



Strathcona County Emergency Services

# COMPREHENSIVE ANALYSIS OF EMERGENCY SERVICES OPERATIONS

February 2017



**Emergency Services Consulting International**  
*Providing Expertise and Guidance that Enhances Community Safety*

CONFIDENTIAL

## TABLE OF CONTENTS

<b>Acknowledgments .....</b>	<b>3</b>
<b>Executive Summary .....</b>	<b>4</b>
<b>Overview of Strathcona County Emergency Services .....</b>	<b>8</b>
Strathcona County .....	8
AHS Ground Ambulance Governance .....	10
SCES Services & Emergency Operations .....	10
<b>SCES Operational Staffing .....</b>	<b>15</b>
Staff Scheduling Methodology .....	15
Current Ambulance Staffing .....	15
Fire Apparatus Staffing .....	16
<b>EMS Patient Outcomes .....</b>	<b>18</b>
<b>Budget &amp; Finance .....</b>	<b>20</b>
Municipal Investment .....	20
Operating Revenues .....	22
Operating Expenses .....	24
<b>Service-Delivery &amp; Performance .....</b>	<b>26</b>
<b>Comparative Analysis .....</b>	<b>35</b>
Evaluation of Comparable Organizations .....	35
Other Three-Person Staffing Models .....	42
<b>Participation in the Provincial EMS System .....</b>	<b>46</b>
Alberta Health Services Contract .....	46
Impact of SCES Participation .....	47
<b>Ambulance Service-Delivery Options .....</b>	<b>50</b>
Option A: Continue the Status Quo .....	50
Option B: Two-Person Ambulance with Quick-Response Units .....	51
Option C: Two-Person Ambulance Staffing Model .....	54
Option D: Termination of Ambulance Service Provision .....	56
Options for Increased Rural Service-Demand .....	59
Financial Summary of the Service-Delivery Options .....	60
<b>Ambulance Service &amp; Deployment Recommendations .....</b>	<b>61</b>
Ambulance Service-Delivery Recommendations .....	61
Ambulance Deployment Recommendations .....	61
<b>Final Observations of SCES .....</b>	<b>63</b>
<b>Appendix A: Table of Figures .....</b>	<b>64</b>
<b>Appendix B: Comparative Survey Tables .....</b>	<b>65</b>
<b>Appendix C: Sample EMS Customer Satisfaction Survey .....</b>	<b>73</b>
<b>Appendix D: References .....</b>	<b>75</b>

## ACKNOWLEDGMENTS

Emergency Services Consulting International would like to acknowledge the substantial time, effort, and cooperation of the Fire Chief, officers, firefighters, and other staff members of Strathcona County Emergency Services, including various individuals from Strathcona County and Alberta Health Services, all of whom contributed substantially to this project.

### Strathcona County Emergency Services

**Iain Bushell**  
Fire Chief & Emergency Management Director

**Devin Capcara**  
Deputy Chief, Operations

**Vern Elliot**  
Deputy Chief, Human Resources & Logistics

**Dawn Nash**  
Assistant Chief, Strategic Services

**Bob Scott**  
DC, Community Safety & Communications

**Elizabeth Holcombe**  
Division Chief, Communications/Dispatch

**Joanne Benvie**  
Quality Management Coordinator

**Andrew Spence**  
President, IAFF Local 2461

**Michele Wilson**  
Administrative Assistant, Office of the Fire Chief

**Nancy Betts**  
Administrative Assistant, DC of Operations

**Rhonda Duncan**  
Administrative Assistant, Office of the Fire Chief

### Alberta Health Services

**Graeme McAlister**  
EMS Associate Executive Director—Edmonton

**Sean Hickey**  
Manager—North/Edmonton Zones

**Richard Scheirer, MD, FRCPC**  
Strathcona EMS Medical Director

**Alison Kabaroff, CD, MD, FRCPC**  
Alberta EMS Medical Director

**Darren Knapp, Manager**  
Vital Heart Response

### Strathcona County

**Rob Coon**  
Chief Commissioner

**Gord Johnston**  
Associate Commissioner, Community Services

**Daren Sears**  
GIS Branch, IT Services

**Sophie Lewin**  
Geospatial Analyst, IT Services

**Dan Nguyen**  
Technical Applications Specialist

***The men and women of Strathcona County Emergency Services,  
who daily serve their community with honour and distinction.***

## EXECUTIVE SUMMARY

The following report is the result of a comprehensive emergency services operations analysis of Strathcona County Emergency Services (SCES) by Emergency Services Consulting International (ESCI). The approach to this project was one of an objective viewpoint, and without preconceptions about the organization or the recommendations that would be ultimately proposed.

During this project, ESCI analyzed multiple data sources; reviewed dozens of reports, studies, plans, and other related SCES documents. The report is the result of a comprehensive evaluation of SCES that included multiple on-site interviews; data analysis; geographic information system or spatial analyses; evaluation of industry best practices utilized throughout North America; and through ESCI's substantial experience.

In this report, ESCI has elected not to include a typical executive summary. Therefore, ESCI will address some of the principal issues, as well as address the four questions below.

Although the project was deemed an "emergency services operations analysis," the emphasis was on the delivery of emergency medical services. The most significant issues identified and evaluated by ESCI during this project were:

- The impact of a three-person ambulance staffing and deployment model
- The challenges of EMS emergency communications/PSAP (911) between SCES and AHS
- The deficiencies in information technology, records management, and other data management
- The effects of SCES participation in the provincial EMS system
- The complexities and costs of providing fully integrated services by SCES

In addition to the preceding issues, the Strathcona County Council sought answers to the following questions:

**1. *What are the outcomes of the current SCES service model in comparison to neighboring jurisdictions?***

There were substantial challenges in acquiring equitable information from other organizations within the region. Many of the agencies were reluctant or slow to respond to information requests. In addition, data definitions varied among the organizations, making the comparative results questionable. Five of the jurisdictions were relatively comparable to SCES, and were used in the various analyses.

ESCI looked at the costs per capita of each of the organizations for 2015. A significant shortcoming of this analysis was the lack of information on revenue sources from each of the organizations. ESCI was unable to determine whether the figures provided were gross or net operating budgets. The average "gross" cost per capita among all the organizations combined was \$269, compared to SCES' gross cost per capita of \$339.

Obviously, revenue offsets costs and, when applying this to SCES, the net cost per capita was substantially lower at \$248 versus \$339.

ESCI also analyzed comparative costs using alternate data. In 2012, AHS requested that its contract agencies prepare budgets based on the cost of operating a standalone service. Using a unit-hour costing methodology, each agency independently determined an hourly cost to operate their ambulance service. The average hourly operating cost among all six agencies was \$235—with SCES at \$245 per hour.

If the hourly costs submitted to AHS are an accurate comparison, then the cost for SCES is about \$10 per hour higher than the average. None of the comparable organizations provides three-person ambulance staffing. The agencies most comparable to SCES were Lethbridge Fire & Emergency Services and Red Deer Emergency Services. Their costs were approximately \$5 and \$7 per hour less than SCES respectively.

If these calculations are an accurate representation of the cost to operate, it indicates that Strathcona County citizens receive the various benefits and advantages found with the three-person ambulance-staffing model for a moderate amount above the average hourly cost among the various organizations.

The results of the 2015 budget analysis must not necessarily be interpreted as an indication that current cost of SCES to provide services are *excessive* in comparison to other similar organizations. It must be noted that the SCES budget includes the cost emergency management and an emergency communications center. Most of the other comparable organizations do not have these costs. The numerous constraints and difficulties in acquiring accurate comparative data made effective analysis impossible within the scope of work and timeframe of the report.

ESCI also compared the career firefighter rates per 1,000 persons served for 2015. SCES was found to have a rate of 1.6, which was equal to the average of rate of the five comparable agencies combined, including SCES. Two of the comparable organizations had slightly higher rates of 1.7.

## **2. *What is the rationale behind the number of personnel sent to respond to fires versus other emergencies?***

Depending on the nature of the incident, in order to provide adequate fire suppression, rescue, hazmat, and other services, a sufficient number of personnel (and equipment) must be deployed. Four-person squads allow considerable flexibility, efficiency, and adequate personnel in fires and other non-EMS incidents. In critical medical emergencies, the fourth firefighter can be removed from the squad and temporarily assigned to the ambulance. In those cases, the squad can remain available for other calls.

Both the NFPA and CFAI recommend four-person engine companies as the minimum staffing. This has been supported scientifically with two significant studies conducted by the U.S. Department of Commerce's National Institute of Standards & Technology (NIST). The first study, released in 2010, found that four-person firefighting crews were able to accomplish essential firefighting and rescue tasks 25% faster than three-person crews were.

The second study in 2013, found that firefighting crews of five or six members, instead of three or four, were significantly faster in completing search-and-rescue operations and extinguishing fires. This is important, as Strathcona County will soon see the addition of at least three high-rise buildings exceeding 12 stories. In the future, SCES will need to be prepared for this with adequate personnel and equipment.

**3. *What is the proportion of ambulance calls that utilize two, three, and four-person EMS personnel staffing respectively?***

Utilizing SCES CAD data, ESCI analyzed 24 months of single-response (as opposed to multi-company responses) ambulance calls. The cumulative results showed that ambulances were staffed with two personnel in only 3% of the incidents. Four personnel were utilized also in 3% of the calls. It must be noted that the fourth person often represented a student and, in rare cases, a high-acuity patient requiring additional personnel. SCES ambulances were staffed with three personnel in 94% of ambulance responses during that period.

In addition, during both 2014 and 2015, 92% of EMS incidents did not require a multi-company response, and were mitigated with a single ambulance.

**4. *What is the proportion of ambulance calls in which three-person staffed ambulances are serving the needs of the residents of Strathcona County, versus those of other communities?***

During 2014–2015, 79% of all three-person ambulance responses were to locations within Sherwood Park and Strathcona County. Approximately 18% were responses to Edmonton, and the remaining 3% of calls were to other locations, such as Fort Saskatchewan. It is evident that the residents of Strathcona County are the recipients of the majority of the benefits of three-person ambulance service. However, the citizens of Edmonton and other communities reap a substantial portion of the benefits as well.

### **Ambulance Service-Delivery Options**

ESCI has presented four primary options for ambulance service-delivery in Strathcona County. They include:

- Option A: Continue the Status Quo
- Option B: Two-Person Ambulance with Quick-Response Units
- Option C: Two-Person Ambulance Staffing Model
- Option D: Termination of Ambulance Service Provision
  - Enhanced EMS Service-Delivery for Option D
- Options for Increased Rural Service-Demand

In addition to Options A–D, an “enhanced” version of Option D has been presented, as well as options for providing increased service to the rural areas as the demand may eventually indicate in the future. Each option includes the advantages and disadvantages of each, as well as projected financial impacts. A summary of the first and second year financial impacts of each is described in the figure below:

**Summary of the Net Financial Impact of Service-Delivery Options**

<b>Service-Delivery Options</b>	<b>First Year</b>	<b>Second Year</b>
Option A: Maintain Status Quo	\$0	\$0
Option B: Two-Person Ambulances with QRUs (first year)	\$532,000	\$22,000
Option C: Two-Person Ambulance Staffing Model	\$0	\$0
Option D: Termination of Ambulance Service Provision	<b>-\$2,580,000</b>	<b>-\$2,580,000</b>
Option D with Enhanced EMS Service-Delivery (first year)	<b>-\$3,112,000</b>	<b>-\$2,602,000</b>

All dollar values are based on estimates, and not an actual analysis of budgetary reporting.

The figure above does not include the costs of the increasing services to address the growing rural service demand, as this option can be implemented independent of the five alternatives for service-delivery. Details and costs for that are described later in this report.

In summary, ESCI has found Strathcona County Emergency Services—though not without its challenges and areas warranting improvement—to be a high-quality organization with effective leadership, outstanding employees, and a provider of effective and efficient services to the community. ESCI consistently found a genuine passion for providing quality service, professionalism, and sense of pride among the employees at every level of the organization.

## OVERVIEW OF STRATHCONA COUNTY EMERGENCY SERVICES

Emergency Services Consulting International was retained by Strathcona County to conduct an independent analysis of Strathcona County Emergency Services and its emergency operations, with an emphasis on the emergency medical services (EMS) component. This report is the result of a comprehensive evaluation of SCES that included multiple on-site interviews; data analysis; review of current literature and research; geographic information system (GIS) or spatial analysis; assessment of current and past SCES documents and reports; evaluation of industry best practices utilized throughout North America; and through ESCI's substantial experience.

### Strathcona County

Located within the province of Alberta, Strathcona County consists of approximately 1,262 square kilometers. The County is comprised of urban and rural areas, along with industrial development, and is situated east of the City of Edmonton. The County has a current population of 95,597, of which 68,782 reside in the urban community of Sherwood Park, with the remaining 26,815 persons located in the rural areas. The population has increased by 3.5% from 2012–2015.<sup>1</sup> Similar to many other communities throughout Canada, the County has begun to see a demographic shift to older adult residents—increasing the demand for emergency medical services.

### Population Growth Projections

The population within Strathcona County has continued to grow steadily, and local planning officials anticipate this growth over the next several decades. Projected population growth was included in the SCES 2012 "Fire & Emergency Services Master Plan."<sup>2</sup> According to the plan, the population of Strathcona County will exceed 130,000 persons by 2032. Estimating the future size of a community is important, as human activity is the primary driver of emergency services—particularly the demand for EMS.

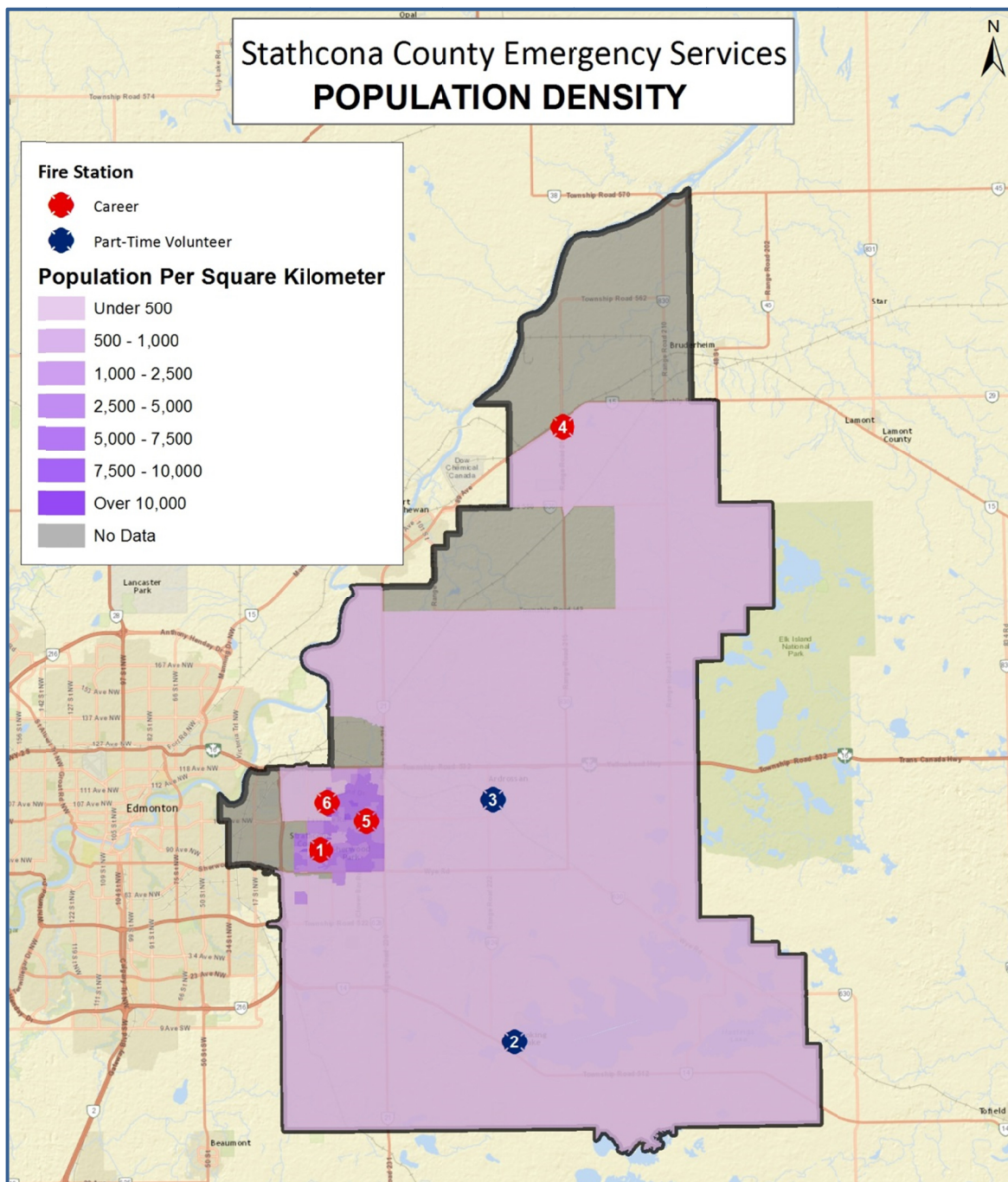
According to recent census data, the majority of the County has a population density of 500 persons or less per square kilometer. In the more populated areas in and around Sherwood Park, population density ranged from around 1,000 to over 10,000 persons per square kilometer.

The following map illustrates the density of Strathcona County's population (note that census data was unavailable for approximately 11% of the County, due to the FOIP rules of the County's legal department). As seen, large portions of the County map also show that Stations 2, 3, and 4 are separated by long distances, and respond to large, rural service-areas of more than half of the eastern side of Strathcona County.



**Figure 1: Population Density of Strathcona County**

Source: Strathcona County GIS (2015 census data)



## Local Governance

Strathcona County Emergency Services functions within the municipal administrative structure of Strathcona County. The County is considered a “specialized municipality,” which is a unique form of government. The citizens are represented by eight elected councilors and a mayor. Strathcona County’s Chief Commissioner (or Chief Administrative Officer) is accountable to the mayor and council. The municipal administration and several Associate Commissioners are accountable to the Chief Commissioner. The SCES Fire Chief is directly accountable to the Associate Commissioner of the Community Services Division.

## AHS Ground Ambulance Governance

Beginning in April 2009, the Province of Alberta assumed the responsibility of the governance, funding, and direct delivery (or contracting with local providers) of ground ambulance service (and eventually air ambulance service) to Alberta Health Services Emergency Medical Services (AHS EMS). The primary intent was to create a province-wide EMS delivery system that was “borderless” and fully integrated within the overall healthcare system. At the time, SCES was given the option of discontinuing the provision of ambulance service, or entering into a contractual arrangement with AHS EMS to continue providing ambulance service (this impact of this contract will be discussed in more detail later in this report). Unless specifically noted, the acronym “AHS” will be used throughout this report to refer to Alberta Health Services Emergency Medical Services.

## SCES Services & Emergency Operations

Founded in 1956, SCES has evolved into a fully integrated, all hazards emergency services organization that originally obtained accreditation to the ISO 9001 Standard in 2009. The name alone reflects this. Rather than referring to itself as a “fire department,” as is typical of most similar organizations, SCES sees itself as an organization capable of addressing a broad spectrum of emergencies and other services beyond fire suppression.

The department operates an emergency communications centre; provides fire suppression, rescue, first-response EMS and ambulance service; conducts fire investigations and fire prevention activities; promotes community health and safety; and provides emergency preparedness and management.

SCES operates out six fire stations located throughout Strathcona County. Four stations (Stations 1, 4, 5 and 6) are staffed 24-hours daily with full-time, career personnel. Stations 2 and 3 are not staffed full-time, but utilize “part-time” (sometimes referred to as “volunteers”) personnel on an on-call basis. For purposes of this report, unless otherwise noted, the term “firefighter” will refer to full-time personnel functioning within the Operations Division, regardless of rank or EMS certification.

