BC’s Mobile Medical Unit
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Disclaimer:
The presenters do not have a significant financial relationship to report.
Session Overview

- Session Objectives
- What is the MMU?
- Background
- Roles & Capabilities
- Deployment Case Studies
- Summary
Session Overview

- **Session Objectives**
  - British Columbia
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Session Objectives

Participants will learn:

1. MMU key roles within the province of BC;
2. Four levels of clinical capability within the MMU;
3. Clinical and facility considerations for integrating a mobile health facility into a hospital or health centre; and
4. How a mobile health facility can increase clinical response capacity during planned or unplanned events.
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What is the MMU?

A- Hospital trailer
B- Support trailer
C- Dually truck
D- O₂ concentrator
E- Inflatable tent (2)
F- 100-person tent
G- Ramp canopy
MMU Hospital Trailer – Primary Care Area

- Flexible space
- Up to 6-10 bays for patient care
- 4 high-acuity monitored bays
MMU Hospital Trailer – Primary Care Area
MMU Hospital Trailer – Multi-purpose room

Positive pressure HEPA filtered room is a flexible space that can be used as:

- Operating room (emergency life-saving surgery);
- Minor procedures;
- Private examination space;
- Semi-isolated additional clinical area;
- Administration; or
- Storage or respite.
MMU Hospital Trailer – Multi-purpose room
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Background
2010 Olympic & Paralympic Games

Critical Care & Emergency Surgical Capability

- Provision of patient care
  → 43 patients, 13 BCAS transfers

- Olympic/Paralympic Medical Volunteers participated in daily exercise/simulation in the MMU.
Background – Legacy to the Province

Provincial Resource

→ BC Ministry of Health purchased the Mobile Medical Unit and requested PHSA to:
  - own and operate;
  - protect and maintain; and
  - work with the six Health Authorities in developing a provincial service to expand upon provincial clinical response capacity.

→ Each of the six Health Authorities share equal operational costs
The MMU clinical team is derived of trauma-focused clinical educators who bring expertise in:

- Pre-hospital care
- Air medical transport
- Disaster medicine
- HazMat
- Search & rescue
- Mass gathering medicine
- Trauma
- Surgery
- Perioperative care
- Emergency medicine
- Anesthesiology
- Intensive care
- Burns & plastics
- And more…
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Roles of the MMU

Renovation support

Emergency Response

Public Health/Outreach

Education

Event Support
The MMU offers a range of clinical capability, depending on requirements:

Level 1 – Public health, outpatient clinic, & first-aid care
Level 2 – Minor ill/injured (CTAS 4-5)
Level 3 – Critical or Emergency Care (CTAS 1-5)
Level 4 – Surgical intervention/life saving emergency procedures, & CTAS 1-5
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BMX Supercross World Cup
September 12-16, 2012

Overview

- Level of care: First aid through emergency critical care (MMU Level 1-3)
- High-profile international sporting event, Abbotsford BMX Park
- Collaboration with BC Ambulance, UBC Mass Gathering Medicine Interest Group, UCI BMX
**Clinical Considerations**

- Past event injury statistics
  - Mechanisms of injury
  - Level of care to be provided
  - Patient flow plan

- Clinical staffing model (NOT health authority based)
- Development of specialized clinical education
  - Trauma team training
- Point of care testing & diagnostic imaging
- Patient treat or transfer protocols, including site helicopter pad
Facility Considerations

- Staggered side-by-side configuration in fenced area
- Packed gravel surface
- Use of inflatable tents for minor first-aid level care
- Incorporation of BCAS Special Ops team vehicles & equipment (bicycles, gators, multiple ambulances, command unit, etc.)
Overview

- Federal earthquake exercise
- Tested high level of interoperability of municipal, provincial, & federal agencies
  → including heavy urban search and rescue teams from across Canada
- MMU positioned at HUSAR Base
- Intensive disaster medicine simulation education program delivered (two sessions at eight hrs)
Exercise Magnitude 2012

Clinical Considerations

- Interdisciplinary trauma and MCI education
- Full spectrum of MMU care (through emergency surgery)
  - Equipment & supplies required for support
- Education program design, recruitment, & administration
  - Clinical team composition
  - Integration with overall exercise
- MCI triage
- Chain of evacuation (VGH)
Exercise Magnitude 2012

