

# Land Ambulance Services

## Background

### RESPONSIBILITIES

The provision of land ambulance services in Ontario is governed by the *Ambulance Act* (Act). Under the Act, the Minister of Health and Long-Term Care must ensure “the existence throughout Ontario of a balanced and integrated system of ambulance services and communication services used in dispatching ambulances.” The Act further states that every municipality will “be responsible for ensuring the proper provision of land ambulance services in the municipality in accordance with the needs of persons in the municipality.” Accordingly, 42 municipalities and eight other designated delivery agents, primarily in remote areas (collectively referred to in this report as municipalities) are responsible for providing land ambulance services in Ontario. Most municipalities provide the services directly, although about 15% have chosen to contract with a third-party provider. Two types of paramedics generally provide land ambulance services—primary care paramedics (who perform basic and some advanced life support procedures) and advanced care paramedics (who perform basic and all advanced life support procedures). In total, municipalities have about

830 ambulances and an additional 300 emergency response vehicles (which have a paramedic but cannot transport patients).

The Ministry of Health and Long-Term Care (Ministry) oversees ambulance services based on requirements set out in the Act. The Ministry’s responsibilities include setting patient-care and ambulance equipment standards, monitoring and ensuring compliance with those standards, and, through service reviews, certifying ambulance service providers to operate in Ontario. The Ministry’s land ambulance functions employ about 560 full-time equivalent staff, most of whom work at Ministry-run dispatch centres.

### DISPATCH CENTRES AND BASE HOSPITALS

Twenty-two dispatch centres are responsible for dispatching Ontario’s land ambulances. Of these, 11 are run by the Ministry, six by hospitals, four by municipalities and one by a private operator. Seven base hospitals (each of which comprises a group of doctors working out of an established hospital) provide medical oversight to paramedics—including any required advice on pre-hospital patient care, as well as continuing education. Since 2008, the number of calls requesting an ambulance, the number of ambulances dispatched and the number

of patients transported have been gradually increasing, as shown in Figure 1. In 2012, about 1.3 million ambulances were dispatched and about 970,000 patients were transported in Ontario, an increase of about 15% for both since 2008.

## FUNDING

Over the last few years, the Ministry has funded about 50% of each municipality's prior-year costs for municipal land ambulance services, plus an increase for inflation. The Ministry funds 100% of the cost of land ambulance services for the 10 First Nations ambulance services and for certain other (primarily remote) areas. The Ministry also funds 100% of the Ministry-approved costs of ambulance dispatch centres and base hospitals. For the 2011/12 fiscal year, total land ambulance costs were an estimated \$1.1 billion, which includes \$627 million of ministry funding (as shown in Figure 2) and \$477 million of municipal funding. Ministry funding includes \$12 million for the off-

load nurse program, in which hospital nurses take responsibility for ambulance patients in order to reduce ambulance delays at busy hospitals.

There is a glossary of terms at the end of this report.

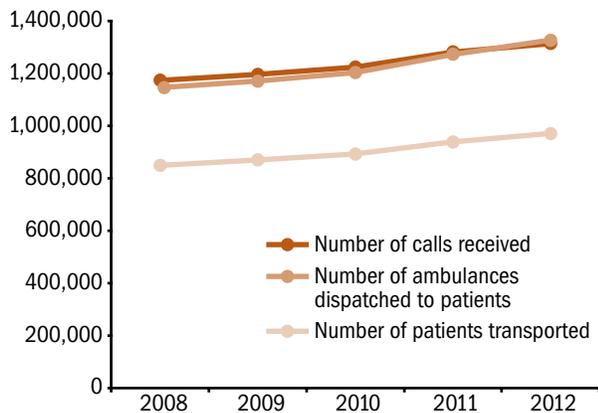
## Audit Objective and Scope

Our audit objective was to assess whether the Ministry has procedures in place to ensure that municipal land ambulance services are meeting Ontarians' transportation health-care needs in a cost-effective manner and are in compliance with ministry and legislative requirements. Senior management at the Ministry reviewed and agreed to our objective and associated audit criteria.

Our audit work was primarily conducted at the Ministry's Emergency Health Services Branch. We also visited three municipal ambulance services—Toronto Emergency Medical Services (run by the City of Toronto), the Superior North Emergency Medical Service (run by the City of Thunder Bay),

**Figure 1: Number of Calls Received, Ambulances Dispatched to Patients,<sup>1,2</sup> and Patients Transported, 2008–2012**

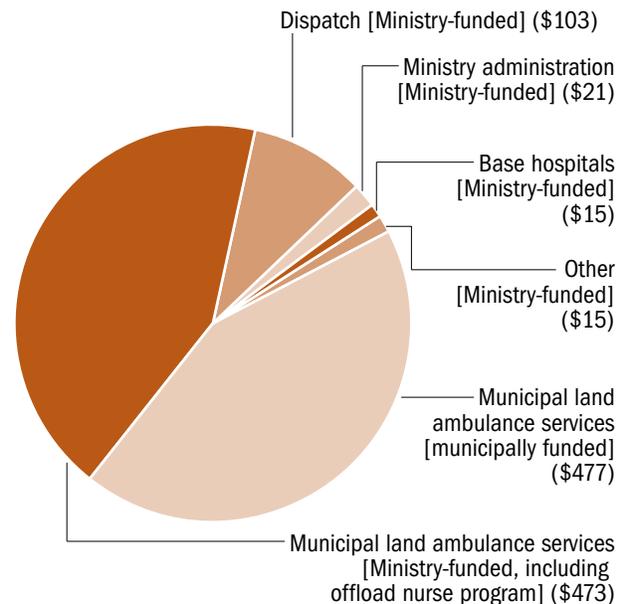
Source of data: Ministry of Health and Long-Term Care



- Although not included in the number of ambulances dispatched to patients, dispatch workload also involves dispatching emergency response vehicles (which occurred 116,000 times in 2012) and repositioning ambulances—for example, to be closer to the next anticipated call (which happened 620,000 times in 2012).
- While an ambulance is generally dispatched for each call received, in some cases (such as when there is a highway traffic accident), many more calls are received than ambulances dispatched. In other cases (such as when the closest ambulance is dispatched, as well as when the closest ambulance with an advanced care paramedic is dispatched), more ambulances are dispatched than calls received.

**Figure 2: Estimated Ministry and Municipal Expenditures on Land Ambulance Services, 2011/12 (\$ million)**

Source of data: Ministry of Health and Long-Term Care



and Essex-Windsor Emergency Medical Services (run by the County of Essex)—to examine certain accounting records relating to ministry grants paid to municipalities, as well as to obtain their perspective on the delivery of land ambulance services in Ontario. In addition, we visited two dispatch centres—one operated by the Ministry and one operated by a municipality—and a base hospital to obtain further information on their policies and practices regarding land ambulance services. We also spoke with representatives from the Ontario Association of Paramedic Chiefs (a not-for-profit organization consisting of senior management from 46 municipalities and nine contracted ambulance service providers that provides advice to the Ministry regarding emergency medical services) and from the Ontario Hospital Association to obtain their perspectives on land ambulance services, as well as with representatives from the Ontario Stroke Network and the Cardiac Care Network of Ontario to learn more about ambulance transportation of stroke and cardiac patients, respectively.

In conducting our audit, we reviewed relevant documents and administrative policies and procedures; analyzed information; interviewed appropriate staff from the Ministry, municipal land ambulance services, base hospitals, and dispatch centres; and reviewed relevant research from Ontario and other jurisdictions. In addition, we asked the Ministry to run a number of computer reports to assist in our analysis of dispatch protocols. We also engaged two independent consultants, each of whom has expert knowledge of land ambulance services, to advise us.

## Summary

Ministry funding to municipalities almost doubled between the 2004/05 and 2011/12 fiscal years, with the largest increases between 2004/05 and 2008/09 reflecting the government's commitment to provide 50% of the cost of land ambulance

services and thereby increasing the grant from \$241 million to \$401 million to meet that commitment. Since 2008/09, annual increases have averaged 6%. Overall, while the cost to fund land ambulance services almost doubled, the number of patients transported in that same time frame increased by only 18%. The Ministry does not know whether the additional funding has resulted in better value for money in terms of service levels and patient outcomes. Ministry data indicated that since 2005 there has been some improvement in ambulance response times, but in the 2012 calendar year still only about 60% of the 50 municipalities responded to 90% of their emergency calls within 15 minutes, as shown in Figure 5. Furthermore, there is no patient-centred measure of the time from receipt of an ambulance call to the time an ambulance arrives at a patient's location.

The Ministry's funding formula provides more funding to land ambulance services that spend more, regardless of the level of service they actually provide. The Ministry indicated that varying service levels were expected and that it had not compared the funding provided to each municipality with the ambulance services provided. Further, the Ministry had not determined the reasons for variations in funding, which could result from differences in the distances ambulances travel for patients (urban versus rural), efficiency of ambulance operations, or municipal priorities and tax-based funding. Data from the Ontario Municipal Benchmarking Initiative representing some municipalities indicated that the 2012 total cost per hour of land ambulance services among 13 reporting municipalities ranged from a low of \$156 to a high of \$247, with significant cost variations even among urban municipalities.

The Ministry has not tracked or reviewed any patient outcome information, such as the survival rates for people with cardiac arrest or stroke who were transported to hospital, either overall or by ambulance service. This type of information could be used to improve ambulance services. There have been some improvements to parts of the quality

assurance processes since our audit in 2005, such as more timely service review follow-ups. However, more work is needed to ensure that dispatch staff are consistently evaluated and that their workloads remain reasonable in order to prevent errors in the dispatch process.

In addition, we noted the following other areas where action is required.

### Ambulance Service Response Times

- Although the Ministry has recently set more meaningful response-time measures for the most time-sensitive patients (such as those who are choking or experiencing cardiac arrest), it has not set standard response-time targets for other urgent patients, such as stroke patients or most heart attack patients. Each municipality sets its own response-time targets for transporting these patients, and the targets vary significantly based on factors such as geographic distances and the amount of tax-based funding available to municipalities.
- The Ministry needs to ensure that response times are reported by municipalities in a consistent and comparable manner, factoring in geographic differences, so that users can meaningfully compare their municipality's performance with others. In 2006, the Standing Committee on Public Accounts (PAC) recommended that response-time targets be similar for similar communities. Although recommended by the Ministry's Response Time Standard Working Group in 2006, definitions to distinguish target response times for different geographic areas have not yet been developed.
- The Ministry expects to start publicly reporting municipal land ambulance response times in 2014. Under the Ministry's new approach for measuring ambulance response times, municipalities will no longer report times based on the call's assessed urgency

when the ambulance is dispatched to pick up a patient. Instead, they will report on how quickly patients are reached based on paramedics' assessment of each patient when the ambulance arrives at the scene. The Ministry had not analyzed the inherent difficulties in using this retrospective approach to measure ambulance response times. We found no other jurisdiction that used a similar approach. Other jurisdictions generally measure response time based on a call's assessed urgency at the time of dispatch.

