



**Portrait of rural emergency departments in Quebec and
utilisation of the Quebec Emergency Department
management guide: a study protocol**

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Department management guide: a study protocol

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52
53 **Keywords:** rural emergency departments, access to health care services, *Emergency Department*

54 *Management Guide*, quality of work life, quality of care indicators

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57 3590 words
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ABSTRACT

Introduction: Emergency departments are important safety nets for people who live in rural areas. Moreover, a serious problem in access to health care services has emerged in these regions. The challenges of providing access to quality rural emergency care include: recruitment and retention issues, lack of advanced imagery technology, lack of specialist support and the heavy reliance on ambulance transport over great distances. The Quebec Ministry of Health and Social Services published a new version of the *Emergency Department Management Guide*, a document designed to improve emergency department management and to humanize emergency department care and services. In particular, the *Guide* recommends solutions to problems that plague rural emergency departments. Unfortunately, no studies have evaluated the implementation of the proposed recommendations. **Methods and analysis:** To develop a comprehensive portrait of all rural emergency departments in Quebec, data will be gathered from databases at the Quebec Ministry of Health and Social Services, the Quebec Trauma Registry, and from emergency departments and ambulance services managers. Statistics Canada data will be used to describe populations and rural regions. To evaluate the use of the 2006 *Emergency Department Management Guide* and the implementation of its various recommendations, an online survey and a phone interview will be administered to emergency department managers. Two online surveys will evaluate quality of work life among physicians and nurses working at rural emergency departments. Quality of care indicators will be collected from databases and patient medical files. Data will be analysed using statistical (descriptive and inferential) procedures. **Ethics and dissemination:** This protocol has been approved by the CSSS Alphonse-Desjardins research ethics committee (Project MP-HDL-1213-011). The results will be published in peer-reviewed scientific journals and presented at one or more scientific conferences.

ARTICLE SUMMARY

Article focus

- This research protocol aims to develop a comprehensive portrait of all rural emergency departments in the province of Québec, Canada.
- It will also allow to evaluate the utilisation and usefulness of the Emergency Department Management Guide, a unique tool to help standardize emergency care.

Key messages

- As the first study of its kind in Canada, our results will undoubtedly be useful to policy-makers and can be used to guide the attribution of resources as well as distribution of healthcare services in rural areas.

- The results will provide policy-makers with a greater understanding and appreciation of the unique challenges faced by rural emergency departments.
- This project will likely contribute to improved health in rural Quebec.

Strengths and limitations

- This is the first study examining access to emergency services in rural Canada, in particular the province of Quebec.
- Methodological limitation: we expect that current clinical databases may not capture all quality of care indicators.

INTRODUCTION

The practice of emergency medicine in rural areas in Canada represents a significant challenge, and there is a lack of knowledge to properly understand this issue^{1,2}. The majority of research on emergency medicine is conducted in tertiary academic centres with patients from urban areas. It is important to study the particular difficulties encountered by rural emergency departments (ED), as these EDs constitute a safety net of sorts for the 20 % of Canadians who live in rural areas³.

Health care professionals and patients in rural areas in Canada face numerous problems: reduced access to specialized care⁴⁻⁸; reduced access to medical imaging (tomodensitometry - TDM, ultrasound, magnetic resonance imaging - MRI)^{9,10}; and to intensive care units; geographical distance from specialized centres, and deficient means of transportation¹¹. Further challenges for rural emergency care include problems with personnel recruitment, level of training in emergency medicine, and infrequent experiences with complex cases¹². Further, several provinces have centralized their medical care in order to reduce costs^{7,13-15}, resulting in limited access to local services and specialized care, and increased pressure on prehospital emergency care (PEC)^{13,14,16}. Limited access in rural regions to primary care^{4,17} and mental health care, and to long term care and services centres (LTC) may increase the number of visits to EDs¹⁸. Finally, risk of death subsequent to major trauma is considerably higher in rural regions