## Public Perception of SCES

Strathcona County conducts annual public satisfaction surveys with specific questions related to the quality of emergency services, and broken down by rural and urban citizen-responses. Respondents are also categorized by those who have used the service and those who have not. The following figure lists results of the surveys from 2014 and 2015.<sup>3,4</sup>

**Figure 2: Public Satisfaction Survey Results (2014 & 2015)**

Public Survey	Satisfaction Levels				
	Very High	High	Average	Low	Very Low
<b>2014 Survey</b>					
SCES User (19%*)	49.5%	45.2%	3.2%	1.1%	1.1%
Non-User	34.7%	49.3%	13.4%	2.0%	0.6%
<b>2015 Survey</b>					
SCES User (13%*)	52.0%	34.0%	12.0%	2.0%	0.0%
Non-User	35.0%	50.1%	13.9%	0.7%	0.3%

\*Percentage of respondents who indicated they had used SCES services that year

The results listed in the preceding figure demonstrates that the majority of residents—whether a user or non-user—rated SCES as either high or very high. Among the respondents that were *not* satisfied with SCES, the most common issues in both 2014 and 2015, included:

- Need to improve response times.
- Insufficient number of ambulances.
- Non-specific “staffing” issues.
- Not enough fire stations in the County.
- Better fire hydrant proximity for rural residents.

In the 2014 survey, 10% of the respondents indicated they “did not know” enough about SCES to make a rating. In 2015, this was even higher at more than 25% of the respondents.

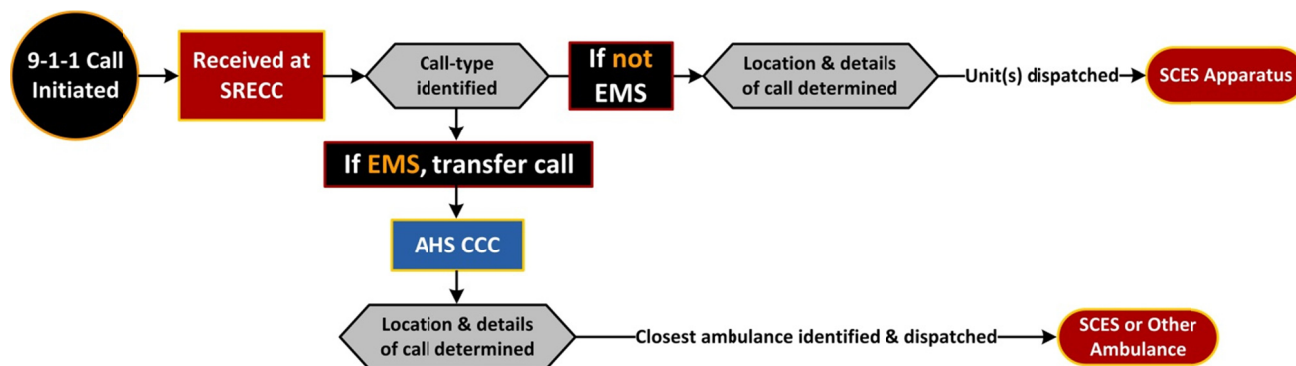
### **Emergency Communications & Dispatch**

SCES operates the Strathcona Regional Emergency Communications Centre (SRECC), which serves as a primary public safety answering point (PSAP) for 911 calls. The SRECC dispatches SCES apparatus to fire-related calls and other non-EMS incidents. In addition, it provides dispatch services to other nearby jurisdictions. All Communications Officers are formally trained in emergency medical and emergency fire dispatching programs.

The process of transitioning EMS to AHS involved the total consolidation of EMS dispatch services across the province. However, in 2010 the process was ceased primarily due to concerns brought forward by various stakeholders throughout the province. The result produced a partial consolidation of emergency communications.

When a call for EMS is received by the SRECC, the Communications Officer determines the incident-type and subsequently transfers the caller to the Central Communications Centre (CCC) operated by AHS in Edmonton. The AHS CCC subsequently dispatches the nearest SCES (or other) ambulance to the incident. The following figure illustrates this process.

Figure 3: Ambulance Dispatch Process in Strathcona County



If there is an indication during the call that an incident may require a combination of EMS and a fire-rescue response (e.g., motor vehicle accident), or the need for a response from either of the two part-time stations, the SRECC Communications Officer will remain on the line to determine the need to dispatch additional SCES resources.

### ***Alberta Central Communications Centre***

EMS calls transferred from the SRECC to the AHS CCC are received and immediately processed by an Emergency Communications Officer (ECO), who subsequently dispatches the closest SCES (or other) ambulance. Using an algorithmic system, the Central Communications Centre applies the Medical Priority Dispatching System (MPDS) to determine the nature and severity of the incident; provide pre-arrival medical and safety instructions; and assign response-determinants and priorities to AHS ambulances.

Ambulances operating in the provincial EMS system are assigned to responses based upon the proximity to an incident and availability status. Therefore, the AHS EMS system is coordinated by the CCC as a borderless and seamless EMS system that does not differentiate between municipal boundaries or organization type (AHS, public sector contractor, or private contractor). For SCES, this means that their ambulances are frequently dispatched to EMS incidents outside of Strathcona County, and that non-SCES ambulances are often sent to calls within Strathcona County.

### ***Emergency Communications Discussion***

The transition of ambulance dispatching from SCES to AHS has produced a fragmented, complex, and inefficient EMS communications system. In a 2013 independent report from the Health Quality Council of Alberta (HQCA), they state, “The partial consolidation of the EMS dispatch system into Alberta Health Services has had a negative impact on the efficiency, effectiveness and safety of the EMS system.”<sup>5</sup>

In another report published in February 2013 by the Provincial Partnership to Support Community First Response, the authors concluded that, “...consolidating ambulance dispatch with AHS assuming control has undermined 911 and a coordinated emergency response system.” It also stated, “Without a cohesive policy we have chaos, with every service provider (AHS, fire, police) questioning the authority of the others to send resources and manage an incident.”<sup>6</sup>

ESCI has observed many of the same issues as identified in the aforementioned reports, and concurs with their conclusions. However, it is beyond the scope of this report to address all of the various issues related to 911 and emergency communications. In response to recommendations described in the HQCA Review of the Operations of Ground Emergency Medical Services, AHS is moving forward with the consolidation of EMS dispatch to two communications centres. Unfortunately, this will not lead to an improvement in the communications issues in Strathcona County. Problems with the additional time necessary to transfer EMS calls from one communications centre to another, as well as other related issues, will remain unresolved.

SCES, in cooperation with AHS and other regional emergency services and law enforcement organizations, should consider initiating a comprehensive independent study to determine the potential for creating a single regional PSAP/consolidated dispatch centre.

### **EMS Operations & Ambulance Deployment**

As required by the AHS contract, SCES operates four advanced life support (ALS) ambulances from Stations 1, 4, 5, and 6. Regardless of which apparatus they are assigned, full-time firefighters work either a “day” or “night” shift. Ambulances are staffed with a minimum of one Paramedic (EMT-P) and two Emergency Medical Technicians (EMT). Part-time firefighters are deployed to their respective response areas from Stations 2 and 3, to begin treatment until either an SCES or AHS ambulance arrives to assume patient care.

The department has employed this unique staffing model based on the assumption that most EMS calls can be handled by a three-person ambulance crew. One of the primary goals of this staffing model is to minimize unnecessary responses by fire apparatus to low-acuity calls; those in which a rapid first-response is not indicated; and during incidents in which multiple personnel (more than three) are not required.

#### ***Ambulance Deployment in Strathcona County***

It is the policy of AHS to dispatch the ambulance closest to the incident scene. SCES ambulances are often sent into Edmonton and other locations relatively remote from their stations. During 2014 and 2015, incident data from AHS demonstrated that 18% of SCES ambulance responses were within the city limits of Edmonton (discussed in more detail under “Service-Delivery & Performance”).

SCES ambulances are deployed primarily from fixed locations. AHS uses its system status management system (SSM) to move ambulances around the province to ensure adequate coverage. All ambulances are equipped with automatic vehicle location (AVL) technology, which enable the AHS communications centre to identify the specific location of ambulances throughout the province, and dispatch the one nearest to an incident. The SRECC, as well as the on-duty Platoon Chief (PC), are not necessarily aware of the status of SCES ambulances, unless contact is initiated with the AHS CCC to identify their locations and status.

AHS operates a deployment system that functions to allocate ambulances in proximity to anticipated demand. This form of SSM is predicated on business rules that trigger ECOs to re-assign ambulances to travel to posting locations or zones. As ambulances shift their position based upon fluctuations in system demand, SCES ambulances are sometimes assigned to re-deploy from SCES stations to provide coverage to high-volume zones within the City of Edmonton.



Likewise, SCES or non-SCES ambulances are re-deployed to backfill resultant gaps in the SCES response area. For example, the ambulance at Station 4 may be moved to Stations 1, 5, or 6 when SCES ambulances in Sherwood Park are on other EMS responses or re-deployed to Edmonton for system coverage due to high demand. The Station 4 response area may then be assumed by other AHS ambulances or contract providers.

### **Ambulance Deployment Discussion**

SCES ambulances continue to be dispatched to a substantial number of incidents in Edmonton. During 2015, emergency scene-responses by SCES ambulances to Edmonton exceeded 19 minutes at the 90<sup>th</sup> percentile. This not only pulls ambulance resources from Strathcona County for extended periods, but also requires patients in Edmonton to wait a considerable time before an ambulance arrives. In other cases, SCES ambulances are deployed to Edmonton to “post” or standby for calls. This is perceived by some as subsidizing AHS ambulance service in Edmonton at the expense of SCES and Strathcona County residents. However, AHS ambulances are also deployed to incidents in Strathcona County through their SSM process.

The “excessive” use of rural ambulance resources in urban locations and cities throughout Alberta was apparently recognized by Alberta Health. During a news conference in March 2015, Alberta Health Minister Stephen Mandel stated, “We’ve heard time and time again that rural communities are concerned their ambulances go into the city, [and] then all of a sudden they’re doing services for the urban community. This will not be allowed; they must return right [back] to their community.” AHS is now developing strategies to address this issue throughout Alberta. The recent addition by AHS of two 12-hour, peak-demand ambulances in Edmonton may assist in reducing the impact on SCES.

## SCES OPERATIONAL STAFFING

As of June 2016, 154 full-time career personnel were assigned to the SCES Operations Division. The minimum daily staffing of Stations 1, 4, 5 and 6 is 28 firefighters and officers, and a Platoon Chief. Each station is assigned seven personnel, with four on each squad, and three on the ambulance. When necessary, the third firefighter on the ambulance may be utilized to staff a tanker.

### Staff Scheduling Methodology

SCES utilizes a scheduling model unique to most fire departments and emergency services organizations. They function as a four-platoon system, and firefighters and officers work a 10/14 shift. The day shift represents the first 10 hours of the day (0800–1800 hours). The 14-hour night shift begins at 1800 hours and ends at 0800 hours.

Operations personnel work two consecutive 10-hour shifts, followed by two consecutive 14-hour shifts. This is followed four days (96 hours) off duty. This represents an approximate 42-hour workweek. There are a number of different schedule patterns utilized throughout North America. Commercial ambulance services typically use a 10- or 12-hour shift.

### Current Ambulance Staffing

Three-person ambulance staffing models are uncommon in most North American EMS systems. Two-person staffing continues to be the predominate model. Later in this report, ESCI provides examples of U.S. fire departments that have successfully operated with three personnel on each of its ambulances.

As is typical with most EMS systems, quantitative data from SCES was unavailable to prove definitively that three-person ambulance staffing provides superior results in patient outcomes, when compared to two-person staffing. While the ultimate goal of EMS is to reduce mortality and morbidity in victims of sudden illness and injury, it is not the *only* metric used to determine the quality and effectiveness of the services provided. Clinical and operational efficiency, cost, and impact on personnel must also be considered.

While there is not definitive proof that three-person ambulance staffing is superior to two-person staffing, there is anecdotal evidence and other indicators that suggest it works well for Strathcona County. This is not to purport that the three-person model should be applied in all EMS systems—only that it works well for SCES. In turn, neither were there quantitative data to indicate this model is inefficient and/or ineffective.

During this analysis, ESCI observed and identified indicators of the benefits and potential superiority of three-person ambulance staffing:

- Incident analysis showed that the majority (86%) of EMS incidents required a single ambulance response, minimizing the need to dispatch squads or other apparatus; thus keeping them in service and available to respond to other incidents.
- On-scene treatment modalities can be accomplished in a shorter time, and enables quicker patient-care procedures and transfer to the ambulance.

- The necessity of utilizing additional personnel from other apparatus, in order to accompany the patient during transport, is reduced.
- A three-person crew increases the safety of both the patient and firefighters during transfer of the patient to the ambulance. In many cases, both firefighters can remain seated with their seatbelts on, which is typically not possible with one firefighter in attendance.
- With one firefighter driving the ambulance, two firefighters can attend the patient during transport. This allows for more efficient patient-management.
- Patient assessment and treatment, both on-scene and during transport, may result in fewer clinical errors and a more accurate clinical impression.
- The current Associate Medical Director (who was the SCES Medical Director prior to the AHS takeover) is a stalwart supporter of the three-person ambulance model, and believes it should be continued. His experience has allowed him to see first-hand the benefits of this model.
- It allows for a sufficient number of firefighters to bring the necessary medical equipment and supplies to the patient, and minimizes the need to return to the ambulance for additional equipment. This is also a safety benefit, as the equipment can be distributed among three firefighters (e.g., carrying equipment while traveling up and down stairways).
- Enables flexibility during significant events, such as wildfires or rescues, where the third firefighter can be taken off the ambulance and assigned to staff another apparatus.
- Experience found in other emergency services organizations utilizing three-person ambulance staffing can be applied to the SCES model:
  - Other departments have seen fewer back injuries.
  - Depending on the condition of patients, roles and responsibilities can be rotated among the three firefighters, so that no one individual is required to perform the same functions consistently.
  - Shorter scene times, resulting in earlier arrival at the hospital, and less time out of service.
  - Following transport, ambulances are cleaned, re-stocked, and returned to service more quickly.
  - Fewer errors have occurred in managing and documenting the use of scheduled drugs (e.g., narcotics, etc.).

### **Fire Apparatus Staffing**

While EMS remains the predominate emergency service-demand within Strathcona County, the ability to provide adequate fire suppression, rescue, hazmat, and other services should not be diminished. Four-person squads allow considerable flexibility, efficiency, and adequate personnel in fires and other non-EMS incidents. In critical medical emergencies, the fourth firefighter can be removed from the squad and temporarily assigned to the ambulance. In those cases, the squad can remain available for other calls.



Both the NFPA and CFAI recommend four-person engine companies as the minimum staffing. This has been supported scientifically with two significant studies conducted by the U.S. Department of Commerce's National Institute of Standards & Technology (NIST). The first study, released in 2010, found that four-person firefighting crews were able to accomplish essential firefighting and rescue tasks 25% faster than three-person crews were.<sup>7</sup>

The second study, published in 2013, analyzed the effectiveness of firefighting crews in high-rise operations. The study found that firefighting crews of five or six members, instead of three or four, were significantly faster in completing search-and-rescue operations and extinguishing fires.<sup>8</sup> This is important, as Strathcona County will soon see the addition of at least three high-rise buildings exceeding 12 stories. In the future, SCES will need to be prepared for this with adequate personnel and equipment.

### **Part-Time Firefighters**

ESCI's evaluation indicated that the part-time firefighters at Stations 2 and 3 might be underutilized in EMS incidents occurring within their service areas. Extensive experience throughout North America has demonstrated that, with proper training, medical first responders operating in a tiered capacity can positively affect patient outcomes. In other systems, police, park rangers, game wardens, lifeguards, and other volunteer personnel have been tasked to provide rapid Medical First Response (MFR) capability to critical life-threats in rural and austere settings.

It is recognized that the part-time firefighters are limited in their ability to respond as quickly, or obtain as high a level of EMS training and experience as the full-time crews. However, given the proper resources and program management, they could prove to be more valuable than at present.

## EMS PATIENT OUTCOMES

The goal of every EMS system is to achieve the best possible outcomes—reductions in mortality and morbidity—in victims of sudden illness and injury. This is the primary measure of the effectiveness of prehospital emergency medical services. As with most EMS systems, SCES does not currently have the ability to determine and track the ultimate outcomes of their patients. Neither can they determine definitively if a three-person ambulance contributes more positively to outcomes than a two-person ambulance. However, was able to acquire limited data that tends to indicate better results.

### *Management of STEMI Patients*

ESCI was able to obtain performance results in cases of ST-segment Elevation Myocardial Infarctions (STEMI)—which is a potentially life-threatening type of “heart attack.” The *Vital Heart Response* (VHR) program is a system that promotes and facilitates rapid treatment of STEMI cases. The treatment for STEMI is reperfusion therapy, which consists of fibrinolysis using a medication administered in the field by paramedics, and/or Percutaneous Coronary Intervention (PCI) performed in hospitals equipped with cardiac catheterization capabilities.

The key is to initiate treatment as soon as possible after the onset of the event. Early intervention can often prevent or reduce damage to the heart muscle that occurs in a STEMI. The goal of the VHR protocol is to treat a STEMI in less than 30 minutes from the first medical contact, using fibrinolysis, and in less than 90 minutes from the first medical contact for primary PCI. The VHR program collects data on STEMI patients treated by SCES and other agencies within the region.

It is important to emphasize, that in the event of a STEMI, time to treatment is critical, in order to prevent irreversible damage to the heart. The following figure is a comparison of SCES average performance in the treatment of STEMI patients to the combined averages of five other EMS organizations in Alberta.

**Figure 4: Comparison of SCES STEMI Treatment to Other EMS Agencies**

Procedure/Intervention	Other EMS* (average)	SCES Only (average)	<i>Difference</i>
Onset of pain to arrival of medic at patient’s side	307.9 min.	147.6 min.	<b>160.3 min.</b>
Interval of paramedic arrival until diagnostic ECG	12.0 min.	10.7 min.	<b>1.3 min.</b>
Medic diagnosis to VHR physician treatment decision	15.1 min.	14.1 min.	<b>1.0 min.</b>

Source: Vital Heart Response

\*Combined averages of five EMS agencies in the region

The results shown in the preceding figure demonstrates that, in its STEMI treatment, SCES has performed, on average, better than the combined average of five other EMS organizations. Although this is based on a relatively small number of cases, it does lend some credence to the benefit of a three-person ambulance. However, by no means does this provide definitive evidence substantiating that three-person staffing is superior to two-person staffing.

## Patient Outcomes

The question of whether prehospital interventions and EMS systems improve patient outcomes has endured for many years. A growing body of research has produced sufficient scientific evidence to support the efficacy of a select number of interventions. Recently, many EMS systems have come under scrutiny. As they have become increasingly data-driven, elected officials, policy makers, and other leaders look for evidence and documentation to demonstrate improved patient outcomes and reduced healthcare costs.

Knowing patient outcomes is valuable, as it is a significant indicator of the efficacy the clinical performance of an EMS system. Essentially, acquiring this information addresses the question of whether the system is reducing mortality and morbidity in victims of sudden illness and injury.

In 2009, the National EMS Advisory Council (NEMSAC), based in the U.S., published a position paper that addressed the issue of whether EMS makes a difference.<sup>9</sup> They concluded that EMS in general and specific prehospital interventions, positively affect the outcomes of patients in both the short and long term, and have been shown to be cost effective.

At present, neither SCES nor AHS has the ability to track the outcomes of patients suffering severe illnesses or traumatic injuries—which makes clinical performance difficult to measure. This lack of patient-outcome data is typical of most EMS systems throughout North America. Alberta Health Services has been working for some time to integrate its ePCR application with the local hospital's records management systems. That work is still in progress. The eventual goal of this project is to obtain regular results on the outcomes of patients treated in the prehospital environment.

Using the Zoll dataset (December 1, 2013–November 1, 2014), there was some indication of how the patients responded to the initial interventions performed by SCES paramedics and EMTs. The patient's condition following the arrival and treatment by SCES was documented in 3,798 cases. The results were:

- Condition remained unchanged—56% (2,129)
- Condition improved—43% (1,629)
- Condition deteriorated—1% (40)

It must be noted that these results represent the opinions of the paramedics and EMTs completing the ePCR. This does not necessarily reflect the final conditions and outcomes of patients following arrival (and eventual discharge) at the hospital. Regardless, the results suggest that a large proportion (43%) of patients benefitted from intervention by SCES EMS providers.

