Alberta Health Services Emergency Medical Services (EMS) Program Area Study

Final Report

January 26, 2024

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Project introduction

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Scope of the review



The EMS Program Area Study in Alberta, "the study", included an analysis of the following key program areas of the Alberta EMS system under the oversight of AHS EMS:

EMS programs

- 1. Ground and Air Ambulance IFT structures, accountabilities, processes, systems, outcomes, and opportunities.
- 2. Ground and Air NCT in Alberta, including potential opportunities for improved coordination of all non-clinical transports in the province.
- 3. Mobile Integrated Healthcare program (i.e., community paramedicine) including analysis of structure, accountabilities, processes, systems and capacity, outcomes, and opportunities.

Resourcing

- 4. Ground Ambulance Resource Capacity assessment of resource levels against a variety of response time target scenarios.
- 5. Resource allocation principles, processes, systems, and outcomes including system status management structure, accountability, processes, systems, and outcomes.

Each program was assessed against a series of hypotheses to test key program performance challenges. These were developed at the outset of the review in conjunction with AHS EMS. Assessments beyond those listed above were considered out of scope for this review, including any assessment of dispatch processes, air resource capacity, and patient outcomes.

Key components of the study included:

- System integration and EMS integration with the broader healthcare system.
- Specific findings related to relevant recommendations in Alberta EMS Provincial Advisory Committee (AEPAC) and Alberta EMS Dispatch Review (Dispatch) Reports.
- Meaningful engagement with key internal stakeholders who possess varying experiences and reflect diverse perspectives of the services provided by the relevant EMS programs.



Each program was assessed against a series of hypotheses to test key program performance challenges. This included comparison against leading practices, analysis of program data and data modeling, and internal stakeholder engagement



<u>°−;</u> −° [−] Program Area	Hypothesis
Ground and Air IFT and NCT	[Substantiated] Hypothesis 1: The IFT program is being used when there isn't a clinical justification
	[Substantiated] Hypothesis 2: There is a reliance on the IFT program for transport due to limited alternatives
	[Partially substantiated] Hypothesis 3: The IFT program does not have the appropriate level of resources and it is detracting from frontline emergency response capability
	[Substantiated] Hypothesis 4: Resources undertaking IFT can be delayed offloading patients which can impact their ability to respond to emergency events
Mobile Integrated Healthcare	[Substantiated] Hypothesis 1: The scope of the MIH program has grown. It is no longer focused solely on alleviating pressure from EMS as it also supports scheduled work
Ground Ambulance Resource Capacity	[Partially substantiated] Hypothesis 1: AHS EMS does not have sufficient resources to respond to emergency demand given the current approach
	[Substantiated] Hypothesis 2: Resources are over-utilized, which contributes to an inability for AHS to meet response time targets
Resource Allocation and Deployment (SSM)	[Substantiated] Hypothesis 1: Resources are not optimally deployed to meet response times
	[Unsubstantiated] Hypothesis 2: SSM inappropriately draws on rural

Key takeaway: This hypothesis driven approach provides Alberta with program specific observations and opportunities that are based on targeted research, thorough data analysis and investigation, and broad stakeholder engagement.

Purpose of the report

An analysis of a number of key program areas within AHS EMS was undertaken. The focus was to identify program improvement opportunities with the goal of improving patient outcomes.

The review encompassed the following programs: **Ground and Air Ambulance Interfacility Transfer, Non-Clinical Transport, Mobile Integrated Healthcare, Ground Ambulance Resource Capacity,** and **Resource Allocation and Deployment including SSM**. The analysis focused on the structures, accountabilities, principles, processes, systems, and outcomes to identify improvements to the system. The review included a comparison of specific AHS EMS programs with leading practices, an analysis of current program performance, as well as internal stakeholder engagement.

Following the review and through normal processes, AHS will be responsible for the:

- · assessment of observations provided in the report,
- any decision related to the implementation of identified opportunities, and
- consideration of impacts that may result from the implementation of the opportunities.

Implementation will require AHS to plan and evaluate any changes such that satisfactory results are realized.



Project introduction and objectives



Over the past 20 months, significant efforts have been made to transform how emergency medical services are delivered by AHS, resulting in improvements within the system. This includes a focus on capacity increases, demand management, strategic enablers, and workforce strategy which have demonstrated improvements in response times, unit availability, and staff satisfaction. The EMS Return to Service initiative, aimed at reducing the EMS hospital interval to a 45-minute target, 90% of the time, has had a profound impact on unit utilization, response time, and relative capacity for emergency response.

Responding to recommendations in the AEPAC and Dispatch Reports, AHS is currently executing improvements to the system. This includes increasing capacity and implementing a 'split production model' in Edmonton, Calgary and Red Deer where units are dedicated to interfacility patient transfers. In addition, program areas such as the community paramedic program, under Mobile Integrated Healthcare, have evolved to support Albertans in their expanding needs for care in the community. To continue to drive improvements, and act on recommendations prioritized in AEPAC and the Dispatch Review, there existed an opportunity to complete an updated analysis of specific AHS EMS programs.

In July 2023, Alberta engaged PricewaterhouseCoopers LLP to conduct an independent review of several key program areas of the Alberta EMS system. The purpose of this review is to identify opportunities to improve the EMS programs. The scope of this review was designed to comment only on the designated EMS programs that could be assessed within the constraints of available time and information provided.



Project limitations

This study provides Alberta with observations and opportunities based on research, analysis and investigation conducted in accordance with the previously stated approach. PwC was engaged to conduct a program review and internal stakeholder engagement. The review was limited to topics that could be reviewed within the time constraints and with the available information. and not the broader EMS system. In a few key cases observations were made on the broader system only in the context of their impact on the respective program operations.

The reader should note that there are limitations throughout the study on this basis, including the following.

• The review was conducted between August 2023 and January 2024.¹

The following contextual factors are key considerations:

- The review encompassed a limited and targeted set of stakeholder engagement activities.
- The review focused on specific AHS EMS programs, including: IFT, NCT, MIH, Ground Resource Capacity, and Resource Allocation and Deployment, which includes System Status Management.
- The review included an assessment of operational data covering the period of January 2018 to July 2023.
- The review resulted in the identification of opportunities identified through the analysis, stakeholder feedback, and leading practice research.

;	EMS across the globe are experiencing similar growth in demand and system constraints and are introducing reforms to address these challenges. While lessons and initiatives from global jurisdictions have been included, there are still a number of areas in which it is simply too soon to discern the practices necessary to cope with this new reality.	The event priority definition and classification schema for IFT events was changed in March 2022, partway through the period used for data analysis (January 2018 to July 2023). Furthermore, changes in unit definitions (e.g. Non-emergency transport [NET] vs Non-ambulance transport [NAT]) limited the potential IFT unit type analyses.	The primary data sources analyzed for the purposes of this review were responses from the unit Computer Aided Dispatch (CAD) software. As such, quantitative analyses are limited to the outcomes of operational decisions regarding unit deployment and resource allocation as the data sources do not provide visibility into these decisions.
	Due to the unique nature of the MIH program relative to IFT and 911, especially in the methods and capability of capturing event and response data, the quantitative analysis and evaluation components of this program were limited.	A recent pilot project for the split production model for IFT units in Red Deer began in 2023. The effects of this program were of interest for the purposes of this review. However, given the recent implementation date (April 2023), it was decided that there was insufficient data available to demonstrate results in this report.	For the analysis of 911 data, it should be noted that both the Determinant and colour priority play a role in the dispatch and prioritization of unit response to events. However, in the data provided for 911 response, only the Determinant data was available for the vast majority of the analysis. This represents a limitation of the analysis of 911 data for the purpose of ground resource capacity. For response scenario testing, colour priority data was available and subsequently used.



In this context, the Review has been conducted in the spirit that Alberta, like other jurisdictions within Canada and worldwide, will continue to actively learn and adapt program operations to address ongoing challenges and patient needs.

1. During this period a number of announcements were made related to proposed AHS restructuring, however, the impact of those changes will not be realized until 2024 and therefore were not taken into consideration in this program review.

Executive summary

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Key findings - Interfacility Transfer and Non-Clinical Transport Programs

Key findings of the EMS Program Area Study (1/3)

Alberta's EMS system has been under pressure to meet increased demand. To address these challenges, AHS EMS implemented a number of initiatives under the EMS 10-Point Plan which included but is not limited to actions such as introducing a split production team in Red Deer, hiring more EMS resources, and updating policies and guidelines to support divert non-emergency care appropriately. As part of addressing the recommendations from the AEPAC and Dispatch Review reports this EMS Program Area Study was conducted.

To better understand and address the capacity constraints facing EMS, the EMS Program Area Study focused on reviewing the following programs: Interfacility Transfer, Non-Clinical Transport, Mobile Integrated Healthcare, Ground Resource Capacity, and Resource Allocation and Deployment (including SSM) programs. This review concluded that although AHS EMS has made improvements to their resource deployment approaches, there are opportunities to improve the delivery of EMS for Albertans.

A summary of the key findings by programs reviewed are below:

Interfacility Transfer Program provides transportation services for patients who require clinical support during transport from one approved health care facility to another. Demand for IFT has grown as the specialization and centralization of healthcare services has increased the need to relocate or transport patients to access care. The policies and regulations that guide the program are not comprehensive and the gaps in guidance, and various other drivers such as the lack of alternatives, and an unclear prioritization approach have led to inconsistent application of the rules and the program being leveraged when there isn't a clinical justification. Opportunity exists to streamline the scope of the IFT program and develop comprehensive guidance in policies and regulations.

The Non-Clinical Transport Program provides an alternative pathway for transportation requests that do not meet the clinical criteria to qualify for an IFT. In other jurisdictions, there are enhanced NCT options (e.g., mileage reimbursement, taxi reimbursement) and partnerships with community organizations to provide local transport options. The NCT program in Alberta has not reached this level of maturity. The depleting options for alternative public or private transportation has resulted in an overreliance on the IFT program for patients for whom a clinical justification does not exist. The NCT program in Alberta should be expanded and concerted efforts should be placed on building appropriate partnerships to support communities with transport options.

Key findings - Mobile Integrated Healthcare Program and Ground Resource Capacity

Key findings of the EMS Program Area Study (2/3)

The Mobile Integrated Healthcare Program leverages community paramedics to provide care to patients in the community, improving access for vulnerable populations and those with difficulty accessing traditional services, and reducing pressures on emergency departments, hospitals, and EMS. This program has grown over the last 10 years and is a valued program among its partners and patients. However, the growth and purpose of the program are not well understood among key stakeholders within EMS, the health system, and the Ministry. Although the program is highly valued, a formal evaluation of its impact on the health system has not been completed. The program's current priorities are not integrated with EMS. Additionally, MIH attracts the same resources that EMS is challenged to recruit and retain - highly skilled paramedics. Opportunity exists to review the purpose and direction of the program, including assessing the opportunity cost of resources moving from frontline EMS to MIH, evaluating the program's impact on EMS and the health system more broadly, and defining the role MIH should play in the future.

Ground Resource Capacity is a measure of the capacity of ground ambulance resources to respond to EMS 911 demand in a timely manner. Analysis has demonstrated that the demand for EMS, especially 911, has rapidly outpaced natural population growth and is expected to continue to increase in the coming years. To meet response targets for Delta/Echo (D/E) level 911 events, assuming maintenance of current operational practices and resource allocation/deployment, overall resource capacity (by improved shift fulfillment) would need to increase by approximately 10-20%. At current resourcing levels, AHS is unable to meet response time targets, especially in urban areas. The problem is exacerbated by long offload delays. At a time when EMS is challenged with filling shifts and expanding its workforce to respond to growing demand, focusing on adding additional capacity through hiring alone is unlikely to address response time performance. Health system changes to improve patient flow, reduce offload delays, and increase health facility capacity will be crucial. EMS is part of a larger health system, and there is an opportunity to include new outcome-based measures and health system performance metrics (e.g., using a balanced scorecard) to evaluate EMS performance and complement current response time metrics.

Key findings - Resource allocation and deployment

Key findings of the EMS Program Area Study (3/3)

Resource allocation and deployment encompasses forecasting the future needs of EMS through capital planning, implementing the appropriate workforce structures (e.g., designing shift options that promote staff well-being and minimize fatigue), and day-to-day operational tactics for strategic placement of resources to optimize coverage and response times. To prepare the units for timely emergency response, AHS EMS leverages System Status Management (SSM) principles that guide the placement of resources at posts across the province based on historical demand and availability of resources.

This review found that the mechanisms used by AHS EMS to manage resource allocation and deployment could be improved to enhance performance against response targets. However, the concern that SSM principles inappropriately draw on rural resources impacting local coverage was unsubstantiated.

EMS response time performance is hindered by the lack of formal strategic planning, overuse of a Lights and Sirens response protocol, misaligned response targets, underrecognition of Medical First Responders, competing strategic priorities, and insufficient IFT resources which contribute to suboptimal deployment of resources.

The use of SSM in AHS EMS is aligned with leading practices, and the borderless system in Alberta facilitates the ability to maximize its benefits. **Despite a common perception that SSM inappropriately uses rural resources, the analysis revealed the underlying response time and coverage issues are due to the lack of capacity.** Resource shortages are evident through the over-utilization of IFT and 911 units, which negatively impacts staff-wellbeing, and relationships across the organization.

EMS resource allocation and deployment could be improved by taking a longer-term service planning approach, adjusting resource deployment strategies by expanding the use of split production teams, and revising the use of the response protocols such as Lights and Sirens. Additionally, Alberta's resource allocation strategies could be strengthened by addressing opportunities related to workforce challenges and improving health system coordination.

EMS service delivery should focus on providing the right care, in the right place, at the right time. AHS EMS is already employing leading practices through their ability to use data intelligence to identify communities that would benefit from split production teams, as evidenced by the recent introduction of an IFT dedicated team in Red Deer. Other examples include AHS EMS' ability to leverage SSM principles to optimize resource deployment, and the development of an innovative MIH program that is appreciated by clinicians and patients. However, the lack of an integrated long-term service plan, workforce challenges related to shift fulfillment, health system capacity issues, and lack of clarity on the role of EMS and its programs within Alberta's health system are hindering EMS performance.

Executive summary - moving forward

Key opportunities

The review of the EMS programs identified a number of opportunities that would improve the delivery of EMS services for Albertans. A summary of the key opportunities are outlined below:

Strategy, governance and planning	Increase resource capacity	System coordination	Align service model to better meet patient needs	Appropriate use of EMS
 Focuses on strategic opportunities including: Review of Lights and Sirens protocol and performance targets to align to best practices and reduce risk. Develop an integrated and long-term service planning process to meet EMS demand. Define the purpose and scope of the MIH program to align with clinical need and core EMS purpose. Update regulations defining scope and accountability of the IFT program to support appropriate use. 	 Increase resource capacity (as measured through shift fulfillment) by approximately 10-20% to meet existing P90 response time targets. 	 Highlights opportunities to that involved working with system partners including: Maintain the Return to Service initiative for EMS response times noting the important relationship between response times and destination wait times. Improve the integration of coordination bodies (e.g., Integrated Operations Centre [IOC], Dispatch, Referral, Access, Advice, Placement, Information & Destination [RAAPID] etc.) responsible for enhancing patient flow and demand capacity management to improve EMS and health system performance. 	 These opportunities focus on altering services to better meet patient needs including: Continue to identify communities that would benefit from split production teams to reduce competing priorities between 911 and IFT demand. Enhance secondary triage options and develop alternative care pathways to support the effective use of EMS resources. Mature the NCT program to provide alternative transport options. 	 Focuses on awareness and education including: Develop an educational campaign for the public and clinicians to enhance understanding of appropriate use of EMS. Simplify the IFT prioritization matrix and introduce data collection approach to enhance appropriate use of the IFT program.

EMS plays a crucial role in the health system; providing emergency response, patient transportation, and an increasing role in community based paramedicine. EMS service delivery occurs within a complex environment, and performance is impacted by increasing demand, system pressures and capacity constraints experienced across EMS and in other parts of the health system. The opportunities outlined above will pave the way to improve AHS EMS system performance.

3A

EMS programs: Ground and Air Interfacility Transfer & Non-Clinical Transport

Overview of the IFT and NCT programs



The IFT program supports patient access to care through coordinating transport to and from facilities

>125,000 IFT requests per year ¹	Patient transfer fleet consist of ground and air ambulances, transport units, and helicopters ¹	109 ground ambulances are dedicated to IFT in the AHS fleet ²	Includes use of air ambulances (11 Fixed Wing Aircraft and 3 Rotary Aircraft) for IFT ³	I/Request is the AHS system used to create IFT requests ¹
© Description⁴			- ➡ → □ Objectives an	d Outcomes⁴

IFT provides transportation for patients to and/or from approved medical facilities, such as acute care hospitals, long-term care centres, ambulatory/urgent care centres, and designated mental health facilities. IFT is a health system requirement within AHS and a core operational business for AHS EMS.

Transportation may be required to access:

- a medical facility that can provide the appropriate level of care required; or
- · a scheduled appointment at a specific medical facility.
- And where there is a clinical justification for EMS transportation due to the:
- · severity of illness or injury, and/or the
- specialized medical equipment or expertise.

4: AHS Inter Facility Patient Transfer, Provincial Strategy & AHS Integration, EMS Organizational Structure and functionality 5: Review of Operations of Ground Emergency Medical Services in Alberta (2013). Health Quality Council of Alberta Act

The objectives of the IFT program are to:

- support patient and family-centred care and align with the AHS Patient First Strategy, and provide appropriate patient transportation options to expedite patient flow and reduce wait times;
- prioritize and coordinate efficient and effective interfacility transfer of patients to help Albertans access the appropriate level of health care while maintaining health system capacity;
- reduce and/or increase efficient utilization of emergency EMS resources for IFT work; and
- cross-department collaboration and improved transitions in care.

Timeline of IFT Program Events^{5, 6, 7}

2009

AHS takes over the operation of the EMS system, including both EMS dispatch and service delivery.

2009 - 2012

Consolidation of 36 municipal EMS dispatch services.

November 2010

AHS approved and implemented the IFT Matrix guidelines.

May 2022

Conclusion of phase one non-emergency IFT pilot, which used other means (e.g. shuttles, taxi) to transport patients who did not require acute care.

December 2022

AHS announces the NCT program - AHS to arrange for alternative transportation for non-medical patient transfer.

March 2023

AHS began the procurement process to evaluate proponents' responses for third party partners for IFT and NCT.

April 2023

Central Zone IFT pilot with ~10 ambulances and/or stretcher capable NETs dedicated to scheduled, low-acuity IFT.

^{1:} Inter-facility Transport Information for Facilities

^{2:} Profile data by region (23-07-07)

^{3:} Provincial Air Ambulance Overview presentation

^{6:} EMS making healthy progress on 10-Point Plan News Release

^{7:} Reducing EMS Response Times - AHS Taking Action

IFT utilizes ground ambulances, speciality vehicles, the I/Request booking system, and a prioritization matrix to meet service level targets across the province

How does the program operate?¹

IFT is booked through an online portal, I/Request, accessible by AHS and contracted staff, who arrange transportation for patients. The general public cannot book IFT on their own - the request must be submitted by their health care provider and the service user must be an inpatient with a sending and receiving doctor. I/Request works in conjunction with the IFT matrix and specialized dispatching technology to establish the priority and improve coordinated scheduling and resourcing.

Geographic Coverage:²

Fleet and Resources:³

IFT is provided provincewide and operates locally across AHS' five geographic zones: South, Calgary, Central, Edmonton and North. On average there are 370 ambulances across the province, including 23 designated for IFT. There are 234 stations across the province housing AHS and contracted ambulances. Edmonton, Calgary, and Red Deer have dedicated (split production) IFT teams. Whereas in other regions, the same pool of resources respond to both IFT And 911 requests.

Measures of Success:⁴

AHS has identified and tracks against service level targets for all IFT pick ups and drop offs across the transfer matrix. Additional metrics measured include:

- · Events (count)
- I/Request Events (%)
- Pre-Booked Events (%), RAAPID
- Booked (%)
- Transfer (Pick Up IFT count)
- Pick Up On Time (%)

1: Inter-facility Transport Information for Facilities 2: AHS Inter Facility Patient Transfer - Provincial Strategy & AHS Integration 3: Profile data by region (23-07-07) 4: Monthly IFT Performance Report 5: Inter-Facility Transfer Reference Guide

- Average Late Pick Up Interval
- Appointment (Drop Off IFT count)
- Drop Off On Time (%)
- Average Late Drop Off Interval

Inter-Facility Patient Transfer Matrix⁵

A colour-coded system guides the triage and prioritization of patient movement between facilities in Alberta.³

EMS has a selection of advanced, basic, and non-emergency transport options that are assigned based on the clinical information provided. If clinical needs are overstated, it may result in fewer options for ambulance availability. Alternatively, understating patients' clinical needs during transport can pose a clinical risk for the patient who may require medication or a higher level of support while being transported.⁴

Red A critical clinical condition requiring an unscheduled emergent response and transport, typically to a higher level of care.

Yellow A potentially life-threatening clinical condition requiring an unscheduled urgent response for higher or specialized care at another facility.

Green Scheduled, non-urgent, inter-facility transfer (no immediate threat to life or limb). Typically for evaluation, intervention or admission at another facility.

Blue Scheduled, non-urgent, inter-facility transfer (no immediate threat to life or limb). Typically movement of patient to a lower level facility with no immediate clinical need.

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The recently scaled NCT program provides options for patients who do not require emergency care during transfers

NCT as a program is not new, but it has been scaled in recent years

2 pilots led to the enhancement of medically stable patient algorithm

► →□ →□

hospitals; and

The NCT program is delivered by Alberta Health Services (AHS)

Objectives and Outcomes

· reduce the burden on emergency departments and

provide a safe and reliable transportation option for

patients who do not require emergency care.

The objectives of the NCT program are to:

Description²

The NCT program is a valuable asset to the Alberta health system. It helps to reduce the burden on emergency departments and hospitals, and it provides a safe and reliable transportation option for patients who do not require emergency care.

Use of NCT is appropriate when:

- the patient can direct their own care, or be cared for by their designated family/support person during transport;
- no emergency health services are anticipated during transport and the patient is able to access the mode of transportation with minimal assistance; and when
- the patient has sufficient cognitive functioning for transport (with potential accompaniment).

1: Profile data by region (23-07-07)

3: Transport of Medically Stable Patients (COEC 20221109)

4: Review of Operations of Ground Emergency Medical Services in Alberta (2013). Health Quality Council of Alberta Act 5: Action on Our Priorities

ELT approved two components: conversion of ambulances to lower-cost Non-Emergent Transport (NET) units and the implementation of the Transport Options Algorithm (to divert non-clinical transports).

AHS takes over the operation of the EMS system, including both EMS dispatch and service delivery.

Timeline of NCT Program Events^{3,4,5}

2021

2009

July 2020

Discharge Transport for Medically Stable Patients algorithm pilot was launched in Peter Lougheed Centre (PLC) (Fall/2021) and North Zone (early 2022).

May 2022

IFT Transport Options Pilots were started at PLC and North Zone, followed by roll-out in Calgary. In December, the new inter-facility transfer or discharge transport for medically stable patients policy was released outlining the eligibility criteria for IFT/NCT.

2023

AHS is working with approximately 180 contractors to provide non-critical transfers for Albertans requiring transportation home after discharge from both Emergency Departments (ED) and hospital stays.

^{2:} INTERFACILITY TRANSFER OR DISCHARGE TRANSPORT FOR MEDICALLY STABLE PATIENTS

The NCT program guides clinicians to use the criteria and select an approved transportation provider for patients who do not require an ambulance

How does the program operate?¹

The NCT program is for patients who do not require medical support during transport and are able to care for themselves on the way, including patients who are cleared to be transferred or discharged from a facility or acute care. AHS contracts with a variety of transportation providers to deliver NCT services across the province. The NCT program does not provide any direct clinical or transportation services, its focus is to arrange the most appropriate non-medical transport option for patients. The program implementation sits within Clinical Operations and is managed at the zone level. NCT is driven by the Interfacility Transfer or Discharge Transport for Medically Stable Patients policy that outlines the eligibility. NCT vehicles are often taxis that are staffed by non-clinical personnel.

Geographic Coverage:

Fleet and Resources:¹

NCT operates provincewide and locally across AHS' five geographic zones: South, Calgary, Central, Edmonton and North. Each of the zones has a list of preferred vendors and/or partnerships for non-medical patient transfer options such as taxis, or other alternative transportation vehicles. Each zone supports patients by arranging an option that works for the patient.

Measures of Success:

The NCT program currently does not have KPIs available.

1: AHS EMS Non-Clinical Transportation Announcement 2: Interfacility transfer or discharge transport for medically stable patients

Non-Clinical and Self-Care Transportation Criteria²

NCT eligibility criteria support emergency and acute care teams in suggesting non-ambulance alternative transport options to move patients who are medically stable, and ready to return home or to another care environments. This was announced in December 2022 and has been implemented for 2023.

Health care professionals, in consultation with the patient, must determine if the patient meets the non-clinical transportation criteria, as per the AHS Interfacility Transfer or Discharge Transport Options Algorithm, and AHS Pediatric Interfacility Transfer or Discharge Transport Options Algorithm. This includes but is not limited to the following:

- A. Patient is able to direct their own care, or be cared for by their designated family/support person during transport;
- B. No emergency health services are anticipated during transport;
- C. Patient is able to access the mode of transportation with minimal assistance;
- D. Patient has sufficient cognitive functioning for transport (with potential accompaniment); and
- E. Patient can be safely transported by their family, friend, or a community resource.

Self-care options include family, handivan, taxi etc.

If the patient does not meet the criteria an IFT request should be booked through EMS.

Governance structures, policy and guidelines and tools support the IFT and NCT programs' operations

Governance and Accountabilities

The development of the policy, determination of the eligibility criteria, and implementation of IFT sits within AHS EMS. Policy and eligibility criteria for NCT were developed collaboratively between EMS and Clinical Operations. The implementation of the NCT program sits with Clinical Operations and each zone/facility manages a list of available options. EMS is contacted when a patient does not meet the criteria for NCT, and to get support through IFT.

Governance of the IFT/NCT programs is provided by the provincial **IFT Strategy Management Team.**¹ Which is comprised of representation from the Manager or Director of all the Zones and Dispatch Coordinators, along with the senior management team for Air and Ground IFT.

This team reviews items related to provincial policy, CAD configuration, and outcomes from the Provincial IFT Matrix Working Group. Recommendations made by the IFT Strategy Management Team are then taken to the Senior Operations Team (SOT). Other stakeholders are invited to IFT Strategy Management meetings as needed.

Policy and Guidelines

The overarching regulation that informs the eligibility of funding and scenarios for coverage for the IFT program is the: Hospitalization Benefits Regulation (244/90)². Section 6, 'Patient Transport' outlines that charges for the patient transport from a generation hospital to another hospital, auxiliary hospital, nursing home or approved facility are not the responsibility of the patient, but rather the responsibility of the sending facility.

In 2009, AHS EMS acquired the funding responsibility. This change in practice has not been reflected in the regulation or policies. To accompany the regulation, a list of approved facilities is maintained by AHS EMS. However, given the vague definition of, 'an approved facility', lack of alternative transport options, and lack of clarity of policy application in different scenarios, the IFT/NCT program sometimes covers the costs of transfer even when a patient is sent to a non-approved facility.

Air Ambulance based patient transport is guided by the Air Ambulance General Operating Procedures and Business Rules. It defines the circumstances, roles and responsibilities of the various partners involved in determining the type of resource to use.

The primary policy that guides IFT and NCT is the Interfacility Transfer or Discharge Transport for Medically Stable Patients.³ It is this policy that outlines NCT transport eligibility. To accompany this policy, an IFT or Discharge Transport Options Algorithm has been developed. This guides clinicians through the various options for IFT/NCT and self-care transport (not covered by AHS).

Supporting Tools

In addition to the regulation, policies and algorithms that define the IFT/NCT options for clinicians and patients, the Inter-Facility Patient Transfer Matrix⁴ has been developed. **The matrix guides the triage and prioritization of patient movement between facilities**. In March 2022, a more descriptive version of the matrix 'V2.0'⁵ was developed and implemented to provide clarity on how to request IFT services based on a patient's stability.

Depending on the urgency level, there are various approaches to requesting IFT/NCT services. Red level requests are managed through RAAPID, Yellow level services are managed through RAAPID with the coordination of other stakeholders (e.g., the most responsible physician, Shock Trauma Air Rescue Service [STARS] etc.). It is through these coordination calls that it is decided whether ground or air travel is most appropriate. Green/Blue requests are managed through an online booking system - I/Request.

I/Request events that are booked from High Priority Areas (e.g., hospitals) that may be clinically determined as the equivalent of a 'Green/Blue' type of request, may be given a higher priority of 'Yellow' to support patient flow (clearing of hospital bed).

I/Request is an online portal that gathers information from clinicians on the type of support their patient requires during transport. Using this information the appropriate resources are arranged to respond to the request. EMS encourages clinicians to prebook Blue/Green as much as possible to support system planning.

1: AHS Inter Facility Patient Transfer | Provincial Strategy & AHS Integration EMS Organizational Structure and functionality

3: Interfacility Transfer or Discharge Transport for Medically Stable Patients Policy 4: Inter-Facility Transfer Reference Guide

5: EMS Interfacility Transfer (IFT) Matrix v2.0 Card 37 visual

^{2:} Hospitalization Benefits Regulation

The IFT program is not meeting Service Level Agreement (SLA) compliance targets

Summary of IFT Program Performance

The overall program performance is poor. Overall compliance with IFT SLA targets is below 50%, though it has been improving since 2022.

- Monthly demand for IFTs has remained stable since 2018. Following the clarification of IFT matrix definitions in March 2022, there was a step change in the distribution of event categories, with pick up based events showing an upward climb and drop off events demand remaining stable.
- SLA compliance has typically been better for pick ups than for drop offs. This may be attributed to pick up compliance intervals within the SLA having a longer on-time window than drop offs (see next slide for details on SLA targets).
- Currently, only around 30% of IFT events are pre-booked, although Blue and Green IFT events, for which the matrix encourages pre-booking, account for almost 60% of IFT requests. This indicates that compliance with pre-booking these requests is low.



Program – Demand and Macro Performance Measures

Event Type	Event Share (since 2018) ¹
Blue	15.4%
Green	44.0%
Yellow	31.4%
Red	9.2%

Pick Up: An IFT Transfer, where performance is measured as the time the unit picked up the patient relative to the scheduled pick up time.

Drop Off: An IFT Appointment, where performance is measured as the time the unit dropped off the patient relative to the scheduled appointment time.

1: In 2022 the event priority classification scheme was changed, altering the distribution. These shares are over the period from January 2018 to July 2023.

Poor SLA compliance is common across all event types

Summary of IFT Program Performance

- IFT is primarily used for low-acuity cases (Blue & Green priority), which make up almost 60% of all events.
- Overall, there is poor compliance against SLA targets across the IFT event types and there does not appear to be a correlation between SLA compliance and IFT priority (e.g. high-acuity events do not have better compliance than low-acuity events).
- The low level of SLA compliance suggests challenges exist with the coordination of the IFT program, the capacity of the EMS system, and the appropriateness of the targets themselves. The target intervals for scheduled appointments provide no room for lateness, inherently making it challenging to meet these targets.

	omnliance by Event	Tvna (since 2022) –						
			Event Class	Description	SLA Max Interval (min)	Average Interval (min)	Compliance Rate	Event Count (2022-pres)
	Event Share	SLA Compliance Rate	A1	Priority Pick up - Major site	15	97	33.9%	9316
Blue	21.1%	51.8%	A2	Priority Pick up - Other site	15	150	30.8%	5952
			A3	Same Day Pick up - Major site	100	110	59.6%	25,772
Green	35.7%	27.4%	A4	Same Day Pick up - Other site	100	96	64.5%	7247
			B1	Scheduled Appt - High priority area	0	28	21.3%	17,075
Yellow	34.6%	46.8%	B2	Scheduled Return from high priority area	100	63	64.6%	7496
			B3	Scheduled Appt - Pre Booked	0	33	32.4%	18,979
Red	9.5%	34.6%	B4	Scheduled Appt - Same day	0	55	27.2%	16,334
			B5	Scheduled Return	0	71	15.1%	21,793
Average		39.8%	B9	Scheduled Organ Transport	5	73	58.8%	51
Average	00.0	00.070	C1	Unscheduled - Clinically urgent	60	170	42.8%	30,501
			C2	Unscheduled - Clinically urgent, ETA-based	10	91	4.1%	5005
			C3	Unscheduled - System capacity/priority area	120	171	49.0%	37,073
			C4	Unscheduled - Rural (ED/HPA) to rural	480	198	86.4%	6676
			D1	Unscheduled - Critical	20	111	37.7%	16,435
			D2	Unscheduled - Specialty team	20	75	26.6%	4933
			D9	High Priority - Organ transport	5	609	1.6%	321

Analysis of the IFT and NCT programs



The four IFT and NCT hypotheses are substantiated as the programs face challenges with non-clinical transportation, appropriate level of resources, and offload delays

o o Program Area	Hypothesis	Finding
Ground and air IFT and NCT	Hypothesis 1: The IFT program is being used when there isn't a clinical justification	Substantiated - The unclear guidelines and outdated policies that define the IFT program are creating an environment in which there is reliance on the program to avoid passing the cost of transport onto patients when there isn't a clinical justification. The lack of clarity on the policies application, public perception of the program, and clinician confusion on the program have led to inconsistent patient experiences and billing practices. EMS takes on the cost of IFT requests, further disincentivizing facilities to think twice about using IFT when there isn't a clinical justification.
	Hypothesis 2: There is a reliance on the IFT program for transport due to limited alternatives	Substantiated - The lack of affordable transportation options in rural and remote Alberta, legacy messaging, and centralization and specialization of healthcare results in the reliance on EMS to access healthcare services even if there isn't a clinical need. There is a higher proportion of low priority events being requested in non-urban areas, indicating a lack of alternatives. The communities with the sustained increase in IFT requests are non-urban communities in which private transportation options have decreased (e.g., cancellations of Greyhounds).
	Hypothesis 3: The IFT program does not have the appropriate level of resources and it is detracting from frontline emergency response capability	Partially Substantiated - The IFT program does not have the appropriate level of resources, demonstrated by high utilization and low SLA compliance when demand is high. In rural areas, resources respond to both 911 and IFTs, resulting in the use of a higher resource level than required (however the IFT volume may not justify dedicated resources in some areas) and detraction from advanced units providing emergency coverage. In contrast, when demand is high in urban centres, 911 response utilizes IFT resources, which impacts IFT compliance.
	Hypothesis 4: Resources undertaking IFT can be delayed offloading patients which can impact their ability to respond to emergency events	Substantiated - Data indicates IFT offload delays may impact the response capability of EMS, as the destination interval increases, SLA compliance decreases particularly in rural areas. Offload delays occur in part due to ineffective coordination between facilities, however, it is also symptomatic of system failures such as bed shortages and over capacity hospitals.

Key takeaway: IFT resources are strained by high demand for low-acuity and non-clinical transports as well as offload delays, which contributes to long IFT wait times. In the current state, IFT does not have sufficient resources to meet performance targets. However, performance could be improved if resources were used more effectively, for example, through prioritization and coordination of transfers and evaluation of sharing resource challenges across 911 and IFT.



Hypothesis 1 is substantiated; IFT usage without clinical justification is driven by policy/funding inconsistencies, legacy messaging and perception of EMS' role

Hypothesis 1

The IFT program is being used when there isn't a clinical justification

Substantiated

The IFT program in its current form supports a variety of patient transport needs. This includes providing transportation for patients when there isn't a clinical justification where alternative transport options may not exist or may result in the cost of transportation being passed onto the patient. The inappropriate program usage is a result of current operations, policies, funding, and expectations.

Inappropriate behaviour driven by legislation and funding

The current regulations and policies that guide the IFT program create an environment in which the program can be inappropriately used to avoid patients paying out of pocket.

Broad role of EMS/IFT

The use of ambulances and EMS staff are not always necessary to conduct IFT requests.

Inconsistent enforcement of policy and funding

Patients have different experiences due to inconsistent application of policies and eligibility criteria.

Encouraged EMS use through legacy culture and messaging

Historical messaging and the public's general understanding of the role of EMS is misaligned with current operations and is exacerbating the challenges resulting from the current resource shortage facing the EMS system.

Inefficient use of resources for rural transfers¹

Air transport is overutilized for non-emergency transfer due to a lack of alternative transport options. For patients who do not the meet criteria for air transport, ground transport may be used for long-distance transfers, which contributes to reduced rural coverage. The legislation and funding structure allows providers to work around the system to help patients acquire transportation, at times without clinical justification

Hypothesis 1: Substantiated

The IFT program is being used when there isn't a clinical justification

Inappropriate behaviour driven by legislation and funding The current legislation and funding structure encourages inappropriate use of EMS and 'gaming the system,' such as ambulances being requested for patient discharge due to a lack of alternative transport options. Health providers may advocate for patients without considering the system impact or consequence to other patients. Health authorities do not pay for IFT usage, and there is no financial accountability or process to enforce policies. Additionally, validation of clinical reasoning for IFT usage is not tracked, which limits the ability to audit the clinically appropriate use of the program through data.

Albertans do not currently incur the costs of transfers from one approved facility to another

- As of 2009, the cost of patient transfers are incurred by EMS. Before 2009, the costs were the responsibility of the sending facility. This has resulted in a shift in accountability away from the referring facility.
- Current regulation stipulates that the patient does not incur costs of transportation if being transferred from one approved health facility to another.^{1,2} As a result, it has been noted that clinicians may admit patients into a facility so that the patient is not required to pay out of pocket for their EMS transportation (a ~\$385 charge).^{1,2}
- A lack of alternatives and the use of IFT programs when there isn't a clinical need are common problems facing all comparable jurisdictions. However, other jurisdictions have developed more diversified transport programs to match patient clinical and non-clinical transportation needs. This includes community transportation options, not-for-profit programs, and reimbursement programs based on mileage or travel costs. In most jurisdictions, it is also the responsibility of the patient to book these transportation services by working directly with the provider.

1: Ambulance Fees and Payments
 2: Hospitalization Benefits Regulation



"Authority and financial responsibility are misaligned"

What stakeholders are saving



The broad role of EMS to answer any health need is sustained through legacy messaging and culture, however it is not viable in moving forward

Hypothesis 1: Substantiated

The IFT program is being used when there isn't a clinical justification



EMS becomes the answer when patients/providers see no alternatives for transfer or care. There is agreement that ambulances are not always required, concern about whether the scope of the IFT program has expanded beyond its core objectives, and questions have been raised around whether EMS should support discharge, transfers to private clinics, and patient management during appointments.

Encouraged EMS use through legacy culture and messaging

EMS usage for all health concerns was established through legacy culture and messaging. Historical messaging of EMS 'always being there' is not sustainable in the current environment. There is the perception that the public and health providers assume that EMS will transport anyone in need. There is a broad misunderstanding about EMS and IFT eligibility/policy, which contributes to the misuse of the system. Stakeholders also shared that the IFT pre-booking process is not dynamic, not allowing clinicians to reflect a change in urgency.

What stakeholders are saying



As part of the EMS Current Status Survey (March to April '22), the overwhelming majority of respondents that represent the patient/public identified that the role of EMS in Alberta should be to 911 calls', but ~18% of respondents also highlighted the role of EMS should be to 'transport patients in remote communities to appointments in cities.' Respondents agreed that more education is needed on the role of EMS and that patients with minor issues should identify alternative care options. pointing to the changing perspectives on the role of EMS and patient responsibility given the growing demand for EMS services.¹

1: Together4Health Current State Survey - All Perspectives

PwC | Alberta Health Services EMS Program Area Study

Inconsistent enforcement of IFT usage, policies and billing across the province contributes to inequitable care and usage without clinical justification

Hypothesis 1: Substantiated

The IFT program is being used when there isn't a clinical justification

Inconsistent enforcement of policy and funding There is variable enforcement of IFT usage, policies, and billing across Alberta, leading to inconsistent patient experiences between AHS ambulances, contracted ambulances, and air ambulances. Additionally, there are scenarios where patients are billed when they have a clinical need for transfer, which results in inequitable care. For example, the policy does not cover transfer to a non-approved facility or movement of patients who are not checked-in when a rural ED closes due to staff shortages.

What stakeholders are saying

"Air may reject a transfer while ground accepts, putting dispatch in a challenging situation"

"The legislation primarily covers hospital to hospital and has not progressed in alignment with the model of care"



Unclear policy guidance leads to implementation inconsistencies

- AHS has recognized billing inconsistencies and opportunities for improvement over the years.¹ Current policies and regulation that guide the IFT program do not provide extensive billing guidance, creating gaps in guidance for scenarios, such as how a patient should be billed if they require transportation from an approved facility to an outside clinic or from a hospital to rehab clinics. These gaps in guidance have led to inconsistent billing practices across regions.
- The lack of alternatives and nature of the current set up of the IFT program (it serves multiple purposes), is also leading to the program fulfilling transport requests that fall outside of the current policy guidance of what type of transport is covered.
- Other comparable jurisdictions have clear eligibility criteria for the various transportation options. These options distinguish between interfacility transfer between public institutions, non-emergency patient transport (NEPT), and Non-Clinical transport (NCT). Policies and program also recognize the need to create access to care in rural communities and have tailored NEPT and NCT program accordingly.
- The centralization of care and specialist services alongside the reduction of commercial transport options in rural communities is creating greater demand for programs such as IFT, and is a common trend in other jurisdictions.

1: EMS Billing Inconsistencies Opportunities for Improvement- March 16 2017

Critical resources may be used for low-acuity and non-emergency events, exemplified by the use of resources for rural transfers

Hypothesis 1: Substantiated

The IFT program is being used when there isn't a clinical justification

Inefficient use of resources for rural transfers¹

The lack of transportation options in rural areas results in high demand on critical EMS resources for low-acuity, non-emergency events. Beechcraft King Air aircraft (e.g. fixed-wing aircraft) are over-utilized and a lower-cost alternative may be suitable for some non-emergency transfers. Additionally, ground EMS resources may be used for long-distance transports when Air rejects the transport eligibility, which reduces EMS coverage in rural areas, and impacts patient experience and timely access to care.

What stakeholders are saying

"Over capacity King Air aircraft may not be ready for cases requiring a rapid response and could be substituted by a BLS plane"

"Patients may be transferred home by ground for long-distance, as the cost is not covered by air"



1: Further evidence can be found on page 32.

PwC | Alberta Health Services EMS Program Area Study

Hypothesis 2 is supported by observations of accessibility in rural areas, legacy messaging and centralization and specialization of healthcare

) Hypothesis 2

There is a reliance on the IFT program for transport due to limited alternatives

Substantiated

The lack of transportation options in rural and remote Alberta results in the reliance on EMS to access healthcare services even when there isn't a clinical need for using EMS resources. Non-clinical demand for EMS and IFT are also impacted by the legacy messaging of EMS' broad role and increased centralization and specialization of healthcare.

Lack of accessibility in rural areas

Decreased transportation options in rural areas contribute to the high usage of EMS resources for health appointments.

Encouraged EMS use through legacy culture and messaging¹

Historical messaging and the public's understanding of the role of EMS are misaligned to the current resource shortage facing the EMS system.

Centralization and specialization of healthcare

Health services are increasingly specialized and centralized, while rural transportation options have decreased, resulting in high demand from rural populations to access tertiary services and limited alternative methods of transportation.

The lack of rural transportation options appears to contribute to the higher reliance on low-acuity transfers for appointments outside of urban areas

Hypothesis 2: Substantiated

There is a reliance on the IFT program for transport due to limited alternatives



Patients in rural and remote communities use EMS at a higher rate for low priority (i.e. Green and Blue) IFTs compared to those in urban centres, where alternative transportation options are more prevalent. This distribution of demand is expected given the increasing centralization and specialization of healthcare in urban areas. However, the greater reliance on low-acuity transfers in non-urban areas may also suggest that a lack of alternative options are contributing to low-acuity IFT demand for patients without clinical justification.

Areas outside urban centres rely more heavily on EMS for low-acuity IFTs (data from 2022 onward)

IFT Event Priorities - Urban

IFT Event Priorities - Non-urban



- In urban areas, higher-priority (i.e. Yellow and Red) IFTs make up nearly 50% of all demand. However, in non-urban areas, this share is less than 30% of all events.
- In non-urban areas, Blue and Green events account for almost 70% of all IFT requests. The distribution of event priorities in non-urban areas therefore shows a higher reliance on lower-priority IFT services.
- The higher proportion of low priority events (Blue/Green) in non-urban areas suggests the demand in these areas may be attributable to the centralization and specialization of healthcare, as well as the lack of alternative transportation to access medical care.

