
Subject: EMS Response Time Performance Plan

Report to: Public Health & Social Services Committee

Report date: Tuesday, March 19, 2019

Recommendations

1. That Council **APPROVE** the Response Time Performance Plan (RTPP) changes outlined in this document.

Key Facts

- The purpose of this report is to describe recommended changes to the EMS Response Time Performance Plan (RTPP).
- The revised RTPP is supported by the implementation of a new Clinical Response Plan (CRP) as well as the integration of the Emergency Communications Nurse System (ECNS).
- From 2007 to 2016 Niagara was the municipality with the largest growth in EMS calls in Ontario, at 55.6% almost double the Provincial growth of 30%.
- Increased call volume growth has resulted in Niagara EMS being challenged in its ability to provide sustainable response time reliability for Niagara.
- This will continue without a system-wide change to the delivery of services or a large infusion of resources. Council has directed a new approach rather than continuously adding resources.
- Over a year-long process, EMS has studied current 911 calls, studied the science and evidence around which calls need a response at what speed, identified alternate care pathways for persons not needing immediate response, and developed a Clinical Response Plan in alignment with this science and evidence.
- A revised Response Time Performance Plan is proposed that would incorporate this Clinical Response Plan, both delivering more tailored health care to 911 callers, while also relieving financial sustainability pressures on land ambulances.

Financial Considerations

The service and call response changes outlined in this report can be fully implemented within the approved 2019 levy operating budget. Economic evaluation will help guide staff in a sustainability plan for this work, which will form part of our 2020 budget submission. The System Transformation Project, which includes the revised RTPP, is to facilitate a more clinically focused and cost-effective mobile integrated health system to improve patient access to appropriate health resources and lessen future burden on the levy.

Analysis

As discussed in PHD 17-2017, Niagara EMS call volume increases since 2011 have significantly deviated from historical trends, and have exceeded both staff and previous consultant predictions (Figure 1). In fact, from 2007 to 2016 Niagara was the municipality with the largest growth in EMS calls in Ontario, at 55.6% almost double the Provincial growth of 30% (MOHLTC 2018). In 2016, at Council's direction, consulting firm Pomax provided an updated forecast on call volume expectations for the next 10 years; the projection, based on previous years' growth, can be seen in figure 1.

