Non-Urgent Patient Transportation in the North East LHIN:

An Evidence-Based 3rd Party Review & Restructuring Plan

June 9, 2014

Prepared by Performance Concepts Consulting Inc.

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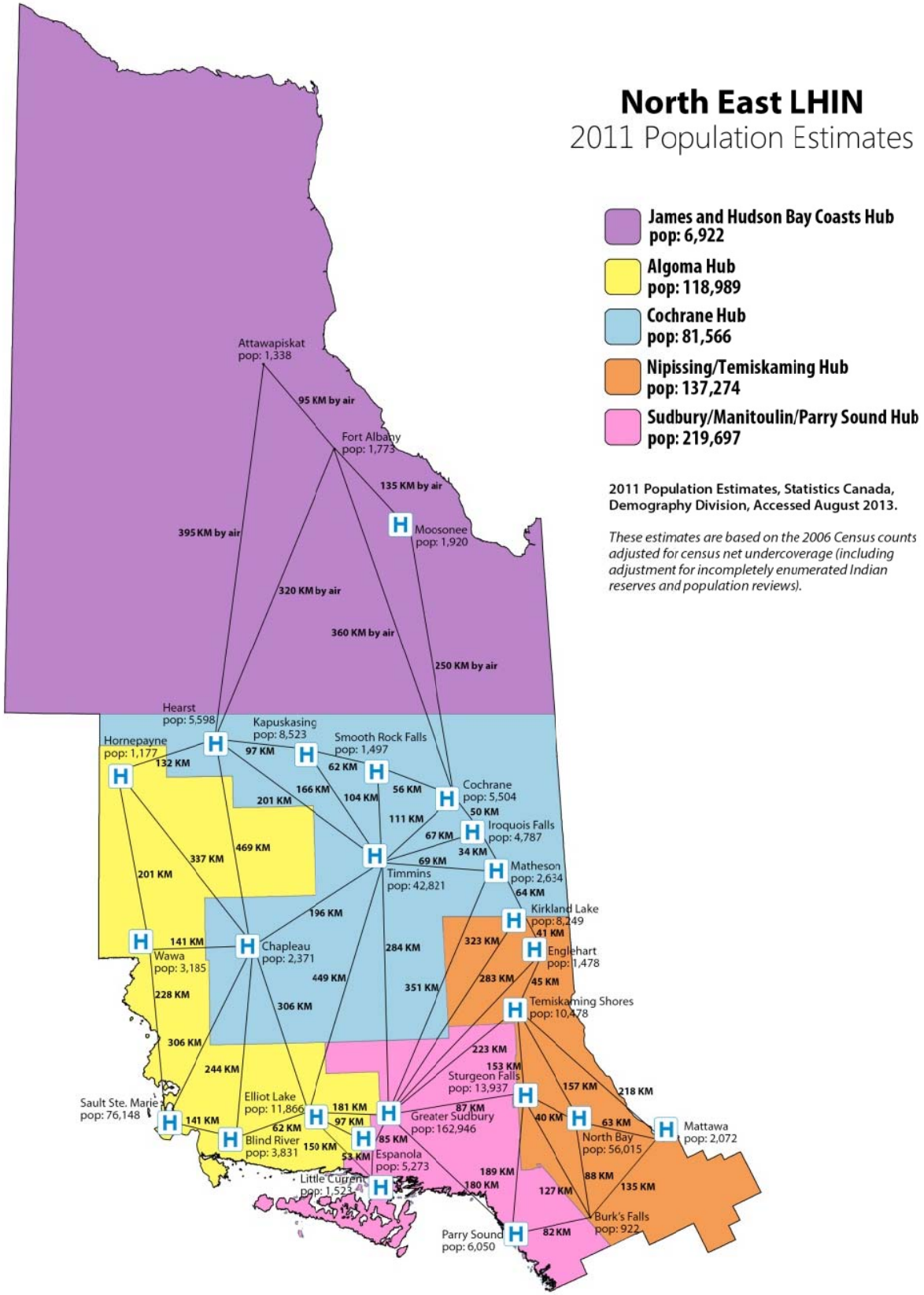
Executive Summary

A review of non-urgent patient transportation across Northeastern Ontario was begun in June 2013 by the North East Local Health Integration Network (NE LHIN) in response to concerns about the current system expressed by patients, hospitals and Emergency Medical Service (EMS) providers. The review's objective was to develop a model of transportation that provides timely, safe and cost-effective non-urgent patient transfers into and out of hospital centres in Northeastern Ontario, while safeguarding needed EMS coverage in communities across the region.

This review of non-urgent patient transfers had been identified as a key project in the NE LHIN's 2013-2016 Integrated Health Service Plan (under the care transitions and coordination priority). Transportation is also a key enabler of the care models and pathways (i.e. flow in and out of the region's hub hospitals) identified in the LHIN's Clinical Services Review, completed in March 2014.

A Project Advisory Committee was created in June 2013 to oversee the review, and Performance Concepts Consulting Inc. was retained (via RFP) to execute the approved project work plan.

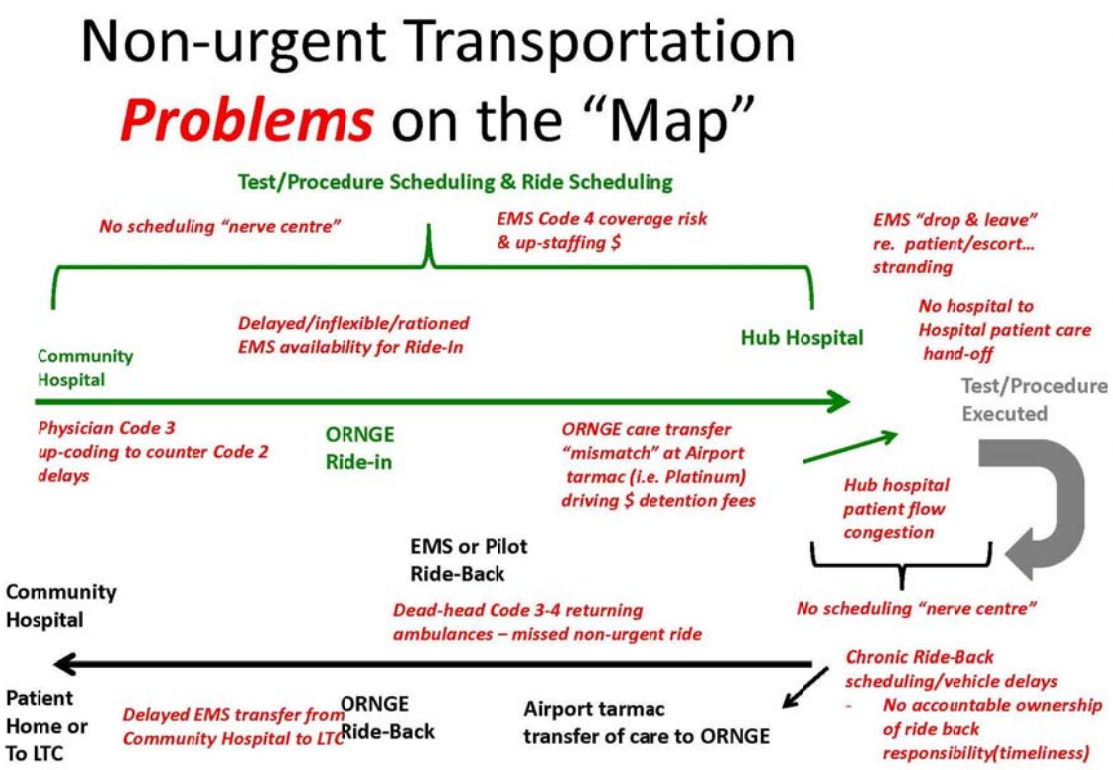
The map below illustrates the relatively long distances between hospitals, and sparse population densities, associated with non-urgent inter-facility patient transportation flows across the vast North East LHIN geography.


North East LHIN
2011 Population Estimates
James and Hudson Bay Coasts Hub
pop: 6,922
Algoma Hub
pop: 118,989
Cochrane Hub
pop: 81,566
Nipissing/Temiskaming Hub
pop: 137,274
Sudbury/Manitoulin/Parry Sound Hub
pop: 219,697
2011 Population Estimates, Statistics Canada, Demography Division, Accessed August 2013.
These estimates are based on the 2006 Census counts adjusted for census net undercoverage (including adjustment for incompletely enumerated Indian reserves and population reviews).
Attawapiskat
pop: 1,338
95 KM by air
Fort Albany
pop: 1,773
135 KM by air
Moosonee
pop: 1,920
395 KM by air
320 KM by air
360 KM by air
250 KM by air
Hearst
pop: 5,598
Kapuskasing
pop: 8,523
Smooth Rock Falls
pop: 1,497
Hornepayne
pop: 1,177
97 KM
132 KM
62 KM
166 KM
104 KM
56 KM
Cochrane
pop: 5,504
201 KM
111 KM
50 KM
Iroquois Falls
pop: 4,787
67 KM
34 KM
337 KM
469 KM
69 KM
Timmins
pop: 42,821
Matheson
pop: 2,634
201 KM
64 KM
Kirkland Lake
pop: 8,249
196 KM
41 KM
141 KM
Wawa
pop: 3,185
Chapleau
pop: 2,371
284 KM
323 KM
Englehart
pop: 1,478
449 KM
351 KM
283 KM
45 KM
228 KM
306 KM
Temiskaming Shores
pop: 10,478
306 KM
223 KM
244 KM
153 KM
Sturgeon Falls
pop: 13,937
157 KM
218 KM
Sault Ste. Marie
pop: 76,148
Elliot Lake
pop: 11,866
181 KM
87 KM
141 KM
97 KM
Greater Sudbury
pop: 162,946
40 KM
63 KM
Mattawa
pop: 2,072
62 KM
85 KM
North Bay
pop: 56,015
Blind River
pop: 3,831
150 KM
53 KM
Espanola
pop: 5,273
189 KM
88 KM
Little Current
pop: 1,523
180 KM
127 KM
135 KM
Burk's Falls
pop: 922
Parry Sound
pop: 6,050
82 KM

The review's stakeholder engagement and execution process consisted of the following components:

- 1:1 interviews with management and frontline staff representing all 25 hospitals and 8 EMS providers in the NE LHIN region, which consists of five geographic transfer "hubs";
- Three rounds of hub-wide consultations with community and secondary/tertiary hospitals;
- Three data driven non-urgent transfer "summit meetings" with the 8 EMS Chiefs covering the North East;
- Working session with the 5 Northeastern Ontario Central Ambulance Communication Centres (CACCs);
- Ongoing Project Advisory Committee evaluation of findings and potential restructuring scenarios;
- Final report with system restructuring recommendations provided to the LHIN CEO in June 2014.

The review's stakeholder consultations and EMS data modeling were used to conduct a non-urgent transportation situation analysis and construct a patient journey "map" – emphasizing current system performance problems requiring restructuring solutions. The system problems "map" appears below.



Beyond stakeholder qualitative feedback, the review also incorporated extensive quantitative data modeling undertaken by Performance Concepts using the EMS Electronic Patient Care Reporting system (ePCR). Detailed modeling (using 2012 data) informed the review's restructuring recommendations. Modeling reports included the following:

- EMS/Non-EMS non-urgent transfer volume mapping of IN/OUT transfer flows by hospital service delivery Hub;
- EMS mean patient transfer duration (minutes per transfer by Hub);
- EMS transfer outputs (transfer hours delivered by Hub);
- EMS 12-hour daytime "peak" service busyness (utilization rate by ambulance base);
- EMS overlapping emergency/non-urgent calls (by ambulance base/coverage zone);
- LHIN-wide patient escort costing/potential restructuring savings estimates

Highlights of the transfer flow data modeling across the LHIN are contained in the following figures. The first figure documents IN/OUT non-urgent transfer volume flows by the five transfer hubs in the region. The second figure sets out “long-haul” vs. “short-haul” duration non-urgent transfer hours delivered by hub.

	IN	OUT	Difference
Sudbury EMS	1,941	2,844	-903
Platinum	712	1,963	-1,251
Sudbury Total	**2,653**	**4,807**	**-2,154**
North Bay	**731**	**1,099**	**-368**
Sault	**584**	**1.210**	**-626**
Timmins	**1,686**	**2,178**	**-492**
New Liskeard	**455**	**489**	**-34**
Total	***6,109***	***9,783***	***-3,674***

	2012 Total Code 1-2 Transfer *Output Hours* Delivered by EMS	2012 EMS Code 1-2 “Long” Transfer *Output Hours* That Could Be Replaced	2012 EMSCode 1-2 “Short” Transfer *Output Hours* Where Replacement Not Necessary
Sudbury	**6,477 Hours of Output (Total)**	**4,357 Hours of “Long” Transfer Output (Replaceable)**	**2,120 Hours of “Short” Transfer Output**
N Bay	**1,727 Hours of Output (Total)**	**939 Hours of “Long” Transfer Output (Replaceable)**	**788 Hours of “Short” Transfer Output**
Sault	**1,910 Hours of Output (Total)**	**1,015 Hours of “Long” Transfer Output (Replaceable)**	**895 Hours of “Short” Transfer Output**
Timmins	**4,910 Hours of Output (Total)**	**3,510 Hours of “Long” Transfer Output (Replaceable)**	**1,400 Hours of “Short” Transfer Output**
New Liskeard	**1,392 Hours of Output (Total)**	**1,211 Hours of “Long” Transfer Output (Replaceable)**	**181 Hours of “Short” Transfer Output**
Total	***16,416 Hours of Output (All hubs)***	***11,032 Hours of “Long” Transfer Output (Replaceable)***	***5,384 Hours of “Short” Transfer Output***

Additional data modeling and analysis conducted by Performance Concepts explored key risk factors associated with i) EMS system "peak" busyness (12-hour daytime utilization rates) and ii) frequency of overlapping emergency and non-urgent calls within a given ambulance base's coverage zone. The following evidence-based modeling conclusions are compelling:

- Across the LHIN, there is a clear separation of non-urgent transfers into "short haul" & "long haul" duration categories for purposes of system restructuring.

- Long-haul non-urgent transfers represent significant Code 4 EMS response risk. The result is eroded EMS response times & unsustainable levels of system busyness at certain ambulance bases.

- Overlapping Code 1-2 & 3-4 calls are creating frequent coverage breakdowns at certain bases. At these bases, EMS units are drawn out of response zones creating a "zero available units" problem characterized by unacceptable response times.

- Short-haul non-urgent transfers do NOT create risk of drawing EMS units out of response zones. There is no compelling reason why EMS and contracted providers cannot continue to deliver these local transfers with existing fixed resources.

The review's in-depth qualitative stakeholder consultations and evidence-based data modeling have together delivered a rigorous situation analysis that has yielded the following *overall system performance conclusions*:

- The current non-urgent transportation system is not sustainable from a patient care or financial perspective for community hospitals. However, significant financial savings are possible with successful restructuring.

- The current non-urgent transportation system is a major problem creating patient flow blockages at hub hospitals.

- The patient escort model of "care and control" is not sustainable for community hospitals unless transportation becomes far more reliable in/out of hub hospitals.

- Non-urgent transportation system reliability improved significantly when the LHIN pilot projects were implemented in 2013.

- The system needs a permanent, non-ambulance solution for long-haul transfers in the North East.

System Restructuring Recommendations

The review's non-urgent transportation restructuring recommendations are organized into the following categories:

1. New Operational Model
2. Hospital-Based Business Process Improvements
3. Leadership, Policy & Decision-Making
4. System Funding
5. Stakeholder Communications

1. New Operational Model

New Operational Model recommendations will create two distinct service delivery channels for short-haul versus long-haul non-urgent transfers. EMS services across the LHIN, and non-EMS transfer resources in Sudbury and North Bay, will continue to deliver short-haul transfers that fall within their existing coverage zones. Long-haul non-urgent transfers will be delivered via a route-based model with scheduled legs serviced by multi-patient vehicles. The proposed legs and vehicle configurations are as follows (note – these are bi-directional routes):

ROUTE LEGS	Route Length	Vehicle Load	Forecast Service Hours
1. Elliot Lake to Espanola	95km	Dual Stretcher	M-F 8 hours (2,080 annual hours)
2. Mindemoya to Little Current to Espanola	91km	Dual Stretcher	M-F 8 hours (2,080 annual hours)
3. Espanola to Sudbury Corridor	70km	3-4 stretcher	M-F 12 hours (3,120 annual hours)
4. North Bay to Sturgeon Falls to Sudbury	129km	3-4 stretcher	M-F 12 hours (3,120 annual hours)
5. Kapuskasing to Smooth Rock Falls to Timmins	166km	3-4 stretcher	M-F 12 hours (3,120 annual hours)
6. Timmins to Matheson to Iroquois Falls to Cochrane	224km	3-4 stretcher	M-F 12 hours (3,120 annual hours)
7. New Liskeard to Englehart to Kirkland Lake to Matheson	195km	3-4 stretcher	M-F 12 hours (3,120 annual hours)
8. Blind River to Thessalon to Sault Corridor	145km	Dual Stretcher	M-F 8 hours (2,080 annual hours)

In two instances (West Parry Sound and Chapleau) where dedicated long-haul route-based transfer resources are not warranted due to volume, consideration should be given to an EMS up-staffing envelope to deliver the long-haul patient transfers.

The New Operational Model will also feature the following:

- One or more CACCs to dispatch long haul non-urgent transfer vehicles – as well as traditional ambulance resources when appropriate (i.e. short haul EMS, dead head returns);
- New information technology tools to coordinate ride scheduling with test/procedure scheduling.

2. Hospital–Based Business Process Improvements

Recommendations concerning Hospital–Based Business Process Improvements focus on eliminating the current system of community hospital-funded staff escorts accompanying non-urgent patients to hub hospitals for tests/procedures (i.e. continuity of patient care and control). Leveraging process improvement insights gained from a 2013-14 North West LHIN pilot project currently underway at the Thunder Bay Regional Health Sciences Centre, hub hospitals in the North East LHIN will phase in staffed patient holding areas to provide basic care to non-urgent patients arriving from community hospitals. Beginning with a pilot project recommended to occur in 2015, the use of community hospital patient escorts should be reduced and then eliminated over time. Patient escort savings at community hospitals will be tracked, and will be used to offset hub hospital holding area costs.

