

2019 PROVINCIAL GUIDELINE

Pre-hospital Triage and Transport Guidelines for Adult and Pediatric Major Trauma in British Columbia



BCEHS | BC Emergency
Health Services
Provincial Health Services Authority

Trauma Services BC
A service of the Provincial Health Services Authority

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Foreword

From:

Dr. John M. Tallon, Vice President Clinical and Medical Programs, BC Emergency Health Services
Dr. David C. Evans, Medical Director, Trauma Services BC

To:

Regional Health Authority Trauma Medical Directors
Regional Health Authority Trauma Program Operations
Regional Medical Directors, BC Emergency Health Services
Paramedics, BC Emergency Health Services

Developed as a collaboration between BC Emergency Health Service (BCEHS) and Trauma Services BC (TSBC), this guideline describes the decision making framework for pre-hospital triage and transport of acute major trauma from the scene of injury to initial hospital assessment and stabilization in British Columbia.

This guideline was produced by the Joint BCEHS-TSBC Trauma Working Group and references best evidence including the consensus derived *Guidelines for Pre-hospital Triage of Injured Patients* produced by the U.S. Department of Health and Human Services and Centers for Disease Control and Prevention in 2011, as current best practice. The guideline is endorsed by both BCEHS and TSBC on behalf of BC's five Regional Trauma Programs representing their respective health authorities.

Special accolades to the exceptional work done by Dr. Wilson Wan, Dr. Sandra Jenneson and Beide Bekele in completing this guideline.

Introduction

British Columbia has an inclusive trauma system within which all acute care hospitals play a designated role in the care of the injured patient. Because of B.C.'s expansive and challenging geography, all acute care facilities must be prepared to receive, assess and stabilize major trauma from the field. Level 5 trauma hospitals are generally located in rural and remote regions and provide basic stabilization with the expectation that major trauma will be transferred forward expeditiously from these centres to a higher level of care at an appropriate Lead Trauma Hospital (LTH). Lead Trauma Hospitals are designated trauma centres that serve defined regional catchment areas. By definition, LTH's are capable of and expected to provide definitive care for the vast majority of appropriately referred major trauma patients.

This document defines a provincial pre-hospital trauma triage and transport guideline to be utilized by BCEHS paramedics and dispatchers. It is intended that the Regional Trauma Programs will adapt this guideline to particular geographic and access challenges, resource availability, and other regionally specific needs. Each Regional Trauma Program will specify appropriate referral hospitals, bypass criteria, and no-refusal policies for reception of the major trauma patient from the field.

Given the evolving nature of clinical trauma care and inherent changes within individual health authorities, this document will be reviewed and updated regularly as outlined in the *Management of EMS Guidelines and Procedures for Major Trauma*.

Adult and Pediatric Pre-hospital Trauma Triage Guidelines – Principles

Pre-hospital triage guidelines offer a framework to ensure that acutely injured patients sustaining major trauma are directed to a medical facility capable of providing appropriate care within an acceptable timeframe. Lead Trauma Hospitals are designated trauma centres that serve defined regional catchment areas (Appendix A).

The criteria cited below reasonably identify the major trauma patients and should be applied by paramedics responding at the scene of injury. Adult and pediatric patients meeting these criteria should be directed to the most appropriate trauma receiving hospital as indicated by regionally adapted pre-hospital triage guidelines. The pre-hospital trauma triage standard includes a four (4) step decision process:

- **Step One: Physiological**
- **Step Two: Anatomical**
- **Step Three: Mechanism of Injury**
- **Step Four: Special Considerations**

Steps 1 and 2 are designed to identify the most seriously injured patients. These patients should be transported to LTHs.

The criteria used for bypass to a LTH in Steps 3 and 4 are not absolute; but rather indicators of the potential for significant injury or need for the specific support services at the LTHs. Not all patients in these two categories require transport to a LTH and paramedics should use clinical judgement to determine the need for direct transport to a LTH.

Patients in traumatic arrest should be treated according to the BCEHS traumatic arrest protocol (Appendix B).

