY - "THYRONET SERBIA"

An eElectronic Thyroid Consultation Network to Optimize Patient Care in Serbia

Currently in Serbia, estimated 80% of all referrals to Tertiary Care for Thyroid disease are deemed unnecessary or ill-timed by the specialty care providers, and detract from time and effort available to treat the remaining appropriate referrals. Specialists are forced to conduct trips to Primary Care facilities to effectively triage the thyroid cases that truly need to be seen in the Tertiary Care setting. Caseloads during these trips are high, reducing patient to specialist interaction to a few minutes per patient. Documentation on patient treatment rarely is delivered from Primary

Care to the Specialty Care center, necessitating costly duplication of laboratory and radiology testing. Documentation from the Specialty Care center often does not return to the Primary Care center, rendering follow up care more difficult, and denying Primary Care clinicians with the opportunity to learn from each case.

A deployed web-based electronic consultation system is proposed to alleviate the problems noted above. Specialty Care endocrinologist and Nuclear Medicine specialists created web-based protocols for patients referred to their facility. These forms dictate the minimum level of clinical data required for referral. A clinical case manager will review these submitted consult requests, triage them, and forward to the appropriate specialist/sub-specialist. The receiving specialist will only accept the referral after approval. Interaction between referring provider and specialist about the case will occur securely within the system. Treatment recommendations, additional diagnostic studies and other required data would be exchanged in this manner. Patient treatment notes, diagnostic findings and follow up notes will be stored within the system. As patient's return to the Primary Care setting, their case history and treatment plans will be available for the referring provider for review.

An important first step in this extensive project is the development of a pilot program implementing web based consultation in a patient referral system. The pilot program comprises an electronic consultation and referral system between the Thyroid Gland and Metabolism Institute in Zlatibor and the Endocrinology University Clinic in Belgrade.

The Thyroid Gland and Metabolism Institute in Zlatibor exemplifies an excellent model for rationalization of a patient referral system, since almost 100% of the patients that enter the Institute are being referred to specialist consultations. Institute in Zlatibor consists of hospital facilities (400 beds) and out-patients unit (ambulatory part). It is a combination of a local (regional) primary health institution (for out-patients) and specialized hospital (second and tertiary level). Thyroid disease patients from the surrounding area (population of approximately 2,000 000 people) are reefed to Thyroid Gland and Metabolism Institute in Zlatibor. Although almost all procedures routinely used in thyroid disease diagnostics and therapy are available the in Zlatibor current physician and staff education levels and experience are at the primary care level. Specialty care consultations are provided by the referent (University) institutions from Belgrade (350 km distance). These specialists travel to Zlatibor to review practically all in-patients and outpatients during their weekend visits. They usually have around 200 consultations per visit (averaging two minutes per patient). Thus, the quality of this type of consultation is less than ideal.

The use of an electronic system will optimize the time a specialist spends with a referred patient, as complete diagnostic workups will have been completed. Additionally, this needy patient will not be competing for specialist time with inappropriately referred patients. Electronic storage of patient information allows for rapid retrieval and secure archival of critical information. Additionally, modern database information supports detailed data analysis to observe clinical patterns and treatment effectiveness.

Nevertheless, ITC - telemedicine projects like “Thyro-Net Serbia” not only hold the potential for increasing patient access, and enhancing the quality and timeliness of patient care, but they also hold the potential of altering the flow of clinical information and the potential to alter the loci of clinical decision-making .It is in the latter two areas that we find the roots of social resistance to the utilization of Health Informatics systems. The degree of this resistance varies from case to case, but is always present and more often than not results in low utilization rates of Health Informatics solutions after the initial “honey moon period” of new implementations. To overcome this serious

problem, the design of the Health Informatics system needs to include both a priori Organizational Change effort to overcome latent resistance within the social system and an early-on and continuing evaluation component to assure accurate feedback of utilization rates on a continuing basis.

We have defined organizational change interventions during the initial implementation phase and a continuous monitoring of system utilization for "Thyro-Net Serbia". Additional Organizational Change interventions will be designed as dictated by downward trends in utilization rates of this project. The Organizational Change program involves group sessions with both Primary as well as Secondary and higher care-givers and their staffs at the onset of the pilot project, and thereafter as necessary. The monitoring effort is continuous during the entire length of the project and include on-site observation during at a 3 day period in time during the 0-3 month, 11 to 12 months, 23-24 month time-line periods. Qualitative methodologies are used as primary data collection techniques, with especial reliance on structured interviews and field observations. Local professionals are utilized to assist implementing the methodologies to facilitate cross cultural communications. Analysis of system utilization data will allow quantitative data cross-validation of the qualitative results.