### Dispatch

- In 2012, 20 of the 22 dispatch centres tracked their time to dispatch emergency calls. None of them dispatched 90% of emergency calls within two minutes, as required by ministry policy. However, all dispatched 90% of these calls within three and a half minutes. Even though dispatch is legislatively a ministry responsibility and half of the dispatch centres are Ministry-run, starting in 2013, each dispatch centre can choose what percentage of high-priority calls it needs to dispatch within two minutes. We noted that the chosen percentages ranged from a low of 70% to a high of 90%, which may affect response times for urgent patients.
- Dispatch protocols are generally designed to over-prioritize calls when there is uncertainty about a patient's condition. Only about 25% of patients actually require an urgent response, but about two-thirds of calls are prioritized at the most urgent code, requiring the fastest response. The municipalities we spoke with indicated that over-prioritizing this many calls can leave few or no ambulances available to respond to new calls that are truly urgent, thereby causing delays. The two dispatch centres that use a different type of dispatch system experienced less over-prioritization.

- The Ministry has not assessed whether the current number of dispatch centres is optimal for performance. Centralized dispatch may help to contain costs and ensure that the closest ambulance responds to a call.
- Only one dispatch centre is able to provide callers with the locations of publicly accessible automated external defibrillators (AEDs), which can significantly improve survival rates for cardiac arrest patients if available within minutes. The other dispatch centres are not able to tell callers whether there is an AED nearby. It may therefore take the caller additional time to locate an AED and could increase the risk to the patient.
- Non-ambulance emergency response vehicles, which cannot transport patients and which require that an ambulance also be dispatched, account for about 25% of the municipal ambulance fleet, yet such vehicles responded to only 10% of calls. These vehicles are about 50% Ministry-funded, and the municipalities we visited indicated that they were often used for administrative purposes rather than being deployed for ambulance calls. A portion of provincial funding could potentially be better directed to serving callers.
- Ministry policy requires that all patients be transported by an ambulance responding to a call unless the patient signs a form refusing transport. The Ministry has not assessed using emergency department diversion strategies to reduce ambulance wait times at emergency departments and free them up to respond to new calls more quickly. Strategies similar to those used successfully in other jurisdictions include referring low-risk patients to Telehealth Ontario to obtain a nurse's advice or having paramedics treat low-risk patients at the scene without transporting them. Notwithstanding this, we noted that in 2012 over 25% (or about 350,000) of ambulances dispatched did not transport a patient. The Ministry has not assessed the underlying reasons to determine, for example, how many of these situations arose from patient refusals, calls cancelled before arrival of an ambulance or paramedics having successfully treated patients at the scene.

### Patient Transport to Hospital

- The Ministry has no provincial protocol to enable consistent identification of certain heart attack patients (called “STEMI” patients, which stands for ST-segment elevation myocardial infarction—a type of heart attack resulting from a blocked artery). Outcomes for STEMI patients can be greatly improved if they are transported in time to specialized care centres. A June 2013 survey conducted by the Cardiac Care Network of Ontario indicated that not all ambulances had both the appropriate ECG equipment and paramedics trained to read the test results to identify STEMI patients and thereby help ensure timely treatment with better outcomes.
- The Ministry started funding an offload nurse program in 2008 as a temporary measure to reduce the time ambulances spend waiting at hospitals for patients to be accepted. It has not evaluated this program's ongoing effectiveness or analyzed whether there are more cost-effective ways to reduce offload delays. Between the 2008/09 and 2012/13 fiscal years, ministry funding for this program totalled \$40 million. We found that since this program was implemented, ambulance waiting time has actually increased at 20% of the hospitals funded.
- Ministry data indicated that offload wait times of more than 30 minutes occurred for about 80% of the ambulances transporting the most urgent patients, but the Ministry generally did not know whether this was due to the hospital not accepting the patient or other reasons, such as time spent cleaning and restocking the

ambulance. Hospitals in only one municipality in the province inform that municipality's dispatch centre when a patient is accepted. Therefore this is the only municipality able to determine the time it takes hospitals to accept a patient once an ambulance arrives.

- Paramedics orally brief emergency department staff about the patient. Patient records generally cannot be electronically shared because the electronic patient-care records introduced by most municipal land ambulance services over the last few years are not compatible with hospital systems. In some cases, patient-care records are not received by emergency departments until days later and some test results are not received at all, which could affect time-sensitive treatment decisions.

### Quality Assurance Over Patient Care

- The Ministry has assigned responsibility for oversight of the vast majority of paramedic patient-care activities (referred to as “basic life support activities” and including management of chest pain, childbirth and hip fractures) to municipal land ambulance services. Base-hospital physicians, who are responsible for reviewing paramedics' performance of more complex or risky medical procedures, told us that municipal land ambulance services may not have the expertise to provide proper medical oversight of basic life support activities performed by paramedics.

response time (that is, the time from call receipt until a dispatcher advises an ambulance service to send an ambulance) and the ambulance response time (that is, the time from when the dispatcher notifies the ambulance service until the ambulance arrives at the patient's location). This approach enables the Ministry, which has legislative control over dispatch, to monitor dispatch response times, and the municipalities, which control ambulance service provision, to monitor ambulance response times.

Most 911 requests for land ambulances are transferred to the local dispatch centre nearest the caller. Twenty of the 22 dispatch centres prioritize calls using a dispatch protocol, which was developed by the Ministry with input from physicians, called the Dispatch Priority Card Index II (DPCI II), as described in Figure 3 column A. The other two dispatch centres prioritize calls with the internationally used Medical Priority Dispatch System (MPDS) codes, as described in Figure 3 column B. DPCI II Code 4, as well as MPDS Codes Echo and Delta, are all considered emergencies, and ambulances are sent out to such calls generally with lights and sirens. Upon arrival at the patient's location, paramedics assess how urgently the patient requires care using the same scale used in emergency departments: the Canadian Triage and Acuity Scale (CTAS), as described in Figure 3 column C.

Until December 2012, ministry policy required both dispatch and ambulance response times to be tracked for all emergency calls. In 2012, almost 710,000 (60%) of ambulances dispatched to patients were for calls classified as emergencies (that is, DPCI Code 4 or MPDS Codes Echo or Delta). Changes to a regulation under the *Ambulance Act* that took effect in January 2013 require tracking of specific dispatch and ambulance response-time measures for only those patients whose conditions are classified as CTAS 1 by the paramedics who arrive on the scene. The Ministry indicated that this new requirement was based on recommendations made in 2006 by the Response Time Standard Working Group, which consisted of

## Detailed Audit Observations

### RESPONSE PRIORITIZATION AND TIME

Many jurisdictions measure overall ambulance response time—that is, from when a dispatch centre receives a call to when the ambulance arrives at the patient's location. In Ontario, two separate response-time measures are used: the dispatch

**Figure 3: Three Ways of Prioritizing Patient Conditions When an Ambulance Is Needed, from Most to Least Urgent**

Source of data: Ministry of Health and Long-Term Care, Toronto Emergency Medical Services, and Canadian Association of Emergency Physicians

A. Dispatch Priority Card Index (DPCI) II Used by 20 of Ontario's 22 dispatch centres to prioritize calls received		B. Medical Priority Dispatch System (MPDS) Used by 2 of Ontario's 22 dispatch centres to prioritize calls received		C. Canadian Triage and Acuity Scale (CTAS) Used by paramedics when ambulance reaches patient's location	
Code	Description	Code	Description	CTAS Level	Description
4	<i>Urgent/Emergency:</i> life- or limb-threatening; person requires immediate attention Examples: cardiac arrest*; stroke; major or moderate trauma (severe injuries or fractures); major and moderate asthma	Echo	Life-threatening calls, usually identified early in call; excludes calls with scene safety concerns, such as gunshot to chest Examples: cardiac arrest*; choking; severe asthma	1	<i>Resuscitation</i> Examples: cardiac* and/or respiratory arrest; major trauma (severe injury or burns); unconsciousness
3	<i>Prompt:</i> all other calls	Delta	Other life-threatening calls Examples: major trauma (severe injury); unconsciousness; gunshot to chest	2	<i>Emergent</i> Examples: chest pain with cardiac features; stroke; serious infections
2	<i>Scheduled:</i> transfers between health-care facilities (e.g., for diagnostic tests or treatment); delay not detrimental to patient safety	Charlie	Calls involving, for example, chest pain with cardiac features or stroke, as well as conditions benefiting from assessment by advanced-care paramedic, such as a person requiring intravenous glucose; irregular heart rhythms requiring an ECG test	3	<i>Urgent</i> Examples: moderate trauma (fractures, dislocations); moderate asthma
1	<i>Deferable:</i> unscheduled inter-facility transfer or low-risk lift assists (e.g., person has fallen and is unable to get up, but has no injuries); delay not detrimental to patient safety	Bravo	Calls involving, for example, moderate trauma (fractures, dislocations) or calls where patient condition is unknown (e.g., caller is unable to answer questions)	4	<i>Less urgent</i> Examples: constipation with mild pain; chronic back pain; earache
		Alpha	Less-serious calls from the community Examples: constipation with mild pain; chronic back pain; minor trauma (minor lacerations, sprain)	5	<i>Non-urgent</i> Examples: minor trauma (sprains, minor lacerations); request for medication or dressing change; sore throat
		Alpha 1, 2, and 3	Calls primarily from long-term-care homes; patient condition less serious		
		Omega	No ambulance transportation required; caller connected with appropriate assistance (e.g., Telehealth)		

\* In cardiac arrest, the heart stops beating. In a heart attack, part of the heart muscle is damaged due to lack of oxygen caused by a blocked artery.

ministry, municipal and physician representatives and reported to the Land Ambulance Committee, which was co-chaired by the Ministry and the Association of Municipalities of Ontario (AMO). Ministry policy still requires those dispatch centres that use DPCI II to track their response times for all emergency calls.

Studies have indicated that a one- or two-minute delay in the arrival of emergency medical personnel can significantly affect the survival of CTAS 1 patients. In 2012, fewer than 12,000 calls, or less than 1% of total calls, involved CTAS 1 patients. Therefore, under the new regulation, tracking of specific response times is required only for this relatively small number of ambulance calls. Figure 4 shows both the pre- and post-2013 response-time standards.

### Measuring Dispatch Response Times

In 2012, 20 of the 22 dispatch centres tracked the time it took them to respond to emergency calls. None of them dispatched 90% of emergency calls within two minutes as required by ministry policy. However, all dispatched 90% of these calls within three and a half minutes.

As required by changes to a regulation under the *Ambulance Act*, each dispatch centre was to establish by October 2012 a target for the percentage of calls to be dispatched within two minutes when those calls involve a patient who is determined by the paramedic, when the ambulance reaches the

patient, to be experiencing either sudden cardiac arrest or any other CTAS 1 condition. That is, after the paramedic reaches the patient, he or she assesses whether or not the call should have been dispatched within two minutes. As a result, the determination of which calls were required to be dispatched within the two-minute standard occurs only *after* the paramedic reaches the patient, rather than at the time of dispatch.

Even though dispatch is legislatively a ministry responsibility, and half of Ontario's 22 dispatch centres are Ministry-run, each dispatch centre can choose its own target for the percentage of calls to be dispatched within two minutes. These targets do not require ministry approval. For the 2013 calendar year, we noted that the targeted compliance rate ranged from a low at two dispatch centres of 70% of emergency calls dispatched within two minutes to a high at seven dispatch centres of 90%.

### Measuring Municipal Ambulance Service Response Times

As noted earlier, ambulance response times are measured separately from dispatch response times. Ministry data indicated that since 2005, there has been some improvement in ambulance response times, but in the 2012 calendar year, still only about 60% of the 50 municipalities responded to 90% of their emergency calls within 15 minutes, as shown in Figure 5.

