

Social networks of staff in an emergency department

Nerida Creswick and Johanna Westbrook

Health Informatics Research & Evaluation Unit (HIREU), Faculty of Health Sciences, the University of Sydney, Lidcombe, NSW

Abstract

Objective:

To measure problem-solving, medication advice-seeking and socialising networks in an emergency department (ED).

Background:

Good communication is core to high quality patient care and dependent upon effective information networks connecting clinical staff. Despite their central role in safe health care provision, ED information networks have rarely been studied.

Clinical information systems are designed to support information flow and decision-making. Yet evidence is emerging that such systems may disrupt communication, contributing to errors. To identify changes it is necessary to compare communication before and after system introduction. This paper reports the use of a social network approach to examine networks in an Australian hospital ED before introduction of an electronic medication management system (e-MMS).

Methods:

A social network questionnaire was completed by 94% of staff (including doctors, nurses, allied health) who worked in the ED at a teaching hospital (n=109). Survey data were analysed using social network measures. Sociograms were produced to display the networks connecting staff in ED.

Results:

With few exceptions, members of staff tend to rely on colleagues from their own profession for help to solve problems, for medication advice, and for socialising. However, in each network key individuals provide help and medication advice to members from all professional groups. Overall, the number of individuals with whom people interact, and the average frequency of interaction are quite low across all networks studied. Staff were more likely to interact to solve problems and for medication advice than they were to socialise.

Discussion:

Given the relatively limited extent to which professionals working in the ED interact currently regarding medication tasks, information and communication technologies have the potential for improving access to up-to-date and relevant decision-making information which should improve the safety of medication tasks. Detailed and systematic analyses of information networks provide valuable data for use in the design, improvement and monitoring of the effectiveness of such interventions.

Keywords:

Communication; Interprofessional Relations; Health Personnel; Emergency Service, Hospital; Social Support; Medication Systems, Hospital;

Objective:

The objective of this study was to measure the problem-solving, medication advice-seeking and socialising networks of staff in a hospital emergency department (ED).

Background:

Good communication and teamwork are core to high quality patient care (Borrill et al. 2000; West et al. 2002; Wheelan et al. 2003). ED staff rely on information from their colleagues (Coiera and Tombs 1998). Despite their central role in the provision of safe health care, information networks of staff in ED have rarely been studied.

Clinical information systems are designed to support information flow and decision-making. Yet evidence is emerging that such systems may disrupt existing communication patterns (Ash et al. 2001; Shu et al. 2001; Andersen 2002; Beuscart-Zephir 2004), contributing to new types of errors (Rigby 2006). These changes may in turn reduce the quality of patient care provided.

In order to identify changes in communication patterns it is necessary to compare processes both before and after system introduction. This paper reports the use of a social network approach to examine the networks of an Australian hospital emergency department before the introduction of an electronic medication management system (e-MMS).

Methods:

All staff who worked in the emergency department (n=109) of a large Sydney teaching hospital were invited to complete a social network questionnaire. The staff members included doctors (n=37) (including emergency staff specialists, registrars, residents and interns) nurses (n=54) (including the emergency clinical nurse consultant and the aged care emergency team clinical nurse consultant, nurse unit managers, clinical nurse educators, clinical nurse specialists, registered nurses and enrolled nurses), allied health professionals (n=4) (including pharmacist, physiotherapist, radiographer and social worker), as well as administrative staff and ward assistants (n=14). The social network questionnaire was completed by 94% of staff (n=103) who worked in the ED. Data from three networks (see Table 1) was gathered using the questionnaire. A list of all staff who worked in ED was provided in the questionnaire.

Networks measured	Corresponding survey questions
Work-related problem network	Q1. How often do you ask [each] person to help solve a work related problem?
Medication advice-seeking network	Q2. How often do you seek advice from [each] person about medication decisions/tasks?
Socialising network	Q3. How often do you socialise (have lunch or go to coffee) with [each] person?

Table 1. *Networks measured and corresponding survey questions*

Frequency of interaction was reported on an 8-point scale ranging from “not once in the last year” to “several times a day”. The questionnaire included demographic items including position, length of experience in profession, length of time worked at hospital, age, sex, full- or part-time employment and usual shift worked.

Survey data were analysed using social network measures, including density, reciprocity and centrality. Sociograms (network diagrams) were produced to display the networks of the staff in the department, and were used for visual analyses.

