

Health Informatics Journal

<http://jhi.sagepub.com>

Deploying a Culture Change Programme management approach in support of information and communication technology developments in Greater Glasgow NHS Board

Joanne Frame, Janice Watson and Katie Thomson
HEALTH INFORMATICS J 2008; 14; 125
DOI: 10.1177/1081180X08089320

The online version of this article can be found at:
<http://jhi.sagepub.com/cgi/content/abstract/14/2/125>

Published by:



<http://www.sagepublications.com>

Additional services and information for *Health Informatics Journal* can be found at:

Email Alerts: <http://jhi.sagepub.com/cgi/alerts>

Subscriptions: <http://jhi.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.co.uk/journalsPermissions.nav>

Citations <http://jhi.sagepub.com/cgi/content/refs/14/2/125>



Deploying a Culture Change Programme management approach in support of information and communication technology developments in Greater Glasgow NHS Board

Joanne Frame, Janice Watson and Katie Thomson

This article reports on the project management and Culture Change Programme adopted by the NHS Greater Glasgow Health Board to deliver an electronic patient record (EPR) to support cardiology and stroke clinical services. To achieve its vision for the EPR ('to "really make a difference" to patient care by providing to the right person, the right information, under the right safeguards') the Board recognized that attending to social and organizational issues is at least of equal importance to addressing strictly technical concerns. Consequently, an ICT Culture Change Programme (ICT CCP) was devised and implemented to assist in the management of change, and in particular to facilitate a visionary clinical and cultural environment operating in conjunction with the evolving technical environment. In this article we describe the key components of this approach, outline the benefits we believe have accrued, and describe the steps being taken to build upon lessons learned.

Keywords

change management, culture change, electronic health record, electronic patient record, project management

Introduction

The National Health Service (NHS) Health Board in Greater Glasgow (NHSGG) is the largest health board in Scotland, providing health services to a population in excess of 1 million people. In 2002, NHSGG embarked on the development of their first NHS Glasgow-wide

information communication technology (ICT) strategy with the banner statement 'to "really make a difference" to patient care by providing to the right person, the right information, under the right safeguards, whenever and wherever required'. The first 2 years focused on key infrastructure deliverables such as new workstations, improving the network, and improved information technology (IT) support. The ICT strategy (2004–7) continued to evolve further, capitalizing on the initial 2 year plan and developing the vision to provide 'improved access to easy to use, more fully "joined up" patient information through the creation of an electronic, integrated care record, available wherever and whenever required'.

The refreshed strategy focused on three main themes:

- 1 eTechnology – technical infrastructure
- 2 priority programmes – covering areas like acute/primary care links, a picture archiving and communication system (PACS: medical imaging), single interface portal technology, GP systems, links to social services and to pharmacy and prescribing
- 3 eAttitude – creating a change-oriented environment (ICT Culture Change Programme).

Clear benefits arising from the introduction of new information technology solutions within the NHS are reported in the healthcare services literature. A systemic review by Chaudray et al. [1] identified (from the 257 studies that met the criteria) three major benefits for quality: increased adherence to guideline-based care, enhanced surveillance and monitoring of care, and reduced medication errors. Wolf [2] 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 [3].

Following Wilson and Greaves [4], NHSGG recognized that in order to achieve their vision they needed not only to develop a technical environment that is 'fit for purpose' but crucially also to establish and support positive clinical and cultural environments through deployment of the ICT Culture Change Programme (ICT CCP). The importance of understanding communication flows, human factors (engagement and active support) and organizational factors (structures, project management processes and procedures) involved in implementing any new IT system cannot be emphasized enough and has been cited in numerous publications [5–9] as well as being at the heart of some very public failures [10].

This article describes the ICT Culture Change Programme in support of the implementation of electronic patient record systems within stroke and coronary heart disease units across NHSGG.

Culture change and ICT

The ICT Culture Change Programme was initiated in 2002, in recognition of the importance of the change management and service improvement aspects of implementing technology. The Scottish NHS ICT National Strategy for IM&T Education, Training and Development [11]

provided part of the direction for the programme. This direction was further endorsed by a review of previous NHSGG ICT projects and lessons learnt from their implementation.