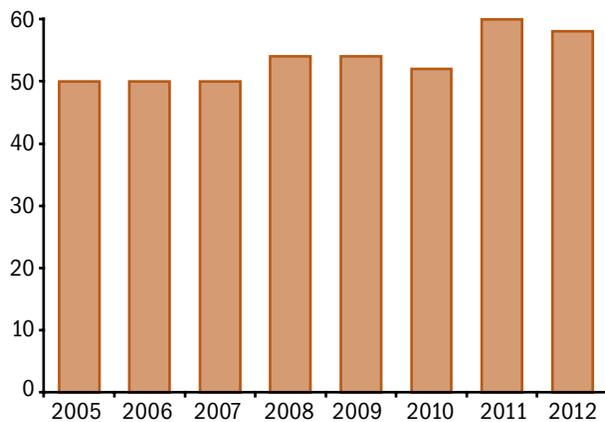
**Figure 4: Response-time Standards, Pre- and Post-January 2013**

Source of data: Ministry of Health and Long-Term Care and *Ambulance Act*

	Dispatch	Ambulance Service
Pre-2013	90% of Code 4 calls within 2 minutes, per ministry policy	90% of Code 4 calls within the actual time it took to respond to 90% of Code 4 calls in 1996
Commencing January 2013	Dispatch centres measure whether 90% of Code 4 calls are dispatched within 2 minutes, per ministry policy.  Dispatch centres measure percentage of CTAS 1 calls to be dispatched in 2 minutes, per legislation.	Municipality measures the percentage of cardiac arrest patients reached with an automated external defibrillator within 6 minutes and the percentage of CTAS 1 patients reached by paramedics within 8 minutes, per legislation.  Each municipality determines its own response-time standard for CTAS 2 to CTAS 5 calls, and also sets a target for the percentage of calls that it aims to reach within this time standard, per legislation.

**Figure 5: Percentage of Municipalities Responding to 90% of Code 4 Calls\* within 15 Minutes, 2005–2012**

Source of data: Ministry of Health and Long-Term Care



\* Includes calls from MPDS dispatch centres, based on Ministry's determination of which MPDS calls are equivalent to DPCI II Code 4.

In our Annual Reports for 2000 and 2005, we recommended that the Ministry, together with municipalities, review the response-time requirement then in use for reasonableness and consistency. As well, in 2006, the Standing Committee on Public Accounts (PAC) recommended that the Ministry report to PAC on how it would update response-time targets.

Until January 2013, the legislated standards required land ambulance services to respond to 90% of emergency calls within the actual times it took to respond to 90% of Code 4 calls in 1996. The legislation was subsequently changed based on recommendations the Response Time Standard Working Group made in 2006.

Legislation that came into effect as of January 2013 requires each municipality to establish a target rate of compliance for the following response-time measures:

- *For all patients with sudden cardiac arrest*—how often any individual equipped with a defibrillator reaches the scene within six minutes of the ambulance service being notified by the dispatcher.
- *For all CTAS 1 patients (as determined by the paramedic when the ambulance reaches the patient)*—how often an ambulance reaches

the scene within eight minutes of the ambulance service being notified by the dispatcher.

- *For patients at other CTAS levels (as determined by the paramedic when the ambulance reaches the patient)*—how often an ambulance reaches the patient, after being notified by the dispatcher, within a time established by the municipality. For these patients, the municipality sets both the response-time targets to be met and the target rate of compliance, which can reflect, among other things, differences in geographic distances and funding available to municipalities through taxes. As shown in Figure 6, this approach has resulted in a wide variety of response-time targets and target compliance rates for the same CTAS code: one municipality may aim to have an ambulance reach 60% of CTAS 2 patients within 10 minutes, whereas another might aim to reach 90% within 10 minutes.

Municipalities submit their chosen targets in their annual response-time performance plans to the Ministry, but may change the plans at any time by notifying the Ministry. The targets do not require Ministry approval, including those for CTAS 2 patients who require an emergency response. The Ministry allows municipalities to use their own definition of urban versus rural areas in their response-time performance plans. Although many Ontario municipalities include rural and urban areas, only three such municipalities have provided separate targeted compliance rates for these areas. Our review of the municipally established targeted compliance rates for cardiac arrest and CTAS 1 patients indicated that they varied significantly, as shown in Figure 7. The lower targets were generally set by municipalities in rural areas, due to the longer anticipated time to reach a patient.

As with dispatch, the determination of which calls are required to be responded to within the established time frames occurs when the paramedic reaches the patient, rather than at the time the ambulance service is notified.

**Figure 6: Municipalities' Chosen Response-time Compliance Rate Targets for CTAS 2 to CTAS 5 Patients, 2013**

Source of data: Ministry of Health and Long-Term Care

	Chosen Ambulance Response-time Target* (minutes)	# of Municipalities Choosing Targets in this Range	Chosen Compliance Rate (% of time chosen response-time target will be met)	
			Lowest	Highest
CTAS 2	8-15	43	50	90
	16-30	7	50	90
	>30	0	–	–
CTAS 3	8-15	41	50	90
	16-30	9	50	90
	>30	0	–	–
CTAS 4	8-15	20	50	90
	16-30	29	55	100
	>30	1	50	50
CTAS 5	8-15	18	50	95
	16-30	29	55	100
	>30	3	50	75

\* Chart includes the urban response-time target for the three municipalities that set both urban and rural targets.

We noted that other jurisdictions measure ambulance response times based on urgency of the call at the time of dispatch, an approach that enables the ambulance's response to be adjusted based on the information available at that time. We could find no other jurisdictions that evaluate the timeliness of ambulance response based on the assessment made by the paramedics after reaching the patient. The Ministry has not evaluated the practical difficulties inherent in this retrospective approach. Subsequent to our fieldwork, the Ministry indicated that it has begun discussions with the municipalities on how best to track and report response times using the retrospective approach.

### Differentiating Rural and Urban Response Times

Generally, rural areas will have longer ambulance response times than urban areas, because longer distances must typically be travelled to reach patients. We noted that in Nova Scotia, response times are measured using a nine-minute response-time standard for urban areas, a 15-minute standard for

suburban areas and a 30-minute standard for rural areas.

The 2006 report from the Response Time Standard Working Group recommended three geographic levels for reporting response times: urban, rural/light suburban, and remote. In 2006, PAC also recommended that response times be similar for similar communities considering, for example, local factors such as urban population densities and road infrastructure. As well, both a 2010 Ministry-commissioned report and a 2011 report released by the Ontario Association of Paramedic Chiefs recommended that municipalities establish definitions for urban, rural, and remote service areas. However, as of May 2013, no such standardized definitions for measuring response times had been adopted by municipalities or the Ministry.

### Transporting Patients to Specialized Care

#### Adopting Transportation Protocols

To obtain the best outcomes, patients with certain conditions, such as stroke and a certain type of

**Figure 7: Targeted Response-time Compliance Rates by 50 Municipalities for Two Emergency Standards, 2013**Source of data: *Ambulance Act* and municipal response-time performance plans

Standards	% of Time Standard Will be Met	
	Lowest Target Rate (%)	Highest Target Rate (%)
Defibrillator arrives within 6 minutes of dispatch for patients in sudden cardiac arrest <sup>1, 2</sup>	15	75
Ambulance arrives within 8 minutes of dispatch for CTAS 1 patients, including sudden cardiac arrest patients <sup>3</sup>	9	85

1. The legislation specifies only the arrival of a first responder—not necessarily a land ambulance—with a defibrillator within six minutes. Therefore, some municipalities set two targets: one for the first responder and a second for the ambulance. For municipalities with two targets, the first-responder target is shown.
2. Data excludes four municipalities that had not set a target for a defibrillator arriving within six minutes.
3. Data excludes one municipality that had not set a target for arriving in eight minutes for CTAS 1 patients.

heart attack (referred to as STEMI, which stands for ST-segment elevation myocardial infarction—the technical term describing one type of heart attack resulting from a blocked artery, so called because of the way it looks on an electrocardiogram or ECG test), should be transported within specific time frames to specialized hospitals that have the necessary medical equipment and professionals trained to provide the required care. The same level of care is not readily available at other hospitals. Municipalities can choose whether or not to participate in a protocol to transport patients with these conditions to a specialized hospital, which may be within or outside their municipality. The Ontario Stroke Network indicated that all municipal ambulance service providers have adopted the Ministry's 2011 Ontario Acute Stroke Protocol, which includes instructions on transporting certain stroke patients to stroke centres. Although the Ministry receives some information on which municipalities have adopted a STEMI protocol, it does not assess why other municipalities choose not to adopt one.

For the municipalities that have adopted protocols, the Ministry does not assess whether patients are transported to specialized care centres when appropriate or within the recommended time frame for the patient's condition. The municipalities we visited indicated that they review this as part of their quality assurance reviews of paramedic performance. Furthermore, the Ministry's DPCI II dispatch system, used by most dispatch centres in

Ontario, does not provide electronic prompts to ensure that such municipally adopted protocols are considered when appropriate, and therefore there is risk that dispatchers will not direct the ambulance to the appropriate hospital.

### Transporting Patients to STEMI Centres

For STEMI, the recommended maximum time for transporting the person to a hospital is generally 60 minutes from when the ambulance reaches the patient, plus an additional 30 minutes after reaching the hospital for the patient to receive treatment. The Ministry indicated that the Branch's Medical Advisory Committee is working toward a standardized STEMI protocol. At the time of our audit, the Ministry had not confirmed an implementation date.

As part of their responsibility to assess the quality of care provided by ambulance services, base hospitals have performed some monitoring of compliance with specialized care protocols. For example, a base hospital in the Greater Toronto Area found that during one month in 2012, 53% of STEMI patients did not receive treatment within 90 minutes from when the ambulance reached the patient. However, there is no provincial policy to ensure consistent and appropriate paramedic STEMI care. A June 2013 Cardiac Care Network of Ontario report indicated that STEMI patients were often not being transported to appropriate specialized care centres, partly because of the lack of a

provincial protocol. For example, three of the 35 ambulance services surveyed by the Cardiac Care Network indicated that not all of their ambulances had the appropriate ECG equipment, and two others said that none of their ambulances did. This ECG equipment is necessary for identifying STEMI patients; a timely ECG test also ensures timely treatment with better patient outcomes. Further, three ambulance services with appropriate ECG equipment indicated that none of their paramedics had been trained in how to interpret the ECG tests to identify STEMI patients. The Cardiac Care Network further noted that because of the lack of a co-ordinated system for identifying and treating STEMI patients, it could not estimate what proportion were reaching specialized care centres.

We noted that in Nova Scotia, paramedics are trained to administer drugs when treating STEMI patients who are too far from specialized care centres. This practice is not done in Ontario, although one base hospital told us that this practice would likely benefit patients in remote locations. No estimate has been made of the number of patients in Ontario who cannot reasonably be transported to a specialized care centre due to their remote location.

### Public Reporting

In our *2005 Annual Report*, we recommended that the Ministry and municipalities “jointly establish pertinent performance measures such as response times and report publicly and regularly on these land ambulance service performance measures.” The 2006 PAC report on land ambulance services also recommended that the Ministry report publicly on response times.

Before 2013, no response-time information was publicly reported by the Ministry, and only some municipalities publicly reported such information on their websites. Beginning in 2013, the Ministry posted on its website the response-time performance plans for each of the 22 dispatch centres and the 50 municipal land ambulance services.

