

Report 13: March 2013

STRIVING FOR QUALITY, TIMELY AND SAFE PATIENT CARE: AN AUDIT OF AIR AMBULANCE SERVICES IN B.C.

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The Honourable Bill Barisoff
Speaker of the Legislative Assembly
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Dear Sir:

I have the honour to transmit to the Legislative Assembly of British Columbia my 2012/2013 Report 13:
Striving for Quality, Timely and Safe Patient Care: An Audit of Air Ambulance Services in B.C.

Air ambulance services are a critical component of the provincial health care system, providing emergency lifesaving treatment and transporting patients across vast distances to the necessary level of care. This service, provided by the BC Ambulance Service, is particularly important in British Columbia due to this province's large size and the remoteness of some communities.

My overall conclusion is that the BC Ambulance Service is unable to demonstrate the quality, timeliness and safety of its patient care. This is largely because the BC Ambulance Service lacks a performance-based approach for managing its air ambulance services. It has not clearly defined objectives or measures and—while it has processes to support quality care, timeliness and patient safety—it does not assess its own performance to find out how well it is doing and look for ways to improve.

John Doyle, MAcc, FCA
Auditor General

Victoria, British Columbia
March 2013

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AIR AMBULANCE SERVICES are a critical component of the provincial health care system, providing emergency lifesaving treatment and transporting patients across vast distances to the necessary level of care. This service, provided by the BC Ambulance Service, is particularly important in British Columbia due to this province's large size and the remoteness of some communities.

To contribute to the best possible outcomes for patients, the BC Ambulance Service needs to provide quality, timely and safe air ambulance services. This audit was undertaken to examine whether this was the case. As these services have a direct impact on peoples' lives, I expected to find that the BC Ambulance Service was monitoring performance against defined standards and using the information to improve the performance of its air ambulance services.

My overall conclusion is that the BC Ambulance Service is unable to demonstrate the quality, timeliness and safety of its patient care. This is largely because the BC Ambulance Service lacks a performance-based approach for managing its air ambulance services. It has not clearly defined objectives or measures and—while it has processes to support quality care, timeliness and patient safety—it does not assess its own performance to find out how well it is doing and look for ways to improve. Further, it has not undertaken an overall assessment of service demands to ensure that paramedics and aircraft are located and dispatched to best meet patient needs.

Air ambulance services were established to respond quickly and appropriately to patient demands for emergency care and transportation. To know that it is providing the best air ambulance services possible with available resources, and to improve accountability for its performance, the BC Ambulance Service needs to fully evolve into an organization that focuses on patient outcomes. Existing accreditation models could provide a basis for moving the BC Ambulance Service forward in building a culture of performance management for its air ambulance services.

During the course of my audit, responsibility for the oversight of the BC Ambulance Service was transferring from the Ministry of Health to the Provincial Health Services Authority. This transition presents an opportunity for the BC Ambulance Service to better manage patient outcomes as it becomes more integrated into the overall health care system.



JOHN DOYLE, MAcc, FCA
Auditor General

I acknowledge and thank the dedicated staff of the BC Ambulance Service for their cooperation with this audit and am pleased that they have accepted the three recommendations. I look forward to receiving updates on their implementation through our follow-up process.



John Doyle, MAcc, FCA
Auditor General of British Columbia

March 2013

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AMBULANCE SERVICES provide immediate lifesaving care and transportation, making them an essential component of patient care. The British Columbia Ambulance Service, created in 1974, provides both ground and air ambulance services to all areas of the province.

Its air ambulance services—the subject of this audit—provide care and transportation for critical pre-hospital incidents, such as motor vehicle accidents, as well as air transportation between hospitals for patients requiring a higher level of care than is available in their local community.

Air ambulance services are part of a larger continuum of patient care that contribute to patient health outcomes. The BC Ambulance Service influences those outcomes by how it manages the quality, timeliness and safety of the air ambulance services it provides. Providing quality, timely and safe services requires that the BC Ambulance Service secure and dispatch aircraft and skilled paramedics quickly and effectively to meet patient needs.

We carried out this audit to determine whether the BC Ambulance Service provides quality, timely, and safe patient care through its air ambulance services. We did this by assessing whether the BC Ambulance Service:

- ◆ has defined and is meeting relevant service standards for quality of care, timeliness and patient safety; and
- ◆ is providing paramedics and aircraft based on an assessment of patient needs.

Our audit findings are specific to air ambulance services. We did not examine ground ambulance services or other health care service providers.

We concluded that the BC Ambulance Service is unable to demonstrate whether it is providing quality, timely and safe patient care through its air ambulance services.