## BUDGET & FINANCE

In this section, ESCI will make observations following a review and limited analysis of budget and finance information related to SCES, as well as financial information regarding the County overall. The following areas will be examined:

- Municipal Investment
- Operating revenues
- Operating expenses
- Financial controls and management

### Municipal Investment

Canadian municipalities invest significantly in the provision of emergency services as a commitment to the health, safety, and security of the public, businesses, and visitors within the community. Many of these municipalities are facing significant budgetary and operational pressures, and the County is no different. In a report titled, “Municipal Fire Services in Canada: A Preliminary Analysis, 2015,” the Fraser Institute summarized Statistics Canada data for comparative growth in population and number of firefighters for the period 1997–2012, and concluded firefighter numbers outpaced population growth by 25.1% to 16.2% respectively. The primary reasons for the growth in firefighter numbers and overall expenditures were not clearly cited in this research, while noting the total number of fires were down significantly for the period. Despite the lack of a comprehensive national database, the report suggests that wages, increased staffing numbers, and increased response needs for non-fire events (e.g., medical) are contributors to the changes in firefighter numbers and overall expenditures.

In order to understand Strathcona County’s municipal investment in SCES, ESCI analyzed financial information provided by SCES along with additional data about the County from online sources. This research included the overall SCES program and other County budget details.

The County population has increased by 15.5% from 2008 through 2015. During this same period, the SCES actual expenditures increased approximately 2%, with an increase in actual revenues of about 240%. However, to put that overall increase in context, the year-to-year changes averaged over 2009–2015 (with 2008 figures omitted given significant contractual, station/staffing changes) suggest a more realistic fiscal change. During this period, the change in expenses reflects an average annual increase of approximately 8%, while revenues were essentially flat or 0%. In order to understand the revenue trend, a detailed analysis of government grants and other revenues would need to be conducted.

Specifically for SCES, many factors may be driving this trend, including increased expenses, relatively flat revenues, new neighborhoods and stations, new legislative and contractual requirements, the risk appetite, and increasing expectations by the public generally.

One industry metric used in the evaluation of municipal investment in emergency services, is the cost per capita. The following figure reflects the measures of both gross cost per capita and net cost per capita for the specific years of the most recent census:

**Figure 5: SCES Annual Gross & Net Costs per Capita**

Census Year:	2008	2009	2011	2012	2015
Population <sup>1</sup>	85,521	87,998	92,490 <sup>2</sup>	92,403	95,597
Gross/Capita	\$179	\$235	\$261	\$286	\$339
Net/Capita	\$137	\$131	\$163	\$196	\$248

<sup>1</sup>Source: Strathcona County Census 2015 Results    <sup>2</sup>Source: Federal Census

Gross per capita includes all operating expenses. Net per capita includes all operating expenses less operating revenues and non-operating or capital costs. The analysis above is based only on the raw financial data provided to ESCI, and does not reflect specific operational or financial variables such as fee-for-service contracts, grants, staffing changes, and/or station openings.

While the above metric provides an indicator of inputs, ESCI notes that the results for SCES should ultimately be measured in tangible or intangible outcomes. ESCI has safely assumed the investments by the County have resulted in benefits and outcomes including lives saved, persons rescued or cared for, responses to major crises and disasters, and a positive image of SCES and the County by the public. The following figures summarize SCES' actual operating and non-operating for 2008–2015:

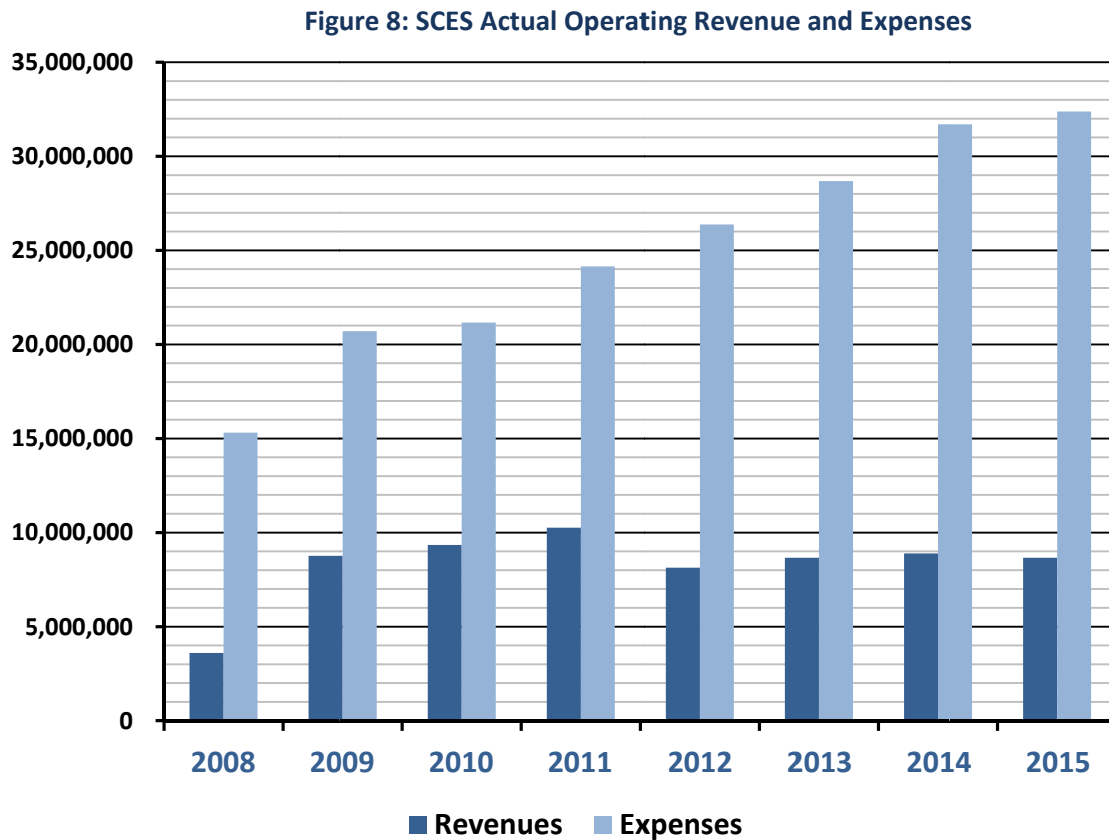
**Figure 6: SCES Operating/Non-Operating Actuals (2008–2012)**

Year:	2008	2009	2010	2011
Revenue/Expenses	Actual	Actual	Actual	Actual
Revenue	3,611,122	8,770,654	9,351,033	10,269,079
Expense	15,318,839	20,713,332	21,171,640	24,153,582
Non-Operating	(48,214)	408,066	49,856	(1,195,870)
<b>Totals:</b>	<b>(11,755,931)</b>	<b>(11,534,612)</b>	<b>(11,770,751)</b>	<b>(15,080,373)</b>

**Figure 7: SCES Operating/Non-Operating Actuals (2013–2015)**

Year:	2012	2013	2014	2015
Revenue/Expenses	Actual	Actual	Actual	Actual
Revenue	8,146,635	8,669,594	8,900,875	8,669,104
Expense	26,388,109	28,686,329	31,709,386	32,387,924
Non-Operating	126,255	251,354	(293,309)	15,685
<b>Totals:</b>	<b>(18,115,219)</b>	<b>(20,268,089)</b>	<b>(23,101,820)</b>	<b>(23,703,135)</b>

The following figure, based on the preceding tables, illustrates the actual revenues and expenses:

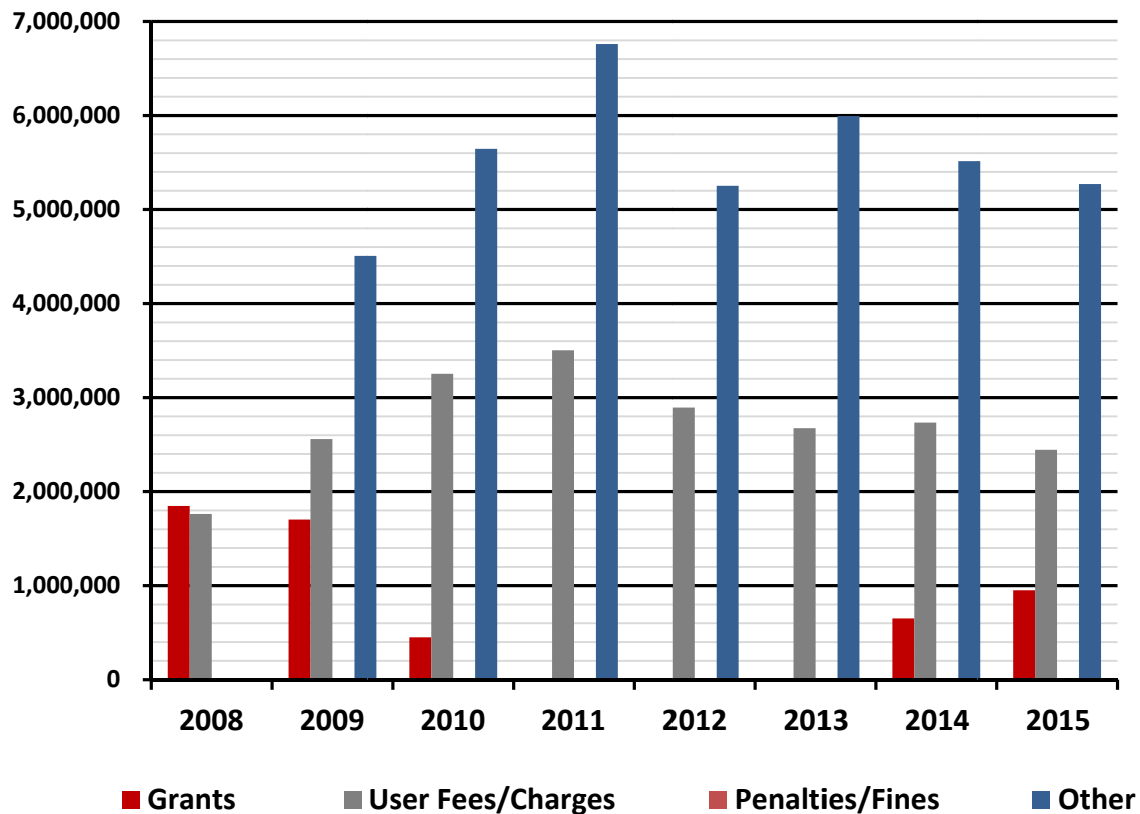


### Operating Revenues

The primary revenue source for SCES is a municipal tax levy offset by revenue from the provision of emergency communications, fire-related ambulance, and other emergency medical services. By all estimates, the majority of EMS costs or expenses are covered by funding from the County's ambulance contract with AHS.

Overall, the total revenues for each fiscal year from 2009 through 2015 reflect a relatively flat trend. "Government Grants" have varied significantly over this period, while "User Fees and Charges" and other revenues have been relatively similar.

Figure 9: SCES Actual Operating Revenues



“Other Revenues” accounted for over 60% on average of the total operating revenues, while “User Fees and Charges” accounted for over 30%, on average, of the total operating revenues. In simple terms, this makes the AHS contract and patient billing important factors in fiscal management. “Penalties and Fines” represented a small portion of revenue, thus these are not observed in the preceding figure.

An assessment of the detailed SCES Quarterly Reports to AHS reflect a comprehensive approach and reporting of financial details related to the provision of ambulance service in accordance with the contract with AHS. These details include actual revenues obtained, direct costs, and critical allocated costs to support the required services under the contract. The County does well to ensure that contract revenues and other user-fees and charges account for the costs of providing ambulance service.

There are intangible benefits and value to the AHS contract, including access to additional resources for various services, crossover knowledge shared between EMS and medical first responders, and various community related functions to the County and SCES.

The billing and collection services for SCES are completed by the Strathcona County Finance (accounts) Department. That department is responsible for billing and collections based on the approved AHS ambulance service contract and County Bylaw 42-2015, “2016 Fees, Rates and Charges” schedule. This schedule reflects those allowed user-fees that may be invoiced directly to patients, their insurance carriers (e.g., Alberta Blue Cross) or other entities (e.g., businesses, Health Canada). The department is also responsible for the policies and processes related to bad debt and write-off of SCES user-fees and charges.

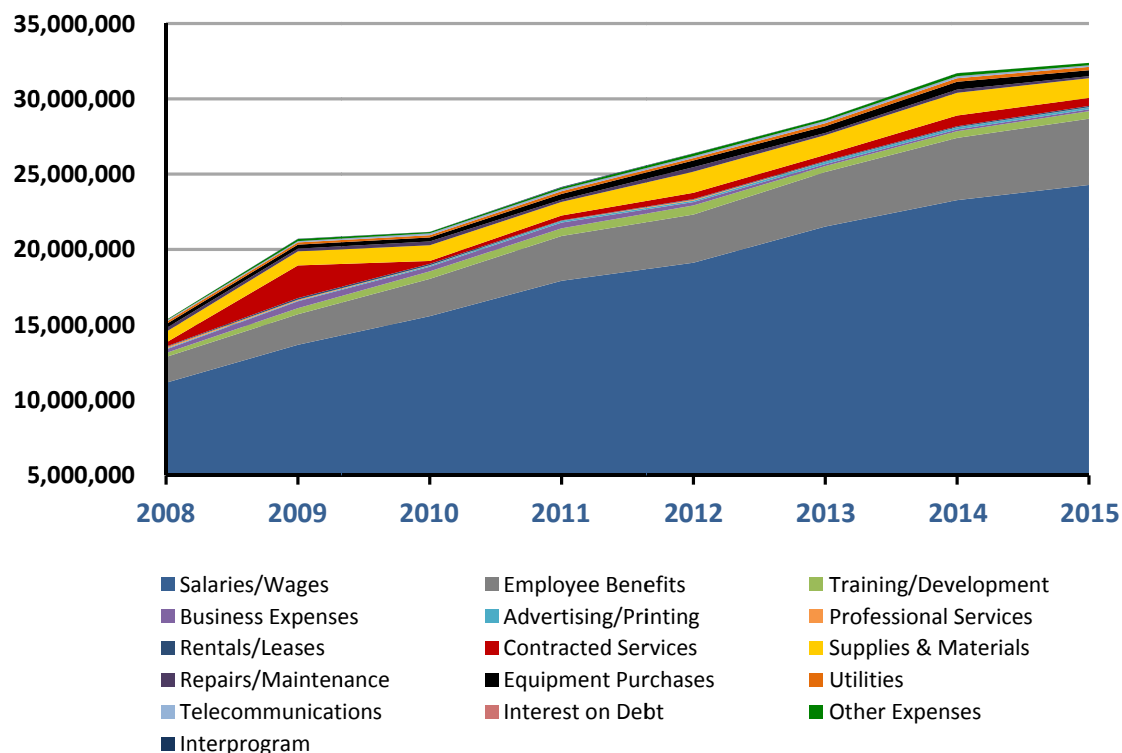
User fees and charges for SCES include fire-related, EMS-related and ambulance-specific services. User fees for EMS include assessment and non-transport, an assessment by an ambulance or medical first-response unit, and/or transport to a healthcare facility in an ambulance.

The authorized AHS user-fees were changed effective January 1, 2015. User-fees charged to patients include charges for assessment and treatment in a patient's home, as well as for transportation to a healthcare facility. Ambulance user-fees may also be covered by Alberta Blue Cross or other insurance providers.

## Operating Expenses

Overall, the total actual expenses for each fiscal year from 2008 through 2015 reflect a relatively consistent upward trend. As expected, the highest component of all expenditures is for salary/wages and benefits, which account, on average, for 85% of the total actual expenses over the period 2008-2015.

Figure 10: SCES Actual Operating Expense Trends





The preceding figure incorporates some one-time and unplanned expenses (with corresponding revenues) from grants, disaster recovery or similar programs related to a major crisis or disaster event. Some recent events include the Strathcona County Wildland Fires (2009), the Slave Lake Fires (2011), and the Southern Alberta Floods (2013), which have had a material impact on the initial budgets. In reality though, when SCES is providing these services, the County is typically able to recoup much of the costs as additional revenue, based on the applicable agreement, and the County fees, rates and charges schedule (did recoup all expenses from the 2009 fires).

The understood factors and contributors to the overall trends in expenses, and those specifically associated with salaries and benefits, include new staffing, new bargaining-unit commitments, overtime, and other services (e.g., specialty teams—water and technical rescue).

The SCES data and reports for budget and finance reflect a lack of consistent, comprehensive and logical information to attribute to fire, rescue, or other specific services versus that of ambulance-specific services. SCES mutual aid, disaster mutual aid, and other contracts appear to have varying formats and implications to the County for operations, cost-recovery, and standards.

## SERVICE-DELIVERY & PERFORMANCE

ESCI evaluated the operational components of service-delivery and performance from the perspective of service demand, distribution, response-reliability, ambulance transport, and response performance. Although other sections of this report are critical to the success of SCES, the delivery of emergency services throughout Strathcona County is the primary reason for its existence.

### Multi-Company EMS Responses

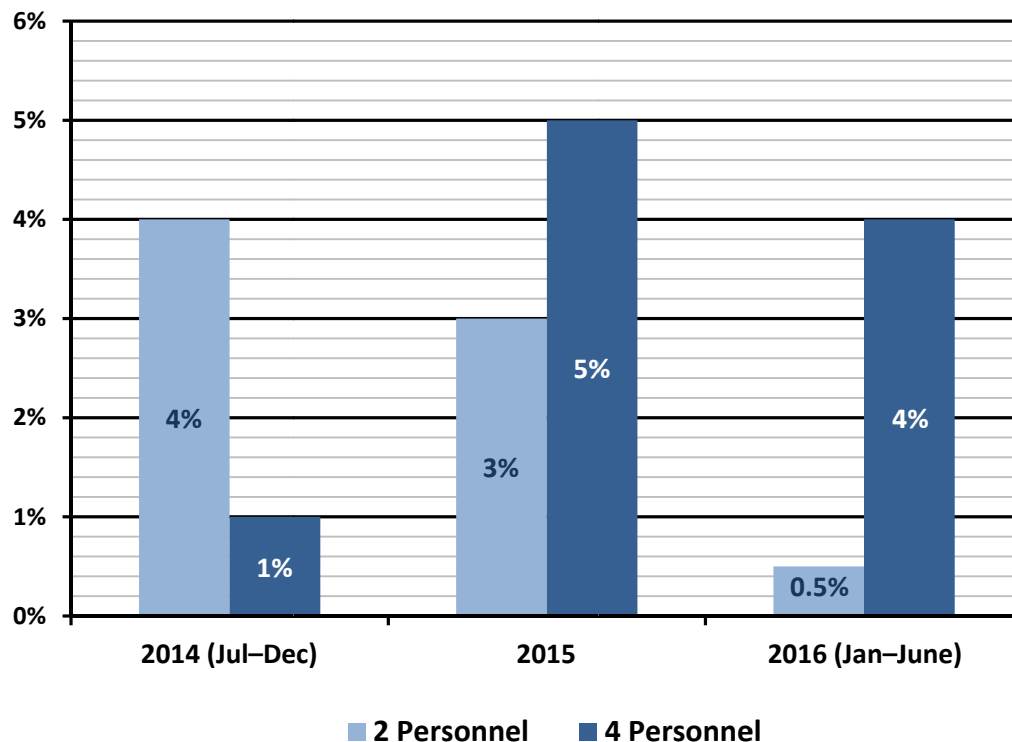
An analysis of the SCES dataset showed that in both 2014 and 2015, about 8% of the EMS incidents during that period required a multi-company response. In other words, 92% of EMS calls over those 24 months were mitigated with a single, three-person ambulance.

### Single-Company EMS Responses

Utilizing SCES CAD data, ESCI analyzed single ambulance responses, based on staffing, for the last six months of 2014; all of 2015; and the first six months of 2016. Ambulance staffing levels were not documented in some of the years prior to the last half of 2014. The following figure illustrates the percentage of ambulance responses in which the ambulance was staffed with either two or four personnel.

**Figure 11: Single Ambulance Responses with Two & Four-Person Staffing**

Source: SCES CAD data



The analysis showed that the majority of single-ambulance responses utilized three personnel. In the second half of 2014, 95% were staffed with three, 93% in 2015, and 95% in the first half of 2016. The following table

shows the cumulative results for the 24-month period. It must be noted that the fourth person often represented a student and, in rare cases, a high-acuity patient requiring additional personnel. The results demonstrate that the vast majority (94%) of ambulance responses utilized three personnel.