Step One – Physiological

Step 1 is to allow for measurement of a critically injured trauma patient's level of consciousness and vital signs. These indicators directly demonstrate with high predictive value the severity of injury and the need to be preferentially transported to a LTH for a higher level of care.

If a paramedic is unable to successfully manage the airway in the trauma patient, the patient should be transported to the nearest Emergency Department.

Adult and pediatric patients who meet any of the following physiological criteria should be transported directly to the nearest LTH.

Adult Trauma Patient:

- GCS \leq 13
- Systolic blood pressure < 90 mmHg
- Respiratory rate < 10 or > 30 breaths per minute or need for ventilatory support

Pediatric Trauma Patient (Appendix C):

- GCS \leq 13
- Abnormal vital signs (HR, RR, SBP) for age or need for ventilatory support

If these criteria have not been met, proceed to Step 2.

In certain cases, the distance or transport time from scene to LTH may be too great given the geographical challenges within the province. As such, regional destination guidelines (Appendix F) may dictate that patients who meet physiological criteria be initially transported to the nearest emergency department. CliniCall or EPOS physician consultation can be obtained for further advice in these situations as necessary.

Step Two – Anatomical

In Step 2, patients do not have abnormal physiologic criteria present but may have obvious major injuries that indicate a moderate risk for clinical deterioration or probable need for definitive surgical management at a LTH.

Adult and pediatric patients who meet any of the following anatomical criteria should be transported directly to the nearest LTH.

- Open or depressed skull fracture
- New paralysis or neurological deficits
- Major penetrating injury (defined as all penetrating injuries to head, neck, torso and extremities proximal to elbow or knee) **
- Facial injury with potential airway compromise
- Two or more proximal long-bone fractures
- Crushed, de-gloved, mangled or pulseless extremity
- Amputation proximal to wrist or ankle
- Chest wall instability or deformity (e.g. flail chest)
- Major burns (defined as partial thickness burns > 20%, full thickness burns > 10% (> 2% for pediatrics), facial or airway burns with or without inhalation injury, 3rd degree burns involving the eyes, neck, hands, feet or groin, high voltage electrical burns)
- Mechanically unstable pelvic fractures

** Patients with a major penetrating injury in traumatic arrest with vital signs absent (VSA) are to be managed by the BCEHS traumatic arrest protocol, and should immediately be transported directly to LTH (preferentially) or closest emergency department, if the time from loss of pulse and respiration to hospital is LESS THAN 15 minutes. Otherwise, EPOS consultation should be obtained for decision to transport or discontinuation of resuscitation.

Similar to Step 1, regional destination guidelines (Appendix F) may dictate that patients who meet anatomical criteria be initially transported to the nearest emergency department due to great distances or transport time to LTH. CliniCall or EPOS physician consultation can be obtained for further advice in these situations as necessary.

If these criteria have not been met, proceed to Step 3.

Step Three – Mechanism

The mechanism of injury (MOI) should be evaluated as some injuries may be occult or in pathophysiological evolution and are more severe. The evaluation of the MOI will assist in determining if the patient should be transported to a LTH. This factor helps to reduce the possibility of under triage.

Adult and pediatric patients with any of the following criteria should be preferentially transported to a LTH if any of the following are present:

- 1) Falls
 - a) Adults \geq 6 metres (one story is equal to 3 metres)
 - b) Children \geq 3 metres or two to three times the height of the child

- 2) High Risk Automobile Crash
 - a) Intrusion \geq 0.3 metres occupant site; \geq 0.5 metres any site, including the roof
 - b) Ejection (partial or complete) from automobile
 - c) Death in the same passenger compartment
 - d) Vehicle telemetry data consistent with high risk for injury (if available)
- 3) Auto vs. pedestrian/bicyclist thrown, run over or with significant (\geq 30 km/h) impact
- 4) Motorcycle crash \geq 30 km/h

CliniCall or EPOS physician consultation can be obtained for advice if required in the decision making process.

If these criteria have not been met, proceed to Step 4.