Also, starting with the 2013 calendar year, municipalities are responsible for calculating and reporting to the Ministry their compliance with ambulance response-time standards using either information in the Ministry’s dispatch system, information in their own electronic patient records, or a combination of both. The municipalities we spoke to indicated a number of concerns about using the Ministry’s dispatch data, including the following:

- Although preliminary data is available after 48 hours, the Ministry takes about four months to finalize its data, making it difficult for municipalities to perform timely reviews of their ongoing performance.
- The Ministry does not have standardized reports to assist municipalities in determining their compliance with the new legislative standards.

The Ministry informed us that it would be developing standardized reports and expected to have them available for municipalities to use by fall 2013.

The Ministry plans to post, in spring 2014, the achieved 2013 response-time compliance rates as reported to it by the 22 dispatch centres and the 50 municipal land ambulance services. However, the Ministry has no plans to publicly report the percentage of calls dispatched as emergencies to which dispatch centres responded within two minutes. Although the Ministry has most of the data it needs to confirm the accuracy of municipally reported information, the Ministry indicated that it had no plans to do so because this is a municipal responsibility.

We also noted that the Ministry obtained data on each ambulance call received, each ambulance dispatched and each patient transported. At our request, the Ministry accumulated this data by year, as shown in Figure 1. However, the Ministry does not regularly review this fundamental data for trends, nor is the data publicly reported.

We further noted that other jurisdictions report publicly on ambulance performance, including response-time reporting by rural versus urban

areas. As well, the United Kingdom's ambulance services publicly report on a range of performance measures, such as the percentage of patients transported to a stroke centre within an hour of a 999 call (similar to a 911 call in Ontario), and cardiac arrest patient survival rates from transport until discharge from hospital.

### Evaluating the Offload Nurse Program

Ambulance response times can be delayed if ambulance crews are detained while offloading a patient at a hospital and are therefore not available to respond to another call. Upon reaching a hospital, the ambulance crew must update hospital staff on the patient's condition and wait for the patient to be triaged and admitted before departing for the next call. However, offload delays (which the Ministry generally defines as time spent at hospital exceeding 30 minutes) occur, especially in busy urban-area hospitals' emergency departments. By contrast, several other jurisdictions—including Nova Scotia, the United Kingdom and Western Australia—have target offload times of less than 30 minutes from the ambulance's arrival at the hospital until it is ready to leave.

The Ministry introduced the offload nurse program in 2008, initially as an interim initiative to reduce ambulance offload delays. Under this program, the Ministry provides funding for nurses to assist with offloading patients. Because the Ministry expects urgent (CTAS 1 and 2) patients to receive immediate care from hospitals, the offload nurses care for the less-urgent (CTAS 3 to CTAS 5) patients. Between the 2008/09 and 2012/13 fiscal years, ministry funding for the offload nurse program totalled \$40 million.

### Tracking and Monitoring Offload Times

Offload time for each patient is tracked from the time when the ambulance arrives at the hospital to when it is ready to depart, as reported by the paramedics to the dispatch centres. Municipalities report to the Ministry twice a year on the time

within which 90% of patients are offloaded. According to this reported information, between the 2008/09 and 2011/12 fiscal years, the offload times for CTAS 3 to CTAS 5 patients actually *increased* at 20% of the hospitals participating in the program. At our request, the Ministry ran a report on the number of patients with offload times greater than 30 minutes during the 2012 calendar year. This report indicated that about 80% of the ambulances with urgent patients evaluated by paramedics as CTAS 1 waited over 30 minutes, as did about 75% of ambulances with CTAS 2 patients. Furthermore, at some hospitals, more than 90% of these urgent patients waited with paramedics for more than 30 minutes before being admitted to the emergency department.

Despite expressing concerns regarding ongoing delays at hospitals, all three municipalities we visited indicated that the offload nurse program had been helpful in reducing the time spent by ambulances at hospitals and that without the program, delays would be significantly longer and/or occur more frequently. However, as also noted in our 2010 audit of hospital emergency departments, the municipalities indicated that hiring offload nurses did not represent a full solution. One municipality thought that some offload funding would be better spent on improving the patient flow process, which they believe contributes to delays at hospitals. The Ministry had not evaluated the current program to determine whether there are more cost-effective ways to reduce offload delays.

Through the National Ambulatory Care Reporting System (NACRS), hospitals also report on ambulance patient offload times, using the time from when the ambulance arrives at the hospital (which the hospital estimates based on the time it initially registers or triages the patient, to determine his or her urgency) to the time the patient is accepted by the hospital. The Ministry has never compared the offload times reported by municipalities to the NACRS offload times. Our review of this data for one hospital indicated that the reported times varied significantly.

One dispatch centre had implemented software that allowed hospitals to electronically inform the centre when the ambulance patient was accepted. Ministry staff noted that even after a hospital accepts a patient, the ambulance may not be able to leave immediately—for example, due to the ambulance requiring cleaning or restocking. Having accurate information on when the hospital accepted the patient and comparing this information to when the ambulance actually left would enable municipalities and the Ministry to better monitor the extent to which delays occur because the hospital is unable to accept the patient or whether there are other reasons for an ambulance remaining at a hospital after the patient is accepted. No other dispatch centres had this software.

### RECOMMENDATION 1

To better ensure that patients receive timely and high-quality ambulance services, the Ministry of Health and Long-Term Care should:

- establish consistent provincial dispatch centre targets for the percentage of calls to be responded to within the legislated response-time measures for patients experiencing sudden cardiac arrest and other patients whose conditions are assessed as fitting into the highest priority according to the Canadian Triage and Acuity Scale (CTAS)—that is, all CTAS 1 patients—and establish response-time targets and compliance targets for CTAS 2 (second-highest priority) calls, since such calls also involve time-sensitive emergencies;
- monitor ambulance response times for all calls dispatched as emergencies in addition to the legislated evaluation of response times based on the paramedics' determination of the patient's condition after reaching the scene;
- finalize a provincial protocol for ST-segment elevation myocardial infarction (STEMI) heart attacks—such as ensuring that all

ambulances are equipped with the appropriate type of electrocardiogram (ECG) machines, that paramedics are appropriately trained to interpret the ECG test results, and that paramedics are directed to conduct such tests for all potential STEMI patients—and implement electronic prompts throughout the dispatch system for transporting these patients to specialized care centres; and

- consistently account for the time spent by an ambulance at a hospital until the patient is accepted, based on patient urgency and any additional time the ambulance spends at hospital until it is free to return to service.

To ensure that Ontarians have access to relevant information on the performance of dispatch centres and municipal land ambulance services, the Ministry, in conjunction with municipal land ambulance services and base hospitals, should:

- establish other key measures (including outcome measures) of land ambulance performance (for example, total ambulance response time from call receipt to arrival at the patient location, and the survival rates of patients with certain conditions such as stroke and cardiac arrest); and
- publicly report on these indicators and on response times for each municipality in a consistent and comparable format (for example, separately by urban and rural areas, as well as by patient urgency levels).

### MINISTRY RESPONSE

The Ministry will review existing dispatch response targets in consultation with provincial dispatch centres and municipal land ambulance service providers to determine the extent to which these targets can be more consistent while also recognizing differences in local community demographics, geography and resources. As part of this review, the Ministry also

plans to expand dispatch response-time measures to include calls determined to be CTAS 2.

The Ministry will monitor and report on response times dispatched as emergencies, in addition to the current legislated measurement of response times, to further enhance the monitoring and oversight of ambulance service delivery.

The Ministry will request its Medical Advisory Committee to consult with the Ontario Base Hospital Group, municipal land ambulance service providers, the Cardiac Care Network of Ontario, and dispatch centres to review and determine the most appropriate medical approach to ensure that effective, evidence-based emergency responses, including electronic prompts through dispatch centres, are provided for STEMI patients.

The Ministry will initiate a program evaluation of the Offload Nurse Program in the 2013/14 fiscal year to review program design, performance metrics, offload-time measurement definitions and funding methodology to ensure the program's alignment to broader emergency room strategies and initiatives. This review will be informed by a recent analysis of emergency room offload processes conducted by a municipality.

The Ministry will request that the Ontario Base Hospital Group, in consultation with municipal land ambulance service providers, develop evidenced-based medical key performance indicators for the provision of ambulance services. The Ministry will work with municipalities to publicly report on these performance indicators. This information will augment the existing public reporting of dispatch response-time plans that were posted on the Ministry's website in 2013 and the public reporting of response-time results planned for early 2014.

## DISPATCH

Call takers at dispatch centres must quickly obtain critical patient details from callers in order to correctly prioritize requests for ambulances. Many municipalities, including those we visited, have said that in order to have the best chance of responding quickly to the most urgent calls, they need to control dispatch. However, the Ministry indicated that centralized dispatch ensures that the closest ambulance responds to a call and also helps contain costs. We noted that British Columbia has three dispatch centres and that Alberta plans to consolidate its 14 dispatch centres into three by the end of 2013. The Ministry has not assessed whether or not the current 22 dispatch centres are the optimal number for Ontario.

Twenty of Ontario's 22 dispatch centres use a computerized dispatch protocol to prioritize requests for ambulances. (The Ministry indicated that the other two dispatch centres, which are in remote areas, will implement computerized processes by fall 2013.)

As noted earlier, 20 of the dispatch centres use the Dispatch Priority Card Index (DPCI) II, which was developed by the Ministry with input from physicians. This protocol was implemented in 2009 to replace DPCI I, about which we identified concerns in our *2005 Annual Report*. As detailed earlier in Figure 3 column A, DPCI II has four priority codes: Code 4 (for the most urgent calls), Code 3 (for calls requiring a prompt response), Code 2 (for scheduled calls) and Code 1 (for deferrable calls). In 2012, the 20 dispatch centres using DPCI II ranked 93% of calls as either Code 4 or Code 3, with 3% ranked as Code 2 and 4% ranked as Code 1.

At Ontario's other two dispatch centres, the municipalities that run them use the Medical Priority Dispatch System (MPDS), an internationally used dispatch protocol. As detailed earlier in Figure 3 column B, MPDS ranks patients under one of five codes—in order from most to least urgent, Echo, Delta, Charlie, Bravo and Alpha—with the

response for each code (for example, whether or not the ambulance is authorized to use lights and sirens) determined by the dispatch centre. In 2012, the two dispatch centres using MPDS ranked about 40% of their calls as Echo and Delta, with 17% ranked as Charlie, 26% as Bravo and 17% as Alpha.

### Dispatch Priority and Responsibility

Because it is difficult to quickly and conclusively identify over the telephone all patients with urgent conditions, dispatch protocols are generally designed to over-prioritize calls—that is, they err on the side of treating the call as more rather than less urgent—when there is uncertainty about the urgency of the patient’s condition. However, if a protocol over-prioritizes too many calls, the availability of ambulances to respond to truly urgent calls may be compromised.

The municipalities we visited confirmed that having to respond to numerous Code 4 calls at once can deplete their ambulance fleets, leaving few or no ambulances to respond to new calls. The Ministry does not routinely track such instances. In 2010, one municipality used data from its ambulance call reports (the medical records used by paramedics to document each call) and found more than 1,000 instances when all in-service ambulances were already being used to respond to calls. During 75% of these instances, responses to new requests for an ambulance had to be delayed.

