

Rapid Synthesis

Enhancing the Efficiency and Effectiveness
of Non-urgent Transportation Models

29 March 2019



HEALTH FORUM

EVIDENCE >> INSIGHT >> ACTION

Rapid Synthesis:
Enhancing the Efficiency and Effectiveness of Non-urgent Transportation Models
90-day response

29 March 2019

McMaster Health Forum

The McMaster Health Forum's goal is to generate action on the pressing health-system issues of our time, based on the best available research evidence and systematically elicited citizen values and stakeholder insights. We aim to strengthen health systems – locally, nationally, and internationally – and get the right programs, services and drugs to the people who need them.

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Timeline

Rapid syntheses can be requested in a three-, 10-, 30-, 60- or 90-business-day timeframe. This synthesis was prepared over a 90-business-day timeframe. An overview of what can be provided and what cannot be provided in each of the different timelines is provided on the McMaster Health Forum's Rapid Response program webpage (www.mcmasterforum.org/find-evidence/rapid-response).

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Conflict of interest

The authors declare that they have no professional or commercial interests relevant to the rapid synthesis. The funder played no role in the identification, selection, assessment, synthesis or presentation of the research evidence profiled in the rapid synthesis.

Merit review

The rapid synthesis was reviewed by a small number of policymakers, stakeholders and researchers in order to ensure its scientific rigour and system relevance.

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KEY MESSAGES

Question

- What are the features of different non-urgent transportation models and what approaches may improve use of non-urgent transportation in Ontario?

Why the issue is important

- In Ontario there are three broad levels of priority related to patient transport: 1) emergent transfer (a life-threatening situation); 2) urgent transfer (not as serious as an emergent transfer, but time-sensitive); and 3) non-urgent transfer (no immediate threat to life or limb, or care that is time-sensitive).
- Patients frequently require non-urgent transportation, which typically includes transfers between institutions or from hospital to home and vice versa, and availability and use of such transportation can contribute to enhancing patient flow, patient safety, quality of care and patient experience, and can also promote efficient use of resources (especially in relation to avoiding unnecessary use of emergency transfers).
- The main challenge to non-urgent transportation is that availability may be limited in some areas, particularly in rural and remote regions where transportation resources need to serve very large geographical areas.
- Reports indicate that emergency medical services (EMS) (i.e., 911) may sometimes be used for non-urgent transportation.
- This rapid synthesis was requested to synthesize the evidence related to non-urgent transportation models and to consider approaches that may improve use of non-urgent transportation in Ontario.

What we found

- We searched three databases (Health Systems Evidence, Cochrane Library and PubMed) from which we identified 13 relevant documents (one systematic review, two non-systematic reviews and 10 primary studies).
- We also used descriptive statistics to estimate the frequency with which EMS services are used for non-urgent transportation and conducted a jurisdictional scan of each of the 14 Local Health Integration Network (LHIN) websites for region-specific information on non-urgent transportation services currently in place.
- One limitation is the limited amount of research evidence available; the evidence we did identify was older with six of the 10 primary studies having publication dates older than five years.
- Four primary studies provided findings about the frequency and costs associated with EMS use for non-urgent transportation, with one older primary study (based on data from 2004 and 2005) conducted in Ontario finding that the average cost of an individual one-way inter-facility transfer of any type was \$704. A typical inter-facility patient transfer was within a 21-km radius and involved a non-urgent appointment with a cardiologist or dialysis treatment.
- Four primary studies published from 2011-2016 specifically examined non-urgent transportation models, which included: 1) non-urgent inter-facility patient-transfer systems; 2) a centralized bed-management system to improve patient flow; 3) a publicly subsidized non-urgent transportation service for rural communities in northern British Columbia; and 4) a decision-support tool based on business intelligence techniques to optimize inter-facility patient transfers in northern British Columbia.
- Two older reviews identified facilitators (e.g., communication, appropriateness, and efficiency for ensuring quality and safety of non-urgent transportation) and barriers (e.g., non-compliance with policies) for optimizing the use and costs associated with non-urgent transportation models.
- The proportion of non-urgent emergency-department visits via ambulance range from 0.1% (in the Mississauga Halton LHIN) to close to or over 2% (in the North East and the North West LHINs).
- To varying degrees, all of the 14 LHINs have access to private non-urgent transportation through a variety of vendors (e.g., Voyageur Transportation and Ambu Trans Medical Transportation Services), volunteer-based non-urgent transportation (e.g., Canadian Cancer Society and Canadian Red Cross) and community-based non-urgent transportation (e.g., from community care centres).
- We identified two regions that are applying innovative approaches to non-urgent transportation: 1) the Champlain LHIN has developed three decision guides (discharge, inter-facility transfer and mental health transfer) to assist hospital staff to determine the most appropriate transport service; and 2) the North East LHIN has developed a non-urgent transportation model that addresses both fixed and on-demand responses and creates two separate delivery channels for long-haul versus short-haul transport corridors.

QUESTION

What are the features of different non-urgent transportation models and what approaches may improve use of non-urgent transportation in Ontario?

WHY THE ISSUE IS IMPORTANT

In Ontario there are three broad levels of priority related to patient transport:

- 1) emergent transfer, which involves a life-threatening situation and receives priority from the Provincial Transfer Authorization Centre due to time-sensitivity;
- 2) urgent transfer for issues that are not as serious as an emergent transfer, but may be time-sensitive and need to be completed within a specified timeframe; and
- 3) non-urgent transfer which does not involve an immediate threat to life or limb, or care that is time-sensitive (note that the definition for non-urgent transfer can vary depending on the stakeholder within the system).(1)

In addition, non-urgent transportation can include any of the following:

- inter-facility transfers or repatriations;
- other (non inter-facility) transports where a patient requires a stretcher;
- transports from hospital to home;
- transports from home to hospital for appointments/treatment; or
- community transportation for rural or isolated patients in need of medical appointments/treatment.

Patients frequently require non-urgent transportation, and the availability and use of such transportation can contribute to enhancing patient flow, patient safety, quality of care and patient experience, and can also promote efficient use of resources (especially in relation to avoiding unnecessary use of emergency transfers). However, the challenge is that the availability of such models may be limited in some areas, particularly in rural and remote regions where transportation resources need to serve very large geographical areas. Moreover, reports indicate that Emergency Medical Services (EMS) (i.e., 911) may be used for non-urgent transportation,(1) such as in situations when a patient who requires non-urgent but time-sensitive care (such as for a surgical consult, dialysis or a diagnostic test) lives far from the care centre and has no other means of transportation. Given this, Converge3 has requested this rapid synthesis to synthesize the evidence related to features of non-urgent transportation models and to describe current approaches to non-urgent transportation in Ontario, including innovations that could improve the efficiency of such services.

Box 1: Background to the rapid synthesis

This rapid synthesis mobilizes both global and local research evidence about a question submitted to the McMaster Health Forum's Rapid Response program. Whenever possible, the rapid synthesis summarizes research evidence drawn from systematic reviews of the research literature and occasionally from single research studies. A systematic review is a summary of studies addressing a clearly formulated question that uses systematic and explicit methods to identify, select and appraise research studies, and to synthesize data from the included studies. The rapid synthesis does not contain recommendations, which would have required the authors to make judgments based on their personal values and preferences.