One unanticipated, but functional result of Health informatics systems such as that here proposed has been the continuing medical education of Primary care-givers by Secondary and higher care-givers. This learning has been seen to occur at both an individual as well as an organizational level [5]. In addition to continuous utilization monitoring, a second effort will be undertaken to document both the individual and organizational learning which occurs as a consequence of the implementation of the proposed pilot Health Informatics system.

Discussion

Applications of health informatics can be done in all areas of patient care [14] provided by real-time and/or store-and-forward technologies [10,12] ranging from telephone and fax machines, e-mail, chat rooms, discussion boards, audio- and video-conferencing. Administrative applications include recording [19] and sharing of billing summaries, electronic connections to pharmacies, etc. Remote medical instruments include various types of imaging technologies [30], pressure sensors, haptic feedback devices and robotics. Educational applications focus on continuing medical education for professionals and patients [13] including tele-mentoring. Further, there exists substantial evidence that a byproduct of telemedicine implementation is substantial continuing education for all participants.

Clear benefits arising from the introduction of new information technology solutions are reported in the healthcare services literature. A systemic review by Chaudray [3] identified three major benefits for quality: increased adherence to guideline-based care, enhanced surveillance and monitoring of care, and reduced medication errors. Wolf [34] highlights that there are potential cost savings as manual tasks become automated and also acknowledges that better information can lead to earlier therapeutic interventions. However, in order to realize these benefits attention needs to be given to organizational change, workflow redesign (new ways of working) and human factor issues in order to provide systems that support the dissemination and sharing of meaning, rather than just information [11]..

The importance of understanding communication flows, human factors (engagement and active support) and organizational factors (structures, project management processes and proce-

dures) involved in implementing any new IT system has been cited in numerous publications [28,27,21] as well as being at the heart of some very public failures [25].

In the European Union "The European Fourth Framework Program for Research and Technological Development" and "The Global Healthcare Application Project" dedicate many sections to healthcare and contain many health informatics projects [7,20].

Information technology interventions in health care have been found successful in terms of cost effectiveness as well as in patient satisfaction. Currently there are widespread health informatics programs in the United States of America and throughout the world [15]. Health Informatics projects have been very successful in developing countries [29,24], and their clinical and economic utility has also been demonstrated in neighboring Croatia and in Kosovo [16,18] .

Our experience has shown that the earliest inclusion of each site's administrative and clinical leadership is imperative to ensure success of the health informatics program. Lasting and meaningful organizational change ultimately comes from the individuals who are the building blocks of the organization. Prior to the first year implementation, sponsorship or sense of participatory ownership must be cultivated, strengthened and shared with each facility to ensure success of the pilot program, and a successful transition from pilot deployment to the broader integrated delivery of care. The true key to sustainability will be dependent upon the successful implementation of the Thyroid Network, where primary care clinicians receive timely and accurate responses to their requests, and specialists are able to better screen and prepare for the most appropriate referrals. This success will occur with the inclusion of the Ministry of Health leadership, the hospital leadership, and the consulting clinicians, in all aspects of the program, to ensure the focus is retained on the improvement of the health of the Serbian people.

References

[1] Aas IH. Telemedicine and changes in the distribution of tasks between levels of care. J Telemed Telecare. 2002;8

[2] A Health Telematics Policy in support of WHO's Health-for-All Strategy for Global Health Development,11-17 December, Geneva,1997.

[3] Amendola, Mario and Jean-Luc Gaffard The Innovative Choice. An Economic Analysis of the Dynamics of Technology. *Basil Blackwell Limited*.UK. (1988).

[4] Chaudray B, Wang J, Wu Setal. Systematic review: impact of health information technology on quality, effi ciency, and costs of medical care. *Annals of Internal Medicine* 2006;

[5] David C. Bangert and Robert Doktor (eds.). Human and Organizational Dynamics in e-Health. *Radcliffe: Oxford/Seattle*, 2005.

[6] Davies, Stephen THE DIFFUSION OF PROCESS INNOVATIONS. *Cambridge University Press*. Cambridge ,1979

[7] De Moor, G., Laires, Maria, McCurry, M., Thayer, Christine. *The European Health Telematics Observatory*. Medical Informatics Europe '96 - Human Facets in Information Technology, IOS Press, Amsterdam, 1996, pp. 108-112

[8] Dodgson, Mark and John Besssant (1996). Effective Innovation Policy: A New Approach. *International Thompson Business Press*, London)

[9] Frances Mair and Pamela Whitten Systematic review of studies of patient satisfaction with telemedicine .BMJ, Jun 2000; 320: 1517 -

[10]Harno KS. Telemedicine in managing demand for secondary-care services. J Telemed Telecare 1999; 5: 189-192

[11] Hartswood M, Proctor R, Rouncefi eld M, Slack R. Making a case in medical work: implications for the electronic medical record. *Computer Supported Cooperative Work* 2003; 12; 241–60.