Between 2006 and 2012, 67% of total calls were dispatched as Code 4 (the highest priority level). A Ministry-commissioned 2011 study stated that DPCI II was good at identifying the most urgent patients, but with high rates of over-prioritization. Based on study data, we noted that about two-thirds of the calls ranked by DPCI II as Code 4 were over-prioritized. Further, our analysis of 2012 patient CTAS data indicated that only 1% of patients assessed by paramedics at the scene were categorized as CTAS 1 and 24% were CTAS 2, for a combined total of 25%. The significant variance between the 67% of calls dispatched as Code 4 and

the 25% of patients whose conditions were actually urgent enough to warrant an ambulance being dispatched as Code 4 indicates a high degree of over-prioritization. As a result, ambulances may not be available to respond to truly urgent calls.

In contrast, in 2012, the two municipalities that use MPDS ranked about 40% of total calls as Echo or Delta (that is, corresponding to a lights-and-sirens response); 2% to 3% of total calls were ranked as Echo.

In response to a 2006 request from PAC, the Ministry indicated that it would evaluate MPDS as part of a pilot project involving municipally run dispatch centres. The resulting 2010 report indicated, among other things, that fewer calls were dispatched as emergencies under MPDS than under DPCI II, which could lead to more efficient resource management for ambulance services.

Although the Ministry may ask the base-hospital group to review medical evidence to ensure that DPCI II reflects current best practices, no medical review, other than for stroke, has been conducted by the base-hospital group since 2009, when DPCI II was implemented. We noted, for example, that although MPDS (which is updated more frequently to reflect new medical studies on best practices in emergency medical services) includes pre-arrival instructions (provided by call takers to callers after an ambulance has been dispatched but before the ambulance arrives) to give aspirin to patients who are experiencing heart attack symptoms, DPCI II has not been updated to give such instructions.

### Dispatch Ambulance Selection

Each municipality is responsible for creating an ambulance deployment plan. Among other things, these plans set out the location where ambulances wait for new calls, how many ambulances and non-ambulance emergency response vehicles (that is, vehicles generally staffed with one paramedic and equipped to treat but not transport patients) are available at any given time, and which calls can be

deferred. As a result, the availability of ambulances for dispatch varies among municipalities.

Electronic systems assist dispatchers in selecting the most appropriate ambulance. For emergency calls—primarily Code 4 calls under DPCI II and Echo or Delta calls under MPDS—such systems identify the ambulance closest to the patient by considering available ambulances as well as those that were previously assigned to lower-priority calls. Dispatchers may also use their judgment to select which ambulance to send based on an electronic map that shows each ambulance's location within a geographic area. Our discussions with dispatch staff at a dispatch centre that handles a high volume of calls indicated that they often do not use the electronic system's recommendation—because, for example, it selects the ambulance that is the shortest distance away “as the crow flies,” rather than the shortest distance based on available roads and speed limits. Further, electronic alternatives at the dispatch centre are too time-consuming to use. Staff also indicated that it is difficult for dispatchers in higher-volume dispatch centres to select the most appropriate vehicle using their judgment due to the multiple demands for ambulance services.

An ambulance may be asked to respond to a call outside its municipality—for example, if it is the closest ambulance to answer an emergency call or if it is returning home after transporting a patient to a hospital in another municipality. Due to the use of different dispatch systems, Toronto vehicles cannot be viewed on any DPCI II dispatch centre's electronic maps at the same time as other ambulances, nor can non-Toronto ambulances be viewed on Toronto's screens. Although DPCI II dispatch centres in areas surrounding Toronto have a separate screen that shows Toronto vehicles, dispatch centre staff indicated that this screen is rarely used given the time-sensitive nature of dispatching. Further, vehicles can be viewed by only one DPCI II dispatch centre at a time. Therefore, dispatch centres are generally not aware of the location of ambulances positioned outside their borders even though these may be closest to the patient.

We further noted that the two dispatch centres that use MPDS have resource allocation software that considers not only which ambulance is closest but also which one would be most appropriate to use in order to maintain emergency coverage across the entire geographic area involved. None of the other dispatch centres had such software, and therefore the dispatch centres may not always select the most appropriate ambulance to meet patients' needs.

### Defibrillator Locations

For patients experiencing cardiac arrest, the timely use of an automated external defibrillator (AED) can significantly improve survival rates. Research indicates that delays of even a few minutes in starting defibrillation after cardiac arrest can result in poor patient outcomes, including death. Accordingly, for all patients with sudden cardiac arrest, the legislated response-time measure is how often any individual with an AED—whether that person is a paramedic, a police officer, a firefighter, or a bystander—is able to reach the patient within six minutes of when the ambulance service is notified.

Our *2005 Annual Report* recommended that the Ministry assess the costs and benefits of a fully co-ordinated emergency response system that includes the strategic placement of AEDs in public places. In June 2011, the then-premier announced the Ontario Defibrillator Access Initiative, which involves providing funding for the placement of AEDs in publicly accessible places such as sports and recreation facilities and schools, as well as creating an Ontario-wide AED registry.

The Ministry indicated that a web-based registry listing AEDs funded by the Ministry and by municipalities in public, other municipal, and First Nations locations is expected to be implemented in late 2013. Privately installed AEDs (such as those located in casinos or shopping centres) may also be included in this registry.

One municipality that tracks the locations of AEDs at municipal facilities as well as a few other

public locations indicated that it has customized its MPDS dispatch system, so that dispatch staff can tell callers if a publicly accessible AED is nearby. However, although none of the other dispatch centres have similar information available, the Ministry indicated that dispatchers will ask callers if they are aware of a nearby AED. People calling these dispatch centres are expected to determine whether an AED is available, which may take additional time and therefore increase the risk to the patient. One municipality we visited indicated that it had asked the Ministry to incorporate AED locations in the dispatch protocol, but had been turned down.

We noted that the province of Manitoba implemented legislation in 2012 requiring AEDs to be installed in high-traffic public places such as gyms, arenas, community centres, golf courses, schools and airports by January 31, 2014. This law also requires AEDs to be registered so that 911 dispatchers can direct callers to locate them in situations involving cardiac arrest.

### Dispatch Staffing

In our *2005 Annual Report*, we indicated that we would follow up on dispatch staff turnover rates at the time of our next audit.

At our request, during our current audit the Ministry conducted an analysis of dispatcher turnover rates for the 2012 calendar year. This analysis indicated that the turnover rate for both full-time and part-time staff had improved since the time of our last audit, with a significant improvement in the turnover rate for full-time staff.

However, we noted that many dispatch staff handled significantly more calls than the ministry target of 4,200 calls per year for a full-time dispatcher. According to the Ministry, handling significantly more calls than the target may result in delays or errors in call-taking and/or dispatching, both of which can negatively affect patients. (See also the “Ministry Oversight of Dispatch Staff” section later in this report.) Overall, 13% of staff handled more than 5,000 calls each in 2012, well in excess of the ministry target of 4,200.

## RECOMMENDATION 2

To ensure the most efficient use of land ambulance services, the Ministry of Health and Long-Term Care should:

- assess the effectiveness of the two protocols used in Ontario to prioritize calls and dispatch ambulances, including comparing the dispatch priority determined by the protocols with the paramedics’ evaluation upon reaching the patient, and adjusting the protocols where needed to reduce excessive over-prioritization of patients;
- consider updating software that assists dispatchers in choosing the best ambulance to dispatch so that it identifies both the ambulance with the shortest actual travel time and the most appropriate one in order to maintain emergency coverage across the entire geographic area involved, as two municipalities have already done; and
- work with dispatch centres to best match staffing with call volumes, with a view to reducing the number of staff handling significantly more calls than the Ministry’s target, and thereby helping to reduce the potential for delays and errors.

To better enable patients experiencing cardiac arrest to receive treatment as soon as possible, the Ministry should incorporate information on the locations of publicly available automated external defibrillators (AEDs) into dispatch protocols.

## MINISTRY RESPONSE

The Ministry has engaged a provincial base hospital to conduct a comprehensive review to assess the two medical dispatch protocols used in Ontario. This review includes a comparison of key elements of the two protocols, which are designed to be highly responsive and ensure that patients receive the most appropriate ambulance response. As part of the review, the Ministry will also consider the results of a 2011

evaluation report, conducted by a provincial base hospital, which indicated that enhanced prioritization is a necessary property of medical dispatch protocols.

The Ministry will consider updating its software to continue to improve the provincial ambulance dispatch system. In doing so, the Ministry will continue to consult with working groups to add enhanced functionalities to support dispatch decision-making that have been, and continue to be, implemented at Ministry early adoption sites. Information technology work currently under way includes enhancements to existing tools used by dispatchers to select the most appropriate ambulance and maintain emergency coverage. Successes from the initial implementations will inform decisions for appropriate province-wide distribution.

The Ministry is currently reviewing dispatch staffing levels and call volumes to determine optimal staffing levels at each of its dispatch centres to ensure effective service delivery.

The Ministry is currently developing a web-based AED registry that will list AEDs in public and other municipal and First Nations locations. AED locations will be provided to the Ministry on a voluntary basis by municipalities and First Nations, and published on the ministry website.

The Ministry will request that its Medical Advisory Committee review the medical efficacy of incorporating the location of AEDs from this registry into dispatch protocols. The Ministry will incorporate AED information into dispatch protocols if the Medical Advisory Committee supports this initiative.

## ALTERNATIVES TO TRANSPORTING PATIENTS TO EMERGENCY ROOM

In Ontario, ambulances generally transport patients to hospital emergency rooms. In contrast, in the United Kingdom, alternatives to

transporting patients by ambulance are used. In 2011, the United Kingdom's National Audit Office estimated a minimum savings of £100 million (about \$150 million) annually resulting from various emergency room diversion strategies, such as providing telephone medical advice and providing treatment at the scene.

In Ontario, once an ambulance is dispatched, ministry policy—which was developed based on advice from its Medical Advisory Committee—generally requires ambulance paramedics to transport patients to a hospital, unless the patient signs a form indicating that he or she refused transport. Therefore, even if paramedics successfully treat a patient's condition at the scene, they still transport the patient. The Ministry indicated that this approach is taken because of concerns that paramedics may miss a potential risk to the patient.

## Telephone Medical Advice

Telehealth Ontario is a 24-hour, seven-day-a-week Ministry-funded service that provides telephone medical advice. Telehealth's nurses assist callers in determining whether their medical condition can be treated at home, and if so, advise callers on self-treatment. For more serious conditions, callers are advised to see their family physician or go to the emergency department, as appropriate.

Only one of Ontario's 22 land ambulance dispatch centres uses a dispatch protocol that identifies patients who can be referred to Telehealth. This dispatch centre offers low-risk patients a choice between calling Telehealth and having an ambulance dispatched. When appropriate, it will also refer patients to other services such as the Ontario Poison Centre. This dispatch centre estimates that in a typical month, more than 200 calls (or about 1% of its call volume) are referred to Telehealth, and that an ambulance is subsequently dispatched for about 15% of these calls.

The Ministry has not assessed this dispatch centre's policy of referring low-risk patients to Telehealth or other programs such as the Ontario Poison

Centre. Such an analysis could include determining whether or not patient outcomes indicate that the practice is safe, and whether it could be appropriate for broader use across Ontario. The Ministry informed us that it does not currently support ambulance diversion strategies such as referring low-risk callers to Telehealth due to concerns that dispatchers may identify patients as low risk when they are actually higher risk. We noted that the United Kingdom publicly reports on referrals to medical telephone advice. For example, in January 2013, 12 ambulance services reported data indicating that 6% of callers received telephone advice; in 87% of these instances, the issue was fully resolved by phone.

