Chapter 4.6

Clinical Decision Support Systems in Nursing

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ABSTRACT

Increasingly, new and extended roles and responsibilities for nurses are being supported through the introduction of clinical decision support systems (CDSS). This chapter provides an overview of research on nurses' use of CDSS, considers the impact of CDSS on nurse decision making and patient outcomes, and explores the socio-technical factors that impact the use of CDSS. In addition to summarising previous research, both on nurses' use of CDSS and on use of CDSS more generally, the chapter presents the results of a multi-site case study that explored how CDSS are used by nurses in practice in a range of contexts. The chapter takes a socio-technical approach, exploring the barriers and facilitators to effective CDSS use at a level of the technology itself, the ways people work, and the organisations in which they operate.

INTRODUCTION

In high income countries, nurses are taking on increasing decision making responsibility, a trend that looks set to continue (Bryant-Lukosius, DiCenso, Browne, & Pinelli, 2004; Furlong & Smith, 2005). Clinical decision support systems (CDSS) have been introduced as one way of supporting nurses who are taking on such extended roles (e.g. (Fitzmaurice et al., 2000; O'Cathain, Sampson, Munro, Thomas, & Nicholl, 2004). However, despite the evidence for the potential benefits of using CDSS in health care (Garg et al., 2005), and the adoption of such systems by nurses, there is little evidence examining how nurses as a specific professional group use CDSS to support their practice.

In this chapter we provide an overview of research on nurses' use of CDSS, considering the impact of CDSS on nurse decision making and patient outcomes, while also exploring the socio-technical factors that impact the use of CDSS. The background section of this chapter first provides some essential terminology, before summarising previous research on doctors' use of CDSS and then considering previous research on nurses' use of CDSS. The main part of the chapter presents the results of a multi-site case study that explored nurses' use of CDSS in a range of contexts. This case study was conducted as part of a recently completed project, funded by the Policy Research Programme, Department of Health (England), which examined how nurses use new technologies (such as CDSS) to inform their clinical decision making. Possible future trends in CDSS use are then considered and the chapter concludes by summarising the research on this topic. In each section, we take a socio-technical approach, exploring barriers and facilitators (factors that may affect the impact of CDSS use on clinician performance and/or patient outcomes and/or encourage or discourage the use of CDSS) to effective CDSS use at the level of the technology and its interface with human operators, the work process level, and the organisational level.

BACKGROUND

Definitions

Clinicians have a range of decision tools available to them to support their decision making (Liu, Wyatt, & Altman, 2006). Examples of decision tools include nomograms (charts that simplify complex information such as Body Mass Index (BMI)), templates incorporated into electronic patient records (EPRs), predictive scores (such as early warning scoring systems for clinical event risk), formularies to support prescribing, and patient information leaflets. CDSS are a computer-based form of decision tool, integrating information (ideally from high-quality research studies) with the characteristics of individual patients, to provide advice to clinicians (Dowding, 2007). As such, CDSS are seen as a potential way of improving the quality, safety and effectiveness of clinical decisions, leading to improvement in clinician performance and patient outcomes (Garg et al., 2005). CDSS vary in their functionality, from 'passive' systems that only provide information to a clinician when they request it, through to 'active' systems that provide patient specific recommendations to a clinician automatically (Hajioff, 1998). For example, computerised clinical reminders (CRs) are an example of an active system, typically being integrated with an electronic patient record (EPR) and presenting reminders to the clinician regarding potentially appropriate interventions, based on an evaluation of the available patient data (Patterson, Nguyen, Halloran, & Asch, 2003Saleem et al., 2005). Computerised provider order entry (CPOE), which enables computer-based ordering of medication, can also be a form of active CDSS, when decision support alerts the user to the risk of a dangerous drug interaction or advises the user of appropriate dosages (Aarts, Doorewaard, & Berg, 2004). Passive CDSS include electronic information tools that provide clinicians with access to online clinical practice guidelines and research evidence (Randell, Mitchell, Thompson, McCaughan, & Dowding, In press-a).

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