



**FLIGHT PLAN:
ADDRESSING PATIENT CARE ISSUES
IN MANITOBA'S STARS AIR AMBULANCE PROGRAM**

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TABLE OF ABBREVIATIONS (IN ORDER OF APPEARANCE)

WORD	ABBREVIATION
Shock Trauma Air Rescue Society	STARS
Advance Trauma Life Support	ATLS
Air Medical Crew	AMC
Air Medical Transport	AMT
Helicopter Emergency Medical Services	HEMS
Critical Care Paramedic	CCP
Advanced Care Paramedic	ACP
Bi-level Positive Airway Pressure	BiPAP
Endotracheal Tube	ETT
Alternating Current	AC
Multi-Vehicle Crash	MVC
Bag-valve-mask	BVM
British Columbia Ambulance Society	BCAS
Commission on Accreditation of Medical Transport Systems	CAMTS
Inter-Facility Transfer	IFT
Quality Improvement	QI
Continuing Medical Education	CME
Crew Resource Management	CRM
Maintenance of Competencies	MOC

FEBRUARY 2014, PREFACE

In late November of 2013, the government of Manitoba requested my services to review a number of cases involving its STARS air ambulance service, as it had suspended operation of the service until such time as the government deemed it to be operating safely. My assignment, as a neutral, expert consultant, was to review the facts of the cases in question, assess those facts, and make recommendations as to how the government could be certain that the service could be safely returned to the air. To that end, the Manitoba government provided me with reports, tape recordings, correspondence and other material. After a thorough review, I wrote and delivered a preliminary report for the government's evaluation that offered recommendations for quality and safety improvements.

An unauthorized release of the preliminary report followed so that it entered the public realm prematurely. STARS managers in Alberta subsequently contacted me and I went to Calgary to listen to their concerns about the preliminary report and to receive more information that they felt was important to my understanding of the cases.

This updated report remains substantially unchanged and I stand by my assessments and recommendations. It does take into account some new information and includes a few corrections and clarifications, particularly where actions taken by STARS personnel may be open to a degree of interpretation, even among experts. STARS requested that its own documents be inserted into my report, but I have not done so, aiming to keep information at a high, summarized level. STARS can certainly provide those documents to the government itself if it so wishes.

My assignment is now complete. The Manitoba government, informed by my observations and recommendations, can now negotiate with STARS management on how and when to resume air ambulance operations for the best interests and care of Manitobans.

I would also like to note that STARS has already taken a number of concrete actions that address some of my concerns and is moving ahead on others.

EXECUTIVE SUMMARY

A number of troubling incidents occurred recently in which the appropriateness and quality of patient care during air medical transfers by helicopter in Manitoba came into question. The Government of Manitoba asked me to review the organization involved — known as STARS, for Shock Trauma Air Rescue Society — to identify any underlying systemic issues that may have caused the problems and to make recommendations to improve patient management services.

This report summarizes my examination of 16 cases, including 12 air medical transports performed by STARS. They include three sentinel cases that required additional scrutiny due to the serious nature of the cases. The goal of this review was not to critique each case individually but to look at them collectively, glean information from each, to identify common themes and issues.

My conclusion is that STARS preparation of its Air Medical Crews (AMCs) for helicopter flight operations in Manitoba is currently substantially less than other Canadian provinces. Compared to other air medical transport programs across the country, its training program is remarkably brief and cannot provide the necessary amount of training required for modern, complex, critical-care transports. The time allowed for experiential knowledge of the flight environment is too short. *A complete review of training requirements for STARS Manitoba staff should be performed and further ongoing training of current staff should occur.*

I have identified eight pressing issues:

1. STARS Manitoba nurses and paramedics require further training and experience to work in the Manitoba air medical environment;
2. STARS Manitoba air medical teams should have further training and experience for the special needs of pediatric patients;
3. Currently STARS Manitoba staff do not have sufficient experience in assessing difficult airways and require further training and experience in dealing with airways and maintaining oxygenation, especially in the air medical environment;
4. STARS Manitoba physician oversight requires further familiarization with STARS Manitoba and with STARS Manitoba air crews to become familiar with the air crews' capabilities and limitations.
5. The methods of dispatching STARS Manitoba teams are multiple and lack co-ordination, costing time and adding potential problems to inherently critical situations;
6. Hospitals lack heliports, which adds to the inherent risks of patient transfers;
7. Promoting and maintaining a culture of quality at the STARS Manitoba organization needs to be emphasized continuously and incorporated into all aspects of the operation.
8. STARS Manitoba AMCs require greater exposure to critical care cases to maintain their competencies.

