

## Chapter 22

# Health—Co-ordinating the Appropriate Provision of Helicopter Ambulance Services

### 1.0 MAIN POINTS

This chapter reports on the processes the Ministry of Health uses for co-ordinating the appropriate provision of timely and quality helicopter ambulance services. The Ministry is responsible for providing air ambulance services. It contracts Shock Trauma Air Rescue Service (STARS), a non-profit organization, to provide 24-hour air medical transportation for critically ill and injured patients by helicopter. Helicopter ambulance services typically offer faster transport than ground ambulance services for patients located far from trauma centres.

Overall, the Ministry needs to do more to know whether helicopter ambulance services are used appropriately, and STARS fully complies with its agreement. In particular, the Ministry needs to:

- Actively oversee air ambulance services. Helicopter ambulance services cost more than ground ambulance services. Keeping its key committee used to oversee ambulance services active enhances its ability to monitor those services, and assess appropriateness of their use.
- Receive regular reporting on quality and timeliness of patient medical care provided during helicopter transport, the qualifications of medical staff who provide those services, and helicopter maintenance. Such reporting is key to assessing STARS' compliance with its agreement, and quality and timeliness of services.
- Obtain sufficient reporting on the number and reasons for missions cancelled or declined (i.e., when request to use STARS is cancelled or when STARS does not fly). Periodic analysis would give the Ministry a better understanding of the barriers contributing to STARS' inability to respond.
- Formalize the process for selecting and prioritizing heliport and landing zones for helicopter ambulance use. Formalized processes increases the likelihood of giving residents fair and equitable access to ambulance services.

Our work found that generally the use of STARS is consistent with established processes, and STARS provides quality services within expected timeframes. Annually, STARS transports nearly 700 patients—60% to 70% are patient transfers between health care facilities, and the remainder are responses to accident scene calls.

### 2.0 INTRODUCTION

Saskatchewan's population of 1.17 million people are scattered across 651,900 square kilometers (1.9 people per square kilometre).<sup>1</sup> The provincial government is responsible

<sup>1</sup> [www150.statcan.gc.ca/n1/pub/91-002-x/91-002-x2019002-eng.htm](http://www150.statcan.gc.ca/n1/pub/91-002-x/91-002-x2019002-eng.htm) (30 September 2019).



for providing residents, including those located in rural or remote locations, with reasonable access to emergency health care.

The Ministry of Health funds the Saskatchewan health care system including the provision of ambulance services.

*The Ambulance Act* makes the Ministry of Health responsible for providing air ambulance services to any person in Saskatchewan, and the Saskatchewan Health Authority responsible for providing ground ambulance services.<sup>2,3</sup>

Saskatchewan provides two types of air ambulance services—via fixed wing (airplane) and rotary wing (helicopter).

- The Authority operates the Saskatchewan Air Ambulance and contracts Transwest Air (a private operator) to provide fixed-wing services.
- Since 2011, the Ministry contracts Shock Trauma Air Rescue Service (STARS), a charitable, non-profit organization, to provide 24-hour air medical transportation for critically ill and injured patients by helicopter.<sup>4,5</sup> In December 2018, the Government of Saskatchewan announced it plans to renew its 10-year commitment with STARS when the current agreement expires on December 31, 2020.<sup>6</sup>

This chapter focuses on our audit of the Ministry's provision of helicopter ambulance services.

## 2.1 Co-ordinating Use of Helicopter Ambulance Services for Saskatchewan

Balancing the provision of appropriate ambulance services and costs is complex and challenging.

The cost of health care continues to increase. From 2010 to 2019, Saskatchewan's cost of health care increased 46% from \$3.98 billion in 2010 to \$5.80 billion in 2019. Also from 2010 to 2019, the percentage of health costs as compared to total Government costs increased from 38.4% in 2010 to 39.4% in 2019.<sup>7</sup>

Annually, for nearly 700 patients, STARS transports around 60% to 70% as inter-facility transfers, and about 30% to 40% from accident scene calls. For inter-facility transfers, a STARS helicopter transports an ill or injured patient from one health care facility (e.g., rural hospital) to another one. For accident scene calls, a STARS helicopter flies to the scene of an emergency incident.

<sup>2</sup> Our *2016 Report – Volume 2*, Chapter 25, reports the results of our audit of ground ambulance services (in the former Cypress Health Region).

<sup>3</sup> Section 41 of *The Ambulance Act*.

<sup>4</sup> *Red Patient Matters Service Agreement* between the Minister of Health and Shock Trauma Air Rescue Society dated April 4, 2011. The Agreement has a five-year term with an automatic renewal clause of an additional five years.

<sup>5</sup> Section 4.10 of the Agreement allows the Ministry to inspect and audit, at its cost, all books and records of STARS.

<sup>6</sup> [www.saskatchewan.ca/government/news-and-media/2018/december/04/nutrien-and-stars-renew-commitment](http://www.saskatchewan.ca/government/news-and-media/2018/december/04/nutrien-and-stars-renew-commitment) (3 September 2019).

<sup>7</sup> Government of Saskatchewan, *Public Accounts 2008–09, Volume 1, Main Financial Statements*; Government of Saskatchewan, *Public Accounts 2018–19, Volume 1, Summary Financial Statements*.

Helicopter ambulance services typically offer faster transport than ground emergency medical services for critically injured patients located far from trauma centres.<sup>8</sup> For many critically injured and trauma patients, getting them to an operating room with a trauma surgeon quickly is the most important factor in a positive patient outcome.<sup>9,10</sup>

However, the cost of helicopter transport is higher than ground ambulance. Helicopters fitted as an ambulance cost several million dollars with Canadian aviation laws and regulations regulating their maintenance. The cost of using helicopters also fluctuates depending on staffing, aircraft type, and transport distance.

The Ministry pays STARS \$10.5 million each year to deliver helicopter air ambulance service in Saskatchewan (i.e., \$68.6 million for the period from April 2012 to March 2018), which covers approximately 50% of agreed-upon STARS operating costs. STARS also receives donations from several public and private industry donors, including a commitment from Saskatchewan Crown Corporations (i.e., SaskPower, SaskEnergy, SaskTel, SGI and Crown Investments Corporation of Saskatchewan) to contribute \$20 million during 2012 to 2021. From 2012 to March 2018, Crown Corporations contributed a total of \$9.2 million to STARS.<sup>11</sup>

In 2018–19, the average cost per STARS transport for the Ministry was approximately \$14,876 per flight.<sup>12</sup> This cost includes aircraft maintenance, services provided by the Transport Physicians besides helicopter missions (e.g., consultations), education for STARS medical staff, STARS dispatch centre, and administration. The Ministry pays an average estimated cost of \$750 per ground ambulance call.<sup>13</sup>

A Saskatchewan resident pays \$465 for a helicopter ambulance (approximately 1.5% of total cost), as well as the cost of any ground ambulance service for transport to/from an airport or hospital (if needed). Comparatively, a Saskatchewan resident pays between \$245 and \$325 (plus \$2.30/kilometre, as appropriate) for a ground ambulance.<sup>14</sup>

Deciding which type of ambulance services (e.g., ground ambulance, helicopter, fixed wing) to use requires co-ordination among physicians, facilities, ground ambulance, and air ambulance providers. Not making appropriate decisions on a consistent basis increases the risk of not providing Saskatchewan residents with fair and equitable access to ambulance services. In addition, it increases the risk of using public money poorly if using STARS unnecessarily.