Rapid syntheses can be requested in a three-, 10-, 30-, 60- or 90-business-day timeframe. An overview of what can be provided and what cannot be provided in each of these timelines is provided on the McMaster Health Forum's Rapid Response program webpage (www.mcmasterforum.org/find-evidence/rapid-response)

This rapid synthesis was prepared over a 90-business-day timeframe and involved four steps:

- 1) submission of a question from a policymaker or stakeholder (in this case, Converge3);
- 2) identifying, selecting, appraising and synthesizing relevant research evidence about the question;
- 3) drafting the rapid synthesis in such a way as to present concisely and in accessible language the research evidence; and
- 4) finalizing the rapid synthesis based on the input of at least two merit reviewers.

WHAT WE FOUND

We identified a total of 13 relevant documents by searching three databases (Health Systems Evidence, Cochrane Library and PubMed), with the search strategy for these databases detailed in Box 2. In addition, we used descriptive statistics to estimate the frequency with which EMS services are used for non-urgent transportation, and undertook a jurisdictional scan of each of the 14 Local Health Integration Network (LHIN) websites for region-specific information on non-urgent transportation services currently in place.

One limitation we note is with respect to the limited amount of research evidence available on non-urgent transportation models. We identified only one relevant systematic review and, of the 10 primary studies, six were specific to the Canadian context. In addition, six of the 10 primary studies have publication dates older than five years, which may have an impact on the relevance of the findings.

Impacts of non-urgent transportation models

We identified one systematic review, two non-systematic reviews and 11 primary studies related to non-urgent transportation models. Findings did not provide direct insights about the impacts of non-urgent transportation models, and instead focused on the:

- 1) reasons for and impacts of inappropriate non-urgent transportation;
- 2) features of non-urgent transportation models; and
- 3) barriers and facilitators for optimizing the use of non-urgent transportation models.

A short summary of these findings has been provided in the narrative below.

Reasons for and impacts of inappropriate non-urgent transportation

We found four primary studies that provided insight into the frequency and costs associated with EMS use for non-urgent transportation. An older study validated the Provincial Transfer Authorization Centre database,(2) which is the database that was used in a more recent study that examined inter-facility land transfers by ambulance in Ontario from June 2004 to May 2005.(1) This study found that:

- the average cost of an individual one-way inter-facility transfer (of all types) was \$704;
- 80% of the transfers were non-urgent and/or routine (e.g., physician appointments, dialysis treatment, return to residence from the hospital);
- 78% of all non-urgent patient transfers in urban settings who were transferred for dialysis, physician's appointments and returning to home facilities or residences, were within a radius of 25 km (no data were provided about rural, remote or northern regions);
- within urban settings, the median distance travelled was 11 km; and

Box 2: Identification, selection and synthesis of research evidence

We identified research evidence (systematic reviews and primary studies) by searching (in January 2019) Health Systems Evidence (www.healthsystemsevidence.org), Cochrane Library and PubMed. In Health Systems Evidence, we used the following search strategies: 1) transport*; 2) inter-facility AND transfer; and 3) patient AND transfer. We also applied the following filters: overviews of systematic reviews, systematic reviews of effects, and economic evaluations and costing studies. In the Cochrane Library we used the following search strategies: 1) transport*; 2) inter-facility AND transfer; and 3) patient AND transfer. Finally, in PubMed we used the following search strategies: 1) patient AND transport*; 2) patient AND transfer; 3) patient AND transfer AND model; 4) non-urgent AND transport*; 5) patient AND transport* AND volunteer; and 6) patient AND flow AND management.

The results from the searches were assessed by one reviewer for inclusion. A document was included if it fit within the scope of the question posed for the rapid synthesis.

For each systematic review we included in the synthesis, we documented the focus of the review, key findings, last year the literature was searched (as an indicator of how recently it was conducted), methodological quality using the AMSTAR quality appraisal tool (see the Appendix for more detail), and the proportion of the included studies that were conducted in Canada. For primary research (if included), we documented the focus of the study, methods used, a description of the sample, the jurisdiction(s) studied, key features of the intervention, and key findings. We then used this extracted information to develop a synthesis of the key findings from the included reviews and primary studies.

- a typical inter-facility patient transfer was within a 21-km radius and involved a non-urgent appointment with a cardiologist or dialysis treatment.(1)

The third primary study examined inter-facility transfers in a rural emergency department in Quebec and found that 3% of all emergency-department visits resulted in transfers to other facilities, of which at least 28% were exclusively for computed tomography imaging.(3) The final primary study reviewed stakeholder insights on models for non-urgent transportation in Ontario.(4) In this study, transportation advisors noted a few trends including: 1) EMS increasingly concentrating on unstable patients, which reduced their availability for stable patient transfers; 2) hospitals being more reliant on contracts with private ambulance services, where cost for a single ambulance ride could range from \$45 to \$200; and 3) most patient transfers with private services using old former ambulances.(4)

Two primary studies focused on appropriate versus inappropriate ambulance use. The first study was a prospective cross-sectional study conducted in California, U.S., on non-urgent ambulance use, which found that overall there was consensus between EMS providers and patients regarding appropriate and inappropriate ambulance utilization.(5) Of the patients in the study who considered themselves to be non-urgent, 38% had alternative methods to transport themselves but chose not to use it.(5) The second primary study conducted structured interviews with patients presenting at emergency departments in Pennsylvania, U.S., and found that severity of illness was not the primary reason for choice of transport (ambulance transport compared to non-ambulance users), and those that were aware of the ambulance fees were less likely to use it.(6)

Features and impacts of non-urgent transportation models

We found one non-systematic review and three primary studies that specifically examined features of non-urgent transportation models. The non-systematic review used guidelines written by the American College of Critical Care Medicine, Society of Critical Care Medicine, Intensive Care Society, the Association of Anaesthetists of Great Britain and Ireland, and the Paediatric Intensive Care Society to develop the Interhospital Transfer Center Model, which identifies the following three core components of non-urgent patient-transfer systems:

- 1) a primary transfer system answer point, which is a single point of access for community hospitals to contact tertiary-care centres;
- 2) bed management coordination located at the tertiary-care centre and which ensures that beds are allocated appropriately; and
- 3) a transport team dispatch to manage patient flow.(7)

In addition, this study indicated that standardized processes, clarifying roles, defining responsibilities and establishing expectations translated into consistent performance and decreased transfer time.(7) Moreover, system-wide real-time dashboards allowed information to be disseminated quickly (e.g., bed status, available transport teams and pending admissions).(7)

The first study examined effectiveness of using a centralized bed-management system to improve efficiency through the Patient Flow Management Centre in an academic trauma centre with three campuses and a total of 953 beds in Pennsylvania, U.S.(8) Prior to implementation, the institution in which the trauma centre was located was experiencing inefficiencies and delays in their patient-transfer process.(8) The study found statistically significant improvements in the number of total admissions and emergency-department visits, transport volumes, various patient processing times (e.g., emergency-department door-to-provider time) and emergency-department process failure measures (e.g., number of ambulance diversion instances).(8) However, the total patient transport trip time did not change significantly.(8) In terms of costs, approximately \$1.2 million was invested (e.g., for technology and hiring more nurses) and, with the patient Flow Management Centre in place, the hospital's income increased by \$2.1 million annually.