3. Leadership, Policy & Decision-Making

Recommendations concerning Leadership, Policy & Decision-Making Model/Tools focus on establishing a multi-stakeholder, permanent Non-Urgent Transportation Leadership Working Group to lead the implementation and oversight of the new system across the North East LHIN. Recommendations also address the need for improved data management practices/standards within the non-urgent patient transportation system. Improved data management will, in turn, support recommended performance monitoring and target setting toolkits.

4. System Funding

System Funding recommendations would see the creation of a new LHIN-wide non-urgent transportation funding model defined as follows:

- EMS providers will continue funding "short-haul" non-urgent patient transportation within their existing approved budgets;
- Hub hospitals that currently fund non-urgent transfer services (i.e. HSN and NBRHC) will continue to do so for short-haul patient transfers;
- New funding will be directed to providers of the new scheduled long-haul transfer routes (likely selected via RFP). Additional funded vehicle hours of long-haul patient transfer service will be added to the North Bay transfer car and the Sudbury EMS non-ambulance community flow car. EMS up-staffing funding is also recommended to support: Parry Sound EMS predominantly "south bound" non-urgent transfer patterns outside the LHIN; and Manitoulin-Sudbury EMS transfers in and out of Timmins from Chapleau.
- Operational savings from all affected health care partners associated with non-urgent patient transportation restructuring should be considered for reallocation/reinvestment where appropriate.

5. Stakeholder Communications

Recommendations concerning Stakeholder Communications will improve stakeholder understanding of the review's change management agenda, and secure buy-in to the necessary restructuring actions. The recommendations outline communications strategies/messages that should be implemented for a variety of key target audiences (e.g. the public, community and hub hospital physicians, hospital administrative and front-line staff, EMS providers, CACCs, ORNGE).

Implementation of Change/Restructuring

The review sets out a three-year critical path for implementing change/restructuring. The critical path implementation activities are categorized as Do NOW (Year 1), Do SOON (Year 2) and Do LATER (year 3).

Do NOW work focuses on establishing the new decision-making and system management units – the Leadership Working Group, the Coordinating Centre, the possible long-haul transfer provider RFP, and a dedicated project management resource to drive the non-urgent transportation restructuring agenda forward.

Do SOON work addresses the start-up challenges of the new operational model, including phased implementation of transfer legs and execution of capital improvements for hub hospital transfer patient holding areas. Budget development, data management reforms, and performance target development will also fall into this timeframe.

The Do LATER period will feature the final roll-out of hospital business process changes around staffed patient “care and control” holding areas expected to generate significant savings in community hospital patient escort costs.

A. Rationale for Reviewing Non-Urgent Patient Transportation in North East LHIN

Non-urgent patient transportation has been a challenging issue in northern Ontario for the past two decades. The travel distances between community and hub hospitals create a host of logistics/patient risk challenges (see map on next page). Northern hospitals, Emergency Medical Services (EMS) providers and local governance authorities have all weighed in with ideas to clarify responsibilities, rationalize funding, and improve service quality. Despite a range of reviews, position papers and local advocacy, fundamental restructuring of non-urgent patient transportation in the North has not yet occurred.

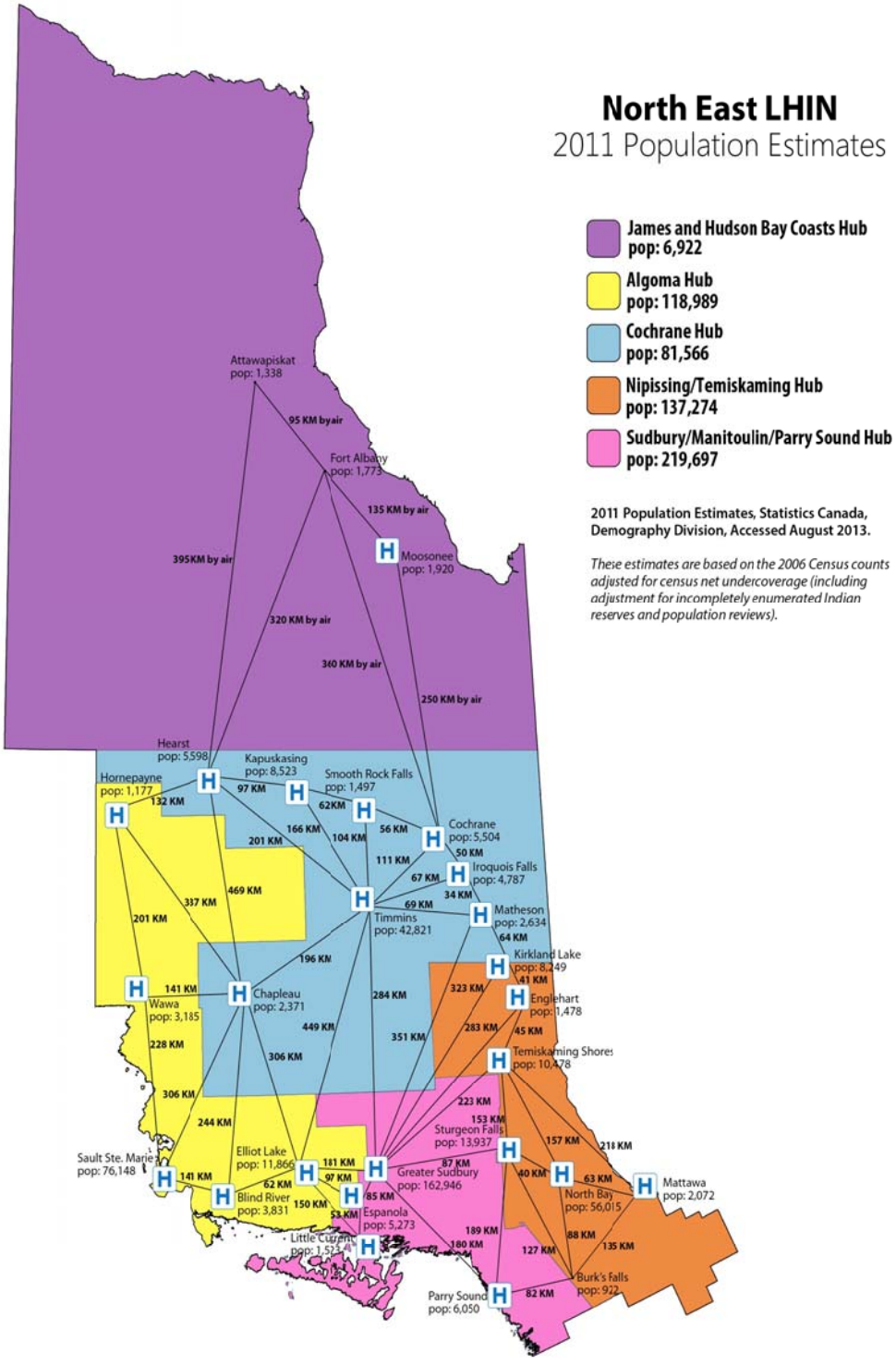
Recently the Province has indicated that a new regulatory framework for non-urgent patient transportation providers will be forthcoming during 2014. The timing of the North East Local Health Integration Network's (NE LHIN) 2013-14 review dovetails with the Province's upcoming new regulatory requirements (i.e. Highway Traffic Act requirements) and health service provider guidelines aimed at improving transport safety and patient care.

Non-urgent patient transportation restructuring is prominently positioned in the North East LHIN's 2013-16 Integrated Health Services Plan. Non-urgent transportation restructuring is also a key requirement of the NE LHIN's just completed clinical service review. During Q2 2013/14 the North East LHIN initiated this comprehensive review of non-urgent patient transportation.

To provide ongoing guidance in this review of non-urgent patient transportation in the region, the LHIN struck a Project Advisory Committee with stakeholder representation drawn from the region's 25 hospitals, 8 EMS services, the ORNGE air ambulance service, 5 land ambulance Central Ambulance Communications Centres (CACC) and a number of community stakeholders. The Advisory Committee endorsed: a project charter, patient centred review principles, and a project work plan setting-out required analyses and restructuring deliverables.

Performance Concepts Consulting Inc. was retained to provide evidence-based analyses and execute project work plan deliverables. This report's restructuring recommendations are the culmination of the stakeholder driven review of non-urgent patient transportation. Performance Concepts Consulting Inc. is providing this report's recommendations to the LHIN and its

partners for consideration. Performance Concepts' evidence-based analyses and system restructuring recommendations have been thoroughly reviewed and supported by the Project Advisory Committee prior to finalization of this report.



In terms of scope, non-urgent transportation within the context of this project refers to:

- Transportation for the following patient groups between hospitals, or from hospitals to Long-Term Care Homes/patient residences:
  - ✓ Stable medical condition; and
  - ✓ Requiring a stretcher vehicle; or
  - ✓ Ambulatory or semi-ambulatory inpatients/LTC residents; or
  - ✓ Requiring a nursing or other health provider escort

- Transportation of Emergency Department patients requiring access to a schedule 1 bed or psychiatric assessment under the Mental Health Act

But not:

- Transportation for medical appointments within a community or between communities

Further, from an EMS perspective, non-urgent refers to lower priority calls i.e. dispatched as code 1 and 2 calls. See Appendix #1 for the definition of pertinent ambulance call codes in Ontario.

B. Overview of Non-Urgent Patient Transportation Across Ontario

Restructuring Initiatives Province-wide

Non-urgent patient transportation restructuring is being actively considered, or is underway, in the North West LHIN, the South West LHIN, and the South East LHIN. The solutions being considered across these LHINs vary, but the common restructuring denominator is improved transportation reliability for non-urgent patients achieved without compromising EMS emergency response coverage.

In the North West LHIN, the key restructuring issue is supplementary funding for EMS up-staffing necessary to safeguard emergency coverage when ambulances at remote bases must execute "long-haul" duration non-urgent patient transfers outside their catchment areas. An alternative to traditional land ambulance provision of non-urgent transfers within the higher volume 225 km Kenora-Winnipeg corridor is also being actively considered.

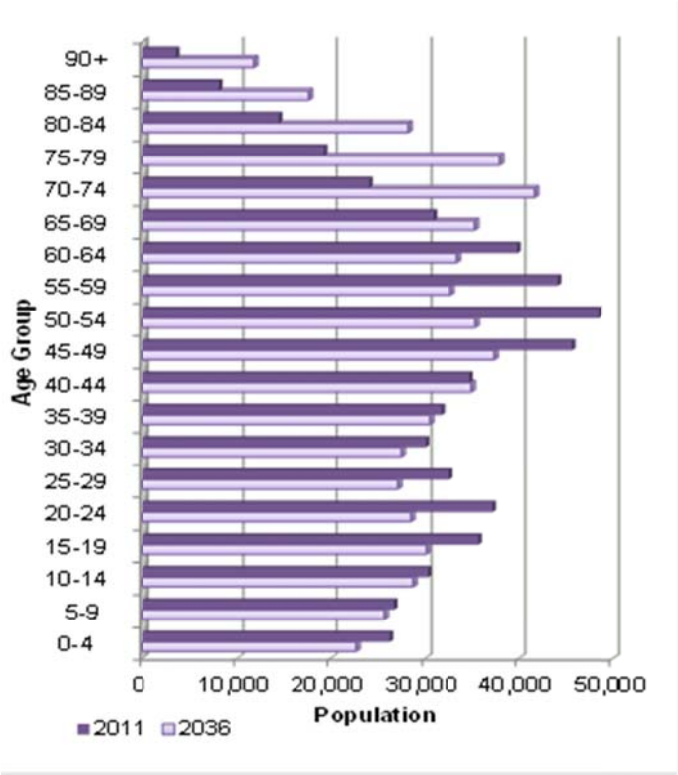
In the South West LHIN, a hospital funded private sector contractor model has been designed and executed through an RFP process. Pricing and service levels have been standardized across the LHIN. A transportation selection algorithm has also been standardized. Hub and community hospitals can utilize this LHIN-wide private contractor on an as-needed basis. Dispatch of the contracted service provider occurs outside the land ambulance CACC system. However, traditional EMS non-urgent service provision has not been eliminated from the menu of transport options.

In the South East LHIN, all hospitals have signed on to a multi-year contract (effective January 2014), as the result of an RFP process, with a single non-urgent transfer provider. The contract lays out a pricing schedule for units of transfer service (cases). Pricing varies based on distance, pre-booked calls vs. same day calls, and single vs. multiple bookings, for example. The contracted non-urgent transportation provider also functions as the dispatch point. Hospitals in the LHIN created a joint funding pool based on their previous year's costs incurred for purchasing non-urgent transportation. The SE LHIN has committed to contributing modest one-time funding over a two-year period to support transitional costs to the new model.

Demographic Pressures Intensifying

The need for a restructured non-urgent patient transportation model is becoming increasingly acute. The aging baby boomer driven demographic service delivery and funding challenges are imminent. The proportion of the North East LHIN population age 65+ is projected to increase from 19% to 30% by 2036. The estimated number of older adults (65+) is projected to increase by 72%, from just over 100,000 to over 172,000 (note the provincial average is expected to increase by about 67%).

The following figure documents the forecasted aging of the North East LHIN population.



Regional Hub Model

A portfolio of large regional hospitals anchors Ontario's system of non-urgent patient care. Patients are transported to and from these consolidated centres for diagnostic and specialty procedures not available in smaller community hospitals. The regional hub economies of scale provide a critical mass of clinical expertise to ensure appropriate service quality for patients. Consolidation has helped to control patient care costs by creating high utilization locations for expensive diagnostic/specialty resources – thereby leveraging efficient economies of scale.

Ontario's dispersed portfolio of community hospitals provides accessible localized care; their medical staff act as decision-making "triggers" to link patients to the more specialized services offered at the regional hubs.

A regional service delivery model cannot function properly without efficient patient flow in and out of the hub hospitals – allowing these locations to service ongoing high levels of demand. Travel distances and associated travel time for patients to access essential medical services also increase in a highly regionalized system. *Timely and dependable transport of non-urgent patients between centralized regional hub hospital locations and dispersed community hospital locations is essential to the functioning of the non-urgent patient care system in Ontario.*

However, non-urgent patient transportation in Ontario is not funded or delivered in a consistent/transparent fashion across the province. Instead, ad-hoc and dissimilar urban and northern/remote arrangements have evolved in parallel. This is problematic for patients and health service providers across the North East LHIN.

System Planning & Funding in Urban Ontario

The funding and delivery of non-urgent patient transportation in urban Ontario has evolved according to the following realities:

- Urban EMS providers deploy the vast majority of their annual budgeted vehicle hours of service to achieve municipal Council-approved emergency response time targets. Urban EMS providers do not typically budget for significant Code 1-2 non-emergent transfer volumes, nor do their deployment plans typically identify significant vehicle hours of service for non-emergent patient transportation call volumes.

- Urban EMS services have relatively high levels of system busyness – referred to in the EMS community as unit hour utilization (UHU). Urban EMS services typically strive for an ideal UHU in the range of 35%. UHU above 40% is understood to degrade EMS deployment plan performance, and lead to higher Code 3-4 emergency response times.

- High emergency call volumes associated with population growth and aging demographics – combined with worsening hospital emergency department off-load delays – are generating ongoing critical shortages in ambulance unit availability. The incidence of "zero units available" is growing across Ontario's urban EMS services. There is no remaining EMS

capacity (in reserve) to service demand for non-urgent patient transfers in many urban jurisdictions on many days. Significant delays in responding to scheduled requests for Code 1-2 non-urgent patient transfers are common – often measured in days rather than hours.

- Urban hospitals have reacted to chronic delays in EMS delivery of non-emergent Code 2 patient transfers by contracting with private sector companies to deliver timely non-paramedic non-urgent patient transportation services. Urban hospitals have somehow carved out funding within their existing base budgets for these non-paramedic transportation contracts – thereby freeing up significant EMS paramedic vehicle hours to deal with escalating demands for Code 3-4 emergency call volumes. Following a critical report by the Provincial Ombudsman, non-paramedic transfer agencies will soon face impending province-wide Highway Traffic Act regulations and guidelines setting out minimum vehicle, staffing and equipment standards.

- From a funding perspective, the urban Ontario system for delivering non-urgent patient transportation is characterized by the following realities:

  - ✓ Local property taxpayers fund approximately 50% of EMS deployed resources/budgets. These resources are directed primarily towards meeting the demand for Code 3-4 emergency calls – not Code 1-2 non-urgent patient transfers.

  - ✓ A robust commercial and industrial property tax base absorbs much of the fiscal burden associated with the local 50% share of budgeted EMS vehicle hours of service. Residential property taxpayers are sheltered from the full cost of the local share of the EMS budget.

  - ✓ Non-urgent, non-paramedic patient transfer contracts are primarily funded by province-wide revenues (e.g. income/sales taxes) funneled through regional hospital budgets. Local property taxpayers avoid these costs altogether in many urban EMS jurisdictions.

Northern & Remote System Planning and Funding

The Northern Ontario Service Deliverers Association (NOSDA) has addressed the need to restructure funding and delivery of non-urgent patient transportation northern Ontario. The NODSA position paper ***EMS Concerns in Northern Ontario (2010)*** has highlighted the following realities:

- Northern/remote EMS providers deploy the vast majority of their annual budgeted vehicle hours of service to achieve Code 4 emergency response coverage over large expanses of territory. Code 1-2 service delivery capacity inevitably comes at the expense of Code 3-4 coverage.

- Northern/remote EMS providers do not typically grapple with high levels of system busyness or UHU – emergency call volumes are low at most bases relative to urban systems. Response times are understandably slower than in urban settings; not a surprise given the challenges of finite EMS resources and large amounts of sparsely populated territory. *Northern/remote system performance is defined by consistency of Code 3-4 coverage – not Code 3-4 response times.*

- The use of "fixed" paramedic resources for Code 3-4 response coverage, and Code 1-2 transport work, creates an inherent tension in Northern/remote EMS services. Growing demand for Code 1-2 transports is linked to the increased regionalization of hub hospital services in recent years.

