Canadian Paediatric Emergency Departments: Triage Practices & Electronic Triage Systems

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Prepared by:

Pernille Bjørn
Post Doctoral Fellow
Simon Fraser University

Document Contact:

Ellen Balka
School of Communication
Simon Fraser University
8888 University Drive
Burnaby, BC, Canada V5A 1S6

tel: +1.604.725.2756
email: ellenb@sfu.ca
website: www.sfu.ca/act4hlth/

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Canadian Paediatric Emergency Departments: Triage Practices & Electronic Triage Systems

Pernille Bjørn
Simon Fraser University, ACTION for Health
pernille_bjorn@sfu.ca

ACTION for health
Applied Communication Technology: Information . Organizations . Networks

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1. Introduction

Researchers from Simon Fraser University in British Columbia, together with the Emergency Department of British Columbia Children's Hospital, collected data about the work practices and use of electronic triage systems in paediatric hospitals in all of Canada in spring 2007. The overall goal of the data collection was to create an overview of existing work practices and electronic systems used in paediatric emergency departments across Canada, including possible challenges, constraints, and benefits. This report summarizes the findings and provides an overview of current status of paediatric emergency departments.

One representative from each of the ten provincial Canadian Hospitals[1] with paediatric emergency departments was contacted, and the key person and contact information were collected. All ten agreed to participate, and at this moment eight interviews have been conducted. We hope to have conducted all by the end of August 2007. The representatives were either the emergency department manager or the clinical nurse educator.

Each representative participated in a telephone interview for about 30 min. or answered a structured questionnaire by email. Questions were sent in advance to the participants and concerned the triage practice and use of electronic systems in the particular emergency department. All interviews were tape-recorded and transcribed.

2. Research Method

The data were collected using a structured interview guide of six general questions about the emergency department, four questions about the work practices, and three main questions about the electronic triage system used in the department (excluding sub-questions about functionality).[2] The questions related to the electronic triage systems were only asked in situations where the department either had an electronic system or was in a process of purging or implementing an electronic system and had enough knowledge about the functionality to be able to answer the questions.

In total eight interviews were conducted. Four interviews were conducted as a telephone interview; one interview was conducted at the emergency department. All these five interviews were tape-recorded and later transcribed. Two interviews were conducted as questionnaires and emailed. In all cases the

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[1] See Appendix A for list of hospitals

[2] See Appendix B for interview guide

participant either signed a consent form to participate or gave verbal consent, which was tape-recorded, at the beginning of the interview.

All interviews where imported to the interpretative software program NVivo, and we constructed a code for each question and sub-question—30 codes in total. After that, all data material was coded according to the coding scheme.

Table 1. Canadian Paediatric Emergency Departments

Emergency department	Contact person	Data collection
Hospital A	Clinical nurse educator	Email
Hospital B	Clinical nurse educator	Phone
Hospital C	Emergency department manager	Phone
Hospital D	Emergency department manager	Phone
Hospital F	Operation director	Phone
Hospital I	Clinical nurse educator	Phone
Hospital J	Clinical nurse educator	Emergency department
Hospital E	Emergency department manager	Email
Hospital G	Waiting	
Hospital H	Waiting	

3. Findings

3.1 General about Canadian Paediatric Emergency Departments

Table 2 summarizes the answers of the general questions asked within the phone interviews. It is important to note that Hospital B has a combined adult and paediatric emergency department and the numbers therefore include the whole department and not only the paediatric emergency.

Table 2. General information about Canadian Paediatric Emergency Departments

Hospital	Annual patients	Nurses in unit	Triage nurses per shift	Doctors per shift	Fast track acute track	# Triage stations	# Examination rooms
Hospital A	50,000	110	1-2	1-4	Yes	3	31
Hospital B	75,000 in total; 25,000 children	App. 80	2-8	1-2	Yes	4	58
Hospital C	44,000	App. 30	1-3	1-2	Yes	3	26
Hospital D	48,000	40	1-3	1-5	Yes	2-3	29
Hospital F	55,000	45	2-8	1-4	Yes	2	32
Hospital I	33,000	App. 30	1	1	No	2	20
Hospital J	30,000	84	3	2	Yes	1-2	23
Hospital H	70,000	64	1-3	1-4	No, but they will have in Fall 2007	2 (3)	38

3.2 Triage Work Practices

Basically triage work practices within all the paediatric emergency departments interviewed have similar patient workflows. Normally a patient would enter either by ambulance entrance or by the entrance to the emergency department, which, in most cases, are separate from each other.