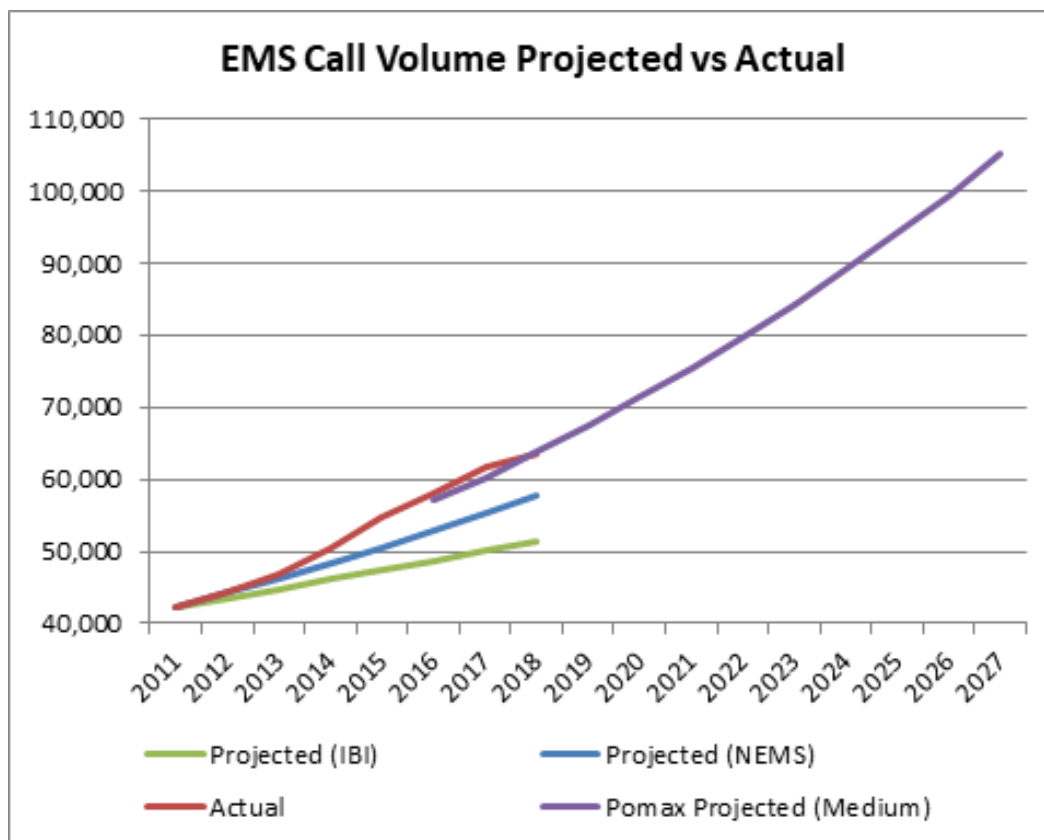


Figure 1 Call volume growth projections since 2011, comparing actual vs. NEMS vs consultant (IBI) predictions. Increase of 21,024 calls/year since 2011 represents a 49.7% increase in call volume. Resource increase during the same period was 25%.

It is apparent that conventional approaches to the delivery of unscheduled health care must be challenged to provide sustainable approaches to quality patient care. In its current state, based on Pomax's recommended ratios of ambulance resources and call volume, the system is short two ambulances and one supervisor (PHD 05-2017). This does not include other factors such as offload delays and is based on call volume growth only. Previous Councils have challenged staff with the direction not simply to follow traditional EMS service models but actively to look for innovative ways to deliver

mobile health services that are not only more efficient but also better meet the needs of patients.

In PHD 17-2017, staff outlined a number of measures that had been implemented, and introduced several more that were to be completed as part of an EMS System Transformation. Many of those measures, which are described in more detail in Appendix 4, have since been implemented.

While data analysis (including an economic evaluation conducted with the Centre for Healthcare Economics and Policy Analysis at McMaster University) of the impact of these changes is ongoing, it should be noted that 2018 call growth was just 2.5%, well below the 6.6% yearly average from 2011-2017. The impact on the 'curve' can be seen in figures one and two. This is the first sign that the efforts undertaken within the System Transformation Project may finally 'bend the curve' of significant EMS volume growth while benefitting patients with care more targeted to their true needs at the same time.