Developing the context

Based on lessons learned from previous projects, the NHSGG identified the following critical dependencies for any successful ICT project:

- the availability of trained, experienced people operating within clear guidelines (roles, responsibilities with clear processes and procedures) [8, 9, 12]
- the utilization of project management methodologies [9]
- the communication, support, cooperation and enthusiasm of those who will operate the new processes and systems (stakeholders) [8, 9, 13].

The core objectives

The core objective of the ICT Culture Change Programme was to encourage the successful implementation of technological change within NHSGG achieved primarily by:

- 1 developing a culture within the service that would ensure that all ICT projects incorporated a robust and standardized approach to the management of projects with training support
- 2 developing facilities to support and encourage staff through changes introduced by the ICT programmes.

Key to the implementation of this programme was, and remains, the continued use of the 'learnings' from each ICT project as a knowledge bank for future projects, thus embedding good practice into new processes. This would eventually evolve to become the normal way for ICT projects in NHSGG to operate. It is important to remember that change in culture can typically 'take five to seven years to engender within an organisation' [14]. The approach is enhanced by the continued increase of skilled and experienced individuals as each project is delivered. These resources can be used to form a pool of expertise, providing capacity which can be called upon to support new project implementations.

Key deliverables of the ICT Culture Change Programme

The ethos of the ICT Culture Change Programme is encapsulated in its communication banner 'developing new ways of working'. The following developments are central to its delivery.

Introduction of a common project management methodology

This provides individuals with clear understanding of the 'what, why, who, when and how' of the project and enhances clear communication between all stakeholders (sponsors, project managers, project teams and employees involved or affected by the project outcomes).

A standardized project management methodology is recognized as a key requirement within a successful organization [15]. The benefits of a standardized project management approach can be summarized as follows:

- development and nurture of good practice culture
- delivery and breakdown of all high level organizational objectives in a clear, organized and logical way
- improvement of the quality of project/programme information and status
- maximizing the use of all available project/programme information and therefore identification of project interdependencies
- identification and use of resources effectively and efficiently
- identification and correction of programme/project barriers.

The ICT Culture Change Programme developed new business processes and operating procedures supported through the introduction of the NHSGG Executive Leadership and Management of Projects (ELMP) project management methodology (Figure 1). ELMP is a simplified version of Prince 2, developed as a more palatable option for the organization to encourage wider adoption. This methodology addressed the key requirements for projects including planning of project lifecycle, clear documented objectives, stakeholder analysis, initial risk assessment, and detailed work and cost plans included within the detailed project initiation package (PID). In addition the project management approach includes project support techniques (continuous improvement tools such as process mapping, problem solving and team working), project monitoring and monthly reporting processes. The 'slimmed-down' version concentrated on just 8–10 forms, or templates, compared to the full total of 30+ in Prince 2, and adoption was supportively encouraged rather than mandated, allowing feedback from project managers to improve the process as the organization (or parts of it) felt ready to implement more of the management tools.

Critical to successful deployment of a standardized project management approach is the provision of a training programme by the ICT Culture Change Team to ensure that all individuals have the opportunity to develop the skills and knowledge required to utilize successfully the processes and methodology and receive project support whilst undertaking their ICT project work.

Service improvement change agent programme

A large number of named ICT programmes are actually more predominately change programmes, or service improvement programmes, with the implementation of technology being only part of the solution [13]. Furthermore, concentrating on the technological aspects of these programmes can lead to less effective results. Mindful of this, it was considered important to augment the development of project management skills with continuous improvement tools. Continuous improvement tools such as process mapping, graphical techniques and statistical analysis help to clarify workflows and processes and assist in problem solving by highlighting and identifying potential problem areas, e.g. bottlenecks. To this end NHSGG developed a Green Belt (project team member) and Black Belt (project lead) change agent programme, including Lean Sigma concepts, to provide an NHS-tailored version of the internationally recognized and accredited programme utilized by General Electric HealthCare. Beneficial results have been shown following application