What stakeholders are saying

"We cannot send a taxi to Peace River"

"If equitable access is one of the priorities of the system, we should define criteria and fund NCT; with workarounds it is occurring in most expensive method"



Discontinued bus and flight services across rural Alberta increase accessibility challenges and IFT demand



There is a reliance on the IFT program for transport due to limited alternatives

Bus and flight cancellations have resulted in fewer options for rural travel to health appointments and may contribute to increased IFT demand

18 communities with the IFT demand from 2018-2	 Greyhound cancelled all bus r (i.e. Red Arrow and Cold Shot 	
1. Sherwood Park	10. Fox Lake	Greyhound, rural populations
2. Fort McMurray	11. Greenview	The provincial government interview
3. Lloydminster	12. Taber	service was suspended in 202 Taber. ^{3,4} which are municipa
4. High Level	13. Ponoka	Domestic flight options from m
5. Wetaskiwin	14. John D'or Prairie First	activity of Air Canada flights
6. Innisfail	15. Nation #215	2,895 flights in Q1 of 2023. Ro
7. Rimbey	16. Stettler	highest sustained increase in
8. Raymond	17. Olds	 Bus and flight cancellations contravel options, longer travel time
9. Fort Saskatchewan	18. Sylvan Lake	

- Greyhound cancelled all bus routes across Alberta in 2018, and while some regional companies (i.e. Red Arrow and Cold Shot Bus Lines) expanded bus services to fill some gaps left by Greyhound, rural populations are faced with fewer accessible travel options.
- The provincial government introduced a Rural Transportation Pilot Program in 2018, however, this service was suspended in 2021.² The end of the pilot impacted Wetaskiwin, Innisfail and Taber,^{3,4} which are municipalities that demonstrated a sustained increase in IFT demand.
- Domestic flight options from major operators have also decreased in Alberta in recent years. The activity of Air Canada flights in Calgary decreased by 59%, from 7,129 flights in Q1 of 2019 to 2,895 flights in Q1 of 2023. Route cancellations included Fort McMurray,⁵ which had the second highest sustained increase in IFT demand across Alberta.
- Bus and flight cancellations contribute to accessibility challenges in rural areas, including fewer travel options, longer travel times and higher ticket prices.

1: Excludes large cities e.g. Edmonton, Lethbridge

2: CBC, Canada, 2018, https://www.cbc.ca/news/canada/calgary/alberta-bus-pilot-projects-1.4761157

3: Medicine Hat News, Canada, 2021, https://medicinehatnews.com/news/local-news/2021/03/17/rural-bus-service-needs-provincial-backing-to-survive/

4: CBC, Canada, 2023, https://www.cbc.ca/news/canada/edmonton/alberta-government-urged-to-help-sustain-restore-rural-bus-service-1.6958849

5: CBC, Canada, 2023, https://www.cbc.ca/news/canada/calgary/bakx-westjet-air-canada-saskatoon-yyc-1.6721375

Hypothesis 3 is partially supported as IFT does not have the appropriate resource level to manage demand, however, there is an opportunity to increase effectiveness

Hypothesis 3

The IFT program does not have the appropriate level of resources and it is detracting from frontline emergency response capability

Partially Substantiated

In the current state of operations, the IFT program is not able to meet performance targets at current demand levels.

Partial substantiation is due to the dichotomy of how IFT resources are utilized between urban and rural areas. In rural areas, resources respond to both 911 and IFTs, resulting in the use of a higher resource level than required and detraction from advanced units providing emergency coverage. On the contrary, in urban centres, 911 response utilizes IFT resources when demand is high, impacting the ability of IFT to be on time. Additionally, the IFT resource capability is negatively impacted by ineffective coordination and communication, and offload delays.

Insufficient dedicated resources

EMS and IFT utilize the same resource pool in rural areas and when demand is high in metro areas. The use of ALS units for low-acuity IFT events detracts from 911 capacity, but may be appropriate for operational efficiency.

Increased response times and unmet performance targets

The compliance rate for IFTs is low, and long wait times are a concern for red events in rural areas as well as frequent rescheduling for medical appointments. Disincentivized IFT booking by historical performance

Clinicians and system coordinators are reluctant to pre-book IFT requests due to the low chance of service being provided on time. Resource shortages and re-prioritization contribute to late pre-booked IFTs.

Ineffective and unclear prioritization approach

The prioritization matrix is not well understood and there are situations of misclassification of patient needs impacting wait times and increasing the load of high priority cases. Ineffective resource utilization due to coordination and communication

Facilities do not sufficiently coordinate appointment logistics, which may result in delays. There may be a misalignment of priorities amongst the coordination systems.

Allocation of resources /processes

Patient drop off delays and inefficient facility ED acceptance processes lead to ineffective use of resources. Additionally, pilot duty hours can impact patient movements.

Overcapacity hospitals significantly impacts IFT

Hospitals operating at over capacity impact how IFT/EMS staff are used, including management of patients without a bed and increased IFT demand.

IFT and EMS utilize the same finite resource pool and it may have various impacts on compliance for both programs in rural and urban areas

Hypothesis 3: Partially Substantiated

The IFT program does not have the appropriate level of resources and it is detracting from frontline emergency response capability

Insufficient dedicated resources In **rural** zones, the finite resource pool supports both 911 and IFT events, which may impact the system's ability to provide coverage for critical 911 events when IFT events are higher than normal (although it is important to note that there may be insufficient volume to justify dedicated IFT units). Both IFT and EMS are drawing from the same resources, where low-acuity transfers are completed by ALS units. In **urban** areas with split production model teams, there are instances of the dedicated IFT units being reallocated to EMS when demand is high. **IFT dedicated units in the split production model spend75% of shift time responding to events;** high IFT unit utilization also suggests there are insufficient resources to respond to high demand, on average. Further, stakeholders outlined challenges with meeting daily staffing targets; for example, ~70% of planned shifts are staffed daily in the North Zone and on weekends in metro zones. Resource expansion is further constrained by 1 to 2 year wait times for ambulance procurement.

The system may not be able to accommodate increased IFT demand with the current operations



- When demand is higher than normal, SLA compliance is typically lower across the province.
- When demand is lower than normal, SLA compliance is not as strongly correlated to demand, which indicates factors other than demand influence performance.



911 demand in urban centres detracts from IFT performance when IFT dedicated units are reallocated



The IFT program does not have the appropriate level of resources and it is detracting from frontline emergency response capability

Insufficient dedicated resources

In urban centres, IFT performance has been impacted by 911 utilization of IFT dedicated units


ALS units are often used for low-acuity IFTs, which may be above the required level, however, in rural areas it may be appropriate for operational efficiency

Hypothesis 3: Partially Substantiated

The IFT program does not have the appropriate level of resources and it is detracting from frontline emergency response capability

Insufficient dedicated resources

Advanced units are often used for low-acuity IFTs

Resources above the required level requested are often used.

- 50% of all IFTs use an ALS unit, however, only 30% of events specified an ALS requirement at the time of booking.
- When a BLS unit is required at the time of booking, 43% of the time an ALS unit will be used instead.
- When a NET unit is required at the time of booking, 72% of the time an ALS or BLS unit will be used instead (higher resource level than required).

The usage of ALS units without a demonstrated clinical needs is largely driven by two main factors:

- 1. The lack of resource selection in rural areas (i.e. it's more operationally efficient to have one ALS unit complete the IFT request than to bring a BLS over from another community).
- 2. NET units are often equipped to handle the IFT requests due to their configuration, however, there are an insufficient number available, resulting in higher resource level use.



Unmet IFT performance targets are a concern, particularly in rural areas where response times are increasing for high-acuity events

Hypothesis 3: Partially Substantiated

The IFT program does not have the appropriate level of resources and it is detracting from frontline emergency response capability

Increased response times and unmet performance targets There is frustration with long wait times for IFT events. Remote areas are concerned about increasing response times for life-threatening "Red" IFT events, often 2-3 hours before pick up occurs. There is a sentiment that expectations of rapid IFT response times may be too high given the current environment of high call volumes in urban areas and lack of resources particularly in rural areas. Additionally, there is concern that scheduled appointments for specialists and diagnostics are frequently bumped, causing patients to miss appointments.

Increasing wait times for high-acuity events in rural areas



- IFT's are not meeting SLAs; the average compliance rate for all IFT's is 37.1%.
- Since 2022, wait times for high-acuity IFT pick ups in rural areas have been increasing, similar events in urban areas have decreasing wait times. Prior to 2022 high-acuity rural wait times were approximately under 2 hours and have now increased up to over 3 hours.



"The targets for IFT should be reflective of the current strained system"

"When an appointment is missed for the fourth time, clinicians are concerned it impacts patient care"



Critical resources may be used for low-acuity and non-emergency events due to the unclear prioritization matrix, despite recent updates

Hypothesis 3: Partially Substantiated

The IFT program does not have the appropriate level of resources and it is detracting from frontline emergency response capability

Ineffective and unclear prioritization approach There is confusion about how to effectively use the prioritization matrix amongst dispatch, operational and clinical staff, sometimes leading to the misclassification of lower acuity events and longer wait times for critical events. There is concern that health providers may describe higher priority cases than required to achieve faster pick up for their patients. The current prioritization approach and utilization of critical resources for non-emergency and low-acuity events may result in ineffective allocation of resources, which impedes a rapid response to urgent and high-acuity patients. Stakeholders also shared that dispatcher training is not distinguished between ground and air, and dispatchers may not be well equipped to prioritize air resources.

Despite changes in the IFT matrix definition there is continued lack of clarity with the prioritization approach



1: I/Request and Inter-Facility Transport Frequently Asked Questions

- To improve understanding of the matrix, an updated IFT matrix (V2.0) was released in March 2022, along with an updated IFT request process to more appropriately match clinical needs with appropriate resources. These changes impacted the distribution of the IFT matrix, although lower acuity requests still account for a high proportion of the volume.
- Despite recent efforts to provide updated education, training, and clarification on the interpretation of the IFT matrix,¹ stakeholders shared that the booking process and system navigation are still complicated and unclear.

What stakeholders are saying

"If everything is a priority then nothing is a priority"

"Misinformation at all levels about prioritization, use of clinical judgement and services offered at each facility"





Historical poor SLA compliance with pre-booked IFTs may incentivize undesirable behaviours with IFT requests and resource inefficiencies

Hypothesis 3: Partially Substantiated

The IFT program does not have the appropriate level of resources and it is detracting from frontline emergency response capability

Disincentivized IFT booking due to past performance **EMS encourages pre-booking IFTs for non-emergency transfers** to enable pre-planning and coordination of resources, **however, stakeholders have shared they are disincentivized to pre-book due to past performance**. Pre-booked IFTs are more frequently late compared to non-booked IFTs, often due to resource unavailability. Stakeholders reasoned that IFT resources are unavailable due to reassignment to higher priority unscheduled work, such as 911 activity or IFT dedicated shifts are unfulfilled. The pre-booking process for IFT also relies on the predictability of the appropriate level of shifts being filled to implement the pre-booked appointments; however, in light of recent challenges with staffing shifts, this has also impacted the ability of EMS to be on time for pre-booked appointments.

Pre-booked appointments are less likely to be on time than unscheduled IFT requests

The IFT matrix colour coded system encourages Green and Blue requests (least urgent) to pre-book appointments as it will enable EMS to better plan and provide on-time service. However, the data shows that pre-booked/scheduled events are late more frequently than non-pre-booked IFT requests. This level of compliance disincentivizes clinicians from following protocol and leaves patients and clinicians frustrated with the IFT program. While these results are somewhat skewed by smaller SLA windows for pre-booked versus unscheduled pick ups (making it harder to meet SLA targets for a pre-booked pick up), there is nevertheless a clear pattern in the data which show that pre-booked IFTs are less likely to comply with SLA targets compared to unscheduled IFT's.

IFT SLA Compliance and Average Performance Delta by Priority

		SLA Compliance			Averag	e Performar	nce Delta ¹ (mi	elta ¹ (min)		
	Blue	Green	Yellow	Red	Blue	Green	Yellow	Red		
Pre-booked IFT	37.2%	29.8%	-	-	73	30	-	-		
Unscheduled IFT	57.2%	26.0%	49.0%	35.3%	31	54	45	65		

1: Performance Delta measured as the difference between the actual performance time (pick up or drop off) and the latest performance time following the IFT SLA matrix.

"EMS requests transports to be pre-booked to support timeliness, however, pre-booked performance is worse than non-pre-booked"

What stakeholders are saving

Frequency



Communication, coordination, and overcapacity hospitals contributes to ineffective utilization of IFT resources

Hypothesis 3: Partially Substantiated

The IFT program does not have the appropriate level of resources and it is detracting from frontline emergency response capability

Ineffective resource utilization due to coordination and communication Stakeholders are concerned that sending and receiving facilities do not coordinate transfers appropriately, including bed management and appointment logistics. Miscommunication and misalignment of priorities between stakeholders such as STARS/Air Ambulance Coordination, IOC, RAAPID, dispatch, EMS, and Clinical Operations may lead to delays and ineffective use of EMS resources.

Overcapacity hospitals significantly impacts IFT demand

What stakeholders are saying

The health system is strained and hospitals are over capacity; stakeholders highlighted that Edmonton has reached record highs of operating at ~153% of funded capacity. IFTs are used when hospitals are at capacity, however, patients get stuck when IFT volumes are high. Additionally, when hospitals are overcapacity, Clinical Operations lean on IFT/EMS to oversee patients in the ED park.

What stakeholders are saying

"Miscommunication with pick up location/timing results in delays"

"There is limited communication between key players" "Siloes exist between RAAPID, IOC and dispatch"





"Paramedics manage patients in hospitals when there are no beds; the issue is deeper than EMS, however, cracks in the system are Frequency visible through EMS"

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IFT/EMS resources are inefficiently utilized due to offload delays, which impacts SLA compliance and is more prevalent at hospitals with high IFT volumes

Hypothesis 3: Partially Substantiated

The IFT program does not have the appropriate level of resources and it is detracting from frontline emergency response capability

Allocation of resources and processes

Offload delays ineffectively utilize EMS resources. The return to service initiative initially improved EMS capacity, however, the issue persists and capacity gains have been stalled as hospitals are over capacity. Stakeholders identified hospital processes contribute to offload delays; for example, some facilities require the assessment of IFT patients in the ED, as opposed to direct admittance to the accepting physician's ward. The additional ED screening exacerbates the IFT resource challenges and increases demand in the ED. IFT capacity may also be impacted by 911 offload delays, as IFT resources are sometimes reallocated to manage 911 patients in hallways. Additionally, the resource availability of EMS and pilots are restricted by duty days; when resources reach the duty threshold, rural patients may receive long wait times and Clinical Operations shifts go beyond reasonable overtime.

Offload delays are prevalent at hospitals with high IFT volumes



What stakeholders are saying

"Return to service demonstrated an instant unit availability increase however, this has not been sustained"

"When pilots time out, transport teams may be left in a rural location waiting for another plane with an unstable patient"



Hypothesis 4 is substantiated as long offload delays ineffectively use resources and are a consequence of coordination challenges and overcapacity hospitals

Hypothesis 4: Substantiated

Resources undertaking IFT can be delayed offloading patients which can impact their ability to respond to emergency events

Substantiated

IFT offload delays may impact the response capability of EMS. Delays occur in part due to ineffective coordination between facilities, however, are primarily symptomatic of system failures such as bed shortages and overcapacity hospitals.

Ineffective coordination and communication¹

Pick up and drop off facilities do not coordinate appointment logistics which may result in IFT drop off delays. Multiple coordination systems also intersect with IFT which may have misaligned resources.

"Offload delays are typically due to bed shortages and logistics, not from staffing shortages."

Allocation of resources/processes²

The long offload delays ineffectively utilize EMS resources. The RTS initiative improved capacity, however, the issue persists.

"RTS demonstrated an instant unit availability increase however, this has not been sustained."

Overcapacity hospitals significantly impacts IFTs

The health system is strained and hospitals are over capacity. When hospitals are overcapacity, Clinical Operations lean on IFT/EMS to oversee patients in ED park.

"EDs are strapped for staff/space as well so we are offloading to a unit that doesn't have capacity either."

To deliver equitable care and timely care, system wide changes may be required

Key Insights

The mission of AHS is to deliver a healthcare system that is accessible. Therefore the system, structure, policy, governance, and funding should be set up to support this in a cost-effective approach, especially as specialized services are centralized. To support the achievement of the AHS mission, the EMS system should appropriately prioritize clinical need and urgency, and provide alternatives.

The IFT program in its current form is serving multiple purposes and the NCT program needs to be expanded to alleviate non-clinically justified demand placed on the IFT program. Focusing on streamlining the focus of the IFT/NCT program, introducing appropriate transport alternatives, matching the appropriate resources to clinical needs, integrating more virtual care delivery options and improving system coordination should improve overall program performance.

As health services continue to centralize in urban/metro regions, providing access to care and supporting the development of infrastructure for Albertans to access care through other means of transportation is a multi-sectoral challenge.

Hypothesis	Finding
Hypothesis 1: The IFT program is being used when there isn't a clinical justification	Substantiated - The unclear guidelines and outdated policies that define the IFT program are creating an environment in which there is reliance on the program to avoid passing the cost of transport onto patients when there isn't a clinical justification. The lack of clarity on the policies application, public perception of the program, and clinician confusion on the program have led to inconsistent patient experiences and billing practices. EMS takes on the cost of IFT requests, further disincentivizing facilities to think twice about using IFT when there isn't a clinical justification.
Hypothesis 2: There is a reliance on the IFT program for transport due to limited alternatives	Substantiated - The lack of affordable transportation options in rural and remote Alberta, legacy messaging and centralization and specialization of healthcare results in the reliance on EMS to access healthcare services even if there isn't a clinical need. There is a higher proportion of low priority events being requested in non-urban areas, indicating a lack of alternatives. The communities with sustained increases in IFT requests are non-urban communities in which private transportation options have decreased (e.g., cancellations of Greyhounds).
Hypothesis 3: The IFT program does not have the appropriate level of resources and it is detracting from frontline emergency response capability	Partially Substantiated - The IFT program does not have the appropriate level of resources, demonstrated by high utilization and low SLA compliance when demand is high. In rural areas, resources respond to both 911 and IFTs, resulting in the use of a higher resource level than required (however the IFT volume may not justify dedicated resources in some areas) and detraction from advanced units providing emergency coverage. In contrast, when demand is high in urban centres, 911 response utilizes IFT resources, which impacts IFT compliance.
Hypothesis 4: Resources undertaking IFT can be delayed offloading patients which can impact their ability to respond to emergency events	Substantiated - Data indicates IFT offload delays may impact the response capability of EMS, as the destination interval increases, SLA compliance decreases particularly in rural areas. Offload delays occur in part due to ineffective coordination between facilities, however, it is also symptomatic of system failures such as bed shortages and overcapacity hospitals.



Opportunities for the IFT and NCT programs



Prioritize addressing the policy/funding, and public messaging opportunities to address non-clinical demand on the IFT program

The following opportunities have been identified through stakeholder interviews, review of practices in other jurisdictions, and analysis of the key themes identified to substantiate the hypothesis tested. The opportunities have been grouped into the following categories:

- 1. Policy/funding focuses on regulation, policies, and funding responsibilities
- 2. Public messaging and internal education focuses on education of the role of EMS and IFT program
- 3. Alternative options and dedicated resources to relieve frontline focuses on alternatives to the IFT program and strengthening NCT program
- 4. Review of prioritization matrix and coordination focuses on helping stakeholders better understand the program and prioritization approach
- 5. Role of EMS/collaboration with Clinical Operations focuses on the importance of EMS integrating with the health system and how it impacts IFT/NCT

<u> 1</u> Policy/funding

Focuses on regulation, policies, and funding responsibilities

- Streamline the scope of the existing IFT program to reduce reliance/inappropriate use of IFT.
- Update the policies and regulations to reflect a more streamlined IFT and NCT program and reflect current health care options.
- Address the billing and policy implementation inconsistencies, including measurement of clinical justification to encourage appropriate use, improve patient experience and standardize billing practices.
- Reassess current program performance targets to reflect more realistic timelines and reflect current system realities.

Note: Additional description of the opportunities can be found in the appendix

High Priority
 Medium Priority
 Low Priority

Public messaging & internal education

Focuses on education of the role of EMS and IFT program

- Conduct an updated campaign that educates the public on health care options, including NCT options for those that do not require ambulance transport and the role of EMS to allow Albertans to better understand their health care options.
- Build into IFT data collection, an approach for capturing whether the services delivered were clinically appropriate to quantify the program 'misuse' and provide more targeted education based on data.
 - Provide education for clinicians about the IFT program/prioritization approach to increase their understanding of how services are delivered to improve the accuracy of information shared when requesting services and overall understanding of the purpose of the IFT program.

Alternative options, review of prioritization matrix and collaboration within AHS are also critical to addressing all IFT challenges

Alternative options and dedicated resources to relieve frontline

Focuses on alternatives to the IFT program and strengthening NCT program

- Further develop the NCT program, and introduce supports for patients to navigate these options to provide and educate Albertans on alternative transport options
- Leverage virtual care/telemedicine as an alternative option to transferring patients from rural communities
- Maintain dedicated IFT resources in urban areas to improve program performance and stop IFT resource reallocation to 911, as implemented in Edmonton in 2023
- Appropriately match resources in rural communities to IFT service requests to limit the impact on 911 demand (includes matching appropriate resources for air and coordination of long-distance transports)

Review of prioritization matrix and coordination

Focuses on helping stakeholders better understand the program and prioritization approach

- Improve two-way communication between EMS and hospitals on the status of patient transfers to reduce miscommunication and provide more transparency
- Simplify the prioritization matrix to reflect the streamlined scope of the IFT and NCT program
- Provide enhanced training for dispatchers, to improve dispatcher ability to prioritize resources, including understanding of the prioritization matrix and specifics of air dispatch

Role of EMS/collaboration with

Focuses on the importance of EMS integrating with the health system and how it impacts IFT/NCT

- Improve integration of coordination bodies (e.g., IOC, Dispatch, RAAPID etc.) responsible for enhancing patient flow/EMS transport and demand capacity management to improve EMS and health system performance and reduce the impact of offload delays which impacts IFT and other EMS operations
- Integrate with other parts of the healthcare system including focusing on primary care and community care to reduce long-distance travel if care can be managed in the community

Note: Additional description of the opportunities can be found in the appendix

High Priority Medium Priority O Low Priority

EMS program: Mobile Integrated Healthcare

Overview of the MIH program



The MIH program treats patients in the community who have challenges accessing traditional health services

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Over 300 partners across the province¹

92% of respondents are satisfied or very satisfied with results of MIH visits¹ Providers are 96% likely to recommend the program¹

75% of MIH events are estimated to have a one-to-one ED avoidance¹

Description¹

MIH is designed to address the needs of patients who have difficulty accessing traditional healthcare services. MIH can also help to reduce the burden on emergency departments and hospitals by providing care to patients who can be treated safely and effectively in the community. Target patient populations for MIH are: seniors and individuals with multiple comorbidities or complex chronic diseases often relying on acute care cognitive impairment or physical disabilities; stable patients requiring expedited work-up or short-term intervention needs to remain out-of-hospital; and substance use disorders and/or mental health issues.

MIH is delivered by **community paramedics, who are specially trained** to provide a variety of healthcare services, including assessments, treatments, education, and referrals.

The objectives of the MIH program are to:

Objectives and Outcomes¹

- improve access to healthcare for patients in the community,
- reduce the burden on emergency departments and hospitals, and to
- provide high-quality healthcare to patients in their homes or other community settings.

Community Paramedics are specially trained to provide short-term treatment for low-acuity illnesses, under the medical direction of Physicians and Nurse Practitioners. A cornerstone of MIH strategy is to reduce reliance on acute care to focus on community-based care. Meeting these needs in patient homes and communities reduces pressure on hospitals, enabling improved access to acute care services for those who require it.

Timeline of MIH Program Events^{1, 2, 3, 4}

2012

The MIH Community Paramedic program is implemented in the Calgary Zone.

2014

The MIH Community Paramedic program is implemented in the Edmonton Zone.

2018

The MIH Community Paramedic program is implemented province-wide.

2018 February - August

MIH expanded the Community Response Team (CRT) program into North, Central, and South Zones and incorporated the ATR program provincially during a phased rollout.

2019

The EMS to CRT Operational Protocol was implemented, which allowed EMS practitioners to refer residents of supportive living sites and long-term care facilities that met the criteria to the MIH program.

2023

Through Shared Response, 911 calls were redirected to 811, to MIH, enabling a new pathway for low-acuity patients that fit the MIH mandate.

2021 MIH Program Performance Report
 MIH overview files
 MIH 1 year comparison report Final Nov 26
 EMS/811 Shared Response

The MIH call centres receive referrals from a wide range of AHS partners and dispatch an MIH team to respond across all zones, with more urban presence

How does the program operate?¹

Patients receive a referral from one of the following sources: community healthcare staff or agency, physicians/clinics (including On-Line Medical Consultation), EMS crew or Shared Response (via 911 to 811 Health link triage). All calls are received at the MIH call centre and are further triaged. Calls can be referred ahead to EMS, homecare, family physician/specialist, online medical control physician, existing community services, MIH City Centre Team or MIH Community Paramedics. Dispatched MIH teams then reach patients who are assessed and/or treated, followed by a consult with the most responsible physician or online medical control physician to devise a care plan.

Geographic Coverage³

MIH and Community Paramedic Teams provide coverage to patients within a 50km distance from their home location.

- North Zone: Grande Prairie Three Community Response Teams (CRT), Peace River One CRT
- Edmonton Zone: Six CRT, One Crisis Response and EMS (CREMS) Team, One City Centre Team (CCT)
- Central Zone: Camrose Two CRT, Red Deer Three CRT
- Calgary Zone: Eight CRT, One CCT
- South Zone: Lethbridge Three CRT, Medicine Hat Three CRT

Measures of Success⁵

 Patient Events (No. of patients reached by MIH), Health Outcomes (No. of patients treated in the community), Emergency Department Avoidance (based on the following measures: administration of specific medications and blood analysis, urinary catheterization, EMS to CRT referrals, Canadian Triage and Acuity Scale [CTAS] score 1, 2 and 3, acute wound treatment.), Continuing Care Experience and Patient Experience.

1: 2023 SLT Presentation

- 2: HealthLink Presentation
- 3: MIH one pager
- 4: 2021 MIH Program Performance Report
- 5: MIH 1 Year Comparison Report6: Updated MIH website content (10-11-203)

MIH Resources⁶

Community Response Team (CRT) - CRTs are staffed by a single Community Paramedic and are supported by direct physician oversight. A Community Response Team is an SUV rather than an ambulance and staff wear a specific uniform. CRTs have all the necessary medical equipment to provide necessary diagnostics and treatments in the patient's home. They do not transport patients to the hospital, if transportation is required it will be facilitated with existing local EMS resources.

City Centre Team (CCT) - The City Centre Team is a mobile resource staffed by a single or two-person Community Paramedic and supported by direct physician oversight. The City Centre Team provides mobile acute care services focused on medical assessments, diagnostics and treatments for health concerns that are not currently being managed because of the difficulties association with homelessness, mental health issues and addiction.

MIH Coordination Centre - The MIH Coordination Centre focuses on connecting people to needed community healthcare services and working in collaboration with the patient's physician and care team to bridge medical assessments, diagnostics and treatments into the patient's place of residence. This is accomplished by either a care provider or EMS crew in the community identifying a need and referring the patient for short-term treatment. **There are two coordination centres**: the Edmonton location provides provincial support in and north of Red Deer and the Calgary location provides provincial support south of Red Deer.

The MIH program is supported by transient steering committees, a project charter guideline and early adoption of Connect Care



Governance and Accountabilities

The MIH program is managed through a **governance approach that is aligned with its organizational structure**. MIH is a program that sits within the AHS EMS, and the Director of MIH, reports to the Executive Director of EMS Operations.

As the MIH program has grown over the last 10 years. Upon funding being secured from other parts of the health system a steering committee is often established to dictate the scope of services, how existing services may need to change, guide implementation and support with developing the clinical guidelines. The steering committee remains in place while the funding is considered a pilot/grant and dissolves as the funding becomes stable.

The Director of MIH also often sits on the funder steering committee for programs that MIH

supports. For example, MIH is represented on the steering committee for the Edmonton Virtual Home Hospital. Through this approach, MIH representation occurs when decisions regarding how to use MIH resources are discussed.

Policy and Guidelines

The **MIH program is guided by a project charter** that has clearly outlined the program's vision, mission, guiding principles, goals and target populations.

The program is also **supported by numerous clinical treatment workflows** that define equipment,

assessment, documentation etc. that are required for the various treatments that are within the scope of MIH. The training modules that are developed for the program are also guidelines that are leveraged when delivering care.

Supporting Tools

MIH is the only part of EMS that leverages **Connect Care** to manage patient care. Connect Care has allowed MIH to view information on a patient's record, understand patient history and use the system to triage and schedule referrals.

An **MIH Patient Coordinator Workflow Manual** guides the MIH call centre on how to triage calls and schedule requests using the tools within Connect Care. All referrals are triaged through the MIH call centre.

Currently, confirmed MIH service requests are texted or called to staff however moving forward, MIH will also move to Logis and leverage the dispatch process. A different approach is used for scheduled events; these events are booked in advance based on the resource scheduled for the day of the service.

There is strong patient and provider support for positive health outcomes, however, KPIs and evidence of program performance and impact is absent

The program demonstrates strong patient experience, support from providers, and estimations of positive health outcomes and ED avoidance; however, clear KPIs and measurements of program impact do not exist.

Program outcomes based on MIH response level data and AHS evaluation reports:

- Patient events: The MIH program currently responds to ~2,000 events per month. The average MIH unit now responds to more events per month compared to the average ambulance responding to 911 (in the areas where MIH operates); MIH responds to ~60 events per unit compared to ~50 per unit for 911.¹
- Patient Experience: 92% of patient respondents were satisfied or very satisfied with their MIH visit.² The majority of patients reported high satisfaction with the MIH program and desire for expansion of the program, highlighting involvement in decision-making, support of continuity of care with physicians, ability to solve problems, and appreciation for treatment at home. Practitioners hope to maintain and expand the program while increasing education and awareness among practitioners.³ Positive support in AHS reports was consistent with feedback in stakeholder interviews.
- Health Outcomes: 92% of patients remained in the community after MIH treatment and the remaining 8% required a visit to EMS, ED or hospital within 7 days.² This suggests MIH is a potential substitute for EMS/ED and may help keep patients in the community, however, in the absence of system benchmarks it is difficult to interpret true system impact.
- ED avoidance: 75% of MIH events constituted a one-to-one ED avoidance, which was estimated based on treatments provided and accompanying CTAS scores in the community.² ED avoidance estimates suggest the program may divert ED visits. Although a comprehensive longitudinal assessment of the health system and economic impact is necessary to draw conclusions.





For MIH data, an "event" is the fundamental row-level entity. For 911/IFT data, it represents one scene for a 911 call (which can have more than one patient), or one IFT. However, since this MIH data comes from the same CAD system as 911/IFT data, it also uses an event as a base occurrence which requires an MIH response. However, given that MIH is not well-suited to the current CAD system, this might not carry the same meaning and should be interpreted as noted above.

1: MIH Response Level Data 2: 2021 MIH Performance Report

3: MIH 1 Year Comparison Report - October 2018 and March 2019

Analysis of the MIH program



The value of MIH is highly supported by providers, however, the hypothesis is substantiated due to the unclear system impact and high opportunity cost associated with the movement of paramedics



PwC | Alberta Health Services EMS Program Area Study

The review of the MIH program was completed from the perspective of assessing the program's integration and impact on EMS frontline service/demand, rather than being reviewed as a self-contained program. It is recognized that the original focus of the program (and one that is celebrated for its value) was on delivering care to patients in the community and playing a preventative role within the healthcare system. This focus has naturally resulted in the program not being as closely integrated with EMS operations and priorities. The following section outlines the hypothesis that was tested, key findings, and corresponding opportunities to explore.

o o⊂ Program Area	Hypothesis	Finding
Mobile Integrated Healthcare	Hypothesis 1: The scope of the MIH program has grown. It is no longer focused solely on alleviating pressure from EMS as it also supports scheduled work.	Substantiated -The MIH program responds to both scheduled and unscheduled work and there is a lack of evidence on the impact on 911 demand diversion, exhibited by the low volume of MIH response diverted through 911. There is strong support for the value that MIH delivers across the health system. However, due to the workforce shortages facing EMS, the system should align on where to prioritize the allocation of resources going forward. The current MIH approach may not be sustainable because the opportunity cost of the movement of experienced Advanced Care Paramedics (ACP) is high and the value to the system is unclear. Other jurisdictions have leveraged community paramedics in different ways to address the type of 911 demand that often does not require frontline EMS response or ED admittance.

Key takeaway: Providers and patients strongly advocate for the value MIH brings to the health system, through scheduled and unscheduled responses. However, the evidence of impact has not been produced and the opportunity cost of the movement of paramedics may impact 911 capacity. There is a need to evaluate the impact of MIH and carefully consider where resources are allocated given the current challenges facing the system and how MIH's goals could be more closely aligned with EMS priorities.

The strategy and governance of MIH has evolved separately from EMS, which has contributed to concerns regarding the scope of practice and workforce availability

*) Hypothesis 1

The scope of the MIH program has grown. It is no longer focused solely on alleviating pressure from the frontline as it also supports scheduled work.

Substantiated

The MIH program responds to both scheduled and unscheduled work and the impact on 911 demand diversion is limited. There is strong support for the value MIH delivers across the health system. However, due to the workforce shortages facing EMS, the system should align on where to prioritize the allocation of resources going forward.

Lack of alignment on strategy and vision

MIH's evolution over time has led to the program becoming siloed from EMS and there is a lack of clarity among health system stakeholders on how to leverage the program and concern over duplication of services.

Misaligned governance to core EMS

MIH's organic growth has been independent of the needs of the EMS system and the involvement of EMS in the governance and decision-making process has been limited. This is compounded by successive changes in EMS leadership throughout MIH's history.

Expanded scope of practice

There is interest in expanding the scope of practice for paramedics that support the MIH program, however, as MIH grows towards offering more scheduled work, the reliance on paramedics as the primary resources needs to be evaluated.

Availability of the workforce

The MIH program has a high supply of applicants while frontline EMS paramedics are facing issues with fulfilling shifts. There may be an opportunity cost of paramedics moving from the frontline to the MIH program, at a time when there is a need for experienced paramedics.

There is strong support for MIH innovation and health system role, however, there is an opportunity cost associated with lack of evidence and 911 diversion

Hypothesis 1

The scope of the MIH program has grown. It is no longer focused solely on alleviating pressure from the frontline as it also supports scheduled work.

Substantiated

The MIH program responds to both scheduled and unscheduled work and the impact on 911 demand diversion is limited. There is strong support for the value MIH delivers across the health system. However, due to the workforce shortages facing EMS, the system should align on where to prioritize the allocation of resources going forward.

Strong support for the unique skill set and innovation of Community Paramedics (CP)

CPs are uniquely positioned to support the MIH program given their background in frontline emergency response. As a result the MIH program can respond to complex scenarios and there is high praise among patients and partners for their contribution.

High degree of satisfaction articulated by patients and service providers

The MIH program is appreciated by its partners and patients for its role in being able to deliver care in the community and avoiding acute admissions/ED visits. However, robust evidence and analysis of its impact has not been created.

Lack of research and evidence

Evaluations of the MIH program to date have been tactical and descriptive in nature. Although the program has grown and there is a desire to expand the program further, an economic assessment or longitudinal health system impact study has not been conducted.

Limited 911 diversion

The integration of MIH to 911 diversion is limited. The current exclusion criteria, limited availability, and lack of use of Community Paramedicine in supporting the 911 system has resulted in low adoption. Although MIH has integrated with 811 recently, the referral rates are low.

There is a lack of clarity of MIH strategy and governance to core EMS

Hypothesis 1: Substantiated

The scope of the MIH program has grown. It is no longer focused solely on alleviating pressure from the frontline as it also supports scheduled work.

Lack of alignment on strategy and vision MIH has evolved to be siloed from EMS and there is a **lack of clarity around the program's strategy, service offerings, and place within the core business of EMS and the health system.** Additionally, stakeholders shared a misconception about duplication of services in certain scenarios where CPs are unique. However, stakeholders identified some overlap in home care scope, such as IV access, where providers value CPs due to factors such as response rapidness and ability to execute without orders. Community partners and providers shared a desire to better understand which cases are suitable for referral.

Misaligned governance to core EMS

MIH has grown organically and independently from EMS. In the current strained landscape, there is inadequate governance to enable the alignment of EMS toward a common goal. EMS has not had extensive oversight over MIH growth as initiative funding has been derived from other areas of AHS and the government of Alberta. Each functional unit (i.e. virtual home hospital) has been established to meet the needs of a specific patient population or health system gap identified by Clinical Operations. Throughout the history of the program, there have been numerous changes in EMS leaders which has contributed to the lack of alignment between MIH and EMS priorities.

What stakeholders are saying

"EMS and some referral partners do not understand what scenarios MIH is suitable to support"

"Homecare and MIH can do the same job with IV access, however, homecare takes longer and has some other scope limitations without orders"



What stakeholders are saying

"5-10 years ago it was standard to encourage MIH to go out and do good things with little oversight, but we have to move into today's world"

"It is extremely challenging to have consistency, decision making and program continuity with that continued level of SLT governance change"



Stakeholders are concerned with the inclusion of scheduled care in the scope of MIH and are interested in evaluation of multidisciplinary teams

Hypothesis 1: Substantiated

The scope of the MIH program has grown. It is no longer focused solely on alleviating pressure from the frontline as it also supports scheduled work.

Expanded scope of practice

There is concern about expanding the scope of practice for MIH paramedics, and interest in evaluating if other care providers, such as Nurse Practitioners (NPs) may be suitable for the role. There is concern about the focus of MIH shifting from unscheduled/episodic to

scheduled/primary/continued care and for longer durations of time. Although, others identified scheduled work is for brief interventions which would otherwise be conducted at acute centres. There is also interest in expanding the scope to include a wider patient population, additional assessments with POC tools and administration of other drugs. While some service offerings may be supported by other clinicians, certain CP skills are viewed as integral to MIH, such as assessment and intervention for urgent issues, collaboration with physicians, and flexibility to provide prompt care in any location. NPs and others may face legislative barriers or competency gaps to providing the same service offering as MIH.

MIH primarily responds to low-acuity events for short-term, episodic and unscheduled care



- 50% of the 34 MIH units are typically allocated to unscheduled work across the province, while 35% handle scheduled work and 15% are dedicated to Virtual Hospital, which can be scheduled or unscheduled.¹
- The vast majority of the 2,000 MIH events per month are low-acuity. However, MIH is responding to fewer high (D/E) and medium-acuity (B/C) events and more low-acuity events, which may indicate a slight shift in focus towards non-urgent and chronic issues.
- MIH predominantly supports patients for short durations. **The average number of appointments per patient is 2.9.** Additionally, 18% of patients are seen over a period of two consecutive weeks. Of these patients, 82% only have one occurrence of appointments over two consecutive weeks. In 2021, the referral process changed to refuse any referrals greater than 2 weeks without manager approval.²

What stakeholders are saying

"MIH's core business is episodic care for vulnerable populations, chronic treatment up to 3 years is uncommon and not a desirable scenario"

"There's no reason we can't use primary care paramedics with ACPs or NPs. A multidisciplinary team may be necessary as the program grows"

"The core group should be paramedics as there are restrictions for NPs such as location of care"

Frequency



1: MIH Capacity Guidelines (allocation is flexible to patient and provider needs)
 2: AHS MIH appointment data for Jan 2018 – Jul 2023 via email 10.30.23

Advanced care paramedics are highly interested in the MIH program, however, there may be an opportunity cost due to the movement of paramedics

| Hypothesis 1: Substantiated

The scope of the MIH program has grown. It is no longer focused solely on alleviating pressure from the frontline as it also supports scheduled work.

Availability of the workforce

The MIH program is highly desirable amongst ACPs and recruitment is met with a high supply of applicants. This is in contrast with the shortage of frontline EMS paramedics and difficulty filling shifts for 911 response. The growth of community paramedics is supported by the professionalization of the workforce. In addition, MIH retention is benefited by desirable working conditions and staff satisfaction through the expanded role and environment of continued care. There may be an opportunity cost due to the movement of experienced ALS paramedics to the MIH program and loss of emergency response capability and integral roles such as preceptors.

Community Paramedicine requires a skilled and experienced paramedic workforce

- Across the province, **MIH staff advanced care paramedics practicing the ACP scope with an additional five weeks of in-class training and four weeks of call rotation. There is currently a total of 164 employees**, including 85 full-time, 44 part-time and 35 casual.
- Across all jurisdictions evaluated, Community Paramedicine programs utilize experienced and higher trained paramedics to deliver innovative services above the traditional role of paramedics. Additional training ranges from short courses to master's degrees which enable CPs to practice more independently and to perform a wider range of skills with less medical oversight.

What stakeholders are saying

"There are not enough advanced care paramedics to staff frontline ambulances, however, we are growing other programs"

"We are struggling to our execute core business, including clinical training due to resource shortage of preceptors - MIH is a huge opportunity cost"

"Staff may drop FT EMS positions to join as a casual for MIH until a FT position opens"

"Paramedics should have an avenue to progress, otherwise they will burn out"

Frequency



Funding from multiple government and AHS sources has driven the growth of MIH and with it, the number of MIH dedicated ACP resources

Hypothesis 1: Substantiated

The scope of the MIH program has grown. It is no longer focused solely on alleviating pressure from the frontline as it also supports scheduled work.

ACP resources dedicated to MIH have grown significantly over the past 10 years, driven by funding from multiple government and AHS sources

• Over the past five years, following the 2018 major expansion, the ACP count in the MIH program has grown by 22%. Over the past 10 years, the MIH ACP resource count has increased by 800%.^{1,2}

•• 20	012 · · · · · · 2013	· · · · · · 2014 · · · · · ·	· 2015 · · · · · · 2016 ·	· · · · · 2017 · · · ·	2018 20	019 · · · · · · 2020 ·	•••••• 2021 ••••••	2022 · · · · · 2023 · · · ·
	Calgary Zone Community Paramedic Program	l Edmonton Zone Community Paramedic Program	Calgary Zone City Centre Team	 Calgary Zone Virtual Home Hospital	 Provincial Expansion	ا Calgary Zone Virtual Home Hospital Expansion	ا VHH and Continuing care	ا EMS/ED visit and VHH
Funding	HQCA	EMS Operations	AHS and Addiction and Mental Health	AHS Clinical Operations	Provincial Governmo - Enhanced Care in t Community Initiative	ent the Operations	AHS Clinical Operations	EMS AEPAC Grant and Alberta Surgical Initiative
# of ACPs	+10 ACPs	+6 ACPs	+4 ACPs	+6 ACPs	+48 ACPs	+2 ACPs	+6 ACPs	+8 ACPs

1: 2023 SLT Presentation

2: Resource count growth assumes ACP positions have not been removed.

Providers and patients articulate strong support for the unique skill set of CPs and impactful role in the system, however, robust evidence has not been produced

Hypothesis 1: Substantiated

The scope of the MIH program has grown. It is no longer focused solely on alleviating pressure from the frontline as it also supports scheduled work.

Strong support for the unique skill set and innovation of CPs **MIH is agile and able to meet the needs of patients who fall through the cracks** and provides excellent patient experience due to CP's unique skills. CPs are flexible and able to tackle problems in urgent and complex scenarios, demonstrating their suitability to care for vulnerable populations such as seniors and individuals who are un-housed, possess multiple comorbidities, and have high rehospitalization rates. There is high praise amongst patients and partners who hope to expand the number of MIH units and hours.

High degree of satisfaction articulated by patients and service providers MIH stakeholders view the program as part of the broader health system that **makes an impact through reduced ED/acute admissions and by expediting discharge from the hospital.** The target patient groups are likely in alignment with the population that contributes to increasing EMS call volume, however, a clear demonstration of impact is lacking. **While there is anecdotal support for the positive impact on the system, robust evidence has not been produced.**

What stakeholders are saying

"MIH is a tool used by acute care partners because other health resources do not meet patient needs"

"We can list countless examples where MIH was used as a stop gap to meet the needs of vulnerable populations without other supports" Frequency



What stakeholders are saying

"MIH is highly connected to the community, agencies and partners that are all aligned to fill gaps in the health system"

"MIH has been hugely helpful with acute care avoidance and benefits of care in place for seniors with urgent care needs"

Μ

Frequency

Н

Longitudinal research, and comprehensive assessment of health system impact is absent to assess future investment in resources

| Hypothesis 1: Substantiated

The scope of the MIH program has grown. It is no longer focused solely on alleviating pressure from the frontline as it also supports scheduled work.

Lack of research and evidence

Evidence of MIH's impact is lacking, including measurement of KPIs or longitudinal research. Current reporting is primarily tactical and descriptive of program operations and participant feedback, however, does not establish meaningful conclusions of program value rooted in long-term data and benchmarks. Historical barriers to data tracking and research are insufficient resources, lack of comparable benchmarks and challenges of data collection from vast partners. Despite large investments and expansion, a comprehensive return on investment and opportunity cost exercise has not been conducted.

Quality assurance assessments do not sufficiently provide evidence of program impact

 Health Systems Evaluation and Evidence conducted a 1 year comparison report to evaluate the program process and outcomes of 2018 provincial expansion which included an estimation of ED avoidance. However, the review was focused in quality assurance and questions remain regarding long-term evidence of the health system and economic impact.

What stakeholders are saying

"There has not been an ROI exercise to determine if the loss of frontline resources is justified and if the significant investment benefits the system"

"There are opportunities for longitudinal research to understand how people are kept out of hospitals, and help outside of EMS would be beneficial"



The traditional approach is unsustainable; Alberta should expand the limited 911 diversion to facilitate the right care, at the right place, at the right time

Hypothesis 1: Substantiated

The scope of the MIH program has grown. It is no longer focused solely on alleviating pressure from the frontline as it also supports scheduled work.