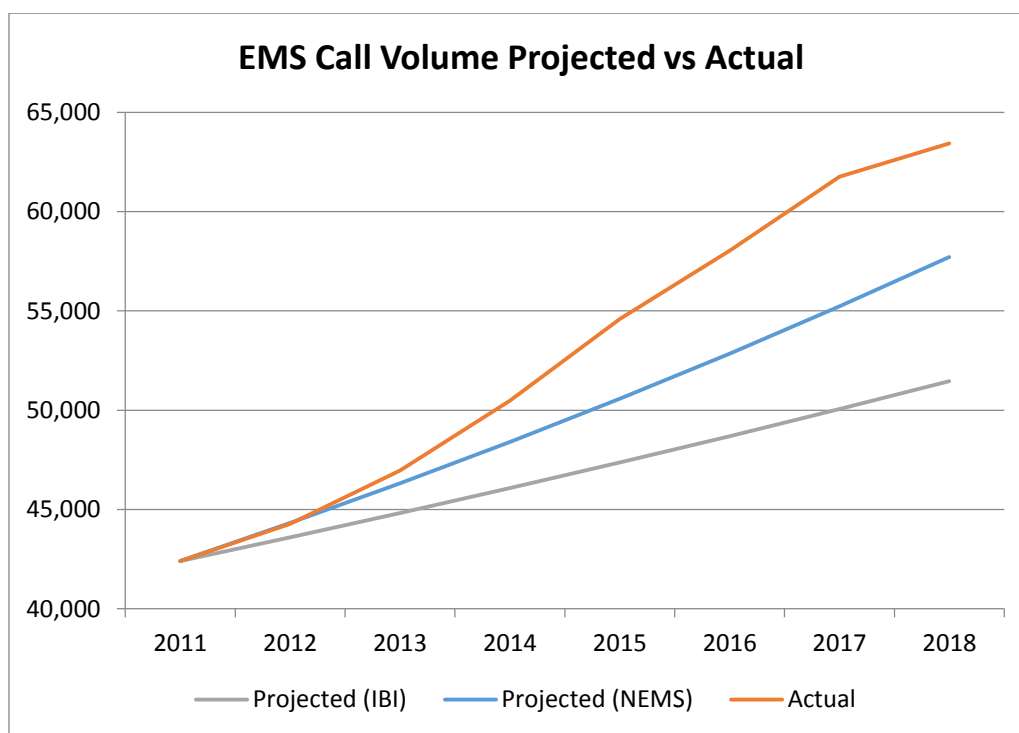


Figure 2, call volume projections vs actual 2011-2018

However, while call growth was reduced last year, it was not yet brought into line with economic and population growth which would be the true measure of sustainability. Therefore, a primary change in the Response Time Performance Plan is recommended to further enhance sustainability and safety by the efficient use of resources that better meets the needs of patients.

Response Time Performance Plan

The *Ambulance Act* Ontario Regulation 257/00 states under Section 23:

(2) No later than October 1 in each year after 2011, every upper-tier municipality and every delivery agent responsible under the Act for ensuring the proper provision of land ambulance services shall establish, for land ambulance service operators selected by the upper-tier municipality or delivery agent in accordance with the Act, a performance plan for the next calendar year respecting response times. O. Reg. 267/08, s. 1 (2); O. Reg. 368/10, s. 1 (1).

(3) An upper-tier municipality or delivery agent to which subsection (2) applies shall ensure that the plan established under that subsection sets response time targets for responses to notices respecting patients categorized as Canadian Triage Acuity Scale (“CTAS”) 1, 2, 3, 4 and 5, and that such targets are set for each land ambulance service operator selected by the upper-tier municipality or delivery agent in accordance with the Act. O. Reg. 267/08, s. 1 (2).

(4) An upper-tier municipality or delivery agent to which subsection (2) applies shall ensure that throughout the year the plan established under that subsection is continuously maintained, enforced and evaluated and, where necessary, updated, whether in whole or in part. O. Reg. 267/08, s. 1 (2).

Pursuant to this, Niagara Region is responsible to establish and maintain these performance targets in a manner that best meets the needs of the community. The current targets were developed in 2011 using the actual performance at that time as the benchmark, with an intent to maintain that base level of service into the future. In the following years, call volume escalated at unpredicted rates resulting in a deficit of necessary resources to maintain this performance. The result has been an inability for the Service to meet the performance targets (Table 1) despite the continuous addition of resources in an attempt to keep pace with volume demands.

	2018 Year	2017 Year	2016 Year	2015 Year		
CTAS Return	% Compliance	% Compliance	% Compliance	% Compliance	Target Time	% of Target
1 CTAS Level 1	76.23%	76.92%	75.37%	77.15%	8:00	80
2 CTAS Level 2	81.75%	82.48%	83.58%	84.73%	11:00	90
3 CTAS Level 3	82.70%	85.41%	88.77%	89.91%	15:00	90
4 CTAS Level 4	89.38%	91.93%	95.34%	94.77%	20:00	90
5 CTAS Level 5	98.80%	98.98%	99.29%	99.59%	30:00	90
1 (SCA)	59.25%	60.64%	52.16%	57.72%	6:00	55

Table 1 Response Time Performance Plan and Results, 2015-2018. The results demonstrate an undesirable inversion whereby targets are met for low priority non-emergent calls but not met for time critical emergent calls.

