This document is formatted for double-sided printing
The BC Guidelines for Decontamination of Patients in Health Facilities were developed under the direction of a Steering Committee and the technical support of a Planning Committee, with members appointed by the BC Ministry of Health Services Emergency Management Unit. Chairpersons for these committees endorse these guidelines for the approval by the Health Emergency Management Council of BC.

Chris Smith  
Chair, Hazardous Substance Steering Committee  
Director  
Emergency Management Unit  
BC Ministry of Health Services

Dr. Bonnie Henry  
Chair, Hazardous Substance Planning Committee  
Director  
Public Health Emergency Management  
BC Centre for Disease Control

Approvals

On behalf of the Health Emergency Management Council of BC, we, the undersigned, adopt these Guidelines as recommended best practices by health institutions where emergency departments may receive contaminated patients. The concepts, procedures, and training elements detailed in these Guidelines are approved for use in the circumstances specified therein.

Approved by the undersigned this date, ___________ of ___________, 2009

John Lavoie  
Co-Chair, Health Emergency Management Council  
Executive Director  
Emergency Management Unit  
BC Ministry of Health Services

Robert Bryan  
Co-Chair, Health Emergency Management Council  
Director, Emergency Management  
Office of the CMHO  
Vancouver Island Health Authority
Executive Summary

Health care workers in British Columbia face critical exposures to hazardous substances when they receive contaminated patients. Harmful agents may be transported to an emergency department on patients' skin, hair, and clothing, and among their personal effects. The Health Care sector needs to be pro-active and take a holistic approach to mitigate these events.

The first-receivers at our acute care institutions have different needs for training and PPE than workers at an incident site. Health care workers exposed to harmful agents ingested accidentally or intentionally need to be protected.

The BC Guidelines for Decontamination of Patients in Health Facilities provide practical information that enable acute care facilities to prepare for and receive contaminated patients. The BC Guidelines systematically address a number of areas including: personnel, plans, facilities, equipment, training, and exercises needed to provide patient decontamination as part of existing health authority all-hazard emergency plans.

In compliance with WorkSafe BC regulations and recognized “best practices” across Canada, the BC Guidelines recommend acute care facilities be capable of safely receiving and decontaminating a limited number of contaminated patients, while others have full capacity to decontaminate patients.

The HEM Council of BC, representing all provincial health authorities, proposes two levels of patient decontamination among acute care hospitals, based on the number of people presenting at each facility. The two decontamination capacity levels are:

- **Limited Decontamination** – Acute Care facilities capable of decontamination of up to 10 patients per hour;
- **Full Decontamination** – Acute Care facilities capable of decontamination of up to 30 patients per hour.

In total, health authorities have currently identified 62 limited-capacity and 41 full-capacity patient decontamination sites at acute care facilities in the province.

The BC Guidelines propose that health authorities ensure decontamination infrastructure is available at all times and that all acute care facilities have the equipment, supplies and trained staff needed to provide for safe decontamination of patients.

Overall, the BC Guidelines offers a sustainable, achievable, fiscally responsible, and long-term vision that clearly sets out a methodology and timetable for a coordinated health sector patient decontamination program throughout British Columbia. The BC Guidelines is an evergreen document that will be reviewed and updated as necessary to ensure an accurate reflection of current “best practices”.
Acknowledgements

The BC Ministry of Health Services would like to acknowledge and thank all members of the Hazardous Substance Steering Committee and the Planning Committee:

**Steering Committee Members**
- Jeanette Beattie, Leader, Emergency Preparedness Program, Providence Health Care
- Kirsten Brown, Manager, Planning, Emergency Management Unit, Min of Health Services
- Robert Bryan, Director, Emergency Management, Vancouver Island Health
- Patty Garrett, Corporate Director, Risk Management, Interior Health Authority
- Randy Hansen, Superintendent, Integrated Public Safety Office, BCAS
- Bonnie Henry, Director, Public Health Emergency Management, BC Centre for Disease Control
- John Lavery, Executive Director, Emergency Management Unit, Min. of Health Services
- Don MacAulister, Director, Protection Services & Emergency Management, Fraser Health
- Doreen Myers, Corporate Director, Emergency Management, Provincial Health Services Authority
- Rod Salem, Manager, Emergency Management & Disaster Preparedness, BCAS
- Chris Smith, Director, Planning & Programs, Emergency Management Unit, Min. of Health Services (Chair)
- Jody Sydor Jones, Regional Director, Emergency Management, Vancouver Coastal Health
- Frank Talarico, Director, Workplace Health & Safety, Northern Health

**Planning Committee Members**
- Wayne Beckham, Provincial Medical Physics Leader, BC Cancer Agency
- Brian Beech, Physical Emergency Preparedness & Response, Health Canada
- Rene Bernklau, Provincial Hazard Substance / CBRNE Technical Coordinator, BCAS
- Quinn Danyluk, Occupational Hygienist Workplace Health, Fraser Health
- Gunnar Erhardt, Emergency Room Physician, Fraser Health
- Rick Erland, Coordinator, Emergency/Disaster Management, Interior Health
- Bonnie Henry, Director, Public Health Emergency Management, BC Centre for Disease Control (Chair)
- Kirsten Jasper, Emergency Management Coordinator, Vancouver Coastal Health
- Brian Johnston, Public Health Inspector, Vancouver Coastal Health
- Norma Jones, Regional Manager, Trauma Program, Vancouver Island Health
- Ross McIntyre, Corporate Manager, Business Continuity, Provincial Health Services Authority
- Deirdre Mclnnehan, Manager, Emergency Mgmt. & Business Continuity, Fraser Health
- Sheila Service, Manager, Health Emergency Management, Vancouver Island Health
- Cecil Unrau, Agency Lead, Emergency Mgmt., Laboratory Services, BC Mental Health and Addictions Services & Provincial Health Services Authority
- Colleen Vaughan, Program Manager, Emergency Management Division, Justice Institute of BC
- Murray Webster, Project Manager, Northern Health

In addition the Ministry would like to thank the following professionals for their contributions of ideas and inspiration towards the patient decontamination program in British Columbia.

- Hafeezah Bassrullah, Senior Policy and Program Consultant, Emergency Management Unit, Ontario Ministry of Health & LTC
- Eric Bone, Regional Director, Office of Emergency Preparedness, Alberta Health Services – Edmonton
- Guy Corriveau, Director, Disaster Management, Winnipeg Regional Health Authority
- Dr. Brian Schwartz, Director, Sunnybrook Osler Centre for Prehospital Care, Sunnybrook Health Sciences Centre, Ontario
- Martin Spriggs, Consultant, Office of Emergency Preparedness, Alberta Health Services, Calgary

The Ministry contracted two emergency management specialists to develop these Guidelines: John Hill of JH2 Emergency Management Services, Ltd., and Jim LaMorte of Smart Risk Control, Inc.
Table of Contents

Approvals ........................................................................................................ iii
Executive Summary ....................................................................................... iv
Acknowledgements ....................................................................................... v
Acronyms and Definitions ........................................................................... viii

1. Introduction ........................................................................................................ 1
   Background ..................................................................................................... 1
   Purpose of the BC Guidelines ..................................................................... 2
   Context for Planning ................................................................................... 2

2. Sources Considered .......................................................................................... 3
   US OSHA ..................................................................................................... 3
   Ontario ........................................................................................................ 3
   Edmonton ..................................................................................................... 3
   Calgary .......................................................................................................... 3
   BC Ambulance Service ............................................................................... 3
   PHSA Disaster Psychosocial Health Program ............................................ 3

3. Risk-Based Preparedness ............................................................................... 4
   Risk Factors ................................................................................................. 4
   Decontamination Capacity Levels .............................................................. 4
   Capacity Assessment Method .................................................................... 4

4. Patient Decontamination Overview ............................................................... 8
   Basic Functions ........................................................................................... 8
   Decontamination Zones and Infrastructure ............................................... 11
   Patient Decontamination Unit Organization .............................................. 18
   Decontamination Personnel ....................................................................... 20
   Decontamination Scenarios ....................................................................... 21

5. Guidelines for Preparedness .......................................................................... 22
   Step 1 – Get Organized .............................................................................. 23
   Step 2 – Select Personnel .......................................................................... 25
   Step 3 – Set Up Infrastructure .................................................................. 27
   Step 4 – Acquire Equipment and Supplies ............................................... 29
   Step 5 – Prepare Patient Decontamination Plan ........................................ 31
   Step 6 – Deliver Initial Training ................................................................ 33
   Step 7 – Facilitate Initial Exercises ......................................................... 35
   Step 8 – Maintain Program ...................................................................... 37

6. Conclusions and Recommendations ............................................................... 39
   Conclusions ................................................................................................. 39
   Recommendations ..................................................................................... 40

7. References ....................................................................................................... 41
## Annexes

<table>
<thead>
<tr>
<th>Annex</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annex A</td>
<td>Incident Summaries – Patient Decontamination</td>
<td>A–1</td>
</tr>
<tr>
<td>Annex B</td>
<td>Patient Decontamination Preparedness Committee Roles</td>
<td>B–1</td>
</tr>
<tr>
<td>Annex C</td>
<td>Medical Screening Questionnaire</td>
<td>C–1</td>
</tr>
<tr>
<td>Annex D</td>
<td>Patient Decontamination Infrastructure</td>
<td>D–1</td>
</tr>
<tr>
<td>Annex E</td>
<td>Inventory – Patient Decontamination Equipment</td>
<td>E–1</td>
</tr>
<tr>
<td>Annex F</td>
<td>Sample Patient Decontamination Plan</td>
<td>F–1</td>
</tr>
<tr>
<td>Annex G</td>
<td>Checklists for Patient Decontamination Unit</td>
<td>G–1</td>
</tr>
<tr>
<td>Annex H</td>
<td>Disaster Psychosocial Health</td>
<td>H–1</td>
</tr>
<tr>
<td>Annex I</td>
<td>Training and Exercises for Patient Decontamination</td>
<td>I–1</td>
</tr>
</tbody>
</table>
## Acronyms and Definitions

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCAS</td>
<td>British Columbia Ambulance Service</td>
</tr>
<tr>
<td>BCERMS</td>
<td>British Columbia Emergency Response Management System</td>
</tr>
<tr>
<td>DPS</td>
<td>Disaster Psychosocial Services</td>
</tr>
<tr>
<td>EOC</td>
<td>Emergency Operations Centre</td>
</tr>
<tr>
<td>HEM</td>
<td>Health Emergency Management</td>
</tr>
<tr>
<td>HEMTEAC</td>
<td>Health Emergency Management Training &amp; Exercise Advisory Committee</td>
</tr>
<tr>
<td>HICS</td>
<td>Hospital Incident Command System</td>
</tr>
<tr>
<td>IC</td>
<td>Incident Commander</td>
</tr>
<tr>
<td>ICP</td>
<td>Incident Command Post</td>
</tr>
<tr>
<td>ICS</td>
<td>Incident Command System</td>
</tr>
<tr>
<td>JIBC</td>
<td>Justice Institute of British Columbia</td>
</tr>
<tr>
<td>MoHS</td>
<td>Ministry of Health Services (BC)</td>
</tr>
<tr>
<td>OSHA</td>
<td>Occupational Safety &amp; Health Administration (USA)</td>
</tr>
<tr>
<td>PAPR</td>
<td>Powered Air Purifying Respirator</td>
</tr>
<tr>
<td>PPE</td>
<td>Personal Protective Equipment</td>
</tr>
</tbody>
</table>

A few terms are used consistently throughout the BC Guidelines:

- **Decon Capacity Level** – The resources available to decontaminate patients arriving at a health facility. Capacity is represented by the number of patients that can be decontaminated per hour.

- **Cold Zone** – Areas supporting the decontamination process where no contaminant agents enter.

- **Decontamination Equipment** – Equipment identified to assist health care workers with decontaminating incoming casualties in a safe environment.

- **Decontamination Set-up Team** – Personnel who construct the tents, shelters, water supply, electrical power systems, and other infrastructure needed to support patient decontamination.

- **First-Receiver** – Health care workers at an emergency treatment facility receiving contaminated patients for treatment.

- **First Responders** – Members of fire, ambulance, law enforcement, and hazardous materials teams who act at the incident site where the primary release of hazardous substance occurs.

- **Gross Decontamination** – A procedure whereby a contaminated person washes without aid to remove the contaminating agent. Removal of clothing accounts for 75-95% of the contaminant.

- **Hazardous Substances** – Any of a number of agents that can harm humans or the environment including chemical, biological, radiological, nuclear, and explosive (CBRNE) materials.

- **Hot Zone** – The area outside the emergency department where contaminated patients are received and remove contaminated clothing.

- **Patient Decontamination Unit** – Consists of the number of trained staff required to safely perform patient decontamination, depending on the requirements of the situation.

- **Personal Protective Equipment (PPE)** – Includes clothing, masks, gloves, boots, and other equipment appropriate to the hazards at hand.

- **Respiratory Protection** – A subset of PPE, refers to breathing apparatus, filters, and air supply that protect the wearer from exposure to harmful contamination agents.

- **Technical Decontamination** – Where required in full-capacity emergency departments, patients undergo a decontamination step where staff perform special decontamination and treatment.

- **Warm Zone** – The area outside the emergency department where patients undergo technical decontamination.
1. Introduction

Background

Patients contaminated with chemicals and other dangerous agents arrive at BC emergency departments every year. A wide range of incidents can lead to patient contamination, including industrial and transportation accidents, drug use and misuse, and criminal activities.

Although the BCAS decontaminates patients prior to transport, individuals will, in certain circumstances, bypass traditional ambulance services and self-refer (or be brought by others) to the nearest emergency treatment facility.¹ There is no foolproof method or process that will prevent contaminated persons from seeking treatment at an emergency department. There are likewise no mechanisms in place at any emergency department to test that patients transported by ambulance have been effectively decontaminated.

Physicians and emergency department staff – as "first-receivers" – are therefore exposed to the risk of cross contamination. The consequences could be extreme, depending on the type and amount of the agent involved.

For example:

- Physicians and emergency room staff could be cross-contaminated, requiring decontamination and treatment;
- Other patients already in the emergency department may be affected;
- Contaminated emergency departments would be closed and evacuated, significantly disrupting health care operations.

Examples of such events and their impacts are evident both in BC and elsewhere in the developed world, represented by the incident below.

Suicide Patient Closes Emergency Department

The emergency department in a UK hospital was evacuated and closed for 12 hours when a suicide victim’s body released toxic fumes. Five hospital workers suffered minor breathing problems. The patient had been terminally ill, and is believed to have intentionally consumed aluminum phosphide, a rat poison that gives off toxic gases when mixed with water.