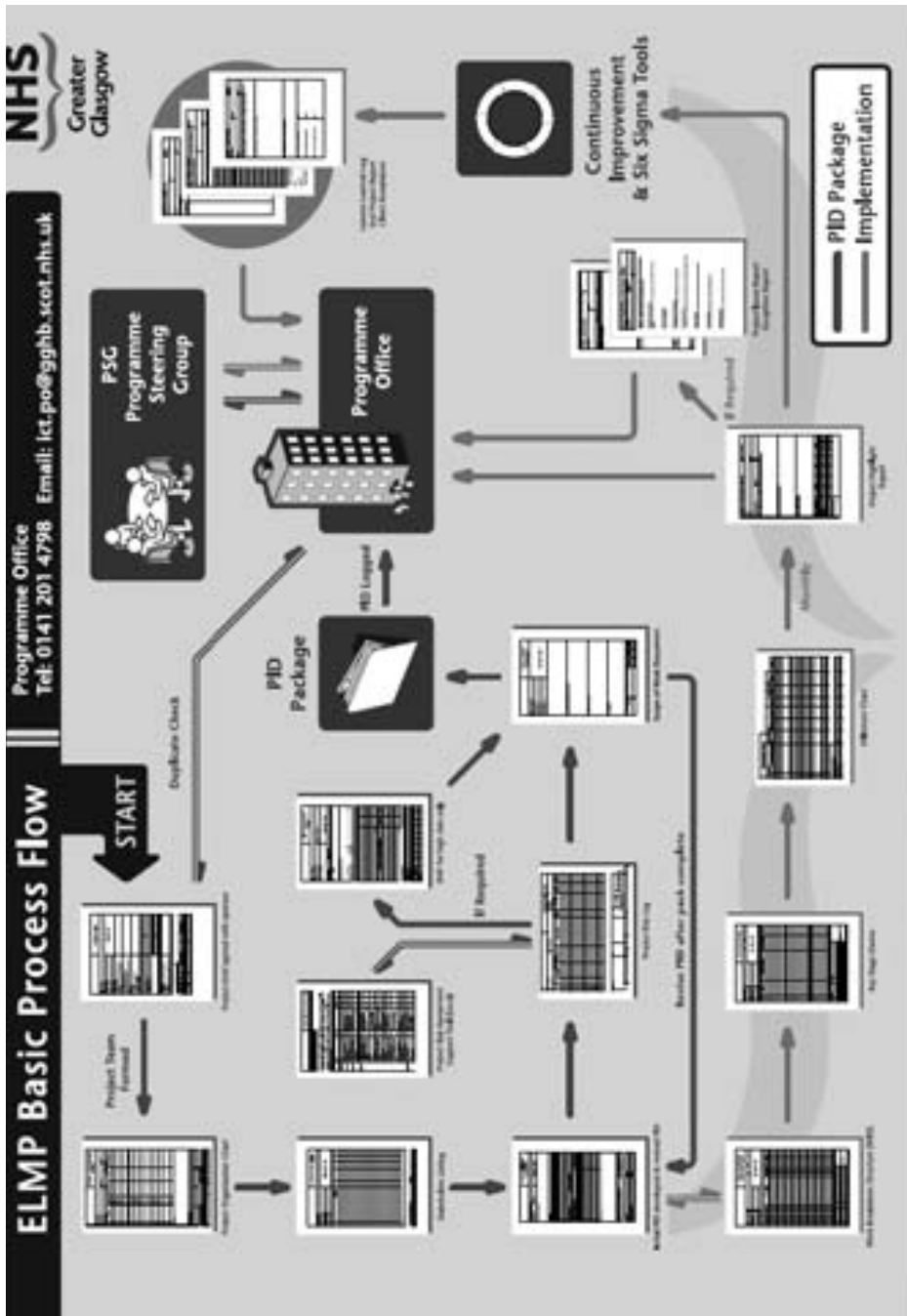


Figure 1 ELMP basic process flow

of the Lean Sigma approach in a healthcare environment [16]. Lean Sigma consists of tools and techniques which reduce waste and variation in a process, by identifying and reducing non-value work such as process delays, inventories, transportation, duplication, and by reducing the variation or fluctuation in process outputs. The change agent accreditation programme incorporates the attendance of training modules providing both hard and soft skills (communication and leadership), the delivery of an actual project improvement, self and sponsor assessment against core competencies, and project presentation to the accreditation committee of their project benefits to the organization. These core components are supplemented by coaching and mentoring support to assist in embedding and applying an individual's and/or team's competencies.