According to the CTAS scale, level 1 are the most acute patients and they become progressively less acute until level 5. As seen in Table 1, response time reliability for the most critical patients is not being met. In fact, the outcome performance of the current system is inverted in that the system overachieves in meeting the response time targets for low acuity patients. To flip this around, increased capacity may be found in finding alternate response options for the lower acuity patients thereby increasing resource availability and response time reliability for the most serious patients.

Niagara EMS staff have therefore reviewed response times in association with a clinical response plan which provides a more efficient and effective model that better matches responses to identified patient need based on clinical evidence. The following changes are being recommended accordingly.

Response Time Reliability

Currently, Niagara EMS responds to approximately 41% of all 911 incidents with lights and siren, as potential 'time-critical' responses. Lights & siren responses could be significantly reduced by a more evidence-based response that limits lights and siren/time critical responses to those call types where clinical science shows that outcomes depend on speed of response. This would preserve resources for true life threatening/time sensitive emergencies. Some modelling in European EMS systems suggests that the true need for lights & sirens response, based on medical literature studying the impact of time on patient outcomes, may be as low as 10% of responses. This change in response urgency could impact up to 20,000 calls (up to 30% of EMS call volume based on 2018 figures), that are currently classified as time-critical, allowing greater flexibility of resources to ensure adequate resources to address those calls identified as time dependant. British Columbia Emergency Health Services has also recently moved to a clinical response plan in 2018.

Clinical Response Plan (CRP)

Over the course of 2018, Niagara EMS, working under the guidance of our Medical Director, has completed significant work with internal staff, local medical experts representing a number of specialties, and university researchers to develop changes to the Niagara EMS response plan based on evidence of outcomes linked to timeliness of response. Academic assistance was especially helpful with conducting reviews of current medical literature as well as the completion and analysis of a public consultation survey over the summer/fall months. This survey validated that the public is receptive to a system that will better meet their needs through a variety of healthcare pathways. The result of this work is a response plan that is focused on time where time is critically important, and is focused on appropriate patient-centred resources and carefully targeted patient care where this is more important than time. The resultant proposed plan is found in Appendix 1.

The CTAS scale discussed earlier is used by emergency departments to evaluate a patient's acuity level and direct timely care. Paramedics also assign CTAS scores to their patients. While time is de-emphasized in the lower CTAS levels, the time parameters noted in the RTPP have been developed with the CTAS methodologies concerning acuity and time-to-treatment in mind. The intent, as always, is to service all calls as quickly as feasible, while managing system resource availability and surge capacity. To this point, the conventional definition of "response time" is modified within the CRP. A "response" is not always measured by the time in which an ambulance arrives at a scene, but rather the point in time in which the most appropriate healthcare pathway is initiated. In some cases, that might not result in an ambulance responding if an ambulance is not the most appropriate means of providing care.

Correspondingly, as part of this model, quality of service delivery will be measured based on impact on patient outcomes, rather than time to respond. Where medical evidence deems time to be critical, as in cardiac arrest, choking, and other time-based emergencies, response time and time to definitive care will be primary measures. Where other factors, such as the type of care provided, the assignment of the correct care resource, or arrival at the appropriate care destination are more important, these will form the basis of system performance measurement. These measures will now be clinically focused, rather than operationally focused. In this way, outcomes rather than processes will drive the clinical focus of this response model.