The patient’s contaminated body and clothes presented a risk to other patients and hospital workers, and triggered the hospital’s chemical incident procedure. Patients were taken to other hospitals in the region.

Annex A offers additional examples of the types of patient contamination incidents of concern.

¹ As many as 80 percent of patients in a mass casualty incident may self-refer and will not have been decontaminated prior to arriving at an emergency department. – OSHA Best Practices
Incidents involving the arrival of contaminated patients at BC health facilities are increasing as hazardous materials proliferate in BC communities. Any of the 103 emergency treatment facilities in the province could receive one or more contaminated patients at any time.

WorkSafe BC sets out the legal requirements for employer protection of workers potentially exposed to hazardous substances. The Patient Decontamination Program in each health authority is expected to comply with current regulations of the WorkSafe BC Occupational Health & Safety Regulations, specifically:

- Part 5: Chemical and Biological Substances
- Part 6: Substance Specific Requirements
- Part 8: Personal Protective Clothing and Equipment

Although the chance of a major contamination event is low, the consequences could be extreme. It is prudent to prepare for such incidents. In this context, preparedness means:

- Decontamination infrastructure is available for immediate service, and can be adapted to meet the requirements of a range of situations. The patient decontamination zone, external to the emergency department, should be either pre-constructed or capable of simple assembly and rapid utilization;
- Health emergency plans address the need to control access to prevent the contamination of staff, current patients, and facilities;
- Every emergency treatment facility has a patient decontamination plan that can be immediately activated to receive patients;
- Plans ensure medically-qualified and trained personnel are assigned to provide patient triage and care;
- All staff and physicians (first-receivers) are trained and routinely exercised in the use of decontamination equipment and procedures, including PPE appropriate to patient decontamination;
- Plans for assisting patients, family and friends include DPS (e.g., stress and trauma counselling).

- Procedures are in place to clean the decontamination area and, if affected, reopen the emergency department for normal operations on approval by WorkSafe BC.

Purpose of the BC Guidelines

The BC MoHS developed these Guidelines in conjunction with the HEM Council to help health authorities in BC advance ongoing preparedness for patient decontamination.

The purpose of the BC Guidelines is to summarize best practices on decontaminating patients, safeguarding physicians and staff, and protecting patients and health facilities from cross-contamination. The BC Guidelines highlight the opportunities to standardize infrastructure, equipment, response, and training among all health authorities, and to maximize cost effectiveness.

These guidelines address health authorities in BC. Private health facilities, BCAS, local fire departments, and First Nations health services may also find the guidelines useful in standardizing decontamination procedures.

Context for Planning

While the BC Guidelines focus on the potential introduction of contaminants to emergency departments, the Ministry and HEM Council acknowledge that hazardous substances represent one of many threats to BC emergency departments.

Each emergency department in the province possesses an “all-hazards” emergency plan that outlines the facility’s strategy for emergency response, business continuity, and disaster recovery from a major incident.

Generic plans provide the overall framework for response to an emergency. All health authorities apply the British Columbia Emergency Response Management System (BCERMS), and incorporate the principles of the HICS.

With these provisions in place, the BC Guidelines are not intended to stand alone, but to form part of a comprehensive all-hazard emergency plan at BC health facilities.
2. Sources Considered

In researching existing programs, the Ministry found no guidelines, standards or regulations that specifically address patient decontamination in health care facilities in BC or elsewhere in Canada. A number of jurisdictions, however, have prepared what may be considered “best practices” for consideration by BC health authorities. This section highlights the sources of greatest influence on the BC Guidelines.

US OSHA

The US Occupational Safety and Health Administration (OSHA) Best Practices for Hospital-Based First-Responders, 2004, reflects legislation requiring PPE and training for hospital personnel who may be exposed to contaminants. Protective clothing and equipment include gloves, gowns, masks, protective eyewear, and fully encapsulated vapour protective suits with self-contained breathing apparatus.

The OSHA Best Practices identifies the information that employees must receive in training sessions, including an understanding of the hazardous agents they may encounter, the role and use of PPE, and specific response procedures in decontamination.

Ontario

The Ontario Ministry of Health and Long-Term Care has adopted a province-wide program for patient decontamination at hospitals. Ontario bases their program on the US OSHA Best Practices, and currently has 176 emergency departments that are trained in procedures and operational with decontamination equipment.

The principles of the program include provincial standardization, inter- and intra-operability, and consistent training regarding use of equipment and standard procedures.

Edmonton

The Alberta Health Services (AHS) – Edmonton also follows the US OSHA Best Practices. AHS Edmonton purchased the equipment for all emergency departments, including PPE and clothing that conform to OSHA and Canadian Standards Association. AHS Edmonton also purchased equipment, as well as portables showers on a site-by-site basis. AHS Edmonton will provide decontamination training to designated emergency department and support services staff.

Calgary

The Alberta Health Services – Calgary decontamination program originated in 2005. AHS-Calgary’s program is similar to Edmonton’s, and follows the OSHA’s Best Practices. The training program includes classroom lectures on agents, exposures, treatments, and an introduction to the use of the ICS in decontamination.

BC Ambulance Service

The BCAS follows the training curriculum currently available in Ottawa and Alberta for first-responders, including decontamination training for all employees. The BCAS intends to expand their Technical Advisor services throughout the province. This program includes early warning that contaminated patients may arrive at first-receiver sites, (e.g., hospitals), as well as treatment suggestions to the unaware physician.

Provincial Health Services Authority Disaster Psychosocial Program

The BC MoHS developed a unique disaster stress and trauma program in 2001, arranging with hundreds of clinicians across British Columbia to volunteer their time in the event of a disaster. The program was re-named Disaster Psychosocial Services in 2008 and moved to the Provincial Health Services Authority in 2009. The DPS initiative currently emphasizes the importance of recognizing the range of social, psychological, emotional, spiritual, behavioural, and cognitive factors that may affect patients, their families, medical staff and the public in general following an emergency.
3. Risk-Based Preparedness

Best practices among other health jurisdictions suggest that capacity for patient decontamination should be based on risk. WorkSafe BC requires an assessment of risks where workers may encounter a hazard. Risk represents two related components, probability and consequence, as in the relationship:

\[ \text{Risk} = \text{Probability} \times \text{Consequence} \]

The greater the probability of contaminated patients arriving at an emergency treatment facility, the greater the risk. Probability can be represented by the frequency of contaminated patients arriving at a specific facility within a given time period. Risk is also greater with an increase in consequences, as measured by the relative hazards characterizing the agents of concern.

Risk Factors

One risk factor that influences the consequences is the nature of the contaminating agent. Some agents present more danger than others.

The OSHA Best Practices guide advises each hospital to identify the specific agents first-receivers might reasonably be expected to encounter, given such factors as the chemicals and biological agents known to be present in the community and region. When an agent is unknown, OSHA calls for PPE with the highest safety ratings.

To determine the level of preparedness for hazardous substance incidents, OSHA’s Best Practices recommends that each hospital prepare a risk assessment that reflects the types of chemicals and other contaminating agents that may be encountered and their chance of occurrence.

However, this type of risk analysis can be time-consuming and, because threats may change over time, must be repeated periodically. After considering the options, the Ministry recommends that all patient decontamination procedures in the province utilize the safest PPE, obviating the need for agent identification in each community.

Decontamination Capacity Levels

The Ministry recognizes two levels of patient decontamination capacity among BC emergency departments, based solely on the potential number of simultaneous presentations. Whereas every emergency department in the province will be prepared to receive some contaminated patients, several centres will be prepared to decontaminate patients at a higher throughput rate. The two capacity levels in BC are:

- Limited Decontamination Capacity – All emergency departments would prepare for a few simultaneous contaminated patients, and be able to decontaminate as many as 10 patients per hour.
- Full Decontamination Capacity – Some emergency departments would prepare for multiple simultaneous cases, i.e., decontamination of up to 30 patients per hour.

This approach assumes that patients may be contaminated with the most hazardous agents, thus simplifying the selection of decontamination equipment, PPE, and respiratory protection.

In a future phase of development, individual emergency departments could augment their equipment and training based on knowledge of specific hazardous agents in their community. For example, some unique antidotes could be stockpiled where certain pesticides are in common use in or transported through a geographic region.

Capacity Assessment Method

Rather than expect health authorities to assess the risks in each BC community, the Ministry selected the following criteria for distinguishing emergency departments that should prepare for limited decontamination capacity or full decontamination capacity. Full-capacity facilities are those with the following characteristics:
- **Large Population Base** – Communities with larger populations, such as cities with more than 50,000 residents, have an increased probability of contaminated patients arriving simultaneously, as with illegal-drug manufacturing premises.

- **High Volume Hazardous Materials** – High-volume chemical manufacture, use, or transportation would suggest a greater frequency of incidents. Extensive agricultural operations would likewise indicate greater risks in a community.

- **Terrorism Targets** – Obvious targets would indicate full capacity emergency departments.

- **Large Hospitals, 24/7 Emergency Care** – Larger hospitals with more staff would most likely attract self-referrals in significant numbers, challenging the facility’s “surge capacity.” Facilities with a physician on-site 24 hours a day, 7 days a week would also influence the frequency of arrivals.

In summary, all BC emergency treatment facilities should be prepared to receive a limited number of contaminated patients. A portion of these facilities should prepare for a large number of simultaneous patients requiring decontamination. In essence, full decontamination capacity facilities require more infrastructure, equipment, and trained personnel than limited-capacity facilities.

Following this assessment method, the health authorities currently identify 62 limited decontamination capacity and 41 full decontamination capacity facilities among the total of 103 emergency departments in the province. This assignment of capacity may vary over time due to changing risk conditions, as determined by each health authority. HEM Council will regularly review the allocation of capacity ratings.

Figure 1 lists the emergency departments in BC by health authority, community, and patient decontamination capacity level.

---

**Table: BC Emergency Treatment Facilities by Region and Capacity Levels**

<table>
<thead>
<tr>
<th>No.</th>
<th>Facility Name</th>
<th>Community</th>
<th>Decontamination Capacity Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Abbotsford Regional Hospital</td>
<td>Abbotsford</td>
<td>Full</td>
</tr>
<tr>
<td>2</td>
<td>Burnaby Hospital</td>
<td>Burnaby</td>
<td>Full</td>
</tr>
<tr>
<td>3</td>
<td>Chilliwack General Hospital</td>
<td>Chilliwack</td>
<td>Full</td>
</tr>
<tr>
<td>4</td>
<td>Delta Hospital</td>
<td>Delta</td>
<td>Full</td>
</tr>
<tr>
<td>5</td>
<td>Eagle Ridge Hospital</td>
<td>Port Moody</td>
<td>Full</td>
</tr>
<tr>
<td>6</td>
<td>Fraser Caryon Hospital</td>
<td>Hope</td>
<td>Full</td>
</tr>
<tr>
<td>7</td>
<td>Langley Memorial Hospital</td>
<td>Langley</td>
<td>Full</td>
</tr>
<tr>
<td>8</td>
<td>Mission Memorial Hospital</td>
<td>Mission</td>
<td>Limited</td>
</tr>
<tr>
<td>9</td>
<td>Peace Arch Hospital</td>
<td>White Rock</td>
<td>Full</td>
</tr>
<tr>
<td>10</td>
<td>Ridge Meadows Hospital</td>
<td>Maple Ridge</td>
<td>Full</td>
</tr>
<tr>
<td>11</td>
<td>Royal Columbian Hospital</td>
<td>New Westminster</td>
<td>Full</td>
</tr>
<tr>
<td>12</td>
<td>Surrey Memorial Hospital</td>
<td>Surrey</td>
<td>Full</td>
</tr>
</tbody>
</table>

**Fraser Health**

<table>
<thead>
<tr>
<th>No.</th>
<th>Facility Name</th>
<th>Community</th>
<th>Decontamination Capacity Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>100 Mile House District General Hospital</td>
<td>100 Mile House</td>
<td>Limited</td>
</tr>
<tr>
<td>14</td>
<td>Arrow Lakes Hospital</td>
<td>Nakusp</td>
<td>Limited</td>
</tr>
<tr>
<td>15</td>
<td>Ashcroft &amp; District General Hospital</td>
<td>Ashcroft</td>
<td>Limited</td>
</tr>
<tr>
<td>16</td>
<td>Barriere Health Care</td>
<td>Barriere</td>
<td>Limited</td>
</tr>
<tr>
<td>17</td>
<td>Boundary Hospital</td>
<td>Grand Forks</td>
<td>Limited</td>
</tr>
<tr>
<td>18</td>
<td>Cariboo Memorial Hospital</td>
<td>Williams Lake</td>
<td>Limited</td>
</tr>
<tr>
<td>19</td>
<td>Castlegar &amp; District Community Health Centre</td>
<td>Castlegar</td>
<td>Limited</td>
</tr>
</tbody>
</table>