Limited 911 diversion

The direct connection of MIH to 911 is limited; there is a new partnership with Healthlink that diverts 811 calls to MIH, however, volumes are low. The low adoption is due to exclusion criteria and low threshold for risk; ~50/1500 (~3%) daily 911 calls are transferred to 811 and the majority are transferred back to 911 for various concerns such as when transfer is required. Additionally, limited MIH availability prevents CP response from 811 in many cases. An indirect 911 connection is the guidance to community partners and health practitioners, to refer patients to MIH as an alternative to 911. There was a strong appetite amongst stakeholders for increased 911 diversion by MIH through secondary triage and expansion of the 811 MIH diversion program.

Alberta's MIH response to 911 is limited, while secondary triage is common in jurisdictions with CPs



- 811 responds to 49 calls daily compared to the average 911 demand of 1574 daily.
 51% of 811 calls are returned back to 911, primarily due to transportation needs (28%) or other clinical concerns (19%).¹
- In the first few months since the inception of the MIH and HealthLink partnership, the MIH program has accepted 67 referrals from 811 (1.2 daily).²
- MIH possesses 33 response units which are not emergency response capable, as units are categorized as class 3 ambulances and do not have lights and sirens, however, events are tracked in CAD and visible to dispatch.
- Secondary triage safely diverts non-emergency to Community Paramedicine programs in other jurisdictions. For instance, in 2021-22 the Tasmanian Ambulance Service (Australia) performed over 10,000 secondary triages, which resulted in 38% of calls that did not require an emergency ambulance response. Additionally, a study in Ireland suggested that 70% of a cohort of low-acuity patients responded by ambulance were suitable for management in the community.



"The nonexistent CP pathway directly through 911 is a huge opportunity cost"

"There is room to grow the Healthlink/MIH program and leverage CPs as a response rather than transferring 811 calls back to 911"

Frequency



1: 811 Shared Response Return to EMS data, Jan 16 - Oct 27, 2023 2: AHS MIH Healthlink data for Aug 29, 23 - Oct 24, 2023 via email 10.24.23

There is an opportunity to evaluate the impact of MIH and determine the role MIH may play in addressing capacity and workforce challenges

Key Insights

The MIH program is widely appreciated by both its health system partners and patients. The program leverages the expertise of ACPs, who are often identified as having the right experience and skill set to manage and provide care in the community.

The MIH program's goals include to: improve access and provide innovative approaches to mobile medicine for healthcare that traditionally requires an EMS, ED or hospital admission. As the program continues to grow there is an opportunity for AHS to take pause and define what role community paramedics can have to address the capacity and workforce challenges facing the EMS system. The MIH program benefits the health system as a whole through keeping patients in the community, however, the current approach to MIH program management has resulted in MIH growing adjacent to the direct needs of the EMS system.

There are potentially more opportunities to formally integrate community paramedics into EMS to provide more direct relief to the challenges facing the EMS system. If it is decided that community paramedics could play a more central role in 911 demand diversion, the MIH program would have to change its current priorities and operations.

	Program Area	Hypothesis	Finding
n	Mobile Integrated Healthcare	Hypothesis 1: The scope of the MIH program has grown. It is no	Substantiated -The MIH program responds to both scheduled and
nd		longer focused solely on alleviating pressure from EMS frontline as it also supports	unscheduled work and there is a lack of evidence on the impact on 911 demand diversion, exhibited by the low volume
le		scheduled work	of MIH response diverted through 911. There is strong support for the value that MIH delivers across the health system. However, due to the workforce
ke			shortages facing EMS, the system should align on where to prioritize the allocation of resources going forward. The current MIH approach may not be
e			sustainable because the opportunity cost of the movement of experienced
t wing			ACPs is high, and the value to the system is unclear. Other jurisdictions
			have leveraged community paramedics in different ways to address growing 911 demand that often does not require
the			admittance.



Opportunities for the MIH program



Redefining the core purpose of the MIH program and completing a comprehensive program evaluation are key to inform future resourcing decisions

The following opportunities have been identified through stakeholder interviews, review of practices in other jurisdictions, and analysis of the key themes identified to substantiate the hypothesis tested. The opportunities have been grouped into the following categories:

- 1. Strategy, governance and mandate focuses on resetting the purpose of the MIH program, and decision making process
- 2. Longitudinal research and communication of value focuses on the need for evaluation of the impact of the MIH program
- 3. Scope of practice and resource pool focuses on workforce related issues and identifying alternatives to recruiting from EMS frontline
- 4. Secondary triage and connection to health system focuses on connection of MIH to the EMS/health system

Strategy, governance and mandate

Focuses on resetting the purpose of the MIH program, and decision making process

- Define the core purpose of the MIH program and the role MIH will play in the health system & its role in supporting scheduled work.
- Develop a decision-making process that aligns with the core purpose of the MIH program when evaluating opportunities to grow MIH.
- Evaluate the opportunity cost of EMS resources transition from frontline to MIH while EMS continues to face resourcing constraints.
- Reassess current program performance targets to better communicate its impact and program outcomes.

Note: Additional description of the opportunities can be found in the appendix.

Longitudinal research & Communication of value

Focuses on the need for evaluation of the impact of the MIH program

- Conduct a comprehensive evaluation of the program to determine MIH's health system impact.
- Communicate the scope of the program, its purpose, and role in the system to EMS and health system partners to increase program clarity.
- Expand MIH data collection, standardization, and measurement of KPIs to support more robust analysis, in line with EMS reporting and analysis.
- Identify the feasibility of integration between dispatch/scheduling applications and clinical documentation systems to reduce workflow issues and increase data sharing among partners.

Alternative staffing models and expansion of secondary triage may help mitigate workforce challenges and 911 demand



Focuses on workforce related issues and identifying alternatives to recruiting from EMS frontline

- Conduct an analysis to identify the feasibility of a staffing model that includes alternative resources to be utilized in the program to reduce the impact on EMS frontline workforce.
- Conduct targeted recruitment of paramedics for the MIH program from outside of Alberta or through its own dedicated workforce pathways (aligned with post-secondary education programs).
- Enhance the education requirements for Community Paramedics to align with the educational practices of other jurisdictions and allow for a greater scope of practice and independence.

📩 Secondary triage &

ビ connection to health system

Focuses on connection of MIH to the EMS/health system

- Review the secondary triage approach that is currently set up between 911 → 811 → MIH program to increase referral volume, including alternative response options such as NCT.
- Review the **role of Community Paramedicine/MIH** and enhance its focus on the support of rural and remote communities.
- Review the **pathways and associated referral criteria** to improve clarity of how patients can be referred to MIH.
- Build relationships with other parts of the healthcare system to allow MIH to refer patients onward for longer-term or ongoing care.

Note: Additional description of the opportunities can be found in the appendix

High Priority Medium Priority O Low Priority

Resourcing: Ground Ambulance Resource Capacity

Overview of Ground Resource Capacity



EMS ground resources are spread across the province, primarily servicing 911 calls and interfacility transfers

How does the program operate?¹

AHS has performance based agreements that have requirements for adherence to a standard set of medical protocols and quality management system. These standards and procedures are continuously improved. Both contracted and health authority EMS practitioners follow these standards and are supported with access to on-call medical consultation with emergency physicians. Additionally, the Alberta College of Paramedics provides governance and licensure to the Paramedicine profession in Alberta.

Geographic Coverage:¹

Fleet and Resources:²

EMS is provided provincewide, and operates locally across AHS' five geographic zones: South, Calgary, Central, Edmonton and North. The province has access to 858 total resources. There are 535 direct delivery (non-contracted) ambulances, 91 of which are IFT-dedicated. Of the 858 total units, 654 are ALS units, and 154 are BLS.

Measures of Success:¹

Ground ambulance performance is primarily measured by resource availability and the ability to respond to events promptly. The review of ground ambulance performance is based on:

- P90 Response Interval Compliance, which measures the time it takes for a unit to arrive on scene at an event and is publicly reported for life-threatening (Delta, Echo) events. Measures vary by event priority and location.
- EMS shifts fulfilled by day for different unit station communities.
- Utilization of EMS resources, measured as the percentage of time spent responding to events.
- Unit destination interval, which measures how long units spend at the destination before being cleared of the event.

Note: All analysis, unless otherwise stated, response compliance is calculated for event determinants from Bravo to Echo.

1: Profile 23-07-07 2: AHS Emergency Medical Services - Response Prioritization System Outline Feb 22, 2022

AHS Emergency Medical Services - Response Prioritization System Outline²

Traditionally, 911 events in Alberta are graded using a Determinant parameter ranging from A to E, where E warrants the most urgent response. Events with a Determinant of B or higher typically have a unit using lights and sirens' when responding to events.

However, there is also a colour-coded system for triage and prioritization of emergency response.

Purple: Immediate or life-threatening event like a cardiac arrest for which the closest resources are dispatched, including suburban and rural. This could interrupt an end-of-shift event.

Red: A critical or immediate event response required for which the closest resources are dispatched, including suburban and rural. This could interrupt an end-of-shift event.

Orange: An urgent or potentially serious but not life-threatening event, for which fresh units and metro ambulances are dispatched in metro areas.

Yellow: Non-urgent or non-serious event, for which fresh units and metro ambulances are dispatched in metro areas.

Blue: Non-urgent or non-serious event, for which, if no secondary triage applies (e.g. 811), it is marked as a Yellow event.

The relationship between event Determinant and colour priority is not always direct, as events with the same Determinant can have different colour priorities.

Overall ground ambulance performance has seen significant change recently, though resource usage has remained mostly stable



Summary of Ground Ambulance Resource Capacity Performance

- Overall response interval compliance is currently at 78% (-12% to target). In non-urban areas, response interval compliance is generally better than in urban areas.
- Urban areas saw decreasing response interval compliance from 2020 to 2022, but compliance has improved as of 2023.
- Metro units have higher destination intervals than IFT and suburban/rural units. The Return to Service initiative shows an immediate and significant decrease in the average destination interval.
- The average unit hour utilization for IFT-dedicated units is typically around 75%. Metro units also show high unit hour utilization, spending more than 50% of their time responding to events. For Suburban/Rural units, this is typically below 25%.
- The average number of shifts fulfilled per day is generally stable but trending down in 2023 for Metro and Suburban/Rural units.

Response Interval Compliance

Data covers the period from Jan 2018 to Aug 2023

Distribution							
A - 24.5%	Determinant	Urban	Non-urban	rban Total			
B - 18.7%	B ¹	67.3%	89.2%	72.2%			
C - 25.0%	C ²	73.3%	89.2%	76.5%			
D - 28.9%	D	82.6%	91.2%	84.4%			
E - 2.1%	E	92.6%	94.5%	93.0%			

O² - 0.7% 1: Resp

Determinant

1: Response compliance measured against provided targets, despite lower operational focus on P90 Response ITV for lower-acuity events.

2: O-level events are the lowest priority, and are typically grouped with A-level events. They make up a small portion of total events, and are often excluded from analyses due to their low operational priority and impact.

3: Some data conditioning was performed to correct for extended spikes in an outlier period using a corrective function.
Analysis of Ground Resource Capacity



Both hypotheses are substantiated as analysis shows ground ambulance resource capacity is insufficient to meet EMS demand, however there are multiple factors to consider



Program Area	Hypothesis	Finding
Ground Ambulance Resource Capacity	Hypothesis 1: AHS EMS does not have sufficient resources to respond to emergency demand given the current approach	Partially Substantiated - Resource levels alone do not paint the full picture, but with continued increases in demand expected, AHS cannot meet response targets while continuing with current staffing levels, inability to fill shifts, and destination wait times. An inability to fill shifts does not position AHS to respond to increasing 911 demand.
	Hypothesis 2: Resources are over-utilized, which contributes to an inability for AHS to meet response time targets	Substantiated - Limited local response capacity and long destination intervals reduce the system's ability to respond to events in a timely manner. Resource capacity increases should be coupled with decreases in offload delays to meet these targets.

Key takeaway: AHS EMS cannot meet 911 response time targets, largely due to resource capacity and offload delays. Event response capacity is hindered by low shift fulfillment, and offload delays exacerbate the problem. To meet current demand and targets for D/E determinant-based events, resource capacity should be increased by approximately 10-20%. However, with continued expected growth in demand for EMS, increasing resourcing alone will be insufficient to meet response targets, and system-level changes will also need to be implemented.

Current resource levels cannot support forecasted increased demand, however, Hypothesis 1 is partially substantiated as other factors also impact response times

Hypothesis 1

AHS EMS does not have sufficient resources to respond to emergency demand given the current approach

Partially Substantiated

With rapidly increasing demand for emergency services and inadequate resource capacity, AHS is failing to meet its response time targets. Performance issues are expected to worsen as demand increases, jeopardizing not only 911 responses but also the IFT program which relies on EMS resource availability. Response capability is significantly reduced when each unit has to respond to more events. **However, resourcing levels and shift fulfillment are not the only bottlenecks, as the time spent by resources at the destination waiting to clear events is strongly correlated with response interval compliance**.

Demand for EMS services is rising and will continue to increase

Demand for 911 services has increased in recent years, and is projected to continue to increase due to economic drivers and population growth. Between 2018 and 2022, a 40% growth in 911 demand was observed.

Current resource levels cannot support increases in demand

Response interval compliance for 911 calls drops when monthly demand is above average, especially in urban areas. Low shift fulfillment contributes to insufficient resources to respond to demand.

The system's ability to manage demand is being tested

Increasing demand per unit has been shown to strongly affect AHS' ability to meet response time targets, especially beyond a critical threshold for unit strain measured via demand per unit.

Resourcing levels do not paint the full picture

Average destination intervals are currently over the RTS targets, negatively impacting both EMS capacity and response times.

Demand for EMS services is rising, and will continue to increase in coming years

[Partially Substantiated] Hypothesis 1: AHS EMS does not have sufficient resources to respond to emergency demand given the current approach

Demand for EMS resources in Alberta is increasing, and this is expected to continue to increase. Key common drivers for demand (apart from population) for both 911 and IFT services are measures of economic activity such as the exchange of goods or household expenditure, which are typically linked to statistics such as crime rate, population health and activity, etc.



ᇥ **Demand modelling methodology**

- Used historic monthly demand in a Local Geographic Area (LGA) for all event determinants (A-O)
- Defined three clusters of LGAs with similar demand and population characteristics
- Use a variance-stabilizing transform to account for increased variability in areas with higher demand
- Configured a specialized function to capture yearly seasonal impacts
- Enriched the demand data with exogenous demographic variables
- Used a mixed-effects model, which takes into account random regional sampling effects, to forecast demand

Note: Confidence intervals displayed reflect the confidence in the average expected demand at a point in time. Confidence intervals are indicative of the precision of the average and not a reflection of total variation.

Demand for EMS services is rising in some regions faster than others, and even decreasing in some regions

[Partially Substantiated] Hypothesis 1: AHS EMS does not have sufficient resources to respond to emergency demand given the current approach

Overall forecasts show a continued increase in demand for EMS services for all LGAs over the next few years. At the LGA level,¹ the **growth** in EMS demand may increase by up to 21%, or decrease by as much as 14% relative to the average demand growth observed between January to July 2023.



1: LGA's represent a portion of a community or group of communities, and are defined using the official mapping found at https://open.alberta.ca/dataset/a14b50c9-94b2-4024-8ee5-c13fb70abb4a/resource/70fd0f2c-5a7c-45a3-bdaa-e1b4f4c5d9a4/download/official-standard-geographic-area-document.pdf

Demand for EMS services is primarily driven by population growth and socioeconomic factors

[Partially Substantiated] Hypothesis 1: AHS EMS does not have sufficient resources to respond to emergency demand given the current approach

Alongside population increase, economic activity which is indicative of crime rates, population health and other socioeconomic factors drives demand at macroeconomics and household levels. EMS demand will continue to rise based on changes in these economic drivers.

Alberta Population Forecast

911 Demand Economic Drivers

- Employment, Utilities
- Inter-provincial Out-migration
- Rate of Population Increase
- · Imports of Goods to Other Provinces
- Household final consumption expenditure: Durable Goods
- · Employment, Alberta, Other Primary Industries

Evolution of Economic Drivers of 911 Demand

Employment, Utilities



Imports of Goods to Other Provinces



Inter-provincial Out-migration



Household final consumption expenditure Durable Goods



Natural Rate of Population Increase



Employment, Other Primary Industries



PwC | Alberta Health Services EMS Program Area Study

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Current resource levels cannot support further increases in demand

[Partially Substantiated] Hypothesis 1: AHS EMS does not have sufficient resources to respond to emergency demand given the current approach

Demand for 911 services has outpaced population growth. Across the province, monthly demand for 911 resources has grown by approximately 50% relative to the average in 2018. At current demand and resourcing levels, response times are demonstrably worse when demand is above average in urban areas, which suggests that the system will not be equipped to handle future increases in demand.





The system's ability to manage demand is being tested, as lower shift fulfillment impairs the ability to meet response targets

[Partially Substantiated] Hypothesis 1: AHS EMS does not have sufficient resources to respond to emergency demand given the current approach

With current resourcing levels, provincial average P90 response time compliance decreases when the average number of active shifts at any given time is lower. This inability to fill and log shifts ultimately reduces the response compliance rate, as units experience more strain. However, non-urban areas do not seem as sensitive to these issues. **The system withstands increases in demand per unit**¹ **up to a critical point, but beyond this, the ability to respond to further increases is limited**. This is shown for urban areas through an increase in response time variance when demand per unit exceeds some threshold (for this level of aggregation, 5 events per unit per shift). While decreases are consistent below the threshold, the odds of large scale drops in compliance increase beyond it.



1: Demand per unit is calculated by taking the daily number of events serviced by a given unit station community, dividing by the number of units logging shifts in that community, and then averaging across all communities for a given month.

There is an opportunity to develop new measures to show the strain placed on resources due to rising demand and better evaluate system performance

| [Partially Substantiated] Hypothesis 1: AHS EMS does not have sufficient resources to respond to emergency demand given the current approach

The number of resources allocated to deal with localized demand can be used in support of creating a new measure for evaluating and controlling system performance. This measure contrasts the deployment of resources relative to the local demand (herein referred to as System Performance Index, or SPI) and in this analysis, unit station communities are clustered into three groups based on local factors, including their demand, resourcing levels, and average destination interval times. The relationship between SPI and average response time variance shows that appropriately matching resourcing to demand will not only improve response time compliance but may also improve response time consistency.



Big Idea

A new measure such as the SPI could serve as a valuable outcome-based measure to evaluate if local resourcing levels match expected demand and other regionally relevant factors, ultimately helping maintain consistency in response interval compliance. For example, using this measure, response compliance is typically better (and more consistent) when the SPI is 0.5 or higher. The development of similar new measures can create a balanced scorecard for EMS performance, which expands beyond response time and is sensitive to the complex nature of EMS (e.g. resource readiness, structural design, etc.).

For cluster 1, there is no observable relationship in response time variance. This may be attributed to either:

a. Not enough demand in these regions to observe this phenomenon

b. The system is not strained in these regions since the SPI is almost always over 0.5.

Resourcing levels do not paint the full picture – offload delays are closely linked to system strain and performance

[Partially Substantiated] Hypothesis 1: AHS EMS does not have sufficient resources to respond to emergency demand given the current approach

Resource availability is not the only driver of an inability to achieve response time targets. High average destination intervals (i.e. the amount of time a unit spends at the drop off facility before it's clear of the event) are also strongly correlated to response interval compliance, as well as demand per unit. Increasing destination intervals places more demand on individual units, decreasing 911 response performance. Improvements in the province-wide average destination interval are expected to result in improved 911 response interval compliance, though the provincial average is still beyond the Return to Service target of 45 minutes.



Hypothesis 2 is substantiated due to low local unit capacity and required resource capacity increase of 10-20% to meet response time targets

Hypothesis 2

Resources are over-utilized, which contributes to an inability for AHS to meet response time targets

Substantiated

The local capacity of units to respond to events is a critical factor in determining response times. An inability to fill shifts (even with contracted providers) places a heavier burden on individual EMS resources, increasing unit utilization and decreasing system capacity. Furthermore, when these units do respond to events, they typically spend significant amounts of time at the destination before they are clear of the event, increasing their individual utilization but reducing the local area's capacity and preventing them from responding to other events. When holding all other system factors and variables constant, to achieve response time targets for high-acuity (i.e. D/E) events, resource capacity (as measured by shift fulfillment) should increase by 10-20%.

Low local unit capacity is limiting response times

The amount of units available locally to respond to events is strongly linked to response times. However, long destination intervals are consuming resource availability and reducing local response capacity.

EMS is unable to fulfill the shifts required to meet 911 response targets

Lower shift fulfillment rates (through both AHS EMS and contracted providers) are linked to lower local front-line response capacity and larger response times (i.e. worse response target compliance).

The units which do log shifts are being strained

Low shift fulfillment increases the load on individual resources, increasing their unit utilization, which is correlated with increased response times.

Increases in resource availability are required to meet response targets

To meet response targets in the current environment (e.g. with identical offload delays), an increase in the number of shifts fulfilled on the order of 10-20% is required, though beyond this point the returns associated with increased resource capacity are diminished.

Maximizing the local number of active units is critical for providing adequate response times

[Substantiated] Hypothesis 2: Resources are over-utilized, which contributes to an inability for AHS to meet response time targets

To measure the system's ability to respond to events locally, a value referred to as the local relative capacity was created. This was established for each event by calculating the number of active units in the responding unit station community at the time of the call, then dividing this by the monthly observed maximum for this unit station community. The local relative capacity is not high enough in urban areas to meet response time targets. **Reductions in average local capacity are linked to increased average destination interval times.**

Local capacity is hindered by low shift fulfilment, which also impacts response target compliance

[Substantiated] Hypothesis 2: Resources are over-utilized, which contributes to an inability for AHS to meet response time targets

Front-line capacity is hindered by shift fulfillment. When this capacity is decreased, response times tend to suffer and response interval compliance decreases. Since 2023, more shifts are being filled relative to previous years, yet response times in 2023 do not follow the historical pattern. Higher shift fulfillment is still correlated to better response interval compliance, though the response compliance magnitudes are lower than expected for the shift fulfillment levels.

Shift fulfillment is also impacting unit utilization and performance compliance, preventing proper utilization of EMS resources to meet targets

| [Substantiated] Hypothesis 2: Resources are over-utilized, which contributes to an inability for AHS to meet response time targets

EMS demand is straining the current resource pool. When shift fulfillment is lower, individual resources must be more heavily utilized to compensate for the reduced capacity. These increases in unit utilization are linked to decreases in response time compliance.

The effects of shift fulfillment on 911 response performance can be be studied by modelling response times for D/E events

[Substantiated] Hypothesis 2: Resources are over-utilized, which contributes to an inability for AHS to meet response time targets

The preceding correlations were, along with other relevant variables, used to model individual event response intervals. Due to higher variability in response times for lower-acuity events (those with event determinants below D) which make generalized models and hypothetical scenario testing less reliable, the response time model was for D/E events. The model was able to accurately predict the response time compliance with 98% accuracy overall for D/E events from Jan 2018 to July 2023.

The response model attempts to predict response times with a linear model which uses a combination of predictors and interactors. The response compliance is calculated for each predicted response interval based on the associated target interval.

Delta/Echo Event Response Model

Predictors: Numerical variables used to model response times. **Interactors:** Dummy variables (0 or 1) multiplied by predictors to capture specific interaction effects which may differ between subgroups.

Hypothetical Test Cases for Delta/Echo Events

Study the effects of resource capacity increases (measured through shift fulfillment) on event-level response time compliance. Investigate two scenarios:

- 1. What would a blanket increase in the number of shifts fulfilled across the province do for provincial D/E event response compliance?
- 2. What would a blanket increase in the number of shifts fulfilled in Calgary and Edmonton do for provincial event response compliance?

Metro/Urban: 12 mins Communities>3000: 15 mins Rural: 40 mins Remote: 75 mins

Predictors:

Total unit capacity

- · Local unit capacity
- Local relative capacity
- Local average destination interval
- Hour of day
- Month in period
- Local avg. demand
- Interactors:
- LGA cluster
- Return to Service Initiative
- Split production
- Weekends

Adding more resources in the two major metropolitan areas (Calgary and Edmonton) is a more effective way to improve response times via capacity gains

[Substantiated] Hypothesis 2: Resources are over-utilized, which contributes to an inability for AHS to meet response time targets

EMS response times have not met P90 targets from Jan 2018 to July 2023. Currently, the compliance rate is 86.7% for D/E events. Assuming that the allocation and deployment of resources remain identical across the province, then Alberta would have needed approximately 17% more shifts fulfilled across the province over the past five years for any given event to have a 90% chance of a timely response. In Calgary and Edmonton, this number would only be 12%, meaning that shift fulfillment has a greater impact on response times in metro areas than it does for the province as a whole.

Scenario 1:

Proportionally increase provincial resource capacity

Scenario 2: Target resource capacity increases in CGY/EDM

Resource increases are applied by increasing the local and total unit capacities by the percentage indicated for the entire period in question. This corresponds to an increase in the number of units logging shifts, <u>not the number of</u> <u>unit hours.</u>

A key assumption of this response modelling is that the operating environment remains identical (e.g. offload delays are consistent) and that units are dispatched similarly to events.

For example, if at the time of a given event, the local capacity was 100 active units and the total capacity was 300 active units, then a 10% increase would correspond to 110 active local units and 330 total active units.

However, there are diminishing returns for improvements to response times through increases in shift fulfillment

[Substantiated] Hypothesis 2: Resources are over-utilized, which contributes to an inability for AHS to meet response time targets

While increasing resource capacity (through improved shift fulfillment) can help meet existing P90 response targets for D/E events, there are diminishing returns with additional response capacity increases. For resource capacity increases beyond approximately 20% relative to current levels, there are negligible returns for D/E event response interval compliance.

EMS demand is increasing, and current resource capacity is insufficient to meet response times. Additional resources alone will not solve the capacity challenge

Key Insights

Demand for EMS is rising and will continue to rise in the coming years. Increases at a demographic level are driven by increases in population and economic factors such as household spending and GDP. The EMS system is part of a larger healthcare system that is facing challenges in emergency care delivery. EMS cannot sustainably deliver on response time targets and on-time performance targets without systemic improvements to emergency health services access across the province, notably in the reduction of destination interval wait times. Addressing destination interval wait times is a symptom of challenges with system-wide patient flow and access to primary care and non-institutional care issues.

The availability (shortage) of paramedics and the increasing demand for this workforce will compound the challenges facing an already fatigued workforce, across all EMS employers. The Return to Service initiative demonstrates that improving the utilization of frontline EMS improves response capability, thus enhances response time performance. Additionally, increasing resource levels may improve response time compliance to an extent. However, without changes to access at emergency departments, these improvements cannot be maintained.

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Program Area	Hypothesis	Finding
Ground Ambulance Resource Capacity	Hypothesis 1: AHS EMS does not have sufficient resources to respond to emergency demand given the current approach	Partially Substantiated - Resource levels alone do not paint the full picture; but with continued increases in demand expected, AHS cannot meet response targets while continuing with current staffing levels, inability to fill shifts, and destination wait times. An inability to fill shifts does not position AHS to respond to increasing 911 demand.
	Hypothesis 2: Resources are over-utilized, which contributes to an inability for AHS to meet response time targets	Substantiated - Limited local response capacity and long destination intervals reduce the system's ability to respond to events in a timely manner. Resource capacity increases should be coupled with decreases in offload delays to meet these targets.

Opportunities for Ground Resource Capacity

We have identified four key opportunities for ground resource capacity, connected to the key themes of this program review

The following opportunities have been identified through data analysis and evaluation to substantiate the hypothesis tested. The opportunities have been grouped into four categories:

- 1. Consider the broader health system focuses on the system level impacts and unit load
- 2. Develop new evaluation metrics Focuses on resource levels and the system's ability to manage demand
- 3. Bridge the resource gap Focuses on shift fulfillment and local unit capacity
- 4. Prepare for demand increases Focuses on system's ability to manage demand

Consider the broader health system

Focuses on the system level impact and unit load

• Maintain the Return to Service initiative, as reducing destination wait times positively impacts response times, and the recent implementation of the initiative demonstrated significant and immediate improvements.

Bridge the resource gap

Focuses on shift fulfillment and local unit capacity

 With current resourcing allocation and deployment, and unit destination intervals held constant, additional resource capacity increases of approximately 10-20% are required to meet existing P90 response time targets. Increases in shift fulfillment or total capacity must be reflected in resource availability to be effective.

Note: Additional description of the opportunities can be found in the appendix

High Priority
 Medium Priority
 Low Priority

Develop new evaluation metrics

Focuses on resource levels and the system's ability to manage demand

The inclusion of the destination interval in EMS reporting is a step in the right direction, but there is an opportunity to identify and develop a new performance measure (such as the System Performance Index). This can be used to create a more balanced scorecard for EMS, which also considers local factors in system performance and could eventually help control response time variance and mitigate shift fulfillment deficiencies.

Prepare for demand increases

Focuses on the system's ability to manage demand

 Prepare for increased EMS demand by using forecasted demand and system modelling to inform service planning, increase resource capacity and address system-wide issues (e.g., hospital capacity).

Resource allocation & deployment (SSM)

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Overview of Resource allocation & deployment (SSM)

Overview of AHS' Resource allocation & deployment (including SSM)

204 stations in 151 communities¹ 5,600 paramedics and emergency communication officers (ECOs)¹

EMS response to 600,000+ events per year¹

Employee locations¹ 38% Calgary 35% Edmonton 9% Central 9% North Zone

8% South Zone

Description

The focus of resource allocation and deployment is to provide optimal patient care and coverage by establishing the right number of EMS resources across Alberta. Conducting service plans to identify infrastructure requirements to meet demand, employing various scheduling strategies, and leveraging SSM are all methods used to inform the location of units and how to dispatch EMS front-line staff based on event priority and demand.

EMS resource allocation and deployment also encompasses the Medical First Responders (MFR). MFR is a provincial program to support MFR agencies that are trained and equipped to provide medical patient care and dispatched routinely using the 911 system.²

AHS EMS uses a process called System Status Management to facilitate preparing the EMS system for the best possible response to the next EMS call. This is achieved by strategically deploying resources to high priority posts. SSM uses mathematical modelling to determine where an ambulance is most likely needed based on the availability of resources and historical demand.^{2,4}

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5: System Status Management: Practice Support Document
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- **Objectives and Outcomes**
- The AHS EMS resource allocation and deployment plans strategically place the appropriate type of resources across the province. The primary objectives are to reduce response times and provide optimal coverage across the province to enable emergency response in the community.
- SSM includes direction and decisions on where the deployment of all available and non-tasked EMS resources should be strategically positioned across the province to reduce response times. Numerous policies and guidelines support SSM, which are tailored to Alberta's various geographical realities.
- The ability to leverage SSM is facilitated by the 'borderless' EMS system in Alberta. SSM enables the deployment of crews/units from any operation to provide system coverage in any area.

Timeline of Relevant Events¹⁻⁵

2009

AHS takes over the operation of the EMS system, including both EMS dispatch and service delivery.

2009 - 2021

Consolidation of 36 municipal EMS dispatch services began in 2009 and were completed in 2021.

2012 - 2015

SSM strategies were employed before 2012, however, SSM's use matured during this period and continued to be adopted as as dispatch centres were consolidated.

June 2017

Alberta finalized the implementation of Optima - the software that allows for proactive reallocation of resources in line with SSM principles.

January - May 2022

Implementation of the EMS 10-Point Plan to address EMS system capacity was completed. This included the rollout of key initiatives such as the Metro Response Plan and Pre-empt and Divert procedure.

2023

January: Introduction of the option to transfer low-acuity to 811 as part of EMS secondary triage strategy.

April: Shift options in Edmonton were redesigned to better match supply to demand (providing a better mix of shifts). The IFT Red Deer Pilot Project was launched, it focuses on low-acuity patient transfers between facilities with dedicated transfer units.

^{1:} EMS Workforce Strategy_Nov23

^{2:} FAQ: One EMS Dispatch System: Borderless System

^{3:} EMS Dispatch Review Report

^{4:} Reducing EMS Response Times – AHS Taking Action

The use of SSM is necessary to achieve the vision of the borderless system

How does the program operate?¹⁻⁵

The dispatch communication centres, staffed with Emergency Communication Officers (ECOs), are guided by local service standards outlined in an SSM practice support document. It outlines the overarching core SSM principles and provides guidance on SSM implementation within CAD. These overarching principles are supported by district-specific SSM protocols that outline targeted minimum coverage and account for local geographic nuances.

With one EMS dispatch system, all ambulances will have mobile data terminals (on-board computers) that show the ambulance location, event location, and the fastest route to the event. SSM uses this information and historical data to predict the probability of incidents in other areas and SSM will deploy/move other ambulances closer to areas of potential incidents to shorten response time while maintaining optimal coverage.

Over the years, the SSM principles have evolved to incorporate lessons learned and feedback from staff. The SSM principles account for the end of shift (returning resources to their starting station), limit the amount of driving if possible, fatigue management principles, and prevent deployment of suburban/rural resources to metro areas to clear low-acuity events.

Measures of Success:^{5,6}

AHS does monitor compliance with SSM at an aggregate level across the province and through reviewing local compliance. The primary outcomes of AHS EMS resource allocation and deployment plans are to achieve performance targets (including response times and IFT SLAs) and maintain optimal unit availability and coverage.

- 1: EMS Workforce Strategy_Nov23
- 2: FAQ: One EMS Dispatch System: Borderless System
- 3: EMS Dispatch Review Report
- 4: Reducing EMS Response Times AHS Taking Action
- 5: System Status Management: Practice Support Document
- 6: Monthly SSM Performance Report

The Borderless EMS system & SSM ^{2,4}

Before the EMS transition to AHS, municipalities were responsible for providing EMS within the boundaries of their local municipality or district. With one provincial EMS dispatch system, dispatchers know the location of all EMS resources in real time through automated vehicle locating technology or GPS technology. This allows EMS Dispatch to send the closest, most appropriate resource to respond to each emergency.

Key SSM principles that are in place today include:

- Units should be returned to their starting station in order to arrive an estimated 30 minutes before their shift end, or once cross-coverage is no longer required (this is built into Optima).
- Deployment for coverage should yield meaningful enhancements to EMS coverage and should limit the amount of driving time where possible.
- Crews are returned to their start/stop station as much as possible.
- Cross coverage using core/flex units (48/96 hr shifts) should be limited between 22:00-06:00 to support fatigue management.
- The last unit from a community should not be assigned for coverage when the nearest covering EMS station is >30 min away.
- Deployment of suburban/rural resources to metro environments with the intent to clear backlogs of pending events should not occur.
- Crews in major and regional centres for long-distance wait and return transfers may be redeployed to carry out another short-distance transfer or to consolidate patients from other crews.

Various governance structures, policies and tools guide EMS resource allocation and deployment strategies

Governance and Accountabilities

Resource allocation and deployment approaches are governed through collaboration and cooperation between AHS EMS leadership, EMS operations, Dispatch centres, and EMS frontline staff.

A few approaches to managing the review of current deployment approaches include:¹⁻³

- The review of event cards (identifies the type of medical issue, determinant and response priority) that were assigned to a call and tracing the clinical outcome of the patient to evaluate the reliability of the MPDS system. Through this analysis, the level of priority assigned to similar medical issues may change.
- SSM deployment rules are formalized in SSM Plans that are updated at least every two (2) years.
- When issues arise or feedback is shared from dispatch centres or other EMS staff, an effort is placed on investigating the issue. Data analysis is completed to investigate the concern and the appropriate representation from dispatch, EMS operations and zones are brought together to determine a solution. An example of this is the review of the Rural SSM plan to better understand if rural resources were disproportionately involved in SSM plans and whether new controls were required.
- Some committees have been established between dispatch and EMS operations. This allows for bi-directional communication between the two areas to address challenges.

Various governance structures, policies and tools guide EMS resource allocation and deployment strategies (continued)

Policy and Guidelines

Several practice support documents, guidelines and policies are in place to guide ECOs on how to deploy resources and leverage SSM to support appropriate coverage across the province. Some of the key guidance documents include:

EMS Response Prioritization System was introduced in January 2022 to complement the existing MPDS protocols used by ECOs. The colour-based prioritization allows for further triaging of 911 events based on AHS clinical data. **EMS Response Prioritization System Outline** (Outline) provides a summary of the most important deployment procedures based on the colour-based response priority that is assigned to the event (these colour-based priorities often overlap with determinants but account for clinical differences more accurately). The Outline notes that crews should respond immediately with a 'lights and sirens' response for event determinants that are assigned a colour-based response priority colour of Purple (covers most Echo and Delta determinant events) to Yellow (not-urgent/ not life-threatening). Yellow events are the only type of events that can be held when there are not enough crews available.

Pre-empt and Divert Procedure: The procedure outlines events that are appropriate and not appropriate for reassignment in order to respond to high priority events. Those not eligible for reassignment include crews that have made patient contact, crews dropping off a patient and unable to transfer care quickly, and crews that are taking over patient care. The guidelines also identify that resources assigned to anything below purple can be assigned to a higher priority event.

Fatigue management principles are built into resource deployment in multiple ways. SSM implementation guidance provided to ECOs outlines that when crews are unusually busy, crew safety should be prioritized. Guidance recommends avoiding timing out a unit (crew is placed out of service because it has exceeded time on task and cannot be deployed) that is working a shift longer than 24hrs, and limiting cross coverage during night hours. Another example of managing staff fatigue is through policies such as The Thresholds for Assigned Work Hours and Resource Utilization policy. It focuses on utilizing **Unit Commitment Thresholds (UCTs)** to define the appropriate use of resources. It identifies standardized, measurable core attributes that quantify the activities of an EMS crew.

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Metro Response Plans: The Metro Response Plans were recently updated (2022) to limit suburban and rural units from being dispatched to Calgary and Edmonton for low priority events, however, they remain eligible for deployment for Purple/Red events. Only Metro-assigned units are eligible for reassignment to Yellow and Orange priority events. In addition to the the Metro Response Plans, AHS EMS has the following response plans as well: Hospital, Suburban, and Rural.

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Pending event management (holding calls process): This directive is guided by the following core ethical values: patient safety, stewardship, transparency and equal access to health services. It provides consistent and standardized direction to Dispatch Communications and Deployment Centre (DCD Centre) staff when EMS emergency event volume exceeds available system resources resulting in pending events. The directive also provides guidance on which scenarios warrant upgrading the colour (e.g., if the patient is in a public place and is not safe, the patient is over the age of 65 etc.). Pending events of the same priority are prioritized by the length of time waited, and consideration for travel time required to get to the scene. This procedure will replace the existing Holding Low Priority Events Directive that outlines the trigger criteria for events to be held and how to the resume regular flow of work.

End of Shift Management Procedure: The procedure provides ECOs with guidance on how to manage resource deployment when a resource is approaching the end of their shift. Preference is given to identifying resources that have greater than 30 minutes left on their shift to respond to an event even if a resource coming to the end of shift is closer unless the event priority is of high-acuity. It also provides guidelines on when replacement units can be engaged if a resource is offloading a patient. The procedure acknowledges that patient care must not be compromised to accommodate shift change, and therefore there are cases in which staff may incur overtime. This procedure has fundamentally changed resource availability and has resulted in changes in how shifts are staggered and resource availability modelling to account for the last 30 minutes of shift needing to be protected.

Various governance structures, policies and tools guide EMS resource allocation and deployment strategies (continued)

Supporting Tools

The allocation and deployment of resources and the ability to implement SSM principles are managed through the following tools:1-3

There are three communication centres in Alberta that dispatch calls. The **Central Communications Centre (CCC)** is located in Edmonton and provides emergency and IFT dispatch services in Central Alberta, as well as provincial air ambulance. The **Northern Communications Centre (NCC)** is located in Peace River and provides emergency and IFT dispatch services in Northern Alberta. Lastly, the **Southern Communications Centre (SCC)** is located in Calgary and provides emergency and IFT dispatch services in Southern Alberta.

Medical Priority Dispatch System (MPDS) (also known as Advanced Medical Priority Dispatch System) is used to categorize calls according to the severity of the patient's condition. It provides a medically approved, unified system that is used by medical dispatch centres to dispatch appropriate aid to medical emergencies, which includes: systematized caller interrogation, systematized pre-arrival instructions, and the call-taker's evaluation of the injury or illness type and severity is matched with the AHS defined response configuration (including determining the appropriate type of resource to be used). Upon an event being categorized through MPDS, an ambulance is assigned through a **Computer Aided Dispatch (CAD) system**. CAD is an Incident Management system that provides call-centre and communications centre operators with tools that they need to field calls, create and update incidents, and manage an organization's critical resources by providing real-time interaction of crucial data. EMS response plans are programmed into CAD and presented to ECOs to guide their deployment of resources.

AHS EMS completed the implementation of Optima in 2017. **Optima Live and Optima Predict** enable EMS operations and dispatches to have insights into how to best deploy resources based on historical patterns. **Optima Predict** allows AHS to test various scenarios and develop deployment strategies. **Optima Live** is used within dispatch centres to aid ECOs with where resources should be best placed to provide coverage and impact response times. It provides the 'big picture' for ECOs through the use of maps to aid with decision-making.

SSM is considered a set of principles rather than a tool and when referenced, it describes the process of preparing the EMS system for the best possible response to the next EMS call. This is achieved by strategically deploying resources to high priority posts. AHS has established overarching service standards that are supported by the local district level. The overarching principles provides guidance that accounts for: how to manage compliance, considerations for suburban/rural settings, IFT, how to manage concerns from crew, and how to leverage Optima to achieve the best coverage. EMS has also developed a tool to support dispatch centres evaluate the risk-reward ratio of covering a rural community from another called the **Flex Utility Tool (FUT).**⁴

3: CCC System Status Management Plan (various geographies)

^{1:} System Status Management: Practice Support Document

^{2:} EMS Rural SSM Plan Review (December 2022)

^{4:} At the time of developing this report, AHS EMS was working on building FUT into Optima.

Variability in SSM compliance between urban and rural regions can be attributed to unit availability

Summary of Program Performance

- In Alberta, SSM Compliance is targeted typically between 85-95%. SSM compliance has been stable in Alberta and operating within target.
- Absolute compliance is not targeted, as it can result in unnecessary movement of EMS resources and Alberta's SSM principles and guidance to ECOs have outlined scenarios in which overriding SSM recommended relocation can be beneficial to staff, and still achieve optimal coverage.

Performance Measures¹

SSM compliance has been stable in Alberta. However, compliance has varied over time in urban areas. In March 2019 (1) the definition of SSM compliance definitions for Calgary were changed to be more aligned with Edmonton compliance measurements. In January 2022 and onward (2), EMS implemented the 10 Point Plan to improve EMS performance with a focus on response time targets. Examples of changes that contributed to the improvement include introducing different types of shifts and adding more resources. Additionally, implementing the RTS initiative aimed to reduce the EMS hospital interval to a 45-minute target, 90% of the time. The improvement in compliance from November 2022 onward can be attributed to these changes.

3

The ability to improve SSM compliance is constrained by unit availability. Low shift fulfillment, demand for 911 and IFT and other factors impact unit availability.

Metro SSM Compliance by Month

1: Alberta SSM Compliance (November 2023)

Unit availability varies by zone, with lowest availability in metro areas which have the highest demand

Summary of Program Performance

• Unit availability not only impacts SSM compliance but also response compliance (a key measure of the success of EMS deployment strategies).

Performance Measures

Unit availability is lowest in Calgary and Edmonton, although the metro areas have the greatest 911 demand. These metro areas also have the highest shift share to manage demand, in comparison to other zones.

SSM principles aim to achieve province-wide coverage through the location of crews where the highest demand is anticipated. However, **if units are not available, the ability to achieve coverage drops and impacts compliance**.

Achievement of response time targets is also a key outcome of EMS resource allocation and deployment plans. Zones with the lowest unit availability also tend to have poorer response time compliance.

Operations Zone	Average Monthly 911 Demand	Average Monthly 911 Demand Share	Average Monthly 911 Shifts	Average Monthly Shift Share
Calgary	15,887	38%	3896	28%
Central	2807	7%	2092	15%
Edmonton	18,044	43%	4120	29%
North	2249	5%	2239	16%
South	2834	7%	1676	12%

Analysis of Resource allocation & deployment (SSM)

Non-optimal resource deployment is substantiated as a result of a lack of formal strategic planning and over-response. Concerns of SSM's improper use of rural resources is unsubstantiated, as coverage issues are influenced by other factors such as resource shortages.