The remaining two studies focused on non-urgent transportation approaches developed in British Columbia. One evaluated a low-cost, publicly subsidized non-urgent transportation service on healthcare access for 41 rural communities in northern British Columbia.(9) The service was found to help participants access healthcare services, and over half of the users rated their health as poor or fair.(9) The most common reasons for using the service were for physical exams (43%), non-surgical treatments (29%), surgical procedures (18%) and post-treatment follow-up (15%).(9)

The other study in British Columbia centred on the use of a decision-support tool based on business intelligence techniques to optimize inter-facility patient transfers.(10) The web-based interactive tool was designed to support health professionals to identify the optimal receiving facility for the transfer and was developed using data collected by British Columbia's Northern Health Authority.(10) The components of the tool included:

- a list of preferred transfer destinations ordered by proximity from the sending facility;
- information on capacity, patient-care services, laboratory and imaging access, and a list of available staff;
- filtering of facilities through desired service options (e.g., general infrastructure); and
- detailed summaries of facilities or side-by-side comparisons of multiple facilities for users to view.(10)

These features of the tool (which were not evaluated in the study) were designed to facilitate decision-making regarding the appropriateness of the receiving facility rather than proximity or familiarity.(10)

Barriers and facilitators for optimizing the use of non-urgent transportation models

We identified two reviews that focused on the facilitators and barriers of non-urgent transportation models. One older narrative review, which conducted searches in 2012, identified three steps to optimize inter-hospital transfers from the perspective of the sending hospital:

- 1) identifying eligible patients for transfer by a health professional (factors influencing transfer could include treatments, weighing the risks of transfer and emotional burden on the patient and family);
- 2) health professional identifying the appropriate destination (i.e., a hospital that provides the greatest benefit to the patient's health); and
- 3) the transfer having to be negotiated with the receiving hospital.(11)

The review also identified three barriers to negotiating patient transfer with the receiving hospital: 1) physician concern about the legal implications of a transfer; 2) difficulty obtaining a qualified ambulance crew; and 3) availability of intensive-care-unit beds.(11)

The second older medium-quality review examined the factors associated with the quality and safety of non-urgent transportation. Almost half of the included studies in the review focused on the structure of transport services, which included the use of policies and protocols to assist in the transfer process.(12) These studies found that non-compliance with policies was likely associated with common problems identified in the transfer process, such as poor communication and inappropriate transport mode or accompanying personnel.(12) The remaining studies in the review addressed other factors related to the transfer process, including communication, appropriateness of personnel, time to arrange transfers, and the safety and efficiency of the process.(12) Specifically, communication, appropriateness, and efficiency were identified as facilitators to ensuring quality and safety of non-urgent transportation.(12) Communication technologies were also shown to play an important role in coordination and standardization of processes that may reduce risk and increase efficiency.(12)

One additional consideration found in a primary study was with respect to effective intra- or inter-hospital transfers. The study reviewed a number of guidelines (American College of Critical Care Medicine, Society of Critical Care Medicine, Intensive Care Society, Association of Anaesthetists of Great Britain and Ireland, and Paediatric Intensive Care Society), and found that the patient's health during transport may be affected by noise, vibration, acceleration and gravitational forces, temperature, humidity and altitude.(7) Common complications that may happen during transport include infections, or conditions that affect the airway, cardiovascular or endocrine system.(7)

What are the key features of non-urgent transportation models in Ontario?

We used two approaches to describe the current state of non-urgent transportation in Ontario. The first approach consisted of using descriptive statistics to estimate the frequency with which EMS services are used for non-urgent transportation by region. The second approach consisted of a jurisdictional scan to characterize the availability of non-urgent transportation services by region.

Estimating the frequency of the use of EMS services for non-urgent transportation services

To estimate the frequency of the use of EMS services for non-urgent transportation service, we used the most recent year (2017-2018) of the National Ambulatory Care Reporting System (NACRS), which is a dataset held by the Canadian Institute for Health Information (CIHI).(13) The NACRS contains data on all hospital-based and community-based ambulatory care in Canada.(13) Submission of data (day surgery and emergency department) to NACRS is mandated in Ontario and in 2017-2018 there were 191 submitting facilities in the province.(14) Specifically, we estimated the frequency of the use of EMS services for non-urgent transportation service by identifying all admissions for patients arriving at the reporting facility via ambulance who were triaged as level five (non-urgent) on the Canadian Triage and Acuity Scale (CTAS) (the remaining categories on the scale are: level one – resuscitation; level two – emergent; level three – urgent; and level four – less urgent). In this calculation, we included all ambulance admissions (air ambulance, ground ambulance, water ambulance or any combination of ground, air or water ambulance).

The descriptive statistics for these variables by LHIN are provided in Table 2. The proportion of non-urgent emergency department visits via ambulance range from 0.1% (in the Mississauga Halton LHIN) to close to or over 2% (in the North East and the North West LHINs). The higher proportion in the two northern LHINs is likely due to the unique context of northern regions of the province which requires service provision to far fewer people but across a significantly larger land mass. This often means that emergency departments in tertiary-care centres are the most common destination for smaller hospital referrals.

Table 2. Number of non-urgent emergency-department visits via ambulance in Ontario by LHIN

Health region	Total non-urgent emergency-department visits via ambulance (level five on the CTAS scale)	Total emergency-department visits via ambulance	Proportion of non-urgent emergency-department visits via ambulance
Central East	1,324	108,994	1.2%
Central	526	104,137	0.5%
Central West	91	57,176	0.2%
Champlain	873	104,120	0.8%
Erie St. Clair	528	55,737	0.9%
Hamilton Niagara Haldimand Brant	939	121,919	0.8%
Mississauga Halton	68	60,219	0.1%
North East	1,053	55,168	1.9%
North Simcoe Muskoka	121	39,819	0.3%
North West	660	29,631	2.2%
South East	306	46,401	0.7%
South West	396	79,035	0.5%
Toronto Central	825	116,854	0.7%
Waterloo Wellington	462	48,968	0.9%

We note two main limitations with respect to the approach to estimate the frequency of the use of EMS for non-urgent transportation services in Ontario. The first limitation is that we were only able to access one dataset, which is restricted to hospital and community-based emergency and ambulatory care visits. Other datasets that could provide a more complete understanding of EMS use for non-urgent transportation services include:

- Ambulance Dispatch Reporting System - a pre-hospital dataset and reporting system of the Ministry of Health and Long-Term Care;
- Discharge Abstract Database - a CIHI dataset that includes data relevant to repatriation;(15) and
- Provincial Transfer Authorization Centre – an Ornge dataset that captures inter-facility patient transfers.(16)

Second, definitions of non-urgent transportation vary between datasets. For example, NACRS defines non-urgent in terms of the triage level at the point of entry, whereas the Provincial Transfer Authorization Centre (PTAC) defines non-urgent at the point of the transfer request (a patient leaving to go to another facility). The lack of a consistent definition limits the ability to make comparisons between datasets.

Jurisdictional scan of non-urgent transportation services in Ontario

We provide a summary of the results of the jurisdictional scan in Table 2, and for each jurisdiction we describe (where possible) the features of non-urgent transportation by region. Specifically, we provide a general description of the type of patient-transport services (e.g., private, volunteer-based and community-based non-urgent transportation), followed by a description of the patient-transport service, and the availability of patient-transport services. Given that our jurisdictional scan was limited to information that was publicly available, Table 2 may not provide comprehensive details of patient-transport services in Ontario, but rather a broad overview of them.