My 20 recommendations to address these issues focus on immediate improvements in staff training and certification, with special emphasis on training in management of patients' airways. Transporting of pediatric patients by STARS should be limited and overseen by on-board medical personnel. STARS Manitoba needs to express its commitment to be a quality organization and back up this promise with action and accountability processes. Other recommendations include centralizing dispatch functions and conducting a feasibility study into building helipads at Winnipeg hospitals.

As requested by the Government of Manitoba, I submit this report to its representative, Karen Herd, Deputy Minister of Health, Province of Manitoba.

Submitted by Dr. Stephen Wheeler (CV in Appendix D)
February 28, 2014,
Victoria, B.C.

INTRODUCTION

Before 2009, Air Medical Transport (AMT) in the province of Manitoba was limited to fixed-wing aircraft. Residents of Northern communities needed these long-haul, fixed-wing aircraft to fly them across vast distances to reach tertiary medical resources in Winnipeg. The southern communities with better road access either used fixed-wing aircraft or ground transportation.

But Southern Manitoba geography and weather patterns create occasional severe flooding, which may isolate communities. During such floods, transporting ill or injured patients to a higher level of care is impossible by airplane, leaving Helicopter Emergency Medical Services (HEMS) as the only method to transport patients around the region.

In 2009, flooding in southern Manitoba was severe, cutting off many communities. The province responded by inviting the Alberta-based Shock Trauma Air Rescue Society (STARS) to help transport patients who were unable to get to medical care by any other means. In 2011, severe flooding again hit southern Manitoba and STARS was again invited to help transport patients from flood-isolated communities. This time, the province of Manitoba arranged with STARS for it to remain in the province to provide emergency helicopter services.

STARS is a non-profit organization currently operating in Alberta, Saskatchewan and Manitoba. Its contract with Manitoba is for 10 years and has an operating budget of \$10-million a year. Approximately 180 to 200 Manitobans are served annually, which means each flight costs on average about \$55,000.

Staffing of Manitoba STARS consists of a paramedic-nurse team, as well as the pilots. It consists of nine flight nurses and eight flight paramedics. I reviewed the team members' short biographies:

17(1); 17(2)(e)

In British Columbia, this means 18 months of training. In Ontario it is 12 to 24 months, in Nova Scotia it is a year-long process for most paramedic trainees and flight nurses all have extensive experience as Intensive Care Unit (ICU) or emergency room nurses. Descriptions of British Columbia's, Nova Scotia's and Ontario's training programs are provided in Appendix B.

THE PROBLEM

Many incidents occurred recently over the course of 13 months in which the appropriateness and quality of patient care during STARS transfers came into question. The Government of Manitoba asked me to review 16 of these cases to determine if underlying systemic issues could be identified and addressed. This report focuses on 12 cases in which medical care was an issue. Four of the 16 cases showed no inappropriate medical care; they are described in Appendix E.

PURPOSE OF THIS REVIEW

This report summarizes my review of 13 air medical transports by STARS Manitoba, and three ground transports. All 16 cases had previously been investigated and have been reviewed by STARS and by Manitoba Lifeflight medical oversight. The goal of this review is to identify and comment on common problematic patterns with STARS operations in Manitoba, and to make recommendations based on my assessment. This report does not intend to provide a detailed critique of each case as this has already been done. Rather the cases were analyzed as an aggregate; general issues and trends were identified. This approach, described below in the methodology section, still required each case to be analyzed in detail so that common issues could be found, and patterns and trends identified. The three sentinel cases required additional scrutiny and are described with specific comments due to the seriousness of the cases.

METHODOLOGY

Today, leading North American air transport experts are working on key attributes for safe and effective air ambulance transport. A brief summary follows on the Delphi method, which these experts are using and which informed the metrics I chose for this review.

The Air Medical Physicians Association held an extraordinary meeting in Denver, Colorado on July 22, 2013. The purpose was to arrive at a consensus on quality metrics that air medical transport programs should use to assess quality of care in air medical transport. This is a very difficult area: quality cannot be measured by simply recording times. Therefore, medical directors and quality improvement personnel from all over North America met to work on a list of 100 possible metrics using the Delphi method and came up with a list of 20. This work continues, as definitions are still being worked on.

Essentially, the Delphi method is a structured communication technique, originally developed as a systematic, interactive forecasting method that relies on a panel of experts. It is based on the principle that forecasts (or decisions) from a structured group of individuals are more accurate than those from unstructured groups. Delphi has been widely used for business forecasting.

It works this way: the experts answer questionnaires in two or more rounds. After each round, a facilitator provides an anonymous summary of the experts' forecasts from the previous round as well as the reasons they provided for their judgments. Thus, experts are encouraged to revise their earlier answers in light of the replies of other panel members. It is believed that during this process the range of the answers will decrease and the group will converge towards the "correct" answer. Finally, the process is stopped after a pre-defined stop criterion (e.g., number of rounds, achievement of consensus, stability of results) and the mean or median scores of the final rounds determine the results.