Hypothesis

Hvpothesis 2: SSM inappropriately draws on

coverage

rural resources impacting

Resource allocation and deployment (SSM)

Hypothesis 1: Resources are not optimally deployed to meet response times

[<u>∕</u> Finding
Substantiated - Challenges with strategic planning, targets, and triaging contribute to the non-optimal deployment of resources. The lack of formal strategic planning processes sustains resource and infrastructure deficiencies, which impedes coverage and ability to meet response times. The current response plan enables over-response for non-life-threatening 911 and underrecognition of MFR, which is misaligned with leading practices, increases risk, and impacts the capacity to respond to critical events. Response time targets do not accurately measure EMS performance and further contribute to risk. Resource augmentation can be used to achieve both current and hypothetical response targets. A resilient (P95) target requires significant resource increases; however, a P95 target for high-acuity is achievable with current resource levels. High unit utilization demonstrates the metro areas have insufficient IFT-dedicated units, and it may be beneficial to explore split production in areas such as Grande Prairie.
Unsubstantiated - Rural response times and coverage

shortfalls are primarily driven by resource shortages and other issues rather than SSM principles. Although urban areas have rural response times and overutilized rural resources in the past, this has been resolved by increased controls, and rural units currently primarily respond to local events. Additionally, unit hour availability is only slightly decreased by IFT events in rural areas (less than 10% even when demand is at its highest), and rural availability remains significantly higher than metro availability. Strong response time compliance in rural areas suggests the utilization of resources from rural areas and communities >3,000 may be appropriate in urban areas. Sharing resources can help meet high urban demand by using surplus capacity when local coverage can be managed.

Key takeaway: There are areas to progress AHS EMS' resource allocation and deployment strategies to reduce over-response, and achieve optimal province-wide coverage. The lack of formal strategic planning processes has left gaps in resource and infrastructure needs in communities experiencing demand growth. Current response protocols and performance measures do not reflect event urgency, contributing to an environment of 'if everything is a priority, nothing is a priority.' Although the use of SSM principles in Alberta is aligned with leading practices, achieving optimal coverage and maximizing the benefits of SSM is hindered by a shortfall of resources.

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Optimal deployment and response times are inhibited by the lack of formal planning, overuse of response protocols and resource inefficiencies

Hypothesis 1

Resources are not optimally deployed to meet response times

Substantiated

Challenges with strategic planning, targets and triaging contribute to the non-optimal deployment of resources. The current response plan contributes to over-response for non-life-threatening 911 and IFT events, and underrecognition of MFR, which impacts risk and the capacity to respond to critical events. Additionally, the lack of rigorous strategic planning processes contributes to resource and infrastructure deficiencies, impeding coverage and ability to meet response time targets.

Lack of rigorous service planning process

Advanced forecasting capabilities are not systemically incorporated in long-term planning for workforce and infrastructure, which impedes deployment and coverage abilities.

Lights and Sirens protocols and response targets are misaligned to event emergency

Response time targets are misaligned and Lights and Sirens protocols inadequately filter determinant priority, which leads to inappropriate deployment of resources.

Underrecognition of MFR role in response plans

MFR is not part of deployment planning and does not contribute to the measurement of response times targets. There is an opportunity to increase the recognition of the role MFR plays in the provision of time critical responses and response time

performance.

Insufficient resources and ambulance vehicles to meet demand

Resource capacity has not sufficiently grown to meet demand in urban areas. Increased staffing and/or introduction of dedicated IFT resources may improve 911 unit availability.

Challenges staffing planned shifts

Shift vacancies are common and systemic due to insufficient human resources across the province. The inability to fill shifts reduces the response compliance rate, as units experience more strain.

Inefficient use of resources due to offload delays

Long offload delays ineffectively utilizes EMS resources. The **RTS** initiative improved unit availability, however, the issue persists. Overcapacity hospitals often lean on EMS to oversee patients in ED park.

Competing priorities and objectives of system partners impacts coordination

EMS is a key partner in the IOC However ability to achieve optimal patient flow is hindered by lack of an integrated approach to system coordination.

A structured process is lacking for long-term resource and infrastructure planning, contributing to underserved communities and difficulties meeting response times

| Hypothesis 1: Substantiated

Resources are not optimally deployed to meet response times

Lack of rigorous service planning process

Data is not systemically incorporated in long-term strategic planning related to workforce, infrastructure, and assets, which impedes coverage and response times. EMS has advanced tools that leverage AI and machine learning to forecast demand and resource needs. This enables EMS to establish the optimal station configuration or placement of resources. However, stakeholders identified strategic planning lacks a formalized and consistent process to establish and implement priorities, as well as limited reconciliation through provincial budget and planning processes. Planning may also overlook the incorporation of key stakeholders and the integration of operational and capital plans. The development of a 5-year plan is currently in progress; however, it may lack a long-term outlook and the timing does not align with government fiscal planning process and existing Alberta Health infrastructure planning. The lack of formal processes to link operational priorities to budget and planning contributes to the continuation of underserved communities due to a lack of infrastructure and resources.

Intermittent development of service plans has left some communities underserved

- Analysis and recommendations that would be part of a service plan are conducted intermittently, rather than in a formalized process. Additionally, the expansion of resources or infrastructure in identified areas has not met the needs of growing communities, and infrastructure gaps remain.
- For example, a 2017 quantitative study identified EMS Performance Improvement Areas, including station deficits, and many of the identified challenges remain. Rural areas may require investment and new stations; for instance, over 300 annual 911 events in Lake Louise experience an extended response of 36-45 minutes from the station in Banff. A core flex unit in Lake Louise may be justified to improve performance, as the area is underserved compared to similar areas such as Kananaskis, and recreation and tourism industries are often complex. Additionally, Blackfalds, with a growing population and the largest community in Alberta without an EMS station, relies on Red Deer/Lacombe for a ~12-16 minute response.¹ Blackfalds response times are above the P50 response target of 10 minutes for communities >3,000, which suggests the area is underperforming.

What stakeholders are saying

"Not all the key stakeholders are at the table for service planning and it is often done with unrealistic timelines"

"Service planning is done on an as-needed basis and there are no formal processes for meeting needs of growing communities"

Misalignment of EMS operations and infrastructure needs may prolong station deficits and response time challenges in Edmonton and Calgary

•) Hypothesis 1: Substantiated

Resources are not optimally deployed to meet response times

Lack of integrated planning with EMS operations and capital planning may perpetuate Edmonton station deficits and performance challenges

- EMS station planning is at risk of not being adequately considered in the design of the new South Edmonton Hospital, despite the ambulance station deficits in Edmonton, which impact the ability to meet response time targets in some areas.¹
- 911 demand in South Edmonton has grown 42% in the past 5 years and the planned new South Edmonton Hospital will impact EMS operational efficiency. However, the new South Edmonton Hospital may not include an EMS deployment hub, potentially negating the opportunity to address the area's station deficit and the impact a new hospital will have on EMS operations. For instance, an additional 20,0000 ambulance unit hours annually may occur from travelling to/from the site, which may negatively impact local ambulance availability in an area facing high demand growth.¹
- Integrated planning is also necessary with municipalities, for instance, the City of Edmonton recently
 planned to divest five EMS stations leased to AHS. The stations cover ~29% of Edmonton 911 demand and
 the loss of the stations would increase overall response times by ~1 minute. AHS plans to acquire the
 stations from the city, however, infrastructure planning would benefit from formalized decision-making
 frameworks and processes to integrate planning with partners.² Furthermore, municipal zoning
 restrictions present barriers to addressing the station deficit. Stakeholders also identified municipal
 zoning restrictions prevent the optimal location of new stations, which results in options that are far
 from demand or co-located with fire stations. Additionally, co-location with other health infrastructure such as
 long-term care centres has not progressed. Alberta should consider authority over municipal zoning
 for critical infrastructure.

1: EDM Facilities Analysis South Edmonton Hospital - 20230825 2: EDM Facilities Analysis 20230808

The current guidelines and response protocols have created an environment of competing priorities

Hypothesis 1: Substantiated

Resources are not optimally deployed to meet response times

Lights and Sirens protocols and response targets are misaligned to event emergency Prioritization is not accurately reflected in the current response targets and plan, which contributes to over-response and inappropriate deployment of resources for some categories of demand. Response time targets do not effectively incorporate determinant priority, influencing resource deployment and contributing to the issue of 'if everything is a priority, then nothing is a priority'. Concurrently, the Lights and Sirens (L&S) response protocol for non-life-threatening events is not clinically appropriate by MPDS guidelines, and stakeholders are concerned about increased risk due to long distances travelled at high speeds. In addition, the Holding Low Priority Events Directive allows low priority events to be held. Stakeholders shared that low priority events (Yellow events) have been held for an hour, then the response is immediate with L&S which results in patient and staff complaints. The response time targets and L&S response for some non-life-threatening events do not effectively prioritize and distinguish critical events, which increases staff risk and contributes to non-optimal deployment.

The L&S response approach for Bravo to Echo events does not align with MPDS guidelines

The current dispatch protocols require a L&S approach to respond to determinants Bravo to Echo, which overlaps with the response prioritization Purple to Yellow events. **MPDS guidelines state that the use of L&S should be reserved for events that are considered life-threatening**,¹ this would be most aligned with Delta/Echo or Purple/Red events within AHS EMS. A L&S response for Bravo/Charlie or Orange/Yellow events may be deemed unnecessary (although some Charlie events may require an immediate response but not L&S).

AHS Response Prioritization System Outline				
Lights & Sirens	Crews respond immediately using existing LIGHTS & SIRENS guidelines	Crews respond immediately using existing LIGHTS & SIRENS guidelines	Crews respond immediately using existing LIGHTS & SIRENS guidelines	Crews respond immediately using existing LIGHTS & SIRENS guidelines
Delaying/Holding events	Not eligible for delaying/holding	Not eligible for delaying/holding	Not eligible for delaying/holding	Delaying/holding events is appropriate as determined by resource availability & patient condition

What stakeholders are saying

"Response times were established as a function of what we could achieve in rural areas"

"The HOT response of B to E contributes to the issue of if everything is a priority, then nothing is a priority"

"Staff are concerned about holding a Yellow event for an hour then responding HOT"

1: Determinant Codes Versus Response: Understanding How It Is Done - National Academy of Emergency Medical Dispatch

PwC | Alberta Health Services EMS Program Area Study

Research has shown that a Lights and Sirens approach increases risk and has nominal impact on response times

Hypothesis 1: Substantiated

Resources are not optimally deployed to meet response times

Research has shown there are inherent risks to taking a Lights and Sirens or HOT response when an event is non-life-threatening

Although a Lights and Sirens-based response provides a visual and audible warning for other drivers to make way for ambulances and enables faster driving,¹ risks increase with this approach. **Research has demonstrated that L&S responses increase the risk of accidents for staff, the public and the transported patient**.^{2,3} **Additionally, L&S responses have a nominal impact on saving time and patient outcomes**.³ L&S responses should be limited to when it is necessary and the frequency of L&S deployment should be carefully considered against the increased risk.

Taking a Lights and Sirens approach for all Bravo to Echo determinant events accounts for approximately 75% of EMS events (there are some Delta determinant events in which a Lights and Sirens response is not used), contributing to a system of over-response and the need to manage competing priorities. To address scenarios in which EMS event volumes exceed EMS system resources, AHS developed a **Holding Low Priority Events Directive** that came into effect in January 2022. The contradiction of this approach is that a Yellow (lower priority) event can be held (if certain criteria are met as outlined in the Directive), but upon returning to normal workflows, the response is expected to be immediate with Lights and Sirens.

Through the **Pre-empt and Divert Procedure** ECOs are guided on the appropriate EMS resources that can be reassigned to respond to higher priority events. However, if Yellow to Purple events are all treated with Lights and Sirens response, **diverting an EMS resource to a higher priority event**, **does not fundamentally change the deployment approach**.

E - 2.1% Data covers the period from
Jan 2018 to Aug 2023 D - 28.9% ~O-level events are the lowest
priority (E is the highest), and
are typically grouped with
A-level events. They make up a
small portion of total events. A - 24.5% O* - 0.7%

Determinant Distribution

Pre-empt	and	Divert	Proced	dure
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Purple	Immediately life threatening (Cardiac / Respiratory arrest)	Highest priority, all other types can be preempted to PURPLE events
Red	Immediately life threatening or time critical	Preempt from RED → PURPLE
Orange	Urgent / Potentially serious but not immediately life threatening	Preempt from ORANGE → PURPLE or RED
Yellow	Non-urgent (Not serious or life threatening)	Preempt from YELLOW → PURPLE, RED or ORANGE
Blue	Non-urgent (Not serious or life threatening). Potentially evaluated using MPDS LowCode protocol	Preempt from BLUE → PURPLE, RED, ORANGE or YELLOW

1: Specific guidance on the appropriate speed, and traffic rules to abide by are currently being drafted into a policy while this report was being developed

2: Is Use of Warning Lights and Sirens Associated With Increased Risk of Ambulance Crashes? A Contemporary Analysis Using National EMS Information System (NEMSIS) Data

3: The Use of Emergency Lights and Sirens by Ambulances and Their Effect on Patient Outcomes and Public Safety: A Comprehensive Review of the Literature; EMS Lights And Sirens; Lights and Sirens by Ambulances and Their Effect on Patient Outcomes and Public Safety: A Comprehensive Review of the Literature; EMS Lights And Sirens; Lights and Sirens by Ambulances and Their Effect on Patient Outcomes and Public Safety: A Comprehensive Review of the Literature; EMS Lights And Sirens; Lights and Sirens by Ambulances and Their Effect on Patient Outcomes and Public Safety: A Comprehensive Review of the Literature; EMS Lights And Sirens; Ligh
Over-triaging is impacting response time performance and how resources are deployed

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Resources are not optimally deployed to meet response times

EMS response time targets are not aligned with leading practices

• EMS Response time targets in Alberta are currently publicly reported for Delta and Echo (considered life-threatening) determinant events. The response intervals are different for a P50 (percentile) or P90 target. However, it is important to note that the targets for P50 and P90 differentiate between geography and not by determinant. Although EMS events are assigned MPDS determinants ranging from Alpha to Omega, the current response time targets do not take the urgency of the event into account, rather it accounts only for the longer distance required to travel depending on the community. As shown on the next slide, the targets for rural and remote Delta and Echo events are often exceeded.

Interval	Definition	Target			
Geography Type P50 Target (Secs)	The 50th percentile response interval target for D&E determinant events in a particular geography type.	Metro/Urban = 480 seconds (8 minutes) Communities > 3,000 = 600 seconds (10 minutes) Rural = 1200 seconds (20 minutes) Remote = 2400 seconds (40 minutes)			
Geography Type P90 Target (Secs)	The 90th percentile response interval target for D&E determinant events in a particular geography type.	Metro/Urban = 720 seconds (12 minutes) Communities > 3,000 = 900 seconds (15 minutes) Rural = 2400 seconds (40 minutes) Remote = 4500 seconds (75 minutes)			

In other jurisdictions, response time targets vary by determinant and account for geographical distances. For example, in multiple states across Australia, the equivalent of Delta/Echo events have shorter target intervals than Bravo/Charlie and lower events (Australia uses the language Priority 1 and Priority 2). Specifically in Victoria, AU, determinant and geography is accounted for in their targets for Priority 1 events, where the statewide target that is <15 mins for 85% of incidents, and 90% for communities with populations larger than 7,500. In the United Kingdom, NHS has moved toward having targets based on event determinant and does not take into account geography (UK follows a colour-based response prioritization system similar to the approach AHS introduced recently).^{1,2} There is an opportunity to re-evaluate the appropriateness of these targets and become more aligned with leading practices through learning from other jurisdictions. Additionally, moving toward an approach where the response targets differentiate between the determinant urgency levels may also benefit AHS EMS in prioritizing events appropriately, improve safety for paramedics, patients and the public through reconsidering using an L&S response for lower priority events.

1: NHS Ambulance Response Programme

2: Jurisdiction scan on performance report (multiple sources for Australia)

Urban response times are aligned to their respective targets, however in rural areas response times are typically far faster than target values

Hypothesis 1: Substantiated

Resources are not optimally deployed to meet response times

EMS response time targets are not always aligned with historical performance and other jurisdictions

- Despite vastly different response time targets between geographic areas, the most likely response time for any 911 call is less than 20 mins. For Delta / Echo events, the P90 response interval is almost always less than the target value for Rural and Remote areas. However, in Metro/Urban areas and Communities >3000 (i.e. the two areas from where the vast majority of EMS demand originates), the P90 response interval has been below the target value less than 50% of the time in 2023.
- In Rural and Remote areas, response times are typically far below target values and therefore P90 compliance is high. The targets are also inconsistent with clinical guidelines. Due to the nature of the population and demand in these communities, meeting response targets while also maintaining unit availability is critical. Given their high response compliance, the existing resource allocation and deployment in Rural and Remote areas is justified, however, it does highlight a need to reconsider their respective response targets.
- In more urban areas, response compliance is significantly worse, though this has recently improved as a result of the RTS initiative. The distributions of response times in Metro/Urban and Communities >3000 are centred near their respective target intervals, indicating that these targets are realistic and attainable; although, an inability to fill shifts limits AHS in its effort to meet response targets in urban areas. Current resource allocation and deployment may allow for response targets to be met in more urban areas, however, this may require additional resource capacity and decreased destination intervals.



Response Interval (ITV) Compliance is calculated by comparing the daily P90 Response ITV for the given geography type to the target value. If the true P90 was below the target, the compliance score for that day was set equal to 1, otherwise 0. A 7-day rolling average was applied to smooth the curve.

Historical P90 response intervals can be modelled to estimate the feasibility of achieving response targets with current resource deployment & allocation

Hypothesis 1: Substantiated

Resources are not optimally deployed to meet response times

Can the current P90 response targets be attained with the current deployment and allocation of resources?

- Even after significant improvements in P90 response interval compliance in more densely populated areas attributed to the RTS initiative, improvements are needed to meet response targets in Metro/Urban areas and Communities >3000.
- For data spanning the period from January 1, 2018 to July 31, 2023, the true daily P90 response interval for Delta and Echo events in each geography type was used to train a machine learning • (ML) model to understand the impact of factors such as demand, fulfilled staff hours, and average destination interval on P90 response.
- Using the ML model, the daily resource increase (as measured by the number of fulfilled staff hours for EMS responders) needed to meet P90 response targets was estimated.
- A critical assumption of the model is that the allocation and deployment of additional resources across the • province remains unchanged (i.e. filled staff hour increases are not targeted in specific geographic areas). In other words, using this model, hypothetical resources do not represent an efficient augmentation of staff hours based on specific geographies.
- However, due to the more limited range of historically observed destination intervals, it was not possible to use this model to extrapolate beyond previously seen destination intervals to estimate their impacts on P90 response intervals.

Geography Type	P90 Response ITV Target (s)	True Monthly Average P90 Response ITV (s)	Model Monthly Average P90 Response ITV (s)	Model Monthly Average Error (s)
Metro/Urban	720	894	872	-22
Communities >3000	900	1087	1077	-10
Rural	2400	1996	2014	18
Remote	4500	3836	3650	-186



P90 Response Model Error (% of Target)

The current resource allocation and deployment plan can allow for province-wide P90 response interval compliance to current targets if resource capacity is increased

Hypothesis 1: Substantiated

Resources are not optimally deployed to meet response times

Achieving the current P90 response targets can be attained through resource augmentation (measured through fulfilled paramedic staff hours)

- Under the current SSM and resource deployment plan, meeting existing P90 response interval targets is possible through increases in fulfilled staff hours. To meet these P90 response targets in Metro/Urban areas, the average number of fulfilled staff hours should be increased by approximately 15% above current levels provincewide.¹ To meet these targets in both Metro/Urban areas and medium-sized (i.e. >3000 population) communities, this augmentation in total fulfilled staff hours could be extended up to approximately 40% above current levels. However, the actual number of additional hours required to meet these response targets is likely less than 40% and may be achievable through targeted resource investment within communities with the greatest demonstrated need.
- <u>The higher estimated resource augmentation for mid-sized than urban communities should be interpreted as a consequence of the uneven distribution of resources across the province.</u> For example, if staff hours were to increase by 1000 across the province following this model, 610 of those hours would be allocated to Metro/Urban areas following the current methodologies for deployment and allocation of resources, whereas only 280 of those theoretical hours would be allocated to Communities >3000.
- No augmentation is required for Rural and Remote areas for the current response targets, as the average response interval for Delta / Echo events meets P90 targets in these regions.

Geography Type	P90 Response Interval Target	Current ² P90 Response Interval	YTD Share of Total Fulfilled Staff Hours	Current ² Suggested Resource Augmentation
Metro/Urban	720 s (12 min)	856 s	61%	15%
Communities >3000	900 s (15 min)	1030 s	28%	40%
Rural	2400 s (40 min)	2026 s	10%	n/a
Remote	4500 s (75 min)	3780 s	1%	n/a

1: The increase in staff hours required to meet P90 response intervals shown here (15%) differs from the previously shown model, which calculates the required increase in shift fulfillment needed to have a 90% likelihood for a given event to comply with existing response targets. Although similar, these models attempt to measure and evaluate different criteria, however the end finding is consistent with respect to the response capacity increase required for AHS to meet its existing response targets falling between 10-20%.

2: Current values are as of the most recent period in the dataset, in this case July 2023.

Alternative response time targets should be investigated to help build a more accurate measure for EMS performance

*) Hypothesis 1: Substantiated

Resources are not optimally deployed to meet response times

Current response interval targets do not accurately reflect the system's ability to respond to 911 events in different geographic areas

- In Metro/Urban areas and Communities >3000, the average performance delta (i.e. the difference between the actual response interval and the target) is close to zero. This signifies that the targets for these areas are relevant and realistic for municipalities associated with these geography types.
- For Rural and Remote areas, the average performance delta is far below zero (signifying an average response much earlier than the target).
- There is an opportunity to develop new response interval targets to more accurately measure EMS
 performance and work towards a more robust response system.



Meets Target Exceeds Target	arget YTD P90 Response ITV by Determinant (Jan - Jul 2023)							
Geography Type	Bravo	Charlie	Delta	Echo				
Metro/Urban	1567 s	1425 s	909 s	661 s				
>3000	1220 s	1228 s	1109 s	885 s				
Rural	2115 s	2100 s	2027 s	1661 s				
Remote	3837 s	4486 s	4104 s	4706 s ¹				





1: Due to low demand in remote areas, the potential for outliers to skew the P90 interval is higher and therefore the lack of compliance is most likely attributed to this phenomenon as opposed to system performance

Using machine learning to model the P90 response interval, hypothetical system performance can be measured against a series of new response target scenarios

Hypothesis 1: Substantiated

Resources are not optimally deployed to meet response times

New target scenarios can be tested using the ML P90 Response ITV model to estimate required resource increases

• Given the need for an updated response target framework, a series of hypothetical response target scenarios were created.

- These target scenarios were tested with similar ML response models to estimate the resource increase under the current system to meet these new targets.
- These scenarios focus on different event determinants, target quantiles, and target times by geography in an effort to assess the current system's performance when an operational focus is placed on different system qualities (such as resiliency, prioritization, etc.).

		P90 Response Target (seconds)					
Scenario Name	Event Determinants Considered	Target Quantile	Notes	Metro/ Urban	>3000	Rural	Remote
Baseline	Delta / Echo	P90	Current response targets	720	900	2400	4500
Resilient	Delta / Echo	P95	Same response intervals with higher quantile target	720	900	2400	4500
Lights & Sirens	Bravo - Echo	P90	Same response intervals with all Lights & Sirens response times targeted	720	900	2400	4500
EMS-served	Delta / Echo	P90	All communities with a unit station should have a target time <= 900 s	720	900	2400	4500
High-acuity	Echo	P95	Only measure high-acuity (Purple priority) events responses vs. a high quantile target	720	720	1800	4500
Slightly Faster	Delta / Echo	P90	Reduce existing response targets by 1 min in urban areas, 5 mins in rural, 15 mins in remote	660	840	2100	3600

The system is capable of performing equally well if current response targets are slightly adjusted but applied to the same determinants for the same target quantile

*) Hypothesis 1: Substantiated

Resources are not optimally deployed to meet response times

For D/E events evaluated at a 90% target quantile, changing response times does not significantly alter response compliance or needed resource gains

- Of the aforementioned response target scenarios, three cases showed nearly identical response compliance and resource gains required to meet P90 response targets. These were the **Baseline**, **EMS-Served**, and **Slightly Faster** scenarios.
- The estimated required increase in fulfilled staff hours to meet P90 compliance targets for the baseline scenario is shown as a representative sample of these three.
- The similarity between the Baseline and EMS-served scenarios shows that the response compliance in rural and remote areas with unit stations is already similar to those of larger communities with stations. In other words, the targets for regions with unit stations could be decreased to more appropriately measure performance, given the expectations for a faster response as a result of having a locally-based EMS resource.
- The similarity between the Baseline and Slightly Faster scenarios shows that current system performance (and therefore compliance) is limited by the uncommonly large response times, the effects of which can cascade throughout the system when capacity is unable to meet demand (especially in urban areas). This is further evidenced by the negative average performance deltas previously shown, which demonstrate that for all event types (from Jan to July 2023), the *average* response time is within the target value. **System performance is currently restricted by the largest 10% of response times and not the most common response times.**
- Decreasing response targets in communities with EMS stations, or decreasing targets in all geographic areas, does not appear to significantly change existing target compliance when the targets are still applied to D/E events with a 90% target quantile.

<u>Note:</u> A critical assumption of the model is that the allocation and deployment of additional resources across the province remains unchanged (i.e. filled staff hour increases are not targeted in specific geographic areas). Using this model, hypothetical resource increases do not represent an efficient augmentation of staff hours based on specific geographies.



Maintaining current response targets but increasing the quantile percentage would require significantly more resources to meet compliance

*) Hypothesis 1: Substantiated

Resources are not optimally deployed to meet response times

For D/E events evaluated at a 95% target quantile with the same response targets, the required increase in resources doubles compared to the Baseline

- For the **Resilient** scenario, where the current response targets are maintained but targeted at a higher quantile (95% versus 90%), the resource increase required to meet target compliance is nearly double that of the Baseline scenario. This corresponds to an approximate 30% increase in fulfilled staff hours required for compliance with the targets in this scenario for Metro/Urban areas, versus approximately 15% for the Baseline scenario.
- This distinct difference in the estimated resource increase required to meet response targets further corroborates the idea that system performance is currently restricted by the longest 10% of response times and not the most common response times. Controlling the largest 5% of response times would therefore require a significant investment in resource capacity (measured by fulfilled staff hours).
- Similar to the other scenarios, there is limited required resource investment for compliance in Rural and Remote areas when the target times are not modified. Response times in these regions are typically far below existing target values, and as such targeting higher quantile percentages does not significantly impact response compliance.
- Given that the longest response times typically occur when demand is highest, the resource increases shown for this scenario show that significant resource investment is needed to increase the resiliency of the EMS system under periods of high demand and meet response targets for event types whose performance is currently being measured.

<u>Note:</u> A critical assumption of the model is that the allocation and deployment of additional resources across the province remains unchanged (i.e. filled staff hour increases are not targeted in specific geographic areas). Using this model, hypothetical resource increases do not represent an efficient augmentation of staff hours based on specific geographies.



The system is already capable of effectively prioritizing and responding to the most urgent and acute events in a timely manner

Hypothesis 1: Substantiated

Resources are not optimally deployed to meet response times

For high-acuity Echo events evaluated at a 95% target quantile with adjusted response targets in certain geographies, the resource increase is minimal

- For the High-acuity scenario, where the current response targets are slightly reduced in Communities >3000 and Rural areas, targeted at a higher quantile (95% versus 90%), and applied only to Purple (i.e. most Echo level) events, the resource increase required to meet target compliance is minimal.
- Despite more strict quantile targets, an ability to prioritize and triage responses for the highest priority and clinically
 acute events allows the system to effectively meet response targets for these events in all geography types.
- Current response intervals at different quantiles for Echo events in each geography type show that the system in its current state is capable of meeting response targets, even at higher quantile values, demonstrating the effectiveness of the deployment strategies used by AHS. For urgent and high-acuity Echo-level events (such as cardiac arrest), response targets should be more stringent to improve clinical outcomes and help the system perform when seconds matter most.

	YTD Response Intervals by Quantile for Echo Events (Jan - Jul 2023)							
Geography Type	P90	P95	P99					
Metro/Urban	661 s	756 s	1048 s					
Communities >3000	885 s	1084 s	1887 s					
Rural	1661 s	2006 s	2696 s					

Data not shown for Remote data due to low demand YTD

<u>Note:</u> A critical assumption of the model is that the allocation and deployment of additional resources across the province remains unchanged (i.e. filled staff hour increases are not targeted in specific geographic areas). Using this model, hypothetical resource increases do not represent an efficient augmentation of staff hours based on specific geographies.



When considering the L&S responses under current targets, the most significant resource investment is required in Metro/Urban areas

Hypothesis 1: Substantiated

Resources are not optimally deployed to meet response times

For all Lights and Sirens events, the resource gains required for compliance in both Metro/Urban and Communities >3000 are similar

- For the Lights and Sirens scenario, the current response targets are maintained but response times for Bravo and Charlie events are included in addition to Delta and Echo events. Although the use of L&S for lower priority events has been identified as increasing unnecessary risk, this scenario was included to outline the impact on resourcing as a result of expanding response time target reporting to include B E events. The resource increase for Metro/Urban areas and Communities >3000 is similar at approximately 30% as of July 2023, however, this is not advisable given the aforementioned risks with the L&S approach.
- For this scenario, the necessary resource augmentation in Metro/Urban areas is similar to that of the Resilient case (which saw the largest need for resource capacity increases), whereas for Communities >3000, this was more similar to the Baseline scenario.
- This can be attributed to the per-event response compliance (i.e. the number of events which meet the response target divided by the number of events), which is lower in more urban areas (due to higher demand). Metro/Urban areas need a more significant resource capacity increase to close the performance gap across B-E determinants, whereas Communities >3000 are closer to meeting response targets on average.
- The difference in per-event compliance for increasing determinants is more pronounced in Metro/Urban, a sign of consistent triaging and prioritization to manage demand.

	YTD Per-event Response Compliance ¹ by Determinant (Jan - Jul 2023)								
Geography Type	В	C	D	E					
Metro/Urban	62%	63%	80%	93%					
Communities >3000	82%	83%	84%	90%					

<u>Note:</u> A critical assumption of the model is that the allocation and deployment of additional resources across the province remains unchanged (i.e. filled staff hour increases are not targeted in specific geographic areas). Using this model, hypothetical resource increases do not represent an efficient augmentation of staff hours based on specific geographies.

1: Here, "Compliance" is used to refer to the percentage of events which have a response time equal to or lesser than the target for that geography type. However, in practice, P90 response compliance is not reported for Bravo / Charlie events.



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Hypothetical scenario testing was used to better understand system performance under different targets, and the resources needed to close the performance gap

Hypothesis 1: Substantiated

Resources are not optimally deployed to meet response times

Testing these hypothetical response target scenarios shows where the system is performing well, and which areas need more work

• Under the current resource allocation and deployment plan, it is possible to meet response targets for D/E events through augmentation of fulfilled paramedic staff hours.

- Slightly altering these targets, but maintaining the same target quantile (P90) and determinants measured (i.e. D/E) does not significantly impact performance.
- For the highest-acuity events, the system is currently able to effectively prioritize and triage events despite rising pressure from demand to meet response targets.
- There are diminishing returns with additional resource gains approximately twice as many staff hours need to be added to meet the current targets at a P95 quantile versus the existing P90 quantile. The longest response times are the hardest to reduce, but are significant for keeping the system in control.
- More densely populated (i.e. urban) areas, which see the most demand, are consistently triaging event responses, ultimately resulting in significant performance drop off with decreasing event priority.

		Scenario Details	P90 Response Target (s)				
Scenario Name	Event Determinants Considered	Target Quantile	Notes	Metro/ Urban	>3000	Rural	Remote
Baseline	Delta / Echo	P90	Current response targets	720	900	2400	4500
Resilient	Delta / Echo	P95	Same response intervals with higher quantile target	720	900	2400	4500
Lights & Sirens	Bravo - Echo	P90	Same response intervals with all Lights & Sirens response times targeted	720	900	2400	4500
EMS-served	Delta / Echo	P90	All communities with a unit station should have a target time <= 900 s	720	900	2400	4500
High-acuity	Echo	P95	Only measure high-acuity (Purple priority) events responses vs. a high quantile target	720	720	1800	4500
Slightly Faster	Delta / Echo	P90	Reduce existing response targets by 1 min in urban areas, 5 mins in rural, 15 mins in remote	660	840	2100	3600

Increased recognition of the important role MFR agencies play in the EMS system could enhance the delivery of responses to time-critical events

Hypothesis 1: Substantiated

Resources are not optimally deployed to meet response times

Underrecognition of MFR role in resource plans MFR is not part of deployment planning and is not measured in the response times, despite efforts being placed into working with each MFR agency to develop a tailored approach for their involvement in emergency response. Stakeholders expressed some barriers to the integration of MFR in deployment planning, namely the variable staff capability from volunteers to primary care paramedics, CAD compatibility, and municipality preferences. There is an opportunity to consider the role of MFR in time-critical responses and the achievement of response time targets.

MFR agencies already provide an important contribution. There is an opportunity to enhance their recognition within response time measurement

- Currently, once an MFR agency receives an event notification, it is up to the agency to choose to respond. In collaboration with each MFR agency, AHS develops a tailored response plan in alignment with local agencies' capabilities. Although there is a standard training required, providing expertise and training beyond the minimum requirement is up to the agency as a way to match training to the level of involvement/frequency of calls responded.¹⁻³
- International high-performing EMS systems have co-response arrangements with a minimum level of capability from MFR partners to support rapid response to time-critical events.^{4,5} Where MFR agencies in Alberta have achieved a minimum level of training, capability and compliance with minimum patient care reporting/documentation requirements, there is an opportunity to more formally recognize their role in time-critical responses and response time performance. Similar to the existing tailored approach, providing this option to MFR agencies to participate in this manner would complement EMS service coverage across the province.
- As the role of MFR agencies are enhanced, recognition of their local capabilities should also be incorporated into EMS response
 plans and considered when developing EMS service plans. As demand grows in municipalities where EMS stations are located or
 limited in being able to provide coverage, accounting for MFR agencies in service planning would be appropriate.

1: Medical First Response Program Information Overview
 2: 5.1 MFR Training Standards
 3: Role of MFR
 4: A review on initiatives for the management of daily medical emergencies prior to the arrival of emergency medical services
 5: Are first responders first? The rally to the suspected out-of-hospital cardiac arrest

What stakeholders are saying

"Municipality demographics are changing and demands for medical care are growing, however, many communities do not have EMS capability to be there all the time, everytime "

"MFRs have a minimum standard of equipment and training"

Frequency



Resource shortages are evident by overutilization of IFT resources and inability to meet SLA compliance

Hypothesis 1: Substantiated

Resources are not optimally deployed to meet response times

Insufficient resources and ambulance vehicles to meet demand Stakeholders expressed that resource investments have not adequately met growing demand; however, **increased dedicated IFT units in some areas may help with 911 unit availability, workload, diversion and efficiency.** Insufficient resources are a daily concern which results in overutilized resources, backlog of pending events and lack of available resources to respond to demand. In addition, there are not enough ambulance vehicles to upstaff for busy periods or large events; when planned shifts are 100% staffed, there is a lack of additional physical ambulances. The lag time between the order to delivery of a new ambulance vehicle is 18-24 months, which constrains the ability to quickly add capacity without advanced planning.

There are insufficient IFT-dedicated resources to respond to demand in Edmonton and Calgary

- The IFT program in metro areas is understaffed. Resource shortages are exhibited by over-utilization of IFT units, up to 90%, and low SLA compliance under the current IFT demand.
- As units are more heavily utilized, IFT SLA compliance decreases. To create capacity in the IFT system and improve SLA compliance, measures should be taken to reduce IFT utilization.
- While it is important to improve IFT performance, resourcing is unlikely to be the only barrier to meeting SLAs, as the data from Calgary shows that better performance is possible even when resources are heavily utilized (>70%). This is likely attributed to reductions in offload delays as a result of the RTS initiative.





"6-8 years of no addition of resources this is the way we survive, not the way we operate effectively"

"Resources are overutilized just to survive"

"We do not have enough metal to upstaff for busy periods"



IFT dedicated units in metro areas do not noticeably improve 911 capacity or compliance, as there are insufficient IFT resources to make a demonstrative impact

Hypothesis 1: Substantiated

Resources are not optimally deployed to meet response times

Increased usage of split production resources in metro areas does not improve 911 response capacity, as there are insufficient IFT-dedicated units

- High 911 and IFT unit hour utilization indicate that metro areas are capacity-constrained and do not have enough 911 or IFT resources. When demand is high and IFT units are heavily utilized, 911 units are also heavily utilized, which may suggest there are insufficient IFT-dedicated units to significantly divert IFT demand from 911 units.
- Per-event 911 response compliance is lower when IFT units are more heavily utilized, however, the capacity constraints facing both 911 and IFT highly impact 911 response times.
- High unit utilization for 911 units can be driven not only by high demand for EMS but also by large hospital wait times which increase the time on task for each unit.

Increased IFT unit utilization is linked to increased 911 unit utilization (i.e. lower 911 unit availability)

Increased utilization of IFT units is correlated with lower 911 compliance, however, the underlying issue is high 911 unit utilization



Non-IFT units in metro areas support IFT demand, even when 911 demand is high, illustrating IFT resource deficiencies which may be unsustainable

Hypothesis 1: Substantiated

Resources are not optimally deployed to meet response times

IFT-dedicated resource deficiencies in metro areas are apparent by the consistent use of non-IFT units for IFT demand, even when 911 demand is high



The use of non-IFT resources for IFT events in metro areas is demonstrative of resource shortages which prevent upstaffing during busy periods. Currently, the IFT program relies on support from 911 resources in Calgary and Edmonton, even when 911 demand is high. 911 resources are able to triage their own events to help manage IFT demand without significantly negatively impacting 911 response performance. Usage of 911 units for IFT can also serve strategic purposes such as clearing hospital beds to reduce offload delays. However, this may not be sustainable as 911 units are managing high unit utilization, rising 911 demand, and IFT demand. The consistent usage of non-IFT units for mitigating IFT demand conceals IFT performance issues; however, to appropriately address this issue the number of IFT-dedicated units should be increased.

Municipalities such as Lethbridge, were evaluated across performance and demand metrics to assess the expansion of split production

Hypothesis 1: Substantiated

Resources are not optimally deployed to meet response times

Assessment criteria of municipalities for split production expansion included performance and demand metrics

- The assessment of municipalities for potential expansion of split production was performed by the evaluation of performance and demand metrics in a few target regions.
- Characteristics for consideration were to be within the top 10 municipalities population in Alberta, and to not be closely located to a major metro centre (Calgary or Edmonton).
- Municipalities were compared to Red Deer, which was the most recent municipality to implement the split production model.
- The following municipalities were considered:

Lethbridge	Medicine Hat	Grande Prairie	Fort McMurray
dge may be an obvious municipality to cons	ider, given its high population and	overall demand, however it is also worth revie	ewing other options, including Grande Prairie fo

• Lethbridge may be an obvious municipality to consider, given its high population and overall demand, however it is also worth reviewing other options, including Grande Prairie for split production.

Municipality	Population (2021)	Population Density (2021)	Total Demand ¹ (# events)	911 Demand ¹ (# events)	IFT Demand ¹ (# events)	Avg. IFT Event Share (%)	Average 911 Resp. Compliance (%)	Average IFT SLA Compliance (%)	Average Unit Utilization (%)
Red Deer	100k	1514 ppl/km ²	16,507	9629	6878	41.7	80.0	41.4	41.6
Lethbridge	93k	1446 ppl/km ²	18,305	13,997	4308	23.5	88.2	51.9	38.9
Medicine Hat	63k	1191 ppl/km ²	8601	7014	1587	18.5	90.0	60.5	29.4
Grande Prairie	63k	1270 ppl/km ²	9080	6874	2206	24.2	90.9	42.1	33.4
Fort McMurray	68k	1303 ppl/km ²	3943	3613	330	8.3	87.2	38.8	15.2
	Statistics Canada data			For current-year data	obtained over the period f	rom Jan 1, 2023 to Jul 31, 2023	3		

1: For the purposes of this analysis, air-related activities (including those with pick up locations at an airport) are excluded from IFT demand calculations. Demand for a given municipality is defined as the events which had any one of: (i) a final destination in the specified municipality, (ii) an origin in the specified municipality, and/or (iii) the event is serviced by a unit stationed in the specified municipality.

Grande Prairie may benefit from a split production model, as it has the highest IFT demand and low IFT SLA compliance compared to the other municipalities



Hypothesis 1: Substantiated

Resources are not optimally deployed to meet response times

Grande Prairie may benefit from split production, due to high IFT event share and low SLA compliance

- The primary benefits of the introduction of a split production model (as indicated through internal reporting by AHS on the Red Deer pilot) are:
 - Improved IFT SLA compliance. 0
 - Increased unit availability for 911 resources. 0
 - Improved P90 response intervals in the service area. 0
- Given these benefits and the data presented below, another municipality with a high potential benefit from a split production model appears to be Grande Prairie, based on the following reasons:
 - It has high relative IFT demand, and subsequently the highest IFT event share of any of the four municipalities under consideration. 0
 - There is typically low IFT SLA compliance compared to the other municipalities under consideration. 0

Municipality	Population (2021)	Population Density (2021)	Total Demand ¹ (# events)	911 Demand ¹ (# events)	IFT Demand ¹ (# events)	Avg. IFT Event Share (%)	Average 911 Resp. Compliance (%)	Average IFT SLA Compliance (%)	Average Unit Utilization (%)
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	Statistics	s Canada data	a data For current-year data obtained over the period from Jan 1, 2023 to Jul 31, 2023			3			

1: For the purposes of this analysis, air-related activities (including those with pick up locations at an airport) are excluded from IFT demand calculations. Demand for a given municipality is defined as the events which had any one of: (i) a final destination in the specified municipality, (ii) an origin in the specified municipality, and/or (iii) the event is serviced by a unit stationed in the specified municipality.

Split production should be investigated in Grande Prairie and Lethbridge, based on estimated gains in P90 Response ITV

Hypothesis 1: Substantiated

Resources are not optimally deployed to meet response times

Compared to Lethbridge, Grande Prairie's response times are more sensitive to increased unit availability from a potential introduction of split production

- Lethbridge and Grande Prairie may benefit from a split production model due to the large population and IFT event share, respectively.
- To quantify the potential benefits of a split production model in ٠ Grande Prairie and Lethbridge, the percent increase in unit availability was estimated by subtracting the total number of unit hours spent on IFT from the total number of fulfilled unit hours in 2023.
- The potential positive impact on P90 response times from the removal of IFT workloads from EMS units was estimated with a linear model. The model captured the relationship between P90 Response ITV and Unit Availability (calculated as 100 minus the percent utilization).
- Grande Prairie sees a large influx of IFT events from the nearby air ambulance landing (approx. 600 events from January to July 2023) which may impact the total benefit of the split production, however, the overall potential of this model in this region is still high

Grande Prairie exhibits a larger drop in unit hour utilization from the hypothetical introduction of split production, likely due to relatively high IFT demand

Compared to Lethbridge, Grande Prairie has higher P90 Response ITV gains based on increased EMS unit availability, demonstrated by the larger slope



While the relationship between P90 Response ITV and Unit Availability is not strictly linear, the sensitivity of response times to unit availability appears to be higher in Grande Prairie compared to Lethbridge. Grande Prairie's observed higher Response ITV gains are despite both regions' similar EMS demand per capita, which was ~0.15 events per person in 2023.

Resource shortages and high demand result in shift vacancies and offload delays, which increases strain on resources and decreases response compliance

Hypothesis 1: Substantiated

Resources are not optimally deployed to meet response times



Shift vacancies are common, as stakeholders estimated only 70% of planned shifts are staffed daily in the North Zone and on weekends in metro areas. Shift vacancies are systemic and due to insufficient resources across the province. The impact of a lost shift may be more significant in rural areas, where there are few resources covering large geographical areas. Units experience more strain when shifts are unfilled, which impacts the response compliance rate.

Inefficient use of resources due to offload delays

Long offload delays ineffectively utilize EMS resources. Stakeholders identified that overcapacity hospitals often lean on EMS to oversee patients in ED park and processes contribute to offload delays; for example, some facilities require the assessment of IFT patients in the ED, as opposed to direct admittance to the accepting physician's ward. RTS decreased the average destination interval, however, the time to clear an event remains above the 45-minute target. High average destination intervals are correlated with increased demand per unit and decreased response compliance.



Collaboration with the IOC and improvement of system flow is important to optimally deploy resources

Hypothesis 1: Substantiated

Resources are not optimally deployed to meet response times

Competing priorities and objectives across partners impacts system coordination The IOC plays a critical role in demand capacity management in Edmonton and Calgary, both high EMS demand urban areas. EMS is a key partner in the IOC, and specially trained paramedics work alongside acute care patient intake coordinators to support decision-making.¹ Real-time data is collected through an integrated tool with multiple data sources, including CAD and emergency department data. As EMS units are deployed, IOC can view EMS movements and can use hospital capacity data to help inform the optimal hospital destination. In the Edmonton zone, stakeholders shared that the partners involved in the IOC are focused on their respective organizational priorities and objectives, which impacts overall system coordination. Stakeholders reinforced the potential for EMS to play an enhanced role in capacity and demand management, with the strong EMS partnership in the Calgary IOC as a valuable example.