<sup>8</sup> Delgado et al, *Cost-Effectiveness of Helicopter Versus Ground Emergency Medical Services for Trauma Scene Transport in the United States*, (2013), p. 2.

<sup>9</sup> K. Widmeier, *Understanding When to Request a Helicopter for Your Patient*, (2014), p. 3.

<sup>10</sup> Steenhoff T., Zohn S., *EMS, Air Medical Transport*, (2019), p.1.

<sup>11</sup> Information based on Crown Investment Corporation *Payee Disclosure Reports*.

<sup>12</sup> STARS operating cost of \$20.11 million divided by 676 patients transported in 2018–19 equals \$29,751; The Ministry's 50% of this cost equals \$14,876.

<sup>13</sup> Information provided by the Ministry of Health. In 2018-19, the Ministry's and the Saskatchewan Health Authority's expenditures for ground ambulance were \$99.3 million divided by 131,326 calls for ground ambulance equals \$756.

<sup>14</sup> *The Government of Saskatchewan EMS Consultation Stakeholder Discussion Guide* ([www.hsas.ca/assets/ems-consultation-discussion-guide-june-2017.pdf](http://www.hsas.ca/assets/ems-consultation-discussion-guide-june-2017.pdf)) (28 August 2019).



## 3.0 AUDIT CONCLUSION

**We concluded that, for the 12-month period ended June 30, 2019, the Ministry of Health had effective processes, except in the following areas, to co-ordinate the appropriate provision of timely and quality helicopter ambulance services in Saskatchewan.**

**The Ministry needs to do more to know whether helicopter ambulance services are used appropriately, and STARS fully complies with its agreement.**

Our work found that generally the use of STARS is consistent with established processes, and STARS provides quality services within expected timeframes.

### Figure 1—Audit Objective, Criteria, and Approach

**Audit Objective:** The objective of this audit is to assess the effectiveness of the Ministry of Health's processes, for the 12-month period ending June 30, 2019, to co-ordinate the appropriate provision of timely and quality helicopter ambulance services in Saskatchewan.

Timely means the amount of time taken for each step in the transport process is appropriate to the situation, and does not compromise patient safety. Quality involves matching patient care needs with the best response in terms of aircraft and critical care team expertise, as well as providing appropriate treatment.

This audit did not question medical decisions of helicopter ambulance staff regarding patient care.

**Audit Criteria:**

Processes to:

1. Determine helicopter ambulance services delivery expectations
  - 1.1 Provide infrastructure for effective distribution of helicopter ambulance services
  - 1.2 Establish helicopter ambulance services expectations (e.g., response time, appropriate care during transportation)
  - 1.3 Align helicopter ambulance services expectations with policies, legislation, and industry standards
  - 1.4 Identify required resources (e.g., number and type of personnel, minimum training and qualifications of ambulance personnel, equipment, supplies)
  - 1.5 Co-ordinate appropriate use of helicopter ambulance services (e.g., dispatch criteria, responsibilities)
2. Deliver quality, timely helicopter ambulance services
  - 2.1 Verify helicopter ambulances and equipment are in good working condition
  - 2.2 Use dispatch criteria for consistent decisions on provision of helicopter ambulance services
  - 2.3 Confirm helicopter ambulances are appropriately staffed (e.g., qualified, trained, full medical team)
  - 2.4 Receive regular information on actual service delivery (e.g., reports and feedback)
3. Monitor helicopter ambulance services
  - 3.1 Compare results against expectations and address areas of improvement as needed
  - 3.2 Take corrective action on critical incidents and complaints
  - 3.3 Report results to senior management

**Audit Approach:**

To conduct this audit, we followed the standards for assurance engagements published in the *CPA Canada Handbook—Assurance* (CSAE 3001). To evaluate the Ministry's processes, we used the above criteria based on our related work, reviews of literature including reports of other auditors, and consultations with management and external advisors. The Ministry of Health agreed with the above criteria.

We examined the Ministry's policies, guidelines, key committee minutes, and other records relating to co-ordinating helicopter ambulance services. We tested a sample of patient care records from completed STARS missions. We consulted with an independent consultant with subject matter expertise in the area, and the consultant helped us identify good practice.

## 4.0 KEY FINDINGS AND RECOMMENDATIONS

### 4.1 Location of STARS Bases Optimal

The Ministry located helicopter bases for air ambulance services optimally.

When the Ministry selected STARS to operate its helicopter ambulances in 2011, it decided to place helicopter bases for STARS in Regina and Saskatoon. It selected these locations based on a recommendation in a 2009 report on air medical services.<sup>15</sup> The report identified Regina and Saskatoon as optimal locations for helicopter bases given their proximity to the projected highest population density, and to hospitals providing specialized consultative care (i.e., tertiary hospitals). Criteria in the report reflects good practice.

A helicopter base is a hangar for the aircraft and crew. The bases are located near the Regina and Saskatoon airports.

The Ministry, through its 10-year agreement, requires STARS to maintain two bases—one in Saskatoon and another in Regina.<sup>16</sup>

As shown in **Figure 2**, STARS uses both bases consistently and, in recent years, transported slightly more patients using helicopters originating from its Regina base (e.g., 51.8% of total patients transported in 2018–19).

**Figure 2—Number of Patients Transported by STARS by Base from 2012 to 2019**

Fiscal Year	Regina Base	% Regina	Saskatoon Base	% Saskatoon	Fiscal Total
2012–13 <sup>A</sup>	170	68.3%	79	31.7%	249
2013–14	271	48.7%	286	51.3%	557
2014–15	385	56.6%	295	43.4%	680
2015–16	403	53.2%	354	46.8%	757
2016–17	372	52.8%	332	47.2%	704
2017–18	369	52.0%	340	48.0%	709
2018–19	350	51.8%	326	48.2%	676
<b>Total</b>	<b>2,320</b>		<b>2,012</b>		<b>4,332</b>

Source: Information provided by the Ministry of Health.

<sup>A</sup> Saskatoon base became operational on October 15, 2012.

We found the locations for these bases continues to make sense. Most Saskatchewan residents reside in and around Regina and Saskatoon, and Saskatchewan's tertiary hospitals are located in Regina and Saskatoon. These facilities also provide advanced or specialized care unavailable elsewhere in the province. Furthermore, our review of requests for helicopter services found most requests came from areas around Regina and Saskatoon.

<sup>15</sup> In 2009, prior to starting a helicopter ambulance program in Saskatchewan, the Ministry hired an independent consultant from Ontario to review Saskatchewan's air ambulance services and make recommendations. The report is available at [www.pubsaskdev.blob.core.windows.net/pubsask-prod/104975/104975-Air-Med-Services-Report-2006.pdf](http://www.pubsaskdev.blob.core.windows.net/pubsask-prod/104975/104975-Air-Med-Services-Report-2006.pdf) (28 August 2019).

<sup>16</sup> Between the two bases in Regina and Saskatoon, STARS utilizes 22 pilots, 20 flight nurses, 20 paramedics, 30 transport physicians, 10 STARS Foundation personnel, seven aircraft engineers, and four administrative personnel.