When a patient enters by the ordinary entrance they will either be met directly by a triage nurse or they will be met by a volunteer/security person who would ask if the patient is there for an emergency. The volunteer/security person's main task is to direct non-emergency visits away from the emergency department. All emergency departments interviewed express that they frequently experienced people entering the department asking for directions rather than having an emergency. In two departments the patient was directed to registration before seeing the triage nurse; however, they were in the process of changing that in both locations.

Approaching the triage nurse either takes place by standing in line in front of the triage desk, or by approaching the desk directly presenting the chief complaint. If there is a line-up, the patients wait in the waiting room until being called up for the triage interview. In some departments there is a 'pre-triage' nurse assessing the line-up at busy times. However, in all departments pre-triage is an important part of the triage practice.

The triage interview takes place in similar ways in all departments. Examinations are done according to PCTAS guidelines and are recorded either using an electronic system or by using a paper form. The number of forms used in

this process varies from one form for all patients to seven different forms used for different patient pathways. Some of these forms might be electronic, while others will be paper-based. Even in the departments where they have electronic systems, they also have paper forms for various kinds of tasks. The number of nurses' initiated treatments or medical protocols varies between the departments. In some departments the triage nurse can order x-rays or blood work, while in others they can only treat fever or do pain control. In some departments the triage nurse weighs the patients and does in-depth investigations of all patients at triage, while in others the in-depth assessments are done later when the patient is in a room.

After the triage interview the patient will go to register at the clerk. In some of the departments that have electronic systems, the information that flows between the triage desk and clerk will be transmitted electronically; however, in most cases the triage nurse or the patient will take the papers from triage and hand them over to the clerk. The clerk does the registration, and after that the patient either goes directly into a room or to the waiting room. Most of the departments have divided the department in to fast track and acute track areas or have in a similar way divided the department into various kinds of areas (e.g., monitored and unmonitored). In some departments they have a waiting-room nurse or a reassessment nurse who monitors patients' conditions while they wait. The waiting line is in all departments based upon the triage judgment and priority of urgency of the patients articulated using PCTAS levels. All of the departments indicated that the priorities of patients are continuously revised due to the ever changing context of an emergency department.

When a room is ready for a new patient the chart nurse (who also is educated as a triage nurse) will call in the patient. In non-urgent cases one department had a service aid, who calls up the patients and leads them to a room. The service aid also weighs the patients before entering the examination room. In some departments a nurse will do an initial assessment of the patient before the physician arrives.

The physician examines the patients according to the order made by the triage nurse. Normally, the physician will do examinations and assign medical orders for the nurses or others to carry out. However, we did not collect data about this in this study.

Preserving an overview of this whole process, which involves numerous people in various positions who together make the flow of the emergency department work through collaborative efforts, the staff use various documents, notes, chart racks, clipboards, whiteboards and other visual clues to keep the order and re-organize the patient flow, sometimes in combination with electronic whiteboards. Also, in one case the department has a computer-generated list of the patients in the waiting room which alerts the waiting room nurse if the time to reassess according to PCTAS is violated.

3.3 Electronic Triage Systems

Table 3 summarizes the status of electronic triage systems at the emergency departments.