- ◆ The BC Ambulance Service has not clearly defined its objectives or tracked relevant standards for quality of care, timeliness or safety for air ambulance activity. While it has introduced processes to improve different aspects of its service, such as streamlined aircraft dispatching initiatives and the use of on-call medical advisors, it does not manage performance to proactively identify issues, improve performance, and report results to stakeholders.
- ◆ The BC Ambulance Service provides paramedics and aircraft based on its understanding of patient needs. For example, it awards contracts for aircraft based on known business requirements, and dispatches staff and aircraft with consideration to patient condition and other factors. However:
 - it has not fully assessed whether it has the right paramedics, in the right locations, to best meet patient needs; and
 - it is not adequately reviewing air ambulance dispatch decisions to ensure aircraft and paramedics are being dispatched to best meet patient needs.



Source: BC Ambulance Service

WE RECOMMEND THAT THE BC AMBULANCE SERVICE TAKE STEPS TO ENSURE IT IS PROVIDING PATIENTS WITH THE BEST AIR AMBULANCE SERVICES POSSIBLE WITH THE RESOURCES IT HAS AVAILABLE. SPECIFICALLY, THAT THE BC AMBULANCE SERVICE:

- 1** Actively manage the performance of its air ambulance services to achieve desired service standards for the quality, timeliness and safety of patient care by:
 - ◆ clearly defining its goals and objectives for air ambulance services;
 - ◆ measuring and monitoring the timeliness of air ambulance transports and quality of care provided to patients;
 - ◆ building on current safety processes to develop a complete safety management program;
 - ◆ communicating performance results to BC Ambulance Service staff and air carrier contractors who are responsible for meeting the standards, and ensuring performance expectations are understood; and
 - ◆ communicating results with stakeholders.
- 2** Periodically review whether the distribution of staff and aircraft across the province is optimal for responding to demand for air ambulance services.
- 3** Regularly identify and review a sample of air ambulance dispatch decisions to ensure resources are allocated with due consideration for patient needs and available resources.

BC AMBULANCE SERVICE (BCAS) appreciates the efforts of the Office of the Auditor General (OAG) in auditing the air ambulance component within our Critical Care Transport (CCT) Program. BCAS was open to the audit and provided information and staff expertise to ensure the findings would be of maximum benefit to patients, our service, staff and the health care system.

In short, BCAS accepts the OAG's recommendations and is addressing the report's findings. The audit conclusions are consistent with BCAS's efforts to evolve air ambulance service from being mainly focused on daily operations and 'efforts driven', to one that is focussed strategically, actively managing performance, and, 'outcomes driven'.

BCAS is developing concrete service standards and improving data collection in order to provide the information needed to monitor performance and make evidence-based changes. BCAS believes in continually improving all of our services and will use the audit findings to further enhance air ambulance operations.

Audit Timing

This audit was undertaken at a very unique juncture in BCAS's history. In 2010, the provincial government announced that the Emergency and Health Services Commission (EHSC) would be moved into the health sector and become a division of the Provincial Health Services Authority (PHSA). Of the three agencies within the EHSC - BCAS, BC Bedline (BCBL) and Trauma Services BC - BCAS is by far the largest organization.

Aligning with PHSA has integrated BCAS within the provincial health care system and enabled the EHSC to implement new systems and processes that support quality care and improved patient and paramedic safety.

Recommendation 1: Actively manage the performance of its air ambulance services to achieve desired service standards for the quality, timeliness and safety of patient care.

BCAS has developed specific performance measures for air ambulance service and the CCT Program continues to improve the reporting system. This section of the response will outline what work has been done to date and what will be done in the future to establish, measure and report performance standards.



The inside of an air ambulance helicopter.
Source: BC Ambulance Service

Following the conclusion of three complex aircraft procurement processes in 2011 and 2012, BCAS focussed on improving the CCT Program. In late 2012, BCAS undertook a review of air ambulance and critical care services and reorganized to realign the program's four-person management structure under a single director. The director is responsible for strategic planning and performance reporting across the program, with a focus on quality of patient care, timeliness and safety.

BCAS is unique as the only agency in North America that operates ground, fixed-wing and rotary-wing ambulance service on a provincial scale. The integration of ground and air ambulance services enables BCAS to provide care that is consistent, effective and closely aligned with regional and provincial health services.

The air ambulance industry throughout the world is evolving and most are at the early stages of developing performance management programs. Each air ambulance service provider does their business differently; the industry itself does not have agreed-upon standards. To this end, BCAS is working with the Air Medical Physicians Association and other providers to develop industry-wide quality metrics which will form the basis of our performance management system, scheduled for implementation by late Fall 2013.

Quality of Care - BCAS's CCT Program is built on a foundation of robust medical oversight and integration with specialist physicians, another unique characteristic. CCT paramedics are in daily contact with critical care intensivists, prior to, during and following transports involving high acuity patients. The specialists are also involved in training the CCT paramedics. This complete integration of specialist physicians into training and oversight of the CCT paramedics has resulted in a clinical team that provides a very high level of care.

The CCT system in B.C. ensures that critical patients receive the highest paramedic care available as soon as possible. When BCAS CCT paramedics arrive in a rural hospital, they have, in effect, reduced the time for the patient to receive critical care. A recent study in the *Journal of Critical Care* conducted by Dr. Peter E. Dodek found that high acuity patients had better medical outcomes and reduced length of stay in hospital when CCT paramedics were involved in the patient transport.