What stakeholders are saying

"There are opportunities to improve patient flow; the province needs to understand the shortcomings and ensure everyone in the system is working towards the same goal"

"In Calgary, collaboration and relationships within the IOC are a strength"



1: Reducing EMS Response Times – AHS Taking Action

PwC | Alberta Health Services EMS Program Area Study

The IOC role is complex and challenging due to strained system capacity, however, communication and strong partnerships can benefit system coordination

Hypothesis 1: Substantiated

Resources are not optimally deployed to meet response times

The IOC manages competing priorities and objectives across health system partners, including EMS

- The IOC has a critical role in the healthcare system, which focuses on demand capacity management and considers all elements of coordination and utilization of the system to improve patient flow. For example, the Edmonton IOC hosts frequent, daily bed availability calls with multiple stakeholders to escalate patient flow issues. However, the IOC role is highly complex and challenging, as system partners are often overcapacity; for example, urban hospitals often operate above 100% capacity.¹ Similarly, EMS struggles to meet response time targets in urban areas.
- The Edmonton IOC supports the repatriation of rural patients to local facilities through IFT and EMS transfer, which frees up capacity in urban hospitals. A common barrier is the lack of capacity in rural health facilities, as department closures are common or reaching maximum capacity due to workforce issues.² Another concern is the disconnect between EMS availability to transport and the system's readiness to receive the patient. EMS manages competing priorities of 911 and IFT demand, and patient transfers have timing constraints. These barriers contribute to rigidity in the system and impact the ability to create capacity.
- The collaborative approach in Calgary presents learnings for other zones; for instance, the Calgary structure promotes relationships with EMS and ED site leads. Furthermore, in Edmonton, EMS supervisors rotate in the IOC role without clearly designated EMS leadership. By contrast, a smaller group of EMS staff rotate through the Calgary IOC which enhances consistency and builds relationships between IOC team members. The review notes that the Edmonton zone has implemented an EMS IOC lead, which is regarded as a positive step towards addressing these challenges.
- Managing demand and capacity across the health system, in particular, emergency health services, requires strong coordination to optimize effective and timely delivery of services that provide good patient experience. A strong collaborative coordination capability is essential to achieve these objectives, against a backdrop of increasing demand at every level of the health system. Alberta should continue to explore opportunities to enhance this capability to ensure coordination across the health system is maintained as structural and other changes occur.



1: Hospital Occupancy 2: The extent of Alberta's rural health-care problems

The hypothesis is unsubstantiated; rural response times and coverage challenges are driven by resource shortages and other factors as opposed to SSM principles

Hypothesis 2

SSM inappropriately draws on rural resources impacting rural response times and coverage

Unsubstantiated

Rural response times and coverage challenges are primarily driven by resource shortages and other issues, rather than SSM principles. Although urban areas have leaned on rural resources in the past, increased controls have mitigated this, and rural units currently primarily respond to local events. Additionally, unit hour availability is only slightly decreased by IFT events in rural areas, and availability remains significantly higher than metro availability. Strong response time compliance in rural areas suggests the utilization of resources from rural areas and communities >3,000 may be appropriate in urban areas to help meet high demand.

Utilization of SSM aligns with leading practice

The use of SSM is necessary to achieve the vision of the borderless system. The resource deficiency that impacts coverage and response times is sometimes perceived as an SSM challenge.

Usage of rural resources in urban areas

Under-resourced urban areas with high activity and long hospital offload delays have over-utilized rural resources in the past, however, increased controls have mitigated most concerns. Additionally, rural areas often benefit from the utilization of units from communities >3,000.

Maintenance of rural coverage during IFT or relocations

Rural communities are concerned with maintaining coverage while faced with high IFT usage and SSM movement. However, IFT demand only slightly decreases rural unit availability, which remains high. Additionally, resource capacity meetings and decision support tools are beneficial to cover communities outside the SSM plan.

Coordination of operations and dispatch

The fragmented relationship between dispatch and operations, manual overrides of SSM guidance, lack of trust and compliance issues contribute to interference with deployment plans that detract from the intended benefits to the broader system.

Well-being of staff is impacted by multiple factors

Staff well-being is significantly impacted by workload, demand and other stressors. Relocations and reassignments guided by SSM principles may be one of the many contributing factors to workforce issues, however, resource shortages are the primary concern. SSM is a tool to reduce the risk within the overall system and improve response times, however, execution of SSM plans are hindered by resource shortages

Hypothesis 2: Unsubstantiated

SSM inappropriately draws on rural resources impacting rural response times and coverage

Utilization of SSM aligns with leading practice SSM is a consistent practice of high-performing EMS systems. The use of SSM is necessary to achieve the vision of the borderless system and reduce the risk of the overall system. However, stakeholders expressed that SSM plans are challenging to execute while faced with staffing shortages, particularly in rural areas. Additionally, the resource deficiency that impacts coverage and response times is sometimes perceived as an SSM issue.

A study on dynamic ambulance redeployment demonstrates SSM improves performance¹

Percentage of calls reached in time against static deployment busy fraction for each redeployment model in Edmonton



- A dynamic ambulance redeployment study tested various dynamic redeployment models with simulation across five cities and call arrival rates, including Edmonton. Static deployment policies restrict ambulances to assigned stations, while dynamic redeployment strategically moves ambulances to various stations or standby locations in real time. Alberta uses the nested compliance table (NCT) model, which is a form of SSM.
- The study found that in most cities and busy fractions (fraction of time the ambulances are busy), dynamic redeployment models increased the percentage of calls reached in time, decreased the mean response time, and increased the ambulance travel time compared to static deployment. Additionally, the redeployment model used in Edmonton, NCT, reached a higher percentage of calls in time compared to other models.

1: Ridler 2023, https://hdl.handle.net/2292/64699

What stakeholders are saying

"SSM reduces risk in a region with some increase to local risk. However, SSM is needed to reduce overall risk."

"SSM is an enabler, if it is used as a crutch for insufficient resources/ lack of coverage this sets unrealistic expectations"



Multiple initiatives and controls were introduced to mitigate the overutilization of rural resources in urban areas

Hypothesis 2: Unsubstantiated

SSM inappropriately draws on rural resources impacting rural response times and coverage

Usage of rural resources response in urban areas Historically, Stakeholders expressed concern that under-resourced urban areas with high activity and long hospital offload delays over-extended rural resources. In 2022, the Metro Response Plans were refined to mitigate this issue. Since the introduction of increased controls to prevent frequent usage of rural resources in urban centres, the utilization of rural resources has decreased; however, metro areas are faced with increased pending events and backlog of activity. For example, in Red Deer, stakeholders identified that SSM mechanisms enabled ~80% of demand to be responded to by local resources. However, this improved to 95% after the implementation of the Return to Service initiative, the Central Zone IFT pilot, and increased peak hour resources. Stakeholders expressed a desire to bolster urban capacity to enable the usage of urban units in surrounding rural areas, which experience shortages. Recently, Edmonton began sharing resources for the first time with the North Zone due to the North Zone's diminishing capacity.

Various initiatives and controls aim to reduce the usage of rural resources in urban areas

- The Metro Response Plans (Edmonton and Calgary) were updated in February 2022 to incorporate rules to maintain suburban and rural EMS capability, while faced with resource shortages and high demand in metro centres. For example, **only metro-assigned units are now dispatched to Yellow and Orange priority events, excluding suburban and rural EMS resources from low priority events in metro areas**.¹
- The local service standard provides the ECOs with direction to implement SSM and includes controls for rural/suburban units. For example, there is direction to not deploy suburban/rural resources to metro environments with the intent to clear backlogs of pending events (only low priority events are eligible for holding).²

What stakeholders are saying

"Urban areas may become 'black holes' when resource needs are not fulfilled"

"Rural resources are now only used in metro when they are the closest unit for Purple and Red events, this has mitigated most stakeholder concerns"

Frequency



1: EMS Metro Response Plans FAQs 20220201 2: GV-DCD-018 System Status Management 20230414 (Local Service Standard)

SSM controls have limited the use of rural resource in urban areas; while units stationed in medium-sized communities are often used in rural areas

Hypothesis 2: Unsubstantiated

SSM inappropriately draws on rural resources impacting rural response times and coverage

The limited use of rural units in urban areas and frequent use of medium-sized community units in rural areas directly benefit Rural and Remote communities which typically see high compliance rates to response interval targets.



- Rural resource usage is primarily concentrated in Rural and Remote areas, where 84% of all 911 events responded to by these resources take place in Rural and Remote areas. Between 2020-2021, there was an increasing number of Metro/Urban events being serviced by Rural and Remote units, however, this number has decreased since 2022 as SSM practices have shifted.
- In contrast to rural areas, only 55% of all 911 responses by units stationed in >3000 Communities are in these communities. Oftentimes, units in these medium-sized communities (e.g. Canmore, LLoydminster, Cold Lake, St. Paul, etc.) are used to respond to events in nearby Rural and Remote regions, which benefit from nearby larger communities.
- In non-urban areas, response interval compliance is generally better than in urban areas.
- Strong response time compliance in non-urban areas suggests the utilization of rural and medium-sized community resources may be appropriate in urban areas to help meet high demand, which is a function of a 'borderless' system.

The P90 Response Interval Compliance Rate is calculated by comparing each individual event response time to the target value. If the event response was less than the target, the compliance for that event was set to 1, otherwise 0. The P90 Response Interval Compliance Rate was then averaged across all events for a given geography type within a monthly averaging period, where the fraction of compliant events represents the compliance rate shown.

The usage of rural resources for IFT does not significantly impact unit availability in rural communities

Hypothesis 2: Unsubstantiated

SSM inappropriately draws on rural resources impacting rural response times and coverage

Maintenance of rural coverage during IFT or relocations Stakeholders are concerned about maintaining coverage in rural areas during IFT events and coverage of neighbouring communities; however, there are mechanisms in place to improve coverage. Municipalities often express the desire for ambulances to remain in a community, rather than participate in the 'borderless' system. Stakeholders also seek transparency and reporting of a standard for minimum coverage and protocols of risk assessments for IFT vs. public safety and coverage. While SSM is the guiding tool, the plans necessitate ad-hoc changes when communities are not covered for long periods and workload is redistributed to replace a home-based resource, often due to resource issues or IFT demand. Resource capacity meetings occur twice daily with dispatch and operations to determine where to place resources outside the SSM plan and improve coverage. Dispatchers leverage the FUT, particularly in the short-staffed North Zone to balance relocation decisions, considering the likelihood of demand and impact on staff.

The relationship between unit availability and IFT demand depends on geography type

- In non-Metro/Urban areas, the average unit hour availability slightly decreases with increasing IFT demand in these geography types.
- Even during periods of high resource usage for IFT events, average unit hour availability is much higher than in Metro/Urban communities, typically near 80% availability.
- Alternatively, in Metro/Urban areas, greater usage of non-IFT units to respond to IFT demand is related to increased average unit availability.
- Increased share of local IFT workload is often the result of an intentional deployment strategy, which has benefits to average unit availability in higher-demand regions and minimal negative consequences in lower-demand (i.e. more rural) regions.



What stakeholders are saying

"We have coverage minimums in place but don't always follow them or measure how often we don't follow them"

"Outliers without coverage are not forgotten by municipalities while multiple patient benefits of coverage are not known"

"Rare we would take the last resource out of a community to cover another"



Coordination issues between operations and dispatch and the local mindset of some staff impacts the broader system and ability to provide coverage

Hypothesis 2: Unsubstantiated

SSM inappropriately draws on rural resources impacting rural response times and coverage

Coordination of operations and dispatch

Resource deployment requires stronger relationships between dispatch/Optima coordinators and frontline staff/operations; however, stakeholders identified a lack of buy-in from operations as they may lack a view of the EMS system big picture (enabled through Optima). There are issues with coordination and trust, where operational supervisors may override decisions made by the Optima coordinators. Supervisors may override coverage assignments in an effort to accommodate staff requests to address resource shortages and staff wellness. Additionally, stakeholders identified some cases of SSM compliance issues where frontline staff workaround CAD to reduce the number of movements made from station to station. The coordination issues and local mindset of some staff impact the broader system and ability to provide coverage.

What stakeholders are saying

"Operations staff should work with dispatch to solve problems, instead of exercising overrides"

"Frontline staff may tell supervisors they will call in sick if they are moved to another community"



Staff are primarily strained by resource shortages and large workload

Hypothesis 2: Unsubstantiated

SSM inappropriately draws on rural resources impacting rural response times and coverage



SSM is one of many factors that may impact staff well-being, but not the primary concern. A significant issue is the lack of resources combined with high demand, which results in increased workload. Some stakeholders are concerned about the focus on statistics and minimal incorporation of operational and resource considerations in SSM plans; such as the impact of relocations on staff and vehicles, changes to policies when planned shifts are not staffed, and other health and wellness concerns. However, principles have evolved as staff needs are identified, such as alternative station configurations and 40-minute breaks from relocation after red dispatch. Additionally, relocations are reduced by the establishment of thresholds that determine the necessity of unit relocation based on the likelihood of the unit relocation meeting an event. Ineffective communication with frontline staff and change management perpetuates misunderstandings about the rationale for relocations and the broad system benefit of SSM.

High utilization strains EMS resources due to high demand and low shift fulfillment

- Demand is straining the current resource pool. When shift fulfillment is lower, individual resources are more heavily utilized to compensate for the reduced capacity. The EMS Current State Survey findings affirm this resource utilization challenge, as Albertans are concerned the EMS workload is unsustainable and staff are under strain.¹
- The AHS EMS overtime rate (overtime as a % of paid hours) is 7.3%, which is high compared to the AHS rate of 3.0% (Aug 2023).² Increased demands on staff have resulted in frontline staff fatigue and burnout, which is demonstrated by the sustained high sick days per FTE from 15.9 in April 2022 to 13.8 in October 2023.² For the same period, vacancy rates have increased from 14.6% to 18.8%.
- AHS EMS is working to improve staff workload and wellness. In response to previous report recommendations such as AEPAC, a workforce strategy is under development.



What stakeholders are saying

"ECO staff morale is low as dispatch is a daily high stress chess game with no pieces"

"Business rules for optima do not always account for the operational and human side"

"Crews may be diverted 2-3 times in a single sequence to respond to high priority events, this is not ideal"

Frequency



1: Current State Analysis 2022

2: Draft EMS Workforce Strategy

3: Workforce Data for Q1 FY 2022/23 to Q3 FY 2023/24 via email 12.01.23 (Includes EMR, PCP, ACP, ECO, Paramedic Team Lead or Supervisor)

Dispatched units are often re-assigned to a new event while already en route to another, increasing staff workload

Hypothesis 2: Unsubstantiated

SSM inappropriately draws on rural resources impacting rural response times and coverage

Resources can be dispatched to an event but do not arrive on scene, more commonly when demand is high, contributing to an increased staff workload

Event Reassignment Rate =	# of "turned out" units – # of units that arrived on scene	
	# of units that arrived on scene	

- Stakeholders expressed that SSM plans' guided reassignments can be a burden for staff, who may be diverted numerous times before an event is reached. Reassignment can contribute to stress, as staff mentally prepare for an emergency response, and then feel deflated after diversion. This can be estimated by comparing the number of "turned out" units (i.e. those which have travelled more than 50m towards a destination) to the number of units which arrive on scene. If the number of turned out units is larger than the number of responding units for a given event, it means that units which were *en route* to but never arrived at an event scene. This may be for any reason, including being reassigned to a new event while already heading towards another.
- In 2022, the event reassignment rate reached highs of 60% in Metro/Urban areas, then began to decrease towards the end of 2022 to a more moderate rate. This is likely due to the implementation of the Pre-empt and divert policy. The event reassignment rate is currently ~20% in communities >3,000 and rural areas, which may impact staff daily.

	Average Monthly Activity per Unit (2023)				
Geography Type	Turnouts	Responses	Turnout Ratio		
Metro/Urban	61	51	1.20		
>3000	21	18	1.17		
Rural	23	21	1.10		
Remote	14	13	1.08		

Monthly Event Reassignment Rate

When demand is higher, the number of responses per number of turnouts decreases for all geography types



Urban units are more likely to be *en route* to an event and never make it to a scene (for any reason, including cancellations). In general, the number of responses per number of Turnouts decreases with the normalized demand for each geography type. In other words, **units are more likely to be dispatched to a new event while already en route to another when demand is higher.** Ideally, the target value for this number is 1.

In addition to addressing resource capacity, there are opportunities to formalize planning, align targets to leading practices, and improve system coordination

Key Insights	o ☆_ Program Area	Hypothesis	Finding
EMS resource allocation and deployment strategies need to balance appropriate system coverage, patient safety and needs, with resource availability. The intention to achieve system coverage and response time targets during sustained demand, coupled with insufficient workforce capacity, contributes to a lack of unity among EMS service delivery staff, including dispatch front-line staff, and health system partners, such as Clinical Operations and the general public. AHS EMS resource allocation and deployment strategies have evolved over time and SSM principles play a critical role in guiding resource deployment. However, as resource capacity issues increase, the ability to maximize the benefits of SSM principles will also be challenged.	Resource Allocation and Deployment (SSM)	Hypothesis 1: Resources are not optimally deployed to meet response times	Substantiated - Challenges with strategic planning, targets, and triaging contribute to the non-optimal deployment of resources. The lack of formal strategic planning processes sustains resource and infrastructure deficiencies, which impedes coverage and ability to meet response times. The current response plan enables over-response for non-life-threatening 911 and underrecognition of MFR, which is misaligned with leading practices, increases risk, and impacts the capacity to respond to critical events. Response time targets do not accurately measure EMS performance and further contribute to risk. Resource augmentation can be used to achieve both current and hypothetical response targets. A resilient (P95) target requires significant resource increases, however, a P95 target for high-acuity is achievable with current resource levels. High unit utilization demonstrates the metro areas have insufficient IFT-dedicated units and it may be beneficial to explore split production in areas such as Grande Prairie.
	Hypothesis 2: SSM inappropriately draws on rural resources impacting rural response times and coverage	Unsubstantiated - Rural response times and coverage shortfalls are primarily driven by resource shortages and other issues, rather than SSM principles. Although urban areas have overutilized rural resources in the past, this has been resolved by increased	
In addition to addressing resource shortages, there is an opportunity to take a more proactive approach to service planning to reduce sustained coverage deficiencies in communities with growing demand, align response time targets to leading practices,			controls, and rural units currently primarily respond to local events. Additionally, unit hour availability is only slightly decreased by IFT events in rural areas, and rural availability remains significantly higher than metro availability. Strong response time compliance in rural areas suggests the utilization of resources from rural areas and communities >3,000 may be appropriate in urban areas to help meet high demand.
and for EMS to play a more significant role in health			



system coordination.

Opportunities for Resource allocation & deployment (SSM)



Improve resource deployment by initiating proactive service planning, and aligning response targets to leading practice

The following opportunities have been identified through stakeholder interviews, review of practices in other jurisdictions, and analysis of the key themes identified to substantiate the hypothesis tested. The opportunities have been grouped into the following categories:

- 1. Service planning focuses on building a proactive approach to operational planning
- 2. Adapt model of delivery to meet patient needs and demand focuses on considerations to improve resource deployment
- 3. Improve communication and build trust between EMS teams focuses on addressing workforce challenges
- 4. Strategic system planning and coordination focuses on EMS role within the broader healthcare system

Service planning

Focuses on building a proactive approach to operational planning

- Review current response time targets to be more aligned with international leading practices from a clinical and operational perspective.
- Implement a rolling 5-10 year strategic and operational planning process that aligns with provincial budget and planning processes to limit the current ad-hoc approach that is currently taken.

Note: Additional description of the opportunities can be found in the appendix



Adapt model of delivery to meet patient needs and demand

Focuses on considerations to improve resource deployment

- Revise the existing Lights and Sirens response protocol to align with international leading practices and reduce risk to staff, patients and the public.
- Enhance the recognition of the role MFR agencies play in emergency response across the province through developing minimum training/equipment required to incorporate their arrival on scene into response targets and recognize their capability in EMS service planning.
- Continue to identify communities that may benefit from split production teams and enhance IFT-unit dedicated resources to reduce competing priorities between 911 and IFT demand impacting unit availability.
- Review the secondary triage options available through EMS to be able to optimize the use of resources.
- Develop education and awareness campaigns for both the community and clinicians on the appropriate use of EMS so they may better understand alternative options available within the healthcare system.

Improve EMS team collaboration, better understand workforce challenges and focus on system coordination to address resource allocation

Improve communication and build trust between EMS teams

Focuses on addressing workforce challenges

- Better understand the obstacles with recruitment of EMS resources into AHS and use this to inform recruitment efforts.
- Continue to work toward creating capacity within the EMS system by focusing on multiple strategies that include increased shift fulfillment, improved hiring/retention strategies for staff, and implementing initiatives that improve unit availability (e.g., RTS and/or split production) to improve EMS performance.
- Improve communication between EMS leadership, operations and frontline staff to enhance trust and buy-in. Communication on the context and rationale for policy and operational changes can reduce misconceptions and strengthen change management efforts.

Strategic system planning and coordination

Focuses on EMS role within the broader healthcare system

- Strengthen the partnership in the Edmonton IOC to enhance working relationships and contribute to the alignment of all system partners towards the same goal of improving patient coordination across the health system.
- Improve integration of coordination bodies (e.g., IOC, Dispatch, RAAPID etc.) responsible for enhancing patient flow/EMS transport and demand capacity management to improve EMS and health system performance and reduce frustrations felt by patients and clinicians with delays and lack of smooth workflows.

Note: Additional description of the opportunities can be found in the appendix



Additional considerations

Themes related to workforce challenges, education, health system coordination and MFR should be explored further

Throughout the review of several key EMS programs as part of this study, and during engagements with stakeholders, a few opportunities that were out of the scope of this study were raised repeatedly. The areas raised have been identified in previous reports (AEPAC and Dispatch) and it's recognized that efforts are being made to address these. Given these areas were not the study's focus and therefore not evaluated in detail, they have been outlined below for further review and consideration:

AHS EMS becoming an Employer of Choice

Improving EMS performance is reliant on a strong and reliable workforce. Although during this study, an AHS EMS-led workforce strategy that aimed to address many known issues within EMS was under development. workforce retention and recruitment was frequently raised during engagements and discussions. The culture, demanding nature of EMS work, pressure placed on staff due to shift fulfillment challenges, communication and trust between EMS teams (leadership, ECOs, frontline staff, etc.) have room for improvement and negatively impact retention and recruitment. Recognizing these workforce issues are not unique to Alberta, exploring the opportunity and feasibility of developing a national paramedic workforce strategy may benefit Alberta, and Canada as a whole. AHS EMS should further explore these issues and place concerted efforts into addressing these workforce issues to mitigate the current resource shortfalls and prepare for increased demand.

The education and training for paramedics is evolving. Through several engagements, the increased educational requirements for paramedics were raised. Increasing the educational requirements was sometimes perceived as having the potential to negatively impact the already limited pipeline of paramedics. However, aligning education requirements with national and global leading practices will be a key part of addressing workforce challenges and exploring the opportunity to develop a national paramedic workforce strategy. Additionally, as AHS EMS reviews the role of the MIH program, exploring the value of further specialization among community paramedics and how it could benefit the EMS and health system overall may be beneficial. In other jurisdictions, community paramedics have an increased clinical scope as a result of more formal education.

Education/training for paramedics

Health system coordination

IOC is the relatively new coordinating body within AHS but has the potential to play an important role in system coordination. Throughout all stages of the study, it was clear that system coordination through improving demand capacity and patient flow is an underlying issue that is impacting all parts of the health system including EMS. A more detailed review of the roles and responsibilities and impact of the various coordinating bodies that impact EMS and patient flow would benefit the health system.

Managing demand and capacity across the health system, in particular, emergency health services, requires strong coordination to optimize effective and timely delivery of services that provide good patient experience. A strong collaborative coordination capability is essential to achieve these objectives, against a backdrop of increasing demand at every level of the health system.

Medical First Responders

The role of **Medical First Responders** within emergency response in Alberta involves a tailored approach to match each municipality's capacity. It would be beneficial to better understand how to build on the funding and investments being made to raise the capacity of MFR agencies to complement EMS coverage across the province.

Summary of key findings

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There are five categories of opportunities that encompass improvements for the program areas reviewed

The analysis of EMS resourcing and programs resulted in 23 prioritized opportunities which were consolidated across five categories:



Focuses on a proactive approach to service planning, policy and funding changes required to meet future demand.

Includes strategic opportunities encompassing the review of Lights and Sirens protocol and performance targets, as well as development of an integrated and data-backed long-term service planning process. Additionally, it includes initiatives to define the purpose and scope of the MIH program to support appropriate use of resources, aligned to clinical need and core EMS purpose. Focuses on future resource requirements as well as recruitment and retention.

The primary opportunity identifies the **resource increases required to meet existing P90 response time targets**. Additional opportunities outline workforce strategy implementation to address recruitment and retention challenges, and organizational communication to strengthen change management efforts. Focuses on EMS role within the broader healthcare system and coordination with system partners.

Highlights opportunities to work with system partners to improve patient flow and meet patient needs. Notably, the importance of maintaining the Return to Service initiative given its impact on EMS response times and improving the collaboration with the IOC and other key partners to improve patient coordination, and manage capacity and demand. Focuses on delivering the right care, at the right place, at the right time, including alternative services to reduce pressures on frontline resources.

There are opportunities to alter services to better meet patient needs and appropriately prioritize critical resources for emergency and acute events. **911 response capability can** be improved through the enhancement of secondary triage options, maturation of the NCT program, and development of alternative care pathways. Focuses on awareness and education about the appropriate use of EMS, IFT and alternative options to the public and health professionals.

An educational campaign for the public and clinicians can facilitate appropriate use EMS and the health system, which can reduce inappropriate demand on EMS services, and help meet patient needs in a timely manner.

Review of response times targets, response protocol and implementation of an integrated strategic planning process are critical to prepare for future demand

Priority	#	Opportunities	Program Focus ¹	Report Alignment ²
High	1	Review current response times targets to be more aligned with leading practices from a clinical and operational perspective.	RA&D	Dispatch #8
High	2	Revise the existing Lights and Sirens response protocol to align with leading practices and reduce risk on staff, patients and the public.	RA&D	
High	3	Implement a formal rolling 5-10 year strategic and operational planning process informed by advanced system modelling and in alignment with provincial budget and planning processes to limit the current ad-hoc approach. Demand for EMS services has rapidly outpaced population growth and is expected to continue to do so. Changes must be made to the system to meet expected increases in demand and reliance on EMS.	GA, RA&D	
High	4	Update the regulations defining the scope and accountabilities of the IFT program to support the development of clear policy and billing guidance that will reduce the inappropriate use of IFT, enhance consistency of program implementation, and improve patient experience.	IFT, NCT	
High	5	Review current IFT program performance targets to reflect more realistic timelines and current system constraints.	IFT	
High	6	Define the core purpose of the MIH program and conduct a comprehensive longitudinal assessment to determine the program impact and opportunity cost of the transition of EMS resources from frontline to MIH. Communicate the role MIH will play in the health system and establish governance and decision making processes to evaluate growth opportunities.	MIH	
Medium	7	Develop a new performance measure, such as the System Performance Index, to create a more balanced scorecard for EMS, which also considers local factors in system performance and could help control response time variance and mitigate shift fulfillment deficiencies.	GA	
Medium	8	Enhance the recognition of the role of MFR agencies play in emergency response across the province through developing minimum training/equipment required to incorporate their arrival on scene into response targets and recognize their capability into EMS service planning.	RA&D	
Medium	9	Reassess MIH program performance targets to better communicate its impact and program outcomes.	MIH	

1: Program areas include Ground and Air Interfacility Transfer (IFT) and Non-Clinical Transport (NCT), Mobile Integrated Healthcare (MIH), Ground Ambulance (GA) Resource Capacity and Resource Allocation and Deployment (RA&D). 2: Numbered recommendations from the assessment of Alberta EMS Provincial Advisory Committee (AEPAC), including #9, 11, 15, 18, 19, 20, 22, 24, 25, 26, 28, 41 and 45, and Alberta EMS Dispatch Review Report (Dispatch), referencing #2, 8, 9, 10, 18, 38, 43 and 44.

Increases in resource capacity, identified as shift fulfillment, is required to meet existing P90 response time targets

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Increase resource capacity

Focuses on future resource requirements as well as recruitment and retention.

Priority	#	Opportunities	Program Focus ¹	Report Alignment ²
High	10	Increase resource capacity (as measured through shift fulfillment) by approximately 10-20% to meet existing P90 response time targets. ³ Across the province approximately a 17% increase would have been needed over the past 5 years to achieve consistent P90 compliance, whereas in Calgary and Edmonton, a resource capacity increase of only 12% is required to achieve P90, demonstrating the greater need for resources in metro areas.	GA, RA&D	AEPAC #25
High	11	Implement the workforce strategy and regularly review the effectiveness in addressing challenges with recruitment and retention.	RA&D	
High	12	Improve communication between EMS leadership, operations and frontline staff to enhance trust and buy-in. Communication on the context and rationale for policy and operational changes can reduce misconceptions and strengthen change management efforts.	RA&D	

1: Program areas include Ground and Air Interfacility Transfer (IFT) and Non-Clinical Transport (NCT), Mobile Integrated Healthcare (MIH), Ground Ambulance (GA) Resource Capacity and Resource Allocation and Deployment (RA&D). 2: Numbered recommendations from the assessment of Alberta EMS Provincial Advisory Committee (AEPAC), including #9, 11, 15, 18, 19, 20, 22, 24, 25, 26, 28, 41 and 45, and Alberta EMS Dispatch Review Report (Dispatch), referencing #2, 8, 9, 10, 18, 38, 43 and 44. 3: Assumes allocation and deployment remains the same across the province.

System coordination and allocation of resources can be improved through maintenance of the Return to Service initiative and strengthened partnerships

ဘို System coordination

Focuses on the EMS role within the broader healthcare system.

Priority	#	Opportunities	Program Focus ¹	Report Alignment ²
High	13	Maintain the Return to Service initiative, noting the important relationship between response times and destination wait times while also observing the immediate effects of the initiative on destination wait times. Continue exploring initiatives such as dedicated support for patients at destination facilities to limit offload delays.	GA, RA&D, IFT	AEPAC #22
High	14	Improve integration of coordination bodies (e.g., IOC, Dispatch, RAAPID etc.) responsible for enhancing patient flow/EMS transport and demand capacity management to improve EMS and health system performance and reduce the impact of offload delays which impacts IFT and other EMS operations.	RA&D, IFT	AEPAC #18
High	15	Improve two-way communication between EMS and hospitals on the status of patient transfers to reduce miscommunication and provide more transparency.	IFT	AEPAC #19
High	16	Integrate with other parts of the healthcare system including focusing on primary care and community care to reduce long-distance travel if care can be managed appropriately in the community.	IFT	

1: Program areas include Ground and Air Interfacility Transfer (IFT) and Non-Clinical Transport (NCT), Mobile Integrated Healthcare (MIH), Ground Ambulance (GA) Resource Capacity and Resource Allocation and Deployment (RA&D). 2: Numbered recommendations from the assessment of Alberta EMS Provincial Advisory Committee (AEPAC), including #9, 11, 15, 18, 19, 20, 22, 24, 25, 26, 28, 41 and 45, and Alberta EMS Dispatch Review Report (Dispatch), referencing #2, 8, 9, 10, 18, 38, 43 and 44.

Alternative service models such as Split production, secondary triage and NCT can help meet patient needs and improve capacity to respond to critical 911 events

ကို Al ကို m	Align service model to better meet patient needs							
Focuses on delivering the right care, at the right place, at the right time, including alternative services to reduce pressures on frontline resources.								
Priority	#	Opportunities	Program Focus ¹	Report Alignment²				
High	17	Continue to identify communities that may benefit from split production teams, maintain and enhance IFT-unit dedicated resources in urban areas to improve program performance and reduce competing priorities between 911 and IFT demand which impacts unit availability.	RA&D, IFT	AEPAC #26				
High	18	Review the secondary triage options available through EMS and develop alternative care pathways to ensure patients receive the right care, at the right palace at the right time and optimize the effective use of EMS resources. For example, review the pathway from $911 \rightarrow 811 \rightarrow MIH$ to increase referral volume and alternative options such as NCT.	RA&D, IFT, MIH, NCT	AEPAC #9, 20				
High	19	Work with government partners to further develop the NCT program, to reduce reliance on EMS for non-clinical transports.	IFT, NCT	AEPAC #20				
High	20	Leverage virtual care/telemedicine as an alternative option to transferring patients from rural communities.	IFT	AEPAC #9				
Medium	21	Explore the potential for Community Paramedicine to play a greater role in supporting primary healthcare in rural and remote communities to align with leading practices and reduce reliance on IFT and 911.	MIH, IFT					

1: Program areas include Ground and Air Interfacility Transfer (IFT) and Non-Clinical Transport (NCT), Mobile Integrated Healthcare (MIH), Ground Ambulance (GA) Resource Capacity and Resource Allocation and Deployment (RA&D). 2: Numbered recommendations from the assessment of Alberta EMS Provincial Advisory Committee (AEPAC), including #9, 11, 15, 18, 19, 20, 22, 24, 25, 26, 28, 41 and 45, and Alberta EMS Dispatch Review Report (Dispatch), referencing #2, 8, 9, 10, 18, 38, 43 and 44.

Appropriate use of EMS can be promoted through campaigns to educate the community and clinicians on alternative care pathways

	pprop	riate use of EMS			
Focuse	s on a	wareness and education abo	ut the appropriate use of EMS, IFT and alternative options to the public and health profession	als.	
Priority	#	Opportunities		Program Focus ¹	Report Alignm
High	22	Develop education and aware alternative options so they may	ness campaigns for both the community and clinicians on the appropriate use of EMS, including better understand the options available within the healthcare system.	RA&D, IFT, NCT	AEPAC
High	23	Simplify the IFT prioritization among clinicians. The new IFT prevaluation of whether the service used to inform education strated	matrix and introduce a data collection approach to enhance the appropriate use of the IFT program prioritization matrix should reflect a refined scope for the IFT and NCT programs. Data collected should enable es delivered were clinically appropriate to be able to quantify the program's potential 'misuse' and could be gies.	IFT, NCT	

Opportunities were prioritized for immediate consideration based on high level of impact and ease of implementation

Opportunities were assessed against level of impact and feasibility to prioritize and determine the timeline of implementation. The following criteria were considered in prioritization:

Level of Impact:

- Impact on response times, coverage, capacity and ability to meet demand
- Supports the achievement of right care, at the right place, at the right time, reduces demand on frontline resources
- Alignment with EMS priorities and AEPAC and Dispatch report recommendations

Ease of Implementation:

- Requirement for new infrastructure, resources or assets
- Political or systemic barriers to implementation
- Involvement of partners and change management

The following opportunities identified are recommended to implement immediately to improve EMS capacity and to meet patient needs:

Wave 1 Implementation	Program Focus ¹	Report Alignment ²
 Review current Lights and Sirens protocols, response times targets, and performance measures to be more aligned with leading practices, consider system performance, and reduce risk. #1, #2, #7 	GA, RA&D	Dispatch #8
 Implement a formal rolling 5-10 year strategic and operational planning process informed by advanced system modelling and aligned with provincial budget and planning processes to limit the current ad-hoc approach. #3 	GA, RA&D	
• Define the core purpose of the MIH program and conduct a comprehensive longitudinal assessment to determine the program impact and opportunity cost of the transition of EMS resources from frontline to MIH. #6	MIH	
 Maintain the Return to Service initiative, as reducing destination wait times positively impacts response times, and recent implementation of the initiative demonstrated significant and immediate improvements. #13 	ga, ra&d, if	FT AEPAC #22
Continue to identify communities that may benefit from split production teams, and maintain and enhance IFT-unit dedicated resources in urban areas to improve program performance and reduce competing priorities between 911 and IFT demand which impacts unit availability. #17	RA&D, IFT	AEPAC #26
• Develop education and awareness campaigns for both the community and clinicians on the appropriate use of EMS, including alternative options so they may better understand options available within the healthcare system. #22	RA&D, IFT, NCT	AEPAC #25

1: Program areas include Ground and Air Interfacility Transfer (IFT) and Non-Clinical Transport (NCT), Mobile Integrated Healthcare (MIH), Ground Ambulance (GA) Resource Capacity and Resource Allocation and Deployment (RA&D). 2: Numbered recommendations from the assessment of Alberta EMS Provincial Advisory Committee (AEPAC), including #9, 11, 15, 18, 19, 20, 22, 24, 25, 26, 28, 41 and 45, and Alberta EMS Dispatch Review Report (Dispatch), referencing #2, 8, 9, 10, 18, 38, 43 and 44.

Additional opportunities were categorized for short-term and long-term consideration

Timeline	Opportunities	Program Focus ¹	Report Alignment ²
Wave 2	 Increase resource capacity (as measured through shift fulfillment) by approximately 10-20% to meet existing P90 response time targets. #10 	GA, RA&D	AEPAC #25
	 Update IFT program regulations to refine IFT scope and accountabilities. #4 	IFT, NCT	
	Review current IFT program performance targets. #5	IFT	
	 Work with government partners to further develop NCT options. #19 	ICT, NCT	
	Redevelop MIH program performance targets to measure and communicate program impact. #9	MIH	
	Improve communication between EMS leadership, operations and frontline staff. #12	RA&D	
	 Implement the workforce strategy and regularly review the effectiveness. #11 	RA&D	
	 Develop alternative care pathways, such as secondary triage, virtual care and explore the role of MIH. #18, 20, 21 	RA&D, IFT, MIH, NCT	AEPAC #9, 20
Wave 3	Enhance the recognition of the role that MFR agencies play in emergency response. #8	RA&D	
	 Improve integration with health system (primary care and community care) to reduce long-distance travel. #16 	IFT	
	 Improve integration and communication of coordination bodies responsible for demand capacity management. #14, 15 	RA&D, IFT	AEPAC #18, 19
	Educate clinicians and build data approach to encourage appropriate use of IFT. #24	IFT, NCT	

1: Program areas include Ground and Air Interfacility Transfer (IFT) and Non-Clinical Transport (NCT), Mobile Integrated Healthcare (MIH), Ground Ambulance (GA) Resource Capacity and Resource Allocation and Deployment (RA&D). 2: Numbered recommendations from the assessment of Alberta EMS Provincial Advisory Committee (AEPAC), including #9, 11, 15, 18, 19, 20, 22, 24, 25, 26, 28, 41 and 45, and Alberta EMS Dispatch Review Report (Dispatch), referencing #2, 8, 9, 10, 18, 38, 43 and 44.

The implementation roadmap includes prioritized opportunities for consideration

	Wave 1	Wave 2	Wave 3		
	Review Lights and Sirens protocols, response times targets, and performance measures [1, 2, 7]				
	Implement a formal rolling 5-10 year planning process [3]				
	Define the core purpose of the MIH program and conduct a longituding	al assessment [6]			
	Maintain the Return to Service initiative [13]				
Strategy, governance and		Update IFT program regulations [4]			
planning		Review IFT program performance targets [5]			
		Redevelop MIH program performance targets to measure and communicate impact [9]			
			Enhance the recognition of the role that MFR agencies play in emergency response [8]		
Q		Increase resource capacity (as measured through shift fulfillment) by	at least 10-20% to meet existing P90 response time targets [10]		
Increase resource		Improve communication between EMS leadership, operations and frontline staff [12]			
capacity		Implement the workforce strategy and regularly review the effectiveness [11]			
וֹבָּוֹ)		Improve integration and communication of coordination bodies respo	nsible for demand capacity management [14, 15]		
System Coordination			Improve health system integration (primary care and community care) to reduce long-distance travel [16]		
م م	Continue to identify communities that may benefit from split production	on teams, maintain and enhance IFT-unit dedicated resources in urban	areas [17]		
Align service model to better meet		Work with government partners to develop NCT options [19]			
patient needs		Develop alternative care pathways, such as secondary triage, virtual c	are and explore the role of MIH [18, 20]		
	Develop education and awareness campaigns for both the community	and clinicians on the appropriate use of EMS [22]			
Appropriate use of		Simplify the IFT prioritization matrix and introduce a data collection ap	oproach to encourage appropriate use of IFT [23]		
EMS					

AHS reorganization and health system dependencies are key risks and considerations for the implementation of the opportunities outlined

AHS reorganization

On November 8, 2023, the Government of Alberta announced the "Refocusing Alberta's Health Care System" initiative. The initiative will transform AHS into a new unified provincial health care system with four specialized areas of focus: Primary Care Organization, Continuing Care Organization, Acute Care Organization (encompassing EMS), and Mental Health and Addiction Organization.

The reorganization may present future implications on EMS priorities, governance, structures, and processes, which may impose challenges on the planning and implementation of opportunities. Additionally, with patient care separated into organizational agencies with focused priorities, challenges of coordination and collaboration may be exacerbated. This may lead to patients falling through the cracks and frustrations and inefficiencies with patient flow.

Mitigation: Align with the momentum of the AHS transformation and consider how EMS opportunities can be implemented concurrently with AHS reorganization to accelerate positive change. Collaborate with health system partners to strengthen patient flow in the face of organizational changes. Work closely with AH to prepare for the reorganization of AHS. Understanding the implications for EMS and planning for minimal impact on patient experience will be imperative. Focus on key stakeholder relationships, change management, and organizational communication to support a smooth transition.

Dependency on health system partners

Improvements to the system are dependent on coordination across numerous government departments, including Clinical Operations, the IOC and other government ministries and agencies. The feasibility of select opportunities is contingent on the capacity of system partners and the ability to effectively coordinate implementation with multiple stakeholders. For instance, to improve EMS and health system performance, streamlining and integration of coordination bodies that manage demand capacity is a priority. Additionally, addressing transportation accessibility through NCT options is a government-wide initiative that extends beyond the health system. Furthermore, increasing secondary triage options requires the connection of numerous partners across the continuum of care to meet patient needs, including the creation of pathways to community care, primary care and others.

Mitigation: AHS should engage AH to drive system-wide initiatives through collaboration and dissemination of key findings of the review with government partners. AHS EMS should play a key role in other projects and initiatives related to patient flow and transportation.

AHS should prepare for increased demand, workforce shortages and strained capacity

Increasing EMS demand

Between 2018 and 2022, 40% growth in 911 demand occurred and increases are expected to continue up to an estimated 21% over the next few years. Alongside population increases, 911 demand will continue to rise based on many economic drivers, such as employment and inter-provincial out-migration, which are indicative of crime rates, population health, and other socioeconomic factors. At current demand and resourcing levels in urban areas, response times are demonstrably worse when demand is above average, which suggests that the system will not be equipped to handle future increases in demand.

Mitigation: To meet the expected increases in demand and reliance on EMS, changes must be made to the system, both in resourcing and connections to the wider health system. Hiring alone is insufficient to meet forecasted demand increases, thus it is necessary to consider a rigorous multi-pronged approach and openness to address unprecedented demand in new ways. Multiple opportunities outlined in this report are designed to prepare for demand increases; notably, an ongoing 5-10 year strategic planning process as well as facilitation of the appropriate use of EMS through education and awareness campaigns concurrently with the development of alternative pathways such as NCT, secondary triage, and virtual care.

Workforce shortages

EMS resource shortage challenges were highlighted throughout the review; however, shortages are not unique to EMS, or Alberta, and workforce shortages continue to present challenges across healthcare and internationally. Some opportunities, such as increasing resource capacity and enhancing IFT-dedicated resources require growing the workforce, which may be a challenge given the systemic resource shortages across the health system.

Mitigation: Increasing resource capacity to meet increased demand needs to have a multi-faceted solution. Only hiring resources will not result in greater capacity. Other initiatives to support resource capacity should include the exploration of alternative service models, efforts to increase shift fulfillment, and the implementation of a workforce strategy that focuses on retention.

Capacity to implement opportunities

From frontline workers to operations and leadership, AHS EMS is at capacity and strained for resources due to daily operational needs to meet high 911 demand, execution of over 100 in-flight recommendations from previous reports and the impending AHS transformation. Given the sustained large workload and resource shortage, it may be a challenge for AHS to promptly implement additional opportunities.

Mitigation: AHS should consider how the identified opportunities in this review fit within the context of the other recommendations identified through previous EMS related reviews. These opportunities and the ongoing efforts to improve EMS service delivery should be organized and prioritized into strategic initiatives that are appropriately resources and budgeted. Implementation of these opportunities (e.g., implementing secondary triage and coordination of demand capacity management) require transformation and change management experience to support successful outcomes.