Placing helicopter bases close to where most requests for services originate helps reduce transport time. Transport time includes time responding to a transport request, travel to a scene or hospital, patient assessment, loading, transport to a health care facility, and patient unloading. For many critically injured and trauma patients, a shorter transport time contributes to a positive patient outcome.

## 4.2 Location of Fuel Caches Strategically Located to Provide Sufficient Provincial Flight Coverage

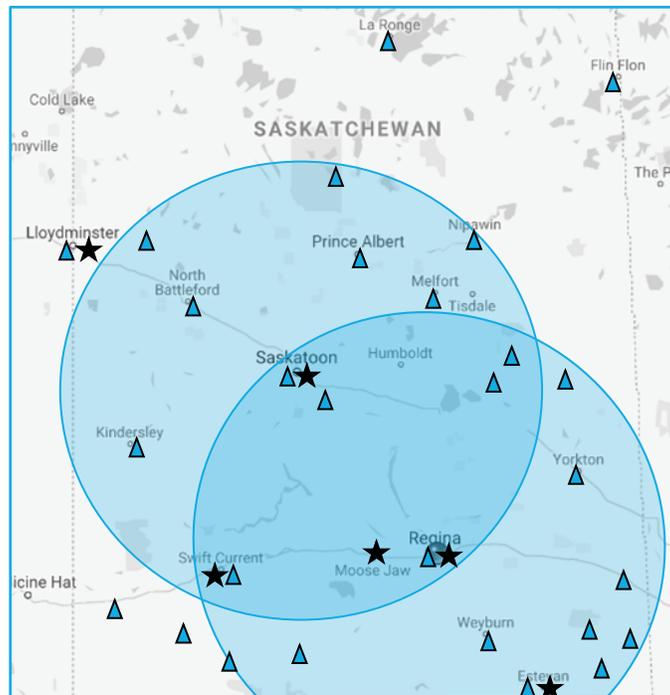
Fuel caches are strategically located throughout the province to provide sufficient provincial flight coverage for STARS helicopters.

Under its agreement with the Ministry, the Ministry requires STARS to operate three helicopters in Saskatchewan. One helicopter is located in Regina and one in Saskatoon, and the third as a back-up used at both bases as required.<sup>17</sup> The helicopters have a typical flight range of 250 kilometers.

By agreement, STARS owns and maintains the helicopters. When refueling at caches, STARS pays for fuel used, and the community in which a cache is located provides the related trailer, fuel pump, and needed supplies.

The Ministry worked with STARS, the Authority, and communities to accommodate flights beyond the flight range. As shown in **Figure 3**, Saskatchewan has almost 30 fuel caches strategically located for STARS helicopters to refuel and continue flying.

**Figure 3—Location of STARS Bases, Heliports, and Fuel Caches at June 30, 2019**



Source: Provincial Auditor of Saskatchewan based on information provided by the Ministry of Health.  
**Black Stars:** Certified heliport locations **Blue Triangles:** Fuel cache locations  
**Light blue circles:** indicate the 250-kilometre range from the STARS bases in Regina and Saskatoon

<sup>17</sup> The back-up helicopter is used whenever the primary helicopter requires maintenance.

Our review of the mapped bases and heliports found fuel cache locations provided adequate provincial coverage for the types of helicopter ambulances currently in use.

### 4.3 Prioritization Process for Determining Location of Heliports Not Formalized

The Ministry has not formalized criteria used to prioritize decisions about developing new heliports/landing zones for use in providing helicopter ambulance services.

From April 2018 to June 2019, the Ministry spent about \$628,000 on funding new heliports.<sup>18</sup> In addition, it gives the Authority funding each year, including funds for heliport maintenance.

A heliport is a landing place for helicopters, often on the roof of a building or in some other limited (e.g., access, security) area. A certified heliport meets the design criteria set out by Transport Canada CAR 305 Regulations and CAR 325 Standards.

At June 2019, the Authority owns and maintains six certified heliports. These are located at its hospitals: Regina General, Saskatoon's Royal University (temporary site), Moose Jaw's Dr. F. W. Wigmore, Estevan's St. Joseph's, Swift Current's Cypress Regional, and Lloydminster Hospitals.

Also, as of June 2019, its construction of the rooftop heliport at the Jim Pattison Children's Hospital (located adjacent to Saskatoon's Royal University) was completed and is in the certification process.

While helicopters can land on highways, in parking lots, fields, and other areas free of obstructions such as from trees or power poles, landing zones must be safe, and appropriately located.

Landing zones are safe landing areas often located near a community airport where there is no certified heliport by a hospital (e.g., Prince Albert). Typically, local communities or municipalities own and maintain these landing zones, seeking funding from the provincial government when developing them.

In spring/summer 2018, the Authority formed a Heliport/Landing Zone Oversight Group. Nine individuals comprise the Authority-led Group with representation from the Authority, STARS, and the Ministry. The Authority chairs the Group, meeting monthly.

When a helicopter lands on a landing zone not located on a hospital roof, a ground ambulance transfers the patient to/from the hospital.

As set out in **Figure 4**, one purpose of this Oversight Group is to work collaboratively with communities, STARS, and the Ministry in the oversight of safe, appropriate landing zones and/or certified heliports in Saskatchewan. Another purpose is to assist in landing area/zone and heliport development.

#### Figure 4—Purpose of the Heliport/Landing Zone Oversight Group

- Work collaboratively with communities, STARS, and the Ministry in the oversight of safe, appropriate landing areas and/or certified heliports in Saskatchewan
- Facilitate consultation and communication with stakeholders
- Assist in gathering information regarding community needs and expectations regarding landing area and heliport development
- Assist in developing criteria, policies and procedures to support the oversight process
- Establish priorities for development, implementation, and operation of new landing areas and/or heliports in Saskatchewan

Source: Saskatchewan Health Authority Heliport/Landing Zone Oversight Group Terms of Reference.

<sup>18</sup> Information provided by the Ministry of Health.



As of June 2019, the Oversight Group identified the next priority locations for constructing certified heliports in Prince Albert, North Battleford, and Yorkton. We found the Group periodically gave the Ministry advice on preferred locations for new, certified heliports for helicopter ambulance services. We also saw the Minister used this advice to select locations to support (e.g., fund development). For example, the Minister decided to approve funding for building a heliport at the Victoria Hospital in Prince Albert in spring 2019.

Our review of the Group's minutes found that when it identifies priority locations for heliports and landing zones, it generally considered the following:

- Proximity of existing heliports or landing zones to hospitals receiving and caring for critically ill and injured patients, and to the STARS bases in Regina and Saskatoon.
- The usual flight range radius of the current STARS helicopters of 250 kilometers.
- The history of requests for air ambulance services (e.g., number of landings) in the area or community. It focused on communities with the highest number of requests per year.
- The time from a community to a tertiary hospital by ground ambulance taking into account distance to the nearest basic life support ambulance service, and to the nearest advanced life support ambulance service.

We found these factors align with good practice.

However, the Oversight Group has not formally documented or approved its prioritization process, or the factors it must consider.