**Figure 12: Ambulance Staffing for Single-Unit Responses (July 2014–June 2016)**

Ambulance Staffing	Cumulative %	Cumulative Qty.
Two Personnel	3%	279
Three Personnel	94%	9,137
Four Personnel	3%	327

Neither the Calgary or Edmonton fire departments provide ambulance transportation services, but instead rely on AHS. However, both departments continue to respond in a MFR capacity to thousands of EMS incidents annually. Should SCES discontinue the provision of ambulance service, it would likely serve in a MFR role and continue to respond to thousands of EMS calls each year.

### **Geographic Service-Demand**

The figures on the following two pages represent a GIS analysis of 2015 ambulance responses using AHS CAD data and SCES CAD data. The figures illustrate incident concentration by square kilometer. The highest concentration of incidents was in and around the Sherwood Park area, followed by calls within the city limits of Edmonton and the Fort Saskatchewan area.

A comparison of these figures—generated from two separate CAD datasets (AHS vs. SCES)—resulted in similar patterns. However, the figure generated from SCES EMS incident data represents a much lower volume of incidents.

Figure 13: 2015 SCES Ambulance Responses by Square Kilometer (AHS CAD Data)

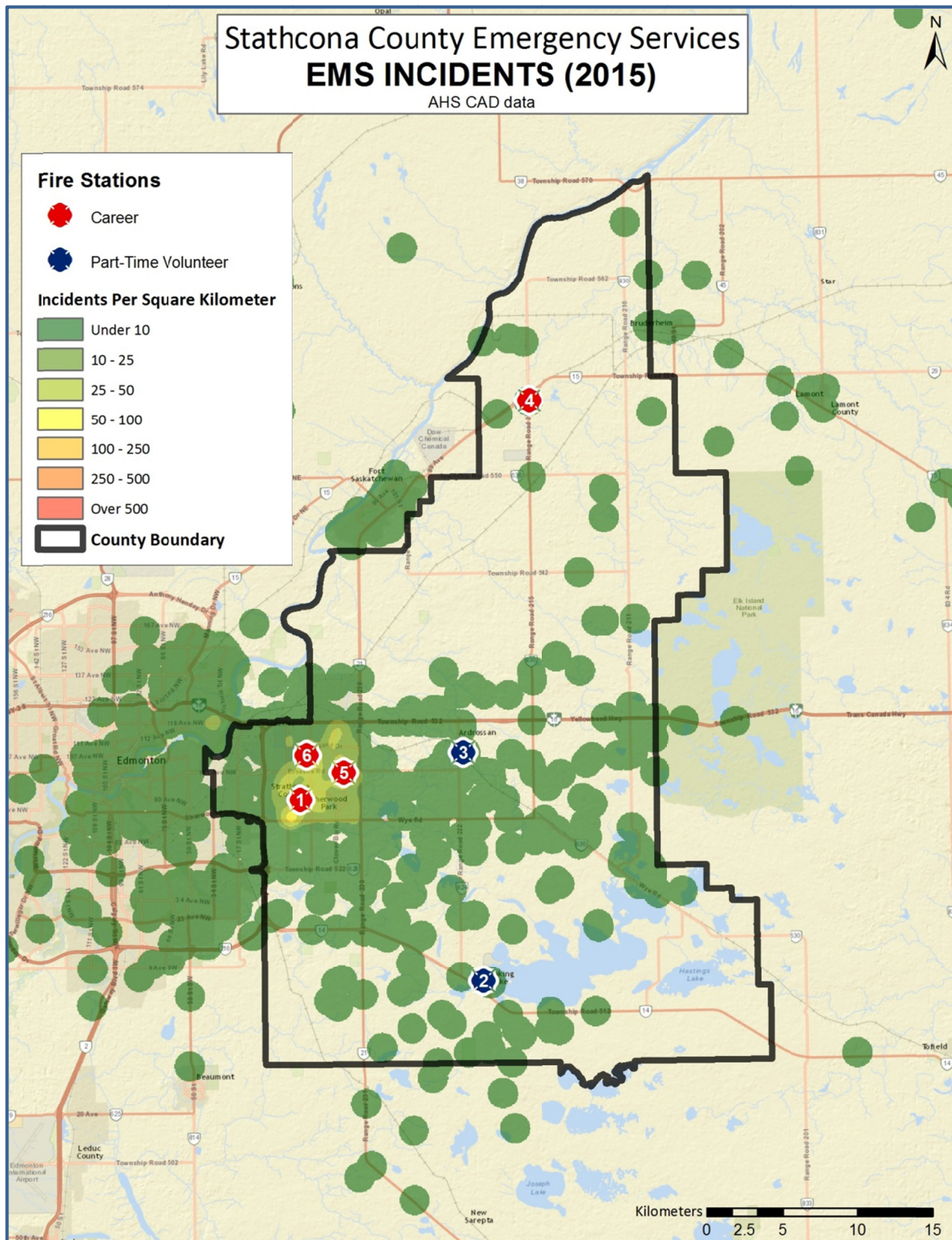
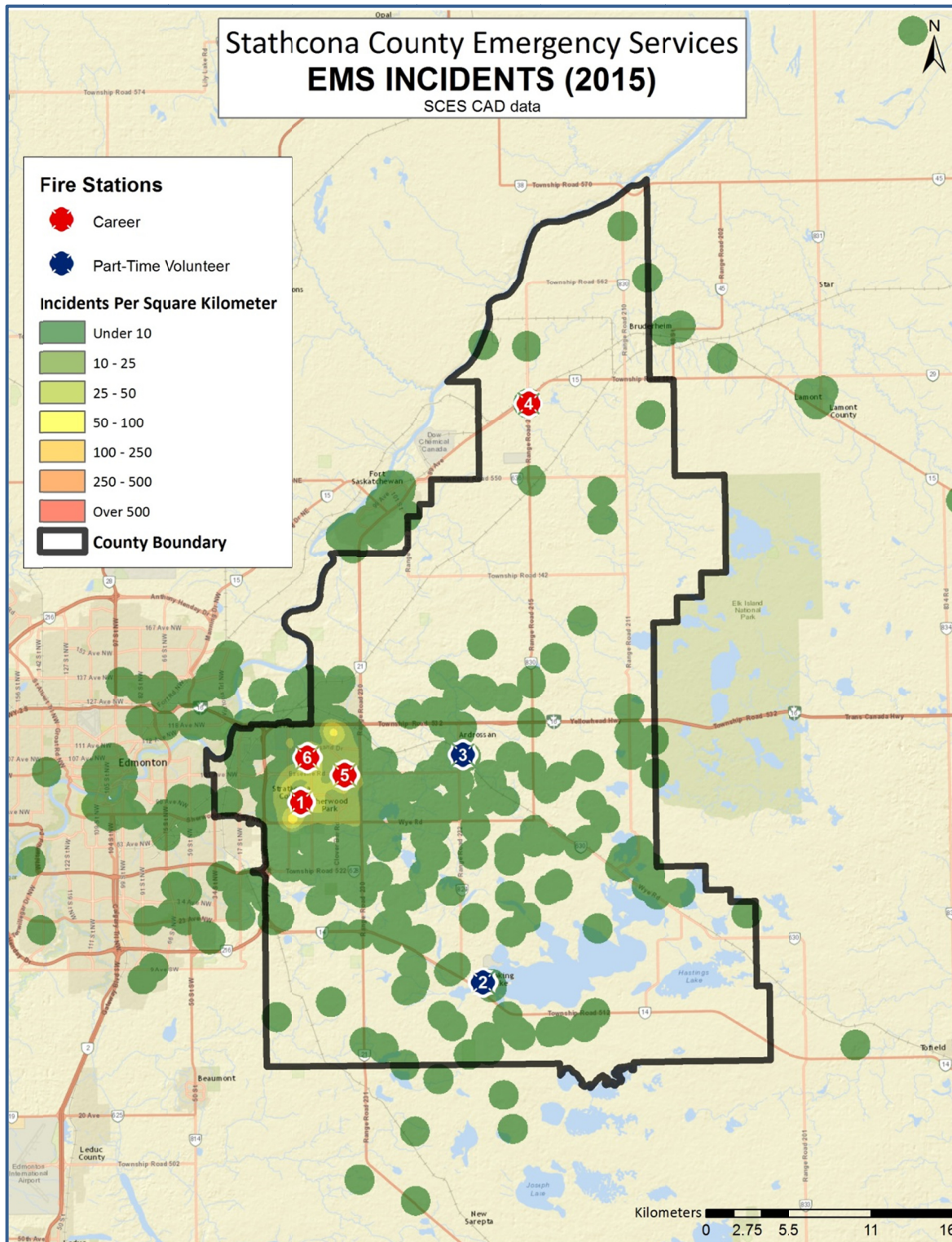




Figure 14: 2015 SCES Ambulance Responses by Square Kilometer (SCES CAD Data)



In the dataset provided by AHS, each record included a “municipality” field listing the incident location. The following figure lists the ten most frequent locations of EMS incidents (excluding interfacility transports and patient transfers). As shown, Sherwood Park and locations within the City of Edmonton accounted for 80% of the ambulance call volume. When including Strathcona County, these three locations represented 97% of the incident locations.

**Figure 15: Ten Most Frequent Locations for Ambulance Calls (2014–2015)**

Municipality	% of Total
Sherwood Park	62%
Edmonton	18%
Strathcona County	17%
Fort Saskatchewan	2%
Bruderheim	1%
Lamont/Lamont County	<1%
Leduc County	<1%

Source: AHS CAD data

### Service-Demand within Strathcona County Boundaries

Alberta Health Services publishes a report on EMS-incident activity within the boundaries of Strathcona County. Incidents were categorized as “911,” (emergent calls), “Interfacility Transports,” and “Other.” The following figure lists ambulance service-demand by SCES and others during 2014 and 2015.

**Figure 16: Ambulance Activity within Strathcona County Boundaries**

Service Provider	2014		2015		TOTALS
	911	IFT/Other	911	IFT/Other	
SCES	4,053	650	4,127	761	9,591
Other Providers	850	1,113	739	1,790	4,492
<b>TOTALS:</b>	<b>4,903</b>	<b>1,763</b>	<b>4,866</b>	<b>2,551</b>	<b>14,083</b>

Source: AHS CAD dataset

During 2014, SCES ambulances were assigned to approximately 83% of the emergency calls that occurred within the Strathcona County, and about 37% of interfacility transports and other incidents. In 2015, SCES responded to nearly 85% of emergency calls, and approximately 30% of IFTs and other incidents. In 2015, other agencies provided a more than 61% increase in IFTs over 2014, while IFTs done by SCES increased by only about 17%.

When looking at the combined 24-month, SCES was dispatched to 89% of emergency calls, and nearly 33% of IFTs and other incidents. Therefore, EMS providers other than SCES were dispatched to approximately 67% of non-emergent incidents, and 11% of emergent calls. In both 2014 and 2015, other outside EMS transport agencies provided 88% of the requests for interfacility transports within the boundaries of Strathcona County.

### Transport Destinations

The following figure lists the five most frequent hospitals and tertiary care facilities to which patients were transported during 2014–2015. In less than 1% of the incidents, the transport destination was not recorded. The facilities listed in the figure accounted for 92% of the total transport destinations from scene responses, and 88% of the combined IFTs and patient transfers.

**Figure 17: Five Most Frequent Transport Destinations (2014–2015)**

Facility	Scene Responses	IFT/Patient Transfers
Grey Nuns Community Hospital (GNCH)	32%	31%
University of Alberta Hospital (UAH)	26%	25%
Strathcona Community Hospital (SCH)	17%	10%
Royal Alexandra Hospital (RAH)	12%	16%
Fort Saskatchewan Health Centre (FSHC)	5%	6%

Source: AHS CAD dataset

For transports from the scene, Sherwood Park Care Centre (SPCC) represented another 4% of the total, while Northeast Community Health Centre (NCHC) accounted for 2% more of the transports. Sturgeon Community Hospital, Misericordia Community Hospital, and Leduc Community Hospital (LHCC) each represented 1% or less of the transport destinations.

Most of the hospitals are located well outside the boundaries of Strathcona County, and a considerable distance from the more populated areas. The top two (GNCH and UAH) and fourth most frequent (RAH) transport destinations are located at a significant distance from Sherwood Park and Strathcona County. The same applies to FSHC, which is the fifth most frequent transport destination.

The following figure illustrates the geographic proximity of the five most frequent destinations of patients transported by SCES ambulances during 2014–2015.

### Hospital Turnaround Times

For organizations that provide ambulance transportation, an important element to observe is the amount of time spent at the transport destination facility (i.e., hospital). Excessive ambulance turnaround times (also referred to as “ambulance offload” time or “EMS hospital time”) affect the agency’s ability to respond to additional calls.

ESCI analyzed hospital turnaround times utilizing the AHS dataset, by subtracting the date/time of arrival at the facility from the date/time recorded in which the unit was clear (“Unit Clear TS” minus “Unit Transport Arrive TS”).

The data included a surprising number of outliers, with times spent at the hospital recorded as up to 10 hours or more. It was not evident as to whether these were data-entry errors or an accurate reflection of the hospital turnaround times. The results were based on 6,749 records in which hospital turnaround times were documented during 2014–2015.

During the study period, the hospital turnaround time for *all* transport destinations was 2 hours, 32 minutes or less at the 90<sup>th</sup> percentile. Average time at the hospital was 92 minutes, 42 seconds, with a median time of 73 minutes. There were no significant differences in times when comparing the results between 2014 and 2015.

The following figure lists hospital turnaround times for the five most frequent transportation destinations during the 24-month study period. Times were evaluated at both the average and 90<sup>th</sup> percentile.

**Figure 18: SCES Hospital Turnaround Times (2014–2015)**

Five Most Frequent Transport Destinations	90 <sup>th</sup> Percentile	Average*
Grey Nuns Community Hospital (GNCH)	2 hrs., 54 min.	97 min., 13 sec.
University of Alberta Hospital (UAH)	2 hrs., 54 min.	95 min., 7 sec.
Strathcona Community Hospital (SCH)	1 hr., 45 min.	65 min., 20 sec.
Royal Alexandra Hospital (RAH)	2 hrs., 58 min.	92 min., 59 sec.
Fort Saskatchewan Health Centre (FSHC)	1 hr., 47 min.	61 min., 50 sec.

\*Calculations based on records of times consisting of 2 hours, 30 minutes or less

Source: AHS CAD data

As the figure illustrates, 90% of hospital turnaround times at GNCH, UAH, and RAH were nearly three hours. Averages among the five facilities ranged from nearly 62 minutes to more than 97 minutes.

### ***Hospital Turnaround Times Discussion***

If these results are accurate, they indicate an excessive amount of time spent at the hospitals after completion of transports. Both SCES and AHS are well aware of this problem. It must be noted that while an ambulance unit may be at a hospital for what appears to be an extended amount of time, it does not necessarily indicate that the unit is unavailable for a response. The “Unit Clear TS” may represent the time the unit left the facility, and not necessarily the time it was available for a response.



The published AHS performance criteria describe a hospital turnaround-time goal of 90 minutes (or less) following arrival.<sup>10</sup> In one published report by AHS, hospital turnaround times in the Edmonton Zone ranged from about 2 hours, 15 minutes to 3 hours, 30 minutes during 2014–2015 (representing all ambulance providers).<sup>11</sup> At no point between the third quarter of 2013, and the second quarter of 2016, did the combined agencies meet the 90-minute target.

Anecdotal evidence indicates that extended times occur because of overcrowded emergency departments and patients with mid- to low-acuity conditions. However, in a position statement by the *Canadian Association of Emergency Physicians* (CAEP) published in the *Canadian Journal of Emergency Medicine* (CJEM), the authors dispute this contention.<sup>12</sup> They assert that emergency department overcrowding (EDOC) throughout Canada is primarily the result of the inability of admitted patients to access in-patient beds from the emergency department. Essentially, EDOC occurs due to hospital overcrowding and a lack of available hospital beds. The paper goes on to recommend national benchmarks that could potentially help reduce EDOC, and suggests improvements that could lead to shorter hospital turnaround times.

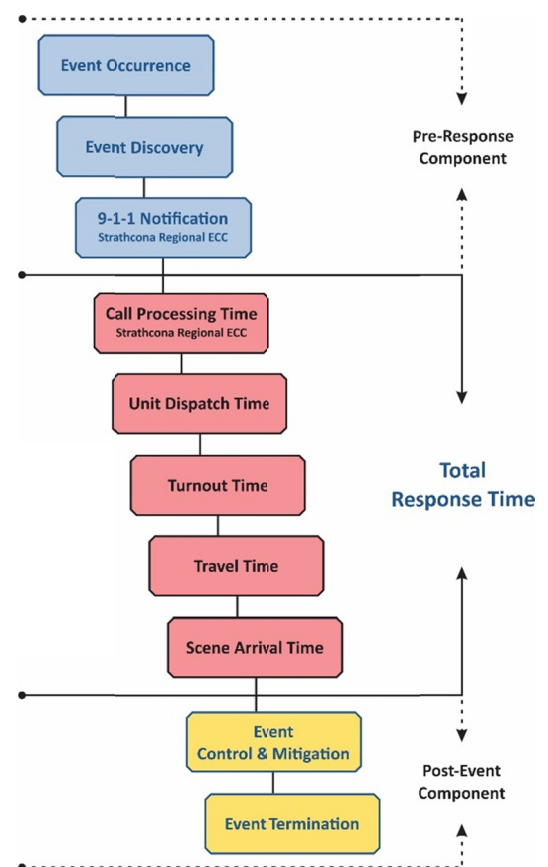
### Response-Time Performance Analysis

In this analysis, ESCI has examined emergency response performance for EMS calls during 2014–2015, using the AHS CAD dataset. Unless otherwise noted, fire-related incidents, non-EMS calls, interfacility transports and patient transfers were excluded. Each record in the dataset was assigned a “Determinant Description” and “Event Category.” Response times were calculated on incidents in which each of these categories indicated an emergency response, and based on approximately 7,692 records. It must be emphasized that, when using the AHS dataset, response-time calculations *excluded* call-processing times.

When looking at time intervals related to performance, there has been a tendency to evaluate *average* times. Average (or mean) is easily understood, but usually does not portray true performance results accurately. Depending on the size of the dataset, outliers—either large or small—can skew the results.

The industry standard is to use the “fractile” method to analyze times. Simply put, to view the results at the 90th percentile. This measure represents the majority of the data. In some cases in this report, ESCI will present averages. However, policymakers should focus on the results found at the 90th percentile.

**Figure 19: Cascade of Events (NFPA 1710)**



### ***Response Times***

ESCI analyzes response-time performance using the recommendations as defined by the *Center for Public Safety Excellence* (CFAI).<sup>13</sup> These are based on standards promulgated by the *National Fire Protection Association* (NFPA). The total response-time definition utilized by Alberta Health Services is consistent with both the CFAI and NFPA. Among these organizations, total response-time is described as being comprised of three time intervals:

- Call Processing Time—interval between the time the 911 centre received the call, and the time that resources are dispatched (also known as “Alarm Handling Time”).
- Turnout Time—interval between the time the units are notified (dispatched), and the time units begin to respond (also known as “chute” time).
- Travel Time—interval between the time the unit begins to respond, and time of arrival at scene.
- Total Response Time—interval between the time the call was received, and time of arrival at scene.

## COMPARATIVE ANALYSIS

As a part of this project, ESCI was tasked to conduct a comparative analysis of nine specific fire and emergency services organizations. The purpose was to evaluate organizations comparable SCES. This was to include how other providers may be similar or different in terms of operations, costs, performance, and other criteria. It is important to note that not all of these were “apples to apples” comparisons, as there were vast differences between SCES and some of the organizations evaluated. In addition to the agencies within Alberta, ESCI reviewed other North American emergency services organizations utilizing similar ambulance-staffing models.

### Evaluation of Comparable Organizations

The following is a result of interviews and data collection from other fire and emergency services organizations. In this section, ESCI has summarized the significant similarities and differences between each organization and SCES. Detailed information on each organization can be found in the survey tables contained in Appendix B.