Appendix

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Alberta Health Services EMS Program Area Study

Final Report - Appendix

January 19, 2024





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A. Detailed opportunities

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IFT and NCT opportunities in detail

Opportunity descriptions are expanded below:

Opportunities	Hypotheses Addressed
Policy/Funding	1,2,4
 Streamline the scope of the existing IFT program and introduce more tailored alternative programs for low-acuity events that are currently being managed through the IFT program due to the lack of alternatives. This includes introducing funding for alternative modes of transportation, working in collaboration with transportation related ministries, municipalities, social services agencies to introduce community/not-for-profit based transport programs, and/or providing direct subsidies or reimbursement for travel costs. These are approaches that are taken in other jurisdictions (B.C., Australia, England). Update the policies and regulations to reflect a more streamlined IFT and NCT program. The current regulation that defines the funding responsibility for the IFT program is vague and leaves room for interpretation. Updating the language and the accompanying supporting policy documents to reflect a more targeted IFT/NCT program will reduce non-clinically justified demand on IFT. Address the billing and policy implementation inconsistencies, including measurement of clinical justification for the IFT/NCT program. The gaps in guidance is resulting in varied patient experiences impacting the reputation of the EMS program overall. Additionally, the lack of measurements and data of clinical reasoning for IFT usage impacts the ability to validate the clinical appropriate use of the program, which was a frequent stakeholder concern. Introducing a policy measurement and enforcement process, such as auditing the top users of the IFT program, will contribute to reducing the reliance on the IFT program when there isn't a clinical justification for the requested service. Revaluate current program performance targets to identify the appropriate adjustments required to reflect the current EMS realities and appropriateness of targets for scheduled appointments were set to demonstrate commitment to being on time for pre-scheduled IFT requests, however the targets provide no roo	
Public messaging and internal education	1,2
5. Given the previous messaging in the system of the broad purpose of EMS, and current operational constraints facing EMS an updated campaign that educates the public on health care options within Alberta and role of EMS would be beneficial. The need for greater education on EMS and its role was a shared sentiment across the various stakeholders that responded to the EMS Current State Survey (2022). This education needs to cover public health literacy and knowledge of other options such as 811, and other community services.	
6. Build into IFT data collection, an approach for capturing whether the services delivered were clinically appropriate to quantify the program 'misuse' and provide more targeted education based on data. The current approach to data collection does not allow for a feedback loop that validates the clinical appropriateness of the program. This information is necessary to improve the program's performance, inform education for clinicians, and contribute to the planning of the NCT program.	
7. Targeted education for clinicians about the IFT program, prioritization approach, appropriateness of care and how it is matches to resources and managing expectations	

on IFT response times is necessary. Education should also focus on understanding how the IFT program operates as a whole, and how 'gaming' the system negatively impacts patient prioritization.

IFT and NCT Opportunities in detail (continued)

0	oportunities	Hypotheses Addressed
Alt	ernative options and dedicated resources to relieve frontline	1,2,3,4
7.	Work with government partners to further develop the NCT program to have more clear options and introduce supports for patients to navigate these options to alleviate reliance on the IFT program for non-urgent and non-clinical transport needs. Currently there is a reliance on IFT to manage transportation upon patient discharge whereas in other jurisdiction, patients are able to work directly with the service provider to arrange transport.	
8.	Explore virtual care as an alternative option to transferring patients from rural communities. Virtual care has been an effective approach to managing care locally in other jurisdictions, especially when the virtual care call is supported by another local health service provider (e.g., nurse at a local health care facility is supported by a specialist from an urban centre to conduct an assessment).	
9.	Maintain IFT dedicated resources in urban areas to limit impact of IFT requests. IFT dedicated resources can be used a backup for 911 demand, which impacts the performance of the IFT program. Since April 2023, IFT resource reallocation to service 911 demand is no longer in practice for the Edmonton Split Production team.	
10.	Appropriately match resources (staffing and equipment) in rural communities to IFT service requests to limit the impact on 911 response capability. Increase dedicated IFT resources in metro areas and explore expansion in rural areas following the likely positive results of the recent Red Deer pilot. Additionally, increase coordination of the Air and Ground resources for long-distance transfers to match the appropriate resource and ultimately minimize lost EMS ground coverage in rural areas, improve patient experience and accessibility.	
11.	Redirecting low-acuity requests that are currently managed through Beechcraft King Air aircraft would be better managed through the use of aircrafts more suitable for low-acuity scenarios and alternative service providers (e.g., SunWest), allowing Beechcraft King Air aircraft to be more appropriately used for higher acuity cases. Additionally, air based IFT services for scheduled appointments should be further explored. A previous pilot project in this space was not continued as the program lacked a dedicated resource to manage appointment coordination.	
Re	view of prioritization matrix and coordination	1,2,3,4
12.	Improve two-way communication between EMS and hospitals. Currently they are operating in silos. Stakeholders expressed that the current lack of insight into transport status of patients results in uncertainty and 'phone tag'.	
13.	Simplify the prioritization matrix to reflect a refined definition and scope of the IFT and NCT program. Stakeholders are frustrated with the complex coordination and unclear on the prioritization approach. Further education and clarification once the programs have been updated and streamlined would be beneficial.	
14.	Provide specialized training for air dispatchers is required as they have been cases where the lack of clarity on how to prioritize IFT requests has resulted in incorrect classification of cases impacting patient care.	

IFT and NCT Opportunities in detail (continued)

Op	oportunities	Hypotheses Addressed
Ro	le of EMS/collaboration with clinical operations	2,3,4
16.	The multiple coordination groups that support the patient flow/EMS transport and coordinating hospital capacity needs to be better integrated . Currently RAAPID, IOC, and the Dispatch system work together but there is room to improve coordination between the groups to take a systems capacity planning lens.	
17.	As EMS enters a phase of time where it refines its role in the healthcare system, a key component to focus on is the integration with other parts of the healthcare system including primary care and community care. These sectors are especially important for the management of the demand for IFT/NCT and facilitation of demand being directed to alternative care options.	
18.	EMS' success is dependent on its integration with the rest of the health care system. Increased sophistication of bed management from IOC/central intelligence hub is required to reduce the impact of offload delays which impacts IFT and other EMS operations. IOC plays an integral role in creating hospital capacity and the stronger the integration with EMS operations would provide better coordination between EMS and hospitals. Taking a system lens will be even more integral as clinical operations expands to meet demand (stakeholders shared that they are forecast needing 1000 more beds by 2025).	
19.	Continue with initiatives such as 'Return to Service' and exploring initiatives such as creating dedicated support for patients at destination facilities (e.g., increased funding for nurses, support for patient transition lounges) to limit offload delays.	

MIH opportunities in detail

Opportunity descriptions are expanded below:

		Opportunities	Main Themes Addressed
<u>ک</u>	Key Themes	Strategy, Governance and Mandate	1,2,4,5
1	Strategy/Vision	 Define the core purpose of the MIH program and establish the role MIH plays in the health system. There is a policy and program strategy decision to be made by bringing together the appropriate stakeholders on what the role of the MIH program should be in the health system and whether it should be redefined to play a greater role in addressing EMS system challenges. The program currently receives funding from multiples ministries and grants, none of which are directly from EMS. 	
2	Governance	 Develop a decision making process that aligns with the core purpose of the MIH program. There is an opportunity to include EMS and other health system leaders/stakeholders in deciding how the program should grow. The program is growing rapidly and its not clear if it is aligned to other health system priorities or if the growth is intentional or reactionary. If it is established that the role of MIH should play a role in addressing EMS demand. EMS leadership should be incorporated into the 	
3	Scope of Practice	 established that the fold of Min should play a fold in addressing Ewe defining, Ewe defining, Ewe leadership should be incorporated into the governance and program growth decision making process. Evaluate the opportunity cost of paramedics transitioning from frontline services to MIH. The MIH program's growth and need for advanced care paramedics should be managed with caution while EMS continues to be challenged with workforce constraints and paced for greater number of presenters. 	
4	Workforce Availability	 Understand the value of MIH program handling scheduled work. As part of the defining the scope of the program, analysis should be done on whether it is appropriate for MIH to conduct scheduled work and what relationship it has to reducing pressure on hospitals, Emergency Departments and 911 demand. 	
5	Innovation and Skill Set	Longitudinal Research and Communication of Value	6,7
	Workforce Availability Innovation and Skill Set Innovation and Skill Set Conduct a comprehensive evaluation of the program, including an economic assessment, impact on reducing ED/acute care admissions an EMS responses. Currently the main measures of impact are based on patient experience which is not enough to provide insight into the impact MIH is having on the health system. 6,7		
 Workforce Availability Understand the value of MIH program handling scheduled work. As part of the defining the scope of the program, analysis should be done on whether it is appropriate for MIH to conduct scheduled work and what relationship it has to reducing pressure on hospitals, Emergency Departments and 911 demand. Innovation and Skill Set Satisfaction from Patients/Partners Expand MIH data collection, standardization and measures of impact are based on patient experience which is not enough to provide insight into the impact MIH is having on the health system. Expand MIH data collection, standardization and measurement of KPIs to support more robust analysis, in line with EMS reporting and analysis. Current challenges with data collection exist due to the unique nature of the MIH program and vast number of partners, and limited capacity of the team, which limits the ability to evaluate the program. Communicate the scope of the program, its purpose and role in the system and specifically what its role within the EMS system. Stakeholders are currently confused about the scope of the program, and are unclear on when to refer patients to it. 			
7	Research and Evidence	• Communicate the scope of the program, its purpose and role in the system and specifically what its role within the EMS system. Stakeholders are currently confused about the scope of the program, and are unclear on when to refer patients to it.	
8	911 Diversion	 Identify feasibility of integration between Logis and Connect Care. This will enable the MIH program to collect and share data to support amongst its partners and to support program performance management. Currently MIH inputs information twice which creates a workflow challenge. 	

MIH opportunities in detail (continued)

	Opportunities	Main Themes Addressed
Key Themes	Scope of Practice and Resource Pool	4,3,5,6
Strategy/Vision	 Conduct an analysis of alternative resources that can be utilized in the program beyond Advanced Care Paramedics. Currently the program is leveraging paramedics at a time when workforce constraints are impacting EMS services. Exploring the use of multidisciplinary teams that include social workers, nurse practitioners and palliative nurses with the appropriate training could diversify the resource pool for MIH and reduce the reliance on ACP's. 	
Governance	• Consider conducting targeted recruitment of experienced paramedics for the MIH program from outside the province. As an emerging area of professional practice the role is likely to attract interest from seasoned paramedics from other jurisdictions expanding the pool of paramedics available to Alberta.	
Scope of Practice	• Enhance the education requirements for Community Paramedics. In Alberta, ACPs receive 5 weeks training followed by supervised practice to undertake the role of a Community Paramedic. In many jurisdictions Community Paramedics come from an educational background of a university degree and post-graduate training to perform the role of a community paramedic. This allows them to practice more independently and to perform a wider range of skills with less medical oversight.	
	Secondary Triage and Connection to Health System	1,3,7,8
Workforce Availability	• Review the secondary triage approach that is currently set up between 911 → 811 → MIH program to increase volume of referrals to MIH, including alternative response options such as NCT. There is an opportunity to increase the volume of 911 diversion that is managed through MIH and alternative pathways. The review of the triaging approach should also focus on	
Innovation and Skill Set	whether calls need to be funnelled through 811 and whether a direct path can be created between 911 and MIH. Although the referral process was set up recently, the level of referrals are low and expansion would be beneficial to alleviate 911 demand and provide appropriate care pathways for patients. NCT should also be integrated with 811 as an alternative response to reduce the number of calls transferred back to 911 due to lack of transportation.	
Satisfaction from Patients/Partners	• Review the role of MIH and enhance its focus on supporting rural and remote communities. Many jurisdictions with characteristics similar to Alberta leverage their MIH or Community Paramedicine program to focus on rural and remote care and it provides benefits such as limiting reliance on IFT programs and distance required to travel for community members.	
Research and Evidence	• Review the pathways and associated referral criteria to improve clarity of how patients can be referred to MIH. Stakeholders shared they want to refer patients into MIH, however the program is already busy or they are unclear on when it is appropriate to do so. It is felt that there is room to increase the intake criteria and tailor it to the various patient populations served within MIH.	
911 Diversion	 Build stronger relationships with other parts of the health care system to allow MIH to refer patients onwards for longer term or ongoing care. Although only a small portion of patients within MIH are kept in the program long-term, often they are kept due to a lack of alternatives. 	

| 7

Ground Resource Capacity opportunities in detail

Opportunity descriptions are expanded below:

		Opportunities	Main Themes
\mathcal{O}	Key Themes	Consider the wider health system	Addressed
1	EMS demand	 Maintain the Return to Service Initiative, which has had immediate and significant effects on the ability to respond to 911 events in a timely manner. There is a strong connection between the average destination interval (i.e. how long a unit spends at the destination before being cleared to respond to the next event), unit capacity (i.e. available units to respond to events) and the average compliance with 911 response targets. 	4,7
2	Resource levels	 Evaluations of system performance (through 911 response interval compliance, unit availability, or other metrics) should be placed into the context of the wider health system, since EMS is not an isolated organization but rather part of an integrated network of healthcare providers. 	
3	System's ability to manage demand		
		Develop new evaluation metrics	3, 5, 7
4	Bigger picture	• New outcome-based measures should be developed and used to evaluate EMS performance, expanding beyond response times, while also taking into account local factors such as demand, resource capacity, offload delays, etc.	
5	Local unit capacity	 These metrics should be used to measure the effectiveness of resourcing levels and inform resource allocation and deployment decisions while taking into account the local factors which affect system performance. 	
	· · · ·	- The addition of new measures will help to create a balanced scorecard for EMS metrics beyond the consideration of response	
6	Shift fulfillment	times.	
7	Unit load		

Ground Resource Capacity opportunities in detail (continued)

Ο	Koy Thomas	Opportunities	Main Themes Addressed
6	Rey memes	Bridge the resource gap	2, 5, 6
1	EMS demand	 Under current operations, resources are not utilized in such a way that allows AHS to meet its 911 response interval targets. Insufficient resource capacity levels are strongly correlated to reduced response interval compliance, especially at the local level. 	
2	Resource levels	 To bridge this gap, resourcing levels should be increased by approximately 10-20%. This can be accomplished by increasing the number of shifts logged, either through increased shift fulfillment rates or hiring of additional human resources (i.e. more paramedics). 	
	System's ability to		
3	manage demand		Main Themes Addressed a way that allows AHS to meet its 911 response interval red to reduced response interval compliance, especially at the pproximately 10-20%. This can be accomplished by increasing liment rates or hiring of additional human resources (i.e. more 2, 5, 6 atpaced population growth, and is expected to continue to do id connections to the wider health system) in order to meet the red, and the ability to respond in a consistent manner is reases in demand, maintaining the status quo will further strain d to events within performance target intervals. tem modelling should be formalized in collaboration with 1, 3, 4
		Prepare for demand increases	1, 3, 4
4	Bigger picture	• Demand for EMS services (primarily 911 calls) has rapidly outpaced population growth, and is expected to continue to do so. Changes must be made to the system (both its resourcing and connections to the wider health system) in order to meet the expected increases in demand and reliance on EMS.	
5	Local unit capacity	The system's ability to manage demand is currently being tested, and the ability to respond in a consistent manner is compromised when the system is strained. With expected increases in demand, maintaining the status quo will further strain the system and lead to large variability in the ability to respond to events within performance target intervals.	
6	Shift fulfillment	 Provincial service planning using forecasted demand and system modelling should be formalized in collaboration with operational delivery partners 	
7	Unit load		
	.		

Resource Allocation and Deployment opportunities in detail

Key Takeaways / Opportunities	Main Hypothesis Addressed
Service planning	
 Review current response times targets to be more aligned with international leading practices from a clinical and operational perspective. The existing targets do not differentiate by the urgency of an event which plays an important role in deployment of resources. Any review of the response targets will require a evaluation of the impact on resourcing. Implement a rolling 5-10 year strategic and operational planning process that aligns with provincial budget and planning processes to limit the current ad-hoc approach that is currently taken. This approach to planning should be informed by clinical and operational performance objectives, provincial demand and coverage needs, and overall health system demand. The planning process should identify areas that require strategic investment in workforce, station location, fleet and other infrastructure requirements that would support EMS to continue to deliver services against their priorities and performance objectives. The process should be informed through a rigorous framework that prioritizes clinical and operational needs and should be refreshed and updated annually. This process should be aligned with provincial fiscal planning process and involve engagement of appropriate stakeholders (representation from capital budget management leads from the government). 	1
Adapt model of delivery to meet patient needs and demand	
• Revise the existing Lights and Sirens response protocol to align with international leading practices and reduce risk on staff, patients and the public. The deployment protocol of using Lights and Sirens for non life-threatening events should be reviewed to understand what impact this existing protocol has on patient outcomes and if there is rationale behind this approach. The current response approach is not in line with MPDS guidelines and is contributing to a culture of 'if everything is a priority, nothing is a priority'.	
• Enhance the recognition of the role of MFR agencies play in emergency response across the province. There is an opportunity to develop the minimum capability required of MFR agencies (training/equipment) in order to recognize their arrival on scene within response time targets. MFR agencies locations and capabilities should also be taken into consideration into service planning, especially in communities with growing demand and limited EMS coverage.	1,2
• Continue to identify communities that may benefit from split production teams and enhance the number of IFT-unit dedicated resources to reduce competing priorities between 911 and IFT demand impacting unit availability. High unit utilization demonstrates metro areas have insufficient IFT-dedicated units. Early analysis has shown Grande Prairie may benefit from having dedicated resources for IFT, however further analysis to explore if there are other underlying issues impacting the workforce in Grande Prairie will be necessary.	

Resource Allocation and Deployment Opportunities in detail (continued)

Key Takeaways / Opportunities

Main Hypothesis Addressed

Adapt model of delivery to meet patient needs and demand (continued)	
• Review the secondary triage options available through EMS to be able to optimize the use of resources. There is an opportunity to increase the volume of 911 diversion that is managed through alternative pathways including increasing the role of Community Paramedicine in diverting lower priority events.	
• Develop education and awareness campaigns for both the community and clinicians on the role of EMS. Given the previous messaging in the system of the broad purpose of EMS, and current operational constraints an updated campaign that educates the public on health care options within Alberta and role of EMS would be beneficial. The need for greater education on EMS and its role was a shared sentiment across the various stakeholders that responded to the EMS Current State Survey (2022). This education needs to cover public health literacy and knowledge of other options such as 811, and other community services.	1,2
Improve communication and build trust between EMS teams	
• Improve communication between EMS leadership, operations and front line staff to enhance trust and buy in. Identifying new ways to share context and rationale on policy and operation changes, especially with front line staff can support develop collaboration across teams. For example, AHS EMS' ability to use Optima to implement SSM principles is considered sophisticated. However helping all parties involved in EMS service delivery have a shared understanding of the role each EMS stakeholder group plays in achieving strategic coverage may improve trust and collaboration among the various groups.	
• Continue to work toward creating capacity within the EMS system through focusing on multiple strategies that include increasing shift fulfillment, improving hiring / retention strategies for staff, and implementing initiatives that improve unit availability. Through the review of alternative response time scenarios and engagement with stakeholders on the use of SSM, it was noted that the underlying barrier to achieving even baseline targets is EMS' capacity.	2
• Better understand the obstacles with recruitment of EMS resources and use it to inform recruitment efforts. Although AHS EMS is currently in the process of developing a workforce strategy, there is limited understanding on why there are barriers with recruitment and retention. There is awareness of anecdotal barriers to recruitment and retention, however effort to evaluate these challenges and development of targeted plans are not in place. The availability of resources is correlated with the ability to implement SSM optimally, further reinforcing the necessity of having the appropriate numbers of resources available for deployment.	
Strategic system planning and coordination	
• Strengthen the partnership in the Edmonton IOC to enhance the working relationships and work culture. IOC plays an integral role in creating hospital capacity, and coordination between EMS and hospitals would improve with increased integration with EMS operations. The recent addition of a new IOC EMS Lead position in Edmonton, similar to Calgary, is a positive step towards increased collaboration and strengthening relationships.	4.0
• Improve integration of coordination bodies responsible for enhancing patient flow/EMS transport and demand capacity management. Currently, RAAPID,	Ί,Ζ

• IOC, and the Dispatch system work together, but there is an opportunity to improve coordination between the groups to take a systems capacity planning lens. It is necessary to establish an integrated approach where all system partners work towards the same goals. EMS' success is dependent on its integration with the rest of the healthcare system and taking a system lens will be even more integral as AHS' operational structure evolves over the next few years.

B. Document review

Multiple documents and policies were reviewed to understand current state operations of the program reviewed

Over ~ 230 documents were reviewed to better understand how each of the programs operate, gain insights into their governance structure, learn about the key policies and decision tools that drive the ongoing management of the programs.

The following types of documents were received, catalogued, and reviewed:

- · Policies program policies that defined program scope, and responsibilities
- Decision Trees/Algorithms outlined criteria, eligibility and pathways
- **Governance** included files such as terms of reference, program strategies and oversight/management
- Regulations defined funding responsibilities and overarching program scope
- Historical program reviews or annual reports reports or presentations on program performance
- · Quality reviews reviews completed by quality committee or any other form of evaluation
- Program charters outlined goals of the program
- **Guiding tools** included tools used by staff that support program operations or clinicians to understand the business rules (e.g., IFT Matrix)
- · Historical analysis analysis completed by AHS or other partners
- **Background on pilots and impact** presentations or reports on the impact of various pilots and recommendations/next steps that followed pilot evaluation

Total number of files reviewed: ~ 230

[─]/ Documents/policies per program

The files received by program breakdown as follows: General EMS overview - 0.4% IFT - 41.3% NCT - 4.7% MIH - 20.0% Ground Ambulance Resource Capacity - 3.4% Resource Allocation and Deployment (SSM) - 23.4%



C. Stakeholder engagements

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A number of stakeholders were interviewed across each of the reviewed programs to capture various perspectives

A broad group of internal stakeholders were engaged to explore the hypotheses and understand the current state of each of the programs, including objectives, challenges and opportunities for improvements. Programs were discussed extensively, including topics such as vision, governance, funding, policy, performance, process, technology and others.

From September 18 to November 24, **32 stakeholder interviews** were conducted with **67 unique individuals**. Stakeholder engagement occurred virtually in 1-1 interviews, small groups, or interactive workshops, which amounted to **31 hours**. Alignment and validation of insights occurred in four workshops over six hours. Additionally, seven in-person site visits were conducted over 12 hours at the RAAPID North, IOC Edmonton, STARS/Air Ambulance, Central Communications Centre, MIH Coordination Centre and 811 Call Centre. Many interviews covered multiple programs; however, each interview's primary topic is highlighted below.

Stakeholder groups across programs

All Programs	IFT/NCT	МІН	Resource Allocation and Deployment (SSM)
EMS Senior Leadership Team	 IFT and NCT Project Leads 	MIH Project Lead	Resource Allocation Project Lead
EMS Senior Operations Team	 EMS LEADS (Physician Leaders) 	MIH Medical Direction	 SLT EMS Provincial Operations
Alberta Health	 Integrated Operations Centre 	 MIH Provincia/Sector Managers 	 SLT EMS Employee Programs
 EMS Strategy, Planning and Reporting 	 EMS Air and IFT Strategy Team 	Seniors Health	EMS Dispatch Leadership Team
	 North Zone Physicians/Nurses 	 Addiction and Mental Health 	 Alberta School of Business
	NICU/PICU Speciality Team	 EMS Quality and Patient Safety 	 Integrated Operations Centre / Integrated Quality Management
	Peter Lougheed Centre Clinical Leader	 Special projects (Public Health and COVID) 	
		Acute Care Speciality Clinics	
		HealthLink/811	
		Virtual Home Hospital	

D. Data analysis

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Multiple data sets were reviewed and analysed to conduct quantitative data analysis and modelling

To support the program review, quantitative data analysis and modelling were performed. The purpose of this analysis was to use AHS EMS data to test the hypotheses investigated in this report using statistical and machine learning methods, as well as to gain insights from the data which could be used to identify opportunities.

Types of data sets used

For the purpose of ground resource capacity analysis, the primary data sets used were the exports of 911, IFT, and MIH event responses from the AHS CAD system. The data covered the period from Jan 1, 2018 to Jul 31, 2023. This data served as the basis for the evaluation of demand, as well as system performance against response/transfer targets where they existed. Overall, there were approximately 3M 911 event responses, and approximately 884k IFT event responses.

To assess resource capacity, a dataset containing all of the logged shifts over this period was also obtained. This list was cross-referenced against a list of unmanned and timed-out shifts, which were removed to form a source of truth for all ground resource shifts completed. Total resource capacity was evaluated using the total number of units across the province which were logged on for a shift during the 15-minute (quarter-hour) window of the time of the event. Local capacity was investigated in a similar manner, though instead of looking at the number of provincial units logging shifts, the number of units attain community were counted.

Methods used for analysis

- To assess performance compliance for 911, event response intervals were compared to the target interval for the specified geography type. Event-level compliance was assessed for all events with Determinants D-E by comparing the actual response time to the P90 target. Similarly, the P90 interval was calculated for different event subsets using the P90 response time in a given region for a given day and comparing it to the target value.
- To assess performance compliance for IFT, a master actual event completion timestamp
 was created for each event based on whether the event was listed as a pickup or dropoff
 event. A master initial timestamp was created using the scheduled IFT time, or the time of
 booking when the scheduled time did not exist in the data. The master performance
 interval was measured as the difference between these two timestamps for every event.
 The performance compliance was measured by comparing this performance interval to
 the max allowable interval according to the Service Level Agreements (SLA) Matrix for
 IFT's. For events in which the performance interval was lower than the max interval, the
 event was marked as SLA compliant, whereas events where the performance interval was
 greater than the max interval were marked as non-compliant.
- Due to the large number of individual events for IFT and 911 events, data were aggregated to reduce the overall noise and reveal patterns in time or geography. As such, the aggregation variables were typically one of both of the geography type of the event origin, or the event month. Data were typically averaged over this period, though sometimes the max observed value or the variance during this period was evaluated.
- To make predictions and test hypothetical scenarios, statistical machine learning methods were used to model the data received. The methodology for these models is described in the main report.
- To properly compare measures which have high variance, normalization is often used. In this report, when variables are referred to as "normalized", this means that the deviation of the value from its mean was divided by its standard deviation.

High-level data overview

911 Data

Period Covered:
Jan 1, 2018 - July 31, 2023Fields:
42 columnsResponse Count:
3.22MEvent Count:
2.28M



IFT Data

Period Covered:	Fields:
Jan 1, 2018 - July 31, 2023	42 columns
Response Count:	Event Count:



Data dictionary: Historical data

For the purpose of data analysis, the datasets provided by AHS were aggregated and manipulated as required. The following data was leveraged during the analysis:

Column	Description
Event Datetime	The date and time an event is created in the CAD software. Event create/event start.
Local Code Pickup	Local Geographic Area code of patient pickup location.
Event Number	An automatically generated number by the CAD software.
Determinant	The priority assigned to the event based on standard questions (A, B, C, D, E & O)
Unit Station Community	The community where the unit is normally stationed.
Unit ID	The standardized unit identification number consisting of station community, shift type, service level and identification number.
Geography Type P90 Target	The 90th percentile response interval target for D&E determinant events in a particular geography type.
Geography Type	The event municipality classification (Metro/Urban, Communities > 3,000, Rural & Remote)
Municipality	The municipality which the event scene is located in.
Response Interval	The interval between event create time and the time the first EMS unit arrives on scene (seconds). This is an event level measure.
Response Compliance	Response target compliance flag. 0 for non-compliant and 1 for compliant.
Performance Delta	Response performance deviation from target.
Unit Destination Interval	This is the time interval between when the unit arrives at the destination and is clear of the event and available (seconds). This is a unit level measure.
Total Unit Capacity	Total number of units logging shifts across province at time of event.
Local Unit Capacity	Unit Station capacity at time of event .
Local Max Capacity	Maximum Unit Station capacity.
Local Relative Capacity	Unit Station capacity at time of event relative to maximum capacity.
Category	Responding Unit category.
Utilization	Responding Unit utilization.
Local Capacity Deviation	Deviation of local capacity from maximum capacity.
Total Capacity Deviation	Deviation of overall capacity from maximum province capacity.
Has Station	Unit Station at event location flag. 1 if there is a station at location.

dat_911: Historical 911 events dataset augmented with shift data

dat_IFT: Historical IFT events dataset

Column	Description
Initial Time Stamp	The date and time an event is created in the CAD software. Event create/event start.
Local Code Pickup	Local Geographic Area code of patient pickup location.
Event Number	An automatically generated number by the CAD software.
Determinant	The priority assigned to the event based on standard questions (A, B, C, D, E & O)
Unit Station Community	The community where the unit is normally stationed.
Unit ID	The standardized unit identification number consisting of station community, shift type, service level and identification number.
Master Performance ITV	Event response interval
SLA Compliance	SLA target compliance flag. 0 for non-compliant and 1 for compliant.
Performance Delta	Response performance deviation from target.

Data dictionary: Model results

The model results for both 911 and IFT data were consolidated into the following datasets.

911 Historical and Forecasted (Monthly): Monthly Historical and Model 911 demand data

Column	Description
Local Code	Local Geographic Area code of patient pickup location.
Date	Monthly date.
Demand	Number of 911 events.
Demand (low)	Lower 95% demand confidence interval.
Demand (High)	Upper 95% demand confidence interval.
Туре	Type of entry, historical or model.

IFT Historical and Forecasted (Monthly): Monthly Historical and Model IFT demand data

Column	Description
Local Code	Local Geographic Area code of patient pickup location.
Date	Monthly date.
Demand	Number of IFT events.
Demand (low)	Lower 95% demand confidence interval.
Demand (High)	Upper 95% demand confidence interval.
Туре	Type of entry, historical or model.

Consolidated Model Results: Determinant level historical and model demand data for both 911 & IFT

Column	Description
Local Code	Local Geographic Area code of patient pickup location.
Date	Monthly date.
Determinant	The priority assigned to the event based on standard questions (A, B, C, D, E & O)
Demand	Historical number of events.
Model	Model results of number of events.
Stream	Type of entry, 911 or IFT.

Data dictionary: Reference data

Reference datasets related to Alberta's population, geography and macroeconomic factors were leveraged to build the demand models. The following historical and forecasted data were used:

Macroeconomic Forecasts
Description
Gross Domestic Product at Market Prices, Alberta (Millions \$)
Gross Domestic Product at Market Prices, Alberta (Millions, Chained \$ 2012)
Real Gross Domestic Product (GDP) at Basic Prices by Industry, All Industries, Alberta (Millions, Chained \$ 2012)
Real Gross Domestic Product (GDP) at Basic Prices by Industry, All Industries, Alberta (Millions, Chained \$ 2012)
Labour Force, Alberta (Thousands ('000s)
Employment, Alberta (Thousands ('000s)
Unemployment Rate, Alberta (%)
Retail Sales, Alberta (Millions \$)
Real Gross Domestic Product (GDP) at Basic Prices by Industry, Crop and animal production, Alberta (Millions, Chained \$ 2012)
Real Gross Domestic Product (GDP) at Basic Prices by Industry, Forestry and Logging, Alberta (Millions, Chained \$ 2012)
Real Gross Domestic Product (GDP) at Basic Prices by Industry, Support activities for agriculture & forestry, Alberta (Millions, Chained \$ 201
Real Gross Domestic Product (GDP) at Basic Prices by Industry, Fishing, hunting and trapping, Alberta (Millions, Chained \$ 2012)
Real Gross Domestic Product (GDP) at Basic Prices by Industry, Mining and oil and gas extraction, Alberta (Millions, Chained \$ 2012)
Real Gross Domestic Product (GDP) at Basic Prices by Industry, Manufacturing, Alberta (Millions, Chained \$ 2012)
Real Gross Domestic Product (GDP) at Basic Prices by Industry, Construction, Alberta (Millions, Chained \$ 2012)
Real Gross Domestic Product (GDP) at Basic Prices by Industry, Utilities, Alberta (Millions, Chained \$ 2012)
Real Gross Domestic Product (GDP) at Basic Prices by Industry, Goods-Producing Industries, Alberta (Millions, Chained \$ 2012)
Real Gross Domestic Product (GDP) at Basic Prices by Industry, Transportation & Warehousing, Alberta (Millions, Chained \$ 2012)
Real Gross Domestic Product (GDP) at Basic Prices by Industry, Wholesale & Retail Trade, Alberta (Millions, Chained \$ 2012)
Employment, Alberta, Agriculture (Thousands ('000s)
Employment, Alberta, Other Primary Industries (Thousands ('000s)
Employment, Alberta, Utilities (Thousands ('000s)

Macroeconomic Forecasts

Description
Employment, Alberta, Manufacturing (Thousands ('000s))
Employment, Alberta, Construction (Thousands ('000s))
Employment, Alberta, Wholesale and Retail Trade (Thousands ('000s))
Employment, Alberta, Transportation and Warehousing (Thousands ('000s))
Total Population, Alberta (Thousands ('000s))
Net Provincial Migration, Alberta (Thousands ('000s))
Inter-provincial In-migration, Alberta (Thousands ('000s))
Inter-provincial Out-migration, Alberta (Thousands ('000s))
Natural Rate of Population Increase, Alberta (Rate of change)
Household final consumption expenditure: Goods, Alberta (Millions \$)
Household final consumption expenditure: Durable Goods, Alberta (Millions \$)
Household final consumption expenditure: Semi-durable Goods, Alberta (Millions \$)
Household final consumption expenditure: Non-durable Goods, Alberta (Millions \$)
Household final consumption expenditure: Services: Services related to dwelling and property (including rental and imputed rent), Alberta (Millions \$)
Exports of Goods to Other Countries, Alberta (Millions \$)
Exports of Goods to Other Provinces, Alberta (Millions \$)
Imports of Goods to Other Countries, Alberta (Millions \$)
Imports of Goods to Other Provinces, Alberta (Millions \$)
Household final consumption expenditure: Goods, Alberta (Millions, Chained \$ 2012)
Household final consumption expenditure: Durable Goods, Alberta (Millions, Chained \$ 2012)
Household final consumption expenditure: Semi-durable Goods, Alberta (Millions, Chained \$ 2012)
Household final consumption expenditure: Non-durable Goods, Alberta (Millions, Chained \$ 2012)

Data dictionary: Reference data

Macroeconomic Forecasts

Description
Exports of Goods to Other Countries, Alberta (Millions, Chained \$ 2012)
Exports of Goods to Other Provinces, Alberta (Millions, Chained \$ 2012)
Imports of Goods to Other Countries, Alberta (Millions, Chained \$ 2012)
Imports of Goods to Other Provinces, Alberta (Millions, Chained \$ 2012)
Real Domestic Product: Metal Ore Mining, Alberta (Millions \$ 2012)
Real Domestic Product: Non-metallic mineral mining and quarrying, Alberta (Millions \$ 2012)
Real Domestic Product: Oil and gas extraction & Coal mining, Alberta (Millions \$ 2012)
Real Domestic Product: Support activities for mining and oil and gas extraction, Alberta (Millions \$ 2012)
Real Domestic Product: Wholesale Trade, Alberta (Millions \$ 2012)
Real Domestic Product: Retail Trade, Alberta (Millions \$ 2012)
Gross Fixed Capital Formation: Business Residential Construction - New Housing, Alberta (Millions \$)
Gross Fixed Capital Formation: Business Residential Construction - Renovations, Alberta (Millions \$)
Retail Sales, Gasoline Stations, Alberta (Millions \$)
Forecast Date

Historical Alberta Population by LGA

Local Geographic Area code	
Year of population	
Year of population	

Forecast Alberta Population by LGA

Description
Local Geographic Area code
Year of population forecast
Population forecast

LGA Data

Description

Local Geographic Area code

Local Geographic Area name

E. Jurisdictional Scan

Jurisdictional Scan Table of Contents

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Jurisdictional Scan

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Executive summary

Global trends in EMS programs

In this section we explore Interfacility Transport and Mobile Integrated Healthcare programs around the globe, and how different jurisdictions are optimizing their use of limited EMS resources

Global trends in EMS to optimize resources and improve health outcomes

The EMS system in Alberta, as well as across Canada and internationally, must meet growing demand with increasingly limited resources. Advances in technology, evolving provider and consumer expectations, and changing healthcare needs are collectively shaping the future of EMS systems around the world. A jurisdictional scan was conducted to identify unique or innovative practices and gain new insights from high-performing EMS models that could be considered for Alberta. The scan focuses on three key programs that significantly impact EMS performance and patient outcomes - Inter-Facility Transport (IFT), Mobile Integrated Healthcare (MIH) and optimizing resource capacity. Each program is introduced briefly, below.

Interfacility transport	MIH Programs	Optimizing resource utilization
 Patient transfers between health services have seen several notable changes in recent years, especially in the wake of COVID-19. In all jurisdictions, there is increasing emphasis on technologies and telehealth solutions to streamline transfers, support the diversion of non-emergency calls and Secondary Triage services. A growing focus on providing improved coordination has led to innovations including advances in scheduling and dispatch systems that allows for auto-scheduling of patient transportation. Another prominent trend is the use of specialized transfer teams and dedicated transfer centres, such as the Mayo Clinic Transfer Center, Patient Transport Service and Intermediate Care Services in the US, England and Ireland, respectively. This model has been shown to enable more appropriate utilization of EMS resources and offers appropriate transportation to match the needs of the patient whilst reducing the burden on emergency ambulance resources. Beyond the services offered by EMS agencies, jurisdictions have looked to other solutions to meet the patient transportation needs of the community, including transportation reimbursement schemes, government supported community transportation and partnerships with non-government transport providers. 	MIH teams have become increasingly prominent in healthcare systems around the world. These multi-disciplinary teams represent efforts to optimize healthcare service efficiency and effectiveness, by delivering the right care, in the right place, at the right time and with the right provider. The rise of MIH teams also represents a broader shift towards proactive and patient-centred care, aiming to reduce presentations and hospital admissions as well as healthcare cost, whilst improving overall health outcomes.	All jurisdictions face constraints in workforce supply, capital and and operating budgets in the face of increasing demand for healthcare services, including EMS capacity. Providers face increasing pressure to optimize resource allocation across the system. One way this is being addressed is through System Status Management (SSM) and leveraging business intelligence, which is increasingly being employed in EMS systems. Alternative pathways to emergency care for non-emergency needs are also being bolstered in several jurisdictions.

Global trends in EMS programs (continued)

This section explains how jurisdictions were selected and which jurisdictions were in-scope for research



The approach to the selection of jurisdiction and scope of scan

When identifying jurisdictions for analysis, it was important to select a variety of jurisdictions with different practices and delivery approaches that have been identified as leaders in EMS based on hallmarks of a leading practice EMS system (performance standards, independent oversight, regulatory framework, etc.) and input from experienced EMS leaders. Jurisdictions within six countries were selected together based on the following criteria:

- Relevance to Alberta context, such as social determinants of health to Alberta (GDP/capita, Gini coefficient, Education Level and Access to Healthcare)
- · Comparable geography/structure to Alberta
- · Demonstrated success in alternative models of care

Relevant and contemporary topics were researched across the selected jurisdictions, the table below indicates where key insights were drawn from:



	Canada	Australia	England	United	Norway	Ireland
Key insights				States		
IFT and NEPT	1	1	1		1	
MIH and CP	1	1	1	1		1
Resource optimization	1	1	1	1	1	1
Service quality/patient experience/access to care	1	1	1	1	1	1
Governance structures and accountabilities			1			
Operational policies, procedures, guidelines		1	1			
Quality improvement measures	1	1	1		1	
Resourcing strategies	1	1	1			
Enabling technologies and IT system integration	1	1	1	1		
Key outcomes that are measured and targets	1	1	1	1	1	1

Selected jurisdictions and health system context

A variety of jurisdictions were selected. Context on each jurisdiction's approach to health system operations is described below:

Canada

Canada has a decentralized, universal, publicly funded health system. Health care is funded and administered primarily by the country's 13 provinces and territories, of which their benefits and delivery approaches vary. Programs: IFT & NEPT, MIH, Resources Optimization

United States

The United States (US) does not have universal health insurance coverage and its health system is a mix of public and private, for-profit and nonprofit insurers and health care providers. Programs: MIH, Resources Optimization

Ireland

The Irish public healthcare system is available to all legal residents and funded by taxation. Out-of-pocket costs to residents depends on the category of care residents subscribe to. Programs: MIH, Resources Optimization

Norway

Norway has universal health coverage. Patients make copayments for some services and products, with caps on subsidies and reimbursements for most services including emergency medical and patient transportation services.

Programs: IFT & NEPT, Resources Optimization

Australia

Australia has a comparable universal healthcare system and geography to Alberta, with populations distributed into major cities and remote areas. Notably Australia has a more significant private healthcare system that creates a uniquely 'mixed' model of healthcare service delivery. Programs: IFT & NEPT, MIH, Resources Optimization

England

All English residents are automatically entitled to publicly funded health care through the National Health Service (NHS), including hospital, medical, and mental health care. The NHS budget is funded primarily through general taxation. Programs: IFT & NEPT, MIH, Resources Optimization

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Interfacility transport



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1.1 Summary of IFT & NEPT Trends

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Inter-Facility Transport and non-emergency transportation

Approaches taken to EMS transport varies between jurisdictions and can be driven by a variety of factors

Transportation impacts access to healthcare and contributes to demand on EMS services

Inter-Facility Transport (IFT) is commonly defined as the transport of patients between authorized public healthcare facilities to support access to care that is beyond the capacity or capability of the facility. While the scope of IFT can vary across jurisdictions, the overarching principle is to provide safe and time appropriate movement of patients between authorized sites of care.

Community expectations have grown in such a way where ambulance services are perceived as a means of hospital transportation in addition to emergency response. Jurisdictions around the world, including Alberta, have experienced a significant and growing demand in low-acuity IFT's, adding strain to EMS emergency response capacity. This may stem from demand from patients that reside long distances away from health facilities having no means of alternative transportation apart from EMS although there isn't a clinical needs for EMS specific transport. Often patients cannot financially afford the available transportation, take further time off of work, and/or may not have a support network to assist with transportation.

As specialized healthcare services centralize to improve efficiencies, there is a need to ensure that accessibility is upheld. In recent times, alongside the centralization of care, a corresponding reduction in transportation in rural and remote communities has occurred, such as the decommissioning and reduction of bus and commercial flight services. This limits how a community can access healthcare, particularly those in more isolated areas to be able to independently commute and access healthcare services, often falling back on EMS to fulfill transportation needs.

Additionally, funding frameworks are inconsistent between jurisdictions, which can be attributed to differing policies, healthcare systems and procurement arrangements. Policies and guidelines have been reported to be complex, inconsistent and open to inappropriate use or workarounds by local staff and clinicians. **Reports of misappropriation of IFT services are not unique to Alberta, and reports in other jurisdictions such as England have been documented.**

^{1:} AHA, United States, 2017, https://www.aha.org/ahahret-guides/2017-11-15-social-determinants-health-series-transportation-and-role-hospitals#:~:text=Each%20year%2C%203.6%20million%20people,adverse%20policies%20that%20affect%20travel.

^{2:} AIHW, Australia, 2014, https://www.aihw.gov.au/getmedia/19dbc591-b1ef-4485-80ce-029ff66d6930/6_9-health-ageing.pdf.aspx#:~:text=Demand%20for%20health%20services%20is,health%20professionals%20than%20younger%20people.

^{3:} Institute of Medicine (US) Committee on the Future Health Care Workforce for Older Americans., United States, 2008, https://www.ncbi.nlm.nih.gov/books/NBK215400/

^{4:} Alberta Health Services, Canada, 2014, https://www.albertahealthservices.ca/assets/about/scn/ahs-scn-don-obesity-facts.pdf

Inter-Facility Transport and non-emergency transportation (continued)

Approaches taken to EMS transport varies between jurisdictions and can be driven by a variety of factors

Jurisdictions create local solutions and policy to IFT

Additional and unnecessary demand impacts the timely delivery of healthcare services including emergency care, and further limit already constrained hospital, ED and ambulance capacity. This may lead to:

- Delays in discharge and patient off-loading and/or movement
- Unnecessary or inappropriate utilization of EMS's scarce emergency care resources
- An overwhelmed and
 obstructed frontline workforce



Different jurisdictions have approached these challenges in varying ways to address this complex issue including offering non-emergency patient transportation (NEPT) services, partnerships with community transport, private and/or non-government organisations, government rebate schemes and government grants.

This analysis of transportation has considered arrangements for IFT and NEPT, as they are sometimes described interchangeably across jurisdictions or in some instances, IFT described as a component of NEPT, where NEPT has a broader definition including transportation to non-IFT locations such as a patient's home. **NEPT services play a pivotal role in freeing up EMS to respond to emergency incidents, reducing hospital discharge delays and freeing capacity for other patients to receive emergency care.**

Across most jurisdictions, patient transportation services and solutions are intended for those:

	•		•	
whose medical condition makes		who reside in remote or rural		on such a low income as to make
independent travel impossible or		locations		transportation unaffordable
unsafe,				
	1		1	

The jurisdictional scan does not explore emergency and time-critical ambulance transportation, given these cases would be considered legitimate and appropriate use-cases for an ambulance response.

1: AHA, United States, 2017, https://www.aha.org/ahahret-guides/2017-11-15-social-determinants-health-series-transportation-and-role-hospitals#:~:text=Each%20year%2C%203.6%20million%20people,adverse%20policies%20that%20affect%20travel.

2: AIHW, Australia, 2014, https://www.aihw.gov.au/getmedia/19dbc591-b1ef-4485-80ce-029ff66d6930/6_9-health-ageing.pdf.aspx#:~:text=Demand%20for%20health%20services%20is,health%20professionals%20than%20younger%20people.

3: Institute of Medicine (US) Committee on the Future Health Care Workforce for Older Americans., United States, 2008, https://www.ncbi.nlm.nih.gov/books/NBK215400/

4: Alberta Health Services, Canada, 2014, https://www.albertahealthservices.ca/assets/about/scn/ahs-scn-don-obesity-facts.pdf

Inter-Facility Transport and non-emergency transportation (continued)

Approaches taken to EMS transport varies between jurisdictions and can be driven by a variety of factors

→ There are five key drivers impacting demand of EMS transportation

Transportation is an important element when considering access to, and engagement with healthcare. Patient transportation represents a significant cost in time and resources to health administrations all over the world, and the level of burden this has on EMS agencies may be influenced and driven by several factors such as:

Transportation infrastructure:

A social detriment of health, there are 3.6 million people in the US each year who do not obtain medical care due to transportation challenges.¹ This includes long distances to services and resources and lack of transport infrastructure such as roads, public transport and other modes of transportation.