BCAS actively monitors the clinical competency of CCT paramedics. The CCT clinical team conducts ongoing 'maintenance of competency' training sessions to ensure CCT paramedics are able to maintain their specialized medical skills.

BCAS's transition into PHSA enables access to a robust infrastructure of patient care quality systems that are currently being implemented throughout the EHSC. BCAS's CCT Program was among the first in the organization to implement a Patient Care Quality Committee which reviews identified patient safety issues, monitors emerging quality trends and recommends system changes to the EHSC Quality Council.

In 2013, BCAS is pursuing formal accreditation by the Canadian Medical Association (CMA) of the CCT paramedic training program. When complete, B.C. will be the second jurisdiction in Canada to provide a CMA-accredited training program for CCT paramedics.

Timeliness of Service – As stated in the report, approximately 90 per cent of air ambulance transports are for patients in hospital who require a higher level of care at another facility. These inter-facility transfers, are undertaken primarily with fixed-wing aircraft. BCAS dispatchers and BCBL call takers work with physicians at both the sending and receiving hospitals, as well as our own physicians, to ensure that the patients with the most critical illnesses and injuries are transferred first.

BCAS is developing a performance reporting system for timeliness of air ambulance service and is working to improve the reliability of the performance data to meet service standards. In 2013, the CCT Program management team will further develop performance metrics to enable proactive management of air ambulance services.

Safety – There are a number of processes in place to ensure the safety of patients, paramedics and flight crew during air ambulance transports. All identified issues are reported to management who work to find a solution in a timely manner. BCAS is working to formally track safety concerns identified by the CCT Program Occupational Health and Safety Committee to ensure that any systemic problems are identified. BCAS complies with all regulations outlined by WorkSafeBC and Transport Canada.

In 2012, BCAS developed an audit process to review the safety of our contracted aircraft providers. The process includes expertise from external subject matter experts and CCT Program staff who will undertake audits for flight operations, aircraft maintenance and contract compliance. Between March 2013 and March 2014, all BCAS aircraft contractors will be audited. In 2014/15, the internal audit process will be expanded to include high-use ad hoc, or charter, air carriers.

As recommended, BCAS will establish service standards and take a proactive approach to managing the performance of the air ambulance system with a specific focus on developing and tracking measures for quality, timely and safe patient care.

Recommendation 2: Periodically review whether the distribution of staff and aircraft across the province is optimal for responding to demand for air ambulance services.

There are a number of elements that are considered when determining where to base aircraft: call volume, call type, patient referral patterns, location of specialized health services, airport size/accessibility, paramedic training sites/opportunities, and economies of scale for base operations. Given the provincial scope of air ambulance services in B.C., the paramedics and flight crew only start and end their shifts at the bases. Many specialized medical services are located in the Lower Mainland and BCAS transfers a large number of patients to this area. BCAS actively seeks to ensure that the air ambulance service is operating effectively and paramedic care is consistent with patient and provincial health system requirements.

As recommended, BCAS will undertake a ‘blank slate’ review in order to determine whether our aircraft and personnel are in the best locations geographically to provide the best possible care for patients throughout the province. This will complement the work already done with health authorities to match resources to need.

Recommendation 3: Regularly identify and review a sample of air ambulance dispatch decisions to ensure resources are allocated with due consideration for patient needs and available resources.

As noted in the report, dispatching air ambulances is an extremely complex process with constantly changing priorities and patient and weather conditions. BCAS regularly reviews dispatch decisions when opportunities, issues or complaints arise.

In 2012, BCAS centralized all ground and air inter-facility patient transfer coordination and dispatch services into a single Patient Transport Coordination Centre (PTCC). Now, BCAS and BCBL call takers are co-located in the dispatch centre, improving the patient transfer flow processes by increasing efficiencies and consistency of service throughout the province. The consolidation of patient transfer dispatch services has also led to better overall ambulance resource planning because dispatchers can see all available resources – ground and air – at the same time.

Throughout our history, BCAS has assessed our cost-per-patient transported by air ambulance to determine efficiency of service. These informal reviews have shown that BC has the lowest cost-per-patient in Canada. However, as noted by the Auditor General, it is difficult to objectively compare the drivers of air medical transport systems throughout North America due to their vast differences in service models. In 2013, BCAS will reassess whether it is possible to accurately compare costs-per-patient to other air ambulance providers in Canada.

As recommended, BCAS will regularly review air ambulance dispatch samples in order to ensure services are operated as efficiently as possible while also considering patient needs and available resources.

Conclusion

The EHSC and its agencies and programs operate by a philosophy of continuous improvement and are developing Key Performance Indicators to monitor our performance against predetermined targets. BCAS will implement a more consistent and systematic performance management program for air ambulance operations. We are confident that we will make the improvements identified in this audit report.

A more fulsome written response to the air ambulance audit is available at www.bcas.ca.