One metric considered by the air transport experts during our meeting bears heavily on this review. Running out of oxygen in flight was identified as a possible good quality metric. After much discussion, it was felt that because this happened so rarely, it would not be useful as a metric: even organizations that did not have a very good quality program almost never run out of oxygen. The rarity of this event means it would not be sensitive enough to signal a bad quality program and that other markers would be more helpful when included in the top 20. ☐

17(1); 17(2)(a)

6. [

25/2011, Boundary Falls, AC... patient presented to a local hospital with a fever... late for mid and was transferred... with a fever... and was transferred... with a fever... and was transferred...

7.

26/2011, Boundary Falls, AC... patient presented to a local hospital with a fever... late for mid and was transferred... with a fever... and was transferred... with a fever... and was transferred...

17(1); 17(2)(a)

8.

27/2011, Boundary Falls, AC... patient presented to a local hospital with a fever... late for mid and was transferred... with a fever... and was transferred... with a fever... and was transferred...

9.

28/2011, Boundary Falls, AC... patient presented to a local hospital with a fever... late for mid and was transferred... with a fever... and was transferred... with a fever... and was transferred...

10.

29/2011, Boundary Falls, AC... patient presented to a local hospital with a fever... late for mid and was transferred... with a fever... and was transferred... with a fever... and was transferred...

11.

30/2011, Boundary Falls, AC... patient presented to a local hospital with a fever... late for mid and was transferred... with a fever... and was transferred... with a fever... and was transferred...

C

12.

17(1); 17(2)(a)

S

COMMENTS ON CASES

Each case requires a brief comment on care to highlight the issue in the case which, when combined with the others, illuminates the underlying systemic problems that are not apparent when the cases are analyzed in isolation. I will start with the three cases I believe are sentinel and truly illustrate the basic issues with the current operations at STARS Manitoba. I will then comment on the remainder of the 12 cases, focusing on the medical care issues that highlight and support the conclusions of this report.

SENTINEL CASES

Case 1: C

17(1); 17(2)(a)

Case 7:

S

C

Case 12:

17(1); 17(2)(a)

OTHER CASES

Case 2: C

17(1); 17(2)(a)

Case 3:

Case 4:

From review of the letter of complaint, it does seem inappropriate that an AMC was photographing the patient during the rescue operation.

Case 5:

[

Case 6:

17(1); 17(2)(a)

Case 8:

]

Case 9: I don't think any significant issues exist with this case. This case meets an Autolaunch activation (see Appendix A) so sending the helicopter would have been automatic. Hence once the helicopter is at the scene it was appropriate to transfer the patient.

[

Case 10:

17(1); 17(2)(a)

Case 11:

]

The distance of this transport is also too long for HEMS as it required refueling on each leg.. Stopping to refuel with the patient on board again puts him or her at risk. Consideration of refueling should be incorporated into the decision process of what mode of transport to deploy.

ISSUES AND RECOMMENDATIONS

As stated in the introduction, the goal of this review was not to critique each case individually but to look at them collectively, identifying common issues. Using this approach, eight issues emerged, which are listed below along with recommendations for addressing each one:

1. [

17(1); 17(2)(e)

]

The best way to provide high-quality patient care is to produce high-quality practitioners from a comprehensive, rigorous training program. Currently Ontario's Ornge training program is Canadian Medical Association (CMA) accredited; Nova Scotia is CAMTS (Commission on Accreditation of Medical Transport Systems) accredited; and British Columbia is in the process of obtaining CMA accreditation of its training program. The STARS organization has been accredited by The Commission on the Accreditation of Air Transport Systems (CAMTS). CAMTS looks at the organization as a whole: aviation, medical care, safety and education. The educational program is part of the overall review and not the sole focus. Specifically CAMTS does not accredit educational programs. Additionally STARS is evaluated as a whole entity by CAMTS so it is not clear how much of the evaluation was done on specifically on the STARS Manitoba operation.