Socioeconomic status:

In countries at all levels of income, health and illness follow a social gradient: the lower the socioeconomic position, the worse the health. Low income may pose a barrier to engaging in healthcare activities due to potential time and costs required for travel and attending appointment.

Ageing population:

It is well documented that older people are higher users of health services^{2,3} and that many health conditions and associated disability more commonly occur with age.² There were 703 million persons aged 65 years or over in the world in 2019, and this number is projected to more than double to 1.5 billion by 2050³.

Population health:

Based on a recent study conducted in the US - by 2030, nearly one in two adults will be obese, and nearly one in four will be severely obese. This **issue is also prevalent within Alberta** as 67% of adults are overweight or have obesity.⁴

Community expectations and education:

Expectations and understanding of ambulance transportation in communities may not often align with the intentions set by health systems and EMS providers. Jurisdictions are finding the need to reinforce the assumption that those with less significant mobility needs should travel independently, and build community awareness of non-emergency patient transportation options.

1: AHA, United States, 2017, https://www.aha.org/ahahret-guides/2017-11-15-social-determinants-health-series-transportation-and-role-hospitals#:~:text=Each%20year%2C%203.6%20million%20people,adverse%20policies%20that%20affect%20travel. 2: AIHW, Australia, 2014, https://www.aihw.gov.au/getmedia/19dbc591-b1ef-4485-80ce-029ff66d6930/6_9-health-ageing.pdf.aspx#:~:text=Demand%20for%20health%20services%20is,health%20professionals%20than%20younger%20people. 3: Institute of Medicine (US) Committee on the Future Health Care Workforce for Older Americans., United States, 2008, https://www.ncbi.nlm.nih.gov/books/NBK215400/

4: Alberta Health Services, Canada, 2014, https://www.albertahealthservices.ca/assets/about/scn/ahs-scn-don-obesity-facts.pdf



1.2 Summary of key themes

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Canada, Australia, Europe



Key insights summary: Interfacility transportation and NEPT

While IFT and NEPT provides additional pathways to access, the jurisdictions in this report identify similar opportunities for service enhancement and optimization



Unintended mismatch between patient need and service delivery leads to inefficiencies and unnecessary demand on emergency resources

All

Most jurisdictions experience varying degrees of overservicing where skills, equipment and resources deployed to respond to cases are greater than what is required. This can be due to a mismatch between patient needs and EMS response, and may be attributed to various factors such as restrictive legislations, limited range of fleet, skills and service offerings or lack of processes like secondary triaging which may hinder the flexibility for EMS agencies to respond with the most appropriate, value-based and efficient response.

Diversification and expansion of transport vehicles opens options for emergency and non-emergency needs

Norway, Nova Scotia, Ireland, Australia, England

Norway's patient transport office coordinates a variety of vehicles for patient transport and is not limited to just emergency vehicles. NS has SUVs in it's EMS fleet to enable ECP responses to lower acuity cases, and to maintain ambulance capacity for emergencies. These examples enable greater flexibility to support patient transportation need and minimise unnecessary demand on critical resources such as ambulances and clinicians.

Centralised patient transportation coordination enables more efficient use of resources and real-time allocation decision-making

All

All the jurisdictions analysed that currently do not have a centralised patient transportation process have highlighted the need and opportunity to take a more coordinated approach for fairer, efficient and more consistent and appropriate provision of transportation services. This includes central points of contact and coordination, and integrated technology solutions to allow system-level patient flow and resource management. Decentralized coordination complicates visibility of resources due to the various transport providers that may service local health providers, as they may all employ different workflows and systems. NSW have a centralized schedule systems to enable planned transportation, which optimises utilisation and efficiencies of patient movement across large areas. England's NHS recommend its health services to make available patient transport coordinators that not only help to organize transportation, but may also build patient awareness about alternative transportation options. Without these systems in place and a planned and coordinated approach, IFT and NEPT by EMS may continue to exacerbate delays to EMS' emergency responses and already overwhelmed emergency departments.

Key insights summary: Interfacility transportation and NEPT (continued)

While IFT and NEPT provides additional pathways to access, the jurisdictions in this report identify similar opportunities for service enhancement and optimization

urisdictions: NSW,	Norway	British Columbia, Australia, Englan	ıd All
Cey insights Limitat coordin have in solutio particul locatio schedu given b rules d resour 'norm', facilitat sched sched sched up cap enable patient and inf	ons in booking systems may hinder the ability to nate efficient routes and utilisation. Jurisdictions nplemented integrated scheduling and dispatch ns (such as Logis IDS CAD). Logis IDS CAD in lar, reviews the capabilities, availability and n of patient transport vehicles and resources, and les the optimal combination of transport for a pooking request. This auto-scheduling is based on efined by the service and enables the human ces to focus on any requests that fall outside the so that they can work with health services to re requests by exception. An integrated uling and dispatch solution automates the uling and dispatch process, which can enable efficient and consistent service delivery, free acity of staff to focus on more complex tasks and better visibility of patient movements. This may a more streamlined process at all stages of transportation and facilitate a more connected ormed experience for all involved.	Most jurisdictions have some reliance on transportation partnerships with external transport providers, which can help shift some of the transportation demand to third-parties. VIC have contracted the services of Red Cross Australia to provide a minimum number o journeys, and BC have even established partnerships with private providers to subsidise and in some instances waive transportation fees for eligible patients	All jurisdictions pathways and s including govern government-com transportation se access to health populations such communities.

Alternative transport options promotes equity of access to healthcare

All jurisdictions have alternative transportation pathways and services available to their residents ncluding government reimbursement schemes and government-commissioned or community-run transportation services. This helps promote equity of access to healthcare, and may target particular populations such as those living in remote and rural communities.

Key takeaways from approaches in **Canada**

Matching patient needs to appropriate responses and transportation is key to addressing the NEPT demand observed by EMS agencies

Nova Scotia

High ambulance overservicing rates: In 2018, 98% of IFT and NEPT responses required only basic life support staffing and equipment⁵. A wheelchair van and car service could have been commissioned to service this demand.

911 response time targets should not be the same for IFT: Independent review recommended IFT response time targets be removed, as resources that could be dedicated to emergency responses are unnecessarily deployed to IFT to meet contractual demands. This creates conflicting priorities between emergency and non-emergency calls.⁵

New medical necessity policy and guidance: A medical necessity policy and procedure could be developed so that many of the low-acuity transport requests could be responded by more appropriate transportation modes and/or staffing profiles instead of limited clinical and emergency response resources.

Conversion of advance care paramedics ambulances to extended care paramedics SUVs: An independent review recommended this conversion to enable more extended care paramedics to respond to low-acuity 911 calls, thus freeing capacity for ambulances to respond to emergencies. In many, if not all low-acuity calls, patients did not want to leave their home. This is particularly so in rural communities, where it was reported they did not want to be transported to the city for care, simply because it is the only option.⁵

Patient off-load delays to EDs: An independent review estimated off-load delays to unnecessarily tie up ambulances for the equivalent of 13.5 ambulance 12 hour shifts per day.⁵ Addressing off-loading delays would reduce the strain on EMS capacity, if ambulances were able to hand patients over to hospitals more efficiently.

Technology-enabled planning and coordination of patient distribution and flow: An independent review made observations of hospital closures, despite having bed capacity causing delays in patient discharge contributing to patient off-loading issues.⁶ A province-wide transport scheduling, patient flow and bed management solution was recommended to improve patient flows. In 2023, NS have begun to phase in their Care Coordination Centre, which provides a real-time view of access to care, patient flow, and health system resources to support decision-making. **Stretcher-related injuries:** Evidence from an independent review noted a significant reduction (53-78%) in injuries relating to lifting and movement of patients following the implementation of power stretchers, and a return on investment of 5.8 and 3 years for Niagara Ontario and Winnipeg Manitoba, respectively.⁵ This may anecdotally reduce the number of side-lined skilled responders and thus minimize the impact to EMS capacity. **Establish secondary nurse call-in line in communications centre to support the appropriate diversion of calls:** An independent review recommended the establishment of a secondary triage function to triage low-acuity calls and determine alternate treatment and/or treatment responses.

5: Fitch and Associates, Canada, 2019, https://novascotia.ca/dhw/publications/FITCH-EHS-Report-Redacted.pdf 6: BCEHS, Canada, 2018, http://www.bcehs.ca/about-site/Documents/factsheets/Fact%20Sheet%20CLINICAL%20RESPONSE%20MODEL.pdf

British Columbia

Matching response to patient needs: In 2018, BCEHS implemented an updated system called a 'Clinical Response Mode (CRM)', which expands triage categories from three to six to enable more accurate matching of resources to patient needs The CRM replaced the Resource Allocation Plan, which assumes ambulance transport for every patient. The CRM system can be found in use at other jurisdictions such as Scotland, Wales and Victoria, Australia.

Non-emergency ambulance transport: Prior to introduction of CRM, BCEHS received 140,000 calls per year that were non-urgent. Approximately 70% of ambulance transports were conducted in a manner that did not require an emergency driving response.⁶

Diverse private and community

transportation options: BC has established various transportation options to suit the many different needs of their province, including shuttle buses specifically for rural and isolated communities, as well as partnerships with the private transportation sector offering subsidized or free patient travel to eligible patients.

Key takeaways from approaches in Australia

Insights from Victoria and New South Wales IFT and NEPT approaches shows us that various challenges and opportunities exist, however a centralized approach to scheduling provides statewide benefits to patient flow, call volumes and service responsiveness

Victoria

Diversion of non-emergency cases to NEPT: In 2021-22, unplanned NEPT made up ~19% of NEPT responses, which otherwise may have had to be fulfilled by AV.⁷

Inefficient utilisation of skilled resources leading to overservicing: Crew composition for NEPT, which is regulated, may exceed a patient's needs and not be required in all low-acuity cases. Clear articulation of acuity categories: Clinical thresholds between low, medium and high-acuity are not clearly articulated with reports of mixed interpretation across the sector, resulting in deployment of higher acuity and/or over-equipped resources than required. Spillback of NEPT: By default, where a private provider is unable to service a request, it falls onto the EMS to fulfill. In 2022, 87% of NEPT spillbacks occurred in rural areas due to inadequate NEPT coverage, which may have spilled onto emergency resources.⁷

More providers, systems and coordination efforts: The decentralized provider model results in many different systems, workflows, communication and status tracking challenges and inefficient vehicle utilisation resulting in a system that is inefficient and complicated to coordinate and monitor patient movement.

Undergoing reform review: Considering insourcing of NEPT, consolidation of outsourced contracts within geographical regions, centralized procurement of assets and training delivery, streamlining booking and purchasing arrangements, exploring social procurement conditions.

New South Wales

Focus on centralised and automated scheduling of transportation: A scheduling and dispatch solution (Logis CAD) implemented in NSW reviews the capabilities, availability and location of patient transport vehicles and resources, and schedules the optimal combination of transport. This auto-scheduling is based on rules defined by the PTS and allows the booking team to focus on any requests that fall outside the 'norm', so that they can work with health services to facilitate exceptional requests. An integrated technology solution that can automate the booking and resource allocation process would support more efficient and consistent service delivery, as well as free up capacity of staff to focus on more complex tasks and enable better visibility of patient movements. This would enable a more streamlined process at all stages of NEPT and facilitate a more connected and informed experience for all involved.

Reduced non-emergency calls spilling to EMS: The centralization of NEPT scheduling and the use of an automated scheduling system contributed to a reduction of non-emergent calls turned over to the emergency ambulance fleet from 15% to 1%.⁸

Integration of CAD with health services' patient flow portals: The real-time information sharing allows two-way tracking. Sending and receiving clinicians and administrators are able to track the status of PTS request, and it reduces the number of phone calls and miscommunication that previously occurred.



7: Department of Health, Victoria, Australia, 2023, https://www.health.vic.gov.au/sites/default/files/2023-05/non-emergency-patient-review-discussion-paper_1.docx 8: Logis Solutions, Australia, https://logissolutions.net/case-studies/new-south-wales/

Key takeaways from approaches in **Europe**

Standards and centralization are key insights from England and Norway that provide efficiencies to service delivery

England

Stimulate the contribution of community transport: Regular engagement with the public to drive recruitment of volunteers, support volunteer training and ongoing development and explore opportunities for integrating community transport better into local coordination platforms.

Establish clearer core standards for specialist and non-specialist transport: Currently, inconsistent standards and contracts are leading to inconsistent services for patients, and sometimes undermined safety.

A central patient transport triage and coordination service: The NHS recommends that commissioners should consider how a single point of coordination and brokerage for NEPTS across a geographical/provider footprint, and coordination technology could improve equity of access, sustainability and productivity

Signposting and navigational support to alternative transportation: Some health services actively signpost and facilitate patients to alternative independent transport modes including community and public transport. However this is inconsistent across health services and further work is required to support patients.

Clear eligibility criteria for more consistent and fairer provision: In 2022, the NHS updated national guidance on patient eligibility, as historical variability in interpretation may have led to inconsistent administration of NEPT.

Improve fleet and resource planning: Available data estimates that only 10% of NEPT cases require specialist vehicles. 73% of NEPT calls are fulfilled with a single-crew vehicle.⁹

Transparency to enable and incentivize improvement: A national patient transport dataset and KPIs have been established to monitor performance of the sector. Currently, available information is limited, which means health administrators are unable to make informed decisions, or identify opportunities for improvements or issues.

9: NHS, England, 2021, https://www.england.nhs.uk/wp-content/uploads/2021/08/B0682-fnal-report-of-the-non-emergency-patient-transport-review.pdf

Norway

Centralised patient coordination: Norway has a patient transport office in place who are the contact point for any patient transport related enquiries or bookings. This provides greater consistency of advice and service to end-users.

Different vehicles and staffing profile to meet different needs: Different vehicles such as multi-passenger vans, wheelchair access cars or buses, adapted vehicles with varying clinical equipments, ambulances, helicopters etc. make up the fleet of vehicles available for patient transportation. This allows for the preservation of ambulances, helicopters and specialist resources for when they are needed most.





1.3 Detailed jurisdictional summaries

Canada, Australia, Europe

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IFT and NEPT service profiles in **Canada**

There are significant differences in the approaches taken to IFT and NEPT between Canadian provinces, particularly in who provides NEPT services and the available alternative options

	Nova Scotia	British Columbia
Key characteristics	 Defined response time targets are in-place for IFT. The province has 14 patient transfer units (PTU), including multi-patient transfer units and wheelchair patient transfer units which mostly provide non-clinical transport. Policy mandates that most, if not all, ambulance IFT's are to be responded to by paramedics equipped with advanced life support equipment. 	 Provision of clinical IFT's by British Columbia Emergency Health Service (BCEHS. NEPT completely privatised. Large focus on other approaches to reduce burden on ED and EMS, such as call taking, secondary triage and response strategies.
Scope of NEPT	Clinical NEPT provided by PTUs which involves transport between healthcare facilities with minimal level of care requirements during transport. Non-clinical NEPT provided by medical transport service vehicles (MTSV) between health-care facilities for several people at once, including those requiring wheelchair services.	 Transportation is available for medical appointments, patient transfer between hospitals and facilities, and hospital discharge to home or residential facilities.
Patient eligibility criteria	No specific eligibility criteria found online.	Clinical NEPT: No specific eligibility criteria found online. Non-clinical NEPT: For medically stable patients who need inter-facility transfers but do not need the presence of paramedics.
Requisition and coordination	The requesting hospitals or facilities coordinate directly with the transport provider, or the patient may also book directly with the provider.	Pre-booked IFT's that require a paramedic must be booked by a healthcare professional. The requests are handled by the Patient Transfer Services (PTS), a team within BCEHS. Non-clinical NEPT can be booked directly with a private provider. Anyone may book via a private provider.
Transport provider	Private – long-term performance-based contract with the provincial government's EHS.	Clinical IFT provided by BCEHSOtherwise private providers provider all non-clinical NEPT.

IFT and NEPT service profiles in **Canada** (continued)

There are significant differences in the approaches taken to IFT and NEPT between Canadian provinces, particularly in who provides NEPT services and the available alternative options

	Nova Scotia	British Columbia
Crew composition	 PTU: Single paramedic units plus non-paramedic for low-acuity transportation, two paramedics plus non-paramedic driver when multiple patients are being transferred. MTSV: One non-paramedic/non-medically trained driver. 	 PTS IFT: At least one paramedic, depending on patient requirements. Private provider: Transfer crew that are not medically trained.
Other non-emergency patient transportation solutions	 Government funding programs Community Transportation Assistance Program (CTAP): Municipalities and non-profit organizations can apply for funding from the CTAP to cover a portion of the operating costs of a community-based, inclusive door-to-door transportation service in low-density areas of the province. Transportation reimbursement schemes Travel Assistance Pilot Program to Support Surgical Access: This program helps low-income Nova Scotians access the scheduled surgery, endoscopy or cystoscopy procedures, and some pre-operative and post-operative appointments they need. Eligible patients travelling between their home and appointment are reimbursed for: Person vehicle use at a \$0.57 per km The cost of bus, shuttle or community transport Accommodation, if traveling >50 km (one way; max \$85 per night) 	 Community transportation programs Community shuttle service: BC Transit operates small interregional buses on infrequent schedules to primarily serve patients in rural areas needing access to urban centers, but makes the service available to all members of the public. Healthcare-specific shuttle service The Health Connections service connects outlying communities in East Kootenay, BC to non-emergency and specialist appointments in Cranbrook. The routes offered are the only passenger transportation available to some major communities that are currently lacking in any form of intercity bus. Private transportation partnerships Travel assistance program (TAP): TAP helps alleviate transportation costs for travel costs for eligible BC residents within the province for non-emergency medical specialist care not available in their own community. An eligible patient must complete a TAP form and retrieve a confirmation number which will then grant access to entitlements. Upon presentation of a completed TAP form, patients are entitled to discounts or fee waivers from various private transport providers.

Canadian EMS billing landscape

There are gaps and differences in approach to the public coverage of patient transportation between provinces, all of which have no public coverage of non-clinical NEPT

	Emergency Patient Transportation	Non-clinical Non-emergency Patient Transport	Out of province
Alberta (part of program review) The Alberta government provides funding for EMS. Only a small portion of the actual cost of the emergency health services (EHS) provided is charged to the patient, if they receive a bill at all. Payment for ambulance services is the responsibility of the patient unless they are covered by a government program or private insurance.	Interfacility transfer (IFT): Albertans transported by ground and air-ambulance from one approved health facility to another do not receive bills for the costs involved. Exemptions: Seniors, First Nations and residents on government income support Eligibility criteria not specified Costs: • \$250 if a patient is not transported, or • \$385 if a patient is transported • An additional \$200 is charged to a patient who is a non-resident of Alberta, whether the patient is transported or not NEPT provided by provided providers not covered and is subject to rates set by private providers.	Not covered	Not covered All Albertans, including seniors, must pay the cost of EMS and interfacility transfers when travelling outside Alberta. These services are not covered by interprovincial health care agreements.
Nova Scotia Wost Nova Scotians pay \$146.55 for an ambulance trip to the hospital. This is only a portion of the real cost of the service. The provincial government covers the other 80 per cent. Medically essential transportation means ambulance transportation that begins or ends at an approved facility, and for greater certainty, does not include inter-facility transportation or transport of a mobility challenged individual for transportation purposes.	 IFT: Nova Scotians with a valid health card and Canadian citizens do not incur costs for IFT Eligibility criteria not specified For medical assistance reasons, the following ambulance fees apply: Nova Scotians with a valid health card: \$146.55 Non-Nova Scotians, Canadian Citizens: \$732.95 Non-Canadians & New Canadians: \$1099.35 People who are defined as third party insured (This includes people in an MVC, covered by Worker's Compensation, or the federal government.): \$732.95 Nova Scotians who are mobility challenged where transport begins or ends at their place of residence and is transported to or from a considered medical appointment (does not include emergent transports): \$108.95 Fee to transport to and from a hospital for residents of approved long-term care and residential care facilities: \$54.50 Patients are only charged a fee if they are transported by ambulance. NEPT provided by private providers is not covered and is subject to rates set by private providers. 	Not covered unless mobility challenged	Not covered

N.B. Ambulances fees vary between provinces, as Ground and Air Ambulance services are non-insured services under the Canada Health Act. It is the responsibility of each province to determine to what extent, if any, it will subsidize the cost of the provision of ground and air ambulance services for its residents and visitors. Many jurisdictions thus recommend medical travel insurance be taken up by travelers and visitors (including domestic) to cover ambulance fees. Local residents may also purchase personal health insurance which may cover ambulance services.

Canadian EMS billing landscape (continued)

Citizens financially cover some or all costs of ambulance services for emergency and non-emergency use...

Transportation Patient Transport	on-emergency atient Transport
British Columbia Inter-hospital transfers: Not covered While ambulance service fees are not an insured benefit under the BC Medical Services Plan (MSP) or the Canada Health Act, fees are heavily subsidized for persons with a valid BC care Care who are covered by MSP (known as MSP beneficiaries). Fees for non-MSP beneficiaries represent the unsubsidized cost of providing services. • MSP beneficiary: \$0 flat fee (ground service) • MSP beneficiary: \$0 flat fee (ground service) • MSP beneficiary: \$0 flat fee (ground service) Services. • MsP beneficiaries, Fees for non-MSP beneficiaries represent the unsubsidized cost of providing services. • \$11 per statute mile (airplane) (\$6.94 per kilometre) • \$11 per statute mile (airplane) (\$6.94 per kilometre) Eligibility criteria not specified. NEPT provided by private medical insurance. • State action with ansfers a private provider charge a fixed rate of \$50, if the booking is for a hospital to home transfer booked by the hospital. ICBC claim, result of an accident at work, a recipient needs to take action with ambulance provider for billing discussions. • MsP beneficiares and private provider charge a fixed rate of \$50, if the booking is for a hospital to home	d Not covered

N.B. Ambulances fees vary between provinces, as Ground and Air Ambulance services are non-insured services under the Canada Health Act. It is the responsibility of each province to determine to what extent, if any, it will subsidize the cost of the provision of ground and air ambulance services for its residents and visitors. Many jurisdictions thus recommend medical travel insurance be taken up by travelers and visitors (including domestic) to cover ambulance fees. Local residents may also purchase personal health insurance which may cover ambulance services.

Canadian EMS billing landscape (continued)

and are dependent on geography, service and relevant government subsidies that may be available for some populations



Emergency Patient Transportation



Clinical Non-emergency Patient Transport



\Box	Out	of	province
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Ontario

When a person accepts transport in an ambulance, that person accepts any costs associated with that service. If a person does not wish to be transported by ambulance they can decline the service at the time of the incident by signing the "Refusal of Service" section of the Land Ambulance Call Report held by the ambulance crew. A person refusing ambulance service by signing this section of the Land Ambulance Call Report will not receive a charge for ambulance services.

Of all the Canadian jurisdictions analyzed, Ontario had the most complicated fee structure.

Patient Transport Ontarians with a valid Ontario health card I and and air ambulance services For non-urgent or primary care transfers, the patient must meet the Not covered (OHC) requiring a medically necessary requirements of the Ambulance Act and the transfer involves one way originating out-of-province are not ambulance service (deemed by a travel of a distance greater than 240 km. an insured benefit under OHIP. physician) are responsible for a \$45 Repatriation transportation for the ill Patients are subject to the fee structure listed in the first column. co-payment for ambulance transport and/or injured for residents of which originates from and ends in Ontario. Ontario, outside of Ontario are not covered by OHIP but may be Ontarians without a OHC entitlements and covered by some private medical other Canadians* insured under their insurances. province's health care plan requiring a medically necessary ambulance service OHC entitled residents are fully (deemed by a physician) are responsible covered for outbound-of-Ontario for a \$240.00 co-payment for each land ambulance transportation, if: ambulance service rendered, and/or the A physician deems your actual cost for each air ambulance service ambulance service medically rendered which originates from Ontario. necessary, and *Other Canadians' trips must also be for The ambulance trip originates at diagnostic or therapeutic services, and an Ontario hospital, and must be returned to the hospital of origin The destination is a hospital or within 24 hours. health care facility outside the Patients who do not meet any of the province or country, and scenarios listed above, are responsible for Prior approval from OHIP for the full cost of any land and/or air out-of-province or ambulance services received. out-of-country medical treatment is obtained, and Treatment is not available anywhere in Ontario.

N.B. Ambulances fees vary between provinces, as Ground and Air Ambulance services are non-insured services under the Canada Health Act. It is the responsibility of each province to determine to what extent, if any, it will subsidize the cost of the provision of ground and air ambulance services for its residents and visitors. Many jurisdictions thus recommend medical travel insurance be taken up by travelers and visitors (including domestic) to cover ambulance fees. Local residents may also purchase personal health insurance which may cover ambulance services.

IFT and NEPT service profiles in Australia

NEPT services differ across states, and range from centralized to fragmented in terms of organisational structure, management and access

	Australia-wide	Victoria	New South Wales
Key characteristics	Service design, provision and management undertaken at a jurisdiction (state) level	 Decentralized NEPT provider procurement. Legislation specific to the NEPT sector which establish the requirement. for NEPT providers to be licensed and prescribe patient safety and quality standards. Transportation crew have a minimum qualification requirement. Non-clinical transport not intended to be provided by NEPT services or Ambulance Victoria. 	 NEPT(locally referred to as PTS, Patient Transport Service) provided by a public agency, separate to New South Wales Ambulance (the State's EMS agency) Centralized PTS booking team to coordinate and schedule PTS amongst the state
Scope of NEPT	Defined by jurisdictions	NEPT provides non-time critical transport in between:HospitalsHospitals and the community.	For people who require transport to, or from a health facility such as a hospital, aged care facility, nursing home, medical practice or rehabilitation unit but do not need a time-critical emergency ambulance.
Patient eligibility criteria	Defined by jurisdictions	 Prior to transport, the patient must be assessed by an authorized health professional as meeting eligibility criteria: Non-time critical response patients Patients unlikely to deteriorate Clinical monitoring requirements, and/or Stretcher requirements due to reduced mobility. 	 Prior to transport, the patient must be assessed by a medical practitioner or registered nurse as medically unsuitable for community, public or private transport Assessed as having a condition that requires the skills of NEPT staff during the journey, or Assessed as having a condition that has affected a person's appearance or one that has caused incontinence, or Stretcher requirements, and Is not subject to exclusion criteria that would deem the patient unfit for NEPT (otherwise requiring EMS).
Requisition and coordination	Provider-based, centralized or a hybrid, determined by jurisdiction	 Requisition occurs by one of two ways, through: A health service booking (planned NEPT) directly with their contracted NEPT provider or EMS (for NEPT coordination, where responsible), or The emergency services call (unplanned NEPT) that are identified as potentially low-acuity that less urgent as part of the emergency call-taking process are directed to their EMS agency, Ambulance Victoria (AV) for secondary triage to assess whether NEPT response is appropriate 	PTS must be requested by health facility staff via PTS' centralized booking team who coordinate scheduling and dispatch. Bookings are captured on a technology solution, Logis IDS CAD which takes requests; reviews the capabilities, availability and location of patient transport vehicles and other resources; and schedules the appropriate transportation. This auto-scheduling, based on rules defined by PTS enables PTS staff to direct their attention to requests by exception, that are more complicated, as well as focus on communication with the hospitals and facilities they serve.
Transport provider	May be private or public	Predominantly private. Note NEPT transfers by air are fulfilled by Royal Flying Doctors Service, a not-for-profit organisation.	Public - provided by a separate public agency to NSW Ambulance
Crew composition	Defined by jurisdictions	Two appropriately qualified and trained crew members (including the driver)	At least one clinically or appropriately qualified crew member and one driver (whose minimum training requirement is an appropriate driving license)

IFT and NEPT service profiles in Australia (continued)

Fees and subsidies apply dependent on entitlements, service provision and market segment, with local partnerships providing additional support through community transportation and funding programs

	Australia-wide	Victoria	New South Wales
Transportation fees	 In Australia, healthcare entitlements are categorized into three main groups: General – those who do not have one of the below entitlements. Concession or pension – entitlements aimed at low-income or elderly Australians (older than 65 or 67 depending on date of birth) Department of Veteran Affairs (DVA) - Veterans who have served in the Australian Defence Force may be eligible for pensions or benefits from DVA including healthcare. Emergency Costs vary depending on the state, entitlement holders are exempt. IFT Transfers between public health facilities have no charge. NEPT Entitlement holders are not responsible for payment of NEPT services. General patients may be responsible for payment depending on jurisdiction. For general patients where they are subject to transport fees, they may have private health insurance, or ambulance membership that cover the associated costs. 	In VIC, general patients are responsible for payment if IFT involves private facilities or non-admissions at a public facility. These costs are not applicable to entitlement holders listed above. Costs are fixed from \$121 to \$28,841 depending on mode of transport and response type. However, ambulance fees can be covered completely by Ambulance Victoria membership which costs a yearly fee of \$51.94 and \$103.88 for singles and families, respectively.	All transfers to private facilities or between private facilities are charged to the person travelling. People transferred between their home and health facilities and who are not eligible for concessions will be charged. NEPT The following charges apply to NSW residents requiring chargeable PTS services: • Booking fee - \$338.00 • Rate per kilometre - \$2.09 per kilometre. Full ambulance coverage including emergency and NEPT is covered by private health insurance which can start at a yearly cost of about \$50 depending on the insurer.
Other non-emergency patient transportation solutions	Community transportation programs and partnerships There are a number of non-government and not-for-profit organisations that provide either specific NEPT services or community transportation services. Transportation subsidy and reimbursement programs Patient Assisted Travel Scheme (PATS): All states and territories have PATS to support patients in rural and remote Australians with the costs of travel for specialist treatment. Government funded grants and programs Community transportation providers can apply for funding for the appropriate provision of their services. Commonwealth Home Support Program provides funding for older eligible individuals and is aimed at supporting individuals in staying independent and in their own home for longer.	Partnerships with not-for-profit provider • The Department of Health contracts the Australian Red Cross to deliver 60,000 door-to-door transports to essential medical appointments per year, funded by local councils and the Department of Health. A referral by a medical practitioner is required to access this funded service.	 Government funded grants and programs NSW's Community Transport Program aims to address transport disadvantage owing to physical, social, cultural and/or geographic factors at the local level Taxi Subsidy Scheme NSW offer a subsidy scheme for residents who are unable to use public transport because of a severe and permanent disability.

IFT and NEPT service profiles in **Europe**

Healthcare systems in England and Norway have structured IFT and NEPT services similarly, with local requirements for eligibility, access pathways and funding

	England	Norway
Key characteristics	 Universal commitment of patient transport support for patients attending in-centre haemodialysis Commitment to net zero by 2040 	Centralised patient transport coordination function
Scope of NEPT	NEPT services is known as Patient Transport Services (PTS), locally. PTS is for those people whose medical condition makes independent travel impossible or unsafe.	Requisitioned travel is intended for patients who are unable to travel by public transport, drive or be driven for health or transport-related reasons.
Patient eligibility criteria	 Only patients who meet one of the below reasons for an appointment will be considered for eligibility for PTS: The patient has been referred by a doctor, dentist or ophthalmic practitioner for non-primary care NHS-funded healthcare services – that is, diagnostics or treatment. The patient is being discharged from NHS-funded treatment. Meet one or more of the following: Medical needs, Cognitive or sensory impairment, Significant mobility needs Travelling to use in-centre hemodialysis Concern for their wellbeing has been raised, or wider needs that have resulted in services or discharge being missed or severely delayed. 	 The treatment providers determine whether there is a need for requisitioned patient travel, reasons may include: Significant reduction in orientation ability Significant reduction in general condition Mental health problems, which make it difficult for you to travel by public transport or in your own car Reduced mobility, which causes you to have difficulty walking or getting in and out of a vehicle, or to need an adapted vehicle.
Requisition and coordination	Patients schedule bookings through patient transport coordinator/designated staff at health services, PTS provider or online portals, if available. Patients will be assessed for eligibility and if eligible, can proceed to schedule a booking. Patients must be assessed every time they request PTS as their condition may have changed.	Patients or treatment providers must make requests for requisitioned patient travel through the patient travel office, who will arrange the most appropriate form of transport for patients according to their need. Health related reasons requiring adapted transport must be determined and authorised by the patient's treating physician.
Transport provider	Both public and private, including the voluntary sector, NHS Ambulance Trusts and large and small independent providers.	Both public and private.
Crew composition	May not necessarily have any clinically trained staff in crew, if no clinical requirement.	May not necessarily have any clinically trained personnel.

IFT and NEPT service profiles in **Europe** (continued)

Funding subsidies and community-based programs are akin to those in the Australian landscape and aim to tackle health equity issues and support access for all

	England	Norway
Transportation fees	PTS provide free transport for those who are entitled to the NHS.	 Users pay a user fee for both the outward and return leg of your journey. In the case of a return journey, a user fee is incurred twice. Ordinary user fee: up to NOK 159 each way Free treatment options: up to NOK 400 each way Exemption apply, including those who have (non-exhaustive list): Acquired an exemption card when they have paid over a certain amount in user fees. Under the age of 16 IFT within the same health trust
Other non-emergency patient transportation solutions	 Transportation reimbursement programs Healthcare Travel Cost Scheme (HTCS): This scheme allows eligible patients to claim a refund of reasonable travel costs, where a patient has been referred by a primary healthcare professional to secondary care at a NHS hospital or premise. Refund based on cheapest suitable mode of transport for patient's circumstances. Eligibility criteria: In receipt of a qualifying government benefit or allowance Permanently living in a care home Children in local authority care This equates to ~6-7M people in England Community Transport Programs and Partnerships Volunteer sector - Take Home and Settle services: Many voluntary sector organisations provide take home and settle services providing transport and initial support for people leaving hospital with limited or no available support from family and friends. Various arrangements are in place at various health services including: Volunteers embedded into the discharge team Transport, provision for renal patients Drivers are provided necessary training, such as basic first aid, safeguarding, compassion and interpersonal skills.	 Transportation reimbursement schemes Provides compensation to eligible residents up to the value of travel to the nearest location where the health service can be provided, regardless of the form of transport taken. From 2022, the standard reimbursement rate is NOK 2,80 per kilometre with potential additional allowances provisionable for travel companion, accommodation and lost earnings. Eligibility criteria include: Travel must be >10 km to be eligible Treatment provided by a public health service Patient travel office must be contacted for any travel requiring air travel. Healthcare-specific shuttle service Health Buses are specially built for patients going to treatment, and are organized by the local patient travel offices. Service offers vary in the different buses. In several of the buses, health personnel or bus hosts are present on the entire route. Some of the buses have space for stretchers, and have extra medical equipment on board.

2.0

Mobile Integrated Healthcare and Community Paramedicine

Table of contents for MIH

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2.1 Summary of MIH and CP trends

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Mobile Integrated Healthcare and Community Paramedicine

MIH and CP is a rapidly-evolving field extending paramedical expertise that is improving access to primary health care

$|\mathbf{B}||$ CP expands paramedic operation to include integration with interdisciplinary health care teams

Over the past 50 years, paramedicine has become a very dynamic and evolving role, that has rapidly changed to suit the needs and expectations of the communities they serve.

A recent consensus on the definition of CP, sometimes referred to as MIH has been reached:

"Community paramedicine....may include provision of primary health care, health promotion, disease management, clinical assessment and needs based interventions. They should be integrated with interdisciplinary health care teams which aim to improve patient outcomes through education, advocacy, and health system navigation.¹⁰" In a CP program, higher trained paramedics operate beyond their role of traditional emergency medicine response and patient transport. CP programs can be broadly categorized into four major care models:



Primary healthcare model: CPs operate at community clinics alongside GPs to provide regular check-ups, with an aim to prevent admission or readmission to local hospitals and nursing or care homes.



Integrated health model: Aims to ensure access to health care in isolated remote and rural areas by using primary care capable and experienced CPs to deliver health services above and beyond what a regular paramedic can provide.



Community coordination model: Aims to avoid unnecessary transport of patients to emergency departments by using specially trained CPs using MIH techniques. Patients are usually treated 'at home' or 'on site' or redirected to appropriate emergency or non-emergency department healthcare settings.



Remote/Telehealth patient monitoring model: CPs work with primary care providers to proactively address patient issues via 24-hour home-based monitoring for chronic health conditions such as COPD and diabetes.

10: Shannon et al., 2023, https://journals.sagepub.com/doi/full/10.1177/27536386221148993 11: Currier et al., 2023, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10258641/ 12: Peters et al. 2023, https://pubmed.ncbi.nlm.nih.gov/37200405/

MIH and CP (continued)

MIH and CP is a rapidly-evolving field extending paramedical expertise that is improving access to primary health care

🔊 CP models of care offer improved access to primary care for specific patient groups and communities

The primary drivers for the development of CP is the increasingly aging population, increasing non-emergency care demand on EMS services, overburdened EDs and the associated costs, and other benefits of ED avoidance. Jurisdictions are looking into improving MIH systems, where a proactive rather than a reactive approach to EMS is taken.

Redirecting medically non-urgent care to other more appropriate primary care settings or pathways can help alleviate the strain on EMS services. These alternatives are estimated to save the US healthcare system \$4.4 billion in spending per annum.¹¹ ED use for non-urgent medical conditions can lead to unintended consequences such as higher healthcare spend, avoidable use of scarce hospital ED and EMS resources, and disconnected relationships between patients and their primary care physician.

The disparities between MIH coverage in rural/remote areas and urban areas is quite pronounced. For example, falls among older adults in rural/remote NSW, Australia, are treated in the exact same manner as urban NSW. This policy has led to higher ED admissions and recurring fall rates among rural/remote patients.¹² Orienting to rural/remote focused CP models in rural/remote areas can potentially mitigate these ED admissions and can lead to significant cost savings.

As the healthcare needs of the community continues to evolve, so too does paramedicine and the role paramedics play in the healthcare system. Innovative models of care, extensions in scope of practice and advancement in skills are required to stay ahead of the changing needs of the community.

It is worth noting that different jurisdictions have variability in skills, capabilities and scope of practice for their frontline ambulance staff, and thus the role of paramedics or their equivalents across jurisdictions is not uniform. This may be attributed to the lack of professional regulation and/or level of training which may range from vocational training through to university postgraduate education.

^{10:} Shannon et al., 2023, https://journals.sagepub.com/doi/full/10.1177/27536386221148993 11: Currier et al., 2023, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10258641/ 12: Peters et al. 2023, https://pubmed.ncbi.nlm.nih.gov/37200405/

MIH and CP (continued)

MIH and CP is a rapidly-evolving field extending paramedical expertise that is improving access to primary health care

CP models require certain conditions for successful implementation and results

In some jurisdictions, Paramedicine may not be a recognised or regulated profession, such as in Ontario where 'paramedic' is not a protected title. This means that differences in skills and training must be considered when exploring models of care between jurisdictions.

Similarly, the role of a CP has not been standardized across jurisdictions. Some examples of what a CP's looks like include:

- In England, where CPs provide standalone services like on-site mobile X-rays, swabbing, sampling and patient monitoring.
- In Ireland, CPs work in tandem with emergency registrar clinicians in two-person rapid response EMS teams, where the role resembles a physician assistant.

To support the appropriate deployment and effective utilization of CP, secondary triage is fundamental. This ensures that clinical oversight is provided in the call taking process to enable the delivery of the right care, at the right time, at the right place, by the right resources.

While CP models have been successful in reducing ED conveyance, EMS response times and associated costs, experienced paramedics are typically needed for CP roles. As a result, more highly skilled paramedics may be drawn away from critical emergency response roles which may contribute to frontline deficits and long-term 'hidden' costs for EMS providers.

The core aim of any deployed CP model should be focused on increasing community paramedic professionalization, reducing ED demand, improving EMS responsiveness through proactive community engagement, and bringing equity to long-term patient outcomes irrespective of locality.

^{10:} Shannon et al., 2023, https://journals.sagepub.com/doi/full/10.1177/27536386221148993 11: Currier et al., 2023, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10258641/ 12: Peters et al. 2023, https://pubmed.ncbi.nlm.nih.gov/37200405/



2.2 Summary of key themes

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Europe, United States, Australia, Canada



Key insights summary: MIH and CP

Community paramedicine can address important gaps in the health system. However, comes at the cost of service's more skilled and experienced paramedics.

Торіс	CP models require a skilled and experienced paramedic workforce
Jurisdictions:	All
Key insights □	CP programs provide services and care that are above and beyond the traditional role of paramedics. Because of this, CP programs require more experienced and higher trained paramedics to be able to deliver new and innovative services. Training looks slightly different between jurisdictions from postgraduate diplomas and masters degrees to additional short-courses. However, it is consistent that clinical experience and additional training are requirements to have a competent community paramedic. Whilst it is important to ensure that paramedics are appropriately skilled and experienced to be able to service CP programs, this also means that more experienced and skilled paramedics are taken away from frontline emergency services, reducing the pool of resources dedicated to emergency response.

CP models are enabled by effective community engagements and partnerships

Australia, Canada, England

Community engagement and partnerships are crucial to the success of CP programs. This is the case, particularly for rural, regional and isolated communities as there may be limited resources, expertise and amenities that would ordinarily be available in metropolitan areas, as well as considerations and prevalent health concerns that may be unique to the community of interest.

An example of this is with Queensland Ambulance Service's CP program, IPAP which partnered with local communities, care providers and other health care professionals to clearly identify roles and ways of work that best supported the community they served. Target cohorts and delivery models for CP should be carefully considered carefully to ensure that a sustainable, integrated and impactful program can be developed and implemented to meet the needs of its target community.

14: Patton et al. 2021, https://bmcemergmed.biomedcentral.com/articles/10.1186/s12873-021-00536-x

21: Tasmanian Government, Australia, 2021, https://www.premier.tas.gov.au/site_resources_2015/additional_releases/secondary_triage_better_care_for_patients

^{15:} Health Service Executive, Ireland, 2022, https://www.hse.ie/eng/about/our-health-service/making-it-better/older-people-benefit-from-new-care-pathway-in-cork.html

^{19:} Tasmanian Government, Australia, 2022, https://www.premier.tas.gov.au/site_resources_2015/additional_releases/community-paramedics-to-boost-patient-care-for-tasmanians

^{20:} Tasmanian Government, Australia, 2022, https://www.premier.tas.gov.au/site_resources_2015/additional_releases/strong-investment-in-ambulance-tasmania-means-less-tasmanians-requiring-hospital-trips

^{38:} Productivity Commission, Australia, 2023, https://www.pc.gov.au/ongoing/report-on-government-services/2023/health/ambulance-services/

Key insights summary: MIH and CP (continued)

Community paramedicine can address important gaps in the health system. However, comes at the cost of service's more skilled and experienced paramedics.



^{14:} Patton et al. 2021, https://bmcemergmed.biomedcentral.com/articles/10.1186/s12873-021-00536-x

21: Tasmanian Government, Australia, 2021, https://www.premier.tas.gov.au/site_resources_2015/additional_releases/secondary_triage_better_care_for_patients

^{15:} Health Service Executive, Ireland, 2022, https://www.hse.ie/eng/about/our-health-service/making-it-better/older-people-benefit-from-new-care-pathway-in-cork.html

^{19:} Tasmanian Government, Australia, 2022, https://www.premier.tas.gov.au/site_resources_2015/additional_releases/community-paramedics-to-boost-patient-care-for-tasmanians

^{20:} Tasmanian Government, Australia, 2022, https://www.premier.tas.gov.au/site_resources_2015/additional_releases/strong-investment-in-ambulance-tasmania-means-less-tasmanians-requiring-hospital-trips

^{38:} Productivity Commission, Australia, 2023, https://www.pc.gov.au/ongoing/report-on-government-services/2023/health/ambulance-services



2.3 Detailed jurisdictional summaries

Europe, United States, Australia, Canada

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Community Paramedicine Training Requirements

Paramedic training and licensing requirements vary between jurisdictions, and community paramedicine which is typically viewed as an advance care or specialist capability does not have well documented training or education requirements.

Training requirem	nents	Paramedicine	Community Paramedicine
Canada	*	Differences observed between provinces ranging from one to three years program and licensing according to provincial regulatory standards.	No documentation about required training programs or accreditations found. However, courses facilitated by private providers available which can take up to 100 hours of online training. ³⁹
United States		Differences observed between States ranging from six months to two-years accredited post-secondary education programs and licensing according to local state requirements.	y No documentation about required training programs or accreditations found. However, independent certifications and accreditations for community paramedicine are available. ⁴⁰
Australia	* *	Two to three-years full-time Bachelor's degree in Paramedical Science, and registration with the national regulatory body.	No documentation about required training programs or accreditations found. However, various post-graduate qualifications are available including: • Graduate Certificate of Community Paramedicine • Graduate Diploma of Community Paramedicine • Master of Paramedicine
England	+	Three-year Bachelor's degree in Paramedic Science, or Four-year apprenticeship degree program, or Two-year Masters degree in Paramedic Science, and registration with the national regulatory body.	Minimum three-years post-registration experience, and HEE Primary care First contact Community Paramedic training (10 months) must be completed as the minimum threshold for entry to primary care. ^{41,42}
Ireland		Three-year Bachelor's degree program with the National Ambulance Service, or Four-year Bachelor's degree in Paramedic Studies at university, and registration with the national regulatory body.	No documentation about required training programs or accreditations found. However, several recommendations have been made by Ireland's national paramedic statutory body to lead the development of education requirements, standards and outcomes for community paramedicine. ⁴³
Norway		Three-year Bachelor's degree program in Paramedic Science, and licensing with the national regulatory body.	No documentation about required training programs or accreditations found.