Additional Mitigation Strategies Pending

As a complement to the System Transformation Project, the following additional measures are currently in development for implementation:

Emergency Communication Nurse System (ECNS)

The Omega Study was undertaken by Niagara EMS (2011-2016) to explore the safety and efficacy of implementing an Emergency Communication Nurse (ECN) within the Niagara Ambulance Communications Centre (dispatch) to conduct secondary triage for select low acuity 911 calls. These are patients calling 911 for non-emergent unscheduled health care needs. Utilizing an internationally recognized and validated algorithm to further triage these patients, the objective of the study was to identify those callers whose health needs may be met by providing advice on the 911 call or recommending alternate, more appropriate medical care thereby eliminating the need for an ambulance response. The study identified specific call/patient types that could be managed without undue risk using means other than an ambulance response. Successful implementation of ECNS is part of the comprehensive Clinical Response Plan and is complemented with the integration of the new Mobile Integrated Health (MIH) teams to realize full benefit. Target date for implementation is June 3, 2019.

Tiered Response

The adoption of the Clinical Response Plan will modify the tiered response of allied agencies, primarily the municipal fire services. Resource allocation to medical responses will be based on clinical requirements of the patient and the clinical intervention to be provided by the responding agency. Currently Niagara EMS tiers fire services within four classifications. These classifications are designed for each of the 12 local fire services to determine which category best reflects their level of service (i.e. full-time versus volunteer-based). Fire services combined respond alongside EMS to approximately 25% of all EMS calls.

While these response classifications are not expected to change at this time, the number of calls that meet a tier criteria will likely be reduced. This will reduce burden on local area municipalities by reducing the frequency of fire services being sent on medical calls. This will also provide increased capacity for other fire type responses or other priorities as determined by local area municipalities.

Police Calls Response Strategy

EMS responded to 5006 incidents in 2018 that originated with police. This represents 8% of EMS incidents for the year. There was no EMS transport in 76% of these calls; many resulted in “no patient found” or patient refusal situations. Many of these calls are dispatched on a higher priority level than the medical triage system typically would assign, based on the difficulty of getting information to accurately triage these calls. For those that were transported by EMS, only 5.7% were consider high acuity (CTAS 1 or 2). Given the very low transport rates and the low acuity of the vast majority of those transported, eliminating this policy and responding as per standard Medical Priority Dispatch System (MPDS) triaging would positively affect the EMS system by allowing greater flexibility for resource utilization without artificially inflating priority of response. This process would also better identify those high acuity patients.

Alternatives Reviewed

One alternative to the proposed ongoing transformation is to remain “status quo” with no further investment in EMS resources. In this scenario, response times for all patients, critical or not, would continue to rise as call volumes rise and the incidence of episodic ambulance shortages (code orange, code red) would increase. This is not recommended, as it would lead to worsening outcomes for patients and increasing risk of litigation.

Another alternative is to continue with traditional land ambulance operations, but to add the resources at the rate prescribed by Pomax in their 2017 review (Appendix 4 and PHD 05-2017). In this model, in keeping with the ‘medium growth’ scenario, an

additional two ambulances, and one supervisor (23 FTE) are required immediately, with another 10.8 FTE for 2020 and 13.6 FTE for 2021. This investment would be utilized within a very traditional “call and transport” EMS model (i.e. ambulances dispatched to all calls within arbitrary time parameters rather than acuity of need of patients) and frequent resource pressures without any demonstrable benefit to patient outcomes. This option is not recommended given it would put unnecessary burden on the levy budget, and it is also not consistent with past direction by Regional Council.

Relationship to Council Strategic Priorities

The changes to the EMS system outlined in this report will improve patient care by more appropriately rationalizing limited EMS resources while also better integrating EMS within the broader healthcare spectrum. This will improve patient care by providing the care appropriate to the circumstance in an appropriate amount of time, and improving the availability of resources to respond to emergencies when time has a critical impact on patient outcome.