ICT governance infrastructure

All new processes and procedures introduced by the ICT Culture Change Programme required a support and governance infrastructure [8]. This consists of four operational arms, as follows.

ICT Programme Board

A key group in the development of NHSGG's ICT strategy and programme, the ICT Programme Board was established to encourage sharing of information and success throughout NHSGG, with particular emphasis on exchanging information on:

- broad objectives and possibilities
- benefits realization
- impact on patients, clinicians and administration
- barriers
- dependencies.

The ICT Programme Board authorized and funded the ICT Culture Change Programme as a necessary infrastructure programme in support of the delivery of the ICT strategy.

ICT Programme Steering Group

The ICT Programme Steering Group was introduced by the ICT Culture Change Programme to prioritize, support and manage ICT projects with respect to interdependencies, resource capacity and resolution of escalated issues. An escalation route to the ICT Programme Board is available for project risk resolution.

ICT Programme Office

The ICT Programme Office (ICT PO) was introduced to provide a central focus to inform the NHSGG organization on project processes for a range of programmes and projects.

The aim of ICT PO is to assist all project managers to develop a core set of project management skills (with common processes and templates) and to provide a support organization for project management. In addition, it aims to serve as a focal point providing

and communicating an NHSGG-wide view of the status of all projects and to report on improvements implemented and project delivery capabilities. The ICT PO also coordinates the improvements and developments to the project management methods, through a formal consultation and change control process.

ICT Culture Change Programme Board

This Programme Board provides the steer to the ICT Culture Change Team, to ensure that objectives are aligned to the goals of the NHSGG organization. Membership has developed over time and has included GP representation, public health, employee director and organizational development management, as well as key project managers.

Communications

Communication within the NHS is a complex process; however, effective communication and engagement with project sponsors and stakeholders throughout the project lifecycle will improve successful project implementation [8, 9]. The ICT Culture Change Programme adopted a multifaceted communication strategy supported through the development and distribution of the ICT Culture Change Communication Plan which informed projects managers of the supporting NHSGG ICT infrastructure network and communication tools available to assist in successful project planning, scoping and implementation. Communication techniques that were introduced in support of ICT project delivery are outlined as follows.

Communication and learning maps

The ICT Culture Change Team identified that not all NHSGG staff clearly understand the need for change or how these changes relate specifically to their jobs. The interactive learning map process was adopted to provide a storyboard approach, which helped to simplify the complex service issues present in the environment in which we operate and promote an understanding of how and why we responded to specific challenges in particular ways (Figure 2). The maps provided a tool for innovative learning, communications, and change management processes that then helped engage and enlist staff at all levels in working towards realizing the goals and specific projects within the ICT strategy (learning map process based on the Root Learning Inc. approach used by Motorola and NCR businesses).

The learning map process. This technique helps participants make connections, share experiences, and challenge assumptions. It builds the capability for dialogue and teamwork by focusing on a specific organizational issue. Groups typically involve 10 participants and the exercise takes between 60 and 90 minutes to complete. The exercise includes a visual aid (the learning map) which aims to metaphorically represent important learning issues. The kit includes card exercises with complementary data that allow learners to make key connections to the metaphorical representation on the visual aid. It also includes strategically directed dialogue questions that foster learning within the group by generating conversation.

A facilitator guides a small group through the learning process in a team-based environment. While the group brings different levels of experience and accountability to foster

a broad view of the organization, the facilitator prompts discussion with questions and channels feedback to the service. The use of visualization in the approach accelerates learning by creating a shared framework and fosters 'systems thinking' by connecting concepts to one another and to the whole. The dialogue developed engages people in exploring the questions critical to the organization, focusing conversations on issues relevant to the organization and connecting individuals to key organizational levers.

