Factors affecting the implementation and use of electronic templates for histopathology cancer reporting

BETTINA CASATI1, HANS KRISTIAN HAUMLAND2, GUNN MARIT J. BARSTAD3 AND ROGER BIUGN4

1Department of Pathology, Akershus University Hospital, Lorenskog, 2Department of Pathology, Haukeland University Hospital, Bergen, 3Department of Pathology, Stavanger University Hospital, Stavanger, and 4Department of Research Administration and Biobanking, Oslo University Hospital, Oslo, Norway

Key words: Checklist, electronic health records, information systems, organisational change, professional practice, quality improvement, synoptic reporting.

INTRODUCTION

The surgical pathology report on cancer resection specimens is fundamental to providing clinicians with the information needed for adequate patient oncology treatment. Since the multi-institutional quality study on pathology reporting of colorectal cancer published by Zarbo in 1992,1 many other studies have shown that the use of checklists or synoptic reporting is superior to traditional narrative (free text) reporting.2–4 Using electronic health records, synoptic histopathology reporting tools can be designed to be very sophisticated with discrete data fields, drop down menus, and automated SNOMED encoding.5 The use of discrete data fields (‘atomic data’) means that it is possible to automatically search, extract, and transmit data electronically.4 Despite the apparent benefits of electronic synoptic histopathology reporting, and the successful regional implementation of such a reporting system in Ontario, Canada,5 others have reported that the implementation and use of electronic histopathology reporting is no easy organisational task.5–7 Similar challenges have also been reported regarding the implementation and use of a web-based synoptic reporting tool for cancer surgery.8–9 From a management and organisational perspective, the list of possible causes for project failure with respect to information technology development, implementation and use is long.10,11 In our opinion, a pro-active understanding and management of key organisational issues is a requirement for successful long-term synoptic histopathology cancer reporting.

INFORMATION SYSTEM CHANGE

Organisational issues

An organisation’s information system can be viewed as an interaction between actors, tasks, organisational structure, and technology (Fig. 1). Information system change is the deliberate change to an organisation’s technical and organisational subsystems that deal with information.11,12 The introduction of synoptic reporting within a pathology department can be viewed as such a change. The change process covers initiation, development, implementation, and operation/maintenance of the new elements introduced.11,12 Changes within a department’s information technology systems (IT systems) and working routines may be considered a task to be decided by the department itself. However, independent of the formal decision procedure, a number of other organisational units and individuals will be affected by or can influence such a change. The complex relationship between stakeholders potentially affecting, or being affected by changes within a single department is illustrated in Fig. 2. Clinicians will clearly be affected by a move from narrative to synoptic histopathology reporting. The hospital harbouring the pathology department may have a general policy on IT development, and there may even be regional and/or national policies on IT systems that one must adhere to. Similarly, external organisations such as regional or national cancer registries will be affected by, and can affect, a transition from narrative to electronic synoptic reporting. Vendors are also required to develop the IT tools needed. Understanding and managing the needs and interests of all such stakeholders is essential for achieving the organisational changes intended.13 In their study on the implementation and use of a web-based synoptic reporting tool for cancer surgery at two hospitals in Nova Scotia, Canada, Urquhart and co-workers found that implementation and early use of the synoptic tool was affected by many factors external to the individual user. A good understanding of the multilevel organisational environment in both the planning and implementation process was deemed important for project success.8 In a similar study on the implementation of synoptic pathology reporting in four pathology departments in three states in the USA, Hassell and co-workers found that adoption depended both on individual user factors and organisational issues. With respect to the latter, an asymmetric organisational balance between benefits and costs was considered a possible hindrance for implementation. If the pathology laboratories were to carry the financial burden for implementing electronic synoptic reporting but considered the cancer registries the beneficiaries of the new reporting tool, why should the laboratories change their information systems?8 However, even in an environment where the development of an electronic synoptic pathology tool was free of costs for pathology laboratories, local adoption varied greatly. Some laboratories had a user rate above 90%, while other laboratories had not implemented the synoptic tool at all.7

Issues related to individual behaviour

Even after the successful development and implementation of a new IT tool, successful long-term usage is not guaranteed. Health care professionals may not adhere to new guidelines and practices,14 and each individual’s adoption and use of new IT solutions is affected by a number of interacting factors (Fig. 3).15 In 1975 Fishbein and Ajzen proposed a model for trying to explain individual behaviour in specific contexts.
A central factor in the theory is the individual's intention to perform a given task.\textsuperscript{16} The original model was later modified to a 'Technology Acceptance Model' to try to explain user acceptance (or rejection) of technology.\textsuperscript{17} This model has again been further developed to try to explain individual behaviour related to adaptation and use of information technologies in the workplace.\textsuperscript{15} Although the model has its limitations and weaknesses,\textsuperscript{17,18} we find it useful when trying to untangle some of the factors affecting individual behaviour with respect to IT systems and electronic synoptic reporting in a pathology department.