**Interior Health**
<table>
<thead>
<tr>
<th>No.</th>
<th>Facility Name</th>
<th>Community</th>
<th>Decontamination Capacity Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Chase Health Care</td>
<td>Chase</td>
<td>Limited</td>
</tr>
<tr>
<td>21</td>
<td>Creston Valley Hospital</td>
<td>Creston</td>
<td>Limited</td>
</tr>
<tr>
<td>22</td>
<td>Dr. Helmerker Memorial Hospital</td>
<td>Clearwater</td>
<td>Limited</td>
</tr>
<tr>
<td>23</td>
<td>East Kootenay Regional Hospital</td>
<td>Cranbrook</td>
<td>Limited</td>
</tr>
<tr>
<td>24</td>
<td>Elkford Health Care</td>
<td>Elkford</td>
<td>Limited</td>
</tr>
<tr>
<td>25</td>
<td>Elk Valley Hospital</td>
<td>Fernie</td>
<td>Limited</td>
</tr>
<tr>
<td>26</td>
<td>Golden and District Hospital</td>
<td>Golden</td>
<td>Limited</td>
</tr>
<tr>
<td>27</td>
<td>Invermere and District Hospital</td>
<td>Invermere</td>
<td>Limited</td>
</tr>
<tr>
<td>28</td>
<td>Kelowna General Hospital</td>
<td>Kelowna</td>
<td>Full</td>
</tr>
<tr>
<td>29</td>
<td>Kootenay Boundary Regional Hospital</td>
<td>Trail</td>
<td>Full</td>
</tr>
<tr>
<td>30</td>
<td>Kootenay Lake Hospital</td>
<td>Nelson</td>
<td>Limited</td>
</tr>
<tr>
<td>31</td>
<td>Lillooet District Hospital</td>
<td>Lillooet</td>
<td>Limited</td>
</tr>
<tr>
<td>32</td>
<td>Logan Lake Health Care</td>
<td>Logan Lake</td>
<td>Limited</td>
</tr>
<tr>
<td>33</td>
<td>Nicola Valley Health Centre</td>
<td>Merritt</td>
<td>Limited</td>
</tr>
<tr>
<td>34</td>
<td>Penticton Regional Hospital</td>
<td>Penticton</td>
<td>Full</td>
</tr>
<tr>
<td>35</td>
<td>Princeton General Hospital</td>
<td>Princeton</td>
<td>Limited</td>
</tr>
<tr>
<td>36</td>
<td>Queen Victoria Hospital</td>
<td>Revelstoke</td>
<td>Full</td>
</tr>
<tr>
<td>37</td>
<td>Royal Inland Hospital</td>
<td>Kamloops</td>
<td>Full</td>
</tr>
<tr>
<td>38</td>
<td>Shuswap Lake General Hospital</td>
<td>Salmon Arm</td>
<td>Full</td>
</tr>
<tr>
<td>39</td>
<td>Slocan Community Health Centre</td>
<td>New Denver</td>
<td>Limited</td>
</tr>
<tr>
<td>40</td>
<td>South Okanagan General Hospital</td>
<td>Oliver</td>
<td>Full</td>
</tr>
<tr>
<td>41</td>
<td>South Similkameen Health Centre</td>
<td>Keremeos</td>
<td>Limited</td>
</tr>
<tr>
<td>42</td>
<td>Sparwood Community Health Centre</td>
<td>Sparwood</td>
<td>Limited</td>
</tr>
<tr>
<td>43</td>
<td>St. Batholomew's Hospital</td>
<td>Lytton</td>
<td>Limited</td>
</tr>
<tr>
<td>44</td>
<td>Vernon Jubilee Hospital</td>
<td>Vernon</td>
<td>Full</td>
</tr>
<tr>
<td>45</td>
<td>Victorian Community Health Centre</td>
<td>Kaslo</td>
<td>Limited</td>
</tr>
<tr>
<td>46</td>
<td>West Chilcotin Health Centre</td>
<td>Tatla Lake</td>
<td>Limited</td>
</tr>
</tbody>
</table>

**Northern Health**

<table>
<thead>
<tr>
<th>No.</th>
<th>Facility Name</th>
<th>Community</th>
<th>Decontamination Capacity Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>47</td>
<td>Atlin Health Centre</td>
<td>Atlin</td>
<td>Limited</td>
</tr>
<tr>
<td>48</td>
<td>Bulkley Valley District Hospital</td>
<td>Smithers</td>
<td>Limited</td>
</tr>
<tr>
<td>49</td>
<td>Chetwynd Hospital and Health Centre</td>
<td>Chetwynd</td>
<td>Limited</td>
</tr>
<tr>
<td>50</td>
<td>Dawson Creek and District Hospital</td>
<td>Dawson Creek</td>
<td>Limited</td>
</tr>
<tr>
<td>51</td>
<td>Fort Nelson Hospital</td>
<td>Fort Nelson</td>
<td>Limited</td>
</tr>
<tr>
<td>52</td>
<td>Fort St. John Hospital and Health Centre</td>
<td>Fort St. John</td>
<td>Full</td>
</tr>
<tr>
<td>53</td>
<td>GR Baker Memorial Hospital</td>
<td>Quesnel</td>
<td>Limited</td>
</tr>
<tr>
<td>54</td>
<td>Houston Health Centre</td>
<td>Houston</td>
<td>Limited</td>
</tr>
<tr>
<td>55</td>
<td>Hudson's Hope Health Centre</td>
<td>Hudson's Hope</td>
<td>Limited</td>
</tr>
<tr>
<td>56</td>
<td>Kitimat Hospital and Health Centre</td>
<td>Kitimat</td>
<td>Full</td>
</tr>
<tr>
<td>57</td>
<td>Lakes District Hospital and Health Centre</td>
<td>Burns Lake</td>
<td>Limited</td>
</tr>
<tr>
<td>58</td>
<td>Mackenzie &amp; District Hospital, Health Centre</td>
<td>Mackenzie</td>
<td>Limited</td>
</tr>
<tr>
<td>59</td>
<td>McBride and District Hospital</td>
<td>McBride</td>
<td>Limited</td>
</tr>
<tr>
<td>60</td>
<td>Mills Memoria Hospital</td>
<td>Terrace</td>
<td>Full</td>
</tr>
<tr>
<td>61</td>
<td>Prince George Regional Hospital</td>
<td>Prince George</td>
<td>Full</td>
</tr>
<tr>
<td>62</td>
<td>Prince Rupert Regional Hospital</td>
<td>Prince Rupert</td>
<td>Full</td>
</tr>
<tr>
<td>63</td>
<td>Queen Charlotte Hospital – Masset</td>
<td>Masset</td>
<td>Limited</td>
</tr>
<tr>
<td>No.</td>
<td>Facility Name</td>
<td>Community</td>
<td>Decontamination Capacity Level</td>
</tr>
<tr>
<td>-----</td>
<td>--------------------------------</td>
<td>----------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>64</td>
<td>Queen Charlotte Islands General Hospital</td>
<td>Queen Charlotte</td>
<td>Limited</td>
</tr>
<tr>
<td>65</td>
<td>Stewart Health Centre</td>
<td>Stewart</td>
<td>Limited</td>
</tr>
<tr>
<td>66</td>
<td>Stikine Health Centre</td>
<td>Dease Lake</td>
<td>Limited</td>
</tr>
<tr>
<td>67</td>
<td>St. John Hospital</td>
<td>Vanderhoof</td>
<td>Limited</td>
</tr>
<tr>
<td>68</td>
<td>Stuart Lake Hospital</td>
<td>Fort St. James</td>
<td>Limited</td>
</tr>
<tr>
<td>69</td>
<td>Tumbler Ridge Community Health Centre</td>
<td>Tumbler Ridge</td>
<td>Limited</td>
</tr>
<tr>
<td>70</td>
<td>Valemount Community Health Centre</td>
<td>Valemount</td>
<td>Limited</td>
</tr>
<tr>
<td>71</td>
<td>Winch Memorial Hospital</td>
<td>Hazelton</td>
<td>Limited</td>
</tr>
<tr>
<td>72</td>
<td>Mount Saint Joseph Hospital</td>
<td>Vancouver</td>
<td>Full</td>
</tr>
<tr>
<td>73</td>
<td>St. Paul's Hospital</td>
<td>Vancouver</td>
<td>Full</td>
</tr>
<tr>
<td>74</td>
<td>Children and Women's Hospital</td>
<td>Vancouver</td>
<td>Full</td>
</tr>
</tbody>
</table>

**Providence Health Care**

<table>
<thead>
<tr>
<th>No.</th>
<th>Facility Name</th>
<th>Community</th>
<th>Decontamination Capacity Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>Bella Coola General Hospital</td>
<td>Bella Coola</td>
<td>Limited</td>
</tr>
<tr>
<td>76</td>
<td>Lions Gate Hospital</td>
<td>North Vancouver</td>
<td>Full</td>
</tr>
<tr>
<td>77</td>
<td>Pemberton Health Centre</td>
<td>Pemberton</td>
<td>Limited</td>
</tr>
<tr>
<td>78</td>
<td>Powell River General Hospital</td>
<td>Powell River</td>
<td>Full</td>
</tr>
<tr>
<td>79</td>
<td>Richmond Hospital</td>
<td>Richmond</td>
<td>Full</td>
</tr>
<tr>
<td>80</td>
<td>RW Large Memorial Hospital</td>
<td>Bella Bella</td>
<td>Limited</td>
</tr>
<tr>
<td>81</td>
<td>Squamish General Hospital</td>
<td>Squamish</td>
<td>Full</td>
</tr>
<tr>
<td>82</td>
<td>St. Mary's Hospital</td>
<td>Sechelt</td>
<td>Full</td>
</tr>
<tr>
<td>83</td>
<td>UBC Hospital and Urgent Care Centre</td>
<td>Vancouver</td>
<td>Limited</td>
</tr>
<tr>
<td>84</td>
<td>Vancouver General Hospital</td>
<td>Vancouver</td>
<td>Full</td>
</tr>
<tr>
<td>85</td>
<td>Whistler Health Care Centre</td>
<td>Whistler</td>
<td>Limited</td>
</tr>
</tbody>
</table>

**Vancouver Coastal**

<table>
<thead>
<tr>
<th>No.</th>
<th>Facility Name</th>
<th>Community</th>
<th>Decontamination Capacity Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>86</td>
<td>Campbell River &amp; District General Hospital</td>
<td>Campbell River</td>
<td>Full</td>
</tr>
<tr>
<td>87</td>
<td>Chemainus Health Care Centre</td>
<td>Chemainus</td>
<td>Limited</td>
</tr>
<tr>
<td>88</td>
<td>Cormorant Island Health Centre</td>
<td>Alert Bay</td>
<td>Limited</td>
</tr>
<tr>
<td>89</td>
<td>Cowichan District Hospital</td>
<td>Duncan</td>
<td>Full</td>
</tr>
<tr>
<td>90</td>
<td>Gold River Health Centre</td>
<td>Gold River</td>
<td>Limited</td>
</tr>
<tr>
<td>91</td>
<td>Lady Minto / Gulf Islands Hospital</td>
<td>Salt Spring Island</td>
<td>Limited</td>
</tr>
<tr>
<td>92</td>
<td>Ladysmith Community Health Centre</td>
<td>Ladysmith</td>
<td>Limited</td>
</tr>
<tr>
<td>93</td>
<td>Nanaimo Regional General Hospital</td>
<td>Nanaimo</td>
<td>Full</td>
</tr>
<tr>
<td>94</td>
<td>Port Alice Health Centre</td>
<td>Port Alice</td>
<td>Limited</td>
</tr>
<tr>
<td>95</td>
<td>Port Hardy Hospital</td>
<td>Port Hardy</td>
<td>Limited</td>
</tr>
<tr>
<td>96</td>
<td>Port McNeill and District Hospital</td>
<td>Port McNeill</td>
<td>Limited</td>
</tr>
<tr>
<td>97</td>
<td>Royal Jubilee Hospital</td>
<td>Victoria</td>
<td>Full</td>
</tr>
<tr>
<td>98</td>
<td>Saanich Peninsula Hospital</td>
<td>Central Saanich</td>
<td>Limited</td>
</tr>
<tr>
<td>99</td>
<td>St. Joseph's General Hospital</td>
<td>Comox</td>
<td>Full</td>
</tr>
<tr>
<td>100</td>
<td>Tahsis Health Centre</td>
<td>Tahsis</td>
<td>Limited</td>
</tr>
<tr>
<td>101</td>
<td>Tofino General Hospital</td>
<td>Tofino</td>
<td>Limited</td>
</tr>
<tr>
<td>102</td>
<td>Victoria General Hospital</td>
<td>Victoria</td>
<td>Full</td>
</tr>
<tr>
<td>103</td>
<td>West Coast: General Hospital</td>
<td>Port Alberni</td>
<td>Full</td>
</tr>
</tbody>
</table>
4. Patient Decontamination Overview

A consistent approach to hazardous substance preparedness among BC emergency departments demands a common vision of the steps in patient decontamination. This section outlines the expectations and core concepts for patient decontamination by first-receivers at emergency treatment facilities in BC.

Basic Functions

Health facility staff will perform a series of basic functions to contend with the arrival of contaminated patients. Figure 2 illustrates the overall flow of patients through triage and decontamination.

1. Receive Contaminated Patients
   A large number of self-referred patients may bypass the decontamination services provided by first responders at the scene. Emergency departments can anticipate some situations where there is little or no warning before contaminated patients begin arriving. Patients transported by the BCAS are received at Step 14 in Figure 2, and tested in Step 13 to ensure they have been effectively decontaminated prior to admission to the emergency department.

2. Receive Notification from Incident Site
   Ambulance crew members on scene at an event that involves hazardous substances will inform the BCAS Dispatch of the number of contaminated patients and the chemical or other agent involved. BCAS Dispatch advises all emergency departments who could possibly receive transports to prepare for potentially contaminated patients. Emergency departments may also be notified by the Ministry of Environment, Provincial Emergency Program, or the MoHS Emergency Management Unit.

3. Activate Decontamination Team and Support
   Upon notification, the

---

Figure 2. Flowchart of Decontamination Procedures
* In Full-Capability Facilities Only
Emergency Room Physician decides to activate the code for patient decontamination, which will:

- Activate Patient Decontamination Team members, who report to the Personnel Staging Area, put on PPE, and receive information about the agent and its symptoms;
- Notify security or designate to unlock the storage areas with decontamination shelter, and to initiate “lock down” of facility;
- Set up decontamination tents and tarps, and appropriate support equipment as needed.

The Emergency Room Physician will also inform the Administrator On-Call, who will activate the ICP and/or the EOC, as needed.

5. Life-Threatening Condition? – Any patient triaged as “immediate critical” is directed to medical staff for Basic Life Support. Medical staff members at this step are located in the Hot Zone and are required to wear PPE.

6. Provide Basic Life Support – If triage indicates a need for immediate life-saving medical care, patients receive Basic Life Support while being fast-tracked through decontamination for admission to the emergency department. Advanced Life Support, if needed is performed once patients are in the emergency department.

7. Test Clean? – Patients that test negative for contaminants (clean) are directed to Function 17 for final processing and support (e.g., DPS services). If testing shows contamination, patients are directed to Function 8 to begin decontamination.

8. Divide Male, Female, and Non-Ambulatory Patients – If several patients arrive together, they are separated by gender to provide privacy throughout the decontamination process. Non-ambulatory patients are assisted through decontamination via stretcher. Infant and youth will either join parents, guardians or other responsible adults in decontamination, or receive special protective care as non-ambulatory patients.

9. Remove Clothing, Valuables – Patients in privacy areas are instructed to remove their clothing and valuables, which are tagged for ownership. Decontaminated clothing and valuables will be returned to patients if approved by the police. Unclad patients move immediately to the gross decontamination area in the Warm Zone. Staff members maintain security of items, including evidence, until otherwise directed by police.

10. Perform Gross Decontamination – Gross decontamination relies on copious amounts of water, delivered by shower in privacy areas. Ambulatory patients are instructed to wash in showers located external to the emergency department, using warm water and mild soap.