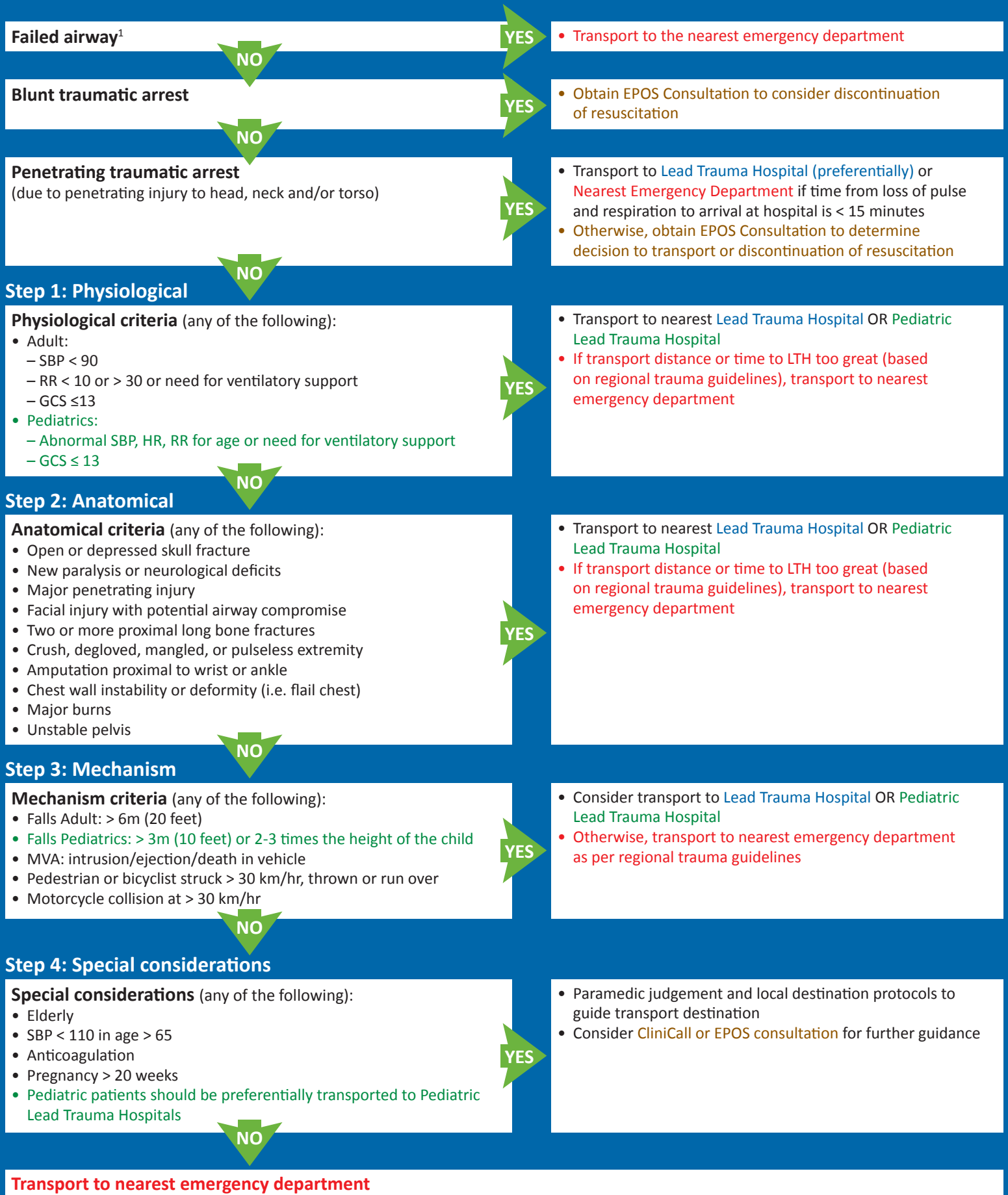
Step Four – Special Considerations

Patients may have underlying conditions that could put them at a greater risk for severe injury. These criteria are indicators of the potential for significant injury or indicate that the patient may require other support services available at the LTH. Patients who meet any of these criteria are recommended to be transported to a LTH or to a hospital that is capable of a complete evaluation and timely treatment.