The lack of a formalized prioritization process increases the risk of making inconsistent decisions about priority locations for heliports and landing zones. Inconsistent decisions could result in treating communities inequitably and communities with similar situations having differing access to timely helicopter ambulance services.

1. **We recommend the Ministry of Health formalize the prioritization process for selecting heliports and landing zone locations for helicopter ambulance use.**

#### 4.4 Contracted Helicopter Ambulance Service Provider Fully Accredited

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Through its involvement with STARS, the Ministry is aware STARS is fully accredited to medically transport patients.

The Ministry's agreement with STARS requires STARS to maintain accreditation from the Commission on Accreditation of Medical Transport (a nationally recognized body). During accreditation, the Commission reviews helicopter ambulance service areas, including:

- Management and staffing
- Quality management (performance improvement, utilization management)

- Patient care (medical oversight, education and training for staff)

We found STARS' recent accreditation is effective from March 21, 2019 to March 21, 2022.

## 4.5 Medically Related 911 Calls Appropriately Redirected

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Medically related 911 calls are appropriately redirected for best patient care.

When dialling 911, staff at one of the Saskatchewan Public Safety Agency's three Public Safety Answering Points located in Prince Albert, Regina, and Saskatoon answer the calls. Once they determine a call is medically related, they transfer it to one of the Authority's three Medical Communication and Co-ordination Centres located in Regina, Saskatoon, and Prince Albert; each Centre is assigned a geographic area.

Centre staff dispatch local first responders and/or the nearest ground ambulance to the emergency scene. They then enter details about the emergency into the Authority's IT dispatch system. Depending on these details, the IT system generates codes that automatically sends notifications to the STARS Dispatch Centre.

We found the staff at the Medical Communication and Co-ordination Centres possess a good understanding of the process to dispatch medically related 911 calls. We also observed the appropriate code being utilized based on the emergency information entered into the IT system, and confirmed the IT system appropriately created a notification to STARS.

Using standard automated processes to notify appropriate parties helps reduce time taken to respond to medical emergencies.

## 4.6 Ministry Involvement in Decision-Making Criteria Over Helicopter Ambulance Use Reasonable

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While the Ministry is not directly involved in deciding when to use STARS for scene calls or inter-facility transfers, it is reasonably involved in developing relevant written criteria and processes used to make these decisions.

The following describes the various parties involved in deciding when to use STARS, and the Ministry's involvement in developing or providing input into the criteria or processes these parties use when making decisions on using STARS.

For **inter-facility transfers**, parties involved in deciding when to use STARS include the Authority's provincial bed co-ordinators, various physicians (e.g., requestor for patient transfer between health care facilities, and receiver at receiving facility), and STARS staff (dispatch, transport physician, and air medical crew). The STARS transport physician (a physician on contract with STARS) decides on transport mode and takes responsibility for patient care during transport regardless of the transport option chosen. Inter-facility transfers are referred to as Red Patient Referrals.

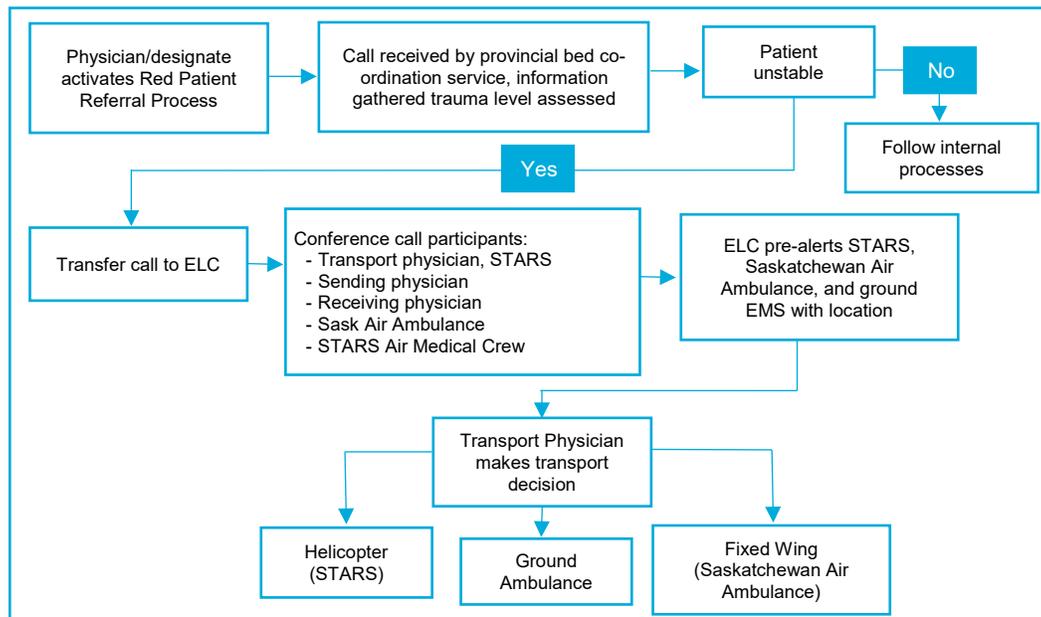


A STARS-chaired committee developed this process.<sup>19</sup> Representatives from STARS, the Authority (including Saskatchewan Air Ambulance, and provincial bed co-ordinators), and the Ministry comprise The Red Patient Referral Committee.

As shown in **Figure 5**, the process is as follows:

- When a critically ill patient in a health care facility (e.g., rural hospital) needs more advanced care than available at the facility, a physician at the facility may request an inter-facility transfer.
- Upon the Authority's Provincial Bed Co-ordination Service receiving such a request, it determines whether the patient is unstable and requires transport. If so, it transfers the call to the STARS dispatch service.
- STARS dispatch leads a phone conference with the sending, receiving, and transport physicians, and relevant EMS providers (e.g., Saskatchewan Air Ambulance, STARS medical crew). They discuss the patient's condition, care needs, and available transport options (ground, helicopter, fixed wing) and estimated transport times.
- Based on this information, the STARS transport physician decides which option to use to transport the patient (i.e., STARS, ground ambulance, or fixed wing).

**Figure 5—Process Flow of the Inter-Facility Transfer**



Source: Provincial Auditor of Saskatchewan based on information provided by the Ministry of Health.

EMS: Emergency Medical Services

ELC: Emergency Link Centre (STARS' dispatch centre)

The Ministry's agreement with STARS clearly requires STARS to use the Red Patient Referral process. The Ministry also developed a poster with the guidelines as a reminder for physicians in rural Saskatchewan on when to call the provincial bed co-ordination service for inter-facility transfers. The Authority located its provincial bed co-ordinators in

<sup>19</sup> STARS and the Ministry originally developed this process in 2012.

Regina and Saskatoon. The Ministry plans to distribute the poster through the Authority in fall 2019.

We found the inter-facility transfer process is similar to industry practices.

We also found STARS usually transports patients to either the Regina General Hospital (42% of all missions) or the Royal University Hospital in Saskatoon (39% of all missions).

For 27 of 30 inter-facility transfers we tested, conference calls occurred with all relevant parties and they discussed which transport to use. For three inter-facility transfers, STARS dispatch did not hold a conference call. For example, initially the patient's condition did not warrant using STARS but, during transport, the patient's condition deteriorated, as a result STARS launched and met the ground ambulance on route to a tertiary centre.