- From a funding perspective, the Northern non-urban system for delivering non-urgent patient transportation is characterized by the following realities:

  ✓ Local property taxpayers fund approximately 50% of the EMS deployed resources.

  ✓ The absence of a robust commercial and industrial property tax base to absorb any meaningful portion of the 50% local share of the EMS budget. Instead, residential property taxpayers absorb almost the entire 50% local share of EMS budgets.

In summary:

Province-wide Non-urgent Transportation Model

- Significant variation in services funded by local tax base

	EMS Code 3-4 Coverage	Code 2 Inter-facility Transfers
Urban Ontario	Funded by local taxpayers (50/50 cost-sharing) Relatively high UHU	Hospital funded non-paramedic delivery model due to significant delays in EMS Code 2 response times
Rural & Remote Ontario	Funded by local taxpayers (50/50 cost-sharing) Low to moderate UHU	EMS paramedic delivery model funded by local taxpayers outside Code 4 deployment plan based budgets

These province-wide non-urgent transportation funding and local tax burden differences between urban and non-urban settings should be recognized as Northern/remote jurisdictions across Ontario seek to rationalize non-urgent patient transportation planning, delivery and funding/taxation models - in partnership with the LHINs.

C. Review Methodology & Patient Centred Principles

Review Methodology

Performance Concepts Consulting Inc. was retained in Q2 2013/14 to deliver an evidence-based review of non-urgent patient transportation across the North East LHIN. When retained, Performance Concepts had already completed two similar evidence-based non-urgent patient transportation reviews focused on Thunder Bay and Kenora/Rainy River districts within the North West LHIN.

A Project Advisory Committee of community hospital, hub hospital, EMS, CACC and community stakeholders was established to advise and provide direction to the review (the Committee's

terms of reference and membership can be found in Appendix #2). Overall project leadership and co-ordination was provided by North East LHIN staff. The review has been executed according with the following methodology components:

- interviews with staff from 15+ community hospitals across the LHIN;
- interviews with staff from the LHIN's four regional "hub" hospitals located in Sudbury, North Bay, Timmins and Sault Ste. Marie;
- Interviews with senior staff from the eight EMS providers delivering emergency and non-urgent patient care services across the LHIN;
- Interviews with a representative of the ORNGE northern Ontario management team;
- Interview with representatives from the Sudbury based Platinum private sector transfer service;
- Facilitated three rounds of consultations of community and hub hospital staff within each of the five non-urgent transfer hub catchment areas;
- Three facilitated "summit" working sessions of eight EMS services to review/refine Performance Concepts technical modeling of various system performance issues/risks;
- Facilitated "stress testing" sessions with community hospital, hub hospital and EMS staff (within each of the five transfer hubs) to review/refine draft findings and recommendations;
- A consultation session with the five North East EMS dispatch services (i.e. Central Ambulance Communications Centres or CACCs).
- Detailed and wide-ranging technical/quantitative modeling by the Performance Concepts team using various MOHLTC and EMS data sets;
- Development of 3rd party evidence-based system restructuring findings and recommendations by the Performance Concepts team.
- Five Project Advisory Committee meetings held throughout the review process to ensure timely project execution, provide direction on key quantitative modeling issues, endorse key project team findings, and "stress test" draft recommendations.

Patient Centred Review Principles

The following figure sets out the principles that have governed this review. These principles have ensured that the restructuring recommendations are efficient, equitable and patient-centred. Adherence to the principles by Performance Concepts and the Project Advisory Committee has ensured the review was both evidence-based, and conducted in a collaborative fashion with diverse stakeholders from across the LHIN.

NE LHIN Non-Urgent Patient Transportation

FOUNDATIONAL SERVICE and SYSTEM PRINCIPLES

Approved at the November 14, 2013
Project Advisory Committee Meeting

Patient

- ✓ Equitable access to the right care, at the right time, at the right place
- ✓ Patient interest is paramount as change happens across stakeholders

Service

- ✓ Non-urgent patient transfers must be safe and high quality both in terms of clinical and transportation dimensions, and aligned with pending provincial non-urgent patient transportation standards
- ✓ The resource / service must match patient need

System

- ✓ Stakeholder communication and engagement are critical
- ✓ There must be system-wide efficiency in the use of resources, funding and personnel
- ✓ The future system must be developed based on evidence-based recommendations that recognize the diversity of needs and community capacity across the Northeastern Ontario

D. Situation Analysis – Stakeholder Qualitative Feedback

EMS Perspective on Non-urgent Transportation System Performance

EMS leadership across the North East LHIN share a common set of perspectives concerning the performance of the current non-urgent patient transportation model, and the role of EMS within that model. These common perspectives are as follows:

- The aging population and resulting patient demand will drive Code 3-4 emergency call volume increases beyond current resourcing levels.
- Northern remote local tax base not robust enough to address emergent and non-urgent demand/budget pressures within EMS system as currently configured.
- Erosion in EMS Code 3-4 coverage and response times created by difficult-to-predict, unbudgeted CACC mandated Code 1-2 workload. Some EMS services report they are not meeting response time targets in performance plans submitted to MOHLTC.
- Overlapping non-urgent (Code 1-2) and emergent (Code 3-4) calls occurring within an EMS single-unit-base coverage zone constitutes a serious risk management scenario for EMS.
- Increasingly inflexible EMS deployment plans rationing non-urgent transfer resources to prevent further response time erosion, control unbudgeted Code 1-2 up-staffing & overtime costs.
- Code 3 up-code of non-urgent transfers by physicians in order to "work around" deployment plan rationing of EMS resources creates instant coverage risk events for EMS.
- EMS units from outlying communities (delivering non-urgent patients to hub hospitals) often get pulled into Code 3-4 workload peaks by CACC. This problem is exacerbated by Code 3-4 offload delay at hub hospitals.

EMS leadership's overall observations indicate that a fundamental tension exists around the utilization of finite paramedic resources. Should these paramedic resources be deployed (and protected) exclusively for higher priority Code 3-4 emergency coverage and targeted response

times? Or should “fixed cost” paramedic resources also be used to maximize efficiency by executing medically necessary Code 1-2 inter-facility transfers – despite potential impacts on Code 3-4 coverage? Quantitative modeling of EMS delivery of Code 1-2 non-urgent transfers will provide evidence-based insights around system efficiency, effectiveness and risk management.

Community Hospital Perspective on Non-urgent Transportation System Performance

Community hospital stakeholder across the North East LHIN share a common set of perspectives concerning the performance of the current non-urgent patient transportation model. These common perspectives are as follows:

- Unreliable EMS availability/timeliness for the ride into the receiving hub hospital (moderate problem).
- Unreliable EMS availability/timeliness for the patient repatriation ride back from receiving hub hospital (major problem).
- Patient impacts (i.e. risks) associated with long land transfer rides across isolated roadways combined with potential adverse winter weather events.
- Stranded patients & nurse escorts at receiving hub hospitals and varying degrees of hub hospital frontline staff support/cooperation with these escorts.
- Unbudgeted nurse escort costs at small community hospitals are being absorbed as unbudgeted system-wide costs associated with the regional care model.
- Compromised Code 3-4 EMS deployment plans at some bases across LHIN due to Code 1-2 workload removing ambulance units from the community.
- Airport tarmac transport delays for hospital escorts/patients (at destination “hub” hospital airports) due to ORNGE and/or land EMS unreliability.

- Code 1-2 related up-staffing problems/delays for EMS services, resulting in late/missed patient appointments.

- MOHLTC has a longstanding business protocol that ORNGE non-urgent air ambulance calls must meet a minimum 240 km distance threshold. However, actual MOHLTC historic practices reflect an inconsistent application of the ORNGE fly/no fly business rule across the North East LHIN.

- Deployment plan policies generally require EMS units to drop Code 2 patients at hub hospitals & immediately return to base to restore eroded Code 4 coverage. This results in the direct creation of stranded patient escorts and associated staff scheduling problems at community hospitals.

- Patient care & control "hand-off" friction between community hospitals, hub hospitals, ORNGE and land EMS providers.

- Concerns with EMS dispatch performance & decision-making when overlapping Code 1-2 and Code 3-4 calls occur at a single ambulance base.

- Community demographics & elderly patient co-morbidities (patients sicker than Code 2 suggests). The aging demographic is most pronounced in Elliot Lake where the median age of the population is 47 years, versus an Ontario-wide average of 40 years. Approximately 35% of the Elliot Lake population is composed of individuals aged 65+ which is the 2nd highest in Canada. Concerns that elderly patient transfer demand will grow, and the risk of long land transfer trips needs to be recognized.

- Transfer dispatch Code 3 "up-coding" acknowledged & explained as a patient advocacy solution (by physicians) to a broken transportation system.

- Patient care & control hand-offs. Many community hospitals intrigued by the Thunder Bay pilot project to provide care by hub hospital staff, while community hospital physicians credentialed to provide simple orders.

- Universal support among community hospitals for the North East LHIN 2013 EMS pilot projects; as proven solutions to fix the current non-urgent patient transportation system. Community hospitals want pilot resources scaled upwards to benefit all LHIN hospitals and high volume transit legs.

Community hospital stakeholder observations paint a picture of an unreliable non-urgent patient transportation system, characterized by a flawed funding model, silo-driven stakeholders and the absence of integrated planning and decision-making. On the positive side, community hospitals are strongly supporting of the improvement opportunities inherent in the North East LHIN 2013 pilot projects, and the currently evolving North West LHIN patient care and control pilot in the Thunder Bay district.

Hub Hospital Perspective on Non-urgent Transportation System Performance

Stakeholders across the North East LHIN's five transportation hub hospitals (i.e. Health Sciences North, North Bay Regional Health Centre, Timmins & District Hospital, Sault Area Hospital, and Temiskaming Hospital) share a common set of perspectives concerning the performance of the current non-urgent patient transportation model. These common perspectives are as follows:

- Non-urgent transportation solutions MUST support hub hospital patient outflow requirements.
- There is an overriding need for a "nerve centre" business unit within/across the LHIN hubs to quarterback non-urgent transport logistics:
    - Non-urgent procedure bookings, selection of transport resource for ride in, selection of transport resource for ride back.
    - Maximize utilization of EMS non-paramedic transfer services, and LHIN EMS paramedic pilot project resources.
    - Ride home logistics out of the hub hospital for Code 1 patients are the key.

- Patient care & control policies (impacting community hospitals) vary across hub hospitals
    - Example: North Bay policy to assume Code 1-2 patient care and control in Emergency Department versus other hubs.
- Recognition of community hospital nurse escort process problems; trying to work with community hospitals on solutions without LHIN funding.
- Significant logistical challenges need to be considered in any system to transfer aspects of community hospital patient care to hub hospital staff. These include:
    - Patient care logistics re. any future community hospital physician orders to hub hospital holding area staff.
    - Physical space planning and logistics for any future holding areas.
    - Hub hospital holding area staffing impacts and costs.
- Impact of community hospital physician Code 3 "up-coding" of non-urgent "scheduled but stable" transfers on hub hospitals needs to be monitored.
    - Same patient profile is a Code 2 call in the morning when EMS available, but Code 3 up-coded in afternoon.
- Strong support for refining & expanding 2013 LHIN pilot project resources/solutions to address the challenges of the ride in and the ride out (both locally and longer inter-hospital runs).

ORNGE Perspective on Non-urgent Transportation System Performance

ORNGE provides medically necessary transportation for Code 1-2 patients across the province, where the transfer distance between facilities exceeds 240 km. Contracted fixed wing aircraft under a Standing Offer Agreement (SOA) delivers ORNGE non-urgent patient transportation. ORNGE medical directors establish non-urgent patient care standards for the organization; most notably by not permitting the transfer of care for a low CTAS medically stable Code 1-2 patient by an ORNGE paramedic to an EMS or transfer service non-paramedic attendant.

Historically, EMS services in Thunder Bay and Sudbury have proven unreliable in moving ORNGE Code 1-2 patients from the respective airport tarmacs to Thunder Bay Regional Health Sciences Centre (TBRHSC) or Health Sciences North (HSN) in a timely fashion. These EMS services have been preoccupied with high Code 3-4 emergency response workload, prompting endemic delays for Code 1-2 calls. During 2012-2013 ORNGE relied on private transfers services (i.e. Ambutrans in Thunder Bay and Platinum in Sudbury) to move these patients. However, ORNGE paramedics rode along with the patient all the way to the TBRHSC or HSN in order to comply with the medical directors' risk management policies on non-urgent patient ground transfers. The time delays associated with the ORNGE paramedic ride to the hospital, and back to the airport tarmac, resulted in tarmac detention fees being levied on the fixed wing aircraft. As well, daily aircraft utilization was negatively impacted by tarmac delays.

ORNGE Tarmac Detention Fee $ Impacts

	2011	2012
Sudbury Tarmac	$150k tarmac detention fees while using Sudbury EMS for delayed hospital rides	$180k tarmac detention fees + $175k Platinum for timely rides to hospital

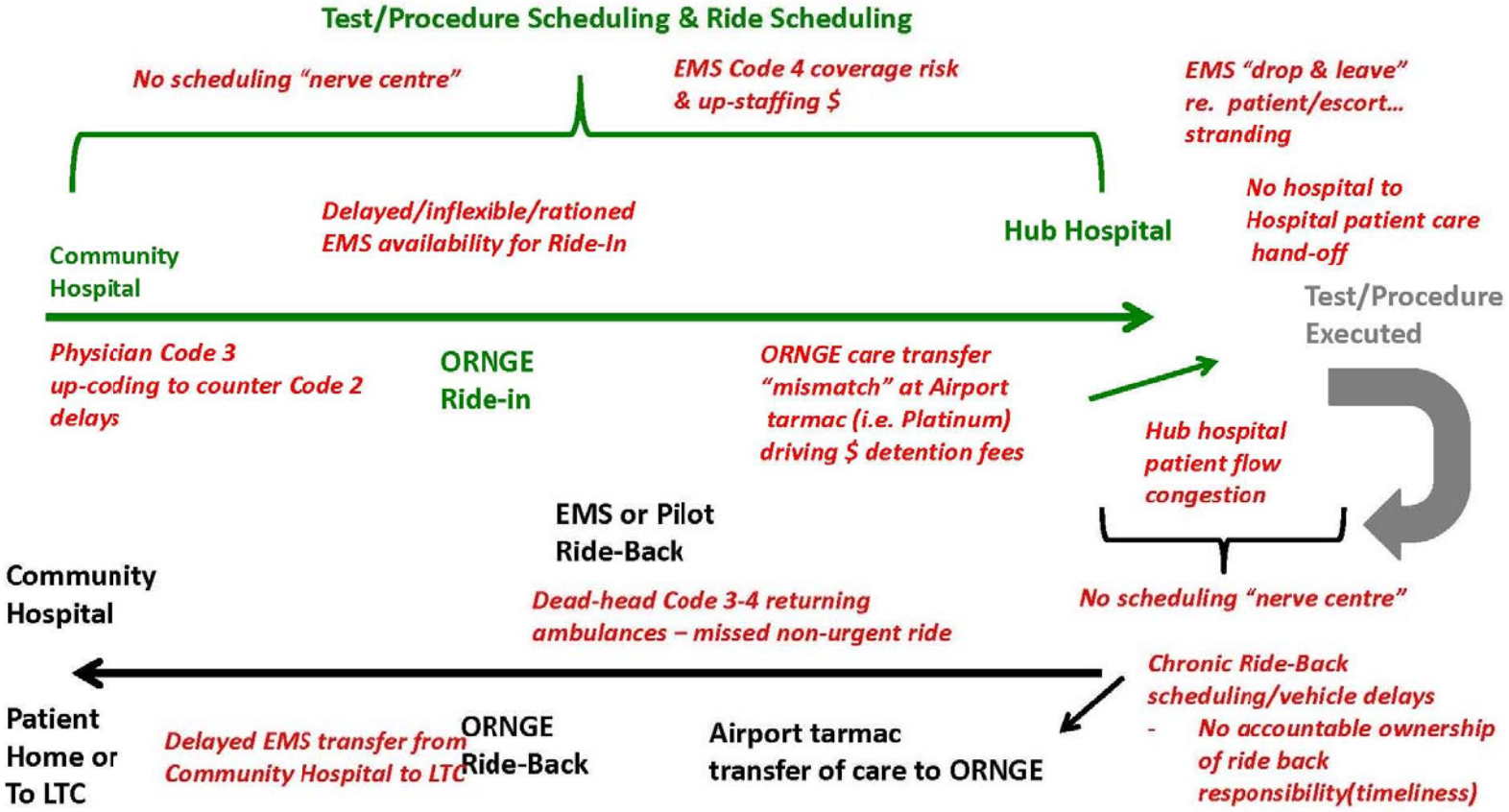
In Sudbury the ORNGE detention fees increased from $150k to $180k when Platinum was retained to provide land transportation for Code 1-2 transfers. The previously delayed "no charge" EMS airport ride in 2011 permitted the transfer to occur at the airport; no ORNGE paramedic was required to travel to HSN. In 2012 and 2013 the more timely purchased Platinum ride from the airport required ORNGE medics to ride along, thereby creating even longer delays. Total annual costs to ORNGE from the Platinum transport model exceeded $350k in 2012. ORNGE has now discontinued its arrangement with Platinum to transfer tarmac patients from the Sudbury airport to HSN. For the time being, Sudbury EMS ambulances move these ORNGE tarmac patients – with all the same delay problems experienced in 2011.

A solution to the airport tarmac patient transfer problem – by creating a timely/dependable airport tarmac based transfer between an ORNGE paramedic and a land EMS paramedic – is an operational priority for ORNGE. ORNGE expenditures associated with the Sudbury tarmac patient transfer problem have reportedly decreased from their peak of $350k in 2012. Further ORNGE expenditure reduction from the 2012 peak is possible if a timely/reliable paramedic-to-paramedic transfer solution on the tarmac is enacted.