Ornge provides province-wide non-urgent transportation based on geographic and population needs as part of its mandate.(17) To varying degrees, all of the 14 LHINs have access to private non-urgent transportation from a variety of vendors (e.g., Ambu Trans Medical Transportation Services, Advanced Patient NET, Angels of Flight Canada, MedicVan Patient Transfer Services, MedEvac Canada, Phoenix Patient Transfer, Pioneer Health Services, Platinum Patient Transfers, RNR Patient Transfer Services, Spectrum Patient Services, Voyageur Transportation), volunteer-based non-urgent transportation (e.g., Canadian Cancer Society and Canadian Red Cross) and community-based non-urgent transportation (e.g., iRIDEPlus). Moreover, all hospitals are responsible for arranging and funding inter-facility transfers, but this is done differently depending on the availability of service (e.g., some use EMS, some use private non-urgent transportation service) and the levels of care and support required during transportation.

In terms of the availability of patient-transport services, the most common services we found were:

- transport for those who have accessibility needs and require stretchers, chair lifts or oxygen;
- inter-facility transport; and
- transport to medical appointments or for treatment (e.g., dialysis and cancer treatment).

In addition, the Northern Health Travel Grants provide funds to cover travel to attend appointments with a patient's closest medical specialist for required healthcare services for one-way trips that are a minimum of 100 km from the patient's home.(18)

We identified two regions (Champlain LHIN and the North East LHIN) that are applying innovative approaches to non-urgent transportation. Champlain is the easternmost LHIN in Ontario, serves approximately 1.3 million residents, and works with and funds approximately 125 health-service providers that collectively provide roughly 240 programs and services in the region's hospitals, community-support services, mental health and addiction service agencies, community health centres and long-term care homes.(19) Additional notable characteristics of the region include having:

- 20% of residents living in rural areas;
- 20% of residents being Francophone;
- 16% of residents speaking a language other than English or French;
- two First Nations communities and having an Indigenous population estimated at over 40,000 people (including one of the largest Inuit populations in Canada); and
- higher rates (as compared to the Ontario average) of people with mental health and addictions challenges, hospitalizations for chronic conditions, fall-related emergency-room visits for older adults, and emergency visits for self harm.(19)

The Champlain LHIN has been working on improving non-urgent transportation since 2012 in a variety of ways. Most recently, the LHIN has undertaken a project to improve non-urgent patient transportation through a collaboration with stakeholders within the region (e.g., representatives from all 20 hospitals, all six emergency-management services, and long-term care homes).(20) The Champlain LHIN has developed three decision guides (discharge, inter-facility transfer and mental health transfer) to assist hospital staff to determine the most appropriate transport method for the patient.(20) These decision guides are also accompanied by an e-learning training module which was created to support their use.

The North East LHIN is Ontario's largest and covers 400,000 square km (44% of Ontario land mass) with a population of 565,000 people (4% of Ontario's population), with some area of the region (communities along the James and Hudson Bay Coast) being only accessible by air or ice roads.(21) The population includes 23% Francophone, 11% Indigenous and 20% older adults, and has higher rates (as compared to the Ontario average) of heavy drinking, smoking, obesity, and chronic disease.(21) The North East LHIN has developed a non-urgent transportation model that addresses both fixed and on-demand responses and creates two separate delivery channels for long-haul versus short-haul transport corridors.(22) EMS services are kept within response zones by separating transports according to route distances. The unique funding strategy for the new operational model involved funding from hospitals, the North East LHIN, the Ministry of Health and Long-Term Care and administrative boards.(23)

CONCLUSION

Our synthesis included 13 documents relevant to the question (one systematic review, two non-systematic reviews and 10 primary studies), used descriptive statistics to estimate the frequency with which EMS services are used for non-urgent transportation, and included a jurisdictional scan of each of the 14 Local Health Integration Network (LHIN) websites for region-specific information on non-urgent transportation services currently in place. Findings from the included 14 documents focused on the: 1) reasons for and impacts of inappropriate non-urgent transportation; 2) features of non-urgent transportation models; and 3) barriers and facilitators for optimizing the use of non-urgent transportation models. The proportion of non-urgent emergency-department visits via ambulance range from 0.1% (in the Mississauga Halton LHIN) to close to or over 2% (in the North East and the North West LHINs). The higher proportion in the two northern LHINs is likely due to the unique context of northern regions of the province (i.e., having to provide services to far fewer people but across a significantly larger land mass), where emergency departments in tertiary-care centres are often the most common destination for smaller hospital referrals. From the jurisdictional scan, we identified two regions that are applying innovative approaches to non-urgent transportation: 1) the Champlain LHIN has developed three decision guides (discharge, inter-facility transfer and mental health transfer) to assist hospital staff to determine the most appropriate transport service; and 2) the North East LHIN has developed a non-urgent transportation model that addresses both fixed and on-demand response and creates two separate delivery channels for long-haul versus short-haul transport corridors.

Table 2. Summary of non-urgent transportation in Ontario

Jurisdiction of focus	Type of patient-transport services	Description of the patient-transport services	Availability of patient-transport services
Province wide			
Ornge (17)	<ul style="list-style-type: none"> Air ambulance services <ul style="list-style-type: none"> Fleet of fixed or rotor wing aircraft (e.g., Leonardo AW139 helicopters, Pilatus PC-12 airplanes) Crestline land ambulance services 	<ul style="list-style-type: none"> Emergent and urgent inter-facility transfer Emergent scene response Repatriation (inter-facility patients) Non-urgent transportation based on geographic and population needs (e.g., mandate includes non-urgent transportation for anyone over 240 km) Organ transplant-related transportation (Trillium Gift of Life Network) 	<ul style="list-style-type: none"> Service coverage of over one million square km, including remote communities Estimated 20,000 patient-related transports per year
Regional			
Central	<ul style="list-style-type: none"> Private non-urgent transportation providers Community-based non-urgent transportation model (iRIDEPlus, including CHATS and Circle of Care) (24; 25) 	<ul style="list-style-type: none"> Non-urgent transportation arranged through public transportation, private companies, community groups iRIDEPlus is a LHIN-funded service that provides non-urgent transportation for seniors aged 55 or older, and adults with disabilities who are not eligible for Wheel-Trans (25) Non-urgent transportation provided by nine community support groups (e.g., CHATS, Circle of Care, Etobicoke Services for Seniors)(24) 	<ul style="list-style-type: none"> Transport for those who have accessibility needs and require stretchers, wheelchair assistance, oxygen Transportation to medical appointments (24; 25)
Central East	<ul style="list-style-type: none"> Private non-urgent transportation providers Community-based non-urgent transportation (e.g., community care centres, Carefirst Seniors and Community Services Association) (26) 	<ul style="list-style-type: none"> Non-urgent transportation arranged through public transportation, private companies, community groups Subsidies for transport available through some community services upon application LHIN-funded non-urgent transportation options (e.g., Community Care Haliburton County, Yee Hong Centre for Geriatric Care) (26) 	<ul style="list-style-type: none"> Air ambulance Transport for those who have accessibility needs and require stretchers, wheelchair assistance or oxygen Transportation to medical appointments (26)
Central West (27; 28)	<ul style="list-style-type: none"> Public non-urgent transportation services (e.g., Wheel-Trans provided by the Toronto Transit Commission) Private non-urgent transportation providers Volunteer-based non-urgent transportation funded by greater Toronto area LHIN (e.g., Better Living Health and Community Services, St. Clair West Services for Seniors) 	<ul style="list-style-type: none"> Non-urgent transportation available through public transportation, private companies and community groups 	<ul style="list-style-type: none"> Transport for those who have accessibility needs and require stretchers, chair lifts or oxygen Transport to medical appointments