2 Disrobing might remove as much as 75 to 90 percent of the contaminant arriving on a patient (Macintyre et al., 2000; Vogt, 2002; USACHPPM, 2003a).
Males and females use separate corridors, if available, or are processed by gender to provide privacy. After gross decontamination, patients dry themselves with paper towels provided in their gown kits. Non-ambulatory patients are assisted with drying, and are transferred to a clean decontamination stretcher.

11. Instruct Patients to Gown in Red – In full-capacity emergency departments, patients who complete gross decontamination are instructed to put on RED gowns while they wait for Technical Decontamination.

12. Perform Technical Decontamination – Where required in full-capacity facilities, patients are guided to an additional decontamination step, where medical and nursing staffs perform the required special decontamination and treatment. Patients dry themselves with paper towels provided in their gown kits.

13. Perform Second Test and Triage – After decontamination, patients are again tested for the presence of agents by qualified technicians. Triage checks for any changes in patient condition during decontamination.

14. Receive BCAS Patients – Patients who have been decontaminated by first responders at the scene are brought to this entrance by BCAS paramedics to be tested for contaminants. If there are one or two BCAS patients, they will arrive in Tyvek coveralls; patients from mass casualty incidents will arrive in green decontamination gowns. All patients must be tested and triaged as they arrive. If further decontamination is needed, the Green Gown is removed and the BCAS patients will be directed to the gross decontamination showers.

15. Test Clean? – Patients that test negative for contaminants are directed to Function 16. If a test is positive, patients are returned to Function 12 for technical decontamination, where supervised washing may be required.

16. Instruct Patients to Gown in Green – Patients that test negative for contaminants are given GREEN gowns and directed to the Emergency Department or to a medical observation area. Non-ambulatory patients are assisted with dressing. Good housekeeping practices ensure that refuse is properly handled.

17. Direct Patients to Observation Area – Asymptomatic patients may be sent to a holding area for medical observation for a period of time dictated by the nature of the agent. Patients are then discharged, with the recommendation to seek support at the Family Information Centre, where appropriate. Patients and family members are advised about DPS services (refer to Annex H).

18. Direct Patients to Emergency Department – Decontaminated patients in need of further medical care are directed to the emergency department for admission. The return of contaminated clothing and valuables will occur after testing for contaminants if authorized by the police. Patients are advised to retain their wrist tags. Once all patients have been processed, contaminated cadavers will be decontaminated and taken to the morgue.

19. Deactivate Decontamination Team – When staff members complete their shift in the Hot or Warm Zones, they must undergo decontamination while still wearing their PPE. Afterwards, they proceed to a “PPE Removal Area” (within the Warm Zone) to remove the equipment.

Before entering the Staging Area in the Cold Zone, staff members undergo testing for contamination. If contaminant agent is found, staff members follow the gross decontamination process and undergo additional testing. Staff then may return to the Staging Area to claim their clothes and personal belongings.

All decontamination team members participate in a debriefing of the decontamination functions and utilize available DPS services. All equipment that has been identified as re-usable is cleaned, refurbished and rendered operational. All other equipment is disposed as hazardous waste.

Other generic functions, such as a debriefing and an After-Action Report, are addressed under existing health authority all-hazard emergency plans.
Decontamination Zones and Infrastructure

To provide the decontamination services outlined in the flowchart shown in Figure 2, emergency departments in the province must have the appropriate infrastructure in place.

Infrastructure includes decontamination shelter, equipment, and supplies supporting the receipt and safe handling of contaminated patients. Trained physicians and staff with Level C PPE are an essential component of patient decontamination. Decontamination areas are divided into three zones:

Hot Zone – The Hot Zone is the triage and holding area, and presents the highest risk of exposure to contaminants as casualties arrive at the emergency treatment area. Patients undergo testing and triage at the entrance to the Hot Zone, commence the decontamination process by removing their clothing, and prepare to enter the Warm Zone. Because of the potential for exposure to dangerous agents, all first-receivers in the Hot Zone and those directing patients to the Hot Zone must wear Level C PPE.

Warm Zone – The Warm Zone is where all decontamination (washing/showering), initial medical treatment, and special needs treatment takes place. Once inside the Warm Zone, patients begin the process of rinsing-soaping-rinsing in a shower.

Medical and nursing staff clean wounds and take other actions to treat special needs through technical decontamination. Patients must test negative for contaminants before leaving the Warm Zone. All staff in this zone must wear Level C PPE.

Cold Zone – This area represents the clean location where contaminants are excluded, including a medical observation area where decontaminated persons who will not be admitted to the Emergency Department wait after decontamination. Staff members in this area must wear normal hospital clothing (Level D PPE), or protection required by routine practices and precautions for the control of infectious diseases.

Levels of Personal Protective Equipment (PPE)

Four levels of PPE protection are generally acceptable for workers potentially exposed to hazardous substances:

Level A – A fully-encapsulated, vapour-tight, chemical-resistant suit, chemical-resistant boots with steel toe and shank, chemical-resistant inner/outer gloves, coveralls, hard hat, and self-contained breathing apparatus.

Level B – Chemical-resistant clothing, non-vapour-tight suit, chemical-resistant boots and inner/outer gloves, and self-contained breathing apparatus.

Level C – Full face-piece, air-purifying-canister-equipped respirator, and chemical-resistant boots and outer gloves.

Level D – Standard work clothes without a respirator, including surgical gown, mask, and latex gloves.

Health care workers engaged in patient decontamination are only required to wear either Level C or Level D PPE.

In a typical decontamination set up, casualties move from the Hot Zone through the Warm Zone to the Cold Zone. There are differences, however, in the infrastructure requirements of limited-capacity and full-capacity facilities, as explained in the subsections below.

Limited Capacity Health Facilities

Sixty-two emergency departments in the province are considered limited decontamination capacity facilities. They may expect to decontaminate no more than 10 patients per hour. Figure 3 shows a schematic illustration of the infrastructure requirements for a limited-capacity health facility. The representation is not drawn to scale and assumes use of available internal space for the Staff Staging Area, and external space for decontamination. Individual facilities may differ, subject to site-specific planning.

\[3\] Adapted from Winnipeg Regional Health Authority
Each area in the limited decontamination capacity facility is briefly described below:

**HOT ZONE (Limited-Capacity Facilities)**

**Patient Arrival Area** – Self-referred patients (not transported by ambulance) would be directed by signs and instruction to an entrance to the decontamination shelter, such as the tent indicated in the diagram. External lighting will be needed for night operations. All staff members wear Level C PPE while in Hot and Warm Zones.

**Initial Test and Triage Area** – Space and equipment must be provided in this area for incoming patients to undergo testing and triage. Signs and hand-written messages may be required for these steps. Basic Life Support would be performed in this area, if necessary. If patients need to be fast-tracked to the emergency department for life saving procedures, staff will take them rapidly through the
decontamination process. Bag valve masks should be available to staff to perform simple airway maintenance manoeuvres, as required. Available medical supplies should include common antidotes and medications.

**Clothing and Valuables Removal Area** – Patients are separated by gender and receive kits containing paper towels, red and green gowns, slippers, and plastic bags for their valuables. Kit instructions show the process for stripping, placing contaminated clothing in one bag (e.g., a clear bag large enough for bulky winter clothing), valuables in another bag, and bar-code wrist bands so patients can later reclaim valuables, if permitted.

Privacy screens should be available to separate males and females, and a bench should be provided for patients removing their clothes. The storage of valuables requires a locking cabinet.

**PPE Removal Area** – Once staff members complete their shift and enter the PPE Removal Area (in Hot Zone), they remove PPE in a manner that avoids contamination to their body, and place used PPE in receptacles. Before entering the Staging Area (in the Cold Zone), each staff member is tested for contamination. If a contaminant is identified, the staff member is returned to decontamination through the PPE removal area. Test records are maintained throughout the process.

**WARM ZONE** (Limited-Capacity Facilities)

**Gross Decontamination Area** – A single shower area should be available for use in turn by male, female, and non-ambulatory patients. Showers should have multiple heads and include hand-held devices. Shower water would be heated via a portable or built-in water heater system. Following gross decontamination, patients dry themselves with paper towels provided in their kits.

Shower mats raise ambulatory patients above the rinse water; non-ambulatory patients are decontaminated while on a stretcher. The gross decontamination area may be surrounded by a low dike to collect waste water. An air space heater would distribute warm air throughout the gross decontamination tent.

While no regulatory mandate in BC details the containment of wastewater from patient decontamination, each site must be capable of containing wastewater for the potential number of patients that may require decontamination (e.g., 10 patients per hour for limited-capacity facilities).

**Second Test and Triage Area** – Qualified technicians test patients for the presence of contaminants using appropriate equipment. Staff members continue with patient tracking by noting the results of this test and triage step.

**BCAS Patient Delivery Point** – BCAS paramedics should deliver decontaminated patients to the decontamination zone at the location where Second Test and Triage services are performed on the BCAS patients.

**Dress Area** – When tests indicate that the patient is free of contamination, the patient puts on a green gown, indicating decontamination is complete. Non-ambulatory patients are assisted with drying and dressing, and are transferred to a clean decontamination stretcher.

**COLD ZONE** (Limited-Capacity Facilities)

**Emergency Department** – All decontaminated patients are directed to the emergency department. If admitted, patients exchange their green gowns for hospital gowns. If discharged, hospitals have protocols for providing appropriate clothing. Prior to leaving the emergency department, the patient tracking record must be updated for each patient.
Personnel Staging Area – The Staging Area stores PPE and communications equipment prior to use. Equipment in this area includes lockers for staff clothing and valuables, including padlocks and keys. Access to washrooms in or near the Staging Area is essential. The Staging Area should also have ready access to refrigeration for storing cool gel packs for the thermal vests.

The Staging Area must offer electrical power to support battery recharging units and communications equipment on continuous charge. Suitable lockers or rooms should provide for the storage of tents and tarps and support equipment.

Other miscellaneous items stored in this area should include garbage cans, bags, sponges, soap, bowls, antidotes, ventilator supplies, sharps containers, and other equipment. The Staging Area may be a multi-use room, not solely dedicated to decontamination.

Full-Capacity Health Facilities

Forty-one emergency departments in BC currently call for full decontamination capacity. Figure 4 depicts the flow of contaminated patients through a full-capacity facility, where the design throughput anticipates as many as 30 patients per hour. As with the previous diagram, this schematic is not drawn to scale.

Requirements for full decontamination capacity facilities are described below.

HOT ZONE (Full-Capacity Facilities)

Patient Arrival Area – As with the limited-capacity facilities, the Patient Arrival Area must include signs and external lighting that make it obvious to all incoming patients where the correct entrance is located. When many patients arrive by automobile, a parking area should be identified to hold and test vehicles for contamination. Vehicles may or may not be important sources of contamination depending on the agent. Contaminated patients may need to be held here pending set-up of the decontamination system or until capacity meets or exceeds demand.

Initial Test and Triage – At the discretion of the Decontamination Unit Leader, testing may occur as patients arrive, or after gross decontamination. The entrance to the decontamination area needs space for patient testing and triage, as well as equipment and electrical power to perform the tests. Staff may require signs and hand-written messages to assist patients with these functions. Patients also receive Basic Life Support, if needed, in the initial triage area.

Antidotes and medications should be available in this area. A route should be provided for patients who test clean on arrival to be redirected to the Observation Area for final processing and support.

Clothing and Valuables Removal Area – Privacy screens divide the clothing removal area into three streams, such as males to the left, females to the right, and non-ambulatory patients in the centre.

Patients are provided with gown kits, which include instructions for removing contaminated clothing to a specified receptacle (e.g., a large clear plastic bag), placing valuables in plastic bags, and retaining the bar-code wrist bands.

A bench would assist patients in removing their clothing. A locking cabinet is required to store patient valuables.
PPE Removal Area – Staff members remove PPE in this area in a manner that avoids contamination to their body, and place used PPE in receptacles. Each staff member is tested for contamination before leaving the PPE Removal Area. If a contaminant is identified, the staff member is returned to the gross decontamination step.

Staff records are completed immediately on exiting the area. PPE removal areas should anticipate wet floors and the need for drainage. This area may require decontamination.
WARM ZONE (Full-Capacity Facilities)

Gross Decontamination Area – Three shower lines are provided to separate male, female, and non-ambulatory patients. Shower water should be pre-heated to a set temperature. Shower mats allow patients to avoid walking through the rinse water. Non-ambulatory patients would be decontaminated while on a decontamination stretcher.

The gross decontamination area may be surrounded by a low dike to collect waste water. A drain, transfer line, and pump system collects waste water for temporary storage in a rubber bladder designed for this purpose. An air space heater distributes warm air throughout the Gross Decontamination area.

To speed throughput when required, patients who were minimally exposed to the contaminant and who undergo gross decontamination could be allowed to proceed to the Second Test and Triage.

Dress Area 1 – At this point, patients put on their red gowns, indicating decontamination may not be complete. Signs in this area would explain more about the decontamination process and what patients can expect.

Technical Decontamination Area – To accommodate the elevated throughput rate expected at full decontamination capacity facilities, staff would deploy the “three-line decontamination” system for technical decontamination. After leaving the waiting area, patients discard their red gowns prior to entering technical decontamination showers. This system includes warm-water showers, with multiple shower heads and skin cleansing supplies, in separate lines for male, female, and non-ambulatory patients. Staff members dressed in Level C PPE are available to perform technical decontamination, as necessary.

Following technical decontamination, patients again dry themselves with paper towels from their gown kits. As with the gross decontamination area, shower mats allow walking patients to avoid rinse water, and the waste water is collected.

Second Test and Triage Area – Testing equipment is needed at this location in the decontamination zone. Staff members continue the patient tracking system by noting the results of the test and triage.

BCAS Delivery Point – Decontamination systems should include signage and openings that facilitate delivery of decontaminated patients by BCAS crews. All BCAS patients are tested for contamination prior to patient admission to the emergency department.

Dress Area 2 – Once testing indicates the decontamination process is complete, patients put on green gowns. Non-ambulatory patients are assisted with dressing, and are transferred to a clean decontamination stretcher.

---

4. The need for wastewater control systems when few patients are involved depends on the type of agent and location of the facility. Runoff to municipal sanitary sewers may be acceptable for small amounts of wastewater.

5. Due to the range of languages spoken in BC, Visual Indicator Signs are preferred.

6. Some BC hospitals have dedicated rooms for this function. The three-line decontamination system may not be used in every event.
COLD ZONE (Full-Capacity Facilities)

Observation Area – The medical Observation Area is in a Cold Zone. Decontaminated patients awaiting discharge may be required to remain in the Observation Area for continual monitoring by medical or nursing staff, depending on the nature of the agent involved. If discharged, hospitals have protocols for providing appropriate clothing.