### Treating Patients at the Scene: Paramedic Care

Paramedics in some jurisdictions can treat certain types of patients at the scene, resulting in the patient not requiring ambulance transport. For example, in Nova Scotia and Alberta, paramedics treat diabetic patients who are experiencing hypoglycemia (low blood sugar) and provide them with instructions on caring for themselves, instead of transporting them to hospital. Further, in Calgary, Alberta, policies on treating patients at the scene resulted in fewer patients being transported to hospital in 2012. In the United Kingdom, 12 ambulance services reported data indicating that in January 2013 about 30% of patients were treated by paramedics at the scene. They further reported that only 6% of these patients subsequently requested an ambulance in the next 24 hours. These and other jurisdictions have established medical policies on when and how patients are to be treated at the scene to assist paramedics in providing patient treatment in accordance with best practices.

Notwithstanding the ministry policy generally requiring ambulances to transport a patient, we noted that in 2012, over 25% (or about 350,000) of ambulances dispatched did not transport a patient. The Ministry has not assessed the underlying reasons for not transporting patients—to determine,

for example, how many of these situations arose due to patient refusals, calls cancelled before arrival of an ambulance, or paramedics having successfully treated patients at the scene. Although base hospitals review a sample of calls where no patient is transported to ensure that appropriate patient care was provided, they do not identify the number of patients who were successfully treated by paramedics at the scene.

### Treating Patients at the Scene: Emergency Response Vehicles

A non-ambulance emergency response vehicle (ERV) cannot transport patients, but is staffed with a paramedic who can provide treatment at the scene. We noted that other jurisdictions, such as Australia and the United Kingdom, use these vehicles to treat patients at the scene. One municipality we visited had expressed interest in doing this for patients when medically appropriate.

In Ontario, ERVs are generally dispatched only in conjunction with an ambulance, because all patients are expected to be transported. The Ministry indicated that the ERV enables patients to be assessed and treated earlier, while waiting for an ambulance. The Ministry also indicated that it is up to each municipality to decide whether or not to use ERVs.

Although the Ministry funds about half the cost of ERVs, it has not evaluated the extent of their use or their cost-effectiveness. At our request, the Ministry produced a report on municipalities' use of these vehicles. This report indicated that ERVs were dispatched for only 10% of calls in 2012, despite making up 26% of the municipal land ambulance services' total combined fleet. By contrast, this type of vehicle represents only 18% of the fleet in New South Wales, Australia, where patients can be treated on the scene and avoid transport. We further noted that some Ontario ambulance services used their ERVs infrequently to respond to calls. For example, although ERVs constituted about 37% of the total active fleet in one municipality, it responded to about 1% of calls with these vehicles.

Furthermore, although municipalities' ambulance deployment plans indicated that many of the ERVs were staffed with advanced-care paramedics, some were staffed with ambulance service chiefs or assistant chiefs, whose primary duties do not include responding to calls. At the three municipalities we visited, various vehicles were used as ERVs, including SUVs and pickup trucks. The cost of these vehicles, fully equipped (including about \$30,000 for a defibrillator), ranged from \$53,000 to \$117,000. The municipalities we visited indicated that their ERVs were often used for administrative purposes, including supervision, training and real-time quality assurance. As well, the vehicles are fully equipped so that they can respond to a patient call if needed. We noted that in other provinces that more regularly treat patients at the scene, less than 5% of their ambulance fleets consist of ERVs.

### RECOMMENDATION 3

To ensure that patients receive necessary care that meets their needs and that patients are not unnecessarily transported to an emergency department, the Ministry of Health and Long-Term Care should consider introducing emergency room diversion policies, similar to those used in other jurisdictions, that meet patients' care needs by, for example, providing referrals to Telehealth for telephone medical advice, and treating at the scene.

The Ministry, in conjunction with the municipal land ambulance services, should also evaluate the cost-effectiveness of non-ambulance emergency response vehicles, including how many are needed and how best to use them to meet patient needs. The evaluation should include a study of practices in other jurisdictions with better utilization.

### MINISTRY RESPONSE

The Ministry will request that the Ontario Base Hospital Group, in consultation with municipal land ambulance service providers, determine

the most effective emergency room diversion strategies for Ontario to ensure that patients get the care they need at the right time and in the right place.

In partnership with municipal land ambulance service providers, who are responsible for determining the appropriate composition of their ambulance fleets, the Ministry will conduct an evaluation of the use of emergency response vehicles to identify best practices for their utilization.

### QUALITY ASSURANCE

In order to ensure consistent quality in ambulance services, ongoing processes are needed to identify and resolve issues, particularly those that may negatively affect patients. To be most effective, such processes should follow the continuum of care from the time the call is received until the patient is released from the hospital. Various methods are used to gain assurance regarding the quality of these services, as shown in Figure 8.

Every three years, the Ministry conducts service reviews of dispatch centre, land ambulance, and base-hospital services. Such reviews aim primarily to assess whether legislative requirements are met and ministry policies are followed—including, for example, compliance with the Ministry's patient-care standards. Since our last audit, the Ministry has improved the timeliness of the follow-up on these reviews, and most have concluded after one visit that the service is complying with required standards.

Although the Ministry has improved its service review, inspection and complaint processes since the time of our 2005 audit, we noted further suggestions to enhance these processes and shared them with the Ministry.

Because service reviews occur only every three years and complaint investigations occur only if a complaint is received, ambulance services require other ongoing quality assurance processes to

**Figure 8: Selected Quality Assurance Processes and Who Conducts Them**

Source of data: Ministry of Health and Long-Term Care

	Responsible Entity		
	Ministry	Municipalities	Base Hospitals
Quality Assurance on Dispatch Centres	<ul style="list-style-type: none"> <li>Conducts quarterly reviews of call taking and ambulance dispatching in accordance with the Ministry's standardized process.</li> <li>Conducts service reviews<sup>1</sup> every three years to ensure compliance with legislation and ministry policies.</li> <li>Conducts random inspections<sup>2</sup> of limited scope that generally look at security of call records maintained and cleanliness of the dispatch centre.</li> <li>Conducts investigations of dispatch-related complaints.</li> </ul>	<ul style="list-style-type: none"> <li>No role with respect to dispatch centres' quality assurance.</li> </ul>	<ul style="list-style-type: none"> <li>No role with respect to dispatch centres' quality assurance.</li> </ul>
Quality Assurance on Ambulance Service	<ul style="list-style-type: none"> <li>Conducts service reviews<sup>1</sup> every three years to ensure compliance with legislation and ministry policies, and certifies those passing to provide services in Ontario. <i>(Results provided to ambulance services.)</i></li> <li>Conducts random inspections<sup>2</sup> of limited scope that generally look at equipment stock levels, ambulance/ambulance station cleanliness, and maintenance of vehicles. <i>(Results provided to ambulance services.)</i></li> <li>Conducts investigations of ambulance service-related complaints. <i>(Results provided to ambulance services.)</i></li> </ul>	<ul style="list-style-type: none"> <li>Conduct processes determined by each municipality to ensure paramedics comply with the Ministry's <i>Basic Life Support Patient Care Standards</i>.</li> </ul>	<ul style="list-style-type: none"> <li>Conduct processes determined by each base hospital to ensure that paramedics comply with the Ministry's <i>Advanced Life Support Patient Care Standards</i>. <i>(Results provided to Ministry.)</i></li> <li>May conduct patient outcome reviews (at base hospital discretion).</li> </ul>
Quality Assurance on Base Hospitals	<ul style="list-style-type: none"> <li>Conducts service reviews<sup>1</sup> every three years to ensure compliance with legislation and ministry policies. <i>(Results provided to base hospitals.)</i></li> </ul>	<ul style="list-style-type: none"> <li>No role with respect to base hospital quality assurance.</li> </ul>	<ul style="list-style-type: none"> <li>No role with respect to base hospital quality assurance.</li> </ul>

1. Service reviews are conducted by a Ministry-led team and take several days.

2. Inspections are conducted by one person and take a couple of hours.

promptly identify and resolve service problems, particularly those that may affect the quality of care given to patients. Ministry inspections are sometimes performed more frequently, but their scope is limited.

### Monitoring Patient Outcomes

The quality of ambulance services, including response times and paramedic care provided, can have a significant effect on the prognosis of certain transported patients. However, the Ministry generally does not obtain information on patient

outcomes, either overall or by ambulance service. The Ontario Municipal Benchmarking Initiative (OMBI) collects data from participating municipalities on a number of service areas. Among other topics, the OMBI collects data on the survival rate of cardiac arrest patients during ambulance trips to hospital. The 2011 results—the most recent available at the time of our audit—indicate significant variations among the 11 reporting municipalities, with survival rates for such patients ranging between 11% and 32%. No explanation was provided for the variance.

Municipalities indicated that they have had access to only certain patient-care information from dispatch centres, and this information cannot readily be compared to that maintained by the municipality. For example, municipalities indicated that they cannot obtain electronic information from dispatch centres on every patient over a given period of time who had no vital signs at the scene—information that would allow the municipalities to perform quality assurance reviews to ensure that appropriate patient care was provided. They also indicated that they cannot assess whether patients survive beyond the ambulance trip—for example, to the point of hospital discharge. All three municipalities we visited indicated that such information could help their land ambulance services identify ways to improve ambulance services. However, the Ministry indicated that municipalities should be able to access this information both from dispatch centres and from hospitals and was not sure why they had been unable to do so. We noted that ambulance services in the United Kingdom measure how many cardiac arrest patients transported by ambulance survive until discharge from hospital.

Base hospitals have access to the patient records maintained by each ambulance service on every person transported. The Ministry gives base hospitals discretion on whether or not to review patient outcomes. We noted that reviews of patient outcomes are rare, in part because base hospitals are, under the *Personal Health Information Protection Act, 2004*, generally unable to access patient information maintained by hospitals in their region regarding patients transported. As well, the Ministry has no province-wide data by patient condition (for example, number of stroke patients transported).

### Ministry Oversight of Dispatch Staff

At the time of 2005 audit, the Ministry told us that it was piloting a standardized quality assurance process for dispatch centres. This process was implemented in 2006 at the 20 centres that use the DPCI II dispatch protocol and was subsequently

revised in 2012. We noted the following regarding the revised quality assurance process:

- A specially trained quality programs officer is to conduct quarterly reviews of 48 call-taking and 48 dispatching activities (a total of 96 calls), giving each a numeric score, and to forward summary information and details specifying areas where dispatch staff performed poorly to the Ministry's senior management.
- Dispatch supervisors are to conduct quarterly live (real-time) reviews of three call-taking and three dispatching activities for each dispatch staff person, with a smaller number of peer reviews to be conducted by dispatch supervisors on the performance of other dispatch supervisors at the same dispatch centre. Although the Ministry obtains the number of live and peer reviews conducted, ministry management who oversee the dispatch centre do not get the results of these reviews unless a specific dispatcher has recurring problems. Therefore, the Ministry cannot identify any systemic issues from these reviews. Quality programs officers are not required to ensure that these reviews are done.