Overall Non-urgent Transportation System Performance Challenges/Problems

The following figure "maps" the key challenges/problems with the non-urgent patient transportation system across the LHIN. This high-level process map reflects the "patient journey" from the community hospital to the hub hospital (in green), and the return trip back to the community hospital (in black) following the test/procedure at the hub hospital. The challenges/problems identified with the current model (as identified by key stakeholders) are superimposed in red across the process map.

Non-urgent Transportation
Problems on the "Map"



North West LHIN Patient Care and Control Pilot

The North West LHIN is currently funding a non-urgent transportation patient "care and control" pilot project involving Thunder Bay Regional Health Sciences Centre and a large portfolio of community hospitals. The following pilot project facts are relevant for purposes of this review:

- TBRHSC (hub hospital) would accept partial care & control for low acuity "treat & return" Code 1-2 patients from community hospitals.
    - Typically diagnostic imaging tests/procedures.
- TBRHSC has established a 3 patient holding area in diagnostic imaging.
- Holding area to be staff by a 1FTE RPN.
    - 8-hour shift beginning at 9-10 a.m. (patients must be returned before 7 p.m. while Superior North EMS medics still on shift).
    - Envisioning two trained RPN staff to ensure coverage across weekly work schedule.
    - Projected 1:3 staff to patient ratio with frequent patient turnover anticipated.
- Key implementation issue is establishing credentials for community hospital physicians at TBRHSC; no transfer of responsibility to TBRHSC physicians.
- Region-wide re-credentialing process for physicians already underway in NW LHIN; would be expanded to resolve care & control problems.
    - Community hospital physician will be able to issue minor scope orders to TBRHSC staff (e.g. IV or meds) for "treat & return" Code 1-2 patients.
    - If these patients require emergency care during time at TBRHSC they would proceed to ER like any other individual.
    - Participating community and hub hospitals will need to make legal wording changes to their hospital by-laws; lawyers currently working on this matter in the NW LHIN.
- Two phase rollout is planned. Phase 1 for patients with no requirements for orders to be filled at TBRHSC and Phase 2 for patients with order requirements.

2013 North East LHIN Pilot Projects

In 2013, the North East LHIN implemented three pilot projects to explore alternatives to the traditional EMS paramedic-based model for delivering non-urgent patient transportation.

Sudbury EMS collaborated with Health Sciences North (HSN) to deliver a non-ambulance patient "community flow car". This vehicle (previously an ambulance, but with markings and radio removed) provided short haul patient transfers of primarily Code 1 patients out of Health Sciences North. The vehicle was not included in the EMS deployment plan and could not be pre-empted from its patient transfer work by ambulance dispatch (CACC). The community flow car was staffed by two Sudbury EMS paramedics, and deployed on a 12-hour shift, seven days per week.

Manitoulin-Sudbury EMS delivered a non-paramedic transfer service consisting of two dual stretcher vehicles deployed Monday-Friday 0800-1900 daily. The prime function of the pilot was to facilitate the transfer of Code 1-2 patients from the two Manitoulin Health Centre facilities, and Espanola Regional Hospital and Health Centre, to-and-from Health Sciences North in Sudbury. The pilot's two non-ambulance transfer vehicles are staffed by non-paramedic first-aid attendants who received enhanced training on stretchers, patient mobility and disease transmission. These vehicles routinely waited in Sudbury to return patients to the facility of origin, so stranding of patient and escort were significantly reduced.

Timiskaming EMS adapted the SW LHIN Patient Transport Decision Guide (algorithm) for their use, so that hospital staff could determine the most appropriate transport solution. EMS performed all in-district non-emergency calls between 0700-1600 daily. A private transfer provider executed all of the out-of-district non-emergency calls 24 hours a day, and in-district calls between 1600-0700 daily. Calls that the private transfer provider was not able to do were reassigned to EMS for completion.

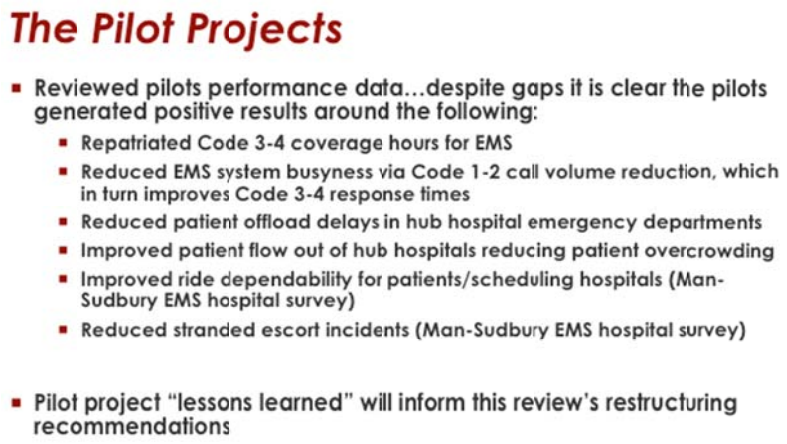
The three pilot projects have delivered significant and measurable improvements in the functioning of the EMS emergency response system and the non-urgent transportation model.

Almost 5,200 EMS emergency coverage hours have been recovered and re-deployed as originally intended by EMS deployment plans. Overall, EMS system "busyness" due to non-urgent transfer workload (i.e. call volume) was reduced to more manageable levels at overworked Manitoulin-Sudbury EMS bases. Both the frequency and duration of patient offload delays at the Health Sciences North emergency department were reduced by 12 percent. Problematic up-coding of scheduled non-urgent procedures (to urgent status) by community hospital physicians has largely dissipated according to EMS leadership. EMS surveys of community hospital medical and administrative staff identified enthusiastic support for the pilots, and the virtual elimination of the highly problematic stranded patient escort.

The following table contains highlights of pilot project performance indicator data.

	Manitoulin-Sudbury	Sudbury	Timiskaming
EMS Emergency Coverage Hours Recovered	1932	1961	1298
Cost per Recovered Code 4 Coverage Hour	$184	$207	$109
Cost per km of Non-emergent Transport Service Delivered	$2.51	Not Reported	$2.45
% Decrease EMS Code 1-2 Calls	40%	15%	Not Reported
Reduction in # Offlocd Delays	Not Aplicable	-12%	Not Reported
Reduction in Duration of Offload Delays	Not Applicable	-12%	Not Reported

The pilot projects have provided the Performance Concepts team fundamental insights into key aspects of the restructuring solution/model that will be required LHIN-wide to create a stable, dependable non-urgent patient transportation system.



Overall Stakeholder Observations

EMS providers, community hospitals and hub hospitals across the North East LHIN independently advanced the following overall observations about the non-urgent patient transportation model:

- ✓ The non-urgent patient system that pre-dated the 2013 pilot projects is not sustainable from patient-centred or financial perspectives for community hospitals. However, significant financial savings at community hospitals are possible with successful implementation of the recommended new non-urgent transportation model.

- ✓ The non-urgent patient transportation system that pre-dated the 2013 pilot projects was a major problem for hub hospitals; creating patient flow blockages, contributing to offload delay in emergency departments, and resulting in stranded community hospital patients and escorts within the hub hospitals.

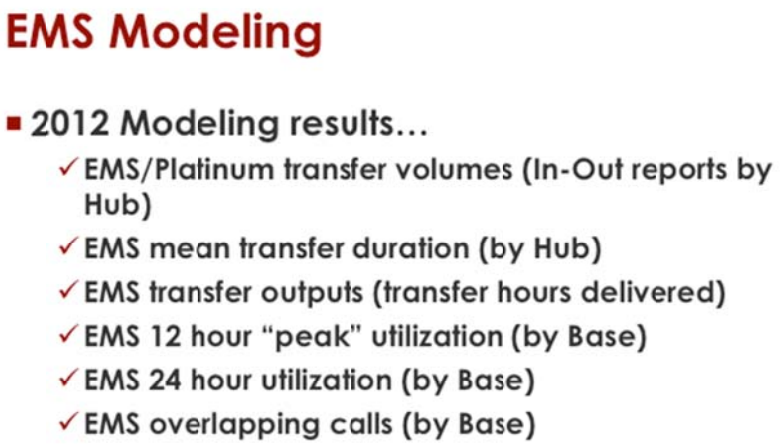
- ✓ The regional hubs model of non-urgent patient care will not be financially sustainable for community hospitals facing aging demographic pressures – unless patient transportation becomes far more reliable in/out of hub hospitals and the system becomes scalable for anticipated increases in transfer volumes.

- ✓ System reliability and the patient experience improved significantly when the pilot projects were implemented in 2013. Scalable and permanent non-ambulance resources for long-haul patient transfers between hospitals are necessary.

E. Situation Analysis - Evidence Based Quantitative Modeling

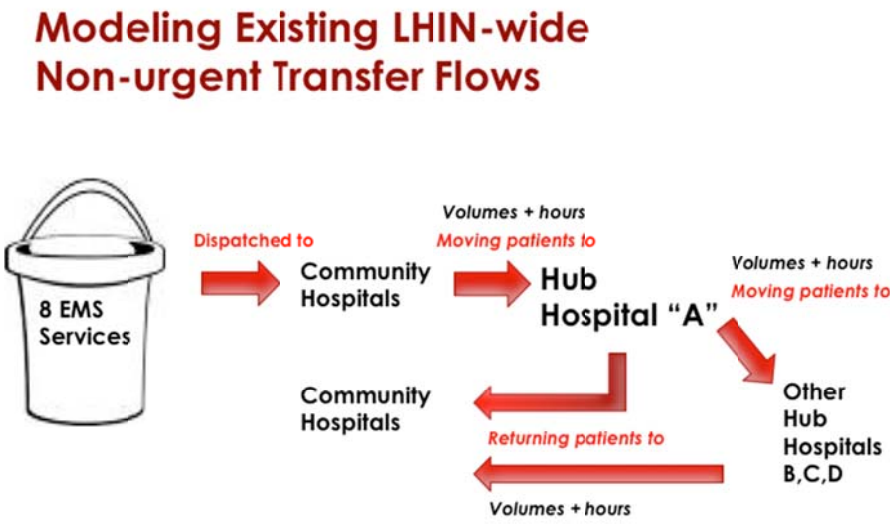
In order to test the perspectives and observations of the various EMS, community and hub hospital stakeholders, the Performance Concepts project team has undertaken extensive quantitative modeling of the EMS (and private provider) non-urgent transportation system that pre-dated the 2013 pilot projects. The quantitative modeling has been conducted using 2012 calendar year data from EMS providers, as well as the existing private transfer supplier in Sudbury (Platinum).

As noted in the following figure, modeling has been conducted LHIN-wide on transfer volumes, vehicle hour outputs, EMS system "busyness" by base, and overlapping Code 1-2 and 3-4 overlapping calls. EMS base-specific analysis has been undertaken where appropriate, in order to understand Code 3-4 patient risk posed by Code 1-2 workload.



For purposes of modeling LHIN-wide patterns of Code 1-2 transfer volumes and vehicles hours of output, an In/Out modeling approach has been used by Performance Concepts. The In/Out approach focuses on community hospital/facility Code 1-2 non-urgent "traffic" flowing in and out of the LHIN's four hub hospitals located in Sudbury, North Bay, Sault Ste. Marie, and Timmins. A mini-hub in New Liskeard (featuring a CT scanner) has also been modeled to complete the In/Out analysis.

The figure below provides a conceptual illustration of the In/Out analysis across the LHIN. The analysis documents patient Code 1-2 flow (by any EMS service) into a hub hospital and back to the facility/residence of origin.



IN/OUT Analysis – Sudbury Hub

The following table highlights the 2012 Sudbury hub's "IN" flow of Code 1-2 non-urgent transfers (i.e. highest volume institutions and hospitals). The largest flows of *inter-hospital* transfers to Health Sciences North originate at Elliot Lake Saint Joseph Hospital (250), ORNGE patients from the Sudbury Airport (200), Espanola Hospital (181), Mindemoya Hospital (115), Little Current Hospital (95), and North Bay Regional Health Centre (91).

Sudbury "IN" Flow of Code 1-2 Transfers

Sending Hospital/Institution	Code 1-2 Transfers	Mean Transfer Duration (minutes)
Local Tranfers - No Institution	469	53
ELLIOT LAKE - SJGH	250	153
Sudbury Airport	200	66
Espanola Regional Hospital	181	103
Mindemoya Hospital MHC	115	150
Little Current Hospital MHC	95	133
NORTH BAY REGIONAL HEALTH CENTRE	91	119
EXTENDICARE/YORK	104	30
*West Parry Sound Health Centre	40	141
EXTENDICARE/FALCONBRIDGE	58	39
Espanola Nursing Home	29	107
FINLANDIA HOIVAKOTI NURSING HOME	22	43
HSN-Emergency Dept.	19	24
Local Tranfers - No Institution	18	39
WEST NIPISSING GENERAL HOSPITAL	17	95
Extendicare York	17	33
Temiskaming Hospital	16	187
St Gabriel's Villa	14	60
TOTAL All Transfers	1,941	

The total number of 2012 Sudbury hub "IN" Code 1-2 transfers is 1,941.

The Code 1-2 transfer duration (i.e. transfer minutes) "stop watch" is turned on by an ambulance deploying for the transfer patient pick-up, and does not turn off until ambulance arrival at Health Sciences North. The same "stop watch" applies to all 5 transportation hub IN/OUTS.

Sudbury "OUT" Flow of Code 1-2 Transfers

Receiving Facility/Destination	Code 1-2 Transfers	Mean Transfer Duration (Min)
RESIDENCE	602	44
ELLIOT LAKE - SJGH	318	150
SUDBURY AIRPORT	269	73
EXTENDICARE/YORK	226	30
Espanola Regional Hospital	201	79
EXTENDICARE/FALCONBRIDGE	135	37
Mindemoya Hospital MHC	126	150
Little Current Hospital MHC	119	120
PIONEER MANOR	110	35
Elizabeth Center	73	48
St. Joseph's Villa	72	34
Null - mostly local	65	86
Kirkland Lake Hospital	49	42
NORTH BAY REGIONAL HEALTH CENTRE	46	112
ELLIOT LAKE - SJGH ER	43	137
HSN-Continuing Care & Rehab	24	30
Temiskaming Hospital	24	143
ANOTHER AMBULANCE	23	87
HSN Memorial Site	20	31
Vale Hospice	19	30
Meadowbrook Village	16	34
*West Parry Sound Health Centre	16	149
WEST NIPISSING GENERAL HOSPITAL	15	92
ENGLEHART AND DISTRICT HOSPITAL	12	38
BLIND RIVER - BRDHC NON-ER	19	120
TOTAL Transfers	2,915	

The table above highlights the 2012 Sudbury "OUT" flow of Code 1-2 non-urgent transfers (i.e. highest volume institutions and hospitals).

The largest flows of *inter-hospital* transfers outwards from Health Sciences North are traveling to Elliot Lake Saint Joseph Hospital (318), the Sudbury Airport for ORNGE transport (269), Espanola Hospital (201), Mindemoya Hospital (126), Little Current Hospital (119), Kirkland Lake Hospital (49), and North Bay Regional Health Centre (46).

The total number of 2012 Sudbury hub "Out" Code 1-2 transfers is 2,915.

IN/OUT Analysis – North Bay Hub

The following table highlights the 2012 North Bay hub's "IN" flow of Code 1-2 non-urgent transfers (i.e. highest volume institutions and hospitals).

The largest flows of *inter-hospital* transfers to North Bay Regional Health Centre originate at West Nipissing General Hospital (171), ORNGE patients from the Jack Garland Airport (98), Temiskaming Hospital (61), and Health Sciences North (47). Rutherglen (relay) calls predominantly originate at the Mattawa General Hospital.

North Bay "IN" Flow of Code 1-2 Transfers

Sending Hospital/Institution	Code 1-2 Transfers	Mean Transfer Duration (Min)
WEST NIPISSING GENERAL HOSPITAL	171	48
No Documented Facility - Primarily Local	103	57
Jack Garland Airport	98	33
Temiskaming Hospital	61	135
SUDBURY - Health Sciences North	47	112
Rutherglen (Relay)	45	51
LEISURE WORLD CAREGIVING CENTRE	35	30
.Lady Isabella Nursing Home	24	60
.Eastholme Home For The Aged	18	56
WEST NIPISSING HOSPITAL LONG TERM CARE	16	51
ALGONQUIN NURSING HOME	14	74
CASSELLHOLME	13	26
ENGLEHART AND DISTRICT HOSPITAL	13	150
NIPISSING MANOR NURSING HOME	10	46
MATTAWA GENERAL HOSPITAL	8	67
TOTAL All Transfers	731	

The total number of 2012 North Bay hub "IN" Code 1-2 transfers is 731.

The following table highlights the 2012 North Bay hub "OUT" flow of Code 1-2 non-urgent transfers (i.e. highest volume institutions and hospitals).

North Bay "OUT" Flow of Code 1-2 Transfers

Receiving Facility/Destination	Code 1-2 Transfers	Duration
WEST NIPISSING GENERAL HOSPITAL	263	44
No Institution Return - Primarily Local Residence	216	38
CASSELLHOLME	119	27
SUDBURY - Health Sciences North	91	118
Jack Garland Airport	85	35
Temiskaming Hospital	84	130
LEISURE WORLD CAREGIVING CENTRE	59	31
NIPISSING MANOR NURSING HOME	53	45
.Lady Isabella Nursing Home	45	62
MATTAWA GENERAL HOSPITAL	36	69
.Eastholme Home For The Aged	27	43
WEST NIPISSING HOSPITAL LONG TERM CARE	22	49
ALGONQUIN NURSING HOME	21	64
Rutherglen (Relay)	17	55
ENGLEHART AND DISTRICT HOSPITAL	16	157
TOTAL All Transfers	1,290	

The largest flows of *inter-hospital* transfers outwards from North Bay Regional Health Centre are traveling to West Nipissing General Hospital (263), Health Sciences North (91), Jack Garland Airport to link-up with ORNGE (85), Temiskaming Hospital (84), and Mattawa General Hospital (36).

The total number of 2012 North Bay hub's "OUT" Code 1-2 transfers is 1,290.

IN/OUT Analysis – Sault Hub

The following table highlights the 2012 Sault hub's "IN" flow of Code 1-2 non-urgent transfers (i.e. highest volume institutions and hospitals).