BACKGROUND

The critical role of air ambulance services

Air ambulance services stabilize and improve patient condition at emergency scenes and during transfers to and between hospitals, contributing to the best possible results for patients as part of a larger continuum of patient care. They can contribute to positive patient outcomes by focusing on two key aspects of patient care within their control: the quality of care provided by paramedics and the timeliness of service. Ensuring that quality care is provided involves matching patient needs with the best response in terms of aircraft and paramedic expertise, as well as providing the appropriate treatment. Ensuring timeliness means arriving at the scene or hospital as quickly as appropriate to the situation, and promptly transporting the patient to appropriate care without compromising patient safety.

The combination of safely reducing transport times and sending the right people and aircraft can contribute to improved patient health outcomes and reduce the likelihood of a decline in condition or mortality.

Air ambulance services that are publicly funded must strive to provide high-quality, timely and safe patient care within their budget.

The British Columbia Ambulance Service and its air ambulance services

The BC Ambulance Service operates an integrated emergency response and patient transfer service across the province by road, air and water. It is one of the largest emergency medical services in North America. Its air ambulance services provide faster emergency responses to certain requests, provide transport where road access is not available and transport patients across vast distances between care facilities. The BC Ambulance Service does this by coordinating air ambulance with ground ambulance services and with its partners, including BC Bedline¹ and regional health authorities.

Air ambulance operations consist of paramedics, pilots, dispatchers and support staff, as well as aircraft and emergency medical equipment.



Source: BC Ambulance Service

¹ BC Bedline, in addition to providing other services, coordinates patient transfers by connecting physicians with ambulance dispatchers. During the conduct of this audit, BC Bedline was in transition to what will be called the Patient Transfer Network, with the aim to improve coordination of patient transfers. The BC Ambulance Service anticipates the completion of this transition by April 2013.

In 2011/12, the BC Ambulance Service spent \$312 million, of which \$48 million was for air ambulance services: \$38.5 million on contracts for aircraft and \$9.5 million on salaries, operating expenses and training. The BC Ambulance Service is funded entirely by the Province.

The BC Ambulance Service operates under the authority of the Emergency and Health Services Commission (EHSC). The members of the EHSC board of directors are also the members of the Provincial Health Services Authority board. Oversight for the EHSC, including the BC Ambulance Service, was in transition from the Ministry of Health to the Provincial Health Services Authority during our audit. All of these organizations are governed by the Ministry of Health.

The BC Ambulance Service provides both *pre-hospital* and *inter-facility* air ambulance responses.

- ◆ *Pre-hospital* response refers to patient care and transport between emergency scenes and hospitals, using rotary-wing aircraft (helicopters).
- ◆ *Inter-facility* response refers to patient care and transport between local health facilities and hospitals that can provide specialized care, as well as transport to take recovering patients back to their local community. Most inter-facility transfers are by fixed-wing aircraft (airplanes). BC Ambulance Service data indicates that it completes nearly 8,000 patient transports by air each year, approximately 90 percent of which are inter-facility transfers.

Air ambulance services operate on either a *dedicated* or an *ad hoc* basis.

- ◆ *Dedicated* refers to aircraft, pilots and paramedics being on standby duty solely to perform air ambulance work. There are dedicated airplanes based in Kelowna, Prince George and Vancouver. Dedicated helicopters and staff are based in Kamloops, Vancouver and Prince Rupert (see Appendix 1 for a map of the BC Ambulance Service’s air ambulance bases and dedicated aircraft resources). Each of the bases is staffed with dedicated Critical Care Paramedics, with the exception of Prince Rupert which is staffed with on-call Primary Care Paramedics (see sidebar on the following page describing paramedic classifications in B.C.).²

According to BC Ambulance Service data, over 90 percent of patients moved by air ambulance between April 2010 and September 2012 were transported by dedicated aircraft.

- ◆ *Ad hoc* refers to aircraft chartered to provide air ambulance transports on an as-needed basis. Ad hoc services are not on standby so are typically slower than dedicated services. Ad hoc aircraft can be staffed with Critical Care Paramedics or with Primary Care Paramedics.

Hypothetical air ambulance responses:

Pre-hospital

A motorist is injured in an accident 80 kilometres north of Kamloops. Based on the reported life-threatening nature of the injury, the Patient Transfer Coordination Centre (PTCC) dispatches Critical Care Paramedics by helicopter from the dedicated air ambulance base in Kamloops. Paramedics land at the roadside, begin life-saving treatment and fly the patient directly to Royal Inland Hospital in Kamloops.

Inter-facility

Doctors in Kamloops stabilize the patient and determine that she requires specialized treatment in Vancouver. The PTCC dispatches an airplane and Critical Care Paramedics from the dedicated base in Kelowna to the Kamloops airport. The patient is transported by ground ambulance to the Kamloops airport, flown to the Vancouver airport, and then transferred by ground ambulance to Vancouver General Hospital. After sufficiently recovering, and when air ambulance resources are not needed for higher priorities, the patient is driven to the Vancouver airport, flown back to Kamloops, and driven back to the hospital in Kamloops to complete her recovery.