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Jurisdiction of focus	Type of patient-transport services	Description of the patient-transport services	Availability of patient-transport services
Champlain (20)	<ul style="list-style-type: none"> • Private non-urgent transportation providers • Volunteer-based non-urgent transportation • Champlain Community Transportation Collaborative that consists of a group of 26 community agencies 	<ul style="list-style-type: none"> • The Champlain LHIN has been working on improving non-urgent transportation since 2012 in a variety of ways, with the most recent (2016) project being focused on improving non-urgent patient transportation in collaboration with stakeholders in the region • Materials developed to aid in hospital staff transportation decision-making • Hospitals book and fund non-urgent transportation between hospitals within the LHIN, and patients can book and pay out-of-pocket for non-urgent transportation elsewhere 	<ul style="list-style-type: none"> • Transport for those who have accessibility needs and require stretchers, wheelchair assistance or oxygen • Transportation between hospitals, to medical appointments
Erie St. Clair (29; 30)	<ul style="list-style-type: none"> • Private non-urgent transportation providers • Volunteer-based non-urgent transportation (e.g., Canadian Cancer Society and Canadian Red Cross) 	<ul style="list-style-type: none"> • Non-urgent transportation including long-distance stretcher transport through the Community Support Centre of Essex County, which is a collaboration of seven local agencies (30) 	<ul style="list-style-type: none"> • Dialysis transport • Cancer-treatment transport • Transport for those who require a stretcher or are wheelchair bound
Hamilton Niagara Haldimand Brant (31)	<ul style="list-style-type: none"> • Private non-urgent transportation providers • Volunteer-based transportation (e.g., Canadian Red Cross) 	<ul style="list-style-type: none"> • Non-urgent transportation for medical, educational and recreational needs • Variety of programs offering subsidized non-urgent transportation upon application 	<ul style="list-style-type: none"> • Transport for those with accessibility needs • Transport to medical appointments
Mississauga Halton (32)	<ul style="list-style-type: none"> • Private non-urgent transportation providers • Volunteer-based non-urgent transportation 	<ul style="list-style-type: none"> • None identified 	<ul style="list-style-type: none"> • Transport for those who have accessibility needs and require stretchers, wheelchair assistance or oxygen • Transportation to medical appointments
North East (33)	<ul style="list-style-type: none"> • Private non-urgent transportation providers • Community-based transportation (e.g., Dokis First Nation) 	<ul style="list-style-type: none"> • New non-urgent patient-transfer model contains fixed and on-demand response; and four long-haul transport corridors and two short-haul at hospitals in Sudbury and Timmins (22) • Separating by route distance has kept EMS services within response zones • Unique funding strategy for new operational model, involving hospitals, the LHIN, the Ministry of Health and Long-Term Care and administrative boards • Set fees for private transfer 	<ul style="list-style-type: none"> • Transport for those who have accessibility needs and require stretchers, wheelchair assistance or oxygen • Transportation to medical appointments
North Simcoe Muskoka (34-37)	<ul style="list-style-type: none"> • Muskoka Ambulance conducts inter-facility transfers • Private non-urgent transportation providers 	<ul style="list-style-type: none"> • Lack of local transportation options is a challenge in North Simcoe Muskoka 	<ul style="list-style-type: none"> • Transport for those who have accessibility needs and require

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Jurisdiction of focus	Type of patient-transport services	Description of the patient-transport services	Availability of patient-transport services
	<ul style="list-style-type: none"> Community-based non-urgent transportation 	<ul style="list-style-type: none"> Province provided funding for Community Transportation Portal to connect patients with non-urgent transportation Non-urgent transportation arranged through public transportation, private companies, community groups LHIN-funded Muskoka Paramedic Services to train community paramedics in provision of care to hard-to-reach populations 	<ul style="list-style-type: none"> stretchers, wheelchair assistance or oxygen Transportation to medical appointments
North West (38-40)	<ul style="list-style-type: none"> Private non-urgent transportation providers Hospital and community-based non-urgent transportation (e.g., Atikokan General Hospital, Sioux Lookout Meno Ya Win Health Centre) 	<ul style="list-style-type: none"> Non-Urgent/Non-Emergent Transportation Integrated Solutions Development Project aiming to address access issues through five participating hospitals Non-urgent patient transfer arranged through public transportation, private companies, community groups Funding from the Ministry of Health and Long-Term Care for inter-facility patient transfer Set fees for private transfer 	<ul style="list-style-type: none"> Airport transfers Land transfers Coordination of air ambulance provided by Medivac helicopter and planes Transport for those who have accessibility needs and require stretchers, wheelchair assistance or oxygen Transportation to medical appointments
South East (41; 42)	<ul style="list-style-type: none"> Private non-urgent transportation providers Community-based non-urgent transportation (e.g., community care centres and CARE North Hastings) 	<ul style="list-style-type: none"> The Community Patient Transfer group is the single regional provider for non-urgent transportation that hospitals and long-term care homes can lock into long-term contracts Hospitals and the Ministry of Health and Long-Term Care joined to fund Health Van project Non-urgent transportation arranged through public transportation, private companies and community groups Subsidies for non-urgent transportation available through some community services upon application 	<ul style="list-style-type: none"> Transport for those who have accessibility needs and require stretchers, wheelchair assistance or oxygen Transportation to medical appointments
South West (43; 44)	<ul style="list-style-type: none"> Private non-urgent transportation providers 	<ul style="list-style-type: none"> All hospitals in the South West LHIN set standards for patient transport and Voyageur Transportation has been awarded a contract for non-urgent transportation Stretcher attendants receive training in basic patient management (e.g., first responder and non-violent crisis intervention) 	<ul style="list-style-type: none"> Transport for those who require a stretcher or are wheelchair bound The hospital covers transfers in cases of care transfer, diagnostics, and treatment related to hospital admission or emergency-department visit Patients must pay in the case of transport from hospital to home,

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Jurisdiction of focus	Type of patient-transport services	Description of the patient-transport services	Availability of patient-transport services
			long-term care, non-admission related care, or out-of-province
Toronto Central (45)	<ul style="list-style-type: none"> • Private non-urgent transportation providers • Volunteer-based non-urgent transportation (e.g., Canadian Cancer Society, Dignity Transportation, CANES Community Centre) 	<ul style="list-style-type: none"> • Non-urgent transportation arranged through public transportation, private companies and community groups • Subsidies available through some community services upon application • LHIN-funded non-urgent transportation options include St. Christopher's House, Woodgreen Community Services 	<ul style="list-style-type: none"> • Transport to cancer treatment and/or financial reimbursement for families travelling for child cancer treatment • Transport for those who have accessibility needs and require stretchers, wheelchair assistance or oxygen • Transportation to medical appointments
Waterloo Wellington (46; 47)	<ul style="list-style-type: none"> • Private non-urgent transportation providers • Volunteer-based non-urgent transportation (e.g., Community Resource Centre of North and Centre Wellington and Canadian Cancer Society) • Option to access private non-urgent transportation services located outside of Waterloo Wellington (e.g., Voyageur Transportation, Angels of Flight Canada and MedEvac Canada) 	<ul style="list-style-type: none"> • Private non-urgent transportation is booked by the patient • Community resources organized by local organizations, which provide free non-urgent transportation to eligible residents (e.g., those under 65, with no other transportation and low income) 	<ul style="list-style-type: none"> • Cancer-treatment transport • Seniors transport • Transport for those with accessibility needs

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APPENDICES

The following tables provide detailed information about the systematic reviews and primary studies identified in the rapid synthesis. The ensuing information was extracted from the following sources:

- systematic reviews - the focus of the review, key findings, last year the literature was searched, and the proportion of studies conducted in Canada; and
- primary studies - the focus of the study, methods used, study sample, jurisdiction studied, key features of the intervention and the study findings (based on the outcomes reported in the study).