Learning development involves three key stages:

- 1 Define strategic and/or operational content.
- 2 Develop an understanding of the content into a map.
- 3 Deploy the content effectively within the organization, by linking learning and communication to the goals.

Once the material is developed, it can be cascaded to large numbers of target groups effectively. This is done by using a 'train the trainer' approach: once key staff have gone through the learning map process they are then recruited to participate in additional sessions before facilitating their own events.

The benefits of this approach are:

- improves understanding of key issues impacting the NHSGG
- creates state-of-the-art learning tools to help achieve goals
- assists in building alignment, increasing understanding, and facilitating change
- engages employees in the organization, in their work, and in generating ideas for results
- communicates strategic and operational issues clearly
- helps launch new concepts, ideas, and processes, such as the ICT strategy
- interprets complex organizational issues clearly and creatively
- helps people learn and adapt more quickly
- helps sustain learning engagement and change.

The concept is based on the principle of:

Tell me, I might forget; show me, I may remember; involve me, and I'll understand.
(Chinese proverb)

Open space events

Open space events are facilitated jointly with project managers and members of the ICT Culture Change Programme. This approach is used as an opportunity for all stakeholders from ICT projects to interact, share and gather information needs and work together through open discussion and group sessions.

In practice

The project approach applied in developing both stroke and coronary heart disease (CHD) clinical information systems commenced with the development of a multidisciplinary

clinical team to agree a common understanding of the issues and gain broad stakeholder involvement. Both teams had representatives from across NHSGG (historically, different parts of the city have been autonomous and developed their own technical, clinical and cultural processes separately). The remit of each team was to define and agree the requirements for a single NHS Glasgow-wide patient information system for their specific speciality and to oversee its development. Each team was led by a project manager, supported by their specific project steering group. Each project was sponsored by a senior clinician who championed the project, and actively resolved strategic issues for the project manager. Both projects utilized the project management methodology, developing a project initiation document, reporting on project progress monthly, and escalating high risks, when necessary, to the ICT Programme Steering Group for resolution.

The first phase of the stroke electronic patient record consisted of a scoping exercise to determine existing systems (paper and electronic) and to define needs and priorities for a clinical information system. This was done by interviewing staff and conducting an open space event. This event, jointly facilitated by the project manager and members of the ICT Cultural Change Team, provided the opportunity for experienced professionals from different organizations to interact, share information and work together through open discussion and group sessions. The second phase of the project was to gain agreement for an NHS Glasgow data set for stroke documentation, which covered eight hospitals and nine professional groups, included both inpatients and outpatients, and supported both discharge and primary care sections of the documentation. This allowed a review of the current paper process to be analysed in stages.

The current phase of the project concerns the development of the electronic screens from the paper documentation and the piloting of the electronic patient record (EPR) within one hospital site.

Interestingly, one issue to arise during the piloting process highlighted the problem of recall when information is presented to the clinician as a series of data items rather than the usual narrative format used in a paper-based case record. A number of clinical staff commented that not having this narrative made it more difficult to remember individual patients and link information in a meaningful manner. This would suggest that careful attention is required when structuring and organizing information electronically and when developing patient summaries. This echoes findings from a Canadian study of physician use of an EPR [17] where most clinicians commented that they found difficulty in adjusting to the hierarchy and structure of knowledge representation in an EPR.

We also found that changing paper-based records to electronic can create difficulties in the translation. An example of this in the stroke project was in the recording of patient drugs. A paper-based system allows the insertion of drugs and associated information with relative ease. When initially designing the electronic version the development team created many iterations, ensuring the electronic form was as easy to use.

Users classically would enter the name of the drug on the paper-based system. Electronically we are providing a searchable list, so first we take the user to the appropriate British National Formulary (BNF) group and further select the appropriate drug. The introduction of the Scottish National Clinical Dataset Development Programme (NCDDP) medication data standards also added to the complexity of the electronic development as standards had to be implemented that were not there before.