The largest flows of *inter-hospital* transfers to Sault Area Hospital originate at the Sault Airport with incoming ORNGE patients (143), Blind River Hospital (90), and Thessalon Hospital (62).

Sault "IN" Flow of Code 1-2 Transfers

Sending Hospital/Institution	Code 1-2 Transfers	Mean Transfer Duration (Min)
SSM Airport	143	58
THESSALON - ALGOMA MANOR	88	95
BLIND RIVER - BRDHC	90	150
THESSALON - BRDHC	62	90
No Sending Hospital - Local Residential	51	42
New Sault Area Hospital	49	36
LADY DUNN HEALTH CENTRE	20	61
TOTAL All Transfers	584	

The total number of 2012 Sault hub's "IN" Code 1-2 transfers is 584.

Sault "OUT" Flow of Code 1-2 Transfers

The following table highlights the 2012 Sault hub's "OUT" flow of Code 1-2 non-urgent transfers (i.e. highest volume institutions and hospitals).

Receiving Facility/Destination	Code 1-2 Transfers	Mean Transfer Duration (Min)
RESIDENCE	174	31
Sault Ste. Marie Airport	152	49
F J DAVEY HOME	109	20
THESSALON - ALGOMA MANOR	90	86
EXTENDICARE/VAN DAELE	86	23
BLIND RIVER - BRDHC	92	122
EXTENDICARE/TENDERCARE	54	17
ARCH Algoma Residential Community Hospice	54	37
Great Northern Nursing Centre	44	19
THESSALON Hospital	46	86
723 North st MAUNO KAIHLA KOTI	33	43
Sault Area Hospital Plummer Site (Long Term Care)	24	30
TOTAL All Transfers	1,210	

The largest flows of *inter-hospital* transfers outwards from Sault Area hospital are traveling to the Sault Airport (152) for connections to ORNGE, Blind River Hospital (92), and Thessalon Hospital (46).

The total number of 2012 Sault hub's "OUT" Code 1-2 transfers is 1,210.

IN/OUT Analysis – Timmins Hub

The following table highlights the 2012 Timmins hub's "IN" flow of Code 1-2 non-urgent transfers (i.e. highest volume institutions and hospitals).

Timmins "IN" Flow of Code 1-2 Transfers

Sending Hospital/Institution	Code 1-2 Transfers	Mean Transfer Duration (Min)
Timmins Airport	408	41
KAPUSKASING Hospital	182	160
Anson General Hospital - Iroquois Falls	159	103
Kirkland Lake Hospital	136	123
Lady Minto Hospital	116	139
No Sending Institution - Local Residences	53	46
BINGHAM MEMORIAL HOSPITAL	72	106
GOLDEN MANOR	108	26
Smooth Rock Falls General Hospital	48	124
HEARST - NDH	51	42
Canadian Liver foundation	34	29
Chapleau Hospital	35	180
EXTENDICARE/TIMMINS	19	21
Mountjoy Street Clinic	17	23
ENGLEHART AND DISTRICT HOSPITAL	17	145
NORTH CENTENNIAL MANOR	13	133
TOTAL All Transfers	1,686	

The largest flows of *inter-hospital* transfers into Timmins and District Hospital (TDH) originate at the Timmins Airport for ORNGE (408), Kapuskasing Hospital (182), Anson General Hospital (159), Kirkland Lake Hospital (136), Lady Minto Hospital (116), Bingham Memorial Hospital (72), Hearst Hospital (51), Chapleau Hospital (35), and Englehart District Hospital (17).

The total number of 2012 Timmins hub's "IN" Code 1-2 transfers is 1,686.

The table on the next page highlights the 2012 Timmins hub's "OUT" flow of Code 1-2 non-urgent transfers (i.e. highest volume institutions and hospitals).

The largest flows of *inter-hospital* transfers outwards from Timmins and District Hospital are traveling to the Timmins Airport (373) for connection to ORNGE, Kapuskasing Hospital (221), Anson General (218), Kirkland lake Hospital (166), Lady Minto Hospital (113), Bingham Memorial (73), Smooth Rock Falls (68), Hearst (50), Englehart District Hospital (21) and Chapleau Hospital (20).

The total number of 2012 Timmins hub's "OUT" Code 1-2 transfers is 2,199.

Timmins "OUT" Flow of Code 1-2 Transfers

Receiving Facility/Destination	Code 1-2 Transfers	Mean Transfer Duration (Min)
TIMMINS AIRPORT	373	40
KAPUSKASING	221	139
Anson General Hospital - Iroquois Falls	218	85
No Receiving Hospital	221	35
Kirkland Lake Hospital	166	120
Extendicare/Timmins	144	31
GOLDEN MANOR	136	28
Lady Minto Hospital	113	99
HOME	96	39
BINGHAM MEMORIAL HOSPITAL	73	76
TIMMINS AIRPORT	73	39
Smooth Rock Falls General Hospital	68	84
HEARST - NDH	50	43
ANOTHER LAND AMBULANCE	46	76
ENGLEHART AND DISTRICT HOSPITAL	21	139
Chapleau Hospital	20	180
Georgian Residence	19	26
SOUTH CENTENNIAL MANOR	18	96
NORTH CENTENNIAL MANOR	11	137
TOTAL All Transfers	2,199	

IN/OUT Analysis – New Liskeard Hub

The following table highlights the 2012 New Liskeard hub's "IN" flow of Code 1-2 non-urgent transfers (i.e. highest volume institutions and hospitals).

New Liskeard "IN" Flow of Code 1-2 Transfers

Sending Hospital/Institution	Code 1-2 Transfers	Mean Transfer Duration (Min)
Kirkland Lake Hospital	169	90
ENGLEHART AND DISTRICT HOSPITAL	76	58
North Bay General Hospital	84	133
Extendicare Haileybury	14	33
Residence	13	44
Extendicare/Kirkland Lake	12	86
SUDBURY - SRH	24	106
Earlton Airport	7	53
Temiskaming Lodge	12	32
TOTAL All Transfers	455	

The largest flows of *inter-hospital* transfers into New Liskeard's Temiskaming Hospital originate at the Kirkland Lake Hospital (169), Englehart and District Hospital (76), North Bay General Hospital (84), and Sudbury's Health Sciences North (24). Airport call volume is minor (7).

The total number of 2012 New Liskeard hub's "IN" Code 1-2 transfers is 455.

New Liskeard "OUT" Flow of Code 1-2 Transfers

The following table highlights the 2012 New Liskeard hub "OUT" flow of Code 1-2 non-urgent transfers (i.e. highest volume institutions and hospitals).

Receiving Facility/Destination	Code 1-2 Transfers	Mean Transfer Duration (Min)
Kirkland Lake Hospital	223	79
ENGLEHART AND DISTRICT HOSPITAL	111	50
North Bay General Hospital	60	135
HOME	35	39
Temiskaming Lodge	34	33
Extendicare Haileybury	29	34
Earlton Airport	18	54
Extendicare/Kirkland Lake	16	75
No Destination Code - Residenial Likely	7	118
Teck Pioneer Residence	6	88
SUDBURY - HSN	15	178
TDGH Timmins	6	144
TOTAL All Transfers	590	

The largest flows of *inter-hospital* transfers outwards from Temiskaming Hospital are traveling to the Kirkland Lake Hospital (223), Englehart and District Hospital (111), North Bay General Hospital (60), Health Sciences North (15), Earlton Airport (18) and TDH (6).

The total number of 2012 New Liskeard hub's "OUT" Code 1-2 transfers is 590.

Understanding IN/OUT Transfer Volume Variances

The following table summarizes IN/OUT Code 1-2 non-urgent patient transfer flows across the North East LHIN's five transportation hubs.

As documented within the table, the OUT transfer volumes exceed the IN transfer volumes by a significant margin in each hub. There are a number of reasons for this pattern of transfer volumes:

- Physician up-coded transfers are not included in “sending hospital” totals (these Code 3 transfers are best understood as “urgent” Code 2 patients, based on physician judgment about the clinical impact of delayed tests due to transfer ride delays)

- Over-triaged Code 3 transfers (DCPI 2 algorithm) who return as Code 1 transfers

- Code 3-4 transfer patients whose condition improves significantly via treatment at hub hospital & then return as Code 1 transfers

Non-urgent transportation restructuring recommendations in this report will need to recognize the challenge posed by significant Code 1 patient repatriation OUT volumes.

Summary of IN/OUT Non-urgent Transfer Volumes

	IN	OUT	Difference
Sudbury EMS	1,941	2,844	-903
Platinum	712	1,963	-1,251
Sudbury Total	**2,653**	**4,807**	**-2,154**
North Bay	**731**	**1,099**	**-368**
Sault	**584**	**1.210**	**-626**
Timmins	**1,686**	**2,178**	**-492**
New Liskeard	**455**	**489**	**-34**
Total	***6,109***	***9,783***	***-3,674***

Notes:

1) North Bay data does not include 500+ North Bay Hospital non-paramedic transfer vehicle trips, because trip volumes are not tracked on in/out basis.

2) Previously in this report, hub hospital-specific in/out information has been correctly presented. In the consolidated summary table above, duplicate cases have been removed (i.e. in some instances one hospital’s transfer “in” may also be another hospital’s transfer “out”), and thus the numbers are not strictly a summation of the individual hospitals’ in/out volume.

Parry Sound Non-Urgent Transfer Referral Pattern

The previous In/Out analysis documents patient movement flows within the LHIN. However, West Parry Sound Health Centre has a unique referral pattern for its Code 1-2 transfers – primarily moving patients outside of the North East LHIN to destination hub hospitals located in Muskoka, Simcoe County, and the GTA. Therefore, Parry Sound EMS transfer workload does not show up in the IN/OUT analyses. However Performance Concepts has documented the following Parry Sound "OUT" volume transfer pattern for 2012:

- A total of 167 long-haul Code 1-2 transfers to Waypoint Mental Health Centre (74), Orillia Soldiers Memorial Hospital (24), Royal Victoria Hospital (18), South Muskoka Memorial (15), and Huntsville District Hospital (18).
- These transfer volumes consumed a total of 283 long-haul transfer hours.

Recommendations in this review will address the unique Code 1-2 transfer referral patterns found in Parry Sound.

Modeling Non-urgent Transportation Service Delivery Outputs – EMS Vehicle Hours

The Performance Concepts project team has modeled 2012 EMS non-urgent transfer outputs – expressed as *Code 1-2 vehicle hours of service*. IN/OUT transfer volumes and average transfer durations have been used to calculate vehicle hours of service across all 5 transportation hubs.

The following table sets out the total 2012 Code 1-2 transfer output hours by hub. The total non-urgent transfer output hours range from 6,477 in the Sudbury hub, 1,727 hours in the North Bay hub, 1,910 hours in the Sault hub, 4,910 hours in the Timmins hub, and 1,392 hours in the New Liskeard hub. These output hour totals include both IN and OUT transfer volumes.

The IN/OUT transfers feature durations that fall into two distinct categories – short haul transfers with average durations less than an hour (one way), and long-haul transfers with average durations of 90+ minutes (one way). Long-haul transfer output hours range from 4,357 in the Sudbury hub, 939 hours in the North Bay hub, 1,015 hours in the Sault hub, 3,510 hours in the Timmins hub, and 1,211 hours in the New Liskeard hub.

Summary of EMS Code 1-2 Transfer Output Hours

	2012 Total Code 1-2 Transfer *Output Hours* Delivered by EMS	2012 EMS Code 1-2 "Long" Transfer *Output Hours* That Could Be Replaced	2012 EMSCode 1-2 "Short" Transfer *Output Hours* Where Replacement Not Necessary
Sudbury	6,477 Hours of Output (Total)	4,357 Hours of "Long" Transfer Output (Replaceable)	2,120 Hours of "Short" Transfer Output
N Bay	1,727 Hours of Output (Total)	939 Hours of "Long" Transfer Output (Replaceable)	788 Hours of "Short" Transfer Output
Sault	1,910 Hours of Output (Total)	1,015 Hours of "Long" Transfer Output (Replaceable)	895 Hours of "Short" Transfer Output
Timmins	4,910 Hours of Output (Total)	3,510 Hours of "Long" Transfer Output (Replaceable)	1,400 Hours of "Short" Transfer Output
New Liskeard	1,392 Hours of Output (Total)	1,211 Hours of "Long" Transfer Output (Replaceable)	181 Hours of "Short" Transfer Output
Total	*16,416 Hours of Output (All hubs)*	*11,032 Hours of "Long" Transfer Output (Replaceable)*	*5,384 Hours of "Short" Transfer Output*

The following table focuses on long-haul patient transfer ***volumes***, **output hours**, and ***duration*** (by transportation hub).

Long-haul Code 1-2 Transfer Volumes & Mean Duration

Hub	2012 EMS Long-Haul Transfer Volumes	2012 EMS Long- Haul Transfer Hours	Mean Long-Haul Transfer Duration (Hours)
Sudbury	**2,230**	**4,357**	**2.01**
North Bay	**934**	**939**	**1.26**
Sault	**573**	**1,015**	**1.77**
Timmins	**1,893**	**3,510**	**1.87**
New Liskeard	**918**	**1,211**	**1.46**
Total	***5,548***	***11,032***	**---**

The Sudbury hub experienced 2,230 long-haul Code 1-2 transfers with an average duration of 2.01 hours. The North Bay hub experienced 934 long-haul transfers with an average duration of 1.26 hours. The Sault hub experienced 573 long-haul transfers with an average duration of 1.77 hours. The Timmins hub experienced 1,893 long-haul transfers with an average duration of 1.87 hours. The New Liskeard hub experienced 918 long-haul transfers with an average duration of 1.46 hours. These durations measure patient transfer time – they do NOT include return time for empty ambulances to return to base following a completed IN or OUT patient transfer leg.

Longer inter-hospital Code 1-2 transfers represent significant EMS Code 3-4 response coverage risk, according to EMS and community hospital stakeholders. Stakeholders have also suggested that short-haul Code 1-2 transfers do not represent comparable risk since ambulances need not leave their Code 3-4 emergency coverage zones to execute this work.

Modeling EMS System Busyness – Unit Hour Utilization (UHU) by Base

EMS system "busyness" is an important metric to review when considering restructuring options for non-urgent patient transportation. Excessive system busyness negatively impacts Code 3-4 emergency call coverage and response times. Code 1-2 response reliability (i.e. promptness) is also negatively impacted by excessive ambulance system busyness.

System busyness in the Ontario EMS sector is measured using unit hour utilization or UHU. *UHU calculates the percentage of a deployed vehicle hour of service that is consumed by actively responding to a Code 1-4 call*. For modeling purposes, Performance Concepts Consulting has calculated two distinct UHU data sets for all EMS bases in the North East LHIN: Code 1-2 non-urgent calls, and Code 3-4 emergency calls. These two UHU scenarios have been further refined on the basis of a "peak daytime" twelve-hour period defined as 7am to 7pm. Peak daytime UHU is the key metric because the vast majority of Code 1-2 transfers are executed during this twelve-hour window. This report will focus on the "peak daytime" UHU calculations in order to assess the risk posed by system busyness.

The following table sets out the “peak daytime” Code 1-2 and Code 3-4 UHUs for EMS bases across the LHIN. It also presents a consolidated Code 1-4 UHU. The Code 1-2 UHU is calculated by creating a ratio defined by a “Time on Calls” numerator and a “Daytime Deployed Minutes” denominator. The resulting ratio is a percentage of daytime deployed vehicle time (minutes) consumed by Code 1-2 workload. The “Time on Calls” numerator calculation includes initial transfer travel time, patient offload time at the destination hospital, and return time to base. A caveat - the formula calculates a “high end of accurate” UHU value, because each Code 1-2 call is assumed to include return time to base – a situation that does not always occur (but usually occurs). The same ratio calculation formula applies to the Code 3-4 UHU panel.

The UHU results are best understood by separating EMS bases into two categories; single ambulance daytime bases versus multi-ambulance daytime bases. Both base categories are negatively impacted by an inordinately high UHU. The system busyness risk is acute for single ambulance bases where long-haul Code 1-2 transfers create a “zero units available” coverage gap that seriously compromises Code 3-4 coverage and response times.