Staff members in the Observation Area need only wear normal hospital clothing (Level D PPE).

Emergency Department – After staff members have updated patient tracking records, the decontaminated patients who are to be admitted to the emergency department are fast-tracked through the Observation Area. Patients admitted to the emergency department exchange their green gowns for hospital gowns.

If authorized by the police, clothing and valuables will be returned following careful decontamination and testing. Patients are advised to retain their wrist tags.

Personnel Staging Area – For full decontamination capacity facilities, the Staging Area should be large enough for the maximum number of staff to suit up simultaneously, including places to sit while putting on leggings and booties.

Furnishings should include lockers, padlocks, and keys for staff personal valuable, and there should be enough lockers for two simultaneous shifts of personnel. A privacy screen may be requested by staff, and access to washrooms must be provided.

Decontamination tents, tarps and other equipment must be stored in secure, heated, and dry lockers or rooms. PPE, batteries, and communications equipment are stored in the Staging Area prior to use. A formal inspection process must be implemented to ensure operational readiness.

“There cannot be a dependence on the BCAS or fire services to provide the sole source of decontamination at a hospital site. These services will assist when you can but it is quite likely that they would be detailed to the site of the incident to assist there and to attempt to ensure that the contaminant does not leave the site.”


7 Professional decontamination may be necessary for items of clothing and valuables. Patients must authorize this process for cost recovery from patient.
Patient Decontamination Unit Organization

Health facility staff members are needed to perform the functions identified in the previous section, and they act as a coordinated team. HEM Council recommends a specific organization structure for patient decontamination, based on the principles of the HICS.

For incidents where patient decontamination is required, staff should utilize the HICS response organization to create a Patient Decontamination Unit in the Hazardous Materials Branch of the Operations Section, as suggested in Figure 5 and discussed below.

Every health authority in the province has adopted the HICS as a generic guide to emergency response. HICS includes a generic organization structure that can be adapted to meet the needs of specific incidents.

For example, the generic HICS organization includes an IC, responsible for directing activities and personnel acting on behalf of the health authority. A Safety Officer maintains a watch for hazards to the responders and ensures all safety measures are in place. A Liaison Officer ensures that any assisting agency receives the information they need, and communicates with all support agencies.

These and other members of the health facility emergency response organization perform their functions at the hospital EOC, which would be activated in incidents requiring decontamination of many patients. An EOC may not be needed to manage a small incident, e.g. one or two patients.

All-hazard emergency response plans for each health authority contain further information on how HICS is implemented in an emergency. Under HICS, a Patient Decontamination Unit is dedicated to the task of decontaminating patients as they arrive at an emergency department. The Decontamination Unit, among several other units, serves in the site Operations Section of the HICS model, and can expect support in terms of information, resources, and policy-making through the EOC. The full organization structure required for patient decontamination includes the functions described below.

Decontamination Team

Patient Decontamination Unit Leader – The Patient Decontamination Unit Leader controls all decontamination team members, and ensures that staff coordinate their efforts. The Patient Decontamination Unit Leader reports to the Hazardous Materials Branch Director, if activated, or to the Operations Section Chief. Some situations may call for the Patient Decontamination Unit Leader to report to an IC.

Personnel Staging Team – Staff members responding to the need for patient
decontamination and treatment report to a pre-designated location to receive instructions, to access the appropriate PPE and respiratory protection, and to acquire communications equipment. A Personnel Staging Team assists all responders with these activities, and initiates a record for each staff member.

**Decontamination Team** – Members of the Decontamination Team are responsible for assisting patients with gross and technical decontamination. They also ensure that contaminated valuables and evidence are collected and safely stored in a secure location.

The Decontamination Team also sets up the shelters, although there may be little or no need for shelters if the external decontamination facilities are permanently affixed to the building and always available.

**Treatment Team** – Physicians and nursing staff comprise the Treatment Team, with prime responsibility for triage, urgent medical care, and special testing and treatment. As with all other responders in the Hot and Warm Zones, members of the Treatment Team are required to wear Level C PPE, including respiratory protection, at all times.

**Detection / Monitoring Team** – Specialists in agent detection are required to ensure the decontamination procedures are effective. Members of this team test patients for the presence of contaminants at various stages in the process, and are also required to wear Level C PPE, including respiratory protection, at all times.

**Support Functions**

**Safety Officer** – A Safety Officer is present at the decontamination zone to ensure that all personnel safety measures are followed correctly.

**Security** – Security staff controls access to the decontamination zone, and manages any traffic control issues. Security staff arranges for at least one member to stand-by in Level C PPE and respiratory protection to ensure staff safety in the event of an unruly patient. If additional security resources are available, they should also be readily operational in PPE and on stand-by to assist, if needed, in controlling a large number of unruly contaminated patients.

**Patient Tracking** – Patient Tracking monitors the progress of each patient through the decontamination and treatment procedures, and ensure that records are forwarded to the Planning Section.

**Environmental Services** – Environmental Services consults with local government and appropriate regulatory agencies on the discharge of contaminated wastewater, and arranges for waste water disposal in compliance with regulatory agency guidelines.
Decontamination Personnel

With the foregoing summary of functions, infrastructure, and organization, this section anticipates the number of personnel needed for effective patient decontamination. In actuality, the number of staff depends on the number of patients who require decontamination over a given time period. Handling more patients per hour requires more personnel.

To provide a rough estimate of the staff required, Figure 6 indicates the number and type of personnel required for two scenarios: 10 patients per hour, and 30 patients per hour. If arrangements exist, health facilities may call on partners (e.g., fire, ambulance) for support when health staff members are not available.

<table>
<thead>
<tr>
<th>Decontamination Functions</th>
<th>Patient Decontamination Function</th>
<th># Personnel for 10 Patients Per Hour</th>
<th># Personnel for 30 Patients Per Hour</th>
<th>Positions that May Serve in Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Decontamination Unit Leader</td>
<td>1</td>
<td>1</td>
<td>Operations support</td>
<td></td>
</tr>
<tr>
<td>Personnel Staging Team</td>
<td>Assist team with PPE</td>
<td>1</td>
<td>1</td>
<td>Any trained personnel</td>
</tr>
<tr>
<td>Provide communications equipment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Track staff status, report</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decontamination Team</td>
<td>Set up decontamination equipment</td>
<td>3</td>
<td>6</td>
<td>Any trained personnel</td>
</tr>
<tr>
<td>Gross decontamination</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical decontamination</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valuables / evidence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment Team</td>
<td>Triage</td>
<td>4</td>
<td>4</td>
<td>Physicians</td>
</tr>
<tr>
<td>Basic Life Support</td>
<td></td>
<td></td>
<td></td>
<td>Nursing staff</td>
</tr>
<tr>
<td>Detection and Monitoring Team</td>
<td>Patient testing</td>
<td>1</td>
<td>2</td>
<td>Any trained personnel</td>
</tr>
<tr>
<td>Staff testing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety Officer</td>
<td>1</td>
<td>1</td>
<td>OH&amp;S personnel</td>
<td></td>
</tr>
<tr>
<td>Security</td>
<td>Access control (external)</td>
<td>2</td>
<td>5</td>
<td>Security / Police / Facilities / Contractors</td>
</tr>
<tr>
<td>Traffic control (external)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff security (safety)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient Tracking</td>
<td>1</td>
<td>1</td>
<td>Patient Placement and Registration Dept. Staff</td>
<td></td>
</tr>
<tr>
<td>Environmental Services</td>
<td>Air monitoring (external)</td>
<td>0</td>
<td>1</td>
<td>Public health</td>
</tr>
<tr>
<td>Waste water monitoring (external)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Personnel</td>
<td>14</td>
<td>26</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Members of the recommended decontamination team may be drawn from health care facility staff, physicians, and nursing staff, or from other health staff. Hospital staffing requirements could be reduced if local fire and ambulance crews joined the decontamination team under pre-existing arrangements. Some staff may perform more than one function at a time thereby reducing the overall staff requirements.

Patient decontamination requires at least 3 trained personnel for processing 10 patients per hour, and 6 staff for 30 patients per hour. The Treatment Team for both limited-capacity and full-capacity facilities requires a minimum of four physicians and members of the nursing staff.
Decontamination Scenarios

The flexibility of the HICS emergency response model for health facilities allows the organization devoted to patient decontamination to grow or shrink according to the requirements of the situation. To envision the actions at limited-capacity and full-capacity emergency departments under different circumstances, Figure 7 contrasts the anticipated actions at limited decontamination capacity facilities (up to 10 patients per hour) and full decontamination capacity facilities (up to 30 patients per hour) over a range of scenarios.

**Figure 7. Comparison of Actions at Limited-capacity and Full-capacity Facilities by Scenario**

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Actions at Limited-Capacity Facility</th>
<th>Actions at Full-Capacity Facility</th>
</tr>
</thead>
</table>
| **Scenario A: 1 to 3 patients/hr**  
Three patients involved in a drug lab explosion self-refer to the emergency department and are stopped outside. | • Following triage, immediately refer patients to gross decontamination showers.  
• Staging Area used to put on PPE.  
• Partial set up of shelter areas for clothing removal, gross decon, and second test.  
• Decon Unit of about 6. | • Following triage, immediately refer patients to gross decon showers.  
• Staging Area used to put on PPE.  
• Partial set up of shelter areas for clothing removal, gross decon, and second test.  
• Decon Unit of about 6. |
| **Scenario B: 4 to 10 patients/hr**  
A tanker truck spill at a major intersection near hospital exposes motorists to flammable and toxic liquids. | • Full set up of gross decon shelter and support equipment.  
• Full use of Staging Area.  
• Set up PPE Removal Area.  
• Decon Unit of about 14. | • Rely on ready-for-use gross decon showers and shelter only.  
• No use of “three-line tent.”  
• Use of Staging Area.  
• Set up PPE Removal Area.  
• Decon Unit of about 14. |
| **Scenario C: 11 to 30 patients/hr**  
Spill of a toxic liquid at a pulp and paper mill exposes workers and their clothing. | • Full set up and decon staff.  
• Divert patients to other facilities.  
• BCAS / Fire support personnel on Decon Unit. | • Full set up of gross decon shelter and three-line technical decon tent.  
• Full use of Staging Area.  
• Set up PPE Removal Area.  
• Decon Unit of about 24. |
| **Scenario D: More than 30 patients/hr**  
A terrorism incident exposes hundreds of people to a toxic gas, such as Sarin. | • Full set up and decon staff.  
• Divert patients to full capacity facility.  
• BCAS / Fire support personnel on Decon Unit.  
• Call for mutual aid assistance through Health Authority, if required. | • Full set up and decon staff.  
• Divert patients to other full-capacity facility.  
• BCAS / Fire support personnel.  
• Call for Mutual Aid Assistance through Health Authority. |
| **Scenario E: Contaminated Patient in Emergency Department**  
An attempted suicide patient arrives at the emergency department and vomits in the waiting room, contaminating patients and staff. | • Immediate lock down.  
• Isolate and identify exposed personnel.  
• Decon patients and staff, if needed, using gross decon shelter and support equipment.  
• Decon emergency room and furnishings using contractor. | • Same as for limited-capacity facility |

Figure 7 highlights that the deployment of Decontamination Unit staff and equipment may vary to match the demands of the situation. Not every Decontamination Unit member must respond to every event. The single most useful infrastructure feature is a ready-to-use external shower system for gross decontamination. It is important that procedures are in place for both the diversion of patients and augmenting available staff and equipment through mutual aid, when needed.
5. Guidelines for Preparedness

Preparing for patient decontamination, with the elements of Section 4 in mind, demands a province-wide concentrated and coordinated effort.

Figure 8 suggests a series of eight distinct steps in preparing health facilities for patient decontamination:

- Step 1 – Get Organized
- Step 2 – Select Personnel
- Step 3 – Set Up Infrastructure
- Step 4 – Acquire Equipment / Supplies
- Step 5 – Prepare Response Plan
- Step 6 – Deliver Initial Training
- Step 7 – Facilitate Initial Exercises
- Step 8 – Maintain Program

Each step outlines the activities required to accomplish a significant objective, and all must be completed to assure preparedness.

Some steps must follow others. For example, Step 6 – Deliver Initial Training, can only effectively be completed after Step 5 – Prepare Response Plan.

Others may be concurrent, as with the set up of infrastructure and acquisition of equipment and supplies (Steps 3 and 4).

The Ministry recommends that each health authority use the information provided in this section to complete the suggested series of activities. Note that there may be a provincial timetable for coordinating such joint activities as bulk equipment purchasing and training.

Each of these eight steps is described in the following pages in terms of the context and suggested activities. These guidelines include tips for successful implementation and examples of best practices from other organizations.
Step 1 – Get Organized

Context

Health Authority Patient Decontamination Preparedness Committee – Health authority representatives must come together and generate a plan for patient decontamination specific to each emergency treatment facility. The Patient Decontamination Preparedness Committee must have a mandate to develop plans, to acquire resources, and to oversee all aspects of preparedness. Recommended positions on the Committee include the following:

- BCAS Supervisor
- Chief Medical Health Officer
- Communications Director
- Emergency Room Physician
- Facilities / Plant Services Director
- Health Emergency Mgmt. Director
- Human Resource Director
- Infection Control Director
- Logistics (Support Services) Director
- Nuclear Medicine Director
- Nursing Director (Acute Care)
- Occupational Health and Safety Director
- Project Manager
- Psychiatry / Social Work Director
- Training Director
- Protection Services Director

Annex B suggests the role of each position in the Patient Decontamination Preparedness Committee. Subcommittees may be assigned as needed to complete specific steps. Implementation may involve Health Service Area managers.

Schedule – The Patient Decontamination Preparedness Committee must set a schedule for completing all steps in preparedness that recognizes the provincial intent of collaboration on equipment acquisition and training.

Budget – Health Authorities should consider the following cost categories in order to effectively plan for funding an ongoing and sustainable Patient Decontamination Program (Refer to Step 8):

- Purchase of equipment and materials
- Facilities upgrade (e.g., external shower)
- Replacement of consumable materials and equipment consumed during training and exercises
- Equipment maintenance
- Staff training and Exercises
- Contractor support, if needed
Step 1 – Get Organized

**Preparedness Actions**

1. HEM Director and VP responsible for Emergency Management identify committee members, including Technical Assistants from BCAS, to guide preparedness for patient decontamination.
2. Assign a Project Manager.
3. Develop a Patient Decontamination Project Plan addressing actions, schedule, responsibilities, budget, and monitoring.
4. Work through Health Authority HEM Director and Ministry for bulk purchases.
5. Set up and prepare an Annual Report (by OH&S, Health Emergency Manager, or Risk Manager) on patient decontamination preparedness.
6. Prepare an annual budget and report to Chief Executive Officer.