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2
3 and a correlation between geographical isolation and mortality^{3, 10, 19-23} has been observed. These
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5 problems impact a significant proportion of Canada's population. Given that the geographic factor is not
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7 changeable, it is imperative to identify factors that could potentially be modified to help resolve these
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9 problems.
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11 12 13 14 15 **Emergency Department Management Guide**

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17 In 1997, the Canadian Association of Emergency Physicians (CAEP) presented its position on rural
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19 emergency medicine in Canada¹². Due to the lack of research data on the issue at the time, the
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21 document was based on expert consensus. The position paper was created to inform the development
22
23 of a framework to evaluate medical practices in rural EDs. The CAEP document did not, however, include
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25 specific recommendations about appropriate patient transportation times or access to TDM or other
26
27 specialized services.
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30 However, the publication of the *Emergency Department Management Guide*²⁴ in 2006 by the Quebec
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32 Ministry of Health and Social Services (MSSS) raised a number of critical issues related to rural EDs.
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34 Developed by a multidisciplinary group of key policy-makers, the *Management Guide*²⁴ is, to our
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36 knowledge, the most recent and concise available document. It specifies the services that should be
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38 accessible in the province's EDs based on number of annual visits to the department and other variables.
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40 The guide²⁴ also includes several recommendations for solving the problems faced by rural EDs. In brief,
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42 this forward-thinking guide²⁴ could provide a starting point for the development of management
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44 standards in Canadian rural EDs. To date, no studies evaluating its implementation in rural areas have
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46 been conducted.
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51 52 53 54 **Shortage of health care professionals in rural areas**

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56 The challenges related to rural emergency medicine are multiple and significant. In particular, problems
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3 related to the vulnerability of recruitment and retention of health care professionals must be addressed.
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5 Despite the critical nature of the problem, there is a significant lack of data about this sector and about
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7 health care services for the rural Canadian population¹. A systematic search of Cochrane Reviews yields a
8
9 complete absence of rigorous studies that adequately evaluate efforts to recruit and retain health care
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11 professionals in rural areas. This problem is not on the verge of resolution: according to the National
12
13 Physician Survey²⁵, only 1% of family medicine residents plan to eventually practice in rural regions, and
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15 rural family doctors tend to leave emergency medicine after only a few years. Anecdotal evidence
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17 suggests that such departures are prompted by high stress, difficult schedules, and poor quality of life.
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19 Combined, these factors make training and recruiting emergency physicians in rural areas a considerable
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21 challenge.
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29 Observational studies^{1, 26-32} describe several factors that could improve retention of health care
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31 professionals in rural areas. Promising strategies include selection of rural students for professional
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33 training programs, establishment of university departments and training units in rural regions, provision
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35 of grants for students who commit to working in rural areas, and development of personal and
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37 professional support programs for professionals working in rural zones.
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43 The *Management Guide*²⁴ also proposes interventions to increase recruitment and retention of health
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45 care professionals in rural areas: encouraging multidisciplinary training for health care professionals;
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47 ensuring access to necessary and appropriate material and technical resources and help from colleagues,
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49 specialists, and surgeons when necessary; increased access to specialized treatment centres; and access
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51 to continuing education. The guide²⁴ also suggests reasonable work and on-call schedules, attractive
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53 salaries, and adequate benefits. Finally, it proposes the following suggestions for recruiting and retaining
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55 health care professionals in rural areas: an environment conducive to raising and educating a family, a
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3 stimulating social and cultural environment, and employment opportunities for the health care
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5 professional's partner, and finally, the prospect of an overall high standard of living and excellent quality
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7 of life. The implementation of these recommendations in Quebec needs to be explored.
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10 11 12 **Trauma, prehospital emergency care and inter-establishment transfers** 13