Table 3. Electronic triage systems in Canadian Paediatric Emergency Departments

Hospital	Electronic triage system	Software/ Vendor	Off-the-shelf or special designed	How long has the system been in the department	Critical system	IT-support
Hospital A	Yes	ISOFT/REDIS[3]	Substantial configurations	6 years	Yes	24/7
Hospital B	Yes	ISOFT/HHSS[4]	Ongoing customization	9 years	Yes	24/7
Hospital C	Yes	Going from eTRIAGE to Sunrise Clinical Manager[5]/ Eclypsis	Customization will be required. They purged the SCM framework from Eclypsis, yet they have their own IT people to customize it.	ETRIAGE: 3-4 years SCM: only beginning. They began implementation of parts of SCM in January 2007, and they suspect that the full implementation will take year. Their current time-line is 27 months.	Yes	24/7 – they also have their own IT people doing customization.
Hospital D	No	-	-	-	-	-
Hospital F	No, but will have in November 2007	Eclypsis ED Management	Customization will be required	In the process of implementation	-	-
Hospital I	No	-	-	-	-	-
Hospital J	No, but will have	Going from ETRIAGE to Cerner	Customization will be required	-	-	-
Hospital G[6]	Process of implementing	MediTech				
Hospital H	Planning to implement	SIURGE				

Those emergency departments who did have an electronic triage system or had knowledge about an electronic triage system they were to implement in the near future were asked additional questions about the functionality of these systems. Table 4 summarizes the findings.

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[3] Regional Emergency Department Information System

[4] The vendor is maybe in transition

[5] They refer to the new system as EDIS Emergency Department Information Systems, but the actual program is called Sunrise Clinical Manager. It should be very different from the old ETRIAGE.

[6] The interview with this hospital is not conducted yet – but I know from previous conversations that they are in a process of implementing MediTech, which began May 1st 2007.

Table 4. Functionality of electronic triage systems in Canadian Paediatric Emergency Departments

Electronic triage system	Overview of functionality	Decision support	Track of waiting times	Multiple complaints	Assignment of CTAS level	Retrieve information
ISOFT/ REDIS (HA) [7]	The system communicates with the Admitting systems (Clinibase). After OK in triage the information shows up on the clerk screen. After registration the paper chart is generated, including nurses' and MD's notes	No	As soon as the mandatory field is clicked the time automatically populates	Chief complaint only, secondary complaint in free text	Triage nurse is responsible to assign PCTAS score independent from the system.	Yes, you can retrieve information on particular patients
ISOFT/HHSS (HB)	Choose adult or paediatric; paediatric has 72 chief complaints which generates templates. Type of visit is recorded, how they arrived. Allergies are not recorded as a standard, only in special cases like bee sting.	Yes. Assessment items pops up based upon chief complaint.	Time is kept as a flag for reassessment. Also making sure ambulance crew is not waiting more than 2.5 hours.	Chief complaint only; secondary complaint in free text.	Automatically generated; triage nurse can override while providing reason.	Yes, all information can be retrieved.
Sunrise Clinical Manager/ Eclypsis (HC)	The system includes a tracking board, triage system, order writing and nurse & doctor charting. It communicates with the Admitting system; it will be a part of the whole system. Also the electronic documents will be a part of the future electronic patient care record. All patient flows are registered so they can see where the bottlenecks are within the workflow of the ward.	Triggers for CTAS guidelines. Chief complaint leads to suggestions for examination. Some examinations are mandatory in the system.	Each time an activity is done within the system, moving a patient to an examination room, making tests, etc., and these are recorded in the system; the system automatically time stamped.	It hasn't been finalized yet, but most likely there will only be one main complaint on the main title of the document, but additional complaints will be in the body of the document rather than as free text.	Not sure in the new system	Yes, data are saved and it will be possible to retrieve data on particular patients.
Eclypsis ED Management (HF)						
ETRIAGE (HC/HJ)	Template based upon chief complaint. Essential it is a PDF-file you print out.		You need to do manual audit of the clock and then type it in.	Chief complaint; others as free text.	Automatically generated, with possibility for override and providing reason.	You don't have access to the information later.
Cerner (HJ)	Patient tracking and triage	No	Yes	No	Nurse is responsible to assign PCTAS	Yes

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[7] I believe that the ISOFT system referred to by both Hospital A and B are the same kind of software. However, I also believe that there are differences between the two types of implementations and customizations.