**Tips for Success...**

For a successful first Patient Decontamination Preparedness Committee meeting:
- Arrange for a subject matter expert to deliver an overview of patient decontamination as it relates to health care covering:
  - Mitigation/Prevention
  - Preparedness
  - Response
  - Recovery
- Outline gaps and vulnerabilities, e.g., staff safety, WorkSafe BC regulations, and potential threats to emergency departments
- Present an overview of the Patient Decontamination Project
- Present a summary of the BC Guidelines for Decontamination of Patients in Health Facilities
- Address the current status, specifically: “What are the gaps between best practices as presented in the BC Guidelines and our preparedness today?”

**Sample Best Practices...**

**Ontario Ministry of Health & Long Term Care –**
Ontario’s Hospital CBRN\(^8\) Emergency Preparedness Program introduced a three-year Action Plan in 2004 that advanced all emergency departments in Ontario to a level of operational readiness.

Hospital physicians and staff are ready to respond effectively to decontaminate patients:
- Who refer themselves to the hospital
- Are triaged critically ill at the scene and require more thorough decontamination (i.e., not duplication of first responder responsibilities.)

Ontario standardized the program for all hospital sites that offer emergency/urgent care to enhance inter- and intra-operability and cost effectiveness, including:
- Supplies and equipment
- Related training
- Education for health care workers
- Regional emergency exercises

\(^8\) CBRN = Chemical, Biological, Radiological, Nuclear
Step 2 – Select Personnel

Context

Number of Trained Personnel – The number of personnel required to safely manage decontamination depends on the assumed number of simultaneous patients. As summarized in Figure 6 in Section 4, limited-capacity facilities require patient decontamination teams of at least 14 persons, and full-capacity facilities require 26. These teams include all security and support positions. Only 4 physicians and nursing staff members are required per team. Some staff may perform more than one function at a time, thereby reducing the overall staff requirements.

Type of Positions – The functions required for patient decontamination dictate the type of trained personnel to select. Physicians and nurses represent the primary individuals responsible for the care of patients. Nursing staff may also assist in decontamination, treatment, and psychological support of patients under the direction of the Emergency Room Physician. Other facility staff, including engineering, housekeeping, and security personnel may organize and set up the decontamination area and equipment.

Medical Screening – The use of PPE and respiratory protection can lead to heat-related impairment, psychological trauma, and unforeseen injury among decontamination staff. Therefore, all personnel designated for patient decontamination must be medically screened before training and assignment. Screening should be repeated periodically. Annex C offers a Medical Screening Questionnaire, adapted from Alberta Health Services – Edmonton.

Preparedness Actions

1. Prepare a master list of all possible health facility and health authority personnel needed for incidents requiring patient decontamination. Assume a team of 14 persons is needed for limited-capacity health facilities and 26 for full-capacity facilities.

2. Screen personnel for suitability, considering the questions offered in Annex C. Retain completed screening forms in confidential personnel files.

3. Finalize the list for training.

4. Monitor ongoing availability of trained staff.
Step 2 – Select Personnel

Tips for Success...

1. Arrange for live demonstrations of the decontamination equipment set-up, specifically for members of the Patient Decontamination Preparedness Committee. Open the invitation to anyone who could participate in patient decontamination.

2. Others should be invited to the demonstration for information exposure, e.g., executives, senior management, health authority OH&S committee members, support staff among nursing, physicians, logistics, security, facilities, maintenance, etc.

3. Invite local and regional BCAS paramedics and fire departments to the demonstration.

4. Distribute a questionnaire soliciting feedback on the demonstration, particularly on the personnel that should be identified and trained to support patient decontamination at emergency treatment facilities.

5. Meet with key players to discuss roles and the allocation of staff.

6. Work closely with labour relations representatives and OH&S committees.

Sample Best Practices...

The Royal Columbian Hospital, Fraser Health – In 2007, Fraser Health set out a program to decontaminate chemically-contaminated patients.

Administration of the program is overseen by the Royal Columbian Hospital Emergency Department, Protection Services & Emergency Management, Respiratory Therapy, and Workplace Health.

Various departments and individuals have specific responsibilities to ensure its successful implementation and ongoing maintenance:

- **Executive Team and Directors**: Senior Management is responsible for ensuring the health and safety of all Fraser Health employees.

- **Supervisors Management / Supervisors**: Work collaboratively with the Hospital Emergency Department, Protection Services & Emergency Management, Respiratory Therapy, and Workplace Health in the implementation and maintenance of the Program.

- **Employees**: Participate in all required education and training programs as outlined in this Program.

- **Joint Occupational Safety and Health Committee**: Promote awareness of and actively participate in the effective implementation of the Program.
Step 3 – Set Up Infrastructure

Context

Hot Zone – The Hot Zone represents an area where an emergency treatment facility will receive contaminated patients before decontamination. All emergency treatment departments should be able to intercept patients external to the facility. Patients are triaged and those requiring immediate care are given Basic Life Support. First-receivers wear Level C PPE while working in this zone.

Warm Zone – This area includes an immediately accessible gross-decontamination showering facility, located external to the emergency department. As a minimum, every emergency treatment facility should have ready access to two external showers with privacy screens for gender separation. The Warm Zone also contains the technical decontamination step, and should be located in an area where access can be restricted. First-receivers wear Level C PPE, including full respiratory protection, in the Warm Zone with the presumption that contaminating agents may be present.

Cold Zone – Following testing in the Warm Zone that indicates successful decontamination, patients are directed to appropriate follow-up care or discharge. All facilities and personnel located in the Cold Zone are presumed to be free of contaminating agents, but standard hospital clothing (Level D PPE) is expected.

Equipment Storage Area – Patient decontamination equipment carts should be stored where the potential patients are predicted to approach for medical care. WorkSafe BC sets the requirements for PPE and respiratory protection equipment. All employers must ensure that appropriate PPE (Level C) is continually in a state of operational readiness and stored in readily accessible and secure locations.

Containment of Contaminated Wastewater – While no regulation in BC details the containment of wastewater from patient decontamination, each emergency treatment facility must be capable of containing wastewater for the potential number of patients that may require decontamination (e.g., 10 patients per hour for limited decontamination capacity facilities). Facilities should also make reasonable contingency plans for controlling waste water when patient decontamination rates exceed their capacity.

Preparedness Actions

1. Prepare and submit a capital project request to Facilities, Plant Services or Operations for any construction needed to support Hot and Warm Zone response activities.
2. Identify a cost centre to support individual projects.
3. Approve final drawings and plans.
4. Inspect the work during construction and on completion.
5. Refer to Annex D for recommended infrastructure elements.

BC Ministry of Health Services
Step 3 – Set Up Infrastructure

Tips for Success...

- As a minimum, every emergency department in the province should have a rapid-access shower system external to the emergency department, in either a fixed or semi-fixed installation. The system should have at least two shower heads and must be available at all times.
- New facility design should examine the need to include decontamination infrastructure.
- Conduct early discussions with Director Facility Planning & Design regarding:
  - Concept of operations of the decontamination facility
  - Capital planning and funding opportunities
- Conduct decontamination site suitability and environmental assessments, including:
  - Prevailing wind situation, cold weather effects
  - Effects of high winds from surrounding buildings on proposed site, e.g., funnelling / gusting effects
  - Adjacent buildings and windows regarding privacy factors for decon patients, i.e., dressing and undressing
  - Proximity to any building systems, e.g., heating, ventilation, air-conditioning air intakes
  - Area drains, storm or sewer
  - Access and egress control routes for suitability
- Consult with first responder agencies regarding layout and location, e.g. routes, location of fire apparatus.

Sample Best Practices...

Vancouver General Hospital – VGH developed an external shower/eye wash station, for gross decontamination, and located it near the emergency department entrance.

"Vancouver General Hospital's Emergency Department's external shower should be a standard that is in place at every hospital in the Province."

Rene Bernklau, BCAS Provincial Coordinator, HSR/CBRNE Team. April 2007

Gross Decon Shower Located Outside VGH Emergency Department

External showers could meet best practice levels by conducting a site inspection using the BC Guidelines for Decontamination of Patients in Health Facilities as a reference, e.g., installing privacy curtains and weather protection, and providing berm and drainage.

"A best practice system would have the hospital decontamination infrastructure or system fixed to the external structure of the hospital. The idea behind this is to provide an area separate from the main health care facility, preventing facility contamination."

Science Applications International Corporation, Homeland Security Support Division
Step 4 – Acquire Equipment and Supplies

Context

Decontamination Equipment – Two types of equipment represent the mainstay of the patient decontamination process:

- **Patient gown kits** for use after decontamination. Gowns come in three sizes, including paediatrics. Red gowns are worn during decontamination, and green gowns are used for post decontamination. Kits include bar-codes for the matching and return of valuables.
- **Three-line shower system** for technical decontamination represented by the equipment purchased by the province in 2004.

Annex E lists the types and quantities of decontamination equipment that should be present at emergency treatment facilities in BC.

Personal Protective Equipment – Level C PPE is required for all first-receivers working in Hot and Warm Zones. Protective clothing includes chemical-resistant garments, gloves, and boots. For the Cold Zone in health facilities, surgical gown, mask, and latex gloves (universal precautions) without a respirator are acceptable (Level D PPE). All PPE must conform to standards of the Canadian Standards Association (CSA) and WorkSafe BC, and should reflect the standards of the US National Institute for Occupational Safety and Health (NIOSH) and US Occupational Safety and Health Administration (OSHA). Appendix E offers guidance on the types of PPE that should be available at each facility.

Respiratory Protection – Every person designated for response in the Hot or Warm Zones is required to wear a respirator. The selection of respiratory protection equipment must comply with the CSA Standard Z94.4-02. Employees must be provided with equipment that fits appropriately, and be trained in its use. Guidance on the types of respiratory protection that should be available at each facility may be found in Appendix E.

Communications Equipment – To ensure first-receiver teams have the support they need, each emergency treatment facility must have ready access to site communications equipment. A minimum, two-way radio communications (no base station) are required for Decontamination Unit personnel, including the Security Team.

Medical Supplies – The amount and type of antidotes and treatment pharmaceuticals to have on hand at each facility should match the expected needs. The provision of pharmaceutical supplies is a tiered response in BC, with regional supplies backed by provincial and/or federal levels of government, depending on the size and nature of the incident.

Maintenance and Refurbishment – Equipment may be stored for long periods before use; routine equipment maintenance and recertification is required. Stored equipment requires monthly inspections by a certified individual. Following the use of equipment in incidents and exercises, all equipment must be inspected and recertified to ensure it is in satisfactory working condition. See Step 8 for more guidance on equipment maintenance.

Records – Records must be maintained for the acquisition of all equipment, and any new installations. For example, changes in respiratory cartridges must be completed according to schedule and recorded.
Step 4 – Acquire Equipment and Supplies

Preparedness Actions

1. Review and revise the inventory of equipment. See Annex E for Inventory.
2. Arrange for acquisition through bulk purchases. Specify delivery sites.
3. Check inventory on arrival, and establish an inventory control method, including record-keeping.
4. Perform initial activation of equipment and test all elements on arrival.
5. Arrange ancillary sources of equipment – If an event becomes protracted requiring a shift change more equipment may be needed at the facility.
6. Arrange equipment maintenance schedule.

Tips for Success...

- To reduce costs, conduct a complete review of all patient decontamination equipment currently in place within your health authority and cross reference with the recommended list of equipment and supplies (Annex E – Equipment Inventory). Identify health authority needs accordingly.
- Review the use of existing communication devices (2-way radios) within the health authority. Re-commission any out-of-service equipment to augment needs of patient decontamination program.
- Purchase new 2-way radio equipment to recognize interoperability with existing site equipment, e.g., security, maintenance etc. Radios should include external speakers to enhance communication with patients.
- Coordinate equipment purchases with HEM Council and MoHS EMU to support bulk purchases, and to ensure compatible and standardized equipment needed for interoperability.
- Inventory health authority pharmaceuticals necessary for contaminated patient emergency care purposes. Develop contingency plans for augmenting these supplies during an emergency.

Sample Best Practices...

Alberta Health Services – Calgary – In developing their patient decontamination program, AHS-Calgary relied heavily on the OSHA Best Practices for Hospital First-Responders for Patients from MCI’s Following the Release of Hazardous Substances. This document helped in supporting the program proposal for standards and benchmarks, and in accessing financing.

In 2002, the G8 Summit was held in Alberta. In preparation for the Summit, AHS-Calgary purchased a large amount of decontamination equipment, and the OH&S Department fit-tested and trained 800 staff in PPE, respirators, and decontamination procedures.

In 2004, AHS-Calgary prepared a "Growth Initiative" submission for funding for a comprehensive, fully sustainable patient decontamination program. Funding included PPE, supplies, carts, equipment, and pharmaceutical stockpiles.

In AHS-Calgary, urban sites have patient decontamination capability in both emergency departments and the urgent care centres. AHS-Calgary has discussed the option of adding external shower heads to provide immediate primary decontamination.
Step 5 – Prepare Patient Decontamination Plan

Context

The Planning Process – The method of planning for patient decontamination at emergency departments is as important as the results. Planning sessions bring people with different perspectives together to resolve challenges that would otherwise impair a successful response. Participants who plan together understand the strengths and weaknesses of the procedures, and are more likely to engage in collaborative problem-solving when incidents arise.

Concept of Operations – Emergency facilities that treat patients contaminated with hazardous substances must have a written emergency response plan that describes how they will manage contaminated patients. Written procedures help confirm expectations, support team training, and can be consulted during an emergency. Although most emergency treatment facilities may follow a generic concept of operations, site-specific plans are needed for the selection of team members, set up of decontamination equipment, and activation procedures. The concept of operations for decontamination should accommodate the generic HICS adopted throughout the province.

Roles of Assisting Agencies – A Patient Decontamination Plan also provides guidance on the roles of assisting agencies. Local fire department and BCAS may be able to assist in the decontamination process at emergency treatment facilities. Poison control centers can be used as clearinghouses for toxicological information. Regardless of the on-site preparedness, all emergency treatment facilities in the province should have access to decontamination resources from other health facilities through well-established inter-health authority operability and/or first-receiver support. This should include the ability to temporarily re-assign staff to facilities within or outside each health authority.