2012 Peak Daytime Unit Hour Utilization (UHU) – Code 1-2, 3-4, 1-4 Transfers

EMS Service	StationDescription	Code 3-4 Time on Calls	Daytime Code 3-4 Calls	Code 1-2 Time on Calls	Daytime Code 1-2 Calls	Daytime Deployed Minutes	Peak Code 3-4 UHU	Peak Code 1-2 UHU	Peak Code 1-4 UHU
Algoma	Blind River	45,128	376	45,391	202	263,520	17%	17%	34%
Algoma	Elliot Lake	124,427	1,198	215,463	876	394,470	32%	55%	86%
Algoma	Hornepayne	3,491	50	3,294	37	263,520	1%	1%	3%
Algoma	Richards Landing	19,817	222	3,372	25	263,520	8%	1%	9%
Algoma	Thessalon	40,870	398	108,995	550	263,520	16%	41%	57%
Algoma	White River	12,959	92	0	0	263,520	5%	0%	5%
Algoma	Dubreuville	7,493	53	0	0	263,520	3%	0%	3%
Algoma	Wawa	14,451	213	6,445	99	263,520	5%	2%	8%
Cochrane	Cochrane	25,501	291	11,043	109	263,520	10%	4%	14%
Cochrane	Hearst Base	29,192	366	29,411	375	252,540	12%	12%	23%
Cochrane	Iroquois Falls	33,062	383	160,761	780	388,800	9%	41%	50%
Cochrane	Kapuskasing	62,267	646	170,388	1,050	263,520	24%	65%	88%
Cochrane	Matheson	13,894	154	8,640	71	263,520	5%	3%	9%
Cochrane	Smooth Rock Falls	13,788	162	14,519	110	263,520	5%	6%	11%
Cochrane	South Porcupine Base	41,715	702	29,643	387	527,040	8%	6%	14%
Cochrane	Timmins Base	126,367	2,221	167,103	1,691	505,080	25%	33%	58%
Manitoulin-Sudbury	Noelville	37,390	265	2,192	15	263,520	14%	1%	15%
Manitoulin-Sudbury	Hagar	27,175	229	4,452	23	263,520	10%	2%	12%
Manitoulin-Sudbury	Killarney	14,330	70	45	1	175680	8%	0%	8%
Manitoulin-Sudbury	Gogama	33,856	157	232	4	175,680	19%	0%	19%
Manitoulin-Sudbury	Foleyet	9,018	42	14,449	49	175,680	5%	8%	13%
Manitoulin-Sudbury	Chapleau	13,190	143	12,225	86	263,520	5%	5%	10%
Manitoulin-Sudbury	Little Current	46,211	366	41,799	241	263,520	18%	16%	33%
Manitoulin-Sudbury	Mindemoya	61,977	432	141,983	539	388,800	16%	37%	52%
Manitoulin-Sudbury	Gore Bay	23,365	187	10,478	57	263,520	9%	4%	13%
Manitoulin-Sudbury	Massey	32,880	361	17,964	90	175,680	19%	10%	29%
Manitoulin-Sudbury	Wikweikong	36,090	399	9,246	74	263,520	14%	4%	17%
Manitoulin-Sudbury	Espanola	46,330	482	54,033	301	263,520	18%	21%	38%
Nipissing	Mattawa	15,421	228	18,023	205	175,680	9%	10%	19%
Nipissing	Temagami	10,639	95	231	2	124,800	9%	0%	9%
Nipissing	Ferris	63,470	944	11,095	110	263,520	24%	4%	28%
Nipissing	NB Main Base	199,583	3,226	79,889	811	746,640	27%	11%	37%
Nipissing	West Nipissing	75,781	1,001	58,086	534	263,520	29%	22%	51%
Parry Sound	Parry Sound	103,890	986	59,278	409	288,480	36%	21%	57%
Parry Sound	Pointe au Baril	22,716	147	2,116	14	241,560	9%	1%	10%
Parry Sound	Burks Falls	61,346	432	5,130	35	263,520	23%	2%	25%
Parry Sound	Seguin	39,650	290	25,892	136	175,680	23%	15%	37%
Parry Sound	South River	60,234	390	6,264	37	263,520	23%	2%	25%
Parry Sound	Powassan	58,214	435	15,760	108	263,520	22%	6%	28%
Sault-Ste-Marie	Old Garden River Rd	334,306	5,447	63,264	801	790,560	42%	8%	50%
Sault-Ste-Marie	Garden River FN	33,438	505	5,065	50	263,520	13%	2%	15%
Sudbury	All Bases	1,050,639	16,717	241,325	2,277	3,464,730	30%	7%	37%
Timiskaming	Englehart	36,851	393	46,606	369	263,520	14%	18%	32%
Timiskaming	Kirkland Lake	83,117	833	194,322	1,186	451,440	18%	43%	61%
Timiskaming	Temiskaming Shores	87,211	889	87,357	460	439,200	20%	20%	40%

There are a number of ***multi-ambulance daytime bases*** across the LHIN with inappropriately high Code 1-2 UHU ratios. Kapuskasing (65%), Elliot Lake (55%), Iroquois Falls (41%), Timmins (33%), Mindemoya (37%), and Kirkland Lake (43%) all feature UHU ratios exceeding a system busyness risk threshold of 30 percent. It should be noted that Kapuskasing's daytime UHU of 65% somewhat exaggerates the "on-the-ground" system busyness because many non-urgent transfers are actually up-staffed with ambulance resources not budgeted in the deployment plan. EMS deployment plan vehicle hours that are supposed to be devoted primarily to Code 3-4 emergency coverage, are being consumed by Code 1-2 workload. Vehicles at these bases are often being removed from their emergency coverage zones for long-haul inter-hospital transfers. While "zero available units" may not be the result at multi-ambulance bases, reduced emergency response capacity (below planned levels) is frequently occurring.

There are a number of ***single-ambulance daytime bases*** across the LHIN with alarmingly high Code 1-2 UHU ratios. Examples include Blind River (17%), Thessalon (41%), Little Current (16%), Espanola (21%), West Nipissing (22%) and Englehart (18%). At all of these bases, the Code 1-2 UHU ratios suggest frequent "zero units available" emergency coverage gaps. EMS services often respond to "zero available units" by moving ambulances from an adjacent base closer to the exposed bases (thereby providing sub-optimal emergency coverage for both bases). The net result is a significant risk "spike" re. emergency response capability on virtually a daily basis.

When Code 3-4 UHU workload is combined with Code 1-2 UHU workload for these at-risk bases, the risk management result is even more problematic.

Modeling EMS Emergency Coverage Risk Associated with Code 1-2 Non-Urgent Workload

The following table (2 panels) documents a significant risk event for EMS service providers – overlapping Code 1-2 and Code 3-4 calls within a given base's coverage zone. When a Code 3-4 emergency call overlaps with a Code 1-2 transfer already in progress, EMS emergency coverage and response times can be negatively impacted. This is especially true if the Code 1-2 call is a long-haul transfer removing an ambulance from its emergency response coverage zone. The overlapping call risk spikes when the EMS base in question only deploys one ambulance at any given time.

Overlapping calls are more frequent at bases with more than one ambulance deployed – overall emergency readiness is negatively impacted but the situation does not always equate with "zero units available". However, at the 12-hour single unit bases across all 5 hubs, "zero units available" is the practical reality for all overlapping calls involving long-haul Code 1-2 transfers – units redeployed from adjacent bases to minimize risk simply cannot avoid unacceptably long emergency response times. The overlapping call modeling is not applicable in a large urban system like Sudbury EMS where multiple units service a single busy Code 4 response catchment area.

2012 Overlapping Call Risk Event by EMS Base

EMS Service	EMS Base	OverlappedCalls	Code 3-4 Calls	Overlap % Code 3-4
Algoma	Blind River - Single Ambulance	36	594	6%
Algoma	Elliot Lake	1085	1840	59%
Algoma	Hornepayne - Single Ambulance	1	78	1%
Algoma	Thessalon - Single Ambulance	198	542	37%
Algoma	Wawa - Single Ambulance	5	358	1%
Cochrane	Hearst Base - Single Ambulance	46	624	7%
Cochrane	Kapuskasing - Single Ambulance	446	1038	43%
Cochrane	Cochrane - Single Ambulance	15	472	3%
Cochrane	Iroquois Falls	260	535	49%
Cochrane	Matheson - Single Ambulance	4	226	2%
Cochrane	Smooth Rock - Single Ambulance	8	230	3%
Cochrane	South Porcupine Base	73	1265	6%
Cochrane	Timmins Base	1419	3699	38%
Parry Sound	Parry Sound	192	1691	11%
Parry Sound	Burks Falls - Single Ambulance	8	678	1%
Parry Sound	Seguin - Single Ambulance	8	297	3%
Parry Sound	South River - Single Ambulane	6	616	1%
Parry Sound	Powassan - Single Ambulance	13	654	2%

EMS Service	EMS Base	OverlappedCalls	Code 3-4 Calls	Overlap % Code 3-4
Man-Sud	Noelville - Single Ambulance	1	456	0%
Man-Sud	Hagar - Single Ambulance	5	355	1%
Man-Sud	Gogama - Single Ambualnce	1	249	0%
Man-Sud	Foleyet - Single Ambulance	7	55	13%
Man-Sud	Chapleau - Single Ambulance	3	247	1%
Man-Sud	Little Current - Single Ambulance	55	556	10%
Man-Sud	Mindemoya	244	678	36%
Man-Sud	Massey - Single Ambulance	6	557	1%
Man-Sud	Wikweikong - Single Ambulance	10	769	1%
Man-Sud	Espanola - Single Ambulance	52	774	7%
NIPISSING	Mattawa - Single Ambulance	12	311	4%
NIPISSING	NB Main Base	1052	4969	21%
NIPISSING	W Nipissing - Single Ambulance	206	1390	15%
NIPISSING	NB Ferris- Single Ambulance	26	1521	2%
Sault	Garden River - Single Ambulance	7	539	1%
Sault	Old Garden River Road	1663	9297	18%
Timiskaming	Englehart- Single Ambulance	34	525	6%
Timiskaming	Kirkland Lake	564	1231	46%
Timiskaming	Temiskaming Shores	269	1355	20%

Algoma EMS features two bases with a high-risk profile, and one base with a moderate risk profile – Elliot Lake, Thessalon and Blind River respectively. Algoma's Thessalon base deploys a single daytime (12 hour) ambulance, and in 2012 faced 198 overlapping call events representing 37% of its Code 3-4 call volume. The multi-ambulance (daytime) Elliot Lake base faced 1,085 overlapping call events representing 59% of its Code 3-4 call volume. Blind River faced 36 overlapping calls impacting 6% of its Code 3-4 call volume.

Cochrane EMS oversees three multi-ambulance bases (daytime) with a high percentage of Code 3-4 call volume impacted by overlapping Code 1-2 calls – Kapuskasing, Iroquois Falls and Timmins. The single ambulance Hearst base deals with 7% of its annual emergency calls being negatively impacted by Code 1-2 overlapping transfers.

Parry Sound EMS has one base that is significantly impacted – the Parry Sound base with two daytime (8 and 12 hour) deployed ambulances. At the Parry Sound base, overlapping Code 1-2 non-urgent transfers negatively impact approximately one-in-ten emergency calls.

Manitoulin-Sudbury EMS deals with significant overlapping call burdens at two multi-ambulance (daytime) bases – Mindemoya (36%) and Little Current (10%). Annual 2012 overlapping call incidents at these two bases total 244 and 55 respectively.

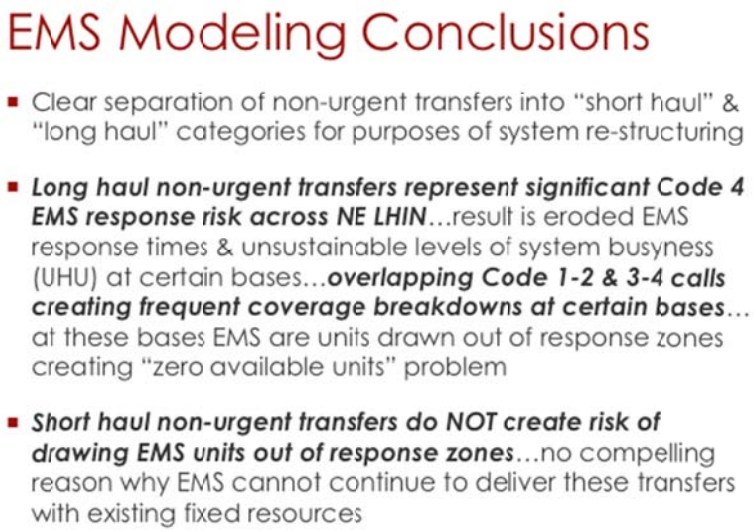
Nipissing EMS faces significant overlapping call burdens at two bases – West Nipissing (15%) and the Main Base in North Bay (21%). West Nipissing is a single-ambulance daytime deployment base, while the North Bay base is a multi-ambulance (daytime) base.

Sault EMS has an 18% rate of overlapping Code 3-4 calls at its multi-ambulance Old Garden urban base – 1,663 total calls in 2012.

Temiskaming EMS deals with significant overlapping call risk at two multi-ambulance (daytime) bases – Kirkland Lake and Temiskaming Shores. Kirkland Lake (46%) faced 564 overlapping call events in 2012. Temiskaming Shores (20%) faced 269 overlapping call events in 2012.

EMS Quantitative Modeling Conclusions

The following figure highlights relevant non-urgent patient transportation restructuring insights generated by Performance Concepts quantitative modeling of EMS data.



The IN/OUT quantitative modeling exercises have confirmed the existence of two distinct categories of non-urgent patient transfers:

- Short-haul transfers (less than an hour) that typically DO NOT require EMS units to leave their respective base emergency response coverage zones.

- Long-haul transfers (typically approaching 90 minutes or more) that DO require EMS units to leave their base's emergency response coverage zones for extended periods of time.

The risk profile associated with long-haul non-urgent transfers is significant – impacting EMS emergency performance across the North East LHIN. Risk associated with daytime EMS system busyness, and emergency coverage breakdowns, spikes at certain bases across the LHIN.

In contrast, short-haul non-urgent transfers delivered by EMS create materially less emergency coverage risk; there is no quantitative modeling case that justifies the replacement of efficient fixed-cost ambulances executing this medically necessary work within the local communities covered by their existing bases.

Patient Escort Costing Analysis

The table on the next page contains three costing scenarios developed by the Performance Concepts project team regarding community hospital costs associated with the provision of patient escorts for long-haul non-urgent patient transfers.

The costing scenarios are modeled using the following formula:

1. Compile 2012 EMS Code 1-2 and up-coded Code 3 long-haul transport hours/volumes by hub;

2. Multiply a patient escort "in hospital" time estimate (4/5/6 hour scenarios) by the hub's long-haul call volume to calculate total annual "in hospital" patient escort hours;

3. Add total long-haul transport hours to total "in hospital" escort hours for each hub (yielding total required patient escort hours);

4. Multiply total required patient escort hours by a $45/hour cost factor to establish a total patient escort costing for each hub, across each of the three costing scenarios.

The three costing scenarios yield an estimated annual community hospital patient escort cost range of $1.82 M to $2.48 M, using the 2012 long-haul patient transfer volumes/hours modeling data already cited in this report.

Community Hospital Patient Escort Costing Scenarios

	2012 "Long Haul" Transfer Volumes (Code 1-2 & Upcoded 3)	2012 "Long-Haul" Transport Hours (Code 1-2 & Upcoded 3)	2012 "In Hospital" Patient Escort Hours (Estimated at 6 Hours per Transfer)	Total Required Patient Escort Hours	Estimated Cost Per Escort Hour	Total Cost
Sudbury	2,790	4,357	16,740	21,097	$45	$949,365
North Bay	974	939	5,844	6,783	$45	$305,235
Sault	589	1,015	3,534	4,549	$45	$204,705
Timmins	2,003	3,510	12,018	15,528	$45	$698,760
New Liskeard	1,012	1,211	6,072	7,283	$45	$327,735
Total	7,368	11,032	44,208	55,240		$2,485,800

	2012 "Long Haul" Transfer Volumes (Code 1-2 & Upcoded 3)	2012 "Long-Haul" Transport Hours (Code 1-2 & Upcoded 3)	2012 "In Hospital" Patient Escort Hours (Estimated at 5 Hours per Transfer)	Total Required Patient Escort Hours	Estimated Cost Per Escort Hour	Total Cost
Sudbury	2,790	4,357	13,950	18,307	$45	$823,815
North Bay	974	939	4,870	5,809	$45	$261,405
Sault	589	1,015	2,945	3,960	$45	$178,200
Timmins	2,003	3,510	10,015	13,525	$45	$608,625
New Liskeard	1,012	1,211	5,060	6,271	$45	$282,195
Total	7,368	11,032	36,840	47,872		$2,154,240

	2012 "Long Haul" Transfer Volumes (Code 1-2 & Upcoded 3)	2012 "Long-Haul" Transport Hours (Code 1-2 & Upcoded 3)	2012 "In Hospital" Patient Escort Hours (Estimated at 4 Hours per Transfer)	Total Required Patient Escort Hours	Estimated Cost Per Escort Hour	Total Cost
Sudbury	2,790	4,357	11,160	15,517	$45	$698,265
North Bay	974	939	3,896	4,835	$45	$217,575
Sault	589	1,015	2,356	3,371	$45	$151,695
Timmins	2,003	3,510	8,012	11,522	$45	$518,490
New Liskeard	1,012	1,211	4,048	5,259	$45	$236,655
Total	7,368	11,032	29,472	40,504		$1,822,680

F. Situation Analysis – Funding, Governance & Decision-Making

System Funding re. the Non-Urgent Patient Transportation System

The funding of non-urgent patient transportation is not consistent across the Province. In recent years, *urban Ontario has been steadily evolving towards a hospital-funded model*. Both community hospitals and secondary/tertiary hospitals in urban Ontario have funded private sector patient transfer services. Private sector contractors are a necessity, given the inability of overburdened urban EMS providers to deliver timely/dependable non-urgent transfer services. Community hospitals are funding the transportation and escort costs of their "treat and return" patients, while secondary/tertiary hospitals are funding post-procedure patient repatriation for their own patient flow reasons. Urban hospitals across Ontario are somehow finding non-urgent transfer funding within their existing base budgets - budgets that do not have a designated "line item" for this service.

Urban hospital funding of non-urgent patient transfers already exists in the North East LHIN – at Health Sciences North and the North Bay Regional Health Centre. This funding is predominantly directed towards short-haul transfers that create positive patient flow impacts for these hospitals.

Consortiums of hospitals are banding together in some parts of Ontario to provide efficient and consistent private contractor purchasing arrangements and pricing. As an example, a recent initiative in the Southwest LHIN has generated a high-quality fee-for-service single contractor model. Contractor staff qualification and vehicle configuration service levels have been standardized across the Southwest LHIN.

Large hospitals in the Southwest LHIN are making use of the contractor to secure timely, dependable rides for patients. However, smaller community hospitals reportedly cannot find budget room to utilize the fee-for-service private contractor, and are instead opting for continued "free" ambulance transfers. The Southwest LHIN's hospital funded model is demonstrating that small hospitals with limited budgets may opt for "free & fast" EMS transfers via up-coded Code 3

requests from some physicians. A LHIN subsidy for small hospitals would seem to be required for them to secure non-paramedic transfer resources. Potential costs for small community hospitals could be reduced by controlling the required number of escort staffed transfers. Reinvested patient escort financial savings could be used to partially fund non-paramedic contracted providers.

A *"non-urgent transfer-provider" funding model* represents a viable/preferred alternative to the urban hospital funded model. Presumably, a transfer-provider funding model could support unavoidable and necessary EMS paramedic costs associated with non-urgent transfer up-staffing to preserve Code 3-4 coverage. A transfer-provider funding model could also support an EMS non-paramedic transfer model, a private sector provider model, or innovations like the Sudbury EMS (paramedic staffed) non-ambulance flow car.