Implementing this quality assurance process is a positive step in the Ministry's management of dispatch centres. Our review of the results for two recent quarters indicated that dispatch staff complied with policies over 90% of the time for most requirements. However, in the most recent of these quarters, dispatch centre staff were only about 60% compliant in documenting both the reason for any deviations from the recommended priority code and the reason for not providing any recommended pre-arrival instructions to callers. (For example, for patients experiencing cardiac arrest, DPCI II requires dispatchers to suggest that callers perform CPR—cardiopulmonary resuscitation—and then instruct callers on how to perform it.) We also noted that the Ministry's analyses of dispatching performance did not include certain systemic issues that would highlight the need for additional training, such as insufficient medical knowledge

and/or understanding of the dispatch protocol, or insufficient computer skills to effectively use the dispatch tool. Subsequent to our fieldwork, the Ministry indicated that it had not analyzed systemic issues because this process has been in place for just 17 months.

We noted that about half of the dispatch centres employed an independent quality programs officer to conduct these reviews, whereas the other centres used other staff. For example, two dispatch centres that did not have a quality programs officer told us that their call reviews were done by a training officer and an operations manager, respectively, both of whom share some responsibility for the performance of dispatch staff and therefore may not be objective.

When dispatch centres conduct live reviews, the staff being reviewed are generally given advance notice. In our view, live reviews conducted without advance notice would be more likely to reflect the staff person's typical performance.

In addition, we found that two of the six dispatch centres we reviewed were not providing timely feedback to staff on their performance. One of these dispatch centres had not completed any individual dispatch staff audits during half of the six months we reviewed. At the other, in most cases there was no evidence that feedback on areas requiring improvement was provided after the reviews.

### Municipal Oversight of Paramedics' Performance

Most ambulance patients require paramedics to perform only basic life support procedures, such as those needed when assessing and managing chest pain, hip fractures, labour and childbirth, and allergic reactions. The Ministry's *Basic Life Support Patient Care Standards* document explains when and how to perform these procedures.

Municipal land ambulance service providers are responsible for monitoring paramedics' compliance with the Ministry's basic life support standards. (As discussed in the next section, base hospitals

monitor the quality of more advanced life support procedures performed by paramedics.) It is up to each municipal service provider to determine the type and frequency of monitoring. All three ambulance service providers we visited indicated that they randomly selected ambulance call reports for review. The frequency of such reviews varied among the three service providers: one reviewed about 15 (of about 120) ambulance call reports a day, another reviewed slightly more than that for its urban areas and all of its rural calls, and the third performed reviews of selected call reports for each paramedic only once a year for the purposes of annual performance reviews. None of the service providers performed issue-specific reviews—for example, to review all childbirth-related calls in a six-month period.

Senior management, such as deputy chiefs, performed the reviews at two of the three service providers we visited, whereas superintendents generally performed the reviews at the third. However, one service provider indicated that it sometimes asked its base hospital to provide feedback on whether its paramedics were following basic life support standards. Two base hospitals we contacted indicated that, when requested, they reviewed paramedics' compliance with basic life support standards for some land ambulance service providers; two base hospitals also noted that, in their view, such municipal providers do not have the expertise to provide proper medical oversight. One indicated that base hospitals should review paramedics' treatment of higher-risk conditions, such as childbirth and fractures.

The Ministry has not asked municipal land ambulance services to report to the Ministry on the results of their basic life support reviews. The Ministry indicated that it reviews a sample of ambulance call reports to test the municipalities' quality assurance process. However, the results of this review were not documented. As a result, the Ministry is not aware of whether a sufficient number of reviews are being conducted or whether there are systemic issues that should be addressed province-wide.

## Base-hospital Oversight of Paramedics' Performance

The Ministry has agreements with the seven base hospitals—consolidated from 21 in 2009 in response to recommendations in our *2005 Annual Report*—to, among other things, monitor the appropriateness and quality of the patient care that paramedics provide. Each base hospital is assigned a different region of the province.

Most land ambulance paramedics in Ontario are either primary-care paramedics (PCPs) or advanced-care paramedics (ACPs). These practitioner levels reflect which medical procedures each is able to perform according to legislation and ministry policy. More specifically, PCPs can, for example, check patients' airways and breathing, administer certain medications such as aspirin, and use an external defibrillator on a patient. ACPs can perform the same medical procedures as PCPs, but can also perform others, such as intubating patients (inserting a breathing tube) and treating seizures. Municipalities are responsible for deciding how many PCPs and ACPs to hire. We noted that in nine municipalities, more than 30% of paramedics were ACPs, whereas in 35, less than 10% were ACPs. Overall, about 20% of Ontario's approximately 7,000 paramedics are ACPs.

## Monitoring Paramedic Provision of Advanced Life Support Procedures

The Ministry does not track how often ambulance calls require advanced life support procedures (any of which can be performed by ACPs, but only a few of which—such as administering glucose—can be routinely performed by PCPs) or how often an ACP is needed. One base hospital indicated that about 85% of its ambulance call reports (the medical record used by paramedics to document each call) described only basic life support acts. Our review of data from an ambulance service provider from another region of Ontario indicated that 70% of its calls required just basic life support and that as few

as 2% of all ambulance call reports noted the performance of any procedure that required an ACP.

Research indicates that advanced life support procedures—and in particular those specified by law as generally performable only by ACPs (such as inserting a breathing tube)—are typically more risky for patients than basic life support procedures. It is therefore all the more important for ACPs to maintain their abilities through practice. However, with so few opportunities to perform advanced life support procedures, ambulance services run the risk of their ACPs' proficiency diminishing. This is especially the case in municipalities with a high proportion of ACPs. Two of the base hospitals we talked to indicated that they were concerned about ACPs' proficiency dropping due to lack of practice and an insufficient amount of ongoing training.

## Transferring Patient Information to Hospitals

Once a patient arrives at the hospital, paramedics need to ensure that information about the patient's condition and the care provided so far is communicated as efficiently and accurately as possible. However, almost none of the ambulance services are able to electronically download their ambulance call reports to the admitting hospital. Instead, after orally reporting the relevant information to hospital staff, ambulance crews either provide a paper call report before leaving for the next call or send in the call report within the next day or two. Staff from three busy emergency departments across Ontario told us they were generally satisfied with the patient information paramedics provided to them orally. But they also confirmed that receiving a copy of the call report a day or two later is not useful for making time-sensitive patient treatment decisions.

One particular type of information that is key to providing appropriate patient care, but that may not always be passed on to hospital staff, is the results of any paramedic-performed electrocardiogram (ECG) test. A three-month study conducted by one base hospital in 2011 found that in 13% of cases where a paramedic had done an

ECG test that showed heart rhythm abnormalities, a later ECG test performed at the hospital did not. In two-thirds of these cases, the paramedic-performed ECG test indicated that the patient may have had a heart attack. The Emergency Health Services Branch's Medical Advisory Committee has expressed concerns about such information not being provided to hospitals, and emergency department staff we spoke with indicated that they would have no way of knowing if this information was not provided to them.

At the time of our audit, the Medical Advisory Committee was evaluating whether to recommend that paramedics be required to submit an ambulance call report to the hospital before leaving, but no solution had been proposed for ensuring that paramedics provide all available test results to hospital staff.

Because base hospitals do not have the resources to periodically accompany paramedics in order to assess the care they provide first-hand, most of the patient-care reviews conducted by base hospitals focus on ambulance call reports. The agreements with the Ministry require base-hospital staff to review the reports only from those calls in which a paramedic performs an advanced life support procedure, such as using an external defibrillator or intravenously administering specific drugs. Our review of 2011/12 information from three base hospitals showed that paramedics in those regions complied with standards over 90% of the time when performing advanced life support procedures.

In 2006, the Ministry provided municipalities with a list of items that must be included in electronic ambulance call reports (called e-PCRs). Even though by the time of our audit, most municipalities had transitioned to e-PCRs—about 15% of municipalities, including Peel Region, continue to use paper call reports—the Ministry did not centrally co-ordinate the acquisition of these patient-care technologies, with the result that many different brands of software are now used even within a single base-hospital region. Therefore, when base hospitals download the data, it is in different

formats, which limits their ability to analyze it on an overall basis (for example, for all patients with a certain condition). As well, base hospitals had to manually enter the paper-based information. At the time of our audit, base hospitals were planning to contract for a common database to house data from ambulance call reports for all base hospitals.

## RECOMMENDATION 4

To promote better-quality land ambulance dispatch services and patient care by paramedics, the Ministry—working in conjunction with municipalities where applicable—should:

- require independent unannounced reviews of calls received by dispatch centres to ensure that they are being appropriately handled by all dispatch staff, including timely feedback to staff to prevent recurring problems, and obtain summary information on these reviews in order to identify any systemic issues;
- consider establishing guidelines on the desired proportion of advanced-care paramedics (ACPs) and ensure that ACPs receive sufficient ongoing experience to retain their proficiency;
- ask base hospitals to periodically review paramedics' basic life support skills, since these skills are used on every ambulance call;
- ensure that paramedics provide patient information documents (including all available test results) to emergency departments in time for the information to be useful for making patient-care decisions; and
- ensure that processes are in place to enable municipal land ambulance services to readily access dispatch information required for patient-care trend analyses and to periodically analyze hospital outcomes for ambulance patients.

## MINISTRY RESPONSE

The Ministry will review this recommendation as part of the continuous improvement of the current Quality Assurance Program for ambulance dispatch to ensure that dispatch staff are provided with timely feedback and that corrective action is taken to address individual and systemic issues. The Quality Assurance Program is now providing comprehensive monitoring, evaluation and reporting of dispatcher performance and compliance with ministry policies, practices, standards and procedures to accurately assess dispatching and deployment decisions on the individual, dispatch centre, and system levels.

Municipal governments are responsible for making decisions on the composition of their paramedic workforces, based on the needs identified by each municipality and the resources available in each municipality. The Ministry will direct provincial base hospitals, in consultation with municipal land ambulance service providers, to review the existing paramedic education and training programs to ensure that all paramedics receive appropriate training and ongoing experience to maintain and improve their proficiency.

The Ministry will request that the Ontario Base Hospital Group and municipal land ambulance service providers evaluate practices currently used to review paramedics' basic life support skills.

The Ministry has initiated discussions with its Medical Advisory Committee and the Ontario Association of Paramedic Chiefs to review existing patient documentation standards and develop recommendations that will ensure the timely provision of patient information documents to emergency departments.

The Ministry will work with municipal land ambulance service providers and the Ontario Base Hospital Group to standardize

information-sharing protocols in order to ensure the timely and appropriate exchange of patient information to further improve patient outcomes.

## MINISTRY FUNDING TO MUNICIPALITIES

The *Ambulance Act* states that municipalities are responsible for funding land ambulance services and gives the Ministry discretion on whether or not to fund municipalities for these services. At the time of our 2005 audit, the Ministry generally funded 50% of Ministry-defined eligible costs, which resulted in the Ministry funding less than 40% of the land ambulance costs incurred by some municipalities. However, in general, municipalities that spent more received more ministry funding, regardless of the number of calls for ambulances received, the service levels provided, the population size served, or the geographical area covered. At that time, the Ministry informed us that varying ambulance services levels were expected because of the varying resources of municipalities (due to, for example, differences in municipal tax bases). As a result, we recommended that the Ministry develop a process to better achieve the existence throughout Ontario of a balanced land ambulance system. Further, the PAC recommended in 2006 that the Ministry re-examine its funding model, including incentives and disincentives aimed at promoting efficiencies in the use of the health-care system's resources, specifically related to land ambulance services.

Between 2005 and 2009, the Ministry adjusted its funding formula three times. Although some municipalities received larger increases than others, these revisions, along with increases to compensate for inflation, resulted in the combined funding to municipalities (including funding for the offload nurse program that ranged from \$4 million in 2008/09 to \$12 million in 2011/12) almost doubling between the 2004/05 and 2011/12 fiscal years, as shown in Figure 9. The number of patients transported increased by 18% over the same period.