MediTech (HG)	No information	-	-	-	-	-
SIURGE (HH)	Patent tracking and triage	-	-	-	-	-

4. Conclusion

The work practices of the paediatric emergency departments across Canada are similar to each other even though the number of patients, nurses, examination rooms, and IT-systems varies. The extent of electronic triage systems in the departments also varies, and it seems that there is not a single IT-system that is most commonly used. However, it seems that most departments are implementing IT-systems that do not solely focus on the triage interview, but instead treat the triage interview as only one part of the triage process. The preferred IT-systems also make the patient flow visible through electronic whiteboards or the like, allowing the staff who are involved to monitor the process.

Finally, it seems that all successful implementations of electronic triage systems require extensive customization—more so during the actual adaptation phase, but also continuously—in Hospital B they still had aspects which needed to be changed after 9 years of use. Also, the implementation process of these extensive, multi-functional IT-systems takes time and will benefit from having local, dedicated IT-people conducting the customization—as in Hospital C, which had a 27-month implementation plan and in-house personnel conducting the customization.

Acknowledgments

Appendix A: List of Hospitals

Alberta Children's Hospital Calgary
Alberta Edmonton Stollery
Winnipeg
SickKids Toronto
Western Ontario
Eastern Ontario
McMaster Hamilton
Montreal
Newfoundland
British Columbia
Montreal Children's Hospital

Appendix B: Interview questions

Hospital:
Contact person:
Phone:
Email:
Date and time of interview:

Consent form
1. Have you read and agree to the consent form labelled: INFORMATION AND CONSENT FOR PARTICIPANTS - ACTION for Health: The Role of Technology in the Production, Consumption and Use of Health - Information: Implications for Policy and Practice - Computer Support for Triage Work: A Work Practice Study (CH Protocol #1)?

General questions:
1. How many patients are seen annually in your emergency department?
2. How many triage nurses work in the emergency department unit?
3. How many triage nurses work per shift?
4. How many doctors work per shift?
5. How is the emergency department organized:
    a. Is there a fast track and an acute track?
    b. How many triage 'stations' do you have? (How many patients can you triage at the same time?)
    c. How many examination rooms do you have (including trauma)?

6. Which nurse-initiated treatments/diagnoses are done at triage? [E.g., can nurses order x-rays or administer any treatment protocols; if so, which ones?]

Work process questions:
1. What is the typical workflow of patients from when a patient enters to seen by a doctor? [Like: patient enters, approaches the triage desk, delivers the chief complaint and name, goes to the waiting room, gets called for triage interview, goes to register, goes to waiting room, is called by doctor for examination.]
2. How many different kinds of forms (paper or electronic) are used in the process from patient enters to seen by a doctor? [Like triage-form for CTAS2/3; triage-form for CTAS4/5; doctors' notes; nurses' notes; registration form, etc.]
3. Does your hospital have electronic patient records or paper-based patient records?
4. Does your emergency department have electronic whiteboards? [If yes, what are these used for and how are they linked to other systems?]

Electronic Triage systems:
1. Do you have an electronic triage system installed in the emergency department? [IF NO, go to final set of questions]
   a. What is the name of the software, and who is the manufacturer?
   b. Is it an off-the-shelf product or special designed?
   c. How long have you had it?
   d. Is it used in the department for triage?
   e. Is the system a critical system? Is the system used 24/7 or only during the days, particular shift?
   f. What kind of IT support do you have available?
2. What kind of information and functionality is there in the electronic system? [Data for statistics, patient records?]
   a. What is the workflow within the electronic system?
   b. Does the application have embedded decision support for triage [CTAS or others]?
   c. Does it keep track of waiting time; if yes, in what way?
   d. How is patient history recorded?
   e. Can the system do multiple complaints?
   f. How is level of urgency (CTAS score) assigned within the system?
   g. How is the data saved within the system, and can you retrieve the information from a particular patient at a later stage?
3. Can you fax or email a screen shot of the system, a user-manual, or a link where we can see the system?

Final questions:
1. Has your department thought about buying/developing an electronic triage system in the future?
2. Have you had an electronic triage system in the past?

3. What are the main reasons for buying an electronic triage system?