Additionally within the stroke EPR there are many disciplines that use the medications form. All the requirements over the various disciplines had to be included.

The first phase of the coronary heart disease (CHD) EPR also began with a scoping exercise to determine the current existing systems and to define needs and priorities for the final clinical information system. A similar approach was taken that involved interviewing staff and conducting an open space event, which all cardiology staff were invited to attend. The CHD EPR project is currently in its second phase, and we have begun the process of defining the requirements for a Glasgow-wide inpatient record, which will ultimately serve all the acute receiving hospitals within Glasgow. In addition, there are complementary parallel initiatives under way arising from the staff discussions. These include the procurement of an electrocardiogram (ECG) management system for electronic storage and retrieval of ECGs and the PACS implementation, which includes, as part of its remit, coronary angiogram images. A cardiac rehabilitation electronic record pilot is also planned.

Issues and challenges (stroke and CHD projects)

A number of common issues and challenges are faced by ICT project teams in NHSGG and are highlighted in this section. As expected, a raft of difficulties were encountered. There were training issues with staff accessibility to courses, ensuring they were allocated adequate leave from other duties. Another was having robust Community Health Index (CHI) patient identification data (equivalent to the NHS number in England and Wales) and meeting the challenge of the 24 × 7 availability of this, together with the issue of identifying patients from other health board areas.

There have also been difficulties arising from conflict between national and local developments. For example, any local clinical dataset development needs to be carried out in collaboration with dataset development at a national level, but often this happens in parallel. Local developments were also taking place at a time when a Scottish national procurement for EPR software was progressing. Changing service environments, e.g. the introduction of national service providers (Golden Jubilee), the introduction of ambulatory care and diagnostic (ACAD) centres and the merging of health boards, all result in changing priorities and requirements.

Within project teams there was a strong need to articulate service needs. Therefore individuals had to be identified who not only had the right level of skills, knowledge and expertise to adequately define a set of systems requirements which reflect the needs of the service, but who were able to articulate these needs to non-clinical staff.

There were also patient confidentiality issues to be considered. A Clinical Reference Group is currently developing a security matrix to deal with issues of login permissions and sensitive patient information. This matrix takes into account a variety of factors such as professional role and the sensitivity levels of the information to be accessed before according access rights.

As can be seen above, the majority of these issues and challenges require human solutions rather than technical intervention. By recognizing the key role that both staff and patients play in the implementation of an EPR, NHS Greater Glasgow and Clyde is confident that this approach will lead to success.

Examples of improvements/potential

- Consensus on a single set of electronic patient information for stroke (across eight hospitals, five community teams and seven professional groups).
- Potential for audit data to be available automatically (saving from previous manual process £60k per annum) when fully implemented.
- Potential for a reduction in duplicated effort for admissions and discharges (£15k annual saving).
- Potential for the increased use of evidence-based guidelines for direct patient care.
- Increase in communication of patient information between primary and secondary care. For the first time within stroke services, primary care professionals (such as those working within community rehabilitation teams) will have easy access to detailed patient information. For those patients who are readmitted to hospital the patient information recorded in the community will be available for secondary care staff.
- Basic IT training provided to 1000 employees.
- A total of 250 PCs provided to units, clinics and community services.

Conclusion

Attempting to change the way organizations operate, especially in the NHS, is not straightforward, though the implementation of a project management approach has substantially improved the process. At Greater Glasgow and Clyde, despite the obvious challenges, it has generally been accepted that the introduction of electronic records is the future of clinical documentation. In order to be successful, any information technology strategy needs to develop in partnership with all clinical staff, allowing everyone the opportunity to influence how it is developed and delivered. Wolf [2] and Adler [18] have both identified a number of overlapping criteria, which are considered to be essential for successful implementation of health information technology. These approaches can be summarized as follows, together with examples of how these methods have been achieved in practice within NHSGG.