² The BC Ambulance Service also has a team dedicated to, and specialized in, the care and transport of infants. This team is located at Children’s & Women’s Health Centre of British Columbia in Vancouver and uses air transport as necessary to serve the province.

The BC Ambulance Service can call on about 40 pre-qualified airplane and helicopter ad hoc service providers throughout British Columbia. For locations near B.C.'s eastern border, the BC Ambulance Service can also call on Alberta Health Services to provide the emergency response on a fee-for-service basis.

Air ambulance services are managed provincially, and all air ambulances are dispatched through the BC Ambulance Service's Patient Transfer Coordination Centre in Vancouver. Air ambulance helicopters are dispatched to provide coverage of up to 280 kilometres from their bases, whereas airplanes are dispatched from their base locations to provide coverage across the entire province. If, how and when an air ambulance service is provided in response to a particular incident depends on several factors, including: the condition of the patient, the patient's location relative to air ambulance resources, the availability of aircraft and paramedics given other immediate priorities, and weather conditions.

The BC Ambulance Service procures pilots and aircraft through contracts with air carrier providers. The air ambulance paramedics, however, are provincial government employees.

AUDIT OBJECTIVES AND SCOPE

We carried out this audit to determine whether air ambulance services delivered by the BC Ambulance Service provide quality, timely and safe patient care. We did this by assessing whether the BC Ambulance Service:

- ◆ has defined and is meeting relevant service standards for quality of care, timeliness and patient safety; and
- ◆ is providing paramedics and aircraft based on an assessment of patient needs.

These audit objectives were developed from industry best practices, accreditation standards, discussions with BC Ambulance Service staff and input from subject matter experts. Through this work, we determined that quality of care, timeliness, and safety are the best proxies for patient outcomes.

We carried out our audit work between August and December 2012. We examined operations and related documentation from the preceding two years concerning pre-hospital and inter-facility service, as well as dedicated and ad hoc service providers. We interviewed BC Ambulance Service management and regional staff with responsibility for air ambulance operations, as well as consulted with external subject matter experts.

The BC Ambulance Service is entirely publicly funded. It delivers air ambulance services using staff paramedics and contracted air carriers. Our audit examined how well air ambulance services are functioning within this existing service model. We did not compare the current service model to alternative service models.³ While air

³ Air ambulance programs in other Canadian jurisdictions can include privately funded not-for-profit providers, the use of physicians and nurses in flight, and wholly owned or leased aircraft.

Paramedic classification in the BC Ambulance Service

All BC Ambulance Service paramedics are licensed by the B.C. Emergency Medical Assistants Licensing Board as follows:

Primary Care Paramedic (PCP):

PCPs represent the entry level of paramedic practice. They are the most common type of paramedic working in B.C. and are located in both urban and rural areas. PCPs are licensed to provide basic emergency care such as patient assessments, basic cardiac care and trauma immobilization. In 2012, the BC Ambulance Service employed 2,499 PCPs.

Advanced Care Paramedic (ACP):

These paramedics have additional training to provide advanced emergency care, including advanced cardiac care and intubation, and typically work in B.C.'s major urban centres. In 2012, the BC Ambulance Service employed 199 ACPs.

Critical Care Paramedic (CCP):

CCPs provide specialized care for critically ill or injured patients during long distance inter-facility transfers and scene responses. These specialized paramedics work in aircraft as well as specially equipped ground ambulances, and use interventions such as expanded drug therapy and mechanical ventilation. In 2012, the BC Ambulance Service employed 47 CCPs.

Infant Transport Team (ITT):

These individuals specialize in the care and transport, of high risk maternity, neonatal and pediatric patients. In 2012, the BC Ambulance Service employed 29 ITT staff members.

ambulance is part of an integrated health care system that includes ground ambulance and services provided by health authorities, our audit focused exclusively on air ambulance services.

We conducted the audit in accordance with section 11 (8) of the *Auditor General Act* and the standards for assurance engagements established by the Canadian Institute of Chartered Accountants.

AUDIT CONCLUSION

We concluded that the BC Ambulance Service is unable to demonstrate whether it is providing quality, timely and safe patient care through its air ambulance services.

- ◆ The BC Ambulance Service has not clearly defined its objectives or tracked relevant standards for quality of care, timeliness or safety for air ambulance activity. While it has introduced processes to improve different aspects of its service, such as streamlined aircraft dispatching initiatives and the use of on-call medical advisors, it does not manage performance to proactively identify issues, improve performance, and report results to stakeholders.
- ◆ The BC Ambulance Service is providing paramedics and aircraft based on its understanding of patient needs. For example, it awards contracts for aircraft based on known business requirements and dispatches staff and aircraft with consideration to patient condition and other factors. However:
 - it has not fully assessed whether it has the right paramedics, in the right locations, to meet patient needs; and
 - it is not adequately reviewing air ambulance dispatch decisions to ensure aircraft and paramedics are being dispatched to best meet patient needs.