#### City of Leduc Fire Services

The City of Leduc Fire Services (LFS) is a fully integrated emergency services organization that provides fire, rescue, EMS, and ambulance services. In a model similar to SCES, LFS maintains a contractual arrangement with Alberta Health Services, and provides emergency medical transportation services to the City of Leduc and adjacent areas within Leduc County. Leduc County Fire Services (LCFS) provides its own fire and rescue services throughout Leduc County, but does not operate ambulances or provide medical transportation services.

- The AHS contract stipulates that LFS operate three ALS ambulances as part of the provincial EMS system overseen by AHS.
- LFS ambulances are staffed with at least one paramedic and one EMT. LFS does not routinely staff their ambulances with three or more personnel. Occasionally, however, additional staff may be added as a supplement, when needed to support patient care and/or safety.
- As with SCES, Leduc purchases and owns its ambulances.
- LFS does not operate a PSAP/communications centre, and all fire/rescue dispatch services are provided by the Strathcona County Regional Emergency Communications Centre.
- Unlike Strathcona County, Leduc does not have any dedicated emergency management personnel.
- LFS ambulances are dispatched by AHS and often respond to ambulance requests outside their normal response area. In addition, the department provides coverage to pre-position for peak-demand periods. LFS ambulances are sometimes deployed to provide peak-demand “orbiting patrol” coverage in Edmonton.

### **City of St. Albert Fire Services**

The City of St. Albert Fire Services (SAFS) provides fire suppression, technical rescue, EMS, hazardous materials mitigation, fire inspection, fire investigation, public education and fire dispatch to the City of St. Albert. The SAFS is currently pursuing accreditation through the Commission on Fire Accreditation International.

- St. Albert provides ambulance service as a subcontractor to the AHS EMS system with two ambulances staffed by two EMS providers (at least one of which is a paramedic).
- Personnel assigned to fire apparatus are utilized to support patient care, extrication and scene management for EMS incidents.
- SAFS will often request an AHS ambulance to provide additional staff in cases requiring additional patient-care support during transport, in order to avoid sending SAFS personnel to the hospital.

### **City of Red Deer Emergency Services**

The City of Red Deer Emergency Services (RDES) is an integrated emergency service that provides comprehensive fire-rescue and EMS to the residents and visitors of Red Deer. RDES is comprised of six branches: Administration, Fire & Injury Prevention, Fire Suppression, EMS, 911 Emergency Communications, and Mechanical. The organization employs over 160 personnel. RDES operates the 911 emergency communications centre, which serves both the city and 70 other communities throughout central and southern Alberta.

- Red Deer operates five ALS ambulances on a 24-hour basis, staffed with a minimum of one paramedic and one EMT.
- RDES operates a separate division and staff to oversee EMS.
- Red Deer integrates injury prevention into its fire prevention functions. They believe this represents a progressive and evolved approach to fire service integration. They have recognized that preventing sudden death and disability from non-fire incidents is a part of their core mission.

### **City of Lethbridge Fire & Emergency Services**

The City of Lethbridge Fire & Emergency Services (LFES) provides a fully integrated career emergency services organization providing fire suppression, rescue, EMS, ambulance service, and hazardous materials mitigation. They serve a core population within city limits of Lethbridge, along with supporting services to the surrounding communities in Southern Alberta. LFES maintains four stations staffed with cross-trained, dual-role firefighters. LFES has been providing ambulance service to the community since 1912.

- Like SCES, Lethbridge is under contract to AHS to provide ambulance service. They operate a minimum of four ALS ambulances daily. In 2014, they added three peak-demand ambulances.
- All LFES ambulances and apparatus are staffed with at least one paramedic and one EMT. Squads are staffed with only three firefighters, and co-respond to a significant number of EMS calls.
- Non-ambulance apparatus function in an ALS medical first-responder role on EMS incidents. LFES also provides water rescue and technical rescue specialty teams.

- LFES maintains administrative staff specifically assigned to manage the EMS mission. This includes an EMS Operations Officer, an EMS Resource Officer, and a Medical Training Division that maintains four EMS field trainers.
- LFES operates a primary Public Safety Communications Centre (PSCC), which is a 911 PSAP that provides police, fire, and EMS dispatch services to both the city and 22 neighboring communities. In 2015, the PSCC dispatched 54,717 events, including law enforcement incidents.

### **City of Spruce Grove Fire Services**

Spruce Grove Fire Services (SGFS) is an integrated emergency service that provides ambulance services in addition to traditional fire department services such as fire suppression, dangerous goods response and other types of response needed to protect property, people and the environment.

- SGFS operates two ambulances as a subcontractor to AHS EMS and staffs each ambulance with two EMS providers, at least one of which is an ALS paramedic.
- SGFS operates four pumpers that are at all times equipped and staffed at the ALS level with at least one paramedic for ALS-level MFR.
- SGFS does not operate a PSAP/communications centre.
- Additional SGFS EMS providers from the pumper or other apparatus will accompany the SGFS ambulance as necessary for patient care.

### **Wood Buffalo Regional Emergency Services**

Wood Buffalo is a large regional municipality located in northeastern Alberta. Located within the municipality, the City of Ft. McMurray is the urban service centre for the area. The Regional Municipality of Wood Buffalo operates Regional Emergency Services (RES), which utilizes the Fort McMurray Fire Department (FMFD) as its primary service provider. FMFD is a full-time integrated emergency services organization, and serves as the ambulance subcontractor to AHS for the entire RES service area. The smaller rural communities provide MFR using primarily volunteer personnel.

- Wood Buffalo contracts directly to AHS (with FMFD providing the service), and maintains a minimum of four ambulances daily.
- RES serves as a regional primary 911 PSAP providing dispatch services through its Public Safety Communications Branch.
- FMFD operates from four fire stations, with a fifth station housing the communications centre.
- The department employees over 130 firefighters certified as EMTs or paramedics.
- The RES Training & Recruitment branch supports the Fire & EMS Operations Branch through the provision or development of mission-specific training, recruitment, and retention.
- The Emergency Management branch is focused on the creation of disaster-resilient communities, and building strong stakeholder relations. The Wood Buffalo Regional Emergency Operations Centre (REOC) is activated as required for major emergencies.

### **City of Calgary Fire Department**

The City of Calgary Fire Department (CFD) provides a range of emergency and non-emergency services. Emergency services include response for fire suppression, EMS, chemical and hazardous materials releases, and motor vehicle collisions. In addition, CFD provides specialized rescue services for assortment of incident-types. Although CFD provides services similar to SCES, they do not provide ambulance service. This produces a lower per capita cost when compared to other organizations with ambulance service operations.

- CFD operates four platoons, which are deployed from 39 fire stations throughout the city.
- CFD provides MFR, but not ambulance transport.
- AHS ambulances respond to approximately 160,000 incidents annually within the Calgary area.

### **City of Edmonton Fire Rescue Services**

The City of Edmonton Fire Rescue (EFR) provides fire suppression, technical rescue, fire prevention, public education, and MFR to the City of Edmonton. As with the Calgary Fire Department, EFR does not provide ambulance service, but instead relies on direct-delivery ambulances from AHS, SCES, and other outside providers. EFR is staffed by career firefighters on a 24-hour basis, and employs approximately 906 personnel. EFR is one of only three fire departments in Canada accredited through the CFAI.

- EFR provides services in five program areas: Fire Rescue Operations, Office of Emergency Management, Public Safety (risk management, investigations, public education, etc.), Training & Logistics, and Technical Services.
- Apparatus are deployed from 28 fire stations, of which three are described as combined fire and emergency medical services.
- EFR operates 33 engine companies, 11 aerial companies, 8 rescue companies, 8 tankers, and 6 rescue boats as well as numerous other specialty vehicles.
- EFR firefighters are trained at the minimum to provide MFR at the Standard First Aid level.

### **Alberta Health Services Emergency Medical Services**

In terms of emergency operations and infrastructure, there are few similarities between AHS and SCES. AHS provides EMS through both its own direct-delivery ground ambulances and contracted services (e.g., SCES), including contracts for rotary wing and fixed-wing aeromedical transport services. The AHS CCC in Edmonton is responsible for centralized communications and dispatching of all direct-delivery and contracted ambulances in the region.

- AHS owns and operates more than 278 ALS and BLS ambulances throughout the province (the rest being operated by contractors). Minimum ALS ambulance staffing is one EMT and one paramedic.
- AHS operates both 24-hour and 12-hour peak-demand ambulances. In 2016, two additional peak-demand ambulances were added to the Edmonton service area.
- AHS has created a provincial model for MFR, which includes the provision of training and funding to MFR agencies. The goals are to build standards for MFR service-delivery; support the agencies providing MFR; and promote safe patient care with medical oversight and patient care guidelines.

## Comparative Analysis Summary

Of the agencies reviewed in this analysis, the following agencies are the most closely structured and function in a manner similar to SCES. Each is a fully integrated organization providing fire suppression, rescue, EMS, ambulance service, and other services.

However, there are differences, and comparisons must not be considered exact, but *relatively* comparable. For example, SCES operates a communications centre and provides emergency management and other administrative functions *not* provided by other departments. In addition, none of these five agencies provides direct services to either large rural areas, or a heavy industrial sector.

- Leduc Fire Services (LFS)
- St. Albert Fire Services (SAFS)
- Red Deer Emergency Services (RDES)
- Lethbridge Fire & Emergency Services (LFES)
- Spruce Grove Fire Services (SGFS)

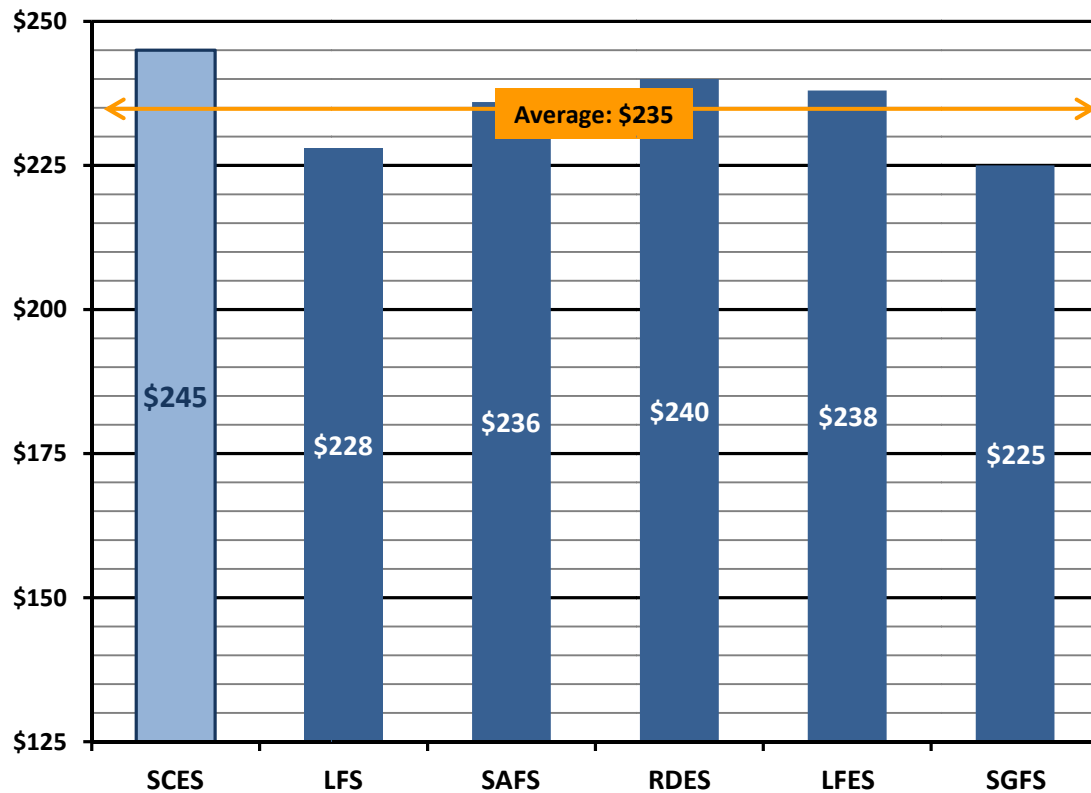
Wood Buffalo Regional Emergency Services operates a unique program and utilizes the Fort McMurray Fire Department. Both Edmonton and Calgary are large departments that do not operate ambulances, but instead rely primarily on direct-delivery ambulance service from AHS (and other subcontractors).

The average per capita cost among the six agencies was \$269, with a median cost of \$267. Excluding SCES, average cost per capita was \$255. Wood Buffalo had a per capita cost of \$271. Edmonton and Calgary—neither of who provide ambulance service—had per capita costs of \$220 and \$169 respectively. Excluding SCES, the average among all eight agencies was \$242.

In comparison to all of the agencies combined, the SCES gross costs were approximately 26% above the overall average, and approximately 33% above the average of the other organizations, excluding SCES. The results of these calculations may be somewhat misleading, as the definitions of “gross operational budget” tended to vary among the agencies. An accurate comparison to other organizations cannot be accurately determined without a comprehensive benchmarking of specific services and a detailed financial analysis.

ESCI also analyzed comparative costs using alternate data. In 2012, AHS requested that its contract agencies prepare budgets based on the cost of operating a standalone service. Using a unit-hour costing methodology, each agency independently determined an hourly cost to operate their ambulance service. The average hourly operating cost among all six agencies was \$235—with SCES at \$245 per hour. The following figure shows the hourly costs of SCES in comparison to other similar organizations.

Figure 20: Comparison of Hourly Ambulance Operation Costs

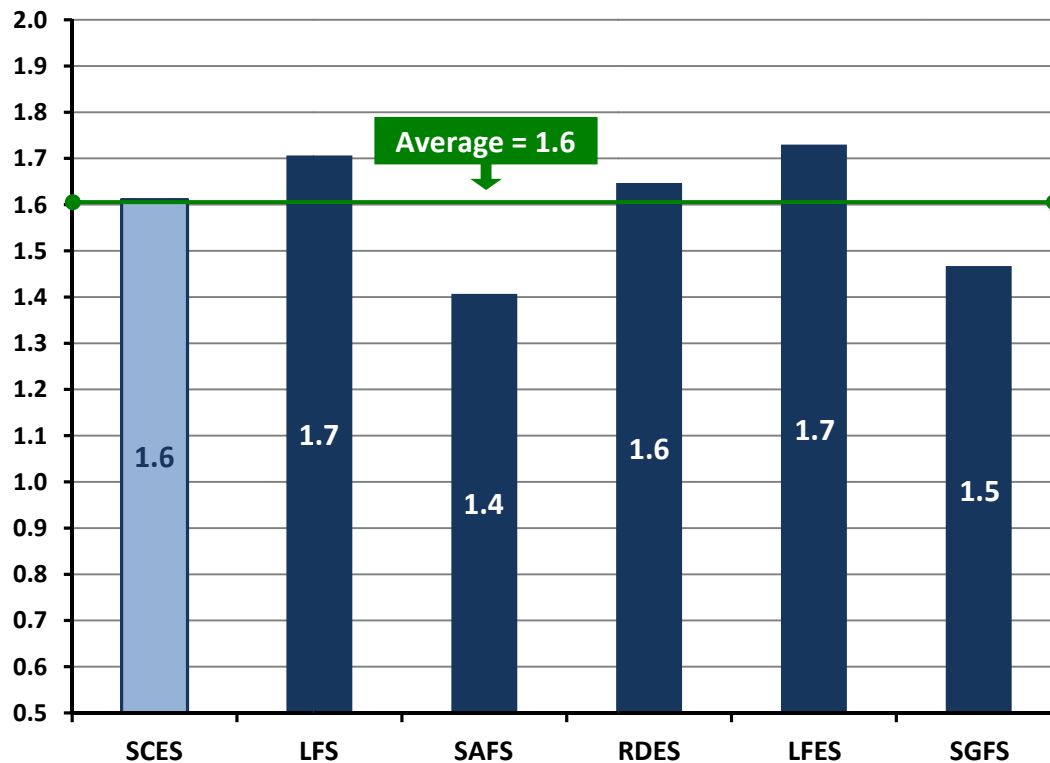


If the hourly costs submitted to AHS are an accurate comparison, then the cost for SCES is about \$10 per hour higher than the average. None of the comparable organizations provides three-person ambulance staffing. The agencies most comparable to SCES were Lethbridge Fire & Emergency Services and Red Deer Emergency Services. Their costs were approximately \$5 and \$7 per hour less than SCES respectively.

The next figure compares career firefighter rates per 1,000 persons. The results did not take into account part-time firefighters, and only included full-time career staff assigned to provide emergency operations. Calculations were based on the number of personnel divided by the 2015 population totals, then multiplied by 1,000. However, some agencies may have included part-time or volunteer personnel in information provided to ESCI.



Figure 21: Career Firefighter Rates per 1,000 Persons Served (2015)



In 2015, SCES had a career firefighter rate of 1.6 firefighters per 1,000 persons—which is equal to the overall average. When excluding SCES from the calculation, the average remains the same at 1.6 per 1,000 persons. If part-time firefighters were included in the formula, the results would be approximately 2.0 firefighters per 1,000 persons. When including WBRES (at a rate of 1.3), the average rate decreased to 1.5.

In August 2016, the NFPA published a report that described results from a survey of career fire departments in the west region (closest to Alberta) of the United States, during 2013–2015.<sup>14</sup> In fire departments with a firefighter hourly workweek similar to SCES, and protecting a population between 25,000 and 249,000, the average number of career firefighters per 1,000 persons was 1.0. The survey consisted of data acquired from a large number of municipal/public fire departments within that region. However, it did not distinguish between fully integrated departments and those with a different composition. The results are presented here only for explicatory purposes, and should not be mistaken for a national standard.

### Discussion of the Comparative Analysis Results

A significant challenge of this project was acquiring information from the various emergency services organizations, in order to conduct an equitable comparison to SCES. Many of the agencies were slow to respond, provided limited or no information, utilized definitions inconsistent with SCES definitions, and/or expressed reluctance to share information. Information for this analysis was acquired either directly from various representatives of the organizations, from published documents, municipal websites, or a combination of these sources.

Alternatively, some agencies were very cooperative and forthcoming with their information. ESCI was unable to identify the reasons behind the reluctance and protraction of some agencies to supply information that should have been readily available from with their organizations. It may simply have come down to busy chief officers and administrative staff occupied with higher priorities and substantial time constraints.

A major shortcoming of this analysis was the lack of revenue sources from each of the organizations. Obviously, revenue offsets costs and, when applying this to SCES, the net cost per capita is substantially lower at \$248 versus \$339. When considering the alternate method that was used to calculate costs for AHS in 2012, the cost for SCES is only \$10 per hour higher than the average. If these calculations are an accurate representation of the cost to operate, it indicates that Strathcona County citizens receive the various benefits and advantages found with the three-person ambulance-staffing model for a moderate amount above the average hourly cost among the various organizations.

The results of the 2015 budget analysis must not necessarily be interpreted as an indication that current cost of SCES to provide services are excessive in comparison to other similar organizations. It must be noted that the SCES budget includes the cost emergency management and an emergency communications center. Most of the other comparable organizations do not have these costs. The numerous constraints and difficulties in acquiring accurate comparative data made effective analysis impossible within the scope of work and timeframe of the report.

In the comparison of 2015 firefighter rates per 1,000 population, SCES was found to have a rate of 1.6, which was equal to the average of rate of the five comparable agencies combined, including SCES. Two of the comparable organizations had slightly higher rates of 1.7.

### **Other Three-Person Staffing Models**

The following section describes three U.S. emergency services organizations that utilize a three-person ambulance-staffing model.

#### **Miami-Dade Fire Rescue (Florida)**

Miami-Dade Fire Rescue (MDFR) is considered one of the top ten largest fire-rescue departments in the United States, with an annual operating budget of \$361 million (USD) and a \$54 million five-year capital-equipment replacement plan. MDRF is staffed by 2,429 employees, of whom nearly 2,000 are uniformed firefighters. More than half are certified paramedics. As the largest fire-rescue department in the southeastern United States, MDRF provides emergency response to all of the unincorporated areas of Miami-Dade County, including 30 local municipalities. MDRF maintains 65 stations strategically placed throughout the 1,883 square mile area. It operates 54 ALS ambulances staffed by three firefighters—of which at least two must be paramedics.