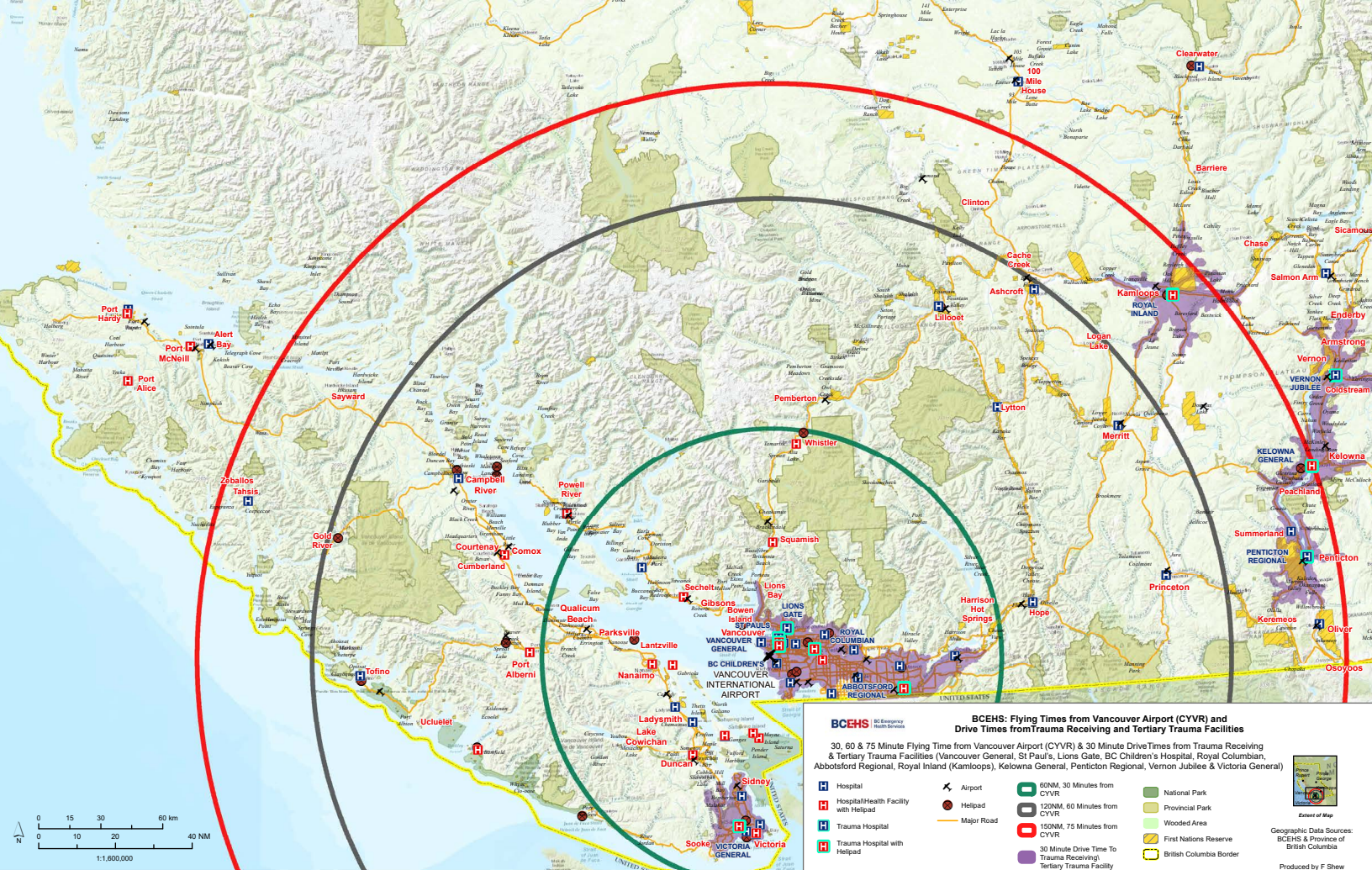
Paramedic judgement and local destination or bypass protocols can be used to help determine transport destination. CliniCall or EPOS physician consultation can be obtained for advice if required in the decision making process.