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15 Trauma is one of the most common reasons for consultation in the ED; correspondingly, it is the most
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17 frequently studied subject in research on rural medicine. Trauma is also the leading cause of mortality in
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19 individuals under forty and the fourth most common cause of mortality for people of all ages^{3,33}. For
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21 over 30 years, major investments have been made in developing traumatology networks²⁰. These
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23 networks have benefitted urban patients, but the results are less robust for rural patients who are often
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25 geographically isolated from designated trauma centres, necessitating complicated inter-establishment
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27 transfers^{23,34,35}. In fact, in some provinces, up to 80% of patients in rural regions are over an hour away
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29 from tertiary trauma centres³⁶.
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35 The distances between rural EDs and tertiary care or referral centres, and the elevated risk of medical
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37 trauma in rural areas are such that PEC is essential for rural residents. A recent American meta-analysis
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39 indicated that PEC response times are significantly longer in rural areas¹¹. This result can be attributed to
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41 greater travel distances, hazardous road conditions, and to the challenge of locating and retrieving
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43 victims in rural areas. Another study demonstrated that the elevated rate of mortality subsequent to
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45 trauma in rural areas is partially attributable to lengthy transportation time in ambulances²².
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51 One critical component of rural emergency medicine is the transfer of more complex cases to a referral
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53 centre. Each transfer indicates the failure of the local centre to meet the patient's critical needs. Every
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55 transfer involves considerable time and personnel, and exposes the patient to the risk of complications
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3 inherent to transportation by emergency vehicle. One Canadian study reported that almost 2% of all
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5 rural ED patients in Ontario had to be transferred to another establishment to receive more advanced
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7 emergency care¹⁶. For a medium-sized rural ED in Quebec (20,000 annual visits), this can mean over 400
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9 transfers per year. Rate of inter-establishment transfers in Quebec rural EDs is a key variable to measure;
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11 an elevated transfer rate could indicate a local shortage or a problem in access to basic services.
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14 15 16 17 **Quality of care indicators in the emergency department**

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19 Research evidence suggests that evaluation of quality indicators and the publication of data about
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21 quality indicators improve quality of care³⁷⁻⁴³. The recent publication of the *Consensus on Evidence-Based*
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23 *Quality of Care Indicators for Canadian Emergency Departments*⁴⁴ permits objective measurement of EDs
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25 performance, allowing objective comparison between departments. Published in March 2010, this
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27 consensus was created by a panel of 24 Canadian experts including managers, clinicians, emergency
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29 medicine researchers, health information specialists, and government representatives. Of 48 indicators
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31 selected, consensus was reached on 8 groups of indicators determined to have the highest levels of
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33 priority and validity. The selected indicators are related to interventions for eight pathologies often
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35 treated in EDs, including myocardial infarction (MI), stroke, sepsis, asthma, and several pediatric
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37 problems related to infection.
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45 The *Management Guide*²⁴ was published after the consensus document and is therefore not mentioned
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47 in this important publication. However, quality of care is one of the central principles of the
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49 *Management Guide*²⁴. Although the eight established quality indicators are key for future studies
50
51 comparing performance between EDs, methodological limitations must be acknowledged. First, data on
52
53 all of the indicators are not included in current clinical databases. Second, the scientific consensus
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55 committee did not include representatives from rural EDs, and certain quality indicators relevant to rural
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3 EDs may not be included (e.g., trauma care in rural areas with limited access to traumatology centres and
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6 investigative technology, inter-establishment transfer needs, and the impact of these issues on quality of
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8 care).

11 12 13 **Objectives**

14 This project is designed to:

- 17 1. Develop a comprehensive portrait of all rural EDs in Quebec;
- 18
19 2. Evaluate the use of the 2006 *Emergency Department Management Guide*²⁴:
 - 21 2.1 *Perceived usefulness and implementation of its various recommendations;*
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23 2.2 *Factors that promote or impede the implementation in rural areas;*
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25 2.3 *Relations between the implementation and performance indicators;*
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27 2.4 *Relations between the implementation and health care professionals' work-related quality of*
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29 *life.*

32 33 34 35 **METHODS AND ANALYSIS**

36 The project is a descriptive and evaluative study of rural EDs in Quebec that offer 24/7 medical coverage,
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38 have hospitalization beds and are located in a rural or small town according to the definition of Statistics
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40 Canada⁴⁵.