In one scenario, a non-urgent transfer-provider based funding model could stand independently, not requiring business process changes or improvements at participating hospitals. In a status-quo transfer-provider funding model, non-urgent transfer rides in the North East LHIN would continue to chase scheduled procedures arranged by hospitals in a separate silo. The funded non-urgent ride would be a reactive "one-off" arrangement to accommodate a separately scheduled procedure at a hub hospital for a single patient. It should be noted that this reactive "chase the single patient" model has historically eroded EMS capability to service non-urgent transfers.

Alternatively in a second scenario, a non-urgent transfer-provider funding model could be integrated with new/restructured business processes to improve the cost-effectiveness of non-urgent patient transportation. Business process improvements could reduce the dollar amount of a front-end financial investment by creating ongoing capacity for multiple patients on the same vehicle during transport. The practice of "chasing the scheduled procedure" with a last minute scheduled ride could be re-assessed. Non-transportation process changes as per the North West LHIN's Thunder Bay "holding areas" pilot could eliminate stranded patients/escorts and achieve financial savings.

In essence, a non-urgent transfer-provider funding model would become a critical component of a *broader non-urgent transportation change management initiative*. Performance indicator derived results targets, transparent results reporting against targets, and a fee-for-results service level contract would become part and parcel of the provider based funding model.

Long-Haul System-Wide Planning & Operations Using Key Performance Indicators

The current non-urgent patient transportation "system" is characterized by a series of independent, non-integrated business processes. For example:

- Absence of a staffed LHIN-wide "nerve centre" mandated to provide integrated planning, operational steering & results reporting. A nerve centre could coordinate the procedure scheduling and long-haul transportation provision sides of the non-urgent patient care line of business. Allocation of the "right" transportation vehicle solution, using a consistent patient algorithm, could be achieved across LHIN hospitals.

- Absence of system-wide, reliable performance measurement data to inform long-haul system planning, operational steering, and results reporting. The current ADRS data system used by MOHLTC to collect/report ambulance Code 1-4 call data from across the province (originally populated with local CACC dispatch data) is clearly inadequate for system planning and reporting purposes. Key Performance Indicators (KPI) of service delivery unit costs, process execution, and quality for patients do not yet exist - although beginning steps towards performance measurement were required by the LHIN as part of the three 2013 pilot projects. Given the absence of KPI, future performance targets derived from historic data trends do not yet exist. A public, transparent results report card to share performance data and drive continuous improvement also does not exist.

Performance Concepts Consulting has developed the following set of Key Performance Indicators (KPI) to inform future stakeholder discussion/finalization of results based business planning and reporting.

Service Delivery Outputs & Efficiency

a) Annual Code 1-2 long-haul transfers by LHIN funded route leg (3-year trend lines)
   - # long-haul Code 1-2 transfer patients delivered
   - # "on the road" long-haul transfer vehicle hours delivered versus planned
   - UHU by long-haul route leg (% deployed vehicle hours spent delivering patients)
   - % stretcher "seats" occupied for each long-haul route/leg
   - Cost per deployed long-haul transfer vehicle hour
   - Cost per delivered long-haul transfer hour
   - Cost per long-haul transfer patient

Business Process Execution

b) % Code 1-2 long-haul land transfers where patient arrives on-time for the test/procedure - as originally scheduled (3-year trend line)

c) % Code 1-2 long-haul transfers featuring patient delivery without a hub hospital mandated patient escort (3-year trend line)

d) Patient escort hours per 100 long-haul transfer patients (3-year trend line)

Patient Impact

e) % Code 1-2 long-haul transfers featuring "same day" return of patient to original community hospital/LTC facility by no later than 8 p.m. (applied only to "treat and return" transfer patients)

This portfolio of KPI will provide a comprehensive "dashboard" for planning and monitoring of the long-haul non-urgent patient transfer system. The amount/cost/utilization of transport service will be tracked. The on-time success rate will be tracked. The performance of the system in generating cost reduction via reduced use of patient escorts will be tracked – a key non-transportation change management challenge. Finally, patient impact will be tracked by monitoring the overall length of the "treat and return" cycle – a critical element of the overall patient experience.

Short-Haul Transfers - Key Performance Indicators

Short haul non-urgent transfers delivered by EMS also require performance measurement tools that can be implemented for system management and accountability reporting. *The key is to measure EMS system performance benefits generated by freeing up vehicle hours of service previously consumed by long-haul non-urgent transfers.* EMS Code 3-4 response time reductions, and reduced UHU are examples of relevant indicators. EMS cost per transfer hour delivered is also a meaningful efficiency indicator.

Horizontal Leadership & Policy-Making Authority

To date, the non-urgent patient transfer system across the North East LHIN has been composed of a range of health care actors budgeting and operating within vertical silos. The non-urgent "system" has actually been a non-system with little horizontal co-ordination talking place. This silo-based reality is not unique to North East Ontario; it is the norm across most of the province. The non-urgent patient transportation *line of business* has not been recognized as such, nor has it been managed or funded with the focus necessary to ensure success. Stakeholders recognize this problem, and the need for dedicated leadership and policy-making.

On a positive note, then NE LHIN's three 2013 pilot projects have succeeded in building the beginnings of coordinated operations and cohesion among the 30+ EMS and hospital actors. However, leadership and policy-making are not yet properly structured/focused to provide the necessary *horizontal system leadership and management.*

In order to provide *horizontal* system-wide leadership, community hospitals, hub hospitals, EMS, ORNGE, CACCs and private sector providers will need to work together in a flexible, non-bureaucratic setting. *An empowered working group (staffed by senior management) would be ideal; with an overriding patient-centred mandate to provide leadership on planning, policy-making and operational levels.*

G. Findings & Recommendations

Findings and recommendations have been organized into the following categories:

1. New Operational Model
2. Hospital Based Business Process Improvements
3. System Leadership, Policy & Decision-Making
4. System Funding
5. Stakeholder Communications
6. Implementation Critical Path

1. New Operational Model

The recommended new operational model is evidence-based; it draws from the IN/OUT, UHU, and overlapping calls modeling. The new operational model recognizes the data-supported existence of distinct short-haul and long-haul non-urgent transfer clusters. The new model addresses long-haul transfers – leaving the existing land ambulance-based delivery approach (dispatched by CACC) intact for short-haul transfers. The new long-haul model is derived from Performance Concepts' quantitative evaluation of the current transfer system's performance problems. The new model is consistent with many of the improvement insights provided by the 2013 pilot projects.

The key components of a restructured operational model for non-urgent transportation are recommended as follows:

1-1 Short-haul Code 1-2 transfers should continue with EMS & private contractors across the LHIN. CACCs and/or hospitals will continue to dispatch these transfers according to the existing processes.

1-2 Long-haul Code 1-2 transfers to be delivered via a new blend of EMS non-paramedic multi-patient vehicles, paramedic flow cars, potential contracted private transfer services and "dead head" ambulance units (across the entire LHIN).

1-3 Long-haul Code 1-2 transfers to be delivered via regularly scheduled transfer legs/routes and multi-patient transfer vehicles (recommended detailed routes outlined across all 5

LHIN hospital transportation hubs). Routes should be designed to move patients into hub hospitals and return them to community hospitals in a timely, cost-effective and predictable fashion.

1-4 *The following specific two-way routes/legs are recommended for the restructured operational model. The recommended initial resource deployment can be refined subject to an initial period of operations – for instance weekend routes can be considered if patient volumes merit additional transport capacity beyond current EMS and non-ambulance resources. Split shifts can also be implemented as required on 8-hour routes.*

ROUTE LEGS	Route Length	Vehicle Load	Forecast Service Hours
1. Elliot Lake to Espanola	95km	Dual Stretcher	M-F 8 hours (2,080 annual hours)
2. Mindemoya to Little Current to Espanola	91km	Dual Stretcher	M-F 8 hours (2,080 annual hours)
3. Espanola to Sudbury Corridor	70km	3-4 stretcher	M-F 12 hours (3,120 annual hours)
4. North Bay to Sturgeon Falls to Sudbury	129km	3-4 stretcher	M-F 12 hours (3,120 annual hours)
5. Kapuskasing to Smooth Rock Falls to Timmins	166km	3-4 stretcher	M-F 12 hours (3,120 annual hours)
6. Timmins to Matheson to Iroquois Falls to Cochrane	224km	3-4 stretcher	M-F 12 hours (3,120 annual hours)
7. New Liskeard to Englehart to Kirkland Lake to Matheson	195km	3-4 stretcher	M-F 12 hours (3,120 annual hours)
8. Blind River to Thessalon to Sault Corridor	145km	Dual Stretcher	M-F 8 hours (2,080 annual hours)

1-5 *In addition to the eight scheduled non-urgent transportation routes, the following transportation service level and staff configuration adjustments are recommended:*

a) *Expand the annual operating hours of the current North Bay Regional Health Centre dual stretcher/wheelchair transfer vehicle to 12 hours M-F. The added 4 hours per*

day (1,040 annual hours) would be delivered as long-haul non-urgent transfer hours. Based on North Bay hospital forecasts, these long-haul transfer hours may be re-deployed on weekends and adjusted on selected weekdays.

b) *Reconfigure the staffing of the Sudbury EMS non-ambulance community flow car to consist of a primary care paramedic (PCP) and a non-paramedic driver attendant qualified in advanced first aid. This configuration will have a lower unit cost compared to the 2013 pilot project, while still providing paramedic capability as required. The 12-hour, 7 days/week deployment pattern would remain unchanged*

c) *Deliver the relatively low annual volume of Chapleau Hospital - Timmins & District Hospital long-haul Code 1-2 transfers using existing EMS ambulance resources (funded as per 1-6 b) below).*

1-6 *Given the somewhat unique out-of-LHIN pattern of non-urgent IN/OUT transfers associated with the West Parry Sound Health Centre (i.e. south-bound referral patterns), the following service delivery/funding recommendations are appropriate:*

a) *Parry Sound EMS ambulances should continue to provide long-haul Code 1-2 non-urgent transfer services for patients at WPSHC. Due to annual transfer volumes/patterns, this service will not be route based, but will continue the existing "one off" reactive transportation model now in place.*

b) *EMS up-staffing costs associated with providing required Code 3-4 coverage during WPSHC long-haul Code 1-2 non-urgent transfers will be funded as per the recommended non-urgent transportation provider-based funding model. This unique funding component should be tied to an MOU setting out performance indicator derived results targets, and annual results reporting requirements.*

1-7 *Performance Concepts has considered long-haul transfer vehicle staffing and equipment configuration options from a risk management perspective*.

a) *The following staffing configuration options are recommended for detailed review by the Leadership Working Group (see Recommendation 3-1) during the upcoming implementation phase of restructuring:*

Risk Tolerance A (Highest)	Risk Tolerance B	Risk Tolerance C	Risk Tolerance D (Lowest)
2 Driver Attendants	1 Driver Attendant 1 PSW/RPN	1 Driver Attendant 1Paramedic	For 3 patient vehicles: 1 Driver Paramedic PSW/RPN

b) *Although qualifications for Paramedics, PSWs and RPNs are well established, there are none for the proposed Driver/Attendant. At a minimum, all employees of the transfer service should feature the following:*

- *Vulnerable Persons Background Check*
- *Class F Driver's License with a clean driving record*
- *Immunization for Hepatitis and Influenza*
- *First Aid, CPR and AED certification*
- *Training for stretcher, stair chair and oxygen delivery equipment use and maintenance*
- *Training for safe movement, handling and positioning of patients*
- *Training in basic response procedures in the event of a medical emergency during transport*
- *Training in use of communications equipment*
- *Training in documentation requirements*
- *Training in basic isolation precautions*
- *Training in WHMIS, infection control and vehicle/equipment cleaning*

c) *For <u>all</u> of the risk-based staffing configurations the following vehicle equipment inventory is recommended*:

- *Stretcher(s) and certified mounting system(s) (Bariatric capability if deemed necessary).*
- *Stair Chair*
- *Linen and Blankets (sufficient quantities to exchange after each transfer)*

- *Toileting Supplies (Bed pan(s), urinal(s), toilet paper, wipes, one each for every patient normally carried)*
- *Basic disinfection and cleaning supplies*
- *Fire extinguisher*
- *Winter Survival Kit*
- *Radio communicating on provincial CACC frequencies, and cellular telephone*
- *AVL (automated vehicle locating) technology to allow immediate location confirmation*
- *First Aid kit*
- *Automated External Defibrillator*
- *Bag/Valve/Mask manual resuscitator (single use) and oral airways*
- *"M" Oxygen Cylinder, Regulator and Flowmeter*
- *"D" Oxygen Cylinder, Regulator and Flowmeter for transportation to and from hospital*

d) *For moderate risk vehicle staffing configurations, the following equipment should supplement the basic equipment listed above*:

- *Blood Pressure Cuff and Stethoscope*
- *Pulse Oximeter*
- *Isolation Supplies*
- *Portable Suction and accessories*
- *Selection of oxygen administration supplies*

e) *For higher risk vehicle staffing configurations, the following equipment should supplement the basic equipment listed above*:

- *Monitor/Defibrillator (instead of AED)*
- *Symptom Relief Medications and Glucometer*
- *BLS Response Kit*
- *C-Spine Collars (potential patients encountered)*
- *CPAP*

f) The process for setting long-haul "within vehicle" staffing and equipment configurations should address the northern/remote risk factors found across the North East LHIN's long-haul transfer environment:

- *Inclement winter weather*
- *Long transfer route distances/travel times*
- *Isolation from hospitals during transfers*

The current non-urgent patient transportation system across the North East LHIN suffers from a lack of coordination across hospital based test/procedure scheduling processes, and the CACC/EMS process for delivering timely/reliable transportation. The following recommendations address this fundamental "no air traffic controller" system management problem.

1-8 Create a North East "Coordination Centre" for long-haul non-urgent transportation system management that integrates the parallel processes of non-urgent procedure/test scheduling and patient ride scheduling.

a) Coordination Centre staffing/administration ideally delivered by a single CACC for the entire North East region under a fee-for-service contract. A multiple CACC delivery option for the Coordination Centre function can be considered by the Leadership Working Group, with an onus on rigorous guarantees by CACCs to deliver seamless system planning/delivery not impacted by CACC EMS dispatch boundaries.

b) The Coordination Centre will provide leadership region-wide with hub hospital patient flow teams, EMS and non-EMS transfer providers, and other North East CACCs.

c) South West LHIN ride selection algorithm to be adopted & adjusted for internal use by CACC Coordination Centre staff with no requirement for community hospital staff to decide on patient transport mode using the algorithm.

d) Coordination Centre dispatches all long-haul non-ambulance non-urgent transfer vehicle resources & flows any ambulance dead head rides to CACCs.

1-9 Utilize information technology tools to integrate system operations data for both test/procedure scheduling and ride provision.

a) Construct a web hosted database/application for community & hub hospitals across the LHIN to ***document scheduled "long-haul" non-urgent procedures/tests****.*

b) *Ensure functionality so scheduled tests or procedures can be viewed (i.e. forwarded to) Coordination Centre CACC staff for purposes of reserving space for the patient on the applicable non-urgent transfer vehicle and route.*

c) *Build functionality into the web hosted database/application for community & hub hospitals across the LHIN to* ***view available non-urgent transfer route "open seats"*** *when scheduling procedures/tests, thereby ensuring a match between scheduling slot and ride.*

2. Hospital Based Business Process Improvements

Non-urgent patient care restructuring is a change management challenge that extends beyond the logistics of ride provision. Hospitals and physicians will need to review and adjust existing patient discharge practices (and other internal business process) to make a schedule driven long-haul non-urgent patient transportation system work. Transportation restructuring and internal hospital business process refinements will need to proceed in a coordinated, parallel fashion.

The need for hospital driven change management extends to community hospital/hub hospital patient care and control processes. Stakeholders from EMS, community hospitals and hub hospitals have all acknowledged that the current community hospital patient escort system approach (mandated by hub hospital policies) is not cost-effective. Therefore the following "care and control" recommendation is offered:

2-1 Phased implementation of hub hospital staffed "holding areas" for non-urgent transfer patients (building on the Thunder Bay pilot project approach underway in the North West LHIN). Pilot "holding area" to feature the following:

a) *Initial pilot site selection/implementation by Q3 2014/15*

b) *Holding area hub hospital staffing funded by community hospitals experiencing reduced patient escort spending (i.e. savings).*

c) *Track patient escort savings to partially fund hub hospital "holding areas" in the longer term after pilot project ends.*

d) *Secure estimated 20% reduction in patient escort expenditures across NE LHIN community hospitals in Year 1 of pilot, via reduced duration of long-haul transfers.*

e) *Secure estimated 90% reduction in patient escort expenditures across NE LHIN community hospitals (3 year timeframe), as holding areas are completely implemented and hub hospital mandated patient escorts are eliminated*.

3. System Leadership, Policy, & Decision-Making

The current non-urgent transportation system is beginning to evolve away from a vertical, silo-based "non-system" that has not served patients well. The 2013 pilot projects have been instrumental in highlighting the benefits of an integrated approach to patient transportation. In order to address the need for integrated, "system based" management of non-urgent patient transportation (i.e. eliminating silos), the following recommendations are made concerning leadership, policy, and decision-making.

3-1 *Create a permanent North East Non-Urgent Transportation Leadership Working Group*

a) *Representation could include the Coordination Centre CACC, 5 transfer hub hospitals, 5 rotating transfer intensive community hospitals (one per hub), all contracted long-haul transfer providers, and 1 EMS short-haul transfer liaison.*

b) *Implement system-wide data management reforms to improve on existing inadequate ADRS/EPCR data sets. Use data for business planning and performance measurement/reporting.*

c) *Adopt results-based system planning, featuring an annual long-haul transportation business plan with performance indicator derived targets. Do so by operationalizing*

the Key Performance Indicators (KPI) included in this report. Compile performance trends in a publicly reported dashboard.

d) *Establish risk-based long-haul transfer vehicle staffing configurations (i.e. policy) for each proposed route/leg.*

e) *Establish vehicle equipment configurations (i.e. policy) for each proposed route/leg based on the risk management approach noted above.*

4. System Funding

The North East LHIN should implement a new "hybrid" funding model for non-urgent patient transportation consisting of the following components:

4-1 *"Status quo" EMS cost-shared funding for Code 3-4 emergency coverage and short-haul Code 1-2 transfers.* This recommendation will have no budget impact on EMS services unless their governing bodies choose to cancel highly utilized ambulance transfer resources being replaced as per this review's recommendations.