Our review of the Red Patient Referral Committee's minutes found it reviews the process annually and updates the process as needed.

Also, the Committee held bi-monthly phone calls where members gave verbal updates, and discussed issues encountered (e.g., IT system updates, staffing, and call volumes) on STARS missions.

We also found the Committee does not have a terms of reference. Because it looks at all STARS missions, we think it should.

Terms of reference typically sets out, in writing, a committee's purpose, membership, member responsibilities, and reporting structure. Not having a written terms of reference increases the risk of misunderstandings, particularly with personnel changes at participating agencies.

**2. We recommend the Ministry of Health, working with others involved in the co-ordination of transporting patients, develop terms of reference for the consultation committee responsible for overseeing patient transports using helicopter ambulance services.**

For **medically related 911 calls (scene calls)**, parties involved in deciding when to request STARS to attend to a scene include the Authority's Emergency Medical Services, crews of either Authority-owned or contracted EMS ground ambulances, and STARS staff. Decisions are based on dispatch criteria.

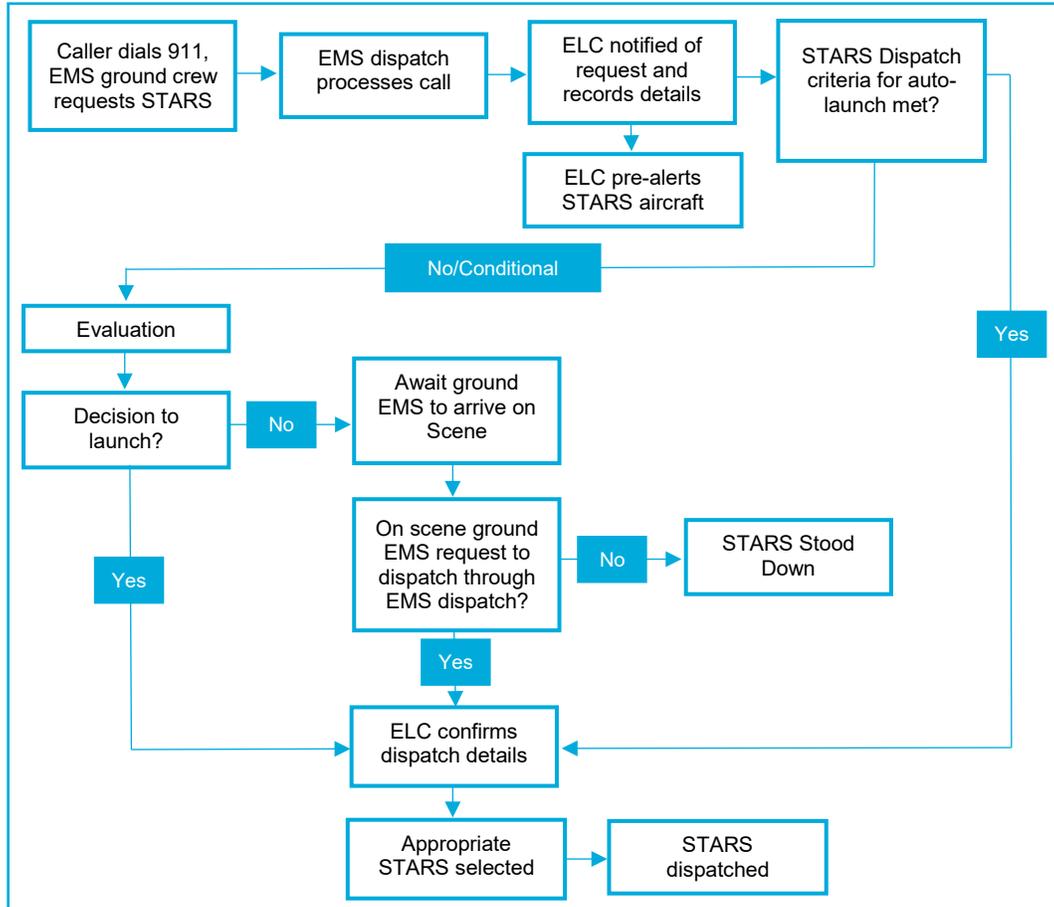
A decade ago, STARS developed the dispatch criteria and related process. We found STARS regularly reviews these criteria (last review May 2019), and gives the Ministry and the Authority updated dispatch criteria. While the Ministry does not formally require STARS or the Authority to follow them, we found they were understood, and embedded in their processes.

The process, as shown in **Figure 6**, sets out when to ask STARS to launch immediately (auto-launch) or make STARS wait until ground EMS staff assesses the situation before deciding on whether to ask STARS to launch. For example, if a patient is unconscious after an electrocution, or where a patient's location limits ground ambulance access, dispatch asks STARS to launch immediately. If a patient has breathing problems (e.g., abnormal



breathing, difficulty speaking between breaths), the dispatch Centre sends advance notification to STARS to wait for the ground ambulance staff's assessment before launching STARS to the emergency scene.

Figure 6—Process Flow for a Scene Call



Source: Provincial Auditor of Saskatchewan based on information provided by the Ministry of Health.  
**EMS:** Emergency Medical Services (SHA-owned or SHA contracted)  
**ELC:** Emergency Link Centre (STARS' dispatch service)

We found these criteria align with good practices in the industry.

For **scene calls**, when Authority-owned or contracted EMS ground ambulance paramedics at a scene call assess STARS is not needed, they can cancel the STARS helicopter launch. This is referred to as a stand-down.

In 2016, STARS, the Ministry, the Authority and ground ambulance representatives jointly developed stand-down criteria (dated May 2016). They are designed to ensure a patient is not placed in danger by inappropriate cancellation of STARS and subsequent delay in definitive care. They list instances when not to cancel STARS (e.g., a patient needs blood products or an emergency/critical airway treatment or intervention exceeding the responder's scope of practice).

We found these criteria align with good practices.

The Authority gave the stand-down criteria to all ground emergency medical services in Saskatchewan. As previously noted, the Authority is responsible for ground ambulance services.

Having written, up-to-date criteria and processes to guide key decisions over using STARS helps foster a clear understanding of the responsibilities for parties involved, and consistent decision-making.

## 4.7 Stronger Ministry Monitoring Over Helicopter Ambulance Use Needed

The Ministry receives insufficient information to enable it to know whether STARS is used appropriately and as intended, and whether STARS fully complies with its agreement.

Besides its involvement on groups or committees noted in **Sections 4.3 and 4.6**, Ministry senior management participate in monthly phone calls with STARS' management. It does not document matters discussed or decisions reached in these calls.

The Ministry also receives STARS' quarterly operational reports, which include financial information, education initiatives, community outreach, and number of missions flown each quarter.

The Ministry does not request or collect information (e.g., quality of care indicators, number and percentage of cancelled or declined service requests and missions, maintenance reports) to enable it to determine whether the helicopter ambulance program works as intended. Rather, it tends to rely on information received (primarily verbally) for awareness of current operations and any issues encountered.

The following sections highlight areas where the Ministry needs to take a leadership role, be more active, as well as request and use better information to monitor the timeliness and appropriateness of helicopter ambulance services. These areas include quality of STARS patient care, staff qualifications, timeliness of services provided, reasons for declined or cancelled missions, and helicopter maintenance.