Results by audit objective and criteria are provided in Appendix 2.

KEY FINDINGS AND RECOMMENDATIONS

Managing Patient Outcomes

Air ambulance services stabilize and improve patient condition and contribute to the best long-term health outcomes possible. Patient outcomes are influenced by many factors outside the control of air ambulance services, such as the location of health facilities, location and size of airports, the severity of patient condition and the patient's underlying health. Air ambulance programs can influence patient outcomes by managing those factors within their control: the quality, timeliness and safety of patient care.

We therefore expected to find the BC Ambulance Service actively managing air ambulance performance in those areas. Specifically, we expected to see a flow of

performance information provided to management and staff so they could analyze the results, follow-up on identified issues and learn from areas of strong performance. Active performance management would also help improve accountability by allowing results to be shared with stakeholders such as patients and families, physicians, regional health authorities and local governments.

We found that the BC Ambulance Service responds to service requests and operational issues as they arise, but does not proactively manage the performance of its air ambulance services with respect to the quality of care, timeliness and safety of its responses. Consequently, the BC Ambulance Service is unable to demonstrate that it provides the quality, timely, and safe patient care needed to improve outcomes for air ambulance patients. Although the BC Ambulance Service is not solely responsible for patient outcomes, it should be measuring how the air ambulance activities within its control are contributing to patient outcomes.

Effectively managing performance in any organization requires a robust strategic planning framework that includes a clear vision, mission, goals and objectives. These provide a foundation for defining what success looks like, and for setting standards to help measure and monitor progress in reaching stated objectives. This means defined service standards will match the organization's unique operating environment. However, the BC Ambulance Service has not yet identified goals, objectives, or measurable standards for the quality, timeliness and safety of its air ambulance services. It lacks the information needed to manage performance and ensure patients receive the best care possible with available resources.

Quality of care

For the purposes of our audit, “quality of care” refers to the medical aspects of air ambulance services – the quality of pre-hospital and inter-facility clinical treatment administered by paramedics. We expected to find that the BC Ambulance Service has established expectations for quality clinical care, knows whether its paramedics are providing appropriate clinical treatment, and monitors patient outcomes to the extent possible.

We found that the BC Ambulance Service does have processes in place to support the provision of quality patient care and respond to issues as they arise. For example, medical doctors specializing in emergency medical transport are available by telephone to provide Critical Care Paramedics with expert medical advice as needed. In addition, we found that the BC Ambulance Service started three initiatives in 2012 to promote quality of care as part of its ongoing transition into the Provincial Health Services Authority (PHSA):

- ◆ The BC Ambulance Service adopted a complaint system (the Patient Safety and Learning System) managed by the Patient Care Quality Office of the PHSA, enabling it to respond to the concerns of both patients and staff.
- ◆ The BC Ambulance Service began tracking the types of medical procedures conducted by Critical Care Paramedics to use in ensuring skills maintenance.

- ◆ The EHSC established a committee with the intent to monitor clinical activity and define performance indicators for the BC Ambulance Service as a whole.⁴

However, we found that the BC Ambulance Service is not proactively managing quality of care for its air ambulance services. While reported issues may be reviewed by medical staff on an individual basis, general clinical activities are not tracked, monitored or communicated to inform decision-making. This means that the BC Ambulance Service may not be detecting clinical practices that are inconsistent with its treatment guidelines or detecting other systemic clinical issues. Monitoring the performance of clinical activity would enable the BC Ambulance Service to report on the quality of care provided, and make informed operational and strategic decisions to improve patient care practices and ultimately patient outcomes.

Timeliness

Patient outcomes are often influenced by the timeliness of care – that is, the time taken for paramedics to attend to a patient, prepare the patient for transport, and deliver the patient to definitive care. For patients requiring urgent care, we expected to find the timeliness of air transports being tracked, measured and reported to enable continuous improvement.

We found that the BC Ambulance Service does recognize the importance of timely transports for patient outcomes and has recently implemented initiatives to improve timeliness for the highest priority calls (see sidebar). Since 2011, the BC Ambulance Service has made efforts to track and monitor the timeliness of air ambulance activity. For the highest priority air transports, it has begun to identify and set performance targets for the time taken for an air ambulance to depart after receiving a service request, and the time spent preparing patients for transport.

However, the BC Ambulance Service acknowledges that its efforts to track and monitor timeliness are in the early stages of development and need improvement. In particular, it recognizes that timeliness performance indicators and targets are not fully developed, performance data has limited reliability, and existing performance indicators for air ambulance services have not been endorsed by the BC Ambulance Service executive and are not well understood by those responsible for achieving performance targets – the paramedics, pilots and dispatchers. Meanwhile the performance data that is available, however unreliable, indicates that the BC Ambulance Service is not achieving its own targets for timely air transports.

Timely care is integral to improving patient outcomes for the approximately 3,200 patients transported by air each year who have conditions that are or may become life or limb threatening. This represents 40 percent of all BC Ambulance Service’s air transports. Monitoring the timeliness of air transports would enhance the BC Ambulance Service’s ability to make informed decisions on operational improvements or on system-wide changes (for example, the location of aircraft and paramedics).