By 2009, the Ministry was funding 50% of all salary increases (previously, only a maximum percentage increase was funded) and 50% of all municipal overhead costs allocated to land ambulance services (previously, only a maximum overhead allocation was funded). Since 2009, ministry funding to municipalities has increased about 6% per year. However, at the time of our current audit, municipalities that spent more still received higher ministry funding, regardless of service levels and other factors. In this regard, the Ministry had not analyzed—for example, through a review of municipalities' ambulance deployment plans—whether similar ambulance coverage is provided for similar population sizes or similar geographic areas. The Ontario Municipal Benchmarking Initiative reported that in 2012, the total cost per hour of land ambulance services for the 13 reporting municipalities ranged from a low of \$156 to a high of \$247, and averaged \$189. The cost varied significantly even among urban municipalities.

By 2012, the Ministry was funding approximately 50% of each municipality's estimated prior-year expenditures plus a Ministry-established percentage increase for inflation. (For example, funding for 2012 was based on each municipality's 2011 revised and approved budgets, plus 1.5%.) Because

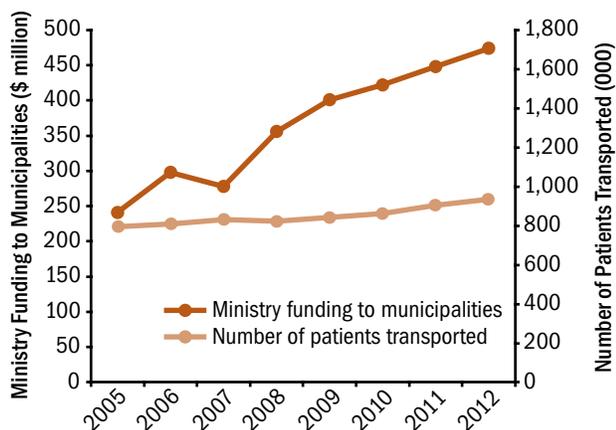
the funding is based on prior-year expenditures, the Ministry does not fund the first year of municipal service enhancements, such as additional paramedics or a new ambulance base: funding begins only the year after a municipality has introduced these services. Therefore, less-affluent municipalities may delay introducing such enhancements.

The Ministry does not review whether the costs to provide certain service levels are comparable among similar municipalities with similar targeted service levels. Further, neither the Ministry nor the municipalities know whether the additional ministry funding has resulted in better value for money in terms of service levels and patient outcomes.

Municipalities we visited indicated that the Ministry's funding rules lead to uncertainty about how much funding will be received each year. This situation hinders municipal planning for ambulance services, especially when the Ministry's funding notification is often not received by municipalities until partway through the funding year. For example, the Ministry notified municipalities in June 2012, or halfway through the year, what their funding would be for 2012. Further, municipalities do not always know which costs the Ministry will fund. For example, municipalities did not know until August 2012 whether the Ministry would pay for any costs associated with the offload nurse program during the 2012/13 fiscal year.

**Figure 9: Ministry Funding to Municipal Land Ambulance Services and Patients Transported, 2005–2012**

Source of data: Ministry of Health and Long-Term Care



## RECOMMENDATION 5

To ensure a balanced land ambulance system throughout Ontario, the Ministry should:

- determine—for example, through a review of municipalities' ambulance deployment plans and service costs—why there are differences in ambulance service levels and costs for similar populations and geographic areas; and
- develop processes, such as incentives, to promote efficient ambulance service delivery—including minimum service levels or benchmarks—especially where differences exist.

The Ministry should also clearly communicate planned funding levels to municipalities in time to support municipal planning processes.

### MINISTRY RESPONSE

The Ministry will consult with municipal land ambulance service providers to identify potential areas to review, such as differences in ambulance service levels and costs for similar populations and geographic areas, to determine best practices in ambulance service delivery. The Ministry will provide the results of this consultation to municipalities to assist them in planning and delivering municipal land ambulance services in accordance with legislated responsibilities under the *Ambulance Act*.

lance services in accordance with legislated responsibilities under the *Ambulance Act*.

The Ministry will ensure that funding rules are communicated clearly and on a timely basis to municipalities. Ministry funding is based on a municipality's Council-approved revised budget from the previous year, with an incremental adjustment to account for increased costs. The Ministry's Land Ambulance Services Grant reflects municipally budgeted expenditures, and the Ministry remains committed to the 50/50 cost-sharing framework, which provides municipalities with the necessary assurances for system and budget planning.

## Glossary

**advanced care paramedic (ACP)**—A paramedic who is trained and certified to perform advanced life support procedures as well as basic life support procedures.

**advanced life support procedures**—More complex medical procedures, all of which can be performed by advanced care paramedics and some of which can be performed by primary care paramedics.

**ambulance call report**—A report, in either paper or electronic (called an e-PCR) form, that must be completed for all patients seen by ambulance paramedics. It is required to include, among other things, the patient's name and condition, as well as details of the care provided by the paramedics.

**ambulance response time**—The time from when the dispatcher notifies the ambulance crew until the time the ambulance arrives at the scene.

**Association of Municipalities of Ontario (AMO)**—An organization that represents and provides support for its over 400 municipal members in Ontario.

**automated external defibrillator (AED)**—A portable electronic device that can analyze a patient's heart rhythm and deliver an electric shock to a patient with life-threatening irregular heartbeat in order to re-establish a normal rhythm.

**base hospitals**—Seven hospitals in the province with agreements with the Ministry of Health and Long-Term Care to, among other things, monitor the appropriateness and quality of the advanced life support procedures that land ambulance paramedics perform. Each base hospital is assigned a different region of the province.

**basic life support procedures**—Less complex medical procedures performed by all paramedics, such as assessing and managing chest pain and allergic reactions.

**call takers**—The staff at the dispatch centre who obtain information from each caller about the patient and determine the call's priority.

**Canadian Triage and Acuity Scale (CTAS)**—The method used by triage nurses in hospital emergency rooms, and by paramedics on arrival at the patient's location and when departing the scene with the patient, to assess how urgently a patient requires care. See Figure 3 for descriptions of the various levels.

**cardiac arrest**—The sudden cessation of a person’s heartbeat.

**Cardiac Care Network of Ontario**—A non-profit organization funded by the Ministry of Health and Long-Term Care that helps co-ordinate and evaluate cardiovascular care in Ontario.

**cardiopulmonary resuscitation (CPR)**—A series of life-saving procedures that improve the chance of survival for people who experience cardiac arrest. CPR includes chest compressions to assist with blood circulation to the heart and brain and may also involve checking to ensure that the person’s airways are open and administering breaths to improve oxygen flow.

**deployment plan**—A plan developed by each municipality that is used by dispatch centres to assign ambulances and non-ambulance emergency response vehicles to calls, as well as to reposition them (for example, to be close to the next anticipated call).

**designated delivery agents**—District Social Services Administration Boards, created by the province, in northern districts to deliver community services, including land ambulance services.

**dispatch centres**—Call centres that receive requests for ambulances, primarily from 911 call centres or hospitals. Dispatch centres are responsible for prioritizing calls and notifying land ambulance crews to go to the patient.

**Dispatch Priority Card Index (DPCI) II**—The dispatch system, developed by the Ministry of Health and Long-Term Care with input from physicians, used by 20 of Ontario’s 22 dispatch centres to prioritize patients. See Figure 3 for descriptions of the various priority codes.

**dispatch response time**—The time from call receipt until a dispatcher advises an ambulance crew to go to the patient location.

**dispatchers**—Staff at a dispatch centre who assign calls to ambulance crews and direct the movement of ambulances to respond to new calls.

**ECG (electrocardiogram)**—A diagnostic test that checks the functioning of a patient’s heart by measuring and recording its electrical activity.

**emergencies**—911 calls prioritized by DPCI II as Code 4, and by MPDS as Codes Echo and Delta. Ambulances are generally sent to these calls with lights and sirens. Refer to Figure 3 for a description of the various priority codes.

**Emergency Health Services Branch**—The branch within the Ministry of Health and Long-Term Care that oversees the land ambulance program, including dispatch operations. It sets patient-care and ambulance equipment standards, monitors and ensures compliance with those standards, and, through service reviews, certifies ambulance service providers to operate in Ontario.

**Emergency Response Vehicles (ERVs)**—Vehicles, such as SUVs and pickup trucks, generally staffed with one paramedic and equipped to treat but not transport patients. ERVs can also be used for administrative purposes, such as supervision and training.

**e-PCR**—See ambulance call report.

**heart attack**—A condition in which a person’s heart continues to beat but blood flow is blocked.

**intravenous**—A drug or other liquid solution injected into a patient’s vein.

**intravenous glucose**—A sugar liquid solution that is injected directly into a patient’s vein, often used to restore blood sugar levels in patients.

**Land Ambulance Committee**—A committee co-chaired by the Ministry of Health and Long-Term Care (Ministry) and the Association of Municipalities of Ontario that includes representatives from various municipal ambulance services. It considers municipal concerns related to the delivery of land ambulance services in Ontario and provides advice on these issues to the Ministry.

**Medical Advisory Committee**—A group consisting primarily of senior staff from base hospitals that advises the Ministry of Health and Long-Term Care on medical issues related to the delivery of emergency medical services and pre-hospital care.

**Medical Priority Dispatch System (MPDS)**—The dispatch system used by two of Ontario's 22 dispatch centres to prioritize patient conditions when a call is received. See Figure 3 for a description of the various priority codes.

**offload**—The process of transferring a patient from the ambulance to the hospital.

**offload nurse**—A nurse hired by a hospital exclusively for receiving lower-risk patients who arrive by ambulance.

**Offload Nurse Program**—A program introduced by the Ministry of Health and Long-Term Care in 2008 to reduce ambulance offload delays by providing funding for offload nurses.

**Ontario Association of Paramedic Chiefs**—A not-for-profit organization, consisting of senior management from municipal land ambulance services and nine contracted ambulance service providers, that provides advice to the Ministry of Health and Long-Term Care regarding emergency medical services in Ontario.

**Ontario Hospital Association (OHA)**—An organization that advocates on behalf of its members, which comprise about 150 hospitals. Among other things, it strives to deliver high-quality products and services; to advance and influence health system policy in Ontario; and to promote innovation and performance improvement in hospitals.

**Ontario Municipal Benchmarking Initiative (OMBI)**—A partnership of about 15 Ontario municipalities that collect data on more than 850 measures across 37 municipal service areas, including land ambulance services, to allow comparison of performance between municipalities.

**over-prioritizing**—Prioritizing a call at a more urgent priority when there is uncertainty about a patient's condition.

**primary care paramedic (PCP)**—A paramedic who is trained to perform basic life support procedures, as well as some advanced life support procedures.

**respiratory arrest**—Cessation of breathing due to the failure of the lungs to function properly.

**Response Time Standard Working Group**—A subgroup of the Land Ambulance Committee tasked with reviewing the 1996 response-time standards and providing advice on a replacement standard.

**Standing Committee on Public Accounts**—An all-party committee empowered to review and report to the Legislative Assembly on its observations, opinions and recommendations on the Report of the Auditor General and the Public Accounts.

**STEMI (ST-segment elevation myocardial infarction)**—A specific type of heart attack resulting from a blocked artery, so called because of the way it looks on an electrocardiogram (ECG) test.