Project title:

An Internet-Based Standardized Communication System (SCS) Linking the Emergency Department with Primary Care Physicians (PCPs): A Randomized Clinical Trial Measuring Continuity of Care

Researcher(s):


Project objective(s):

The objective of this study was to determine the effects of a Standardized Communication System (SCS) on measures of continuity of care.

Hypotheses or research questions:

Rapid, efficient and secure electronic communication of patient information from the emergency department to their PCP can improve physician knowledge that impacts on patient care and follow-up emergency department (ED) care.

Sociopolitical context, study population, geographical territory:

23 family physician practices closely affiliated with the SMBD-Jewish General Hospital whose patients frequent the ED on a regular basis participated in the study. The SMBD-JGH is a community-based tertiary care university-affiliated hospital that serves an elderly, urban and multicultural population

Theoretical perspective, conceptual framework, intervention logic etc., on which your research is based:

Theoretical perspective: Improved communication between healthcare providers is the single most important determinant of continuity of care.

Conceptual framework: A cluster randomized controlled trial comparing the SCS system to the current standard of care will demonstrate the benefits of the intervention.

Intervention logic: Enhanced and effective transfer of medical information to the primary care giver (family physician) regarding the ED visit will assure a continuum in the patient's health care episode.

Phase I: Determining the needs

Physicians from across Quebec were recruited from two health care disciplines (emergency and family medicine) to participate in an expert consultative process (focus groups). The goal was to identify the type of information emergency physicians (EPs) and PCPs require about patients who present to the ED. EPs would use this data to render their evaluation
process more efficient, while enabling them to make more informed treatment decisions in the ED. The information deemed important to PCPs will enable them to provide a more comprehensive follow-up of their patients.

Phase II: Developing the communication tool (SCS)

The second phase of the project was devoted entirely to the development of information technologies that will facilitate the transfer of information between EPs and PCPs. The objective of this process is to build upon existing databases and information systems and create a network through which clinical information can travel between the hospital and the community. The qualities required of this tool are security, accuracy, a user-friendly interface and compatibility with current in-hospital systems.

Phase III: Implementation and Evaluation of SCS

This phase of the project sought to evaluate the standardized communication tool through the comparison of outcomes in patients enrolled in the control group (no SCS available) and the intervention group (SCS available)

Description of the specific aspects of primary care services organisation studied in your project:

**Vision or organisational culture** (responsibility toward population or clientele, service vs health finality, etc.)

| Continuity of care |

**Organisational structure**

1. Governance (professional vs community-based, relations between actors stemming from regulations or laws, payment in the form of incentives, etc.)

| Integration of care within the health care system |
| Continuity of care |

2. Integration/coordination (organisational/functional, clinical, strategic, systemic, external, internal, etc.)

**Resources**

1. Type (human, financial, physical, technological, etc.)

| Information technology |

2. Level (quantity, distribution)

3. Substitution (do primary care services substitute for specialised services?)

| Innovation within information transfer between emergency department and primary care giver |

**Practices**

1. Multidisciplinarity/interdisciplinarity

| Interdisciplinary (emergentologist/family practice) |

2. Interprofessional, interorganisational collaboration process

| Interprofessional collaboration (emergentologist/family practice) |

3. Services offered (scope, range)

| Information transfer via the Web |

4. Mechanisms to ensure continuity, accessibility, comprehensiveness

| Information transfer via the Web |
Effects
1. Profile of use
   - Satisfaction and compliance of family physician to the use of SCS
2. Continuity, comprehensiveness, accessibility, responsiveness
   - Continuity of care
3. Health

Research strategy:

Impact analysis/Analyses des effets
The SCS is an internet and e-mail-based application that enables PCPs to receive detailed reports regarding their patients who have received ED care. We conducted a non-blinded, triple-crossover, randomized controlled trial of PCP practices, stratified by age and load of ED-using patients. PCPs who were allocated to the intervention group received reports via the SCS and those allocated to the control group were mailed copies of hand-written ED notes. Outcomes were measured with a patient-specific questionnaire completed by PCPs 3 weeks following the ED visit of interest. Questionnaires assessed continuity of care, resource utilization and physician satisfaction. A mixed-model analysis was employed to compare the 2 groups.