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46 In a previously conducted pilot study, rural EDs were identified using the Health Canada Establishment
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48 Guide⁴⁶ and confirmed by the MSSS and the *Direction Nationale des Urgences*. There are 26 rural EDs in
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51 Quebec.

52 53 54 55 56 **Phase 1 - Portrait of all rural emergency departments**

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3 To develop a comprehensive portrait of all rural EDs in Quebec, a questionnaire will be sent by email to
4
5 the chief nurse to collect data on: 1) hospital centre characteristics (e.g., referral centers, availability of
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7 local intensive care unit beds, number of acute and long-term beds); 2) availability of health information
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9 technology (e.g., Internet and Wifi access); 3) knowledge transfer activities (e.g., quality assurance, book
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11 club); 4) ED variables (e.g., triage level, wait time, average hospital stay, number of transfers between
12
13 facilities); 5) available diagnostic services 24/7 (e.g., lab, basic radiography, TDM, MRI, ultrasound,
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15 portable ultrasound); 6) medical and paramedical staff (e.g., number of emergency doctors, years of
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17 experience and level of training, percentage of locum doctors per period, availability of specialists,
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19 number and level of training of nurses, presence of other health professionals); 7) pre- and post-
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21 emergency care resources in the region (e.g., number of family doctors, availability of convalescence
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23 beds); 8) long-term housing and care centres and mental health facilities (e.g., number of beds, waiting
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25 list). Some data will also be gathered from databases at the MSSS (e.g., number of annual visits), the
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27 Quebec Trauma Registry (information on traumatic event, health care institution implied, emergency
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29 department, hospitalization, patient acuity (triage level), etc.), PEC centres (e.g., number of ambulances
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31 deserving each rural hospital) and Statistics Canada (e.g., data on population and rural regions).
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33 For the first phase of the study, the project needs no further ethical evaluation since all of the data
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35 required is non nominal.
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45 **Phase 2 - Emergency Department Management Guide**

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47 First, an online survey about use of the *Emergency Department Management Guide*²⁴ will be developed
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49 and administered electronically to the management personnel of the EDs included in the study (chiefs of
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51 staff, head nurse). Research staff will contact managers to introduce the project and to explain the
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53 online questionnaire. Regular follow-ups will be conducted in order to obtain the most complete
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55 responses possible. The survey will be developed using all the *Management Guide*²⁴ recommendations (n
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3 = 69) pertained to rural hospitals. Respondents will respond on a 7-point *Likert*-type scale to two
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5 questions: 1) *To what extent is the recommendation useful in my hospital?* ; 2) *To what extent is the*
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7 *recommendation used in my hospital?*. Further, a phone interview will be administered to the
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9 respondents to evaluate factors that promote or impede implementation of the recommendations
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11 perceived equally useful and not used.
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17 Second, the following indicators will be used to explore the association between use of the *Management*
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19 *Guide*²⁴ and performance and quality of care: 1) the performance indicators assessed in the first phase
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21 (e.g., average ED stay), and 2) the following 8 high-priority quality of care indicators established by
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23 Canadian consensus⁴⁴ in the following categories: ED operations (e.g., length of stay), patient security
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25 (e.g., unplanned/unexpected readmissions), pain management (e.g., delay in administration of
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27 medication), cardiac and respiratory problems (e.g., treatment delay for thrombolysis, corticosteroid
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29 administration percentage), stroke (e.g., delay in administration of plasminogenic tissue activator), and
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31 sepsis/infections (e.g., delay in administration of antibiotics). Information missing from the databases
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33 will be obtained from patient medical files. The number of file reviews necessary to obtain the relevant
34
35 information will vary by indicator.
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42 In order to evaluate their quality of life, two online surveys will be administered to all consenting nurses
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44 and doctors working at rural EDs. The exact number of professionals to complete the survey will vary
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46 between EDs, but the expected response rate is 70%. In an effort to boost response rate, we will
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48 telephone hospital spokespersons (e.g., head nurse) to establish contact and explain the procedure.
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53 The first survey refers to the Quality of work life systemic inventory (QWLSI)⁴⁷ and will be available for
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55 completion via <http://qualitedevie.ca>. The measure includes 34 themes divided into 8 subgroups:
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3 remuneration, professional development, work schedule, social environment/relationships with
4 colleagues, relationships with superiors, physical environment, factors that influence employees'
5 perception and enjoyment of the task, and employee support. A supplementary module of 6 questions
6
7 will be designed to capture aspects specific to ED, that are not covered by the existing 34 items. The
8
9 QWLSI provides an organizational diagnosis and permits comparison to over 3,000 workers who have
10
11 already completed the measure. The internal validity (Cronbach's alpha) of the subgroups ranges from
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13 0.60 to 0.82⁴⁸. The overall internal validity is 0.88 and the test-retest reliability is 0.85. The English-
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15 language and French-language versions are equivalent (0.84). Lower scores (below the 25th percentile)
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17 indicate greater psychological distress and professional burnout. The second survey contains questions
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19 about sociodemographic variables, and factors related to recruitment and retention and will also be
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21 completed online.
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31 **Statistical analyses**