- 1) Age
 - Older adults
 - Risk of injury/death increases after age 55
 - SBP <110 may represent shock after age 65
 - Children
 - Should be triaged preferentially to a pediatric-capable trauma centre
- 2) Anticoagulation and bleeding disorders
- 3) Burns with trauma mechanism
- 4) Pregnancy \geq 20 weeks

If these criteria have not been met, transport the patient to the closest, most appropriate emergency department.



¹. Failed airway = failure to maintain patency by ANY means. If you can oxygenate/ventilate, then it is not a failed airway.



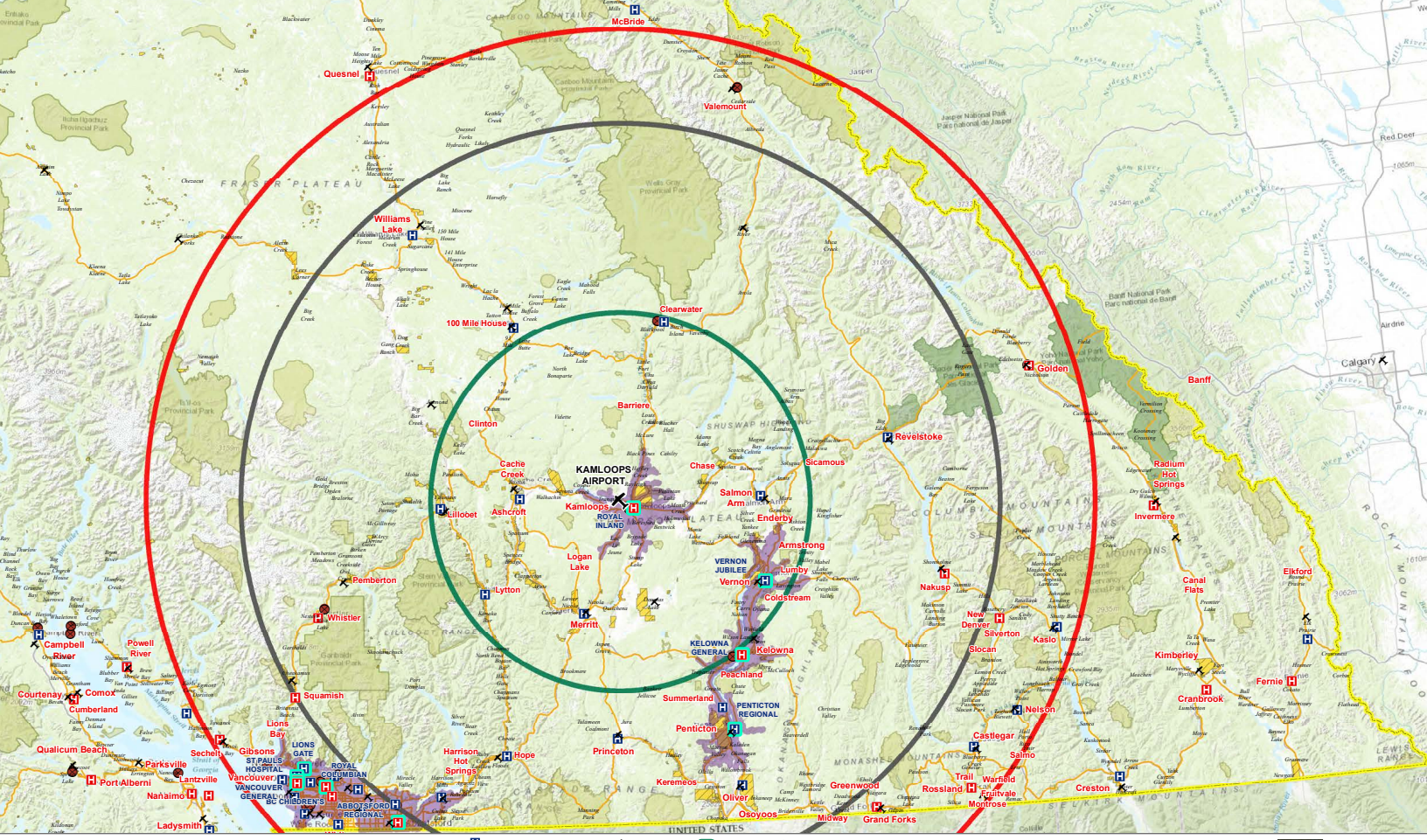
Helicopter Flight Range from Vancouver

Map Credit: Frances Shew, Corporate Data Analyst (GIS), BCEHS

Air Ambulance Utilization Guideline – Introduction

The BCEHS Critical Care Transport Program provides specialized, emergency patient care and transport for the critically injured trauma patient across the province. “Auto-Launch” is an innovative, life-saving protocol that helps ensure that patients with life-threatening injuries are transported to a trauma centre as quickly as possible. The Auto-Launch protocol simultaneously dispatches both a ground ambulance and a helicopter with a critical care transport crew based on information provided from the scene by 911 callers.

The Auto-Launch program is available within the flight ranges of dedicated helicopters located in Vancouver and Kamloops. The helicopter has a flight range of approximately 300 nautical miles without refueling at a speed of 115 nautical miles per hour. As such, the deployment area is considered to be within 60-75 flight minutes for Auto-Launch calls.



BCEHS BC Emergency Health Services

BCEHS: Flying Times from Kamloops Airport (CYKA) and Drive Times from Trauma Receiving and Tertiary Trauma Facilities