Other Pertinent Reports

PHD 17- 2014 - EMS System Performance Sustainability
PHD 17- 2015 - EMS System Performance Sustainability
PHD 05- 2016 - Niagara EMS Master Plan
PHD 08- 2016 - Master Plan Award of RFP
PHD 19- 2016 - Niagara EMS Mobile Integrated Health Community Paramedic Update
PHD 21- 2016 - 2016 Update to EMS System Performance Sustainability
PHD 05-2017 - Niagara Emergency Medical Services (NEMS) Pomax Master Plan Review
PHD 17-2017 - Niagara Emergency Medical Services System Design Changes
PHD 19-2017 - NEMS Resource Investment

Ministry of Health and Long-Term Care (2018). *Ontario's Emergency Health Services: Sector Overview*. Health Analytics Branch, Health System Information Management Division.

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Appendices

- Appendix 1 Clinical Response Plan
- Appendix 2 Response Time Performance Plan (Current and Proposed)
- Appendix 3 Pomax Resource Table
- Appendix 4 Mitigating Strategies Implemented in 2018

Appendix 1: Proposed Clinical Response Plan

Priority	Time Dependency	Determinant Level Typically Includes*	Resource/Response Plan Could Include*	Alternative Response Options*
1	Critical Immediate Lights/Sirens	Echo, Delta	PCP Transport Unit MIH Teams Allied Agencies Citizen Response	ACP Transport Unit
2	Emergent Lights/Sirens-- discretionary	Delta, Charlie	ACP Transport Unit	PCP Transport Unit
3	Urgent No Lights/Sirens	Charlie, Bravo	PCP Transport Unit MIH Unit	ACP Transport Unit MIH Unit
4	Less Urgent No Lights/Sirens	Bravo, Alpha	MIH Unit	PCP Transport Unit
5	Non Urgent No Lights/Sirens	Bravo, Alpha, Omega	Clinical Advisor MIH Unit	PCP Transport Unit
* While this provides a guideline, response priority could vary by individual determinant, assessment of skills demand and previous outcome data				

Appendix 2: Response Time Performance Plan (Current and Proposed)

Current Land Ambulance (does not include dispatch time):

CTAS	Target time*	% of target**
Sudden Cardiac Arrest	6	55
1	8	80
2	11	90
3	15	90
4	20	90
5	30	90

*Target time: the amount of time (minutes) from paramedic notification (T2) until on scene (T4)

** % of target: percentage of time the target time will be achieved

Current Dispatch:

Patient Acuity Level	Response Time (T0 - T2) in seconds	Targeted % of the Time
SCA	120	90
CTAS 1	120	90
CTAS 2	120	75

Proposed Land Ambulance (CTAS 3, 4 and 5 inclusive of dispatch time):

CTAS	Target time*	% of target**
Sudden Cardiac Arrest	6	55
1	8	80
2	15	90
3	30	90
4	60	90
5	120	90

*Target time: the amount of time (minutes) from paramedic notification (T2) until on scene (T4) or alternate decision point for care

** % of target: percentage of time the target time will be achieved

Proposed Dispatch:

Patient Acuity Level	Response Time (T0 - T2) in seconds	Targeted % of the Time
SCA	120	90
CTAS 1	120	90
CTAS 2	120	75