4-2 *"Status quo" hospital funding arrangements for short-haul non-urgent transfers delivered via i) the contracted provider at Health Sciences North, and ii) the non-paramedic transfer vehicle operated by North Bay Regional Health Centre.* Health Sciences North will no longer be required to fund long-haul transfers using its contracted provider (i.e. service capacity to be dedicated to short haul work exclusively within the City of Greater Sudbury).

4-3 *A new "non-urgent transfer provider" funding model should be put in place to fund long-haul Code 1-2 transfers across the North East. Funding will be based on the annual number of scheduled/deployed vehicle hours for designated transfer leg routes recommended across the region. Providers will be selected for a multi-year term – most likely by way of an open RFP process.*

4-4 *ORNGE should work collaboratively with Sudbury EMS, the CACC and MOHLTC to identify and implement opportunities re. Sudbury EMS paramedic community flow car services (i.e. non-ambulance) to/from Sudbury airport. Discussions could reflect potential operational savings at ORNGE and flow car funding arrangements.* Prompt flow car service to/from the airport will replace the existing "best efforts" by Sudbury EMS ambulance resources that have historically resulted in significant delays in delivering non-urgent patient transportation. The enhanced Sudbury EMS flow car service delivery model will execute timely paramedic-to-paramedic patient hand-offs at the airport. The recommended Sudbury flow car service delivery arrangement would be a unique solution featuring an enhanced non-ambulance paramedic service level that does not apply to traditional land ambulance "best effort" airport tarmac service levels delivered at airport tarmacs across the Province.

Tracking System Financial & Operational Efficiencies: The execution of this review has made it clear that the current mix of EMS, ORNGE and hospital data collection systems do not provide for easy system performance monitoring. However, system efficiency tracking will be important to steer ongoing restructuring decisions, and establish system funding mechanisms that re-invest a portion of identified cost savings associated with restructuring. Information system refinements/integration will be necessary to support the following recommendation:

4-5 *The recommended Leadership Working Group should document future system financial and operational efficiencies from restructuring and apply these efficiencies and savings (in part) to future initiatives where appropriate. Efficiencies could be derived from the following:*

a) *EMS vehicle hours traditionally used for non-urgent transportation that are freed-up for emergency response or redeployed for other emerging health care priorities such as community paramedicine.*
b) *EMS operating costs traditionally associated with non-urgent transportation in high volume transfer legs that have been identified by District Service Boards to generate financial savings.*

c) *Community hospital **patient escort savings** associated with shorter non-urgent transfer durations generated by the more dependable and timely route based long-haul system (i.e. fewer escort hours).*

d) *Community hospital **patient escort savings** associated with increased volume of transfers not requiring an escort once hub hospital holding areas are implemented (i.e. fewer escort trips).*

5. Stakeholder Communications

In order for non-urgent patient transportation restructuring to be successfully implemented, stakeholder business rules and practices will need to be changed. Clear and concise communication with stakeholders will be critical. The overall objectives, new operational realities, and new business rules concerning restructuring will need to be clearly communicated. Clear unambiguous communication regarding the restructuring process will allow EMS, CACC, hospital administrative staff, nursing staff and physicians to adjust accordingly. The following recommendations should guide subsequent communication activities/efforts.

5-1 *A comprehensive communications plan should be developed by the newly formed Leadership Working Group, as part of the overall implementation plan for non-urgent patient transportation restructuring. The communications plan should consider the following:*

Objectives

- *To use a variety of approaches and tactics to ensure that all target audiences understand how the change process will affect them.*

- *As the restructuring occurs, to develop communications mechanisms that allow for two-way information flow so that necessary adjustments can be made in a timely manner.*

Key Messages

- HEALTH CARE PARTNERS ARE IMPROVING ACCESS TO CARE WHEN AND WHERE IT'S NEEDED – This restructuring plan recommends a model that meets the needs for timely, safe and cost-effective non-urgent patient transfers into and out of hub hospitals in North East Ontario, while safeguarding needed EMS coverage in communities across the region.

- PREPARING FOR AN AGING POPULATIONS AND CLINICAL INTEGRATION MODELS - This plan complements other activities to positively transform the health care system to care for Northerners. This review responds to changing population demographics, and the implementation of clinical integration models that require timely emergent and non-urgent transportation systems be in place to support the movement of patients into and out of the hub centres. The North East LHIN's 2013-2016 Integrated Health Service Plan focuses on strategies to integrate and realign the local health system to better care for Northerners, particularly the region's older adults and frail elderly.

- COLLABORATION IS CRITICAL – Key project partners included all 25 NE LHIN hospitals, 41 LTCHs, 8 EMS services, ORNGE, 5 Central Ambulance Communication Centres. A transparent evidence-based process was used to assess the current non-urgent transfer system in the North East, make recommendations for a future model and implement the model going forward.

- RECOMMENDATIONS ARE PATIENT/PEOPLE-FOCUSED – These include: timely access to services for patients; improved patient experiences with non-urgent transfers to and from acute care facilities or to/from hospitals and LTCHs; decreased pressures in EDs, EMS and inpatient units related to patients awaiting timely transfers; sustainability of emergency medical services in all communities.

Target Audiences and Stakeholders

- The public and users of the health care system.
- Organizations partnering in the review and its implementation – EMS, hospitals, DSSABs, CACCs, etc.
- Health service providers (acute, long-term care, community, primary care, CCAC) and administrative leadership across the NE LHIN region.
- Health professionals – including physicians, paramedics, hospital nursing staff and social worker.

6. Implementation Critical Path

Performance Concepts Consulting has considered implementation priorities for restructuring non-urgent patient transportation according to the following critical path timeframes:

- Do NOW
- Do SOON
- Do LATER

This phased rollout approach is expressed in the 3-year implementation critical path set out below (next page). Do NOW work focuses on establishing the new decision-making and system management units – the Leadership Working Group, the Coordinating Centre and a dedicated project management resource to drive the restructuring agenda forward.

Do SOON work will address the start up challenges of the new operational model, including the RFP process for selecting route leg providers. Budget development, data management also fall into this timeframe.

Finally the Do LATER period will feature the roll out of hospital business process changes around patient "care and control" holding areas expected to generate significant savings in community hospital patient escort costs.

It should be noted that the implementation critical path for the recommended "long-haul" non-urgent transportation model will need to be coordinated with action items emerging from the North East LHIN's recently completed Clinical Services Review (CSR). To effectively implement the clinical integration models recommended in the Clinical Services Review requires that responsive and timely emergent and non-urgent transportation systems be in place to support the movement of patients into and out of the Hub centres. The CSR and Non-Urgent Patient Transportation Review are complementary projects aimed at providing the best care to the region's residents at the right place and right time.

Long-Haul Patient Transportation Restructuring Implementation Critical Path	Activity Description	Year 1 Q1	Year 1 Q2	Year 1 Q3	Year 1 Q4	Year 2 Q1	Year 2 Q2	Year 2 Q3	Year 2 Q4	Year 3 Q1-4
New Operational Model										
Roll-out Restructuring Communication Plan	Inform & motivate key stakeholders									
Secure Dedicated PM Resource to Oversee Implementation	Critical success factor to drive restructuring	■								
Leadership Group Establishes Route Staffing Configurations	Risk based staffing configurations reflecting Northern realities									
Leadership Group Establishes Vehicle Equipment Configurations	Risk based staffing configurations reflecting Northern realities									
Select Coordination Centre CACC...Including Fee for Service Contract	Single CACC for LHIN generates integrated system management	■								
Start-up Staffing & Operationalize Coordination Centre...Including IT tools	Coordination Centre start-up staffing estimated 2-3 FTE		■	■						
Establish Proposed Transfer Route Details/Schedules	Key decision is how many daily runs across the various legs		■							
Design RFP...Content & Process	Key workload item for Dedicated PM resource		■							
Execute RFP Process	Key workload item for Dedicated PM resource			■	■					
Oversee RFP Bid Evaluation & Select Contracted Route Provider(s)	Key workload item for Dedicated PM resource				■					
Establish Route Provider(s) Service Level Agreements	Endorsed by Leadership Working Group					■				
Negotiate N. Bay Transfer Car Expansion	Ongoing funding for 4 hours/day via Provider Funding model		■							
Devise Espanola Transfer Site Solution	Necessity to make the 2-part trips into/out of Sudbury work			■	■					
Phased Implementation of Priority Transfer Legs	Selection of priority legs by Leadership Working Group						■	■	■	
Hospital Based Business Process Improvements										
Evaluate T-Bay Pilot Results & Lessons Learned	Lessons Learned will define Pilot Project deliverables/approach	■	■							
Select "Holding Area" Pilot Hub Hospital & Community Hospitals	Leadership Working Group to endorse selected Pilot Hub		■							
Design & Execute "Holding Area"Ppilot...Document Findings	Ongoing monitoring of Pilot...establish a pilot working group					■	■			
Execute Necessary Capital Rennovations at Hubs for Holding Areas	TBD							■	■	
Rollout Refined Holding Area Model Across Remaining Hub Hospitals	Phased implementation									■
Leadership, Policy & Decision-making Model/Tools										
Strike the Leadership Working Group	Pressing early priority	■								
Refine & Finalize KPIs	Critical for longer term planning & reporting			■	■					
Prepare 2015 Budget/Business Plan...Including Targets	Will dovetail with RFP pricing submissions			■						
Design Process for Tracking System Efficiencies	Critical to establish NET budget funding requirements from LHIN		■							
Arrange for Re-configured Sudbury Flow Car (One Paramedic)	Sudbury EMS aware configuration changes needed longer term		■							
Coordinate ORNGE Funding Collabortion for Sudbury Flow Car	A portion of ORNGE cost savings can be utilized		■							
Oversee Establishment of Parry Sound Long-Haul Funding Contract	Part of Provider Funding model...upstaffin costs for EMS			■						
Establish Coordination Centre Multi-year Budget/Staffing Requirement	Pressing Early Priority	■								
Oversee Nerve Centre Algorithm Refinement	Work with Nerve Centre CACC			■						
Oversee Long-Haul Report Card Style Public Reporting	End Result of KPI work and data tracking improvements						■			
System Funding Reform										
Finalize 2014 Bridge Funding Arrangements for Pilots	Pressing Early Priority	■								
Develop 2015 Budget Based on P. Concepts Costing Submission	Linked to RFP & confidential costing analysis			■	■					
Adjust 2015 Budget Based on RFP	Final budget to trigger route based payment flows				■					
Stakeholder Communications										
Oversee Development of Rollout Communication Plan	Leadership Working Group to endorse the plan/tactics etc.	■								
Data Based Toolkit Using P. Concepts Modeling	Visual toolkit...data driven...the evidence based story	■								
5 Hub Briefing/Working Sessions to Promote Restructuring Understanding	Critical to build buy-in & stakeholder operational awareness	■	■							
Web Based Critical Path Implementation Tool to Drive/Monitor Progress	The online project storyline & progress scoreboard		■							
LHIN Wide Physicians Workshop/Interactive Session	Critical to harmonize patient discharge & route scheduling		■							
Implementation Critical Path & Execution										
Designated PM Resource to Refine Critical Path Content & Timing	Critical path refinement & updates will prove necessay									

H. APPENDICES

#1 – Definitions of Land Ambulance Dispatch Codes 1-4

#2 – Terms of Reference and Membership of the Non-Urgent Patient Transportation Review Project Advisory Committee

APPENDIX #1

Priority Codes

The priority codes are used to identify:
a) the urgency of a response or transport
b) other use of an ambulance when a patient is not carried

Dispatch Priority Code
This is the priority code number that is assigned to the call by a dispatcher. It identifies the priority under which the ambulance responds to the call location (e.g. an urgent response would be entered as a Code "4"). Enter the appropriate Priority Code that corresponds to the assigned dispatched priority.

Code 1	**"Deferrable"** – a routine call that may be delayed without being detrimental to the patient (e.g. a non-scheduled transfer; a minor injury).
Code 2	**"Scheduled"** – a call which must be done at a specific time e.g. because of special treatment or diagnostic facilities are available at a specific time (e.g. inter-hospital transfers for MRI, a scheduled meet with an air ambulance).
Code 3	**"Prompt"** – a call that should be performed without delay (serious injury or illness e.g. stable fracture).
Code 4	**"Urgent"** – a call that must be performed immediately where the patients "life or limb" may at risk (e.g. Vital Signs Absent patient; unconscious head injury).
Code 8	**"Stand-by"** - a call where an ambulance is dispatched to a predetermined location in order to stand-by for further call reassignment.
Code 9	**"Maintenance"** – a call where the vehicle is out of service for maintenance.

Completion of an ACR is not required for standby and maintenance calls.

APPENDIX #2

REVIEW OF NON-URGENT PATIENT TRANSFERS IN NORTH EAST ONTARIO AND DEVELOPMENT OF A NEW BUSINESS MODEL

PROJECT ADVISORY COMMITTEE

Terms of Reference

Reviewed by the Advisory Committee on June 27, 2013.

PURPOSE

The purpose of the Advisory Committee is to provide strategic guidance and input to the NE LHIN and the project consultant re. the development of a model that meets the needs for timely, safe and cost-effective non-urgent patient transfers into and out of hospital centres in North East Ontario while safeguarding needed Emergency Medical Services (EMS) coverage in communities across the region.

OBJECTIVES

The Advisory Committee's objectives will be to:

1) Assist in the completion of the major project tasks, per the Project Charter, such as providing input regarding:
    a. Analysis of the current state
    b. Identification of opportunities and challenges for a future non-urgent patient transfer business and service model
    c. Development of clinically driven process maps and transfer vehicle/staff standards
    d. Identification of integration and coordination mechanisms to support and facilitate non-urgent patient transfers in the North East
2) Suggest stakeholder consultation mechanisms and review the resulting stakeholder feedback.
3) Assist in project communications activities.
4) Review and provide feedback on the draft project report.

SCOPE

What elements are within/outside the boundaries of the project?

In Scope:

- Transportation for the following patient groups between hospitals, or from hospitals to LTCHs/patient residences:
  - Stable medical condition; and
  - Requiring a stretcher vehicle; or
  - Ambulatory or semi-ambulatory inpatients/LTC residents; or
  - Requiring a nursing or other health provider escort
- Transportation of ED patients requiring access to a schedule 1 bed or psychiatric assessment under the Mental Health Act

Out of Scope:

- Transportation for medical appointments within a community or between communities
- Addressing hospital cost pressures related to the use of professional staff during patient transportation

COMMITTEE MEMBERSHIP

The Committee membership (of no more than 15) will include representation from the key project partner sectors:

- Hospitals (large and small)
- LTCHs
- EMS Designated Delivery Agents (i.e. municipalities or DSSABs)
- Certified Land Ambulance Operators
- Central Ambulance Communications Centres
- ORNGE
- Other TBD

It is recognized that some members may have multiple roles. Committee members are not participating on behalf of their own individual organizations.

Consideration will be given to both sectoral and geographic representation in the selection of Committee members.

Ex officio members will include the MOHLTC, NE LHIN ED Physician Lead, NE LHIN staff as appropriate, and the third party project consultant.

MEMBERS

Jean Guy Belzile – Nipissing EMS
Elaine Blakeborough – Sault Area Hospital
Nancy Boody – Mattawa General Hospital
Don Brisbane – Community Member
Jean Carriere – Cochrane EMS
Heather Cranney – Canadian Red Cross
Sandra Fox – Community Member
Tracy French – Kirkland & District Hospital
Nicole Haley – Espanola Regional Hospital and Health Centre
Robin Joanisse – Sault Area Hospital
Jo-Ann Lennon-Murphy – West Nipissing General Hospital
Michael MacIsaac – Manitoulin-Sudbury EMS
Josee Mitron – Hôpital Notre-Dame Hospital (Hearst)
Joe Nicholls – City of Greater Sudbury EMS
Pierre Ozolins – St. Joseph's General Hospital (Elliot Lake)
Marc Picard – North Bay CACC
Don Pierce – Sudbury CACC
Dr. Jason Prpic – North East Base Hospital
Rob Smith - ORNGE
Grace St. Jean – Health Sciences North (Sudbury)
Jim Stewart – Nipissing EMS
Steve Trinier – Cochrane EMS
Mike Trodd – Timiskaming EMS

MOHLTC (ex-officio)

Jack Cruikshank

NE LHIN (ex-officio)

Kathleen Bain
Micheline Beaudry
Philip Kilbertus (Chairperson)
Kristen Taus

ROLES AND RESPONSIBILITIES

Members are expected to provide resources to the work of the Advisory Committee as necessary and appropriate (e.g. time, expertise, information). The NE LHIN will provide the Advisory Committee with the support of its planning resources (staff time, information, meeting logistics) as appropriate.

REPORTING RELATIONSHIP / ACCOUNTABILITY

The Advisory Committee will address its advice to the NE LHIN Chief Executive Officer.

DECISION–MAKING

Advisory Committee decisions will be based on consensus. If consensus is not possible, the chairperson may call a vote. A simple majority favourable vote of those members in attendance will be needed to resolve or approve any issue requiring a vote. A simple majority of members will constitute a quorum.

CONFIDENTIALITY

Members will respect the privacy of Advisory Committee participants and agree not to disclose information or views expressed by individuals during meetings. Deliberations should remain confidential until there is general agreement and consensus to make them public. In addition, all Committee members must agree to not disclose any other confidential information or documentation. All materials produced by the Committee will remain the property of the North East LHIN.

MEETING FREQUENCY

Monthly meetings will be held over the duration of the project with additional project activity occurring via email in between meetings.

Most meetings will be held by teleconference/video conference although 1-2 face-to-face meetings may be required (likely in Sudbury as a central location within the region).

PROJECT COMPLETION

It is expected that the Advisory Committee will conclude its work in the fall of 2013 or before.