Facility Considerations

- Ideal positioning within broader context of HUSAR base
- End-to-end configuration
- Use of inflatable tents for triage external to MMU
- Key learning from HUSAR:
  - Equipment, set-up, storage, transport
- Heavy rain during pack up
  - Equipment storage considerations
Overview

- First emergency activation of the MMU
- Severe flooding of SMH Emergency Department, leading to 10-day closure
- MMU served as part of temporary urgent care centre
  - Saw approximately 10% of total patients
- Rapid deployment of MMU
  - Official request 1300hrs
  - On-site 1900hrs
  - Set-up 2200hrs
Clinical Considerations

- Determining equipment and supplies to pack
  - no pre-defined mission
- PACS System & other IT set-up requirements
- Patient inclusion/exclusion criteria (& on-going amendments)
- Staging and patient flow
- Just-in-time staff education
  - MMU Duty Officer at all times
- Logistics of support services
- Pediatric equipment
- Critical MMU BC Ambulance Liaison support at all stages
- Media***
Facility Considerations

- Early contact with protection services
  → Recce visit
- Maximum parking lot grade
- Ambulance access
- Increased security requirements
- Tents for patient privacy and weather protection
- Generators for power (vs. shore power)
- IT requirements & PACS set-up
- Ongoing support and trouble shooting
  → MMU Duty Officer at all times
Pemberton Health Centre Renovation
March 21 – May 17, 2013

Overview

- Level of Care: Emergency (MMU Level 3)
- ED renovation
  - complete relocation into the MMU for 8 wks
- Longest deployment to date
- Nearly 900 patient visits
- First childbirth to take place in the MMU (5 total)
  - Rare at this particular site
Clinical Considerations

- Expected injuries in the community
  - rural, agricultural, mountainous (ski, mountain bike)
  - large First Nation population

- Patient flow
- Diagnostic Accreditation Program (x-ray)
- Pediatric care & obstetrics
- Clinician education/team practice prior to care
- Governance
Pemberton Health Centre Renovation

**Facility Considerations**

- Weatherproofing & site safety
  - Entrance ramp canopy
  - Underbelly heating
- Shore power
- Requirement for x-ray perimeter (per diagnostic accreditation)
- Ambulance access
- Community “path disruption”
- Black-water waste disposal
- Orientation & training for on-site Facility Manager
- Renovation schedule & firm departure date
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**Summary**
Summary

The MMU:

- Is a publicly funded emergency management & business continuity resource for the province of BC;
- It has proven valuable as and adjunct to address gaps in trauma, emergency, and other areas of care;
- Provides clinical education each time it is deployed; and
- Has been designed with an inherent flexibility, allowing for adjustments in level of care to meet changing needs of a given mission.
Supplemental Slides
Medical Equipment – Stretchers & Beds

Stryker Hospital Stretchers

Hydraulic Ambulance Stretcher

Cot (first aid level care)
Medical Equipment – Oxygen

Portable oxygen generation system – 95% $O_2$

Oxygen Redundancy:
- Low-flow portable oxygen concentrator
- Praxair Grab’n’Go

iVent Ventilator (2)
Medical Equipment – Suction

In-line suction

Portable suction
Medical Equipment – Adjuncts

- Blanket and fluid warmer
- Welch Allyn integrated diagnostics
- Automated blood pressure
- Crash cart
- Digital thermometer
- Level 1 Rapid Infuser
- Sigma Spectrum IV Pumps
- Medication fridge
Medical Equipment – Point of Care Lab Testing

- **iSTAT**
  - Lytes
  - Creat
  - ABG’s
  - Troponin
  - Lactate

- **Hemacue**
  - Hgb monitor

- **Roche Coagulocheck**
  - INR

- **Accu Chek**
  - Blood glucose monitor

- **Bayer Contour**
  - Blood glucose monitor

- **Others**
  - Urinalysis
  - Pregnancy testing kits
Medical Equipment – Diagnostics

GE Portable Ultrasound

GE Portable X-ray

CR Reader
Monitors

Four GE Dash 5000 monitors with Central Monitor station within the primary patient care area

Zoll X-series Portable Monitor and Defibrillator
Waste Management

Vernacare system
For disposal of Vernacare products only

Medical waste
Please use the receptacles provided, as appropriate.

General waste & Recycling
The MMU strives to be as green as possible. There are multiple garbage and recycling bins located around the entire site. Please recycling where possible.