Checklists – Patient decontamination plans should also contain checklists that detail the actions to be taken for each function. Checklists ensure that important actions are highlighted in training and implementation.

Contact and Resource Information – Decontamination plans should also identify available resources, and acknowledge Memoranda of Understanding (MOU) with other organizations specific to hazardous substance incidents.

Preparedness Actions

1. Review the recommended procedures for decontamination contained in Annex F, and the sample function checklists shown in Annex G.

2. Revise and develop decontamination procedures and checklists unique to specific emergency departments.

3. Identify and consult with designated representatives of the Patient Decontamination Unit at each facility. Address the hazard-specific needs for decontamination in relation to the generic HICS concept of operations.

4. Work with external agencies to identify roles during patient decontamination, and develop MOUs where required.
Step 5 – Prepare Patient Decontamination Plan

Tips for Success...
- Review available plans, including:
  - The health authority all-hazard emergency plan
  - HICS structures in place and associated training
  - Existing decontamination plans and programs
- Invite a guest speaker to address patient decontamination on behalf of the health authority, e.g., a subject-matter expert from Alberta Health Services – Edmonton.
- Share your plans, progress, and lessons learned with other health authorities. Post draft plans on the MoHS Emergency Management Unit’s SharePoint site.
- Make decontamination preparedness a standing agenda item on the HEM Council monthly telephone conferences.

Sample Best Practices...

Vancouver Island Health Authority (VIHA) – In June of 2005, VIHA and the BC MoHS produced the “Emergency Response Field Manual” for Environmental Health Officers, Specialists and Practitioners.” A provincial or Canadian emergency response field guide did not exist prior to this publication.

The Emergency Response Field Manual was prepared as a field guide for Environmental Health Officers.

The manual is intended to provide an overview of the key responses and recovery elements that are apt to be encountered and that will require prompt, informed decisions to protect the health and safety of the Environmental Health Officers and the public in a consistent and expeditious manner.

“A primary goal of any hospital HAZMAT response plan should be preventing the entry of a contaminated patient to the hospital. Procedures must be pre-established to prevent the entry of an unannounced contaminant into the facility.”

Step 6 – Deliver Initial Training

Context

Training is Essential – Regulatory agencies overseeing workplace safety demand that all employees who may be exposed to hazardous substances receive training that mitigates their risk of exposure. Training is mandatory for anyone who has a designated role in patient decontamination, including activity in Hot, Warm or Cold Zones. Different levels of training have been designed to reflect individual functions. With appropriate training, physicians and staff are in a position to better protect themselves, other employees, other patients, and the facility in general, as well as to provide decontamination to contaminated patients.

Training Topics – All personnel who may be expected to receive contaminated patients must be trained in procedures, the use of decontamination equipment, and safe use of PPE and respiratory protection. Training should be standardized throughout the province because: 1) Health workers are mobile, 2) Health authorities will provide mutual aid, and 3) Consistent training develops a long-term culture of safety.

Training Format – Health authorities may consider E-Learning mechanisms for delivering training in appropriate topics or for recertification. However, hands-on classroom training is required for some topics, such as the deployment of decontamination equipment, and putting on and removing PPE.

Participants in Training – Employees expected to perform decontamination must be trained to the first receiver operations level. All other staff should be alerted that the patient decontamination program exists in the facility. In addition, members of local and regional fire services and BCAS should be invited to participate in training sessions with health professionals.

Training Records – Health authorities must document all training attendance and certification. Records of training must be kept of the type of training each person has received and the dates when training occurred. All medical records related to respiratory protective equipment should be maintained in the employee’s file.

Preparedness Actions

1. Develop a Training Plan to record the health positions that require training, the type of training required and delivered, and the course pre-requisites. Refer to Annex I.
2. Identify the training participants.
3. Work with training stakeholders on methods of delivering the provincial curriculum (e.g., use of JIBC) and a training schedule.
4. Identify a training budget and obtain approvals.
Step 6 – Deliver Initial Training

Tips for Success...

- Post all health authority training and exercise sessions on HEM SharePoint site.
- Develop a HEM calendar of decontamination training and exercise programs that align with HEM Council recommendations.
- Offer any vacant training “seats” to:
  - Other health authorities
  - BCAS
  - Local fire departments
- Consider cost recovery from other agencies for training sessions.
- Hands-on training should use operational equipment, including PAPR, coveralls, gloves, and boots. However, NiCad batteries may be used for the PAPR instead of lithium-ion batteries, because lithium batteries are difficult to monitor and are not rechargeable.
- Look for cost-savings measures during training. For example, tape used in the training for taping the boot, glove, suit interfaces need not be the same as the more expensive tape stored on the operational cart.
- Training may be broken into parts for decontamination personnel because staff may have only two hours to train at a time. Consult with department managers on creative measures to deliver training, (staffing challenges).

Sample Best Practices...

CBRNE Research and Technology Initiative – CRTI sponsored a one-day training course for first-receivers in Vancouver and Victoria in 2007.

Participants included both first responders and first-receivers, and covered specific guidance on management, decontamination, and treatment of radiation/nuclear casualties. An equivalent course has never previously been offered within Canada.

Course content included:

- Requirements of the medical/health care community when receiving contaminated patients.
- Going beyond the basic decontamination with an emphasis on special decontamination, medical management, and requirements for treatment.
- A table-top exercise on receiving a patient contaminated with radioactive materials.

Participants were restricted to 40 professionals with an interest in emergency medical casualty management (i.e., advanced care paramedics and Physicians and Emergency Room Nurses as well as health authority Radiation Safety Officers).

“I would suggest that joint training and exercises would be a must if the different agencies are to respond effectively together...We all need to be on the same page and know what each other are capable of as well as what we are not.”

— Ron Miller, Fire Chief, Prince Rupert City Fire Rescue Department
Step 7 – Facilitate Initial Exercises

Context

First-Receiver Exercises – The health care system’s ability to respond to the extraordinary demands of patient decontamination would depend, to a large extent, on the health system’s pre-event preparedness, planning, and exercising for such events. One critical preparedness activity is the use of health care facility exercises to test the procedures and functions in responding to emergencies requiring patient decontamination and care in the unfamiliar settings of the decontamination zone. Exercises also identify and address gaps in decontamination preparedness. Refer to Annex I.

Table-Top Exercises – The table-top exercise is an effective and relatively inexpensive method for testing decontamination preparedness. The participants consist of key members of the emergency treatment centres, the health authority, and public health leadership who work through the decision-making issues raised during a fictional realistic scenario. Table-top exercise invitations should extend to senior representatives of the BCAS, including the Technical Assistant, and the local or regional fire department.

Functional Drills and Exercises – Functional drills and exercises target specific activities and systems in the decontamination process to fine-tune procedures and to provide focussed practice opportunities. One example is the use of PPE and PAPRs. Infrequent users of this equipment are subject to risk from slips, trips, falls, and over-exertion. Drills that involve putting on, working with, and removing PPE enhance the safety of health care workers and, ultimately, the patients being served.

Full-Scale Exercises – The full-scale exercise is a simulated emergency event, as close to reality as possible. It involves all emergency response functions and requires full deployment of equipment and personnel. The purpose of the full-scale decontamination exercise is to demonstrate the use and capabilities of new equipment, training and proficiency of the responders by deploying the equipment, and decontaminating and processing simulated patients. The scenario should highlight the use of the facility’s decontamination team, and the interaction between the Incident Command team and facility Emergency Operation Center. Typically, this type of exercise should include BCAS, Public Health, fire department, and other organizations as identified in the scenario.

Preparedness Actions

1. Prepare scenarios for testing plans, people, equipment, and facilities.
2. Identify the objectives of each exercise, such as familiarization and review of the concept of operations.
3. Select a realistic scenario that presents the participants with the types of challenges they would face in an actual situation.
4. Develop and deliver exercise sessions for multiple agency coordination.
Step 7 – Facilitate Initial Exercises

Tips for Success...

Lay the groundwork for the exercise:
- Review the current plan for the health facility
- Assess the capability to conduct an exercise
- Assess the cost and liabilities associated with conducting the exercise
- Gain support from executive, physicians, staff for the exercise program
- Identify an exercise design team

Exercise documents that must be developed include:
- Exercise Plan
- Control Plan
- Evaluation Plan
- Player Handbook

These documents are basically handbooks for particular audiences. Much of the content of these documents will come from these exercise design steps:
- Assess needs
- Define scope
- Write a statement of purpose
- Define the objectives of the exercise
- Compose a scenario and specific inputs for the exercise
- Write major and detailed events
- List expected actions
- Prepare exercise messages

Outputs from the design process are pulled together in a master scenario events list, a chart that the controller and simulators can use in keeping the exercise on track and on schedule.

Sample Best Practices...

Grady Memorial Hospital, Oklahoma – In 2008, more than 20 separate agencies participated in a full-scale exercise designed to test response procedures and coordination in the event of a mass contamination incident. The hospital joined local fire department, police, ambulance, and several state agencies in a realistic enactment of response to a simulated train derailment and chemical spill. Grady Memorial Hospital received more than a dozen ‘patients’ for decontamination and treatment.

In the test of emergency response at the hospital, a triage area was set up in the parking lot near the emergency room, where the hospital has installed a permanent outdoor decontamination shower.

Arriving patients were separated into three categories. Red-tagged patients were treated immediately; yellow-tagged patients were considered stable enough to wait for treatment; black-tagged patients were either pronounced dead on arrival or were deemed so severely injured they had no chance of survival.

Red-tag patients were rushed to external decontamination showers by hospital staff wearing protective suits outfitted with breathing apparatus, where they were given detailed instructions on how to decontaminate themselves using the external shower equipment. Non-ambulatory patients were decontaminated by hospital staff.

Hospital staff members volunteered to participate in the drill, both as patients and as part of the decontamination and treatment team.

The drill was designed to improve the use of multiple agency coordination centers, practice response and communications plans, and identify additional equipment needed to prepare for and respond to a contamination event.

"The world we live in is pretty scary. It's a shame we have to prepare for something like this... We do a drill every one or two years with Grady EMS, fire, police, the hospital and other health agencies.”

– John Crump, Grady Memorial Hospital Director
Step 8 – Maintain Program

Context

A Permanent Program – Preparedness for patient decontamination is an ongoing activity requiring continuous adjustment and amendment due to a number of factors, such as new staff at individual emergency departments. Maintaining the patient decontamination program means ensuring that the plans, trained personnel, infrastructure, and equipment are ready for activation at all times.

Personnel – Each health authority is responsible for ensuring the appropriate number and types of personnel are available at each emergency department for patient decontamination. This requires development and maintenance of a Staffing Plan that informs each worker of the roles they are expected to fulfill.

Plan Updates – Health authorities guide the process of reviewing and updating the plans for patient decontamination, and revise their plans at least every three years. The health authority should submit all substantial revisions to the MoHS and HEM Council for review.

Equipment and Supplies – All equipment, facilities, and material resources required for patient decontamination should be assessed and repaired on a regular basis, according to manufacturers’ recommendations. This includes replacing any consumable items used in training and exercises. All equipment should be checked monthly to ensure they function properly, and staff should receive training in the maintenance of all equipment.

Training and Exercises – All persons with responsibility under this program must receive ongoing training based on an individual’s potential assignment during patient decontamination. Each health authority must ensure emergency department staff members and support staff members engage in periodical exercises of the decontamination process, using the PPE and other equipment used in actual events.

Annual Reports and Funding – Annual reports should be provided to facility managers, health authority executive, and the Ministry’s EMU. Each year, health authorities should consider all recommendations for advancing patient decontamination programs and budget appropriately to ensure preparedness.

Maintenance Actions

1. The Patient Decontamination Preparedness Committee should meet at least annually to review the status of preparedness among the emergency departments, to advance decontamination plans, and to acquire the resources needed for success. Decontamination programs should be integrated within the health authority annual budget.

2. Health authority personnel should be tasked with preparing and implementing a maintenance schedule that accounts for manufacturers’ recommendations. Staff should be qualified for equipment maintenance through training according to manufacturers’ specifications.

3. All health workers should periodically receive information about the patient decontamination plans, and designated personnel should receive initial and upgrade training.

4. Designated members of the Patient Decontamination Unit should participate in at least one functional exercise annually.
Step 8 – Maintain Program

Tips for Success...

- Ongoing staff training in patient decontamination must include hands-on practice with Level C PPE and decontamination equipment.
- Personnel who are expected to set up decontamination tents, tarps and other equipment should practice at least annually.
- All required agreements, memoranda of understanding, and other implements of coordinated patient decontamination should be reviewed annually and upgraded as needed.
- Ongoing training should be coordinated throughout the province to minimize costs and enhance the opportunity for health staff from different jurisdictions to train together.
- Consult WorkSafe BC on PAPR equipment selection and maintenance schedules.
- Provide regular orientation seminars to introduce or refresh participants to the patient decontamination plans and procedures, by lecture, panel discussion, media presentations, or discussion.
- Coordinate program elements among all emergency departments where contaminated patients may arrive, with other agencies that support patient decontamination, with adjacent health authorities that can provide mutual aid assistance, and with the Ministry.

Sample Best Practices...

Alberta Health Services – Edmonton – AHS – Edmonton established a patient decontamination standard for all 11 of its emergency departments.

The Alberta Health Services process follows the US OSHA Best Practices for Hospital First-Responders for Victims from MCIs Following the Release of Hazardous Substances, and is designed primarily for ambulatory patients.

AHS – Edmonton purchased the necessary equipment for all emergency departments. This includes PAPRs, Tychem suits, and chemical resistant gloves and boots that meet OSHA and Canadian Standards Association standards.

AHS – Edmonton also purchased mobile carts, plastic patient gowns, buckets, sponges, and other equipment, as well as portables showers on a site-by-site basis. Procedures are in place to flush patients with water in the ambulance bays, remove clothing, and shower and sponge patients before they are gowned and allowed to enter the emergency department.

Two AHS – Edmonton Emergency Management staff members are qualified by the US Federal Emergency Management Agency (FEMA) Train-the-Trainer Course for Hospital Emergency Response Decontamination Teams. Currently, an 8-hour decontamination training program is being developed for delivery to designated staff in each Edmonton emergency department.

The training program is being piloted and will be under continuous revision to reflect national and international best practices. The program complies with CSA standards and the Alberta Health Services Respiratory Code of Practice.
6. Conclusions and Recommendations

Conclusions

There is a clear threat to physicians and emergency room staff whenever patients contaminated with hazardous substances arrive at any of BC’s 103 emergency treatment facilities. WorkSafe BC regulations require the protection of health care workers who may be exposed to hazardous substances in the workplace.