Recommendations:

- A. **STARS Manitoba should review its training model to determine if it is adequate for the needs of Manitoba, where long flights and harsh environments are commonly encountered. There are various models of AMCs and the nurse-paramedic team, as is operating in STARS Manitoba, is an established one. However, the competencies required for critical care nursing in the flight transport environment should be reviewed to address any gaps that hospital-based critical care nurses will have when working in the high stress/high risk flight environment. The paramedics should be trained to the level of Critical Care Paramedic with the minimum competency as determined by the National Occupational Competency Profile (NOCP).**
- B. **STARS Manitoba should immediately supplement its Manitoba AMCs with experienced flight personnel for a minimum of six months.**

2. ☐

17(1); 17(2)(a)

Recommendations:

- C. STARS Manitoba should review its pediatric training with an emphasis on airway assessment and management.**
 - D. Until pediatric training and management have been evaluated transport of pediatric patients by STARS Manitoba should be limited to trauma responses, either to scene or to intercept at the closest hospital.**
 - E. Until pediatric training and management have been evaluated STARS Manitoba should have on-board medical personnel from the Children's Hospital of Winnipeg for escorts on all pediatric non-trauma Inter-Facility Transfers (IFTs), either a pediatric nurse, respiratory therapist or physician.**
 - F. STARS Manitoba and the Manitoba Dispatch Centre should establish a pediatric medical oversight model for triaging and dispatching pediatric and neonatal IFTs.**
3. A common theme arising out of most cases — and made clear by the three sentinel cases — is a lack of appreciation of what constitutes a difficult airway and a lack of sophistication in dealing with airways and maintaining oxygenation. In addition to the sentinel cases, other cases require comment here. ☐

17(1); 17(2)(a)

17(1); 17(2)(a)

Recommendations:

- G. Further extensive training of STARS Manitoba air crews in advanced airway management should be done immediately.. Sophistication in managing airways takes time and experience. STARS has developed a manual of airway management that provides a base for the AMCs. Critical thinking in airway management is a necessary component of advanced airway management and should be integrated into all AMC's airway training.**
 - H. Video laryngoscopy should be included in the STARS Manitoba airway training and skill set for the air crews.**
 - I. Until such time as STARS Manitoba has experienced AMCs with sophisticated airway skill sets physicians should be on all Inter-Facility Transfers where any airway interventions and ventilation issues may occur.**
4. STARS medical oversight requires greater orientation to the STARS Manitoba organization and to the issues involved in air medical transport. ☐

17(1); 17(2)(e)

☐ I do not believe that this is enough to acquire the knowledge required to become familiar with triage and transport decisions, and the difference between Inter-Facility Transfers, where time is not usually the main issue, and pre-hospital scene transfers, where time is of the essence. ☐

17(1); 17(2)(a)

☐ It also appears that the medical oversight has an inflated view of the AMCs' skill set and experience in the flight and transport environment. This is probably due to the transference of expected skill sets from more established bases onto the less experienced Manitoba STARS crews.

Recommendations:

- J. STARS Manitoba should review its physician orientation process to increase the physicians' understanding of the advantages of different transport modalities with respect to time to definitive care, out of hospital time, and level of care needed on each transport.**
 - K. STARS Manitoba orientation should include a set number of fly-alongs with the AMCs.**
5. Quality in the health industry is going through a transformative phase. In the past it was called Quality Assurance (QA), which was mainly retroactive assessment of events with corrective actions. The newer Continuous Quality Improvement (CQI) attempts to look forward to find ways of improvement based on best practices and data. CQI becomes an integral part of the operations of an organization and is often reflected in its mission statement. The airline industry has led the way with CQI and its emphasis on a quality culture has greatly improved safety in the air. This same culture can be applied in the back of the aircraft. My impression from reviewing the cases is that there is still an aspect of reactive quality assurance to the STARS Manitoba program and that there is less of a Continuous Quality Improvement focus, defined as an organization's dedication to make

ongoing efforts to predict, prevent and improve efficiencies and effectiveness at all levels. An open and continuous quality improvement process will provide greater opportunities to correct problems before adverse events occur. The Safety Learning Summary that was provided to me [REDACTED] 17(1); 17(2)(a) [REDACTED] attempts to do this, but the overall message from the summary is that the use of BiPAP on the aircraft was the problem. A higher-level analysis would then look at the management of oxygenation throughout all of operations and develop a culture where everyone is committed to ensuring that adequate oxygen is on every flight.

Recommendations:

- L. A dedicated, local, Manitoba Quality Improvement director, who communicates with other QI directors within STARS Manitoba, Lifeflight and dispatch, should be established.**
 - M. STARS has an Integrated Risk and Safety Management System (IRSMS). I would recommend that STARS Manitoba express its commitment to be a quality organization with a dedicated Quality Improvement Committee that works in tandem with the IRSMS. Additionally it should add a specific bullet point in its mission statement, should reflect its commitment to quality.**
 - N. Development of a Crew Resource Management (CRM) culture, as practiced in the airline industry, should be a priority.**
6. During my interviews with medical and dispatch personnel in Manitoba, it appears the methods of dispatching of STARS Manitoba are multiple and lack co-ordination. Dispatching the appropriate mode of transport and skilled level of care for each patient should be the priority. A determination of what is required to transport each patient in the safest possible manner should occur. I was told during my interviews that sending institutions sometimes request helicopter transport without an assessment being made of whether that is in fact the most appropriate method of transportation. Mode of transport should be deferred until the circumstances and condition of the patient can be determined. The provincial dispatch centre with proper medical oversight would be the most appropriate organization to determine the mode of transport. Finding an appropriate receiving facility with available resources, and finding the appropriate mode of transport within the constraints of competition for resources, weather and crews timing out, is a complex and dynamic process. The only organization capable of doing this is a centralized dispatch centre.