ESCI interviewed the MDRF EMS Chief, who described a number of benefits their organization has identified after a long history of employing a three-person staffing model. Some of these include:

- Similar to SCES, the MDRF ambulances respond to and manage the overwhelming majority of EMS incidents without the initial or secondary response of additional fire apparatus.
- The community has come to expect the level of service afforded by the three-person ambulance staffing. Changes in this model would be noticed by the public.
- Three-person ambulances provide the correct balance of personnel, by not resulting in over- or under-staffing.
- Ambulance service is provided in a consistent and efficient manner that produces the best value in both quality and cost.
- Ensures that an adequate number of personnel are available to convey the necessary medical equipment and supplies to the patient's side. This also contributes to the safety of the ambulance crew.
- Three-person staffing affords adequate supervision and oversight, which increases clinical accuracy and reduces medical errors.
- This model allows for the rotation of crew roles and responsibilities, and adds redundancy in capabilities. This also contributes to stress-reduction among the ambulance crews.

Although MDRF is a substantially larger organization with a much higher call-volume than SCES, there are operational, administrative, and philosophical similarities between the two organizations. As with SCES, Miami-Dade is an integrated, all-hazards emergency services organization with a strong commitment to EMS. Both provide services to large tracts of urban and rural areas.

### **Saint Paul Fire Department (Minnesota)**

The City of St. Paul, Minnesota is served by the St. Paul Fire Department (SPFD), which provides integrated emergency services to the city. SPFD delivers fire suppression, rescue, hazardous materials mitigation, and EMS response from 15 stations throughout the city. St. Paul is 56 square kilometers and has a residential population of 300,000. The department responded to approximately 32,634 EMS incidents in 2015, or about 89 EMS responses daily.

In an interview with the Chief of EMS, SPFD was described as model with ambulance staffing similar to SCES, along with some distinct differences. Some of the specific operational characteristics of the SPFD's EMS system include:

- The department has 15 ambulances based at each of its 15 stations. All ambulances are equipped to provide advanced life support.
- Twelve of the 15 ambulances are staffed with four firefighters. Two of the four firefighters are paramedics, and two are EMTs.
- At these 12 stations, the four-person crews function as a "jump crew" and cross-staff either an ambulance or an engine company, depending on the nature of the incident.

- The other three stations are staffed and designated as “super-medic” companies. On EMS calls, these companies respond six firefighters on two separate apparatus—an ambulance with two firefighters and a fire apparatus with four firefighters.
- The SPFD down-staffs their ambulances for Alpha and Bravo responses. These calls tend to be low-acuity incidents, in which the need for additional personnel is unnecessary.
- Based on information received from the caller at the communications centre, SPFD may not down-staff, but send adequate resources in potential low-acuity cases (e.g., bariatric patients, etc.).

### **Kennewick Fire Department (Washington)**

The City of Kennewick Fire Department (KFD) serves a population of approximately 68,000 persons with a service area of 27 square miles (approximately 70 square kilometers). The department maintains three platoons within their operations division, and deploy from five staffed fire stations. In 2015, KFD ambulances were dispatched to 7,040 EMS calls, of which 4,490 patients were ultimately transported. An ALS ambulance is located at each of the five stations. Although not the same model as SCES, there are some similarities between the two departments.

Four of the KFD fire stations are staffed full-time with a three-person “jump crew.” Depending on the incident, three firefighters will respond in either an engine (same as a Squad at SCES) or ambulance. The fifth station staffs the ambulance with a two-person crew. Ambulances from the “jump crew” stations are staffed with a minimum of one paramedic and two EMTs—one of whom is a company officer. Otherwise, they are staffed with one paramedic and one EMT.

Operating both two-person and three-person ambulances has enabled KFD to make some comparisons between the staffing models. As seen with other similar systems, quantitative data was unavailable to demonstrate whether three personnel on an ambulance produced better patient outcomes. However, there was substantial anecdotal evidence to indicate a number of benefits of ambulances staffed with three personnel.

- The department has found that patient-care procedures are accomplished more rapidly and efficiently. This has resulted in shorter scene times, and enables the patient to arrive at the hospital more quickly.
- Safety is better for both patients and ambulance crews during transport. Having two personnel in the patient compartment allows personnel to remain seated with a seat belt during transport. This is usually not possible with one attendant in the patient compartment, as they often must move around to access supplies or perform a procedure. With two persons seated on either side of the patient, most activities can be accomplished while seated.
- Having the third person has reduced clinical errors and provided for better patient care. This has been especially true during transports, as two individuals can discuss the patient’s clinical presentation and appropriate treatment, rather than one person making these determinations.

- Fewer back injuries among the three-person crews, compared to the two-person crews, have been observed. KFD has also found that the two-person ambulance crews request lift-assistance less frequently from other stations during the late evening and early hours, as they do not want to awaken other personnel unnecessarily. This has contributed to the increases in back and other injuries.
- Following transport, ambulances with three personnel are cleaned, re-stocked, and back in service more quickly. In addition, having the third person has resulted in much fewer errors in the scheduled-drugs (narcotics, etc.) log.
- KFD has seen other benefits with the three-person model, unrelated to EMS activities. In cases of structure fires or other significant events, the ambulance has often arrived first. In these instances, the officer has assumed incident command, performed an initial size-up, and directed incoming apparatus. Since each ambulance carries SCBAs, and ambulance crews carry full turnout gear, in some situations two of the ambulance personnel have been available to affect a rescue, while the officer continues to perform incident-command functions until arrival of the Battalion Chief.

## PARTICIPATION IN THE PROVINCIAL EMS SYSTEM

On April 1, 2009, governance and funding for ground ambulance service was transferred to Alberta Health Services, which is a division of Alberta Health. Prior to that time, there were more than 100 separate agencies in the province providing ambulance service—many bound by local commitments and boundary restrictions, and operating under different patient-care protocols. In essence, the province lacked a true integrated emergency medical services *system*. The Minister of Health indicated this change was necessary based on the premise of several public policy principles that included:

- EMS must be responsive to urban and rural needs.
- EMS must be aligned with the delivery of health care.
- EMS must maintain a public safety role.
- EMS must have active and consistent medical oversight.
- EMS service provision is performance-based.
- Responsibility for EMS stewardship is proportionate to the funding contribution.

### Alberta Health Services Contract

Following the Province of Alberta's decision to assume EMS, SCES elected to continue providing ground ambulance service through a contractual arrangement with Alberta Health Services. The latest agreement was effective April 1, 2014, but was amended July 1, 2015 to include updated requirements on specific reports that must be provided regularly to AHS.

The agreement between SCES and AHS is comprehensive and describes in detail the contractual obligations the department must meet in exchange for payments of nearly \$432,000 per month (about \$5.1 million annually). Some of the contract terms consist of elements often seen in many ambulance service contracts. Some of the significant terms include:

- Provide four fully equipped and staffed primary advanced life support (ALS) ambulances 24-hours daily, seven days per week.
- Mandatory compliance with applicable laws, medical oversight requirements, and AHS policies.
- Obtain accreditation from Accreditation Canada (or other accreditation organization, if approved).
- Maintain a quality assurance program (includes both clinical and operational).
- Obtain consent from AHS to implement proposed new approaches to the performance of services.
- Maintain a professional and courteous image, and good working relationships with others.
- Not require patients to pay user-fees, except under certain circumstances.
- Maintain minimum EMS training and continuing medical education.
- Provide specific infection prevention and control standards.
- Performance criteria that include "chute" (aka "turnout") times of 100 seconds at the 90<sup>th</sup> percentile; participation in quarterly performance meetings; and other performance requirements as prescribed from time-to-time by AHS.

The agreement also allows for payment, at an hourly rate, to SCES for occasional additional services beyond the usual, that may be requested by AHS. In these cases, SCES is supposed to invoice AHS separately for the cost of each additional staffed ambulance, and each additional EMS provider (although this has never been done in the past).

### Impact of SCES Participation

Undoubtedly, there has been a considerable impact on Strathcona County Emergency Services since its integration within the provincial EMS system in 2009. Some aspects of this integration have been positive, while others have produced negative effects on the delivery of ambulance services. Although it was a laudable endeavor by Alberta to create a province-wide “borderless” prehospital EMS delivery system, it has not been without controversy, challenges, and problems.

During ESCI’s interviews, nearly every employee at SCES expressed the opinion that the quality of ambulance service within Strathcona County has declined since AHS assumed responsibility for EMS. This was also reflected in the results of the SWOT Interviews Analysis. Recognizing the probability of bias, if the opinions and perceptions of many of the SCES employees are accurate, EMS in Strathcona County has *declined* since the AHS takeover. Accurate or not, their perspectives should be taken into consideration.

On occasion, the relationship between SCES and the AHS leadership has been strained for a variety of reasons. This is not unique to SCES, as other organizations in Alberta have expressed similar frustrations with AHS and its service-delivery model. An ongoing debate throughout North America has been whether prehospital EMS belongs in the public safety realm, or within public health. Public health organizations and fire/EMS agencies tend to have dissimilar cultures and conflicting viewpoints on how EMS should be delivered. Recently, there have been some indications that relationship between AHS and SCES has begun to improve.

During this project, ESCI met personally with a number of AHS officials, including phone interviews and e-mail correspondence. It seemed apparent that, among the AHS officials with which ESCI interacted, that they have a genuine desire to ensure quality EMS within the province. When information and data was accessible to AHS, they were cooperative and forthcoming in responding to requests from ESCI.

Without comprehensive historical data prior to 2009, it is not possible—with any degree of exactitude—to gauge the true effects of the AHS takeover of EMS. Although the quality and accessibility of ambulance service may have improved in other regions within the Province of Alberta, ESCI found no tangible evidence to demonstrate improved service and better patient outcomes to the residents of Strathcona County since the attainment of EMS by Alberta Health Services. Until there is definitive evidence, the positive or negative effects of the AHS/SCES operational relationship on patient outcomes will be based primarily on a subjective evaluation.



A review of a variety of sources and published reports suggested that AHS has apparently recognized its share of the issues and deficits in the EMS delivery system, and appears to be taking steps to address them—albeit not as expeditiously as some would prefer. In its 2013 review and report on ground ambulance operations, the Health Quality Council of Alberta suggested five primary recommendations, including non-primary recommendations, of which 16 required actions:<sup>17</sup>

1. *Recommendation #1—The 911-Public Safety Answering Point (PSAP) System*  
The Government of Alberta [should] develop and implement legislation, operational standards and an accountability framework for the Public Safety Answering Point system in the province.
2. *Recommendation #2—EMS Dispatch System*  
Alberta Health [should] immediately reverse its decision to suspend the consolidation of the EMS dispatch system into Alberta Health Services, and Alberta Health Services proceed with establishing a province-wide, consolidated EMS dispatch system.
3. *Recommendation #3—EMS Delivery System*  
Alberta Health [should] articulate a vision and plan for the EMS delivery system and incorporate an EMS delivery model that standardizes care across the province recognizing the unique realities and requirements for urban, rural, and remote areas.
4. *Recommendation #4—Informing & Managing the Quality & Safety of the EMS System*  
Alberta Health and Alberta Health Services [should] collaborate to establish a comprehensive, single source of valid EMS system data that encompasses the EMS dispatch and delivery systems to be used for operational decision-making as well as quality and safety management.
5. *Recommendation #5—Quality & Safety Management*  
Alberta Health Services [should] specify a quality and safety management approach that is an integral component of the AHS EMS planning and performance documents.

The government of Alberta accepted recommendations two through five, and recommendation one in principle. AHS has developed an implementation plan that includes the accepted recommendations and associated required actions.

Despite the lack of definitive evidence, other factors indicate positive systemic attributes, or at least attempts to address previous EMS system deficiencies. Many of these are contained within the contractual agreement between AHS and SCES. Each of the following represents positive contributors to the EMS delivery system.

- Requirement to maintain a clinical and operational quality assurance program.
- Minimum training and continuing medical education requirements.
- Infection and prevention control standards.
- Turnout-time standards (although not consistent with AHS or other industry standards).
- More than \$5 million dollars in annual funding to support ambulance operations, including a portion of administrative costs and capital equipment.

Another benefit may be the use of dynamic ambulance deployment by the AHS CCC. If managed correctly, dynamic deployment methods tend to be more effective and efficient than static methods (deploying from fixed locations, i.e., fire stations). However, this remains controversial, as SCES ambulances are so often deployed to incidents in Edmonton.

Probably the most significant issue for SCES is its lack of direct control of ambulance operations and communications within Strathcona County. SCES is no longer a direct provider of ambulance services, but a contractor under the oversight of AHS. Although there have been some benefits with the development of a contractual relationship, an elevated sense of frustration with the administrative oversight of SCES by AHS was evident. Such concerns are legitimate when an external agency has the level of influence and authority over an organization that was previously autonomous. However, as a provider of EMS in Alberta in the current environment, SCES can no longer see itself as independent of the healthcare system.

SCES and AHS will be inextricably linked so long as Strathcona County Emergency Services continues to provide ambulance service. AHS must be willing to listen to legitimate concerns from the SCES leadership, and address issues both decisively and precipitously. In turn, if SCES identifies problems, issues, or the necessity to make system modifications, it must communicate its concerns by providing accurate data and sufficient evidence to justify any changes that would ultimately require approval by AHS.

It was apparent to ESCI that AHS has developed a comprehensive EMS program throughout Alberta, which includes a wide range of outstanding programs and system components. There was every indication that AHS utilizes contemporary EMS industry standards, and endeavors to progress towards the highest quality system that can be achieved.

Despite some of the challenges that have occurred since the transition of EMS to Alberta Health Services, Strathcona County Emergency Services has continued to provide high-quality EMS, rescue, fire protection, and other critical services to the community.

Ultimately, it is in the best interests of both SCES and AHS and the citizens of Strathcona County and beyond, to work cooperatively towards a common goal of achieving the highest quality EMS and ambulance service that can be achieved.

## AMBULANCE SERVICE-DELIVERY OPTIONS

Although this project consisted of an evaluation of SCES operations, the emphasis has been on emergency medical services, the integration of SCES within the provincial EMS system, and the unique ambulance-staffing model utilized by the department. In this process, ESCI identified several questions related to ambulance service-delivery:

1. Is the SCES approach an effective, economical, and efficient means of providing ground ambulance service to the citizens of Strathcona County?
2. Are there other alternatives to providing ambulance to the community?
3. Should SCES continue its contractual relationship with AHS to provide ambulance service?

Following the completion of an *objective* and comprehensive analysis of emergency operations and other components of the Strathcona County Emergency Services delivery system, ESCI can present several potential service-delivery options that are intended to address the aforementioned questions. Admittedly, some of the following projected impacts are speculative. However, each is based on detailed observations and analysis, historical precedents, and substantial experience.

### Service-Delivery Assumptions

In each of the following options, it is assumed that SCES would continue the current schedule of 10- and 14-hour shifts, using four platoons. The second assumption is that SCES would maintain sufficient minimum staffing to ensure an Effective Response Force (ERF) and retain its tanker shuttle accreditation in accordance with the *Fire Underwriters Survey* (FUS). Any scenario that results in the loss of the tanker accreditation could result in substantial increases in rural residential insurance rates.

The current minimum staffing is 29 personnel per platoon. This consists of one Platoon Chief and seven firefighters and officers at each of the four full-time stations.

If the aforementioned assumptions are declined, other alternatives or modifications of the following options could be considered. Changes in the current shift schedule, or minimum staffing levels of the squads at the four full-time stations, are examples of where alterations could be applied.

### Option A: Continue the Status Quo

This option is simply to maintain the current EMS ambulance service-delivery model, and continue staffing each of the ambulances with three personnel. Alternative schedules and platoon configurations could also be considered with this option, and potentially not affect ERF capability and tanker accreditation. The advantages of this option will be discussed in more detail in the “Proposed Recommendations” section of this report.

As shown in the following figure, there would be no change in the current financial status if Option A is selected.

**Figure 22: Financial Impact of Option A—Maintain Status Quo**

Description	First Year	Second Year
Annual AHS contract revenue	No change	No change
Revenue from patient fees	No change	No change
<b>Total Revenue Impact:</b>	<b>\$0</b>	<b>\$0</b>
Maintain current three-person staffing & deployment methods	No change	No change
<b>Total Expenditure Reduction/Increase</b>	<b>\$0</b>	<b>\$0</b>
<b>TOTAL IMPACT:</b>	<b>\$0</b>	<b>\$0</b>

### Option B: Two-Person Ambulance with Quick-Response Units

If Strathcona County elects to move to a two-person ambulance model (Option C), the following would be a modification of that scenario, and include the addition of two quick response units (QRU). This is not a new concept. However, the use of QRUs or quick response vehicles (QRV) have become a growing trend among fire departments throughout North America, as a more efficient and cost-effective alternative to deploying larger apparatus and personnel to EMS incidents.

#### Configuration, Staffing & Deployment

The following describes a potential vehicle configuration, staffing, and deployment methods for the Quick Response Units option.

##### Vehicle Configuration

- A QRU could be configured in one of several alternatives, such as a large SUV, pickup truck, light-duty rescue or emergency response unit (ESU), or a brush-truck configuration similar to those at Stations 2 and 3.
- QRUs should be smaller, lighter, and quicker than the squads, engines, or rescues that SCES currently operates. The QRUs should be equipped with a full complement of ALS equipment and supplies, including two self-contained breathing apparatus (SCBA).
- A brush-truck configuration may be the best option due to its versatility. While equipped to provide ALS, it would also be capable of often arriving quickly, and ahead of other apparatus. In cases of small wildland, trash container, and other fires requiring limited fire suppression, a QRU could mitigate a certain number of these without the need of other apparatus.

##### Staffing Configuration

- The third firefighter from the ambulance would be re-assigned to one of the QRUs.
- All four ambulances would be reduced to two-person units.
- Staffing would consist of a minimum of one paramedic and one EMT.
- Ideally, either the EMT or paramedic should have the rank of company officer (Lieutenant, Captain, or Qualified Officer).

### Deployment

- Assign one QRU each at Station 1 and Station 6.
- With quicker and lighter vehicles, the QRUs could be deployed beyond the typical service areas of Stations 1 and 6, in order to provide support to the other stations.
- Modify the SCES dispatch protocols to account for the addition of these units, including expanded services areas, and what type of primary and secondary incidents to which they would be deployed.

### Option B: Potential Advantages/Disadvantages

#### Potential Advantages/Benefits

- No reduction in FTEs in the Operations Division.
- During ambulance calls outside the normal service area, and patient transports into Edmonton, those personnel previously assigned to the ambulance would remain within Strathcona County and available for other calls.
- QRU would have the ability to arrive at locations inaccessible to larger apparatus.
- Personnel assigned to the QRUs could cross-staff tankers, rescues, and other apparatus, when indicated.
- By maintaining tanker accreditation, rural residential insurance rates would not be affected.
- In significant fires, complex technical rescues, multiple-casualty incidents, or other major events, a QRU would often be the first to arrive on scene. In these situations, the company officer (if staffed accordingly) could assume incident command until arrival of the Platoon Chief. The second firefighter could be assigned to the first-due squad, tower, or other apparatus.
- With quicker and lighter vehicles, and shorter response times, the QRUs could be deployed beyond the typical service areas of Stations 1 and 6, in order to provide support to the other stations.
- While there would be limited benefits to Stations 2, 3 and 4 due to their present locations, the QRUs would be able to minimize unnecessary EMS responses by Squads 1, 5, and 6.
- Less impact on organizational morale than Option C or D.
- Being tasked to a QRU could be seen by firefighters as a desirable assignment.
- Likely would not be considered as a change in working conditions by the local bargaining unit.
- Unlikely to have negative repercussions from the community.

### Potential Disadvantages/Negative Impacts

- Since there would be no reductions in FTEs, no savings would be realized with regard to personnel salaries and benefits.
- Ambulance staffing reduced to two personnel. Advantages of the three-person ambulances eliminated.
- Would require initial start-up costs and capital expenditures for vehicles and equipment (e.g., cardiac monitor/defibrillators, SCBAs, etc.), along with ongoing operational maintenance.
- In critical patients, one or more QRU personnel may need to accompany the ambulance during transport, and remain out of service until arrival at the transport destination.
- Would necessitate additional time and planning to modify the existing dispatch protocols and operational policies. Would need to determine if QRUs would be dispatched by SCES or AHS.