### **Ministry-Led Advisory Committee for Air Ambulances Needs to be Active**

While the Ministry established a Ministry-led Advisory Committee for air ambulances, the Committee last met in November 2018 because of Ministry staff turnover.<sup>20</sup>

The Committee's purpose is to determine strategic priorities for air medical services and to collaboratively plan for the provision of critical care air medical services in Saskatchewan.<sup>21</sup> The Ministry-chaired Committee includes Ministry senior management responsible for air ambulances, STARS, the Authority (including staff from Saskatchewan Air Ambulance), and Transwest Air (Authority-contracted fixed wing contractor).

<sup>20</sup> The Ministry created this advisory committee to provide a forum for the collaborative planning and provision of critical care air medical services in Saskatchewan. The Committee consider air ambulance services provided in Saskatchewan and suggest improvements.

<sup>21</sup> Air Medevac Advisory Committee Terms of Reference.



The Committee intended to meet quarterly. At June 2019, management indicated it expects to resume meeting in fall 2019.

We found this Committee serves as the only committee or group related to air ambulance service delivery that the Ministry chairs (leads). For all other air ambulance related committees or groups, the Ministry participates as a member and, for some, views its role as advisory only. Because the Ministry is responsible by law for air ambulance services, it is critical it ensures its Committee remains active.

**3. We recommend the Ministry of Health actively oversee air ambulance services (e.g., chair committee(s) responsible for helicopter ambulance services oversight).**

**Ministry Monitoring of the Quality of STARS Staff Needed**

While the Ministry appropriately makes STARS responsible for not only using qualified operational staff on each mission, but also providing ongoing training, the Ministry does not monitor or know whether STARS fulfills these responsibilities.

The Ministry, in its agreement with STARS, requires all STARS staff to be registered or licenced by a professional regulatory body, and for STARS to provide them with on going training. The Ministry expects STARS to provide advanced or specialized paramedic care. As shown in **Figure 7**, this training level is higher than that held by most EMS providers practicing in Saskatchewan.

**Figure 7—Levels of EMS Providers in Saskatchewan**

	Emergency Medical Responder (EMR)	Primary Care Paramedic (PCP)	Intermediate Care Paramedic (ICP)	Advanced Care Paramedic (ACP)	Critical Care Paramedic (CCP)
Training Duration	80–120 hours	48 weeks	Training no longer provided in Saskatchewan <sup>A</sup>	PCP Certification +65 weeks	ACP Diploma + Accredited Critical Training Program
Basic Life Support (BLS) Procedures	Yes	Yes	Yes	Yes	Yes
Advanced Life Support (ALS) Procedures	Monitoring of minimal advanced life support procedures	Increased ability to assist, monitor, and perform ALS skills	Increased ability to assist, monitor and perform ALS skills	Performs invasive advanced life support skills	Performs invasive advanced life support skills and critical care therapies
Administer Medications	Limited to select BLS medications	Increased ability to administer symptom-relief medications	Increased ability to administer symptom-relief medications as compared to the PCP level	Increased ability to administer medications to treat conditions	Administers critical care medications
% of practicing EMS in Saskatchewan <sup>B</sup>	14%	60%	7%	17%	2%

Source: Information provided by the Ministry of Health.

<sup>A</sup> Previous training requirements based on PCP 2001 Certification +21 weeks requirements.

<sup>B</sup> Saskatchewan College of Paramedics, *2018 Annual Report*, 2019, p.17.

The Ministry, also in its agreement with STARS, requires STARS to staff each mission (flight) with two pilots and, at minimum, a qualified critical care paramedic and nurse.

We found the Ministry does not require (either in the agreement or in practice) STARS to regularly report on staff qualifications or training, or actual staffing used on missions. This is contrary to good practice for managing contracts.

Although it is STARS' responsibility to employ and train qualified medical staff, the Ministry remains the helicopter ambulance program's steward. It needs to know whether STARS uses appropriately qualified and trained staff on all missions. Without this information, the Ministry does not know whether STARS meets the terms of its agreement and uses only qualified medical staff to provide air ambulance services to Saskatchewan patients.

**4. We recommend the Ministry of Health periodically verify medical staff qualifications and training of those providing helicopter ambulance services.**

We found at June 2019, STARS employs 17 critical care paramedics and 19 advanced care flight nurses to provide medical care to patients. STARS also uses 28 transport physicians who provide online medical control oversight during all missions, and fly on the mission with the medical crew from time to time. It always has two transport physicians on call each day (one at each base in Regina and Saskatoon).

The records of 30 inter-facility transfers and 15 scene calls we tested each showed STARS used a full medical crew (i.e., a paramedic and a nurse as required by the agreement).

Each of the three nurses and two paramedics we tested held current licences and registration with their respective regulatory bodies (e.g., Saskatchewan Registered Nurses Association for nurses). Each of the two transport physicians we tested held current licences from the College of Physicians and Surgeons and were in good standing. The transport physicians were practicing physicians within the Saskatchewan health system.

We also found that to maintain the specialized medical skills of its medical staff (paramedics and nurses), STARS provides mandatory monthly, quarterly, and annual training. Monthly education consisted of online, interactive lessons directly related to a monthly planned theme. For example, the January 2019 neurological theme included an eLearning module: *Neurologic Assessment and Treatment of Metabolic Acidosis*. Each month, it also hosts human patient simulation sessions corresponding to the monthly theme (e.g., Traumatic Brain Injury Rapid Sequence Intubation and Ventilation Strategy for January 2019).

Each training record of two nurses and two paramedics we tested showed they met their monthly, quarterly, and annual training requirements.

**In-Depth Monitoring on the Timeliness of Helicopter Ambulance Services Needed**

While the Ministry receives regular data about two indicators on the timeliness of STARS' ambulance services, the data does not explain trends, or highlight instances where STARS did not achieve the targets, or explain why. The Ministry does not actively seek this information.



Chute time refers to time from dispatch to lift-off. The Ministry's agreement with STARS expects STARS helicopters to be in the air 15 minutes after dispatch.

We found a 15-minute target chute time consistent with good practice. We also found good practice views chute time tracking as a reasonable indicator on the timeliness of helicopter ambulance services.

Good practice also identifies other indicators for the timeliness of ambulance services. These include time spent with a patient before transporting them.

We found STARS tracks the following as indicators on the timeliness of its air ambulance services:

- Chute time as its Agreement with the Ministry expects; STARS aims to meet a 10-minute chute time
- The time between the initial 911 call and the call arrival time at STARS dispatch (dispatch time); STARS aims for its dispatch to receive the requests within five minutes of the 911 call 90% of the time
- Time spent by STARS medical staff at a patient's side (e.g., preparing a patient for transfer, conducting any medical procedures, if necessary); STARS does not set a target time for this as the amount of time depends upon the complexity of the patient's situation

We found Ministry staff did not know STARS tracked information on additional indicators other than chute and dispatch times. Although not required in its Agreement, but consistent with good practice, STARS reports to the Ministry each quarter its monthly average chute and dispatch times by base location, and overall. However, the reports do not explain trends, highlight instances where STARS did not meet the targets, or explain why.