Recommendation:

- O. All dispatching of air medical transports should go through central provincial dispatchers, who will then determine the most appropriate mode of transport.**
7. Hospitals lack heliports. The current process in southern Manitoba of transporting patients by helicopter requires them to be transferred from the sending hospital to a local airport by ground and then by helicopter to Winnipeg airport, where they are again transported by ground to a Winnipeg hospital. This creates a situation where at least two extra transfers of patients occur into and out of vehicles. For critical-care patients who are attached to numerous machines and tubes, the risk of something moving or coming apart is raised every time they are moved. It also significantly adds to the time of transport, often making the helicopter transfer longer than a transfer by ground. Often a helicopter is requested not for the helicopter itself, but for the level of care that is provided by the mode of transport.

Recommendations:

- P. In cases where time to definitive care is important, the patient should go by the fastest means possible.***
- Q. In cases where out-of-hospital transport time should be minimal, transport by the fastest method should be arranged, including the time required to transfer the patient between vehicles.***
- R. A feasibility and cost analysis of building hospital helipads should be done for all Southern Manitoba hospitals.***

- 8.** Maintenance of competencies (MOC) must be a priority. Many organizations face the problem of maintaining skills for high-acuity and high-consequence situations when the frequency of exposure to individual caregivers is low. Approaches to this problem vary depending on the unique circumstances of the organization. STARS Manitoba faces this issue, with fewer than 200 missions in Manitoba a year, or just slightly more than one every two days. Four AMC staff are on duty per day, from a total staff of 17. This means each staff person, on average, attends a mission once a week. Considering that not all missions are critical-care flights (estimates are approximately one in three), it is not unreasonable to suggest some staff may go several weeks between critical-care flights. This is not sufficient to maintain medical skills and flight situational awareness on critical-care missions.

Recommendations:

- S. Due to the relative low exposure to critical care cases a comprehensive MOC program is essential for STARS Manitoba staff and should emphasize critical care management.***
- T Explore rotating STARS Manitoba AMCs through higher-volume programs. Possibilities are with higher volume STARS bases in Alberta and with Manitoba Lifeflight.***

CONCLUSION

STARS Manitoba preparation of its Air Medical Crews for helicopter flight operations in Manitoba is currently inadequate. A complete re-evaluation of the training program should be performed and further training of current staff should occur.

Compared to other air medical transport programs across the country, its training program for its AMCs is remarkably brief and cannot provide the necessary amount of training required for modern, complex, critical-care transports. The time allowed for experiential knowledge of the flight environment is too short. Current Manitoba staff should be paired with experienced flight personnel for six months for training. Current patient transport volume is probably insufficient to maintain STARS Manitoba's personnel competencies.

LIMITATIONS

All reviews are limited by varying factors. This review was undertaken with the understanding from involved parties that "time was of the essence." I have attempted to be as neutral, objective and as comprehensive as possible but, understanding that STARS Manitoba and the Manitoba Department of Health wished a timely report, I acknowledge some areas may require further review. However, I believe the essential issues underlying the problems have been captured here.

It is now up to Manitoba Government and STARS management to assess together both the validity of these points and the recommendations and then for the government of Manitoba to decide which to apply to achieve a level of confidence in the operation of the STARS Manitoba operations.

I wish to express my thanks for this opportunity to serve the people of Manitoba. I am grateful to be able to play a role in creating a safe and secure environment for patients who expect their treatment in flight to be equal in quality to the care they deserve — and pay for with their taxes — on the ground. I would also like to thank Santé Communications Group, of Victoria BC, for editorial assistance in preparing this report.

Dr. Stephen Wheeler
February 28, 2014
Victoria, BC

APPENDIX A

This is an example of BC's criteria for sending a Helicopter Emergency Services dispatch. In cases noted by the asterisk, the HEMS is dispatched only when the patient is unconscious. The continuance criteria applies to situations where first responders, such as ground paramedics, arrive at the scene and assess the situation. If the patient is found showing any of these vital signs, symptoms or injuries, the HEMS is still dispatched.