Appendix 3: POMAX Ambulance and Paramedic Requirement Model

Table 33: Ambulance and Paramedic Requirement Models - 10-year Time Frame

Paramedic Enhancements Levels	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Totals
Low Growth Model 3.6% - Ambulances	2		1			1		1		1		1	7
Paramedic FTE	21.6		10.8			10.8		10.8		10.8		10.8	75.6
Supervisors		1.4		1.4		1.4			1.4		1.4		7
Emergency Response Units		1		1		1			1		1		5
Medium Growth Model 5.7% - Ambulances	2		1		1	1		2	1	1	1	1	11
Paramedic FTE	21.6		10.8		10.8	10.8		21.6	10.8	10.8	10.8	10.8	118.8
Supervisors		1.4		1.4		2.8		1.4	1.4		1.4		9.8
Emergency Response Units		1		1		2		1	1		2		8
High Growth Model 8.5% - Ambulances	2	1	1	1	1	1	2	2	1	2	2	2	18
Paramedic FTE	21.6	10.8	10.8	10.8	10.8	10.8	21.6	21.6	10.8	21.6	21.6	21.6	194.4
Supervisors		1.4		1.4		1.4		2.8		2.8		2.8	12.6
Emergency Response Units		1		1		1		2		2		2	9
Patient Based Model Ambulances	2					1					1		4
Paramedic FTE	21.6					10.8					10.8		43.2
Supervisors		1.4					1.4				1.4		4.2
Emergency Response Units		1					1				1		3

Appendix 4: Mitigation Strategies Implemented in 2018

- 911 'Unknown' Calls—EMS reduced call volume by approximately 2.4% (1540 calls) in 2018 by eliminating responses to 911 'unknown' calls. These are calls where there is no voice contact with a caller, and often turn out to be inadvertent calls, phone line issues, or police-related matters. EMS now responds only if a need is validated by the police, or if a patient is confirmed at the scene (i.e. by Fire or call back). It should be noted that some local fire services have chosen a similar approach to "unknown" calls.
- Mental Health Calls—Approximately 6-7% of EMS call volume consists of calls where the primary problem is mental illness- or addictions-related. In July of 2018, and with the assistance of partner agencies, Niagara EMS launched the Mental Health and Addictions Response Team (MHART). This team consists of a Paramedic with additional training deployed with a mental health nurse, in a non-ambulance response vehicle. MHART responds to low acuity mental health calls as well as providing follow up after EMS overdose responses where the patient refuses transport after treatment. This program has been very successful, responding to 207 calls for mental health in the latter months of 2018. Niagara EMS has seen a 5% reduction overall of mental health transports to hospital emergency departments despite a 7% increase in mental health calls coming into our communication center in 2018. Analysis is ongoing to determine the influence of this team on this reduction.
- Falls/Lift Assists—in 2018, EMS responded to 7,790 calls to 911 for falls (12% of EMS call volume). Many of these calls were for 'lift assists' (where the patient identifies no injuries but wishes EMS to lift patient from floor) or from repeat callers. Since July of 2018, Niagara EMS launched the Falls Intervention Team (FIT). A Paramedic and an Occupational Therapist deploy together in a non-ambulance response vehicle. The FIT team has responded to 111 calls for falls in the latter half of 2018. In between the actual 911 calls for falls, this team proactively goes out to visit frequent fallers to provide assessment and support to prevent a future falls. For 2018, there was no increase in calls for falls over previous year, and a 2% decrease in transports to ED. The 0% increase in falls is unusual (the previous year we saw an increase of 9% in incidents) and may be related to proactively engaging with our frequent fallers and connecting them to additional supports. Analysis to determine the influence of this team on repeat falls is ongoing.

Additionally, this team is working with long-term care facilities to find innovative ways to decrease the reliance on EMS for assistance with patients who have fallen in a long-term care home environment where there is no identified need for medical intervention.

- 'Low Acuity'/Unscheduled Non-emergency Calls—in 2018, EMS responded to 5,246 low priority calls for 'general illness' (8% of EMS call volume). In July of 2018, Niagara EMS launched the Community Assessment and Referral Team (CARE Team). These are Paramedics with additional skills work alone in a non-ambulance response vehicle, responding to low acuity/low priority 'sick' type calls. This Paramedic is occasionally accompanied by a discharge planner, and has access to a 'fast track' resource coordinator within the Local Health Integration Network (LHIN). The teams have collectively responded to 741 calls to 911. These non-acute calls held steady for 2018; however, there was an overall decrease in transports to ED of 6% for this cohort. This team provides these patients connections to community resources. A more in-depth analysis is underway to determine the impact of this team on repeat callers.