Leadership. Adler [18] argues that an EHR project needs three kinds of leaders: one (or more) physician champion(s), a senior management commitment and a skilled project manager. In NHSGG the financial director, who also had responsibility for the development of IT, initialized and supported the project. Clinical champions were also made available and several formed the basis for a Clinical Reference Group to oversee the clinical aspects of any health information technology implementation. Finally, a robust project management methodology was put in place assisted by the ICT Programme Officer (ICT/PO) to enable a consistent approach to managing projects and ensure that all project managers were trained and operated to the same standard. Wolf [2] also identified the need for executive and clinician leadership buy-in.

Create a detailed plan. All project managers were trained in developing detailed project plans and all projects had to submit these plans to ICT PO for approval. Progress against the project plan was made on a monthly basis.

Managing expectations. Careful consideration was given to the scope and benefits of the projects so that user expectations were kept realistic. The manager of the stroke project ensured that staff were updated on the project on a regular basis through personal contact and the distribution of a newsletter.

Ensure that clinicians are an integral part of the initiative. Where appropriate, project sponsors were lead clinicians and both project steering groups and working groups consisted of multi-disciplinary groups. Adler [18] and Wolf [2] both mention the need to involve physicians, but it was also recognized that implementing a successful electronic health record involves buy-in from a variety of staff. Members of both working and steering groups consisted of clinical staff from a wide variety of backgrounds, e.g. physicians, nurses, administrative staff and allied health professionals.

Design user-friendly interfaces integrated to clinician workflow. User interfaces were developed in consultation with local clinical staff. As part of the specification phase, patient pathways were carefully examined (process mapping) in each of the hospitals where the new patient record was to be implemented to enable agreement of a common approach. Utilization of learning maps encouraged face-to-face discussions by staff on workflow issues, highlighting problems in the existing workflows and enabling staff to consider and take ownership of the (jointly agreed) new ways of working that would improve the service provided.

Provide ongoing IT support and maintenance. The IT training department (product training) was involved as early as possible in the development process as it was considered important that they were able to support users even in the pilot stages and also to provide the necessary hardware support. In addition, the hands-on approach by the project manager at implementation time provided additional support and demonstrated confidence in the project implementation and a willingness to take responsibility.

Future direction

An evaluation of the ICT Culture Change Programme was completed in 2006, comprising a documentation review and eliciting feedback using questionnaires and semi-structured interviews. Feedback from the ICT Programme Board was also captured in a review workshop.

A common project management approach across NHSGG is seen as a valuable tool for the entire NHS Greater Glasgow and Clyde (NHSGG&C) group, and there is a stated desire to develop this potential across the whole organization.

The training offered for project management and continuous improvement, coupled with the Green Belt and Black Belt accreditation, is viewed favourably by staff attending training and there is a steady and growing interest. Senior management are now committing to widening this approach across NHSGG&C.

A full benefits realization of the project processes was lessened because applying the ELMP project management methodology was optional rather than mandatory. This led to competition for resources that could have otherwise been planned and prioritized. Software/hardware upgrades to related integrated systems would mean delays and additional testing

time needed to be replanned. ELMP project management is now mandatory in the NHS GG&C Health Information and Technology Directorate.

The Programme Office is critical to the process; therefore this has to be appropriately resourced to be effective. The restructured Health Information Technology Directorate incorporates a head of programme and performance, including accountability for the Programme Office operation. This provision of this role in the structure conveys a clear message on the importance of the function, as well as providing the resources required to make a success of the approach.

The organizational structure required to resolve project issues and interdependencies needs to be reviewed and strengthened and the existing ICT Programme Steering Group to be more effectively aligned to the newly developing organization of NHS GG&C, as some of the key stakeholders were not included in the initial governance approach. This process is now under way.

The vision for the EPR 'to "really make a difference" to patient care by providing to the right person, the right information, under the right safeguards' is still the shared vision, and for stroke patients, it is closer. Overall, NHS GG have demonstrated that a change management programme [19] incorporating innovative approaches to project planning and communication processes has greatly assisted the clinical staff through the change to ICT and adjusting to new methods of working. The process has also increased the understanding and skills of the staff involved, for the wider benefit of the service. In addition (not reported here) there are recognized opportunities to increase the service benefits by widening this approach across the organization. We look forward to developing the vision further for both stroke and other healthcare areas, within NHS GG&C and across the NHS.