AUTOLAUNCH ACTIVATION CRITERIA

Drowning / Diving / SCUBA

Drowning *unconscious

Electrocution, Lightning *unconscious

Industrial / Machine accidents (entrapped)

Traffic / Transportation / Pinned *unconscious

Traffic / Transportation / High mechanism *unconscious

Stab / Gun shot wound / Penetrating trauma (wound above knee or elbow)

Stab / Gun shot wound / Penetrating trauma *unconscious

Fall / Long fall *unconscious

Burn *unconscious

Burn / Explosion

Burn 3rd degree > 10% BSA

Burn 2nd degree > 20% BSA

CO / Inhalation injury *unconscious

FLIGHT CONTINUANCE CRITERIA

GCS less than or equal to 13

BP less than 90 systolic, signs of shock

Two or more proximal extremity fractures

10 % or more 3rd degree burns

20 % or more 2nd degree burns

Facial / Airway burns

3rd degree burns of eyes, neck, hands, feet, groin, or proximal extremity

High voltage burns

Respirations <10 or >30

Penetrating injury to head, chest, abdomen, groin, or proximal extremity

Major extremity amputation

APPENDIX B

Examples of Critical Care Air Transport Training Programs in Canada

British Columbia: An 18-month-long training program, its entry requirements are limited to Advanced Care Paramedics (ACP) who have been with BC Ambulance Service (BCAS) for at least two years. Entrants are selected based on his/her record as an ACP, how he/she has done in the prerequisite courses in the BCIT critical care nursing program, and how he/she performs in McMaster Mini Multi Interviews, which evaluate critical thinking.

The training program is split into three semesters. The first has four weeks of classroom work and includes the rest of the BCIT critical care nursing program, which participants must pass. Our courses include physiology, pharmacology and introduction to equipment. The six-month field practicum introduces students to the flight environment. They learn about ventilators, pumps, physicality of the flight environment and issues and problems that may be encountered in the transfer of care.

The second semester is more clinical, with lectures in hospitals in the morning and instruction in critical care wards in the afternoon. The emphasis is on single-system pathology. The practicum component requires students to ride as a third attendant. Here they start to develop awareness of patient care in the flight environment. This allows them to progress with patient care in a safe and closely monitored environment.

The third semester returns them to the hospital with lectures in the morning and clinical in the afternoon with the emphasis on multi-system pathology. The practicum moves them into the role of second attendant with a trained and highly experienced paramedic partner. The student becomes the primary attendant under the scrutiny of the experienced partnered paramedic.

Nova Scotia: The training program for both the critical care paramedic and nurse is one year. The Nova Scotia Critical Care Program is CAMTS (Commission on Accreditation of Medical Transport Systems) accredited. Nova Scotia essentially trains all its own AMCs. The paramedics have an average of 15 years as an ACP and are selected on their high performance. Similarly, the nurses must have many years of critical care experience. The program is approximately eight months of training with an emphasis on evaluation of patients and also teaching in standard courses such as ATLS. There is extra emphasis on airway management with AIME (Airway Management in Emergencies) as the base course, moving onto cadaver labs and other simulations. The training stresses the critical approach to advanced and difficult airways. They then move into the flight environment; it takes at least one year to make staff flight-ready.

Ontario: Ornge chooses paramedics from within its own organization for its 12- to 24-month program. ACPs must first become a Flight ACP in this competitive process. Over four to six months, knowledge is gained in pharmacology, cardiac and respiratory physiology, with an emphasis on developing critical thinking skills. From this pool of Flight ACPs, selection to be a CCP is made. The CCP training is approximately 12 months long with a three-month residency included, during which time trainees fly as a third CCP. There is also a strong emphasis on pediatric skills and knowledge. Ornge has a dedicated pediatric educator. Overall Ornge has 7.5 FTE educators and each CCP has to do 72 hours of Continuous Medical Education (CME) per year.

APPENDIX C

Material reviewed:

- Manitoba web pages on Lifeflight, STARS, STARS FAQs
 - Internet search for documents on flooding in Manitoba in 2009 and 2011
 - Maps of Manitoba
 - Time distance chart for communities in Manitoba
 - Interviews with:
 - Dr. George Kovacs, Nova Scotia Air Medical Director
 - Dr. Russell MacDonald, Ornge
 - Dr. Renata Singh, Manitoba Lifeflight Medical director
 - Dr. Tony Herd, Manitoba EMS Medical Director
 - STARS Manitoba Air Medical Crew Bios and Credentials
 - Meeting with STARS Dec 10, 2013:
 - Dr. J.N. Armstrong, Chief Medical Officer
 - Dr. Doug Martin, Medical Director STARS Manitoba
 - Betty Lou Rock, Vice President Manitoba Operations
 - Dr. D. Nesdoly, STARS Chief Medical Officer
 - Dr. M. Mrochuk, , Director of Medical Education
 - Dr. Jane Duncan, PhD, STARS Director of Learning and Development
 - Andrea Robertson, President and CEO
 - Dr. JN Anderson, VP Medicine STARS
 - Dr. Mike Betzner, Medical Director Calgary Base
 - Mike Lamacchia, VP of operations Alberta
 - Case 1. All audio files, STARS clinical review by Dr. Renata Singh, STARS safety learning summary, STARS Patient Care Record (PCR), STARS QA website document 3 pages
 - Case 2. STARS7 Clinical Review, STARS PCR, STARS website QA review 6 pages
 - Case 3: STARS7 clinical review, STARS PCR, STARS QA website 4 pages
 - Case 4: STARS7 clinical review, STARS PCR, [17(1); 17(2)(e)], STARS QA website 4 pages
 - Case 5: Audio files, STARS clinical review, STARS PCR
 - Case 6: STARS PCR, STARS QA website 3 pages, STARS safety learning summary, STARS clinical review
 - Case 7: Audio files, STARS PCR, [17(1); 17(2)(2)]
 - Case 8: Audio files, STARS clinical review, STARS PCR, STARS QA website 3 pages
 - Case 9: Audio files, STARS clinical review, STARS PCR
 - Case 10: STARS clinical review, STARS PCR, STARS QA website 4 pages
 - Case 11: Audio file review, STARS clinical review, Case review by Dr. Renata Singh, STARS PCR, STARS QA website, 6 pages
 - Case 12: Audio files, STARS PCR, STARS QA website 6 pages, Winnipeg Base Mission report, [17(1); 17(2)(2)]
- Meeting with STARS management at headquarters in Calgary, February 5, 2014.
- STARS Manual of Airway Management
 - STARS Air Medical Crew Competencies
 - CAMTS Clinical Education Requirements

APPENDIX D

STEPHEN JAMES WHEELER, B.SC., M.D.,
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ABEM Subspecialty Certification in Emergency Medical Services

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1701; 17(3)(1)

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1987-1990

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BC College of Physicians and Surgeons, 11665

1987-2013

California Board of Medical Quality Assurance, G62925

1988-2013,

Northwest Territories 6448

2012-13

CLINICAL STAFF APPOINTMENTS:

Staff Emergency Physician

Royal Jubilee Hospital and Victoria General Hospital

Victoria, British Columbia

1991-present

CERTIFICATIONS:

American Board of Emergency Physicians,

1992, 2002, 2012

POSITIONS:

Vancouver Island Health Authority:

Executive Medical Director: Emergency, Trauma, Internal
Medicine, Rehabilitation Medicine and Hospitalists

2009

Medical Director of Emergency and Trauma Services

2005-09

Director of Trauma

2001-09

VIHA HAMAC Member

2005-09

Chief and Medical Director:

South Island Emergency Depts.	2002-05
Vice-Chief, Dept. Of Emergency Medicine	1996-98, 2001-02
Vancouver Island South Island Regional Medical Advisory Committee	2002- 05
High Intensity Services Committee	2005-09
Dept. of Emergency Medicine Quality Assurance Committee	1994-2005
Chairman of QA Committee	2001-2005
Chairman of VIHA Trauma Quality Assurance Committee	2002-09
Chairman of Trauma Steering Committee	2002-09
ER operations committee	1996-98
Hospital Computerization Committee	2000-2009

Current Positions British Columbia Ambulance Service:

Medical Director of B.C. Air Ambulance and Critical Care Transport	2006-present
Air Transport Advisor for B.C.A.S.	1997-2013
Coordinator of Provincial Dispatch Transport Advisor Program	1999-2013
Member of Provincial Medical Advisory Committee to the B.C.A.S.	2000-present
Vancouver Urban Search and Rescue oversight committee	2013

PHSA Positions:

Provincial Trauma Advisory Committee	2001-present
Mobile Medical Unit Advisory Committee	2012-present

Canadian Armed Forces:

Medical Advisor to Canadian Navy for their on board Physicians Assistants while at sea	1998-2011
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Canada West Mountain School:

Medical Director for Canada West Mountain School, providing expertise for high altitude expeditions

Medical Expert for medico-legal cases	1999-present
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Current Professional & Society Memberships:

-British Columbia Medical Association	-Trauma Association of Canada
-Canadian Medical Association	-Air Medical Physician Association
-Victoria Emergency Medical Associates	-Victoria Medical Society
-BCMA Section of Emergency Medicine	

ACADEMIC ACTIVITY

Publications:

Chapter 25: Pelvic Pain in Women,
Schwartz 's Principles and Practice of Emergency Medicine, 1992.

Rewrite for 2nd edition: Pelvic Pain in Women,
Schwartz 's Principles and Practice of Emergency Medicine, 1999.