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33 The statistical analyses will be achieved in collaboration with the biostatistics service from the Unité de
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35 recherche en santé des populations du Centre hospitalier affilié universitaire de Québec. The data
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37 collected as part of the phase 1 will be described as means, medians and percentages, according to the
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39 variables distribution in order to meet the objective 1. In order to meet the objective 2.1, the mean of 6
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41 point Likert scores measuring the use and usefulness of the guide²⁴ will be presented for each of its
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43 recommendations. Likert scores will also be dichotomized with the intention of showing the agree or
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45 disagree between the utilisation and usefulness of the guide²⁴, which will allow to calculate the mean
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47 number of useful recommendations, the mean number of applied recommendations and the proportion
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49 of ED where at least 70% of recommendations are applied. Answers to the questions concerning the
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51 perceived usefulness and utilisation will be compared in order to evaluate the level of application of
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53 recommendations considered useful. The participants' phone interview answers (objective 2.2) will be
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3 qualitatively analyzed in order to show the obstacles and facilitators considered to be the most
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5 important to the implementation of the guide²⁴. With the aim of meeting the objective 2.3, the relation
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7 between the use of the Management Guide²⁴ and the performance and quality of care indicators will be
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9 measured with Spearman correlation. The utilisation of the guide²⁴ will be measured by the mean
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11 number of applied recommendations in ED. Finally, regarding the objective 2.4, the results of the two
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13 surveys will be presented with descriptive statistics in a first phase. The association between the Quality
14
15 of work life systemic inventory (QWLSI) score and utilisation of the guide²⁴ will be assessed by the aid of
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17 a generalized estimation equations model (GEE) in order to take into consideration the correlation
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19 between the responders from a same ED. The utilisation of the guide²⁴ will be measured by the number
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21 of recommendations applied (objective 2.1 analyses) and processed as a continuous or dichotomous
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23 variable. The data collected during phase 1 as well as information on characteristics of responders
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25 collected in the second survey of the objective 2.4 will be able to serve as adjustment variables in the
26
27 model. However, if the sample size doesn't allow such analyses in objective 2.4, the association between
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29 the quality of life scores and utilisation of the guide²⁴ will be measured with Spearman correlation
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31 coefficients. Furthermore, some correlational analyses will allow to compare the quality of work life
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33 scores and some retention and recruitment factors.
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42 **Ethics and dissemination**