Initiatives to improve response times:

Air Ambulance Autolaunch

For high-risk emergency events in parts of the province, the BC Ambulance Service simultaneously dispatches both a ground ambulance and helicopter ambulance based on information provided from the scene by 911 callers. This compares to the more traditional method of waiting for ground ambulance paramedics to arrive and assess the patient’s condition. This Autolaunch approach is therefore intended to reduce the elapsed time from patient injury to arrival at definitive care. The BC Ambulance Service began using Autolaunch at its dedicated bases in 2004.

Early Fixed Wing Activation

Early Fixed Wing Activation (EFWA) is an initiative designed to get high-risk patients located in select rural areas of BC to specialized care quickly. EFWA, which began in 2010, allows on-scene ground paramedics to alert dispatchers to ‘ready’ an airplane and the closest critical care transport team in events where air transport to specialized care is likely to be requested by an emergency physician.

⁴ We were informed that the first report of performance indicators was submitted to the PHSA Quality & Access Committee on December 5, 2012.

Safety

For the purposes of our audit, “safety” refers to the safe transport of patients.⁵ Safety is essential to patient outcomes; the achievement of timely transports should not come at the expense of safety. We therefore expected there to be a safety management program in place to proactively identify risks that might contribute to fatalities and injuries.

We found that the BC Ambulance Service does have processes for reporting and addressing safety incidents and issues for its air ambulance services. Staff and contractors report safety incidents and concerns to BC Ambulance Service management, who investigate the event and take corrective action. Also, contracted air carriers are regulated by Transport Canada. A consistent message that came through in our interviews was that staff were proud of the safety of the service, and that safety issues are a priority for the BC Ambulance Service. However, we also found that the BC Ambulance Service lacks a comprehensive safety management program that documents, tracks and evaluates responses to all key safety issues with its air ambulance services. Specifically, it has not established objectives for the safe transport of patients, analyzed and evaluated safety issues and incidents over time, or conducted audits of the safety systems and operations of contracted aircraft carriers. Without these processes in place, the BC Ambulance Service could fail to identify and address key risks to patient safety.

RECOMMENDATION 1: *We recommend that the BC Ambulance Service actively manage the performance of its air ambulance services to achieve desired service standards for the quality, timeliness and safety of patient care. It should:*

- *clearly define its goals and objectives for air ambulance services;*
- *measure and monitor the timeliness of air ambulance transports and quality of care provided to patients;*
- *build on current safety processes to develop a complete safety management program;*
- *communicate performance results to BC Ambulance Service staff and air carrier contractors who are responsible for meeting the standards, and ensure performance expectations are understood; and*
- *communicate results with stakeholders.*

⁵ While the audit focuses on patient safety, safe transport of patients also infers safe transport of medical crews and pilots. Another aspect of patient safety—patient safety during medical interventions—is captured generally in the discussion of Quality of Care.

Providing paramedics and aircraft

Paramedics and aircraft are key to every air ambulance response, and their performance influences the timeliness and quality of care provided. We assessed how the BC Ambulance Service determines that it has the right paramedics and aircraft to meet patient needs, and whether it is dispatching those resources according to patient need.

Providing paramedics based on patient needs

Understanding patient demand for service is fundamental to the effective design of a service that provides timely, quality patient care. We therefore expected to find that the BC Ambulance Service has defined the optimal number and type of paramedics for air ambulance services based on an assessment of patient demand across British Columbia.

We found that the BC Ambulance Service is monitoring patient demand relative to staffing on a limited basis. For example, it monitors “time on task” for Critical Care Paramedics (CCPs). Also, before establishing a new helicopter base in Kamloops, it assessed patient demand as part of a review of the need for air ambulance services in the Interior Health region. However, the BC Ambulance Service has not reviewed air ambulance staffing levels and skills relative to workload across the province. This means it has not fully assessed whether it has the right number and type of paramedics in the right locations to meet patient needs.

We also found that current staffing levels are leading to staff being “recalled” at time-and-a-half pay rates, incurring overtime costs. Furthermore, current staffing levels for CCPs do at times result in them being paired with an Advanced Care Paramedic or Primary Care Paramedic. Such “de-paired” responses result in a lower combined level of medical expertise for treating patients. The BC Ambulance Service does not have data on the frequency of “de-paired” missions.

The BC Ambulance Service acknowledges its staffing challenges for its air ambulance services and in 2012 implemented training initiatives to graduate additional CCPs in 2013 and 2014. These training initiatives are intended to address existing staffing needs and anticipated attrition. We believe, however, that a comprehensive review of patient demand relative to resource locations would complement current training initiatives and give the BC Ambulance Service the information it needs to ensure the best use of existing resources.

RECOMMENDATION 2: *We recommend that the BC Ambulance Service periodically review whether the distribution of staff and aircraft across the province is optimal for responding to demand for air ambulance services.*

Procuring aircraft based on patient needs

To provide emergency medical transport, aircraft must suit British Columbia's challenging geography, weather and landing conditions, as well as patient needs.