39: Community Paramedic, Canada, 2023, https://premergency.com/product/community-paramedic-2/#:~:text=Community%20Paramedic%20Practitioner%20is%20an,term%20care%20programs%20across%20Ontario.

40: IBSC, United States, 2023, https://www.ibscertifications.org/roles/community-paramedic

41: NHS Greater Manchester Integrated Care, England, 2023, https://gmprimarycarecareers.org.uk/generalpractice/new-roles/community-paramedic/

42: HEE, England, 2021, https://www.hee.nhs.uk/sites/default/files/documents/Paramedics-FINAL%20(002).pdf

43: PHEC, Ireland, 2020,

https://www.phecit.ie/Custom/BSIDocumentSelector/Pages/DocumentViewer.aspx?id=oGsVrspmiT0dOhDFFXZvIz0q5GYO7igwzB6buxHEgeDKMmmW%252fnE3lbsxRkYxd6aQYk7snfcymr0EG16DvMZvqmNsz5SqfTY2bCjDsrkmvfchr0f6fWdxsRfEpP0eHF2WFYnnA1HA6sq8buhbiuE7h UxFSMEFO%252btRyWB31RTiP1quSbFCsa%252bZGt6Ri4g1h1nnWZcXksZCSqw%253d

MIH and CP service profiles in **Europe**

England and Ireland are both currently rolling out programs related to community coordination, aiming to alleviate service pressures across primary, secondary and tertiary care

	NHS, England ¹³	Alternative Pre-Hospital Pathway, Ireland ^{14, 15}
Key characteristics	Launched as a three-month pilot in July 2019, the at-home paramedic treatment scheme has secured permanent funding from NHS Clinical Commissioning Group.	Provided pre-hospital emergency care in and around Cork, Ireland using the Alternative Pre-Hospital Pathway (APP) model which founded in 2019 and increase non-conveyance for "low-acuity" dispatches on 111 or 999 calls.
		The team covered a mixed urban and rural population of approximately 300,000 people located within a 40-min drive time of Cork University Hospital.
	Model A community coordination model, ED avoidance with 'at-home' paramedicine. The scheme is run by the North East Ambulance Service (NEAS), where a small team of paramedics respond to calls in the Berwick area and supporting to the local NHS services. The program aims to reduce EMS response times, the number of unnecessary hospital transfers, and reduce the workload of local GP practices.	 Model A community coordination model, a small specialised APP Team that respond to low-acuity 112/999 calls aiming to provide definitive patient care in the community or to refer patients to the appropriate community or specialist service. The team consists of: Specialist Registrar in Emergency Medicine, and An Emergency Medical Technician (EMT). Patients accessed the EMS service by dialling 112 or 999, with "low-acuity" cases screened and fed to the APP team. The APP team was extensively equipped with medical equipment, advanced life support bags, pre-hospital drug bags, oral medications boxes, wound management bags and urinary catheter
Define the shout		equipment.
Patient cohort	Patients or all ages. Patients accessed or engaged the service by dialling 999, calling for EMS services directly to affected site. The service was delivered by a small team of 3 paramedics who attended patients at-home, irrespective of whether a case was determined to be "high-acuity" or "low-acuity".	2,001 people of all ages of a mixed urban and rural population located within a 40-minute proximity to Cork University Hospital.
Outcomes	Life-threatening Category 1 wait time average halved to 6.02 min per patient.	67.8% ED non-conveyance rate.
	 Fewer patient transfers from Berwick to the Northumberland Specialist Emergency Care Hospital (NSECH) in Cramlington and Borders General Hospital. 	 In patients aged over 75, the ED non-conveyance rate was lower at 62.0%.

13: NHS Berwick, UK, 2022, https://neas.nhs.uk/news/2022/february/7/beloved-berwick-community-paramedic-scheme-made-permanent-following-its-success.aspx

14: Patton et al. 2021, https://bmcemergmed.biomedcentral.com/articles/10.1186/s12873-021-00536-x

15: Health Service Executive, Ireland, 2022, https://www.hse.ie/eng/about/our-health-service/making-it-better/older-people-benefit-from-new-care-pathway-in-cork.html

MIH and CP service profiles in **Europe** (continued)

Each jurisdiction has identified program wins and opportunities that are relevant for similar healthcare systems internationally

	NHS, England ¹³	Alternative Pre-Hospital Pathway, Ireland ^{14, 15}	
Challenges,	Improved capacity of GPs and other ambulance crews	Study highlights the high rate of non-urgent calls	
Challenges, opportunities and insights	Paramedics that attended patients with long-term conditions at home or on-site, freed up both GPs and emergency ambulance crews to see more patients in need.	The data generated by the APP Team demonstrates that in a cohort of patients with low-acuity complaints for whom an emergency ambulance was called, 70% of them were suitable for management in the community.	
	Diversion to alternative care pathways away from ED		
	Patients were sent to either the Minor Injuries Unit (MIU) or treated on site, where appropriate helping to avoid transfers to the ED department at NSECH in Cramlington.	Highly specialised team and vehicle	
		This model requires specialty skills from an emergency medicine registrar partnered with an EMT, equipped with equipment typically suited for higher acuity care, despite	
	Successfully operated during COVID-19 pandemic	the low-acuity patient cohort.	
	The community response to the program's continued operation during the pandemic was well received according to patient testimonials.	High overall non-conveyance rate Participants who received intervention from this program and similar programs in other	
	Additional paramedic training required	studies, showed a significant improvement in ED non-conveyance.	
	CPs needed to be trained in mobile X-ray radiology, swabbing, sampling and patient monitoring.		

13: NHS Berwick, UK, 2022, https://neas.nhs.uk/news/2022/february/7/beloved-berwick-community-paramedic-scheme-made-permanent-following-its-success.aspx

14: Patton et al. 2021, https://bmcemergmed.biomedcentral.com/articles/10.1186/s12873-021-00536-x

15: Health Service Executive, Ireland, 2022, https://www.hse.ie/eng/about/our-health-service/making-it-better/older-people-benefit-from-new-care-pathway-in-cork.html

MIH and CP service profiles in the **United States**

Jurisdictions in the United States have trialled models of care related to MIH and CP and identified improvements to access to care and preventable ED visits

	Care Transition Intervention, New York and Wisconsin ¹⁶	Community Paramedicine in Rural County, Oregon ¹¹	
Key characteristics	Tested the effectiveness of "Care Transitions Intervention" team (CTI) post-ED in three hospitals (2 in Rochester, NY & 1 in Madison, WI) 30 days following discharge. A randomized controlled trial (RCT) was conducted on 1756 participants. Model CTI team assigns one community paramedic coach (CPC) to provide 'at-home' post-ED checkups. The intervention consisted of a home visit 24 to 72 h post-discharge by an assigned CPC, and up to three coaching phone calls within 28 days of ED discharge. Objectives	A recent study (Jun 2023) conducted in Oregon explored the effect of a Community Paramedicine program implemented in 2 rural counties in reducing non-emergent ED use.	
		A community coordination model, the program intervention consisted of two CPs in a care team providing home-based care in a non-urgent setting. Each intervention involved five CP home care visits over a 3-month period, which were assigned by the patients' ED discharge coordinator and their primary care team. Objectives To reduce the frequency of ED use among patients with high ED utilisation and complex medical history	
	 Reduce ED revisits and relieve the costs of further advanced inpatient care of hospitals. Reduce the prevalence of adverse events after a visit to the ED. Improve post-ED care transitions ED visits among older adults (60 years or older) 	using a CP intervention program.	
Patient cohort	 Participants aged over 60 years old Discharged from ED into the community within 24 hours of arrival Have a working telephone Have a primary care provider 	Aged 18 years or older, discharged from the hospital within the last 24 hours, a current Medicaid beneficiary, a member of the health service catchment, a history of high ED utilisation and complex medical histories. Patients enrolled in a home health or hospice programs were excluded from the study.	
Outcomes	CTI did not reduce ED re-visits post-intervention, but significantly increased patient follow-ups with outpatient clinicians and patient recall of red-flag issues post-ED.	 The study found that with the CP program intervention, ED use and avoidable ED visits decreased by 13.9% and 38.9%, respectively. Measures Sum of emergency medicine ED use per member per month – "diagnosis and treatment of unforeseen illness or injury provided in a hospital emergency department setting." Avoidable ED visits per member per month - "not requiring any diagnostic tests, procedures or medication" and visits to the ED that could have been more appropriately managed by a physician in an office or clinic setting. 	

MIH and CP service profiles in the **United States** (continued)

There are potential cost and community benefits, however additional programs or trials are needed to identify whether this could be replicated at scale in a complex and inequitable system

	Care Transition Intervention, New York and Wisconsin ¹⁶	Community Paramedicine in Rural County, Oregon ¹¹
Challenges,	Possible hidden cost-benefits	Post-discharge support reduced ED use and avoidable ED visits
opportunities and insights	Even though CTI did not reduce ED re-admissions in any meaningful manner, hidden cost-benefits may lie in potentially reduced future ED visits by patients who were more actively engaged in using outpatient services by CPs. Longer term studies are required to look at potential longer term outcomes.	The results of this study suggest that this CP model is a promising approach to foster more appropriate ED use, by providing frequent ED users with greater support post-discharge including supporting patient-primary care engagement, follow-up care maintenance and navigating other support services.
		Promising results
		The study is limited by its small sample cohort of 102 people, and requires replication, but the results looks promising.
		Policy and funding shift to support CP
		For the CP model to effectively support appropriate ED use long-term, reimbursement policies and government funding need to be revised to enable the development and implementation of

innovative, efficient and effective models of care.

MIH and CP service profiles in Australia

Some jurisdictions in Australia have developed programs for community coordination and integrated health and range in target population from whole-of-community to issue-specific

	Non-Emergency '000' response, Tasmania ^{19, 20, 21}	Isolated Practice Area Paramedic, Queensland ¹⁹
Key characteristics	This program was modeled off similar successful programs implemented in Canada, the US and UK, and forms part of the Tasmanian Government's plan to treat more patients in the community and keep Tasmanians out of hospital. Model A community coordination model, where a community paramedic (CP) responds to low-acuity calls made to the emergency services line, '000'. CPs are tasked by Emergency Medical Dispatchers (EMD) direct to a defined group of 'low risk' calls, or via Secondary Triage. Treatment is provided at the call-out location, and is intended to minimise the need to send patients to hospital or ED. The program provides 16 hours of coverage per day and paramedics require specialised training which includes patient assessment, clinical decision-making, and specific clinical skills, equipping providing these specialist CPs with the skills to care for patients in the community without necessarily needing to visit the emergency department.	Queensland Ambulance Services partnered with Queensland Health and James Cook University to pilot the Isolated Practice Area Paramedic (IPAP) program in 2006 which aimed to improve access to healthcare in rural and remote communities. This has since become a permanent program in Queensland. Model An integrated health model, the program provides integrated health services in partnership with other health professionals and extends access to healthcare in rural and remote communities. Program components include: Continuing to provide pre-hospital and emergency care Developing advanced clinical skills to meet the health needs of the community, in consultation with other health providers targeting key health issues including: • Aboriginal Health • Diabetes • Infectious Diseases • Mental Illness • Chronic and Complex Disease • Health Promoting Practice Paramedics have direct contact with on-call emergency physicians, when needed. This model employs the skills of IPAPs which are Extended Care Paramedics (ECPs) who have further specialised training, in addition to training with other healthcare professionals.
Patient cohort	Low-acuity patients as assessed by EMDs as per a defined criteria for low-risk calls, alternatively, patients may be assigned CP response via Secondary Triage following a comprehensive patient assessment undertaken by a highly-trained Secondary Triage nurse or paramedic.	 Patients in rural, remote and isolated regions. IPAPs respond to patients via emergency 000 calls.
Outcomes	 Reduce pressure on hospitals by freeing up our ambulances to attend to higher priority emergency calls. Ease the pressure on Emergency Departments by caring for some patients in the comfort of their own homes rather than waiting for hours in our emergency departments. Between Feb 2021 and Oct 2022, over 10,000 triages were completed resulting in 38% of calls not requiring an emergency ambulance response. 	 Advanced scope of practices such as health promotion, chronic disease management, medication administration and primary care. Develop localized health care plans to minimize demand for hospital care.

19: Tasmanian Government, Australia, 2022, https://www.premier.tas.gov.au/site_resources_2015/additional_releases/community-paramedics-to-boost-patient-care-for-tasmanians

20: Tasmanian Government, Australia, 2022, https://www.premier.tas.gov.au/site_resources_2015/additional_releases/strong-investment-in-ambulance-tasmania-means-less-tasmanians-requiring-hospital-trips

- 21: Tasmanian Government, Australia, 2021, https://www.premier.tas.gov.au/site_resources_2015/additional_releases/secondary_triage_better_care_for_patients
- 19: Guo et al. 2017, https://www.ncbi.nlm.nih.gov/books/NBK549096/

MIH and CP service profiles in **Australia** (continued)

The opportunities for scale and expansion are evident and provide specific access benefits to individuals in regional and remote communities

	Non-Emergency '000' response, Tasmania ^{19, 20, 21}	Isolated Practice Area Paramedic, Queensland ¹⁹
Challenges, opportunities and insights	 Secondary Triage pivotal to CP model and addressing low-acuity calls Secondary triage enables for the diversion of non-emergency calls to be responded to by the CP program. This diversion occurs via two mechanisms, either by a patient meeting a pre-defined criteria to be determined by EMDs as 'low acuity' or to be assessed by a team of highly-trained secondary triage clinicians. This ensures that patients are appropriately assessed and responded to and supports emergency ambulance resources to be freed up to respond to urgent calls more quickly. Specialist training required to care for patients in the community Community paramedics practice to an extended scope beyond the standard of a general paramedic. As a result, to ensure CPs are adequately skilled, CPs undergo additional training to meet the competency requirements. EMS agencies exploring CP programs should ensure that CPs are adequately 	 Partnerships and community support This program has partnered with local communities, care providers and other health care professionals to clearly identify roles and ways of work that best support the community they serve. This is crucial to CP programs particularly in rural, remote and isolated areas where there may be limited resources, expertise and amenities that would ordinarily be more accessible in metropolitan areas, as well as considerations and prevalent health concerns that may be unique to the community of interest. Formalization and recognition of extended scope of practice In Australian rural and remote communities, paramedics have often provided a wider range of services and care compared to their metropolitan counterparts. The additional needs of these communities and the care provided by these paramedics is well recognised and has resulted in the development of more advanced paramedic courses and pathways to become a CP. Typically, CPs are more experienced paramedics that have undertaken postgraduate training.
	upskilled to be able to perform their extended scope, meet the expectations of the community and maintain patient safety and quality care.	As CP demands a more advanced scope of practice including primary care, chronic disease management and health promotion, recognition and the professionalisation of such paramedics ensures that the workforce is equipped with the skills and knowledge to service the community.

19: Tasmanian Government, Australia, 2022, https://www.premier.tas.gov.au/site_resources_2015/additional_releases/community-paramedics-to-boost-patient-care-for-tasmanians

21: Tasmanian Government, Australia, 2021, https://www.premier.tas.gov.au/site_resources_2015/additional_releases/secondary_triage_better_care_for_patients

^{20:} Tasmanian Government, Australia, 2022, https://www.premier.tas.gov.au/site_resources_2015/additional_releases/strong-investment-in-ambulance-tasmania-means-less-tasmanians-requiring-hospital-trips

^{18:} Guo et al. 2017, https://www.ncbi.nlm.nih.gov/books/NBK549096/

MIH and CP service profiles in **Canada**

Ontario's model for community coordination highlights the opportunities for communities who are most vulnerable by providing care and supports increasing access and system navigation

	CP@Clinic, Ontario, Canada ^{17, 18}
Key characteristics	CP@clinic is an innovative, evidence-based chronic disease prevention, management, and health promotion program. Model A community coordination model, where a CP provides care mostly in the common rooms of subsidized housing buildings (CP@clinic). Patients are able to seek frequent check-ins (weekly, biweekly or monthly) for risk assessment, disease prevention and health promotion focusing on diabetes, cardiovascular disease and falls risk. Sessions may include: • Conduct several evidence-based health assessments • Provide referrals to primary care and community resources • Assist participants in navigating the health care system • Provide referrals to primary care and community resources • Assist participants in having the disting deucation • Engage participants in healthy lifestly discussions • Set health goals with participants Different staffing models have been tested to evaluate cost-effectiveness: • 'Minimum care' refers to 2 paramedics staffing the CP@ clinic, made up of two modified duties paramedics • 'Moderate care' refers to 2 paramedics staffing CP@ clinic, made up of two CPs Staff placed on modified duties are those who are unable to do regular paramedic duties because of temporary physical/mental health conditions. Objective • Improve older adults' health and quality of life, and reduce their social isolation • Better connect older adults with primary care, and community resources • Beduce the economic burden of avoidable 911 calls by older adults
Patient cohort	Typically, low-income seniors aged 55 and above living in state subsidized housing.
Outcomes	CP@clinic has been demonstrated to: Reduce 911 Calls by 19-25% Improve quality of life Reduce chronic disease risk Empower participants
Challenges, opportunities and insights	Care closer to home This program model leverages public housing infrastructure and delivers the program directly in the vicinity of the patients who are most vulnerable and likely to use 911. This may be a cost effective way to engage with those that are most vulnerable and support them to better navigate the health system, right where and when they need it. Outcomes from modified duties paramedic staffing profile comparable to CP profile Results from this study suggests that it may be effective to use paramedics on modified duties to support community paramedics deliver CP programs, as it produced comparable outcomes and results to having a two-community paramedic team team. EMS services that are facing workforce shortages, may be able to supplement and scale CP programs utilising a mix of fully trained CPs and paramedics duties.

17: Agarwal et al. 2020, https://bmjopen.bmj.com/content/10/10/e037386; CP@Clinic 2023, https://cpatclinic.ca/ 18: Guo et al. 2017, https://www.ncbi.nlm.nih.gov/books/NBK549096/



Optimizing resource utilization

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Table of contents for optimizing resource utilization

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3.1 Summary of key themes

Europe, United States, Australia, New Zealand, Canada

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Key insights summary: Optimizing resource utilization

Taking advantage of the latest technologies to enable more intelligent and efficient decision-making can facilitate faster response times, and integrating non-emergency responses with alternative care pathways can help keep patients out of the ED and reduce the burden on emergency resources.



Boosting intelligence capabilities for ambulance services can have numerous and significant benefits including optimizing resource allocation, improving predictive analytics and modeling, real time hospital status, optimizing routing, and resource utilization, locations and status. This can enable ambulance services to strategically place resources closer to where there is most likely to be incidents, plan, allocate, deploy and route resources more efficiently, and thus reduce response times, improve resources utilization and improve awareness of real time statuses.

Leveraging business intelligence can

Australia, England, United States

resourcing

optimize system status management and

Secondary Triage can link patients with better care options for their need and focus emergency resources for critical responses

British Columbia, Australia, England

Secondary ambulance triage reduces inefficient use of ambulance and emergency services when another health care response may be more appropriate. It ensures that patients receive the right care in the right place at the right time. Secondary ambulance triage has the benefit of connecting non-emergency patients with care options that are more appropriate to their level of urgency. thereby not contributing to the consumption of emergency ambulance capacity. This can help reduce pressure ambulance services and EDs, and supports more optimal resource allocation for better patient outcomes.

Resources in the community can compliment existing services and alleviate pressure from emergency services

England, Australia, New Zealand

Many resources in the community can be leveraged to compliment emergency ambulance services. Solutions like GoodSAM can allow for sooner intervention utilizing Community First Responders, or in the instances of CT, preserve emergency ambulance capacity to respond to the most urgent and time sensitive calls. Both examples demonstrate the opportunity to involve the community to help support the health system.

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Key insights summary: Optimizing resource utilization (continued)

Taking advantage of the latest technologies to enable more intelligent and efficient decision-making can facilitate faster response times, and integrating non-emergency responses with alternative care pathways can help keep patients out of the ED and reduce the burden on emergency resources.



Public education initiatives help people to navigate the health system more effectively

Non-emergency requests represent a large portion of emergency calls received by emergency services. Improving public education of the alternative pathways available that they can access before escalating contact to emergency services has the benefit of safeguarding costly paramedic and ED attention for the most urgent care cases, and also optimising utilisation of non-emergency health services that may currently be underutilized due to lack of awareness.

Alternative care pathways to the **Emergency Department connects** people with more appropriate levels of care and saves capacity and time.

All

Building out a robust health sector with strong non-emergency care service options and infrastructure, both physical and virtual for alternative distribution from emergency service requests is imperative to establishing a sustainable EMS system as it allows non-emergency cases to access care without contacting ambulance services or EDs as their source of urgent primary care. Adjunct to this, equipping EMS resources including paramedics and triage staff with enabling pathways, protocols or authority to respond in ways other than ED conveyance that match patient to the appropriate care or intervention will help keep patients out of ED and save paramedics' time spent responding on events.

Virtual primary care pathways expands people's access to care options

Canada, Australia, United States

The provision of virtual clinical support for persons seeking advice in non-emergency health scenarios, is a cost-effective way to provide the community with convenient and low-cost access to medical care that would otherwise have reached out to higher-cost EMS response and triage. People are increasingly seeking guidance and information through digital channels. Establishing strong virtual solutions for consultations or triage, such as telehealth or call lines direct to nursing or other clinical teams, can increase people's access to accurate health advice and allow for specialised emergency services to be reserved for people who most need urgent and intensive care.



3.2 Levers to optimize EMS resources

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Resource capacity Call prioritization Resource response Resource planning and coordination



Optimizing resource utilization

Efficient allocation and appropriate use of both EMS and broader healthcare resources is key to optimized utilization

The primary objective of EMS agencies around the world is to coordinate the delivery of the right care, in the right place, at the right time. **Changes in community expectations and growing demand is impacting scarce emergency resource capacity and emergency response times.** Demand management and appropriate resource utilization is a key issue in this environment. It has been estimated that unnecessary emergency ambulance dispatch occurs in 11% to 52% of all emergency calls,¹⁴ contributing to unnecessary strain on emergency departments and utilization of emergency care resources on non-emergencies.

Historically, EMS agencies have had a strong focus on response times as a key performance indicator. As the demand on EMS services continue to grow, agencies have become more strategic in how they approach reducing response times, as they begin to look more and more at other parameters such as what they are responding to and the appropriateness of an emergency response.

This section of the jurisdictional scan explores the levers to optimize EMS resource utilization, comprising:

- 1. Resource capacity
- 2. Call prioritization
- 3. Resource response
- 4. Resource planning and coordination



22: Adu, 2023, https://www.theguardian.com/society/2023/aug/22/nearly-7000-ambulance-workers-in-england-left-in-past-year-figures-show 23: NHS, England, 2023, https://www.england.nhs.uk/long-read/accessible-nhs-long-term-workforce-plan/

24: Victorian Government, Australia, 2023, https://www.premier.vic.gov.au/new-dedicated-hub-upskill-paramedics-delivered 25: Vecellio *et al.*, 2012, https://www.mq.edu.au/__data/assets/pdf_file/0006/687021/Secondary-Ambulance-Triage-Literature-Review_final.pdf 31: Government of Nova Scotia, Canada, 2021, https://novascotia.ca/news/release/?id=20211007001



Resource capacity:

Resources such as ambulance vehicles and the ambulance workforce are limited, and is even more so in jurisdictions such as England, where some of its ambulance services see workforce vacancy rates as high as 17%²². As such, many jurisdictions such as England and Victoria, Australia have **committed significantly to expanding their paramedic workforce**. England is investing to uplift its workforce by up to 15,600 paramedics by 2031-32²³ and Victoria is working to establish a new training facility with the capacity to train around 1500 paramedics per year.²⁴ Nova Scotia have made similar investments in NEPT, expanding not only their NEPT workforce, but also their fleet and equipment.³¹



Optimizing resource utilization (continued)

Efficient allocation and appropriate use of both EMS and broader healthcare resources is key to optimized utilization



Call prioritization:

Prioritization and triage are key functions of an EMS service as they identify which calls require the service's most immediate response and which may not. For calls that have been identified to be lower acuity, they may be referred to **secondary ambulance triage which is designed to reduce inefficient use of ambulance and** emergency services when another health care response is more appropriate.

Jurisdictions such as England and several states in Australia have successfully implemented secondary ambulance triage. As a result, England has reported an estimated annual saving of £40-80 million and Victoria, Australia, having estimated a 9% reduction in demand for emergency ambulances in its metropolitan region.²⁵ Further evidence is required to support its benefits in terms of response time reductions. However, jurisdictions have reported financial cost savings and reduced demand in emergency calls.



Resource planning and coordination:

For resources to respond to emergencies in a timely and efficient manner, jurisdictions have employed various strategies and technologies to support them with their planning and coordination efforts. Many jurisdictions employ a concept called system status management (SSM) which uses historical and up-to-date call data to deploy ambulance fleets for optimal response times to areas with the greatest possibility of the next emergency event. This can be better enabled and enhanced by leveraging technologies that collect call data such as computer-aided dispatch (CAD) systems like Hexagon and Logis which most jurisdictions have, and integrating it with data analytics and simulation modeling platforms, such as Microsoft Azure and Omda Optima Predict and other relevant data sources such as traffic, and weather.

25: Vecellio et al., 2012, https://www.mq.edu.au/__data/assets/pdf_file/0006/687021/Secondary-Ambulance-Triage-Literature-Review_final.pdf 31: Government of Nova Scotia, Canada, 2021, https://novascotia.ca/news/release/?id=20211007001

 ^{22:} Adu, 2023, https://www.theguardian.com/society/2023/aug/22/nearly-7000-ambulance-workers-in-england-left-in-past-year-figures-show
 23: NHS, England, 2023, https://www.england.nhs.uk/long-read/accessible-nhs-long-term-workforce-plan/
 24: Victorian Government, Australia, 2023, https://www.premier.vic.gov.au/new-dedicated-hub-upskill-paramedics-delivered

Optimizing resource utilization (continued)

Efficient allocation and appropriate use of both EMS and broader healthcare resources is key to optimized utilization



Resource response:

As there are significant proportions of unnecessary emergency ambulance responses occurring around the world, it is important to identify the characteristics of patients driving ambulance demand to enable targeted demand management strategies that optimize emergency resource capacity.

Many jurisdictions have developed **diversion pathways for non-emergency care** to other, more appropriate options in the health system. For example, in Ireland, a dedicated service known as Intermediate Care Service was established to specifically provide NEPT, and in Australia alternative care services such as Virtual Emergency Department and Urgent Care Clinics were implemented to treat urgent but non-life-threatening conditions.

These services have been established to relieve demand and pressures on emergency ambulance and ED, and include implementing or leveraging approaches such as:

- Community paramedicine
- NEPT services
- · Virtual health services
- Urgent care centres
- Community participation

22: Adu, 2023, https://www.theguardian.com/society/2023/aug/22/nearly-7000-ambulance-workers-in-england-left-in-past-year-figures-show
23: NHS, England, 2023, https://www.england.nhs.uk/long-read/accessible-nhs-long-term-workforce-plan/
24: Victorian Government, Australia, 2023, https://www.premier.vic.gov.au/new-dedicated-hub-upskill-paramedics-delivered
25: Vecellio *et al.*, 2012, https://www.mq.edu.au/__data/assets/pdf_file/0006/687021/Secondary-Ambulance-Triage-Literature-Review_final.pdf
31: Government of Nova Scotia, Canada, 2021, https://novascotia.ca/news/release/?id=20211007001



Resource capacity

Jurisdictions have invested in increasing the workforce, expanding their fleets and reducing workplace injuries to improve their resource capacity



Funding more training, paramedics and ambulances

To meet the growing demand for emergency healthcare services, many jurisdictions such as England, Victoria Australia, and British Columbia Canada, are investing in the training and recruitment of more paramedics.

🔊 Jurisdictions: All

Funding and investments in paramedicine and emergency ambulance vehicles

England is investing to uplift its workforce by up to 15,600 paramedics by 2031-32²³, while British Columbia is providing funds to expand the primary care paramedic certification program which will train hundreds of students in advanced skills and techniques, and Victoria is building a Centre for Paramedicine at Victoria University, which will train around 1,500 paramedic students each year using advanced teaching methods and technology.²⁴

These initiatives are intended to improve the quality and availability of pre-hospital care, reduce the workload and stress of existing paramedics, and enhance the resource capacity and efficiency of the emergency health care system.



Fleet diversification to preserve capacity of emergency ambulance resources

Nova Scotia and NSW are investing in the expansion and diversification of their emergency ambulance resources to improve access to the most appropriate care and reduce pressure on emergency ambulance services.

New vehicle types to meet local needs

Nova Scotia is adding new non-clinical staff and vehicles including multi-patient transfer units and wheelchair patient transfer units which provide non-emergency and non-clinical transportation between health-care facilities. This is intended to preserve the utilization of emergency resources for when they are genuinely needed.

NSW is introducing 80 new 4WD ambulances, which can navigate through difficult terrain and complement the standard ambulances by retrieving patients and delivering them to a suitable transport method.³⁵ This initiative will improve the quality and availability of pre-hospital care, preserve the capacity of emergency ambulance resources, and help ensure they are using their resources more efficiently and effectively.



5: Fitch and Associates, Canada, 2019, https://novascotia.ca/dhw/publications/FITCH-EHS-Report-Redacted.pdf

- 23: NHS, England, 2023, https://www.england.nhs.uk/long-read/accessible-nhs-long-term-workforce-plan/
- 24: Victorian Government, Australia, 2023, https://www.premier.vic.gov.au/new-dedicated-hub-upskill-paramedics-delivered
- 31: Government of Nova Scotia, Canada, 2021, https://novascotia.ca/news/release/?id=20211007001
- 35: NSW Government, Australia, 2023, https://www.nsw.gov.au/media-releases/4wd-ambulances#:~:text=The%20NSW%20Government%20has%20rolled,Health%20Ryan%20Park%20announced%20today
- 37: VHBA, Australia, 2017, https://www.vhba.vic.gov.au/news/new-powered-stretchers-lower-paramedic-injuries

Call prioritization

Connecting patients to the right response, secondary triage better enables EMS to assess, prioritize and recommend appropriate care for non-emergency calls



Secondary triage

The number of 911 calls is increasing by 8% annually,³² and thus prioritizing calls and managing resources is crucial. The unnecessary deployment of scarce paramedic resources can be effectively limited through the implementation of secondary ambulance triage services such as those found in British Columbia, Australia, and England. Secondary ambulance triage is designed to reduce inefficient use of EMS and emergency services when another and more appropriate response is available, which may not include paramedic support or ambulance conveyance.

Jurisdictions: British Columbia, Australia, England, United States

British Columbia Emergency Health Services (BCEHS)

A study which looked at the outcomes of BCEHS's secondary triage service found that out of 5,937 8-1-1 callers who were secondary triaged and subsequently seen by virtual physicians, only 26% were advised to immediately go to the ED, with the remaining callers advised to seek less urgent care options.²⁸

In 2021, BCEHS reported that their secondary triage service assessed over 2000 patients, of which 46% were connected with care not requiring an ambulance response.

These outcomes demonstrate a significant diversion of calls from the EMS and EDs to more appropriate, less urgent forms of care.

A lack of visual and non-verbal cues has been recognised as a limitation of secondary triage, when making triage decisions. To address this, in 2022, BCEHS implemented the use of a virtual health solution, GoodSAM which facilitates on-scene video consultations between a patient and clinician in a dispatch centre. This enhances the accuracy and contextual information of the secondary triage team's assessment prior to emergency ambulance dispatch, helping ensure patients receive the care they require.

21: Tasmanian Government, Australia, 2021, https://www.premier.tas.gov.au/site_resources_2015/additional_releases/secondary_triage_better_care_for_patients

^{28:} University of British Columbia, Canada, https://www.med.ubc.ca/news/virtual-physician-calls-safely-reduce-in-person-visits-to-the-emergency-department/

^{32:} CBC, Canada, 2017, https://www.cbc.ca/news/canada/british-columbia/paramedics-911-calls-1.4059551

^{36:} Ambulance Victoria, Australia, 2023, https://www.ambulance.vic.gov.au/major-milestone-for-ambulance-victorias-secondary-triage/

Call prioritization (continued)

Connecting patients to the right response, secondary triage better enables EMS to assess, prioritize and recommend appropriate care for non-emergency calls



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Jurisdictions: British Columbia, Australia, England, United States

Ambulance Tasmania (AT)

Further building on AT's highly trained clinical assessment and triage staff, specially trained paramedics and nurses will provide secondary triage by taking incoming '000' calls and where appropriate, connecting patients immediately to alternative health services so that they receive the right care, in the right place, at the right time.

AT's secondary triage service has the potential to divert up to 16,000 patients to alternative service providers,²¹ and is intended to match patients to the most appropriate care, provide better support for paramedics, help emergency resources respond more efficiently to emergencies and avoid conveyance to ED when it is unnecessary.

Alternative pathways secondary triage may refer to include virtual care, urgent care centres, community paramedicine programs or other local healthcare providers such as pharmacists, general practice or allied health professionals.

The implementation of this service was supported by a community awareness campaign, including a series of television ads to provide community information about this important new feature of Ambulance Tasmania services.²¹

21: Tasmanian Government, Australia, 2021, https://www.premier.tas.gov.au/site_resources_2015/additional_releases/secondary_triage_better_care_for_patients
 28: University of British Columbia, Canada, https://www.med.ubc.ca/news/virtual-physician-calls-safely-reduce-in-person-visits-to-the-emergency-department/
 32: CBC, Canada, 2017, https://www.cbc.ca/news/canada/british-columbia/paramedics-911-calls-1.4059551
 36: Ambulance Victoria, Australia, 2023, https://www.ambulance.vic.gov.au/major-milestone-for-ambulance-victorias-secondary-triage/

Ambulance Victoria (AV)

AV is home to the largest secondary triage service in any ambulance service in the world. It is made up of more than 270 registered nurses and paramedics, who are highly trained to triage and determine the most appropriate healthcare for patients.³⁶

AV report that one in five calls to '000' do not need an emergency ambulance response, and their specialist trained secondary triage clinicians safely avoid sending emergency ambulance to around 20% of '000' calls. As a result, this is freeing up more ambulance crews to respond to genuine emergencies, faster³⁶.

This service connects patients to alternative pathways including non-emergency patient transport, virtual care and telehealth services, urgent care centres, respiratory clinics and other healthcare providers such as general practice and pharmacies.

Resource planning and coordination

Uplifts in technology have enabled jurisdictions to have more integrated data to make more informed and efficient decisions and actions



Integrated data to enable more powerful insights

It is no longer reasonable to expect services to manually analyse and estimate where, and when, to allocate emergency resource, especially when organisations are understaffed, data sets are larger and more complex than ever before, require integration between multiple sources, and information is changing in real time. The use of data integration and machine analysis is imperative for high-performing EMS' of the future.

S Jurisdictions: Australia

Data management platform

Ambulance Victoria (AU) has employed the use of Microsoft Azure to provide a platform to access data from multiple solutions and sources across its different environments. The platform will harness insights from broad data sets and grant the service access to information in real-time including hospital, ambulance and resource statuses and weather, traffic and routing information.

Access to various rich sources of data combined with analytics solutions will enable the service to tap into powerful information such as nearest appropriate hospital and best routes to take, taking into consideration hospital statuses, weather and traffic to ultimately provide patients with care faster.

It also aims to be the foundation to support machine learning, data mining, AI, and contextual models for richer data insights that Ambulance Victoria can leverage to improve its services and performances.

26: Logis Solutions, United States, https://logissolutions.net/case-studies/logis-ids-improving-response-times-buchanan-county-ems/ 27: EMS1, United States, 2010, https://www.ems1.com/ems-products/computer-aided-dispatch-cad/press-releases/florida-ems-uses-optima-software-to-do-more-with-limited-resources-avoiding-more-than-750000-in-unnecessary-costs-lvfWcNEH21cr7HXW/

Resource planning and coordination (continued)

Uplifts in technology have enabled jurisdictions to have more integrated data to make more informed and efficient decisions and actions



Predictive analytics

The accurate prediction of ambulance demand provides valuable insights to EMS providers. Such insights support the rational and dynamic allocation and deployment of ambulance staffing and resources, and ensures patients have timely access to such emergency care.

🔊 Jurisdictions: Canada, Australia, United States

Predictive modelling

Predictive analytics is enabled through solutions such as Optima Software (since rebranded as Omda Optima), which when implemented by a Florida County (US), allowed the County to run complex complex and comprehensive simulations to make service location and emergency dispatch decisions for the community's growing health needs.

Taking into consideration information including crew shift patterns, fleet mix, base and hospital locations and other variables such as major community and social events, road closures and weather conditions, the solution simulates and predict changes in call volume to help place the right resources in the right area at the right time, thus improving deployment efficiency and medical care.²⁷

The improvements in deployment reduced EMS call response time by more than 2.2%, even though call volume increased by more than 5%.²⁷



Automation

There are various software solutions and technologies that processes data and supports EMS dispatchers to plan resources and dispatch responses more efficiently and in turn help to facilitate a more rapid response to calls. Some systems take it a step further and are able to facilitate the automation of scheduling and dispatching logic.

S Jurisdictions: United States, Australia, New Brunswick

Dispatch decision support solution

One of which is Logis Intelligent Decision Support (IDS) Computer Aided Dispatch (CAD) software system, which has been implemented in various jurisdictions including New South Wales (AU), Buchanan (US) and New Brunswick (CA).

The Buchanan County EMS (US) saw improvements in emergency response times when they implemented the cloud-based solution that integrated data to automatically schedule, communicate tasks, and dynamically update emergency transport plans. The solution provides real time tracking of vehicle locations and status' had the added benefit of streamlining dispatch decisions for better resource allocation.²⁶



26: Logis Solutions, United States, https://logissolutions.net/case-studies/logis-ids-improving-response-times-buchanan-county-ems/

27: EMS1, United States, 2010, https://www.ems1.com/ems-products/computer-aided-dispatch-cad/press-releases/florida-ems-uses-optima-software-to-do-more-with-limited-resources-avoiding-more-than-750000-in-unnecessary-costs-lvfWcNEH21cr7HXW/

Resource response

Jurisdictions have developed or leveraged pathways to divert patients to more appropriate non-emergency services or care



Paramedics respond by providing out of hospital care and proactively keep frequent flyers out of the ED

Paramedics equipped with a greater range of responses and alternative pathways to care beyond the ED have more options to manage a patient and more opportunities to distribute emergency care demand to other health services without the need to convey to ED.

🔊 Jurisdictions: British Columbia

Assess, See, Treat and Refer pathway

Paramedics in **BC follow an approach, called Assess, See, Treat and Refer.** Following this approach, paramedics are able to manage some patients on-scene and in the community without having to convey patients to ED and where appropriate, enables paramedics to convey patients needing urgent but not emergency care to locations including urgent and primary care centres, mental health urgent response centres and sobering centres.

This approach has avoided unnecessary hospital visits, reduced ED congestion, and reduced time on events for paramedics by an average of 25 minutes, thereby freeing up ambulance resources for other patients.³³



Community paramedicine programs

Advanced practices in community paramedicine have been implemented globally, utilizing highly trained, specialized paramedics to deliver CP programs. Many programs perform primary care support functions targeting post-ED-discharge patients to minimize their likelihood for readmission, and other programs provide a means for paramedics to perform or facilitate interventions outside of the hospital to mitigate the need for care at the ED, thus improving ED avoidance, diverting calls from emergency ambulance resources.

Refer to section 1.2 of the jurisdictional scan for a more thorough analysis.

33: BCEHS, Canada, 2021, http://www.bcehs.ca/about-site/Documents/bcehs_progress_report_2021_web.pdf

20: Tasmanian Government, Australia, 2022, https://www.premier.tas.gov.au/site_resources_2015/additional_releases/strong-investment-in-ambulance-tasmania-means-less-tasmanians-requiring-hospital-trips

Resource response (continued)

Jurisdictions have developed or leveraged pathways to divert patients to more appropriate non-emergency services or care

Virtual care offers access to more immediate medical and emergency care without the need for conveyance, and reduces the demand on ED and EMS services

Health systems with virtual pathways are able to provide more immediate care without the need for transportation. Virtual solutions can better support EMS agencies by diverting calls that can be managed and resolved by a virtual care team or by supporting frontline EMS staff with more specialized clinical expertise, thereby helping to improve ED avoidance, response times, and freeing up emergency resources.

Jurisdictions: Canada, Australia, United States

Virtual Urgent Care Centres

Telemedicine and other virtual care solutions have bolstered the capacity and ability of health systems and ambulance services to respond more appropriately to both emergency and non-emergency calls.

Virtual services in Australia, such as the Victorian Virtual Emergency Department (VVED) provide an alternative pathways for non-emergency calls to be referred to emergency or primary care clinicians for telehealth video consultation, connecting calls to more appropriate and non-emergency care. Patients are also able to access VVED services without triage referral.

Similar solutions in the US such as Mass General Brigham's Virtual Urgent Care service, and also in Ontario have enabled non-emergency calls to receive the help they need without a

Jurisdictions: Australia, UK

Virtual emergency physicians

In Australia and UK, other innovative solutions like 'My Emergency Doctor' (MED) have connected paramedics with emergency physicians via telemedicine services for in-situ response management to improve patient health outcomes and ease pressures on stretched paramedic staff and EDs.

The service also provides privately billed, direct to consumer, on-demand virtual emergency medical care, as an alternative means to the ED. The service may include the provision of direct clinical consultations, medical advice, prescriptions and emergency escalations if needed.

In Tasmania, Australia MED has reported an hospital avoidance rate of 83% for patients that it provided telemedicine care to.²⁰

In-field telemedicine by emergency physicians may also provides on-scene support to call-takers or paramedics with more specialized expertise when they most need it. Doing so can help provide greater certainty on the most appropriate course of action, and can help maintain EMS capacity for the most critical patients and ensure that patients are provided the right care.



33: BCEHS, Canada, 2021, http://www.bcehs.ca/about-site/Documents/bcehs_progress_report_2021_web.pdf

paramedic or emergency department (ED) visit.

20: Tasmanian Government, Australia, 2022, https://www.premier.tas.gov.au/site_resources_2015/additional_releases/strong-investment-in-ambulance-tasmania-means-less-tasmanians-requiring-hospital-trips

Resource response (continued)

Jurisdictions have developed or leveraged pathways to divert patients to more appropriate non-emergency services or care



Urgent care centres to increase access to primary healthcare and reduce pressure on EDs

Health systems with urgent non-emergency health services for patients to seek primary healthcare at provide an alternative option to the ED. This essentially provides a during and after-hours GP service intended to help relieve the demand on EDs.



Urgent Care Centres

Urgent Care Centres (UCC) provide urgent, non-life threatening care to the community at extended operating hours. This type of service provides jurisdictions with a offering that can treat lower acuity cases, that may otherwise contribute to ED and emergency ambulance demand, and preserve emergency resource and service capacity for those in critical, life-threatening situations.

In Australia, the federal government committed over AUD \$350 million to fund a national roll out of 58 UCCs around the country to help ease the burden on EDs. In British Columbia, paramedics are able to convey patients needing urgent but not emergency health care to alternate locations such as urgent and primary care centres, mental health urgent response centres and sobering centres.

More education and community awareness about the purpose and intent of these services may be required in effort to educate the community when it would be appropriate to seek emergency care. Jurisdictions like England and Australia provide UCC as a free service to patients, which removes barriers and encourages equitable access.

Resource response (continued)

Jurisdictions have developed or leveraged pathways to divert patients to more appropriate non-emergency services or care



Effectively harnessing capabilities in the community can complement and enable better outcomes for the use of stretched and highly specialised paramedic resources in emergency situations

Jurisdictions: England, Australia, New Zealand

Community transportation

NEPT demands varying degrees of ambulance resources around the world with community transportation (CT) playing a role in relieving some of the pressures from patient transportation. CT solutions are observed in all jurisdictions explored. However, the level of impact of these community programs vary depending on health service integration and awareness of such CT programs, available government funding and grants, transportation coordination efforts, and public awareness campaigns.

In Australia, the state of Victoria has contracted a not-for-profit provider to deliver 60,000 medical-related, non-clinical transports per year⁸ to support patient flow, discharges and relieve potential transportation pressures away from ambulance services and hospitals.

England have recognised the need to make a more concerted effort to engage with the community and promote CT programs by way of funding, building awareness and volunteering, and making greater efforts to coordinate and broker NEPT demand to CT programs.

S Jurisdictions: Australia, England

Bystander response

Other ways to engage community health resources and creatively connect them with emergency situations in order to relieve pressure from paramedic response times, has been seen in several Australian States and their use of the free smartphone GoodSAM app.

GoodSAM can integrate with CAD systems to facilitate a Community First Responders dispatch system and notify nearby responders to act when someone is in cardiac arrest. This allows trained persons in the area to act while an ambulance is on its way. In England, the odds ratio of survival to hospital discharge was found to be 3 times greater with a GoodSAM response.^{19, 20}

29: GoodSAM, Australia, https://www.goodsamapp.org/evidence 30: Smith *et al.*, 2021, https://cache.goodsamapp.org/assets/pdf/CardiacArrestPaper.pdf



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