In settings with individual voluntary use of synoptic reporting, engagement with pathologists is of course essential in all stages of the development and implementation phases of the synoptic tools to be used. However, even in cases where this has been ensured, individual behaviour is difficult to predict. In our experience, perceived (and experienced) output quality and ease of use in combination with a positive subjective norm (as expressed by colleagues in the department) are important factors for a stable, high long-term use of synoptic reporting.\textsuperscript{2}

In settings with compulsory use, the subjective norm will of course favour synoptic use, particularly if combined with a monitoring system. However, evidence from other settings of medical care indicates that such individual performance feedback alone is not sufficient to attain high adherence to a new procedure. Multifaceted strategies for interventions at different levels (individual health care...
LESIONS LEARNED AND THE WAY FORWARD

There is good evidence for stating that electronic synoptic reporting is qualitatively better and more efficient than traditional narrative histopathology reporting. However, there is also good evidence for stating that there are many organisational hurdles to overcome when trying to implement and sustain electronic reporting in pathology laboratories. In our opinion, the quite unique successful implementation of synoptic cancer reporting in the entire province of Ontario, Canada, is due to a combination of a thorough, long-term political and organisational process involving all relevant stakeholders and a compulsory organisational implementation with active monitoring of actual use. One cannot expect such a framework to be present in all settings. However, the models describing organisational and individual change of behaviour presented in this article are relevant for most settings, whether it be one single pathology department or one whole country. Absence of ‘big’ plans should not stop individual pathology departments from trying to achieve quality improvements attained by electronic synoptic reporting. Sound local organisational planning can be undertaken also with limited resources. A good business plan attuned to the local environment, combined with a long-term strategic vision, can reward even small pathology departments with success.

Conflicts of interest and sources of funding: The authors state that there are no conflicts of interest to disclose. The work was funded by the authors’ own organisations.

Address for correspondence: Dr R. Bjugn, Department of Research Administration and Biobanking, Oslo University Hospital, Kirkeveien 166, NO-0407 Oslo, Norway. E-mail: rogbru@ous-hf.no

References

1. Zarbo RJ. Interinstitutional assessment of colorectal carcinoma surgical pathology report adequacy. A College of American Pathologists Q-Prosbes study of practice patterns from 532 laboratories and 15,940 reports. Arch Pathol Lab Med 1992; 116: 1113–9.
2. Casati B, Bjugn R. Structured electronic template for histopathology reporting on colorectal carcinoma resections: five-year follow-up shows sustainable long-term quality improvement. Arch Pathol Lab Med 2012; 136: 652–6.
3. Cross SS, Feeley KM, Angel CA. The effect of four interventions on the informational content of histopathology reports of resected colorectal carcinomas. J Clin Pathol 1998; 51: 481–2.
4. Ellis DW. Surgical pathology reporting at the crossroads: beyond synoptic reporting. Pathology 2011; 43: 404–9.
5. McGown T, Mackean A, et al. Standardized synoptic cancer pathology reporting: a population-based approach. J Surg Oncol 2009; 99: 517–24.
6. Challengers and opportunities in the adoption of College of American Pathologists checklists in electronic format: perspectives and experience of Reporting Pathology Protocols Project (RPP2) participant laboratories. Arch Pathol Lab Med 2010; 134: 1152–9.
7. Haugland HK, Casati B, Dorum LM, et al. Template reporting matters—a nationwide study on histopathology reporting on colorectal carcinoma resections. Hum Pathol 2011; 42: 36–40.
8. Urquhart R, Sargeant J, Porterm GA. Factors related to the implementation and use of an innovation in cancer surgery. Curr Oncol 2011; 18: 271–9.
9. Urquhart R, Porter GA, Grunfeld E, et al. Exploring the interpersonal-, organization-, and system-level factors that influence the implementation and use of an innovation-synoptic reporting-in cancer care. Implement Sci 2012; 7: 12.
10. Lientz BP, Larssen L. Risk Management for IT Projects: How to Deal With Over 150 Issues and Risks. Burlington, MA: Butterworth-Heinemann, 2006.
11. Lytinen K, Newman M. Explaining information systems change: a punctuated socio-technical change model. Eur J Inform Syst 2008; 17: 589–613.
12. Butterworth-Heinemann, 2006.
13. Bryson JM. Strategic Planning for Public and Nonprofit Organizations. 4th ed. San Francisco: Jossey-Bass, 2011, Chapter 4, Clarifying organizational mandates and mission.
14. Grol R, Grimshaw J. From best evidence to best practice: effective implementation of change in patients’ care. Lancet 2003; 362: 1225–30.
15. Venkatesh V, Bala H. Technology Acceptance Model 3 and a research agenda on interventions. Decision Sci 2008; 39: 273–315.
16. Ajzen I. The theory of planned behavior. *Organ Behav Hum Dec* 1991; 50: 179–211.

17. Chuttur M. Overview of the Technology Acceptance Model: origins, developments and future directions. *Sprouts: Working Papers on Information Systems* 2009; 9: Article 37. http://sprouts.aisnet.org/9-37/

18. Bagozzi RP. The legacy of the Technology Acceptance Model and a proposal for a paradigm shift. *J Assoc Inf Syst* 2007; 8 (4): Article 12. http://aisel.aisnet.org/jais/vol8/iss4/12

19. Davis FD. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quart* 1989; 13: 319–40.

20. Duvalko KM, Sherar M, Sawka C. Creating a system for performance improvement in cancer care: Cancer Care Ontario’s clinical governance framework. *Cancer Control* 2009; 16: 293–302.

21. Cancer Care Ontario. Synoptic Pathology Reporting. 17 May 2012; cited 11 Dec 2013. https://www.cancercare.on.ca/cms/one.aspx?portalId=1377&pageId=48150