Node label	Abbreviated from	Staff positions
Sr dr	Senior doctor	Staff specialists
Jr dr	Junior doctor	Registrars; Senior Residents; Residents; Interns
Sr nurse	Senior nurse	Nurse unit manager; Clinical nurse consultant; Clinical nurse educator; Clinical nurse specialist; Discharge planner; Clinical coordinator
Sr RN	Senior Registered Nurse	Registered nurses years 5+
Jr RN	Junior Registered Nurse	New graduate nurses; Registered Nurses years 1-4;
EN	Enrolled nurse	Enrolled nurses
TEN	Trainee enrolled nurse	Trainee enrolled nurses
Allied health		Pharmacist; Physiotherapist; Social worker
Admin	Administrative staff	Unit clerk; Administration officers; Administration office co-ordinator
Ward asst	Ward assistant	Ward assistants

Table 2. Node labels for staff positions

The problem-solving network in Figure 1 is very dense, with many connections between individuals. Those in the centre of the network are the people who ask more people or who are asked by more people for help to solve a work-related problem. Those on the periphery of the network ask fewer people and/or are asked by fewer people to help solve a work-related problem. The shapes of the nodes in Figure 1 show that clinicians are positioned closely to colleagues from their own profession. The nurses are positioned mainly in the centre and right-hand side of the network, the doctors are positioned mainly in the left side of the network, the allied health professionals are located throughout the network and the administrative staff tend to be positioned in the top right quarter of the network. This indicates that members of the unit ask for help to solve work-related problems from colleagues within their own profession. Senior doctor 3 and Junior doctor 2 are located closer to the nurses and the administrative staff than their medical colleagues.

Similar patterns of individuals interacting most with those from their own professional group are found in the medication advice-seeking and socialising networks. A summary of the results from applying network measures to the problem-solving, medication advice-seeking and socialising networks is shown in Table 3.

		Work-related problem	Medication advice	Socialising
Cohesion	Density	53%	37%	18%
	Average frequency of interaction	< Once a month	~ A couple of times a year	< A couple of times a year
	Reciprocity	43%	26%	24%
Centrality	High in-degree (key people in the network)	Sr drs & Sr nurses	Sr drs, Jr drs & Sr nurse	Sr nurses, Sr RNs, Jr RNs, EN
	High out-degree (eg ask many others for help)	Sr dr, Sr nurses, Sr RN, Jr RNs & EN	Sr nurses, Sr RNs, Jr RNs & Admin	Jr drs, Sr nurses, Sr RNs, Jr RNs, EN & Admin
	High betweenness (Powerful individuals)	Sr drs & Sr nurses	Sr drs, Jr dr, Sr nurses & Sr RNs	Jr drs, Sr nurses, Sr RNs, EN & Adm

Table 3. Summary of network measure results

Table 3 shows that the medication advice-seeking and socialising networks are less dense than the work-related problem network. Overall, the number of individuals with whom people interact, and the average frequency of interaction are quite low across all networks studied. Staff were more likely to interact to solve problems and to exchange medication advice than they were to socialise with each other. The higher rate of reciprocity (43%) in the problem-solving network indicates that people rely on each other for help to solve work problems. The lower rate of reciprocity in the medication advice-seeking network (26%) indicates that there are key individuals in the network who act as hubs and are connected to many other ED staff. Some of these hub individuals are important across all networks studied, while others are more important in particular networks. For example, the high in-degree centrality (in Table 3) of senior doctors and senior nurses shows they have many people ask them for help to solve work-related problems. Their high betweenness centrality shows they sit on the paths connecting many other individuals and therefore hold power in the network. For medication advice, in addition to the senior doctors, many staff rely on some of the more senior of the junior doctors and one senior nurse (Senior nurse 2). In the socialising network, nurses from across a range of positions are important.

Discussion of implications:

Staff largely interacted with others from their own professional groups. This finding is consistent with another study of communication in an emergency setting (Eisenberg et al. 2005). Despite the focus on improving multi-disciplinary teamwork in emergency departments (Michaelson and Levi 1997; Ummenhofer et al. 2001; Morey et al. 2002) it appears in these results that clinicians continue to primarily interact with colleagues from their own professional groups for help to solve-work related problems, for medication advice and to socialise.

Senior doctors were more central in the emergency department (ED) networks compared to the position of senior doctors in general ward networks studied (Creswick and Westbrook 2006; Creswick and Westbrook 2007). In general wards, senior doctors undertake more of a consulting role, dividing their time between the unit, their clinics and their office. In ED, the senior doctors spend most of their time working in the unit. In a study of communication in a US emergency department, nurses played important roles, particularly the senior nurses in charge (Fairbanks et al. 2007). Similarly, in the current study senior nurses were very important in helping other ED staff to solve problems.

Detailed and systematic analyses of these networks provide valuable data for use in the design, improvement and monitoring of interventions to increase quality of care, such as electronic medication management systems (e-MMS). For example, data about the ways in which groups of health professionals interact to provide care are vital to designing clinical information systems which enhance rather than disrupt information networks. The results from this study provide baseline data for assessing both the positive and negative impacts of e-MMS on clinical communication in the ED. This is particularly important given previous overseas research which has demonstrated that communication patterns can be negatively disrupted with the introduction of such systems.

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Contact details:

Nerida Creswick, Researcher, Health Informatics Research & Evaluation Unit, Faculty of Health Sciences, The University of Sydney. PO Box 170, Lidcombe NSW 1825. T: (02) 9351 9987
Email: n.creswick@usyd.edu.au