For the appendix table providing details about the systematic reviews, the fourth column presents a rating of the overall quality of each review. The quality of each review has been assessed using AMSTAR (A MeaSurement Tool to Assess Reviews), which rates overall quality on a scale of 0 to 11, where 11/11 represents a review of the highest quality. It is important to note that the AMSTAR tool was developed to assess reviews focused on clinical interventions, so not all criteria apply to systematic reviews pertaining to delivery, financial or governance arrangements within health systems. Where the denominator is not 11, an aspect of the tool was considered not relevant by the raters. In comparing ratings, it is therefore important to keep both parts of the score (i.e., the numerator and denominator) in mind. For example, a review that scores 8/8 is generally of comparable quality to a review scoring 11/11; both ratings are considered “high scores.” A high score signals that readers of the review can have a high level of confidence in its findings. A low score, on the other hand, does not mean that the review should be discarded, merely that less confidence can be placed in its findings and that the review needs to be examined closely to identify its limitations. (Lewin S, Oxman AD, Lavis JN, Fretheim A. SUPPORT Tools for evidence-informed health Policymaking (STP): 8. Deciding how much confidence to place in a systematic review. *Health Research Policy and Systems* 2009; 7 (Suppl1):S8).

All of the information provided in the appendix tables was taken into account by the authors in describing the findings in the rapid synthesis.

Appendix 1: Summary of findings from systematic reviews about non-urgent transportation models

Type of review	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
Systematic review	Examining the quality and safety issues associated with non-urgent patient transport (12)	<p>This study included 12 studies examining the factors associated with the quality and safety of non-urgent patient-transport services.</p> <p>Five of the studies focused on issues related to the structure of transport services, which included the use of policies and protocols to assist in the transfer process. In these studies, a general absence of policies or knowledge of their contents by responders was found. Non-compliance with policies is likely associated with common problems identified in the transfer process, such as poor communication and inappropriate transport mode or accompanying personnel.</p> <p>All other studies addressed other factors related to the transfer process, including communication, appropriateness of personnel, time to arrange transfers, and the safety and efficiency of the process. Overall, communication, appropriateness, and efficiency were found to be the key factors to ensuring the quality and safety of non-emergency transport services. Communication technologies have also been shown to have an integral role in coordinating the transport process. Finally, the standardization of transport processes has demonstrated potential in reducing risk and increasing efficiency.</p> <p>The authors note that the limitation of this review to English-language and published literature may have narrowed the scope of its results.</p>	2009	4/9 AMSTAR Rating Provided by the McMaster Health Forum	0/12
Non-systematic review	Identify systemic barriers to the optimal integration of transfer services into care (11)	<p>This narrative review provides an overview of patient-transfer infrastructure in the U.S. The author identified three steps for inter-hospital transfers from the perspective of the sending hospital.</p> <p>First, healthcare providers must identify patients who would be eligible for transfers. The provider should consider transfers like treatments, weighing the risks of transferring (especially for critically ill patients) with the benefits in terms of survival (e.g., access to better equipment or skill). There are three mortality risks for transfers: having an adverse event during transportation; events associated with front-end discontinuity (e.g., loss of patient information during the transfer); and back-end discontinuity (e.g., failure to follow up with new problems after transferring from an Intensive Care Unit (ICU) to care of lower intensity). Providers should also consider the emotional burden of transferring on the patient and their family.</p> <p>Second, healthcare providers must identify an appropriate destination. Ideally, patients would be sent to the hospital that provides the greatest benefit to the patient's health. This can be done in an evidence-based manner by looking at appropriate metrics of candidate hospitals, like 30-day mortality rates for cardiac patients. However, data suggests that destinations are currently being chosen for proximity and habit instead of hospital performance.</p> <p>Third, the transfer must be negotiated with the receiving hospital. There are three systemic barriers</p>	2012	No rating tool available for this type of document	Not stated

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Type of review	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
		<p>that can hinder transfer: physician concern about the legal implications of a transfer; difficulty obtaining a qualified ambulance crew; and availability of ICU beds. Much of these issues come from the laxer standards for ICU admissions in recent years and bed blocking (where medically stable patients cannot be discharged from the unit due to the lack of beds on other wards.)</p> <p>Data suggests that the last step, the actual transfer of the patient, is usually well done.</p> <p>The author made several recommendations. First, there should be a regionally implemented system that provides real-time bed availability and hospital quality information to help providers decide upon the best hospital for the patient. Second, there should be rapid-transfer protocols and an automated decision-support tool for clinicians to identify early potential transfer patients and systematically select the destination hospital. Third, clinicians at receiving hospitals should view ICU beds as a regional resource. In other words, triage decisions should not only consider one's own emergency department or operating room, but also the needs of other nearby hospitals. Last, the outcomes of transfer and bed lock should be monitored to help guide decisions for the future.</p> <p>The author identified reverse triage (where patients who no longer need specialized interventions are sent back to smaller hospitals) as a topic that needs further research.</p>			
Non-systematic review	Review the various guidelines for effective intra- or inter-hospital transfers (7)	<p>Identified guidelines were written by the American College of Critical Care Medicine, Society of Critical Care Medicine, Intensive Care Society, Association of Anaesthetists of Great Britain and Ireland, and Paediatric Intensive Care Society.</p> <p>The transfer should only be initiated after balancing benefits and risks. Information about the patient's clinical condition, treatment being given, reasons for transfer, mode of transfer and timeline of transfer should be sent to the receiving facility. The patient should be properly stabilized before the transfer and at the sending facility to prevent adverse events or further deterioration. The patient should then be transferred through the proper mode of transportation (i.e., ground versus air) and with staff with the appropriate level of expertise. The transferring vehicle should be well equipped with all the drugs and devices needed to stabilize, treat and monitor the patient.</p>	Not stated (published in 2016)	No rating tool available for this type of document	Not stated

Appendix 2: Summary of findings from primary studies about non-urgent transportation models

Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
Evaluate the impact of Connections, a non-urgent transportation service, on healthcare access for rural populations (9)	<p><i>Publication date:</i> 2011</p> <p><i>Jurisdiction studied:</i> British Columbia, Canada</p> <p><i>Methods used:</i> Survey questionnaires were administered through mail, phone interviews and in-person to people using the transportation service. The questionnaire asked about the respondents' demographic, socio-economic and health status, as well as their levels of satisfaction with the service.</p>	The questionnaire was distributed to users of the service. There were 297 respondents. Most of the clients were over 40, with a mean age of 55 years. Approximately 18% were of Indigenous background.	Connections is a low-cost, publicly subsidized non-urgent transportation service that operates in northern B.C. This service allows residents of 41 northern rural communities to access healthcare services in Vancouver, Kamloops, Grand Prairie (in Alberta) and other rural communities.	<p>Delivering healthcare to residents in rural British Columbia is difficult due to a variety of systemic barriers: recruitment and retainment of healthcare professionals; weather; lack of infrastructure; and expansive geography. This study found that Connections improved access to healthcare for rural residents.</p> <p>The service helped people with medical need access healthcare services. Over half of the users rated their health as poor or fair. The most common reasons for using the service were for physical exams (43%), non-surgical treatments (29%), surgical procedures (18%) and post-treatment follow up (15%).</p> <p>Most respondents had difficulty accessing services (without Connections) due to financial difficulties. About 72% of users were retired, unemployed, or only worked part time. 61% of respondents had household incomes of less than \$30,000 annually. Half were divorced, widowed or single and needed to rely on others for travelling purposes.</p> <p>Overall, older people who were under- or unemployed and had more health problems used the service more frequently. Those with higher education levels were more likely to access the service, potentially because they were more aware of the resources in their area.</p> <p>It should be noted that this study did not examine Connections' cost-effectiveness and impact upon health outcomes.</p>
Identify the characteristics of good patient transfer systems (7)	<p><i>Publication date:</i> 2015</p> <p><i>Jurisdiction studied:</i> U.S.</p> <p><i>Methods used:</i> Site visits at tertiary-care transfer systems. Semi-structured discussions with staff about the transfer-system structure, technology, process, staffing, challenges and outcomes.</p>	Ten academic tertiary-care centres were observed. Nine were voluntary non-profit hospitals, and one was a governmental county hospital.	Each hospital had developed their own system of transferring patients between community hospitals and tertiary-care centres. Each transfer system had three core components: a primary transfer system answer point (TSAP), which is a single point of access for community hospitals to contact tertiary-care centres; bed-management coordination (BMC) at the tertiary-care centre to ensure that beds are allocated	<p>The investigators identified several design elements present in the most well-integrated transfer systems. First, physically keeping the TSAP, BMC and TTD teams in the same place improved communication among the transfer-system staff. Processes were completed simultaneously instead of in a linear fashion. Overall, this improved performance time and customer satisfaction.</p> <p>Second, having a standardized process, clarifying roles, defining responsibilities and establishing expectations translated to consistent performance and decreased transfer time.</p> <p>Third, real-time dashboards that were implemented across the whole system allowed information to be disseminated quickly.</p>

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Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
	The Interhospital Transfer Center Model was developed from observations. The model elements were validated through consultation with experienced leaders in transfer-system administration, operations and clinical care.		appropriately; and a transport team dispatch (ITD).	Information may include bed status, available transport teams and pending admissions.
Determine the effectiveness of using a centralized bed-management system to improve efficiency (8)	<p><i>Publication date:</i> 2016</p> <p><i>Jurisdiction studied:</i> Pennsylvania, U.S.</p> <p><i>Methods used:</i> Key metrics were compared before and after the implementation of the Patient Flow Management Centre (PFMC).</p>	One Level 1 academic trauma centre with three campuses and 953 beds in total.	<p>PFMC is a centralized control centre for bed management. It used software that displayed patient-flow information across hospital units in real time. Information included the number of pending bed requests, the bed types available, and the number of confirmed upcoming discharges. The software was also able to perform automated tasks, like routing and tracking telephone calls.</p> <p>There were daily bed meetings between nurse managers and charge nurses from all campuses to discuss the overall bed demand and capacity.</p> <p>Implementation was assisted by education sessions for staff on how to use the software, and weekly operations meetings to monitor the performance of the system.</p>	<p>Prior to the implementation of the PFMC, the institution was experiencing inefficiencies and delays in their patient-transfer process. This resulted in adverse patient-safety events and overcrowding.</p> <p>The PFMC was implemented to streamline the process of bed management and patient transfer. Approximately \$1.2 million was invested into new technology and hiring more nurses to provide 24/7 clinical coverage.</p> <p>After the introduction of the PFMC, the institution saw operationally and statistically significant improvements in the number of total admissions and emergency-department visits, transport volumes, various patient processing times (e.g., emergency department door-to-provider time) and emergency-department process failure measures (e.g., number of ambulance diversion instances). However, the total patient transport trip time did not change significantly.</p> <p>Overall, with PFMC, the hospital's income increased by \$2.1 million annually. Training sessions and support from hospital leadership were identified as particularly important factors in the successful implementation of this model.</p>
Determine the characteristics of patients who are more likely to use ambulance services for non-urgent reasons (5)	<p><i>Publication date:</i> 1999</p> <p><i>Jurisdiction studied:</i> California, U.S.</p> <p><i>Methods used:</i> Prospective cross-sectional study</p>	887 patients who used ambulance services to get to the emergency department of an urban Level 1 academic trauma centre.	Surveys were used on patients who arrived by ambulance and their EMS providers. Patients were asked about their demographic information and their availability of alternate means of transportation to the hospital. Both the patient and their EMS provider were asked whether they	Overall, EMS providers felt that 56% of patient transports were appropriate and constituted true emergencies. By contrast, 78% of patients felt that their condition was a true emergency. There was a 75% agreement rate between EMS providers and patients on whether the method of transportation was appropriate. Blunt traumatic injury and altered mental status were the most common reasons for ambulance transport.

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Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
			thought that their use of ambulance transport was for an emergency or a non-emergency.	<p>Of the patients who considered themselves to be non-emergencies, 38% had alternative methods to transport themselves to the emergency department, but chose not to do so.</p> <p>EMS providers tended to perceive older men with cardiac complaints as having true emergencies.</p> <p>The characteristics associated with patients who perceived themselves to have true emergencies were black ethnicity, higher education, respiratory complaints, blunt traumatic injury, altered mental status and Medicare insurance.</p> <p>The characteristics associated with patients who EMS providers felt did not have true emergencies were of white ethnicity, 31-40 years old, musculoskeletal pain, had no insurance, and had a grade school education.</p> <p>The most common patient descriptions by EMS providers for medically unnecessary transport were minor acute problem not requiring urgent care (38%) and chronic illness not requiring urgent care (27%).</p> <p>Overall, there was good agreement between EMS providers and patients regarding appropriate and inappropriate ambulance utilization.</p>
Provide a cross-sectional view of patient transfers in Ontario (1)	<p><i>Publication date:</i> 2009</p> <p><i>Jurisdiction studied:</i> Ontario, Canada</p> <p><i>Methods used:</i> Descriptive examination of data from the Provincial Transfer Authorization Centre (PTAC)</p>	5,000 randomly selected inter-facility land transfers in Ontario, Canada from June 2004 to May 2005.	PTAC was operated by Ornge. It was responsible for processing and approving patient-transfer authorization requests. Transfers were assigned one of three levels of priority: emergent, urgent and non-urgent. Most patient-transfer requests were processed consecutively while emergency transfers were processed immediately. When the transfer request was approved, a regional Central Ambulance Communication Centre or local ambulance service provider carried out the transfer.	<p>On average, a one-way trip costed \$704, and 80% of the transfers were non-urgent and/or routine (e.g., for physician appointments, dialysis treatment, return to residence from the hospital). Of all the transferred non-urgent patients, 77.7% travelled within a radius of 25 km. Within urban settings, most were even shorter, with the median distance being 10.5 km.</p> <p>There were many lateral transfers between facilities of the same level (i.e., from tertiary-care centres to tertiary-care centres, from community hospitals to community hospitals). This is symptomatic of hospital crowding, lack of available beds, staffing shortages, and a lack of comprehensive services available.</p> <p>In summary, the typical inter-facility patient transfer involved a non-urgent appointment with a cardiologist or dialysis treatment and covered 20.5 km. Other options should be explored to free up transportation services (e.g., more dialysis facilities).</p>