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44 This rural project required ethics evaluation through a complex multicenter study mechanism described
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46 below. In the province of Québec, a study that is conducted in several centres must conform to an
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48 established ethics procedure according to the MSSS. Two preliminary steps must be undertaken. First,
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50 the project must be peer reviewed by a recognized expert committee (ex. Scientific research committee).
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52 Second, a main research centre ethics committee (main REC), which is normally the REC that belongs to
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54 the research center where the project is initiated, must be determined. When these two conditions are
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3 fulfilled, the principal investigator sends the project to the main REC, to each local REC (if applicable,
4 otherwise no review occurs) and to every participating study site. Once the local RECs has reviewed the
5 project, they send their comments to the main REC, which takes into consideration their specific
6 requests and decides to approve/reject the project within two weeks following the examination. When
7 the expectations of the main REC are satisfied, the preliminary decision is sent to the principal
8 investigator and to every participating study site. A feasibility study committee, which evaluates the
9 practicability of the project in each institution, must submit its evaluation to the institutional director
10 (Hospital CEO or director) before the end of the ethical procedure. Once the ethics and feasibility
11 examinations are completed, the decision is reviewed by each local REC (or its designed authority if it
12 doesn't have its proper REC). Once the local REC (or its designed authority) approves this decision, it
13 sends it to the institution. Furthermore, the feasibility study committee forwards its decision to the
14 general management of the institution, which will relay its decision to the main REC. Finally, the main
15 REC sends its final decision to the principal research coordinator and to each institution and REC implied
16 in the project.

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38 The phase 1 of this study was exempted from ethical evaluation as no human subject was involved. The
39 phase 2 of this study has been approved by the CSSS Alphonse-Desjardins main REC (Project MP-HDL-
40 1213-011). Results from this study will be published in peer-reviewed scientific journals and presented at
41 one or more scientific conferences.

42 43 44 45 46 47 48 49 **DISCUSSION**

50
51 To our knowledge, this will be the first study to evaluate EDs in rural Quebec and Canada at such a broad
52 scale. It will provide a greater understanding of the factors that promote and impede the
53 implementation of the recommendations in the *Management Guide*²⁴. The results could be used to
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3 develop one or several interventions designed to increase implementation of the *Management Guide*²⁴
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5 recommendations. The questionnaire could also be used to investigate the implementation of the
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7 *Management Guide*²⁴ in EDs outside Quebec and Canada by researchers wishing to test the
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9 implementation of a management guide²⁴ adapted to their own region and context.
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14 Our use of performance indicators recently published by Schull and colleagues⁴⁴ to measure the impact
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16 of a knowledge transfer tool (a practical guide) on EDs performance is a further innovation that could
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18 advance knowledge transfer research. We plan to identify performance indicators that are specific to
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20 rural EDs and were not included in the list of indicators published by Schull and colleagues⁴⁴. Eventually,
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22 we wish to explore the impact of the use of the *Management Guide*²⁴ on the quality of care offered in
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24 Quebec relative to that offered in other Canadian provinces. The proposed project would allow us to
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26 establish an essential knowledge base that would serve to plan a future comparison with EDs in other
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28 provinces.
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34 The results of this study will also allow a greater understanding of the factors associated with work-
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36 related quality of life in ED health care professionals, and those relevant to recruitment and retention of
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38 ED personnel. The research evidence generated by this study could also be used to develop interventions
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40 that could, in turn, be evaluated using the same questionnaires.
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47 Finally, our results will undoubtedly be useful to policy-makers and can be used to guide the distribution
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49 of healthcare services in rural areas. The results will provide policy-makers with a greater understanding
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51 and appreciation of the unique challenges faced by rural EDs in the province. The results will contribute
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53 to the bank of available research data that can be used to develop policies about attribution of resources
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55 in rural areas. Ultimately, this project will contribute to improved health in rural Quebec.
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Contributors

The First Author, RF is the principal investigator. He is responsible for the original idea, literature review and study design. Co-authors contributed to various aspects of the study design with input relating to their specific expertise in the field. All authors read and approved the final manuscript.

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Competing interests

None

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