The following figure lists the financial impact on Strathcona County if Option B is selected. It would require an initial capital expenditure of vehicles and equipment, including durable goods and other disposable supplies. Additional staffing would not be required. After the first year, maintenance costs would be reduced to approximately \$22,000 annually.

**Figure 23: Financial Impact of Option B—Two-Person Ambulance with QRU**

Description	First Year	Second Year
Annual AHS contract revenue	No change	No change
Revenue from patient fees	No change	No change
<b>Subtotal Revenue Impact:</b>	<b>\$0</b>	<b>\$0</b>
Vehicles purchase—two brush trucks at \$155,000 each	\$310,000	\$0
Capital medical equipment & supplies costs—two at \$100,000 each	\$200,000	\$0
Personnel and staffing—no change required in FTEs	\$0	\$0
Annual maintenance & operation of QRUs—two at \$11,000 each	\$22,000	\$22,000
<b>Subtotal Expenditure Impact:</b>	<b>\$532,000</b>	<b>\$22,000</b>
<b>TOTAL IMPACT—NET COST INCREASE:</b>	<b>\$532,000</b>	<b>\$22,000</b>

All dollar values are based on estimates, and not an actual analysis of budgetary reporting.

## Option C: Two-Person Ambulance Staffing Model

This option would result in many of the same negative impacts as described later in Option D.

### Staffing Configuration

This option suggests the following minimum staffing configuration.

- Two crossed-trained firefighters assigned to each of the four ambulances (one paramedic, one EMT).
- Minimum staffing of 29 personnel per platoon. Seven firefighters and officers per full-time station, and one Platoon Chief.
- Four firefighters previously assigned as the third person on an ambulance would be reassigned to two stations (two per station) to cross-staff tankers and other apparatus to maintain the STSS accreditation. From a deployment perspective, SCES would need to determine which fire stations would be the most advantageous.

### Option C: Potential Advantages/Disadvantages

#### Potential Advantages/Benefits

- AHS funding would likely continue at the current level, so long as SCES continued to maintain its contractual obligations.
- Patient-billing revenues would remain unchanged.
- If not assigned to incidents, four firefighters would remain within Strathcona County and available for other calls. In the three-person configuration, these personnel would often be on calls for extended periods (especially when transporting patients to Edmonton, or dispatched to more remote locations), and not immediately available for other incidents.

#### Potential Disadvantages/Negative Impacts

- No cost savings, since no FTEs would be eliminated from the Operations Division.
- EMS responses by the full-time and part-time stations would increase for those incidents in which a two-person ambulance was incapable of managing patients both effectively and safely. This would not only involve higher-acuity patients, but certain bariatric patients that could not be moved to the ambulance safely with only two personnel, as well as other incidents requiring sufficient personnel.
- AHS does not apply any type of formula for funding its ambulance contractors. When determining reimbursement, SCES submitted a pro forma of costs. In the future, AHS could re-negotiate its contract with SCES to reduce funding, due to reduced ambulance staffing (although unlikely).
- Would likely produce a considerable decline in morale among the firefighters assigned to the Operations Division.
- The local bargaining unit (IAFF) would likely consider this a change in working conditions, which would affect their members. Could result in a demand to re-negotiate the labor agreement.
- Less likely to recruit top firefighter candidates who are attracted to the three-person model.
- Although probably less likely than with Option D, there could be potential negative repercussions from the community.



Removing the third firefighter as described in Option C would not impact SCES from a financial perspective. However, this does not take into account the effect on emergency operations and service delivery.

**Figure 24: Financial Impact of Option C—Two-Person Ambulance Staffing**

Description	First Year	Second Year
Annual AHS contract revenue	No change	No change
Revenue from patient fees	No change	No change
<b>Total Revenue Impact:</b>	<b>\$0</b>	<b>\$0</b>
Personnel and staffing—no change required in FTEs	No change	No change
Vehicles (estimated)—no cost savings; same number of vehicles	No change	No change
Capital medical equipment & supplies—no cost; same equipment	No change	No change
<b>Total Expenditure Reduction/Increase</b>	<b>\$0</b>	<b>\$0</b>
<b>TOTAL IMPACT:</b>	<b>\$0</b>	<b>\$0</b>

## Option D: Termination of Ambulance Service Provision

Strathcona County could elect to terminate its contractual relationship with Alberta Health Services and discontinue providing ambulance response and emergency medical transportation services. If they choose to pursue this option, a number of issues would need to be carefully considered.

### Staffing Configuration

This option suggests the following minimum staffing configuration.

- No firefighters assigned to ambulances.
- Minimum staffing of 25 personnel per platoon. Six firefighters and officers per full-time station, and one Platoon Chief.
- At each full-time station, four personnel assigned to each Squad, with two personnel assigned to cross-staff tankers, rescues, and other apparatus.

### Option D: Potential Advantages/Disadvantages

#### Potential Advantages/Benefits

- Cost-reductions in salaries and benefits of an estimated \$2 million by the elimination of approximately 32 FTEs within the Operations Division.
- Some of these FTEs could be re-assigned to non-combat administrative and support roles within other divisions.
- ALS ambulance-service operations require considerable administrative, managerial, logistical, and other support services in comparison to fire departments providing ALS- or BLS-level MFR. Discontinuation of ambulance service by SCES would reduce some of the workload and costs associated providing patient transport.
- As a provider of MFR, SCES may be eligible for limited funds and access to resources through the Alberta Health Services Medical First Responder program.
- Overtime callback costs would likely decrease.
- Platoon Chiefs would be able to more effectively monitor and manage all on-duty SCES operations personnel and resources. This is currently a challenge with personnel assigned to ambulances.
- SCES EMS personnel would no longer be required to document patient care in the AHS ePCR system, and could utilize the SCES RMS instead. This could have the potential of consolidating all incident records into a single RMS, and improving the accuracy of EMS incident and patient records.

### Potential Disadvantages/Negative Impacts

- SCES would lose \$5.2 million in annual funding from the AHS contract, and approximately \$1.2 million from patient billing.
- Alberta Health Services would need to re-allocate funds previously provided to SCES, in order to add direct-delivery ambulances and/or fund other contractors to provide service within the County.
- AHS would provide two-person ALS ambulances, with a minimum of one EMT and one EMT-P. However, some ambulances would be BLS. The citizens of Strathcona County would lose the benefits and efficiencies found with the current three-person ambulance-staffing model.
- SCES would need to re-define its role and operational methods in the delivery of emergency medical services. Likely, this would be in a MFR capacity only, and in support of AHS (and other) ambulance service providers.
  - Re-configuring its current EMS service-delivery to an MFR model would increase the workload on those companies located at the four full-time stations, and potentially those at the part-time stations.
  - To some degree, higher fuel and maintenance costs on apparatus (i.e., squads, brush trucks), resulting from increased EMS first-response service-demand.
- SCES would likely operate similar to the Edmonton and Calgary fire departments, and continue to respond to thousands of EMS incidents annually in a MFR role.
- SCES would need to determine the necessity of providing ALS versus BLS.
- Over time, firefighter's EMS skills would diminish, leading to degradation in the ability to provide high-quality care to both citizens and their own members. Reductions in patient interactions and experience can result in errors that are more frequent, poor patient care, and increased liability.
- SCES would no longer be a fully integrated, all-hazards emergency services organization.
- Would produce a considerable decline in morale among personnel at all levels of the organization.
- Potential backlash from citizens accustomed to high-quality ambulance service from SCES.

With Option D, there would be an annual savings of approximately \$500,000 in direct operating costs. Eliminating 32 firefighter FTEs at an approximate cost of \$115,000 annually, would reduce expenses by about \$3,680,000 annually.

Although cost savings would be realized, there would be a substantial loss of revenue currently provided by the contractual arrangement with Alberta Health Services. This would be reduced by \$5.3 million, along with approximately \$1,460,000 in lost revenue from patient transport fees. The overall impact of this option would result in approximately \$2,580,000 annually in lost revenue. The following figure illustrates the financial impact with this option.

**Figure 25: Financial Impact of Option D—Termination of Ambulance Service**

Description	First Year	Second Year
Annual AHS contract revenue reduction	-\$5,300,000	-\$5,300,000
Revenue from patient fees reduction	-\$1,460,000	-\$1,460,000
<b>Subtotal Revenue Impact:</b>	<b>-\$6,760,000</b>	<b>-\$6,760,000</b>
Annual direct operating costs	\$500,000	\$500,000
Firefighters (salaries/benefits) \$115,000 each (eliminate 32 FTEs)	\$3,680,000	\$3,680,000
<b>Subtotal Expenditure Impact:</b>	<b>\$4,180,000</b>	<b>\$4,180,000</b>
<b>TOTAL IMPACT—NET REVENUE LOSS:</b>	<b>-\$2,580,000</b>	<b>-\$2,580,000</b>

All dollar values are based on estimates, and not an actual analysis of budgetary reporting.

### Enhanced EMS Service-Delivery for Option D

If Strathcona County were to select Option D, the addition and deployment of two quick-response units, as described in Option B, would enhance the ability of SCES to provide advanced medical first response. SCES would attain many of the advantages and benefits as described under that option.

In this option, there would be an annual reduction of expenditures of \$4,180,000, with an increase the first year of capital expenditures and maintenance expenses of \$532,000. In the second and subsequent years, annual maintenance costs would be approximately \$22,000. However, the net impact in lost revenue would be about \$3,112,000 and \$2,602,000 respectively.

**Figure 26: Financial Impact of Option D—Enhancement of Services**

Description	First Year	Second Year
Annual AHS contract revenue reduction	-\$5,300,000	-\$5,300,000
Revenue from patient fees reduction	-\$1,460,000	-\$1,460,000
<b>Subtotal Revenue Impact:</b>	<b>-\$6,760,000</b>	<b>-\$6,760,000</b>
Annual direct operating costs	\$500,000	\$500,000
Firefighters (salaries/benefits) \$115,000 each (eliminate 32 FTEs)	\$3,680,000	\$3,680,000
<b>Subtotal Expenditure Reductions:</b>	<b>\$4,180,000</b>	<b>\$4,180,000</b>
Vehicles purchase—two brush trucks at \$155,000 each	\$310,000	\$0
Capital medical equipment & supplies costs—two at \$100,000 each	\$200,000	\$0
Annual maintenance & operation of QRUs—two at \$11,000 each	\$22,000	\$22,000
<b>Subtotal Expenditure Increases:</b>	<b>\$532,000</b>	<b>\$22,000</b>
<b>TOTAL IMPACT—NET REVENUE LOSS:</b>	<b>-\$3,112,000</b>	<b>-\$2,602,000</b>

All dollar values are based on estimates, and not an actual analysis of budgetary reporting.

## Options for Increased Rural Service-Demand

A new residential development in Strathcona County has been in the planning stages for several years. Known as the *Cambrian Crossing*, it would be located in an area northeast of Sherwood Park. In anticipation of this, SCES has included plans to build a seventh fire station in that area within their five-year budget (2019). Because of the economic decline, the rate of the Cambrian Crossing development has slowed substantially. Currently, construction of Station 7 would likely not be built until 2020–2021. The current plan is to staff the station with a second on-duty Platoon Chief and six personnel. The station would house a squad, tanker, and brush truck, but likely not an additional ambulance.

In the meantime, SCES should closely monitor the growth and service-demand within the Station 3 response area. Historically, this station has had the highest service-demand between the two part-time stations. Station 3 appears to be the most strategically located for a large portion of the eastern side of Strathcona County, which require travel times exceeding 10 minutes from the staffed stations. As the rural population density increases, an option to consider for improving response times and addressing service-demand in the Station 3 area could be as follows:

- Utilize Brush Truck 3 as a quick-response unit. This unit should be fully equipped to provide ALS, basic extrication, and some fire-suppression capabilities.
- Staff the vehicle with two personnel, consisting of a minimum of one paramedic and one EMT—one of whom should be a company officer.
- Consider cross-staffing Tanker 3 for rural wildland and structure fires.
- Consider a 10-hour peak-demand schedule initially. As service-demand increases, upgrade to 24-hour staffing (using the current 10/14-schedule for personnel).

This would result in Station 3 becoming a full-time station, manned with career firefighters, and with limited hours. While this may not be consistent with the typical staffing/scheduling model used by SCES, it would be a cost-effective and efficient option. If service-demand increases over time, it may be necessary to establish a full-time squad at Station 3. At present, adding an ambulance to this station does not appear to be necessary. If the current service-demand analysis is accurate, an immediate need to staff this station is not indicated, and it should be considered a mid-term strategy.

The following figure outlines the potential cost of increasing service to address the growing rural service demand:

**Figure 27: Cost of Increased Rural Service Demand**

Description	First Year	Second Year
No additional revenue	\$0	\$0
<b>Total Revenue Impact:</b>	<b>\$0</b>	<b>\$0</b>
QRU peak-demand staffing—10 hours daily (5 FTEs)	\$575,000	\$575,000
Capital vehicle purchase (none, if existing Brush Truck used)	\$0	\$0
Capital medical equipment & supplies	\$100,000	\$0
Annual maintenance & operation costs	\$11,000	\$11,000
<b>Subtotal Expenditure Increases:</b>	<b>\$686,000</b>	<b>\$586,000</b>
<b>TOTAL IMPACT:</b>	<b>\$686,000</b>	<b>\$586,000</b>

All dollar values are based on estimates, and not an actual analysis of budgetary reporting.

### Financial Summary of the Service-Delivery Options

The following figure is a summary of the financial impact to Strathcona County of each of the options. The figures listed are estimates based on current available information. It is important to note that this only illustrates how each of these would impact the SCES budget. It does not take into account the impact on emergency operations or the department's ability to provide services.

**Figure 28: Summary of the Net Financial Impact of Service-Delivery Options**

Service-Delivery Options	First Year	Second Year
Option A: Maintain Status Quo	\$0	\$0
Option B: Two-Person Ambulances with QRUs (first year)	\$532,000	\$22,000
Option C: Two-Person Ambulance Staffing Model	\$0	\$0
Option D: Termination of Ambulance Service Provision	<b>-\$2,580,000</b>	<b>-\$2,580,000</b>
Option D with Enhanced EMS Service-Delivery (first year)	<b>-\$3,112,000</b>	<b>-\$2,602,000</b>
Options for Increased Rural Service-Demand	\$686,000	\$686,000

All dollar values are based on estimates, and not an actual analysis of budgetary reporting.

The costs of the suggested improvements for rural service demand was excluded from the options listed in the figure above, as it can be implemented exclusive of the other options.

## AMBULANCE SERVICE & DEPLOYMENT RECOMMENDATIONS

ESCI recognizes that the Strathcona County Council and Executive Team are responsible for ensuring their citizens and taxpayers receive high-quality emergency services in the most cost-effective and efficient manner possible. This has become increasingly important as the County's population continues to grow, revenue is limited, and the demand for emergency services is increasing. In the following recommendations, ESCI has considered these issues without bias and with the community's best interests as the primary objective.

### Ambulance Service-Delivery Recommendations

After a comprehensive and objective analysis of emergency medical services operations and other aspects of SCES, ESCI recommends that Strathcona County:

- *Option A: Continue the Status Quo, or*
- *Option B: Two-Person Ambulance with Quick-Response Units, if Option A is unacceptable.*

As previously discussed, there was insufficient data to conclude definitively that three-person ambulance staffing produced better patient outcomes over ambulances staffed with two personnel. This was anticipated, as most communities are unable to determine the direct impact their EMS systems on patient outcomes. However, ESCI was able to acquire limited information that provided some indication that the three-person model *may* contribute to better patient outcomes. ESCI believes that, for Strathcona County, the three-person model is superior. In this report, under the section, "Operational Staffing, Current Ambulance Staffing," ESCI has included a list of indicators demonstrating the benefits of three-person ambulance staffing.

ESCI firmly believes that either Option C or Option D, identified in the previous section, would be a step backwards from the current system. Eliminating FTEs in the Operations Division would have significant negative ramifications on the entire organization. Being a fully integrated emergency services provider, staff reductions, or substantial changes in crew size would generate a "domino effect," and ultimately jeopardize or diminish the ability of SCES to provide other emergency services.

### Ambulance Deployment Recommendations

Considering the frequency of SCES responses to Edmonton, AHS should apply whatever strategies it determines to be effective for Strathcona County. ESCI recommends that:

- SCES participate with AHS in the development of strategies that would minimize drawing resources from Strathcona County, and reduce the volume of SCES ambulance scene-responses, interfacility transports, and posting/standbys in Edmonton.
- Participate with AHS in developing strategies that minimize the time SCES ambulances spend at the hospitals, thereby increasing their availability to return to Strathcona County as soon as possible.



Ambulances deployed from Stations 1 and 6 are at the high-end of service-demand, with Station 5 close behind. As expected, the Station 4 ambulance is underutilized in comparison to the other staffed stations.

- If service-demand increases substantially in 2016, SCES should consider the addition of a daily "peak-demand" ambulance Tuesday through Friday or Wednesday through Saturday of each week.
- In order to minimize staffing and scheduling difficulties, the ambulance should be staffed during the usual day-shift hours of 0800–1800 hours.
- Consider staffing this ambulance with two firefighters and deploying it first-out for all IFTs.

## FINAL OBSERVATIONS OF SCES

During this project, ESCI analyzed multiple data sources; reviewed dozens of reports, studies, plans, and other related documents; and conducted interviews with SCES personnel from every division within Strathcona County Emergency Services.

ESCI consistently found a genuine passion for providing quality service, professionalism, and sense of pride among the employees at every level of the organization. ESCI observed and identified characteristics of the organization that are worth mentioning. Some of the positive attributes observed and described below may seem insignificant. However, the positive effects of these should not be underestimated.

- A fully integrated, all-hazards emergency services organization with cross-trained, dual-role firefighters that can be assigned to staff and function on ambulances and other apparatus, has produced an organization with much greater depth than a single-service provider organization.
- Having firefighters regularly rotate between the ambulance and other apparatus adds to employee satisfaction and minimizes “burnout,” which is common in personnel assigned to an ambulance in a busy EMS system.
- All members of the department wear uniforms, including administrative and communications staff. This exhibits not only an appearance of professionalism, but also generates a feeling of unanimity among the staff.
- Firefighters do not wear patches or emblems on their uniforms signifying their level of EMS certification. This contributes a sense of parity among the firefighters. From a citizen’s perspective, EMTs are indistinguishable from paramedics.

In summary, ESCI has found Strathcona County Emergency Services—though not without its challenges and areas warranting improvement—to be a high-quality organization with effective leadership, outstanding employees, and a provider of effective and efficient services to the community. However, SCES must strive to consistently and accurately measure and report its performance as the primary provider of EMS in Strathcona County.

ESCI is optimistic that the citizens and leadership of Strathcona County will continue to recognize the value of SCES, which is a solid organization capable of mitigating the numerous daily emergencies, as well as potential risks that may occur within the community.