30, 60 & 75 Minute Flying Time from Kamloops Airport (CYKA) & 30 Minute Drive Times from Trauma Receiving & Tertiary Trauma Facilities (Vancouver General, St Paul's, Lions Gate, BC Children's Hospital, Royal Columbian, Abbotsford Regional, Royal Inland (Kamloops), Kelowna General, Pentiction Regional, Vernon Jubilee & Victoria General)

- Hospital
- Hospital/Health Facility with Helipad
- Trauma Hospital
- Trauma Hospital with Helipad
- Airport
- Helipad
- Major Road
- 60NM, 30 Minutes from CYKA
- 120NM, 60 Minutes from CYKA
- 150NM, 75 Minutes from CYKA
- 30 Minute Drive Time To Trauma Receiving/Tertiary Trauma Facility
- British Columbia Border
- First Nations Reserve
- National Park
- Provincial Park
- Wooded Area

Scale: 0 15 30 60 km / 0 10 20 40 NM / 1:2,000,000

Geographic Data Sources: BCEHS & Province of British Columbia

Produced by F Shew

Helicopter Flight Range from Kamloops

Map Credit: Frances Shew, Corporate Data Analyst (GIS), BCEHS

The East Kootenay Auto-Launch is a version of Auto-Launch program modified for the East Kootenay Health service area that utilizes both BCEHS and STARS (Shock Trauma Air Rescue Society via Alberta Air Ambulance) resources and consists of both helicopter and fixed-wing responses. Region specific details on the Auto-Launch protocol can be found in Appendix D.





Fixed Wing Flying Times and Distances

Map Credit: Frances Shew, Corporate Data Analyst (GIS), BCEHS

Requests for air ambulance trauma responses outside the Auto-Launch prescribed operating areas should be considered for an Early Fixed Wing Launch (EFWL). EFWL provides a primary fixed-wing resource for areas of BC that are not accessible by the Auto-Launch program to improve transfer times for trauma patients. The EFWL program relies on aircraft that are based in Vancouver, Kelowna and Prince George.