Enhancing the Efficiency and Effectiveness of Non-urgent Transportation Models

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Validating the Provincial Transfer Authorization Centre database (2)	<p><i>Publication date:</i> 2006</p> <p><i>Jurisdiction studied:</i> Ontario, Canada</p> <p><i>Methods used:</i> Administrative data from the PTAC database was compared to institutional patient records from the sending facility for validation. Data variables that were assessed for accuracy fell under four categories: facility identification and timing of transfer, patient demographics, transfer supervision and services, and reason and urgency of transfer.</p>	One hundred patient-transfer records from the PTAC database were randomly selected and compared to corresponding institutional patient records. Data was stratified to include records from high- and low-volume sending facilities, academic and non-academic centres, and nursing homes and long-term care facilities. All of the sending facilities were based in the Greater Toronto Area.	The PTAC database stores all patient-transfer data in Ontario. The database also contains data from private transfers not routinely captured by the Emergency Medical Systems, the National Ambulatory Care Reporting System or hospital discharge data.	<p>The investigators managed to locate 95% of the institutional patient records. Three of the four data variable categories had strong accurate rates and sensitivity measures: facility identification and timing, patient demographics, and reason and urgency of transfer categories.</p> <p>Variables in the fourth category, transfer supervision and service, were consistently not documented. Specifically, information about medical supervision and transfer services were missing from 80% of forms (whether obtained for PTAC or elsewhere). However, when documented, the information was recorded accurately.</p> <p>The other 10 variables had very strong accuracy rates from 85.3% to 100%. The most common error was misspelling the patient's last name.</p> <p>Overall, the database had a high level of validity and accuracy. Hence, the PTAC database can be used as a legitimate data source for population-based research.</p>
Create a decision-support tool based on Business Intelligence techniques to help identify the optimal receiving facility for patient transfers (10)	<p><i>Publication date:</i> 2015</p> <p><i>Jurisdiction studied:</i> British Columbia, Canada</p> <p><i>Methods used:</i> A decision-support tool was developed based on Business Intelligence techniques</p>	The solution was built based on data collected by British Columbia's Northern Health Authority.	A web-based highly-interactive tool that helps healthcare providers identify the optimal receiving facility for the transfer.	<p>In Canada, inter-facility patient-transfer processes are heavily affected by communication delays, ineffective documentation, and the selection of the receiving hospital based on proximity and habit, rather than hospital performance and capability.</p> <p>Business Intelligence techniques can help build user-friendly decision-support tools that help healthcare providers identify the most suitable receiving facility for a patient transfer.</p> <p>Details are as follows. Users are presented with a list of ideal transfer destinations ordered by proximity from the sending facility. Some other information presented includes capacity information, patient-care services, laboratory and imaging access, and a list of available staff. Facilities may be filtered based on the selected desired service options (e.g., general infrastructure). Users can also access detailed summaries of specific facilities or view side-by-side comparisons of multiple facilities.</p> <p>Ultimately, such a program would allow decisions on where to transport the patient to be made based on data rather than proximity or familiarity.</p>
Assess the proportion of inter-facility transfers that happen	<i>Publication date:</i> 2017	The sending facility was an emergency department located in		Canadian rural emergency departments are less likely to have CT scanners due to resource constraints. Physicians practising in the emergency departments without CT scanners must often send

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from rural hospitals without CT scanners for the purpose of CT imaging (3)	<p><i>Jurisdiction studied:</i> Quebec, Canada</p> <p><i>Methods used:</i> Investigators looked at all transfers between a rural emergency department without a CT scanner and another rural hospital 51 km away with a CT scanner within a specific time period</p>	rural Quebec that did not have access to a CT scanner.		<p>patients to another facility with a CT scanner, delaying treatment and diagnosis. It is estimated that the yearly cost of these transfers, which use ambulances, is about \$68,000, not including staff salary or costs accrued by the patient.</p> <p>For the emergency department in the study, 3% of all visits resulted in transfers to other facilities. At least 28% of all transfers were just for CT imaging.</p> <p>Although health outcomes were not investigated in this study, the investigators concluded that equipping more rural emergency departments with CT scanners can help reduce health inequities.</p>
Compare the clinical and demographic characteristics of emergency-department patients who used ambulance transport versus non-ambulance users (6)	<p><i>Publication date:</i> 2008</p> <p><i>Jurisdiction studied:</i> Pennsylvania, U.S.</p> <p><i>Methods used:</i> Structured interviews</p>	A Level 1 academic trauma centre. Patients presenting with trauma alerts were excluded.	Over 48 hours, a researcher asked patients presenting at the emergency department for their reasons of choice of transport to the emergency department, their knowledge of ambulance cost, and a self-estimation of illness or injury severity. Data on insurance coverage, chief complaint, nurse triage score and discharge diagnosis were extracted from medical records. Physicians who treated the patients filled out questionnaires on whether patients should have been transported by 911 ambulance, their discharge diagnosis, and the patient's disposition.	<p>A total of 22% of the patients arrived by ambulance. These patients tended to be older, have higher nurse triage scores, and have a higher likelihood of being admitted to the hospital. The most common chief complaint among these patients were trauma- or respiratory-related.</p> <p>Most of the patients who did not arrive by ambulance felt that they were not sick enough for the ambulance. The most common chief complaints for non-users were non-cardiac pain and injury, or related to the gastrointestinal and/or the genitourinary system.</p> <p>Many people in both groups admitted that severity of illness was not the primary reason for choice of transport. Those who knew the cost of an ambulance ride were less likely to use it. However, there was no difference in insurance status between users and non-users.</p> <p>Physicians agreed with the transportation method in 68% of the ambulance users and 92% of the non-ambulance users.</p>
Summary of patient transfers from the transportation industry's perspective (4)	<p><i>Publication date:</i> 2002</p> <p><i>Jurisdiction studied:</i> Ontario, Canada</p> <p><i>Methods used:</i> Summary of insights and lessons from transportation advisors</p>			<p>At the time, there were many delivery models for non-urgent patient transfers. These included: a brokerage model; joint purchasing agreements between several hospitals in an area and a private supplier; contracts with multiple private companies; a second level of non-urgent ambulance service devoted to patient transfers; using taxis for routine transfers (taxi drivers receive additional training); volunteer drivers; or some combination of the above.</p> <p>Funding arrangements also differed from region to region. Some municipalities and hospitals shared the cost. Others allocated</p>

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				<p>money in the ambulance budget specifically for non-urgent transfers.</p> <p>Transportation advisors observed several trends over the last few years before the publishing of this summary. Public emergency ambulances were increasingly concentrating on unstable patients, reducing their availability for stable patient transfers. Hospitals became more reliant on contracts with private ambulance services, where a single ambulance ride can range anywhere between \$45 and \$200. Most of the patient transfers with these private services used old former ambulance vehicles.</p> <p>The article suggested partnering with public transportation managers to provide local specialized transit services. Decision-makers should be aware that better timeliness, vehicle safety and paramedic qualifications all mean higher costs. As off-peak services can be costly, costs can be controlled by scheduling services and personnel according to hour-to-hour usage trends. Independent monitoring is also expensive, but can provide more holistic feedback than customer complaints alone and inform decisions about cost and quality trade-offs.</p>



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