Our review of STARS' quarterly reported data for the period from July 2018 to May 2019 found:

- STARS met the Ministry's 15-minute chute time target on a monthly average basis. On average, it took 10 minutes for a helicopter to be in the air after dispatch for the 610 missions in this period.
- STARS' quarterly reports do not detail instances where it did not meet the Ministry's 15-minute chute time (e.g., number of instances, and number of minutes exceeding target).

Our testing of 30 inter-facility transfers and 15 scene calls identified instances where STARS did not achieve the target.

- For 30 inter-facility transfers we tested, STARS took, on average, 10 minutes for a helicopter to be airborne (chute time). For these 30 transfers, chute time for the Regina base ranged from 4 to 15 minutes with an average of 8.7 minutes. Chute time for the Saskatoon

Inter-facility transfers made up about 60 to 70% of all STARS missions, and scene calls made up 30 to 40% of all STARS missions for the period from July 2018 to May 2019.

For this period, STARS completed 463 inter-facility patient transfers and responded to 147 scene calls treating 156 patients.

base ranged from 6 to 26 minutes with an average of 11.1 minutes. STARS indicated the 26 minute chute time resulted from the medical crew taking the necessary time to restock supplies as it just returned from another mission.

- For 15 scene calls we tested, STARS took, on average, 9.7 minutes for a helicopter to be airborne (chute time). For those 15 scene calls, chute time for the Regina base ranged between 6 and 10 minutes, with an average of 8.9 minutes; and for the Saskatoon base, it ranged between 9 and 13 minutes, with an average of 10.5 minutes.
  - Longer chute times for the Saskatoon base was consistent with our expectations because of base design (e.g., the door at the Saskatoon base takes longer to open).
- STARS did not always meet its dispatch time goal and its quarterly reports to the Ministry did not explain why.

For example, in May 2018, STARS met this goal less than 40% of the time at its Saskatoon base. We found the Ministry did not know, or inquire, why STARS did not meet the goal. We also found STARS could not provide an explanation.

Also, in our testing of 30 inter-facility transfers and 15 scene calls, we noted how long STARS' medical crew spent with patients. We found:

- For 30 inter-facility transfers we tested, STARS medical crew spent between 7 to 95 minutes with a patient before transporting them to a hospital with an average of about 26 minutes spent with a patient.
- For all 15 scene calls we tested, STARS received notification of the call and completed the mission. For these calls, STARS' medical crew spent between 2 to 40 minutes with a patient on scene before transporting them to a hospital with an average of 16 minutes spent with a patient.

Without receiving adequate reporting from STARS about the timeliness of air ambulance services, the Ministry cannot understand why there may be delays or take action to better co-ordinate the provision of helicopter ambulance services.

**5. We recommend the Ministry of Health obtain written reasons where timeliness indicators for helicopter ambulance services are not met.**

**Information Required to Assess Quality of Helicopter Ambulance Patient Care**

The Ministry does not receive or assess the quality of patient care provided by helicopter ambulance services. It only expects to be made aware of instances of failure in providing appropriate patient care when transported by helicopter ambulance.

We found Ministry management unaware of the quality of care indicators STARS tracks. In addition, it had not determined how best to analyze the overall quality of care provided by helicopter ambulance services. It did not ask STARS to share information about the quality of patient care received during a helicopter ambulance inter-facility transfer or scene call.



Rather, the Ministry relies on critical incident reports to gain insight about the quality of patient care received through helicopter ambulance services. It defines critical incidents as a serious adverse health event including, but not limited to, the actual or potential loss of life, limb, or function related to a health service provided by, or a program operated by, a health care organization.<sup>22</sup>

It requires the Authority, through its policies, and STARS, through its Agreement, to report critical incidents.

For the period from July 2018 to May 2019, the Ministry received two reports from the Authority on critical incidents related to helicopter ambulance services. Each report advised it of a ground ambulance provider not using the stand-down criteria properly, which could have affected patient outcome (i.e., the ground ambulance EMS staff at the scene stood down the helicopter contrary to the stand-down criteria). Each report related to a different ground ambulance provider.

We found for both cases, the Ministry and the Authority took appropriate steps, such as conducting an investigation and providing recommendations to limit future incidents.

For three randomly selected ground ambulance service providers, we confirmed their awareness of the stand-down criteria in effect and used them. As of June 2019, Saskatchewan uses 105 different ground ambulance services.

The lack of regular, timely tracking of key quality of care indicators limits the Ministry's ability to analyze performance information for helicopter ambulance services and to take timely action to address issues with quality of care.

**6. We recommend the Ministry of Health routinely receive and analyze key information about the quality of patient care provided during helicopter ambulance services.**

We found STARS tracks seven quality care indicators related to medical procedures completed during a mission. See **Figure 8** for these seven quality care indicators. STARS uses the results from internal reviews of each helicopter mission to collect this information. STARS has its peers (e.g., nurses), followed by its medical directors, do these internal reviews.

**Figure 8—Quality Care Indicators STARS Tracks**

1. Advanced airway placement
2. Ventilator placement
3. Helicopter utilization (clinical, time, mass casualty incident, accessibility)
4. Blood glucose check for altered mental status
5. Waveform capnography ventilated patients (measurement of the partial pressure of CO2 in each exhalation)
6. First attempt tracheal tube success
7. Verification of tracheal tube placement

Source: Information provided by STARS.

In addition, STARS tracks its utilization in the following four areas: clinical level of care, time-sensitive, mass casualty incidents, and accessibility. **Figure 9** briefly defines each of these four areas.

<sup>22</sup> Ministry of Health, *Critical Incident Guidelines*, 2004.

**Figure 9—Helicopter Utilization From July 2018 to May 2019 by Regina and Saskatoon STARS bases**

Indicators	Defined As:	%of Cases by Base Location	
		Regina	Saskatoon
Clinical level of care	When a patient's required level of care is the level STARS provides	79.3%	59.5%
Time-sensitive cases	When a patient had time-sensitive illness or injury	40.5%	49.5%
Mass casualty incident	When STARS responded to an incident where there were more than three patients	2.3%	2.3%
Accessibility issues	When a patient was trapped or in a not easily accessible area (e.g., a forest, limited road conditions)	0.3%	1.5%
Other	Includes factors such as lack of available resources (e.g., patient required a medication or infusion that local EMS service could not administer) or long ground transport (e.g., a patient coming from a significant distance, four hours, with a spinal fracture).	0.0%	11.0%

Source: Provincial Auditor of Saskatchewan based on information provided by STARS.

We found each of the quality care indicators STARS tracks align with good practice.

Good practice also suggests other key quality indicators that STARS does not track. These include rate of chest compressions performed during transport.<sup>23</sup>

### **Closer Monitoring Needed for When and Why Helicopter Ambulance Services Not Provided**

The Ministry did not ask or obtain adequate information from STARS about reasons for declined helicopter service requests and cancelled missions to determine whether it provides sufficient and appropriate helicopter ambulance services.

The quarterly reports the Ministry received from STARS on its operations and activities includes data about the volume of missions flown each quarter for the period from April 1, 2018 to March 31, 2019. We found these do not explain fluctuations in data between quarters, between bases (i.e., Saskatoon, Regina), or from year-to-year. In addition, they do not explain why STARS declined service requests or why missions were cancelled.