Studied variables:

Randomized controlled trial
Intervention: PCP received medical information relative to ED visit via the SCS
Control: PCP received medical information relative to ED visit via mailed copies of “NCR” paper copies of ED notes

Continuity of care: follow-up to PCP after ED visit, reception of information, PCP knowledge of patient’s visit to the ED, PCP satisfaction with patient management, action undertaken after information reception and duplication of diagnostic tests in PCP office.

Resource utilization in ED and in PCP office: length of stay, admission, haematology, biochemistry, microbiology, imaging, consultation to specialist and return visit to the ED within 28 days.

PCP satisfaction: usefulness, accuracy and completeness of information, clinical aspect of patient care, obtaining results.

Research design
Cluster randomized controlled trial of PCP practices, stratified by age and load of ED-using patients.
Triple crossover design; total of 4 periods, 2 intervention and 2 control periods for each physician

Sample (type, size)
Patients of the 23 participating physicians presenting to the Jewish General Hospital-SMBD emergency department, were eligible for recruitment if they were ≥ 18 years, spoke either French or English or had a translator and were active patients of one of the participating FPs (seen their FP at least once within the last 2 years). A total of 2022 ED visits (1616 patients) were part of the study.
Measurement scales, data collection tools and sources:

| Continuity of care: Web-based electronic questionnaire, answered by FP 21 days after patient ED visit |
| Resource utilization in ED and PCP office: Web-based electronic questionnaire, answered by PCP 21 days after patient ED visit, administrative database |
| PCP satisfaction: Web-based electronic questionnaire, answered by FP 21 days after patient ED visit, pre- and post-study questionnaire |

Type of analysis (quantitative, qualitative, triangulation):

- Continuity of care: quantitative, qualitative.
- Resource utilization in ED and PCP office: quantitative
- PCP satisfaction: quantitative, qualitative

Period of time covered by the study:

Recruitment took place between May 2000 and June 2001

Results, aspects of the approach specially pertinent for decision-makers:

### Phase I
1. A large gap exists in information sharing between emergency departments and the Primary Care Network (PCN).
2. PCPs are generally unaware of their patients’ emergency department utilization

### Phase II
1. The technological success of a Standardized Communication System linking Emergency Departments (EDs) and PCPs relies on the dedicated investment of all potentially relevant partners, i.e., information technology experts, clerical staff, and physicians on either end of the system.
2. Characteristics of a successful communication tool include automation, accuracy, rapidity, seamlessness (integration with a central data warehouse), user-friendly interface and ease of accessibility (high-speed connection). Interfacing with existing databases (lab systems, radiology) is still a daunting technological challenge and remains a barrier to widespread implementation of the SCS.
3. Bi-directional communication between ED and primary care givers is nearly impossible without electronic charting on the part of the PCP.

### Phase III

**Continuity of care:**
1. PCPs’ follow up of patients discharged from the ED is enhanced by SCS.
2. The SCS facilitates patient management through more informed decision-making.

**PCP satisfaction:**
3. PCPs appreciate and are satisfied with the SCS as it empowers them and allows them to become more involved with hospital-based care.

**Resource utilization:**
- In ED
  4. Increased availability of information delivered to PCP via the SCS can result in an increase in subsequent ED utilization (revisits, diagnostic tests).
  5. The SCS does not appear to have an impact on ED resource utilization and patient length of stay.
- In PCP office
  6. The SCS does not appear to have an impact on duplication of diagnostic tests in PCP office.
Your opinion on the convincing nature of your results for decision-makers:

<table>
<thead>
<tr>
<th>Internal validity: how confident are you about the strength of the relation between your variables based notably on:</th>
<th>Little</th>
<th>Somewhat</th>
<th>Very much</th>
<th>N.A.*</th>
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<tbody>
<tr>
<td>• Research design</td>
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<tr>
<td>Physicians were not blinded, although patients generally were unaware of allocation.</td>
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<td>• Sample size (statistical power)</td>
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<td>Only 23 family physician practices were involved in the trial</td>
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<td>• Intervention analysis (logic/theory of intervention)</td>
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<tr>
<td>Cluster analysis and the triple crossover design increased study power.</td>
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<td>• Implementation analysis (synergy, antagonism with context elements)</td>
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<td>x</td>
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<td>Technical barriers prevented what was planned as a multi-center intervention</td>
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<th>External validity: how easily can your results be applied in other contexts based notably on:</th>
<th>Little</th>
<th>Somewhat</th>
<th>Very much</th>
<th>N.A.*</th>
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<tr>
<td>• Size of reference population, diversity of studied cases</td>
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<td>Excellent case mix but enhanced impact may be seen when the effect of SCS on high-risk subgroups (elderly, chronically ill) are examined</td>
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<tr>
<td>• Statistical inference (inference of sample to sampled population)</td>
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<tr>
<td>Only one health care institution was involved</td>
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<tr>
<td>Only 23 family physicians</td>
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<tr>
<td>• Implementation analysis (can implementation conditions be found in another context, ability to replicate)</td>
<td>☐</td>
<td>☐</td>
<td>x</td>
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<td>Technological advances, even over the past few years, would facilitate the implementation of SCS or similar applications at present and in the future.</td>
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<td>• Intervention analysis (theoretical inference stemming from the fact that the studied intervention is based on an explicit intervention theory which can be applied in another context)</td>
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<th>Applicability: how easily can your results be used by decision-makers based on what you know to be constraints or barriers or elements facilitating their application:</th>
<th>Little</th>
<th>Somewhat</th>
<th>Very much</th>
<th>N.A.*</th>
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<tr>
<td>Describe constraints: Health care institutions use different software needing different interfaces. Interfacing with existing databases (lab systems, radiology) is still a daunting technological challenge and remains a barrier to widespread implementation of the SCS</td>
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<td>Describe facilitating elements: The SCS application is very user friendly. Family physicians complied to answer study</td>
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*N.A.: Not applicable.*
Financing sources:

Fondation Canadienne de recherche sur les services de santé, MSSS, RRSSS de Montréal-Centre, FRSQ, AMUQ

Knowledge exchange strategies favoured in the project:

1. Inform the co-sponsors and administrators in non-technical language
2. Presentation of results at scientific assemblies within Quebec, Canada and USA
3. ACFAS
4. Department of Family Medicine
5. Departments of Emergency Medicine
6. Workshops at family medicine and emergency medicine congresses, including AMUQ, CAEP, CCFP, CQMF, CMQ
7. Publication of results in peer-reviewed scientific journals
8. Web site
9. Newsletter to decision-makers at the MSSS

Anticipated fall-out or use in planning or decision-making:

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<th>TARGETTED DECISION-MAKERS (administrative, clinical)</th>
<th>FALL-OUT</th>
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<tr>
<td>Policy and program managers (MSSS, Agences régionales)</td>
<td>Enhanced information transfer between these two settings shows policy managers the benefits of incorporating reliable modes of communication as a fundamental component of emergency department standard of care.</td>
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<tr>
<td>Organisation managers (CH, CLSC, GMF, CMA, etc.)</td>
<td>Enhanced information transfer between health care institutions benefits continuity of care. Bi-directional communication between institutions is nearly impossible without a patient regional medical electronic chart.</td>
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<td>Professional groups/associations</td>
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<td>Community groups</td>
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What promising research avenues stem from your project, on the same issue or on a new issue?

Future research should build upon this experience and work toward investing in the technological infrastructure that would facilitate information access for all health care providers. Standard and affordable bi-directional systems for hospitals and the community settings still have to be designed and evaluated.

Main key words:

Information technology, electronic health record, health care integration, continuity of care, information transfer