## APPENDIX A: TABLE OF FIGURES

Figure 1: Population Density of Strathcona County.....	9
Figure 2: Public Satisfaction Survey Results (2014 & 2015).....	11
Figure 3: Ambulance Dispatch Process in Strathcona County .....	12
Figure 4: Comparison of SCES STEMI Treatment to Other EMS Agencies .....	18
Figure 5: SCES Annual Gross & Net Costs per Capita .....	21
Figure 6: SCES Operating/Non-Operating Actuals (2008–2012).....	21
Figure 7: SCES Operating/Non-Operating Actuals (2013–2015).....	21
Figure 8: SCES Actual Operating Revenue and Expenses.....	22
Figure 9: SCES Actual Operating Revenues .....	23
Figure 10: SCES Actual Operating Expense Trends .....	24
Figure 11: Single Ambulance Responses with Two & Four-Person Staffing .....	26
Figure 12: Ambulance Staffing for Single-Unit Responses (July 2014–June 2016).....	27
Figure 13: 2015 SCES Ambulance Responses by Square Kilometer (AHS CAD Data).....	28
Figure 14: 2015 SCES Ambulance Responses by Square Kilometer (SCES CAD Data) .....	29
Figure 15: Ten Most Frequent Locations for Ambulance Calls (2014–2015).....	30
Figure 16: Ambulance Activity within Strathcona County Boundaries.....	30
Figure 17: Five Most Frequent Transport Destinations (2014–2015).....	31
Figure 18: SCES Hospital Turnaround Times (2014–2015) .....	32
Figure 19: Cascade of Events (NFPA 1710) .....	33
Figure 20: Comparison of Hourly Ambulance Operation Costs .....	40
Figure 21: Career Firefighter Rates per 1,000 Persons Served (2015).....	41
Figure 22: Financial Impact of Option A–Maintain Status Quo .....	51
Figure 23: Financial Impact of Option B–Two-Person Ambulance with QRU .....	53
Figure 24: Financial Impact of Option C–Two-Person Ambulance Staffing .....	55
Figure 25: Financial Impact of Option D–Termination of Ambulance Service.....	58
Figure 26: Financial Impact of Option D–Enhancement of Services.....	58
Figure 27: Cost of Increased Rural Service Demand .....	60
Figure 28: Summary of the Net Financial Impact of Service-Delivery Options.....	60
Figure 29: City of Leduc Fire & EMS Department .....	65
Figure 30: City of St. Albert Fire Service.....	66
Figure 31: City of Red Deer Emergency Services .....	67
Figure 32: City of Lethbridge Fire & Emergency Services .....	68
Figure 33: City of Spruce Grove Fire Services .....	69
Figure 34: Regional Municipality of Wood Buffalo Emergency Services .....	70
Figure 35: City of Calgary Fire Department.....	71
Figure 36: City of Edmonton Fire Rescue.....	72

## APPENDIX B: COMPARATIVE SURVEY TABLES

The following figures list specific information acquired from the various organizations surveyed for the comparative analysis section of this report. ESCI cannot confirm the accuracy of the information provided in the tables. Attempts were made to confirm budget numbers from at least two sources. In some cases, the numbers conflicted. Due to the significant differences between AHS ambulance operations and SCES, a survey table was not completed for Alberta Health Services EMS.

**Figure 29: City of Leduc Fire & EMS Department**

SURVEY COMPONENT	RESULTS
<b>Demographics</b>	
Population	29,304 (2015) 30,496 (2016)
Service Area (square kilometers)	36.97 square kilometers
<b>Operating Budget</b>	
2015 & 2016 Operating Budgets	\$8,229,523 (2015) \$8,732,456 (2016)
Cost Per Capita (2015 & 2016)	\$280.83 (2015) \$286.35 (2016)
<b>Number of Personnel (FT—Full Time; PT—Part-Time OC—Paid on Call)</b>	
Chief Officers (above the rank of Captain)	1 Fire Chief; 3 Deputy Chiefs; 1 Inspector
Firefighters-only (no EMS certification; regardless of rank)	16 firefighters
Firefighter/EMTs or EMRs (regardless of rank)	43
Firefighter/Paramedics (regardless of rank)	22 FT (5 PT paramedics)
Paramedics receive incentive pay above base?	No
Firefighters receive incentive pay for specialty teams?	Not applicable (no specialty teams)
<b>Fire Station &amp; Apparatus Staffing</b>	
Total Staffed (in-station) Fire Stations & Hours Staffed	2 fire stations, staffed 24-hours daily
Total Non-Staffed (no in-station staff) Fire Stations	0
Minimum Ambulance Staffing (number & certifications)	1 paramedic; 1 EMT (2 ALS ambulances)
Are ambulances ever staffed with three personnel?	No (unless new employee on orientation)
<b>Service Demand</b>	
2014 Total Call Volume	4,793
Total EMS-related Calls & Percent of Total	396 other apparatus responses (8%)
Total Ambulance-Only Calls Dispatched	3,841 (80%)
2015 Total Call Volume	4,501
Total EMS-related Calls & Percent of Total	373 other apparatus responses (8%)
Total Ambulance-Only Calls Dispatched	3,646 (81%)

Figure 30: City of St. Albert Fire Service

SURVEY COMPONENT	RESULTS
<b>Demographics</b>	
Population	63,255 (2014) 64,645 (2016)
Service Area (square kilometers)	48.27 square kilometers
<b>Operating Budget</b>	
2015 & 2016 Operating Budgets	2015: \$13,157,233 2016: \$13,245,800
Cost Per Capita (2015 & 2016)	\$208.00 (2015) \$204.90 (2016)
<b>Number of Personnel (FT—Full Time; PT—Part-Time OC—Paid on Call)</b>	
Chief Officers (above the rank of Captain)	1 Chief, 3 Deputy Chiefs, 4 Platoon Chiefs
Firefighters-only (no EMS certification; regardless of rank)	0
Firefighter/EMTs or EMRs (regardless of rank)	39
Firefighter/Paramedics (regardless of rank)	46
Paramedics receive incentive pay above base?	No
Firefighters receive incentive pay for specialty teams?	Yes, but only after 10 years of service
<b>Fire Station &amp; Apparatus Staffing</b>	
Total Staffed (in-station) Fire Stations & Hours Staffed	3 staffed stations; 24-hr., 2 with ambulances
Total Non-Staffed (no in-station staff) Fire Stations	None
Minimum Ambulance Staffing (number & certifications)	1 Paramedic, 1 EMT
Are ambulances ever staffed with three personnel?	No. AHS provides second crew if needed
<b>Service Demand</b>	
2014 Total Call Volume	6,722
Total EMS-related Calls & Percent of Total	4,284 (64%)
Total Ambulance-Only Calls Dispatched	3,006+
2015 Total Call Volume	6,957
Total EMS-related Calls & Percent of Total	4,334 (62%)
Total Ambulance-Only Calls Dispatched	2,917+

Figure 31: City of Red Deer Emergency Services

SURVEY COMPONENT	RESULTS
<b>Demographics</b>	
Population	100,807 (2015) 99,832 (2016)
Service Area (square kilometers)	104.29 square kilometers
<b>Operating Budget</b>	
2015 & 2016 Operating Budgets	\$31,859,000 (2015) \$34,663,322 (2016)
Cost Per Capita (2015 & 2016)	\$316.04 (2015) \$347.21 (2016)
<b>Number of Personnel (FT—Full Time; PT—Part-Time OC—Paid on Call)</b>	
Chief Officers (above the rank of Captain)	1 Chief, 3 DCs, 2 Assistant DCs, 4 PCs
Firefighters-only (no EMS certification; regardless of rank)	0
Firefighter/EMTs or EMRs (regardless of rank)	8 (FT)
Firefighter/Paramedics (regardless of rank)	154 (FT)
Paramedics receive incentive pay above base?	No
Firefighters receive incentive pay for specialty teams?	No
<b>Fire Station &amp; Apparatus Staffing</b>	
Total Staffed (in-station) Fire Stations & Hours Staffed	5 stations 24-hours daily
Total Non-Staffed (no in-station staff) Fire Stations	0
Minimum Ambulance Staffing (number & certifications)	1 EMT, 1 Paramedic (5 ambulances)
Are ambulances ever staffed with three personnel?	No (sometimes in certain critical transports)
<b>Service Demand</b>	
2014 Total Call Volume	14,233
Total EMS-related Calls & Percent of Total	9,309 (65%)
Total Ambulance-Only Calls Dispatched	9,309 (same as EMS calls)
2015 Total Call Volume	14,854
Total EMS-related Calls & Percent of Total	9,535 (64%)
Total Ambulance-Only Calls Dispatched	9,535 (same as EMS calls)

Figure 32: City of Lethbridge Fire &amp; Emergency Services

SURVEY COMPONENT	RESULTS
<b>Demographics</b>	
Population	94,804 (2015) 96,828 (2016)
Service Area (square kilometers)	123 square kilometers
<b>Operating Budget</b>	
2015 & 2016 Operating Budgets	\$20,407,389 (2015) \$22,149,753 (2016)
Cost Per Capita (2015 & 2016)	\$215.25 (2015) \$228.75 (2016)
<b>Number of Personnel (FT—Full Time; PT—Part-Time OC—Paid on Call)</b>	
Chief Officers (above the rank of Captain)	4 chief officers
Firefighters-only (no EMS certification; regardless of rank)	0
Firefighter/EMTs or EMRs (regardless of rank)	26
Firefighter/Paramedics (regardless of rank)	138
Paramedics receive incentive pay above base?	No
Firefighters receive incentive pay for specialty teams?	No
<b>Fire Station &amp; Apparatus Staffing</b>	
Total Staffed (in-station) Fire Stations & Hours Staffed	4 fire stations; staffed 24-hours daily
Total Non-Staffed (no in-station staff) Fire Stations	0
Minimum Ambulance Staffing (number & certifications)	1 EMT, 1 Paramedic(4+ ALS ambulances)
Are ambulances ever staffed with three personnel?	No
<b>Service Demand</b>	
2014 Total Call Volume	14,668
Total EMS-related Calls & Percent of Total	13,317 (91%)
Total Ambulance-Only Calls Dispatched	9,461 (transported)
2015 Total Call Volume	15,168
Total EMS-related Calls & Percent of Total	13,799 (91%)
Total Ambulance-Only Calls Dispatched	10,322 (transported)



Figure 33: City of Spruce Grove Fire Services

SURVEY COMPONENT	RESULTS
<b>Demographics</b>	
Population	32,036 (2015) 33,600 (2016)
Service Area (square kilometers)	32.3 square kilometers
<b>Operating Budget</b>	
2015 & 2016 Operating Budgets	2015 not available; \$8,500,000 (2016)
Cost Per Capita (2015 & 2016)	\$252.97 (2016)
<b>Number of Personnel (FT—Full Time; PT—Part-Time OC—Paid on Call)</b>	
Chief Officers (above the rank of Captain)	1 Chief, 1 DC, 3 Assistant Deputy Chiefs
Firefighters-only (no EMS certification; regardless of rank)	0
Firefighter/EMTs or EMRs (regardless of rank)	26
Firefighter/Paramedics (regardless of rank)	18
Paramedics receive incentive pay above base?	No
Firefighters receive incentive pay for specialty teams?	No
<b>Fire Station &amp; Apparatus Staffing</b>	
Total Staffed (in-station) Fire Stations & Hours Staffed	1 station; 24-hours daily
Total Non-Staffed (no in-station staff) Fire Stations	0
Minimum Ambulance Staffing (number & certifications)	1 EMT, 1 Paramedic (2 ambulances)
Are ambulances ever staffed with three personnel?	Ad hoc for specific need
<b>Service Demand</b>	
2014 Total Call Volume	4,349
Total EMS-related Calls & Percent of Total	3,962 (91%)
Total Ambulance-Only Calls Dispatched	Not available
2015 Total Call Volume	3,756
Total EMS-related Calls & Percent of Total	3,320 (88%)
Total Ambulance-Only Calls Dispatched	Not available

Figure 34: Regional Municipality of Wood Buffalo Emergency Services

SURVEY COMPONENT	RESULTS
<b>Demographics</b>	
Population	125,032 (2015) 2016 not available
Service Area (square kilometers)	68,454 square kilometers
<b>Operating Budget</b>	
2015 & 2016 Operating Budgets	\$32,890,500 (2015) \$33,208,700 (2016)
Cost Per Capita (2015 & 2016)	\$270.81 (2015) 2016 not available
<b>Number of Personnel (FT—Full Time; PT—Part-Time OC—Paid on Call)</b>	
Chief Officers (above the rank of Captain)	9 chief officers
Firefighters-only (no EMS certification; regardless of rank)	None
Firefighter/EMTs or EMRs (regardless of rank)	114 (approximate)
Firefighter/Paramedics (regardless of rank)	22 paramedics (need 12 more)
Paramedics receive incentive pay above base?	Yes, 5% above
Firefighters receive incentive pay for specialty teams?	No
<b>Fire Station &amp; Apparatus Staffing</b>	
Total Staffed (in-station) Fire Stations & Hours Staffed	4 fire stations 24-hours daily
Total Non-Staffed (no in-station staff) Fire Stations	5 rural stations (paid on-call) 90 personnel
Minimum Ambulance Staffing (number & certifications)	1 Paramedic, 1 EMT (ALS); 2 EMTs (BLS)
Are ambulances ever staffed with three personnel?	No
<b>Service Demand</b>	
2014 Total Call Volume	6,415
Total EMS-related Calls & Percent of Total	4,672 (73%)
Total Ambulance-Only Calls Dispatched	2,623
2015 Total Call Volume	6,585
Total EMS-related Calls & Percent of Total	4,829 (73%)
Total Ambulance-Only Calls Dispatched	1,883

Figure 35: City of Calgary Fire Department

SURVEY COMPONENT	RESULTS
<b>Demographics</b>	
Population	1,230,915 (2015) 1,235,171 (2016)
Service Area (square kilometers)	318 square kilometers
<b>Operating Budget</b>	
2015 & 2016 Operating Budgets	\$208,561,420 (2015) \$ 212,387,000 (2016)
Cost Per Capita (2015 & 2016)	\$169.43 (2015) \$171.94 (2016)
<b>Number of Personnel (FT—Full Time; PT—Part-Time OC—Paid on Call)</b>	
Chief Officers (above the rank of Captain)	1 Chief, 4 DCs, 7 Asst. DCs, 4 BCs 24 District Chiefs
Firefighters-only (no EMS certification; regardless of rank)	1,125
Firefighter/EMTs or EMRs (regardless of rank)	89
Firefighter/Paramedics (regardless of rank)	7
Paramedics receive incentive pay above base?	No
Firefighters receive incentive pay for specialty teams?	No
<b>Fire Station &amp; Apparatus Staffing</b>	
Total Staffed (in-station) Fire Stations & Hours Staffed	39 stations staffed 24-hours daily
Total Non-Staffed (no in-station staff) Fire Stations	None
Minimum Ambulance Staffing (number & certifications)	Not applicable
Are ambulances ever staffed with three personnel?	Not applicable
<b>Service Demand</b>	
2014 Total Call Volume	60,154
Total EMS-related Calls & Percent of Total	29,086 (48%)
Total Ambulance-Only Calls Dispatched	Not applicable
2015 Total Call Volume	57,521
Total EMS-related Calls & Percent of Total	29,680 (52%)
Total Ambulance-Only Calls Dispatched	Not applicable

Figure 36: City of Edmonton Fire Rescue

SURVEY COMPONENT	RESULTS
<b>Demographics</b>	
Population	877,926 (2014); 892,850 (2015 projected) & 907,136 (2016 census)
Service Area (square kilometers)	699.8 square kilometers (SLIM map data)
<b>Operating Budget</b>	
2015 & 2016 Operating Budgets	\$196,000,000 (2015) \$204,700,00 (2016)
Cost Per Capita (2015 & 2016)	\$219.52 (2015 estimated) \$225.66 (2016)
<b>Number of Personnel (FT—Full Time; PT—Part-Time OC—Paid on Call)</b>	
Chief Officers (above the rank of Captain)	36 (includes officers in non-suppression areas such as Training, Public Safety, Dispatch, Logistics)
Firefighters-only (no EMS certification; regardless of rank)	870 (includes Captains)
Firefighter/EMTs or EMRs (regardless of rank)	None
Firefighter/Paramedics (regardless of rank)	None
Paramedics receive incentive pay above base?	N/A
Firefighters receive incentive pay for specialty teams?	No
<b>Fire Station &amp; Apparatus Staffing</b>	
Total Staffed (in-station) Fire Stations & Hours Staffed	28 stations, 24-hours daily
Total Non-Staffed (no in-station staff) Fire Stations	None
Minimum Ambulance Staffing (number & certifications)	Not applicable
Are ambulances ever staffed with three personnel?	Not applicable
<b>Service Demand</b>	
2014 Total Call Volume	42,180
Total EMS-related Calls & Percent of Total	27,276 (65%)
Total Ambulance-Only Calls Dispatched	Not applicable
2015 Total Call Volume	48,058
Total EMS-related Calls & Percent of Total	31,848 (66%)
Total Ambulance-Only Calls Dispatched	Not applicable

## APPENDIX C: SAMPLE EMS CUSTOMER SATISFACTION SURVEY



### Strathcona County Emergency Services

## EMS Customer Satisfaction Survey

As a recent patient, or family member of a patient, of Strathcona County Emergency Services (SCES), we would greatly appreciate you taking a few minutes to complete and return this questionnaire. SCES provides emergency medical services and ambulance transportation to our community.

Your input will help us to serve our patients better through continuous quality improvement. Please rate the service you received while being treated and transported by our organization.

### AMBULANCE VEHICLE

#### *Promptness with which the ambulance responded and arrived?*

☐ Very poor      ☐ Poor      ☐ Fair      ☐ Good      ☐ Excellent

#### *Cleanliness of the ambulance and equipment?*

☐ Very poor      ☐ Poor      ☐ Fair      ☐ Good      ☐ Excellent

#### *Comfort of the ambulance (warmth, lighting, etc.)?*

☐ Very poor      ☐ Poor      ☐ Fair      ☐ Good      ☐ Excellent

### AMBULANCE CREW

#### *Courtesy of the Strathcona ambulance personnel (firefighters)?*

☐ Very poor      ☐ Poor      ☐ Fair      ☐ Good      ☐ Excellent

#### *Degree to which the ambulance crew kept you informed?*

☐ Very poor      ☐ Poor      ☐ Fair      ☐ Good      ☐ Excellent

#### *Knowledge and technical skills of the ambulance crew?*

☐ Very poor      ☐ Poor      ☐ Fair      ☐ Good      ☐ Excellent

**How would you rate the ambulance crew's professionalism?**

☐ Very poor      ☐ Poor      ☐ Fair      ☐ Good      ☐ Excellent

**TREATMENTS****How was your pain treated (if applicable to your condition)?**

☐ Very poor      ☐ Poor      ☐ Fair      ☐ Good      ☐ Excellent

**How were any other of your symptoms treated?**

☐ Very poor      ☐ Poor      ☐ Fair      ☐ Good      ☐ Excellent

**Do you feel that the treatment you were provided made a difference?**

☐ Yes      ☐ No      ☐ Maybe

**OVERALL SERVICE****Quality of service provided by Strathcona County Emergency Services?**

☐ Very poor      ☐ Poor      ☐ Fair      ☐ Good      ☐ Excellent

**Quality of the ambulance crew (SCES firefighters)?**

☐ Very poor      ☐ Poor      ☐ Fair      ☐ Good      ☐ Excellent

**What could we do to improve our service?****Comments:****Optional:**

First Name: \_\_\_\_\_ Last Name: \_\_\_\_\_

E-Mail: \_\_\_\_\_ Phone: \_\_\_\_\_

☐ I am the patient      ☐ I am a family member or friend

☐ I would like a representative from Strathcona County Emergency Services to contact me.

## APPENDIX D: REFERENCES

- <sup>1</sup> Strathcona County Census 2015 Results; Corporate Planning & Intergovernmental Affairs
- <sup>2</sup> "Strathcona County Emergency Services Master Plan;" Emergency Services Consulting International (2011/2012)
- <sup>3</sup> "2014 Public Satisfaction Survey Research Results;" Strathcona County (April 2015)
- <sup>4</sup> "Strathcona County 2015 Public Satisfaction Survey Research Results;" Strathcona County (April 2016)
- <sup>5</sup> "Review of Operations of Ground Emergency Medical Services in Alberta;" Health Quality Council of Alberta (January 2013)
- <sup>6</sup> "An Alberta Rural EMS Direction, RED doc4;" RED committee of the Provincial Partnership to Support Community First Response (February 2013)
- <sup>7</sup> Averill J, Moore-Merrell L, et al. Report on Residential Fireground Field Experiments;" [NIST TN 1661], 2010
- <sup>8</sup> Averill J, Moore-Merrell L, et al. "Report on High-Rise Fireground Field Experiment;" [NIST TN 1797], 2013
- <sup>9</sup> "EMS Makes a Difference: Improved clinical outcomes and downstream healthcare savings;" National EMS Advisory Council (December 2009)
- <sup>10</sup> "EMS Performance Dashboard, Frequently Asked Questions;" Alberta Health Services (2015)
- <sup>11</sup> "Quarterly EMS Dashboard;" Alberta Health Services (2016)
- <sup>12</sup> Affleck A, Parks P, Drummond A, et al. "Emergency department overcrowding and access block." 2013; CJEM; 15(6):359-370
- <sup>13</sup> Fire & Emergency Service Self-Assessment Manual (8<sup>th</sup> edition); Commission on Fire Accreditation International
- <sup>14</sup> Haynes H, "Career Firefighters per 1,000 Population for All Career Fire Departments, 2013–2015." NFPA (2016)