Canadian Association of Emergency Medicine Annual Meeting 2009, poster presentation:
Novel Application of a Video Laryngoscope in Primary, Secondary and Tertiary Aeromedical
Evacuation-A Case Series

BC Medical Journal: Criteria For Sedation of Psychiatric Patients for Air Transport in British
Columbia, Oct. 2009.

Pneumomediastinum after Inhalation of Helium Gas from Party Balloons, Zaia, B, Wheeler, Dr. S. J.,
Journal of Emergency Medicine, Nov. 14, 2007.

Autolaunch Development: From Local Pilot Program To Multiregional Implementation, BC Air
Ambulance Experience and Findings, Dr. Stephen Wheeler, Mr. Randy L'Heureux, Concurrent
Paper Session, Trauma Assn. of Canada, Ottawa, May 2007.

Can Bystander Observations Be Used to Launch Helicopter Flights To Trauma Scenes, Enabling
Shorter Transport Times To Tertiary Hospitals, Without Overusing Resources, Dr. Stephen Wheeler,
Randy L'Heureux, Concurrent Paper Session, Trauma Assn. Of Canada, Whistler, BC, March 2005.

Academic Appointments:

- University of British Columbia, Department of Emergency Medicine, Clinical Assistant Professor
- Island Medical Program, Clinical Instructor

Research Activity:

- *In Progress* Effectiveness of Helicopter Autolaunch on Patient Transport Times and Outcomes
- Resuscitations Outcomes Consortium: Site Investigator for Victoria General Hospital and BC Air Ambulance
- Sedation of psychiatric patients for air transport

Current Teaching:

Bedside clinical teaching in the Victoria emergency departments to medical students, family practice residents, and skill enhancement for rural physicians.

Student tutor, Island Medical Program

Critical Care Paramedic Instructor

AWARDS:

2013 BCAS Certificate of Appreciation for medical oversight of Provincial Air Dispatch
1999-2013

2011, 5 year service award, BC Ambulance Service

2009, October, Guest of Honour, Canadian Armed Forces Medical Service Dinner, for contributions to Military-Civilian Medical Cooperation, received the Health Services Civilian Military Cooperation Award

2007 BCAS Excellence Award: Autolaunch development

2007 VIHA Excellence Award: Trauma Team development

2006 BC Public Service Technology Award for Innovation

In recognition for work done on computerization of emergency departments.

Sept. 23, 2005, BC Emergency Health Services Commission Certificate of of Appreciation for representation on Medical Advisory Council.

Community Service:

Scout Leader with 12th Garry Oak Boy Scouts, Cascadia Council 2006-12

Physician Volunteer Patrol, Whistler Mountain, 2009-Present

P.A.R.T.Y Public Speaker to high schools about drinking and driving risks

APPENDIX E

Four of the 16 cases requested for review did not, in my view, warrant inclusion in the main report, as they did not raise issues of medical concern. Brief descriptions of those four cases follow, along with my reasons for setting them aside:

CASE 1

☐

17(1); 17(2)(a)

☐

COMMENT: The call was dealt with appropriately at the scene. The exact nature of the patient's condition was not known from the initial 911 call. The ground ambulance crew was close to and nearing the incident location and were at the patient's side in 14 minutes. ☐

17(1); 17(2)(a)

☐

CASE 2

☐

17(1); 17(2)(a)

☐

COMMENT: There were no issues reported to me with respect to the care of this patient. The question posed was whether STARS should have been Autolaunched. The criteria for Autolaunch are not the same as for trauma team activations. ☐

17(1); 17(2)(a)

☐

CASE 3

On 5/2/2015, Alvin Brown with 1041, Manitoba Transport Commission, contacted a flight nurse with the STARS program regarding a patient who was in a serious condition with a diagnosis of acute myocardial infarction. The patient was in a serious condition and the flight nurse was unable to reach the patient's home. The patient was in a serious condition and the flight nurse was unable to reach the patient's home. The patient was in a serious condition and the flight nurse was unable to reach the patient's home.

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COMMENT: There are no issues with patient care in this case. The lack of a clear understanding of the patient's issues certainly led to confusion as to how urgent it was to reach

CASE 4

The patient was in a serious condition and the flight nurse was unable to reach the patient's home. The patient was in a serious condition and the flight nurse was unable to reach the patient's home. The patient was in a serious condition and the flight nurse was unable to reach the patient's home.

COMMENT: There were no issues reported to me with respect to the care of this patient. The question posed was whether STARS should have been used for the IFT.

[

17(1); 17(2)(a)

]

SUMMARY

Case 3 was transported by STARS Manitoba but there were no issues. Overall this case was confusing and is not indicative of any systemic issues. The other three cases were not transported by STARS Manitoba but did not require emergency helicopter transport. All of these cases follow current established medical policies.