In our review of STARS' service requests and mission data for the period from July 2018 to May 2019, we analyzed the reasons why service requests and missions were cancelled or declined. As shown in **Figure 10**, we found 82% of uncompleted missions resulted from STARS being asked to stand-down, and 10% of missions not accepted or declined resulted from STARS being on another mission.

<sup>23</sup> Ground and Air Medical Quality in Transport (GAMUT) key quality indicators (supported by the Air Medical Physician Association (AMPA) and the American Academy of Pediatrics (AAP) and used by Commission on the Accreditation of Transport Systems (CAMTS)) found at [www.gamutqi.org/metrics.html](http://www.gamutqi.org/metrics.html).



**Figure 10—STARS' Reasons for Cancelling or Declining Service Requests and Missions from July 2018 to May 2019**

**Missions not completed (i.e., helicopter lifted off and then grounded)**

- 21 times (18%) STARS reasons: five times helicopter diverted to another call, one time due to mechanical issue, and 15 times due to weather
- 95 times (82%) requester cancelled STARS (stood down): either transport not needed at all or another transport used (e.g., ground ambulance)

**Requests for potential missions not accepted or declined<sup>A</sup>**

- 314 times (10%) STARS declined request due to already being on the mission
- 758 times (23%) STARS declined request due to weather
- 21 times (1%) STARS declined due to scheduled or unscheduled maintenance
- 261 times (8%) STARS declined due to lack of sufficient information to know whether STARS is indeed required or STARS' medical crew decided not to respond. STARS not called to respond to these calls after ground ambulance arrival
- 1,873 times (57%) STARS notified of possible mission, but then cancelled by a requester because another transport was used (e.g., ground ambulance or Saskatchewan Air Ambulance did inter-facility transfer) or no transport needed at all
- 24 times (1%) other reasons for cancellation (e.g., patient weight over helicopter limit)

Source: Provincial Auditor of Saskatchewan based on information provided by STARS.

<sup>A</sup> STARS may or may not have been used for these missions (and other transport may have been provided instead of STARS)

Periodically analyzing declined or cancelled service requests and missions would give the Ministry a better understanding for the appropriate use of STARS and the barriers affecting STARS' ability to respond. Not doing such analysis increases the risk the Ministry may be unaware of potential risks or barriers to provide timely and appropriate air ambulance services in the province.

**7. We recommend the Ministry of Health receive periodic and detailed reporting on the number and reasons for cancelling or declining requests for helicopter ambulance services.**

**Some Monitoring of Ambulance Helicopter Maintenance Needed**

The Ministry does not expect STARS to share, nor does it receive, summarized results from Transport Canada's inspections of the three helicopters used to provide air ambulance services in Saskatchewan. In addition, it does not request or receive reports on the STARS' maintenance of those helicopters, including reasons for unscheduled maintenance.

STARS, as an air ambulance provider, is required to maintain helicopters, according to the federal regulations. Transport Canada regulates Canadian aircrafts' compliance with regulations, and can inspect STARS' operations at any time, including helicopter maintenance.

STARS management indicated Transport Canada would ground aircraft if there was significant non-compliance. We found the Ministry aware Transport Canada periodically inspected STARS and held the authority to ground STARS aircraft when warranted.

Transportation Canada last inspected STARS in 2017. Its findings reported STARS did not have any significant non-compliance issues with federal legislation.

We found Ministry staff unaware of STARS' last inspection, or whether Transport Canada identified any findings that could impact STARS' ability to provide reliable air ambulance service.

Our review of the 21 requests for missions declined because of maintenance in the period from July 2018 to May 2019 found STARS declined 16 requests for potential missions due to unscheduled maintenance on eight different days (i.e., something broke down), and only five missions due to scheduled maintenance. STARS flew 610 missions during this timeframe.<sup>24</sup>

We found having more instances of unscheduled maintenance than scheduled maintenance seemed consistent with the Government's December 2018 announcement of STARS' plan to replace all three helicopters used for air ambulance services in Saskatchewan by 2021 because of age. Aging helicopters suggests a need for more frequent scheduled maintenance.

As shown in **Figure 11**, on most occasions, STARS was unavailable for only a single day due to unscheduled maintenance. However, on some of those days, unscheduled maintenance resulted in STARS declining multiple requests (e.g., on March 20, 2019, STARS declined six requests). Even if STARS' helicopter is not available, STARS Transport Physician is still involved in patient care when needed (e.g., consultation).

**Figure 11—Unscheduled STARS Helicopter Maintenance from July 2018 to May 2019**

Date	Base Location	Out-of-Service Reason
July 7, 2018	Regina	➤ Out-of-service for five hours due to wiring hardness issues Declined one request
September 1, 2018	Saskatoon	➤ Out-of-service for five hours due to cracked windscreen Declined two requests
September 27, 2018	Regina	➤ Out-of-service for two hours due to communication box issues Declined one request
October 10–11, 2019	Regina	➤ Out-of-service for 11 hours due to issues with engine trim switch Declined four requests
March 20, 2019	Saskatoon	➤ Out-of-service for 22 hours due to broken oxygen cable Declined six requests
May 24, 2019	Regina	➤ Out-of-service for four hours due to engine chip light Declined one request
May 31, 2019	Saskatoon	➤ Out-of-service for two hours due to cracked windshield Declined one request

Source: Information provided by STARS.

While the Ministry received information on scheduled maintenance dates, it did not ask for, or receive any details, about unscheduled maintenance, including the time helicopters were out of service, the reasoning, the number of missions declined as a result, and STARS' strategy to minimize future instances, if needed.

Without receiving summarized results of Transportation Canada's inspections and STARS' maintenance reports, the Ministry does not know whether STARS sufficiently maintains helicopters used to provide air ambulance services in Saskatchewan. Having improperly maintained helicopters could adversely affect their availability, and put staff and patient safety at risk.

**8. We recommend the Ministry of Health receive periodic reports on the maintenance of helicopters used to provide air ambulance services.**

<sup>24</sup> 463 inter-facility transfers plus 147 scene calls = 610 missions.



In December 2018, the Government of Saskatchewan made public its commitment to purchase one of three new helicopters for use in Saskatchewan as part of STARS' initiative to renew its fleet across the prairie provinces.<sup>25</sup> It estimates the costs for Saskatchewan to finance one new helicopter and meet increased operating costs will be incremental over the life of a new 10-year agreement with STARS.

The Government of Saskatchewan expects STARS to fund the other two new helicopters through other mechanisms (e.g., fundraising, private company sponsorship, federal funding).<sup>26</sup> STARS expects the first new helicopter to be operational in Saskatchewan in fall 2019, and plans to purchase the others by 2021.

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<sup>25</sup> [www.saskatchewan.ca/government/news-and-media/2018/december/04/nutrien-and-stars-renew-commitment](http://www.saskatchewan.ca/government/news-and-media/2018/december/04/nutrien-and-stars-renew-commitment) (3 September 2019).

<sup>26</sup> In March 2019, STARS received \$65 million from the Federal Government to fund the purchase of five new helicopters in 2019–2020 for the prairie provinces.