Acknowledgements

The authors thank Dr Lee Brawley (Senior Consultant Evolution Organisational Development, 2 Buckie Walk, Bellshill, Scotland) for her contributions to the development of this article.

References

- 1 Chaudray B, Wang J, Wu S et al. Systematic review: impact of health information technology on quality, efficiency, and costs of medical care. *Annals of Internal Medicine* 2006; **144**; 742–52.
- 2 Wolf E J. Critical success factors for implementing CPOE. *Healthcare Executive* 2003; **18** (5); 14–19.
- 3 Hartswood M, Proctor R, Rouncefield M, Slack R. Making a case in medical work: implications for the electronic medical record. *Computer Supported Cooperative Work* 2003; **12**; 241–60.
- 4 Wilson L, Greaves N. Why we need an NHS culture change to implement ICT change successfully and to give people modernised healthcare services. *British Journal of Healthcare Computing and Information Management* 2002; **19** (8); 29–30.
- 5 Ryder-Smith J. The secret of good conversations: investing in success. *Health Manpower Management* 1998; **24**; 38–40.
- 6 Smith A, Preston D. Communications between professional groups in an NHS trust hospital. *Journal of Management in Medicine* 1996; **10**; 31–8.
- 7 Tourish D, Hargie O. Communication in the NHS: using qualitative approaches to analyse effectiveness. *Journal of Management in Medicine* 1996; **10**; 38–50.
- 8 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.

- 9 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* 2004; **10** (suppl.); S36–47.
- 10 Reider J. Cedar–Sinai Medical Center suspends CPOE. January 2003. <http://www.docnotes.net/000866.html>.
- 11 National Strategy for IM&T Education, Training and Development. Scottish Executive.
- 12 Wagstaff R. Reflecting on change. *Nursing Management* 2006; **13** (2); 12–17.
- 13 Legris P, Colletette P. A roadmap for IT implementation: integrating stakeholders and change management issues. *Project Management Journal* 2006; **37** (5); 64–75.
- 14 Morgan G. *Images of Organisations*. London: Sage, 1995.
- 15 Toney F, Powers R. *Best Practices of Project Management in Large Organisations*. Project Management Institute, PA, 1997.
- 16 Stahl R. Healthcare horizon. *Six Sigma Forum Magazine* 2003; 17–26.
- 17 Patel V L, Kushnick A W, Yang S, Yale J F. Impact of a computer based patient record system on data collection, knowledge, organization and reasoning. *Journal of the American Medical Association* 2000; **7**; 569–85.
- 18 Adler K G. How to successfully navigate your EHR implementation. *Family Practice Management* 2007. <http://www.aafp.org/fpm>.
- 19 Lawrie M, Pericos C, Pitts T. Breaking the performance barrier. 2005. http://www.deloitte.com/dtt/cda/doc/content/uk_cons_breakingperformance.pdf.

Correspondence to: Joanne Frame

Joanne Frame

Head of Programmes and Performance
(interim)

NHS Greater Glasgow and Clyde

Dalian House

350 St Vincent Street

Glasgow G3 8YZ, UK

Tel: 0141 201 4444

Mobile: 07796 338 584

E-mail: Joanne.Frame@ggc.scot.nhs.uk

Katie Thomson

(Room A367 Govan Mbeki Building)

Division of Occupational Therapy

School of Health and Social Care

Glasgow Caledonian University

Cowcaddens Road

Glasgow

Tel: 0141 331 8472

E-mail: Katie.Thomson@gcal.ac.uk

Janice Watson BSc (Hons) MSc MPH,
Terminology Services Manager

NHS National Services Scotland

Information Services Division

Cirrus, Marchburn Dr

Glasgow Airport Business Park

Paisley PA3 2SJ, UK

Tel: 0141 282 2271

E-mail: Janice.Watson@isd.csa.scot.nhs.uk