[12] Houston MS, Myers JD, Levens SP, McEvoy MT, Smith SA, Khandheria BK, Shen WK, Torchia ME, Berry DJ. Clinical consultations using store-and-forward telemedicine technology. Mayo Clin Proc. 1999 Aug;74(8):764-9.

[13] Ian Jardine and Bruce A Swanson Reconfiguring health systems BMJ, Mar 2003; 326: 599

[14] Johnson P, Andrews DC, Wells S, de-Lusignan S, Robinson J, Vandenburg M. The use of a new continuous wireless cardiorespiratory telemonitoring system by elderly patients at home. J Telemed Telecare 2001; 7(suppl 1): 76-

[15] Kokesh J, Ferguson AS, Patricoski C. Telehealth in Alaska: delivery of health care services from a specialist's perspective. Int J Circumpolar Health. 2004 Dec; 63(4):387-400.

[16] Kovai L, Lonari S, Paladino J, Kern The Croatian telemedicine Stud Health Technol Inform. 2000, 77:1146-50

[17] Legris P, Collerette P. A roadmap for IT implementation: integrating stakeholders and change management issues. *Project Management Journal* 2006; 37 (5); 64–75.

[18] Latifi R, Muja S, Bekteshi F, Reinicke M. Use of information technology to improve quality of healthcare: Kosova's telemedicine project and international virtual e-hospital as an example. Stud Health Technol Inform. 2004;104:159-

[19] Loane MA, Bloomer SE, Corbett R, Eedy DJ, Hicks N, Lotery HE, Mathews C, Paisley J, Steele K, Wootton R. A randomized controlled trial to assess the clinical effectiveness of both realtime and store-and-forward teledermatology compared with conventional care. J Telemed Telecare. 2000;6 Suppl 1:S1-3.

[20] Marcin JP, Nesbitt TS, Cole SL, Knuttel RM, Hilty DM, Prescott PT, Daschbach MM. Changes in diagnosis, treatment, and clinical improvement among patients receiving telemedicine consultations. Telemed J E Health. 2005 Feb;11(1):36-43.

[21]Marsden C, Taylor S, Coker D. Implementing an electronic patient record for Leicestershire's therapists working in the community: 2002–2005. *British Journal of Healthcare Computing and Information Management* 2005; 22 (5); 20–2.

[22] Pamela S Whitten, Frances S Mair, Alan Haycox, Carl R May, Tracy L Williams, and Seth Hellmich Systematic review of cost effectiveness studies of telemedicine interventions BMJ, Jun 2002; 324: 1434 – 37

[23] Paunkovic J, Doktor R, Paunkovic N, Whitton R, Garshnek V :An Electronic Thyroid Consultation Network to Optimize Patient Care. VIPSI-2008 CROATIA – OPATIA, April 2008 19-23

[24] Person DA, Hedson JS, Gunawardane KJ. Telemedicine success in the United States Associated Pacific Islands (USAPI): two illustrative cases. .Telemed J E Health. 2003 Spring;9(1):95101

[25] Reider J. Cedar–Sinai Medical Center suspends CPOE. January 2003.

[26]Ryder-Smith J. The secret of good conversations: investing in success. *Health Manpower Management* 1998; 24; 38–40.

[27] Smith A, Preston D. Communications between professional groups in an NHS trust hospital. *Journal of Management in Medicine* 1996; 10; 31–8.

[28]Statistics Canada report: Wulong Gu and Surendra Gera. (Nov. 2004). The Effect of Organizational Innovation and Information Technology on Firm Performance.

[29] Steven M Edworthy Telemedicine in developing countries BMJ, Sep 2001; 323: 524 - 525.

[30] Weinstock MA, Nguyen FQ, Risica PM. Patient and referring provider satisfaction with teledermatology. J Am Acad Dermatol. 2002 Jul;47(1):68-72

[32] Wild E L, Hasting T M, Gubernick R, Ross D A, Fehrenbach S N. Key elements for successful integrated health information systems: lessons from the states. *Journal of Public Health Management Practice*

[33] Witchalls, Clint. "The art of change management. " Computing. (June 28, 2007): 33.

[34] Wolf E J. Critical success factors for implementing CPOE. *Healthcare Executive* 2003; 18 (5); 14–19.