The EFWL program includes geographic areas serviced by the Northern Health Authority, Island Health Authority (northern Vancouver Island), Interior Health Authority (communities outside Station 370 and STARS ranges), and Vancouver Coastal Health Authority (communities of Bella Bella and Bella Coola). Additionally, EFWL provides a secondary air resource, when appropriate, for areas covered by Auto-Launch but where the dedicated helicopter is unavailable for patient transfer.

Helicopter On-Scene Response for Trauma Patients (Auto-Launch Protocol)

Auto-Launch is a dispatch protocol and is the automatic dispatching of dedicated helicopters with a critical care transport (CCT) crew to a specific set of MPDS criteria.

The following two criteria must be met by a patient to qualify for an air ambulance on scene response:

Criteria #1: MPDS Auto-Launch criteria AND

Criteria #2: Meeting the continuation criteria AND / OR The patient is not accessible within a reasonable treatment window.

When Criteria #1 is met, based on the 911 call information and MPDS coding, the helicopter will be launched directly to the scene. Once the ground ambulance crew arrives at scene, they will assess for continuation criteria (Criteria #2). If the patient meets the continuation criteria, the helicopter will continue to the scene. If the patient is not accessible by ground ambulance within a reasonable treatment window, the helicopter will continue to scene without confirmation of continuation criteria.

If the call's circumstances and patient fail to meet the continuation criteria and an air ambulance is known to be responding based on the merits of the initial request (i.e. 911 call), the ground paramedic will obtain CliniCall consultation to confirm that an on-scene response is not required.

In addition to the MPDS and continuation criteria, the transport time from accident scene to the LTH by ground ambulance must be greater than 30 minutes.

Once the CCT crew arrive at the scene and assess the patient, they may decide to:

- Transport the patient by air to the LTH
- Accompany the patient by ground with the BCEHS ground crew to the LTH
- Direct the BCEHS ground paramedics to the appropriate local hospital without the support of the CCT crew

BCEHS ground paramedics on scene may decide to cancel the Auto-Launch if:

- The patient does not meet the Auto-Launch continuation criteria
- The response time of the aircraft and CCT crew is longer than the drive time to the LTH

Conclusion

The introduction of the Pre-hospital Trauma Triage Guidelines and Air Ambulance Utilization Standard for Trauma in British Columbia is based on expert medical opinion guided by established existing evidence. The goal is to improve the outcomes of severely injured trauma patients by providing paramedics with the necessary criteria to apply when assessing trauma patients in the pre-hospital environment and determining the most appropriate receiving facility.

For any questions, comments or change requests, please email Trauma Services BC at tsbc@phsa.ca



Appendix A. Adult and Pediatric Lead Trauma Hospitals in British Columbia

Health Authority	Location	Name of Facility	Level
FHA	New Westminster	Royal Columbian Hospital	Level 1
	Abbotsford	Abbotsford Regional Hospital and Cancer Centre	Level 3
IHA	Kamloops	Royal Inland Hospital	Level 2
	Kelowna	Kelowna General Hospital	Level 2
	Cranbrook	East Kootenay Regional Hospital	Level 3
	Penticton	Penticton Regional Hospital	Level 3
	Trail	Kootenay Boundary Regional Hospital	Level 3
	Vernon	Vernon Jubilee Hospital	Level 3
	Williams Lake	Cariboo Memorial Hospital	Level 3
NHA	Prince George	University Hospital of Northern British Columbia	Level 3
	Fort St. John	Fort St. John Hospital	Level 4
	Quesnel	GR Baker Hospital	Level 4
	Terrace	Mills Memorial Hospital	Level 4
PHC	Vancouver	St. Paul's Hospital	Level 3
PHSA	Vancouver	British Columbia Children's Hospital (Pediatric LTH only)	Level 1
VCH	Vancouver	Vancouver General Hospital (Adult LTH only)	Level 1
	North Vancouver	Lions Gate Hospital	Level 3
VIHA	Victoria	Royal Jubilee Hospital	Level 2
	Victoria	Victoria General Hospital	Level 2
	Nanaimo	Nanaimo Regional General Hospital	Level 3