Aircraft used to transport patients are owned and operated by private sector companies under contract with the BC Ambulance Service. We audited the BC Ambulance Service's procurement processes that resulted in dedicated helicopter and airplane services through three long-term contracts, effective as of 2011 and 2012. We expected to find that the BC Ambulance Service had awarded the contracts based on an assessment of business requirements to meet patient needs. We also expected to find that procurement processes were consistent with the requirements of government procurement policy.

We found that the BC Ambulance Service understood its aircraft needs, translated those needs into evaluation criteria, and selected successful proponents based on those criteria. The procurement processes were consistent with expectations for fair and open procurement as defined in government policy and guidelines. We consistently heard from interviewed paramedics and management that they are satisfied with the type of aircraft procured for air ambulance services.

In 2011, the BC Ambulance Service appointed fairness reviewers to review its procurement process for the three contracts. The external fairness reviewers concluded that the procurement processes were fair or generally fair in design for each of the contracts.

Dispatching paramedics and aircraft

Dispatching paramedics and aircraft to where they are needed is a crucial link in any air ambulance operation. Dispatchers at the BC Ambulance Service's Patient Transport Coordination Centre, who dispatch all air ambulance services, work with regional dispatch centres, BC Bedline, and physicians to coordinate patient transfer requests.

Dispatchers at the BC Ambulance Service determine whether to deploy aircraft and, if so, the type of aircraft required, as well as the level of paramedic to send to the call. Dispatchers make these decisions based on numerous factors, including the severity of patient condition, distance to a suitable health facility, weather, geography and staff shift times. Medical doctors with expertise in emergency patient transport are also available to advise dispatchers by telephone.

We expected to find that dispatchers were following BC Ambulance Service guidelines to match available staff and aircraft to patient needs. We observed that dispatchers prioritize patient transfers, manage paramedic and pilot overtime, and assign resources based on their own experience, advice from on-duty supervisors, and advice from the medical advisors.

While this approach is consistent with aspects of the dispatch guidelines, we found that the BC Ambulance Service is not reviewing air ambulance dispatch decisions to ensure resources are allocated appropriately as intended by the guidelines, and is not tracking performance information pertaining to the efficiency and appropriateness of dispatch decisions. Further, paramedics we interviewed expressed their opinions that dispatch decision-making could be improved to better match paramedics and aircraft to patient needs, as well as to improve efficiency (for example, by reducing the frequency of empty flight legs). While dispatch decisions are reviewed in response to formal complaints, without proactive evaluations of dispatch decisions and performance information, the BC Ambulance Service cannot determine whether it is making the best use of its resources to meet patient needs.

RECOMMENDATION 3: *We recommend that the BC Ambulance Service regularly identify and review a sample of air ambulance dispatch decisions to ensure resources are allocated with due consideration for patient needs and available resources.*

WE WILL FOLLOW UP on the status of the implementation of these recommendations in our April 2014 follow-up report.

APPENDIX 1: LOCATION OF BC AMBULANCE SERVICE DEDICATED AIR RESOURCES



What We Evaluated Against	Not Achieved	Partially Achieved	Fully Achieved
Objective 1: Has the BC Ambulance Service defined relevant air ambulance service standards for quality of care, timeliness and safety?	X		
Criterion 1.1: Service standards have been established to measure the overall quality of care provided	X		
Criterion 1.2: Service standards have been established to measure the overall timeliness of service provided	X		
Criterion 1.3: Service standards have been established to measure the overall safety of service provided		X	
Criterion 1.4: Service standards are based on commonly accepted industry standards, with variances between standards disclosed, or reasons for not using commonly accepted standards explained	X		
Objective 2: Is the BC Ambulance Service meeting its established service standards for the air ambulance service?		Not Measurable	
Criterion 2.1: The BC Ambulance Service is meeting its service standards for quality of care		Not Measurable	
Criterion 2.2: The BC Ambulance Service is meeting its service standards for safety		Not Measurable	
Criterion 2.3: The BC Ambulance Service is meeting its service standards for dispatch, readiness, arrival, on-site and return times		Not Measurable	
Criterion 2.4: Where performance targets are not being met, the BC Ambulance Service makes changes to improve results	X		
Criterion 2.5: The performance results communicated to key stakeholders are sufficient to hold the BC Ambulance Service accountable for the results achieved	X		
Objective 3: Does the BC Ambulance Service air ambulance service provide paramedics and equipment based on an assessment of patient needs?		X	
Criterion 3.1: The number of paramedics and their level of training meets the BC Ambulance Service's expectations for accessible patient care		X	
Criterion 3.2: Procured equipment and aircraft meets the BC Ambulance Service's business requirements regarding quality of care, timeliness, safety and cost-effectiveness		X	
Criterion 3.3: Dispatchers follow the BC Ambulance Service procedures to match available staff and equipment to patient needs		X	



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