The presence of hazardous substances introduced by patients could also expose others already in the emergency department, and lead to an evacuation and closure of the emergency department. Health facility operations could be significantly disrupted.

BC health authorities and their employees would benefit from a comprehensive and province-wide Patient Decontamination Program to improve the safety of first-receivers.

The BC MoHS, working with HEM Council, developed the BC Guidelines for health facilities in the province to emphasize the opportunities for and benefits of standardizing decontamination equipment, procedures, and training across all health authorities.

Criteria applied to distinguish the categories included: 1) Population served in the community, 2) Hazardous materials in the region, 3) The presence of potential terrorism targets in the community, and 4) Facility staff levels.

In an effort to develop a consistent provincial vision of patient decontamination at health facilities, the BC Guidelines offer an illustrated chart of how patients flow through triage, decontamination, and medical treatment processes.

Three zones are anticipated to organize patient decontamination, referred to as the Hot Zone, Warm Zone, and Cold Zone. All physicians and staff working in decontamination Hot and Warm Zones are required to wear Level 3 PPE, including a PAPR.

HEM Council recommends a specific organization structure for use in patient decontamination, the Patient Decontamination Unit. The most effective organization will reflect existing plans under the HICS. Activating the required functions will focus on decontamination and urgent medical care for arriving contaminated patients of exposure to harmful agents.

The number of first-receiver personnel required for decontamination depends on the expected number of simultaneous contaminated patients. For limited-capacity emergency treatment facilities, 14 staff members are required to fill all functions in a fully activated organization. For full-capacity facilities, as many as 26 staff members may be required. These staff requirements may be reduced if some personnel perform more than one function at a time.

Members of the recommended Patient Decontamination Unit may be drawn from health facility staff, physicians, and nursing staff, and from the health authority. Hospital staffing requirements may be reduced by including local fire and ambulance crews on the patient decontamination team.

---

"Emergency departments may have to care for persons contaminated with chemicals resulting from self-inflicted contamination, industrial incidents, and terrorist events. To protect health-care workers caring for these patients, emergency departments should adhere to existing guidelines and decontamination protocols, train staff in the use of PPE, and maintain adequate quantities of antidotes."

Morbidity and Mortality Weekly Report, 2001

The Ministry recognizes two levels of decontamination capacity among BC emergency treatment facilities, based on risk. Of the 103 facilities in BC, 62 locations are designated for limited decontamination capacity, and 41 are assigned full decontamination capacity.
Recommendations

In consideration of BC worker safety regulations and best practices in other jurisdictions, all health authorities in the province should adopt relevant elements of these guidelines. All health authorities should be prepared to receive contaminated patients, execute decontamination protocols, and provide safe workplaces.

All emergency treatment facilities should be capable of safely receiving and decontaminating a limited number of contaminated patients. Some emergency facilities in higher risk areas should have full capacity to decontaminate patients from mass casualty incidents.

Personnel – Health authorities should identify staff members who may be expected to deliver and support patient decontamination services, including ancillary staff capable of deploying equipment. Further, all health facilities should have access to additional resources through well-established inter-health authority operability and/or first responder support.

Infrastructure – Health authorities should ensure decontamination infrastructure is available at all times, and can be adapted to meet the requirements of a range of situations. As a minimum, every emergency department in the province should have a rapid-access shower system external to the emergency department, in either a fixed or semi-fixed installation.

Equipment and Supplies – Health authorities should ensure that emergency treatment facilities have the equipment and supplies needed to provide for safe decontamination of patients.

Decontamination Plans – Health facility emergency plans should be adapted to address patient decontamination, including the need to control access to prevent the contamination of staff, current patients, and facilities. Health authorities should prepare HICS-based patient decontamination plans for every emergency treatment facility. Such plans should ensure medically-qualified and trained personnel are assigned to provide patient triage and care, including the provision of DPS services.

Training and Exercises – Health authority policies and procedures must address the requirement that staff members who provide or support patient decontamination must receive appropriate training. Each health authority should provide a policy stating that those who may become involved in an actual decontamination event must receive training and exercises that support the training.

Partnerships between first-responder facilities and local first responders are key to success. For example, BCAS staff may become part of the training delivery component, perhaps through an expanded role for the Technical Assistant Program. This would engender an integrated approach to decontamination awareness and training throughout the provincial health system.

Scheduling the delivery of training must coordinate with the acquisition and delivery of equipment. To use decontamination equipment safely, staff must have the training. To participate in training and exercises, staff must use the appropriate equipment.

Equipment manufacturers frequently offer training when delivering equipment, such as PPE, respirators, and three-line decontamination tents. Such training may include a description of the equipment, instructions for initial set-up, personal safety advice, maintenance procedures, and the provision of training or maintenance manuals. Health authorities should explore the training opportunities that accompany equipment purchases. Identification and specification of equipment training should be considered as part of the tendering process.
7. References


US Department of Health and Human Services “PPE, Decontamination, Isolation/Quarantine, and Laboratory Capacity”, August 2005


Winnipeg Regional Health Authority. 2007. Hospital Emergency Department Decontamination Policy, Procedures, Required Training. March.

## Annex A
### Incident Summaries
#### Patient Decontamination

<table>
<thead>
<tr>
<th>Type</th>
<th>Year</th>
<th>Location</th>
<th>Description</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazardous Material Spill</td>
<td>2008</td>
<td>Vancouver BC Canada</td>
<td><strong>Patients Bring Gasoline Vapours to Emergency Department</strong> – In April 2008, emergency department staff at the Children's Hospital were exposed to gasoline fumes when two adults and a child arrived. The 6-year-old child was accidentally splashed with gasoline when his aunt and uncle stopped to gas up his car. Gas also spilled on the uncle's pants and shoes. The three drove to Children's Hospital, where the uncle took the child to the triage desk, which was very busy at the time. As a consequence, the waiting area filled with gasoline vapours and several parents moved their children to other areas and to the parking lot. The odour of gasoline lingered for more than an hour.</td>
<td>(Source: Provincial Health Services Agency)</td>
</tr>
<tr>
<td>Hazardous Material Spill</td>
<td>2008</td>
<td>East St. Louis Missouri USA</td>
<td><strong>Workers Contaminated in an Industrial Accident Close Hospital Emergency Rooms</strong> – In August of 2008, emergency rooms in two separate Missouri hospitals were evacuated when eight contaminated workers arrived following an accident at the Ro-Corp. plant. The spilled chemical was the highly toxic nitroaniline, released when a barrel was dropped at the plant. Both emergency rooms had to be decontaminated following the visit and treatment of the workers. The eight affected workers were later hospitalized.</td>
<td>(Source: The Associated Press, August 31, 2008)</td>
</tr>
<tr>
<td>Suicide</td>
<td>2008</td>
<td>Kumamoto Japan</td>
<td><strong>Hospital Staff Exposed, Emergency Department Evacuated</strong> – On May 22, a Red Cross Hospital in Japan evacuated its Emergency Department after 54 people were sickened by toxic fumes when a man vomited after drinking pesticide to commit suicide. The 34-year-old man subsequently died. Of the 54 people who were sickened, 11 were doctors and another 20 were staff members at the hospital. All recovered. The pesticide was later identified as chloropicrin, a highly toxic liquid used to produce tear gas during World War I. The hospital's emergency department was closed for about 12 hours after the incident.</td>
<td>(Source: <a href="http://edition.cnn.com">http://edition.cnn.com</a>)</td>
</tr>
<tr>
<td>Type</td>
<td>Year</td>
<td>Location</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>------------------------------</td>
<td>------</td>
<td>-------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
</tbody>
</table>
| Chemical                     | 2008 | Portland Oregon USA     | Patients: Several Staff Exposed: 0 Fatalities: 0  
**Emergency Department Closed by Contaminated Patients** – On July 16, the Providence Hospital in Northeast Portland treated an unconscious man and several firefighters and paramedics after they were exposed to a mixture of chemicals at a nearby hotel in Oregon City. Hotel guests began complaining about chemical fumes coming from one room, and first responders found an unconscious man and several chemicals (later identified as ammonia, Drano and bleach), and a small hibachi-style barbecue burning inside the room. Eighteen people were evacuated from the hotel. Several firefighters and paramedics exposed to the chemical fumes were also taken to the hospital as a precaution. The emergency room was closed to all but the chemically-exposed patients to protect others from potentially toxic fumes.  
(Source: The Clackamas Review, Radio KPAM 860, June 16, 2008) |
| Malicious Act Using Chemicals| 2007 | Vancouver 3C Canada     | Patients: 2 Staff Exposed: 6 Fatalities: 0  
**Pepper-Sprayed Patients Cross-Contaminate Emergency Department** – In September, 2007, two 14-year-old females, pepper sprayed by "ladies of the night," sought treatment at the Children's Hospital. Because the emergency department had no decontamination facilities, one female was taken to the staff bathroom shower. The other was taken to the physicians' washroom to shower. Both were hysterical and needed a nurse in the room.  
One asthmatic nurse became distressed and needed Ventolin treatment. Five other nurses in the department were affected to a lesser degree, and several parents of children in the emergency department complained of the pepper spray effects to them and their children.  
(Source: Provincial Health Services Agency) |
| Facility Hazardous Materials | 2007 | Terre Haute Indiana USA | Patients: 3 Staff Exposed: 3 Fatalities: 0  
**Chemical Fumes Force Outpatient Facility Evacuation** – On July 21, toxic chemical fumes forced an evacuation of the Wabash Valley Surgery Center in Terre Haute. The incident occurred after fumes from a corrosive, flammable and toxic cleaning fluid called Tri-Act 2813 got into the 28,000-square-foot building's air ducts when a mechanism designed to clean the boiler system malfunctioned. Staff first began noticing a highly offensive odour and ordered an evacuation shortly thereafter. Hospital officials said three staff members received emergency medical care after they complained of symptoms such as nausea, headache and respiratory distress. Decontamination of the building required four days.  
(Source: Courier Press, by the Associated Press, July 2, 2007) |
| Chemical                     | 2006 | New Westminster BC Canada | Patients: 1 Staff Exposed: 0 Fatalities: 0  
**Chemical Hazard Incident** – On March 17, ambulance crews brought to the Royal Columbian Hospital emergency a patient who had ingested an organo-phosphate substance. The BCAS conducted the decontamination of the patient, and assisted with the containment of secretions from the patient and advised on the use of proper equipment to safeguard physicians and hospital staff. Equipment included respiratory masks, rubber gloves, and plastic material to deal with biohazard materials.  
(Source: G. Harwood, Executive Director, R. Morton, Medical Director) |
<table>
<thead>
<tr>
<th>Type</th>
<th>Year</th>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
</table>
| Chemical     | 2006 | Winnipeg, Manitoba, Canada | Patients: 1  Staff Exposed: 0  Fatalities: 0  Emergency Department Contaminated – On November 1, a chemically contaminated patient self-presented to Seven Oaks General Hospital Emergency Department and contaminated the ED. Although he was quickly isolated, his condition caused the relocation of 15 patients from the ED to other parts of the hospital, in addition to re-direction of ambulance service. The hospital ED resumed normal operations four hours later.  
(Source: Winnipeg Regional Health Authority, Hospital Emergency Department Decontamination Policy, Procedures, Required Equipment, and Training, File No.: 1.3.5.10.4 Revised: July 9, 2007) |
| Suicide      | 2002 | Merseyside, UK   | Patients: 1  Staff Exposed: 5  Fatalities: 1  Suicide Patient Closes Emergency Department – On October 11, the Arrow Park Hospital Emergency Department was evacuated and closed for 12 hours when a suicide patient’s body released toxic fumes. The patient had been terminally ill with leukemia, and is believed to have intentionally consumed aluminium phosphide, a rat poison that gives off poisonous fumes when mixed with water. Five staff at the hospital suffered minor breathing problems. Because of the risk to patients and hospital workers from his contaminated body and clothes, the hospital’s emergency chemical incident procedure was triggered and the emergency department was evacuated. Patients were taken to other hospitals in the region.  
(Source: The Guardian Newspaper) |
| Terrorism    | 1995 | Tokyo, Japan     | Patients: 3,227  Staff Exposed: Hundreds  Fatalities: 12  Terrorist Attack with Sarin in Tokyo – In the morning rush hour on March 20, 1995 a group of terrorists placed containers of the nerve gas Sarin on three of Tokyo’s ten underground railway lines. When the gas was released, the Tokyo Emergency Control Centre staff received a great number of alarms from fifteen underground stations. Arriving first responders reported a strong smell of a solvent (which turned out to be acetonitrile) and intense eye irritation. People also experienced breathing difficulties and muscle weakness, and many lost consciousness.  
No advanced medical treatment was given on site, only life saving procedures. Ambulance and medical personnel triaged patients for transport to hospitals. At 08.35 the first patient was transported by ambulance to St Luke’s International Hospital, arriving at 08.40.  
Of the ambulance personnel taking care of injured people at the accident site, 135 developed symptoms of Sarin poisoning and 33 of these required hospitalization. The ambulance personnel worked without protective clothing. Policemen also developed symptoms of acute poisoning, as did hospital doctors and nurses (23%) suffered acute poisoning symptoms.  
Of the 5,000 to 6,000 persons exposed to the toxic gas, 3,227 went to 41 of Tokyo’s many hospitals. In all, 550 persons were transported by ambulance to hospital. The rest made their way on foot or in private cars to hospitals and private outpatient clinics. In all twelve people died from the Sarin exposure. Several other people have permanent brain damage.  
(Source: Wikipedia) |
<table>
<thead>
<tr>
<th>Type</th>
<th>Year</th>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terrorism</td>
<td>1994</td>
<td>Matsumoto, Japan</td>
<td><strong>Terrorist Attack Using Sarin</strong> – In June, nine months before the Tokyo attack, the same terrorist group had spread Sarin in the city of Matsumoto, about 150 km west of Tokyo. Seven persons died and just over 300 people were exposed to Sarin. Fifty-six required hospitalization. Also in this accident, both fire personnel and hospital staff were exposed to Sarin while taking care of patients. <em>(Source: Wikipedia)</em></td>
</tr>
<tr>
<td>Chemical</td>
<td>1994</td>
<td>Riverside, California, USA</td>
<td><strong>Contaminated Patient Exposes Emergency Room Staff</strong> – On February 19, mysterious fumes gassing-off from a dying young woman affected 24 emergency room staff. At about 8:15 pm, paramedics wheeled a young woman into the emergency room. As blood was being sampled, staff noticed an ammonia-like smell to the blood. The nurse who conducted the procedure felt suddenly ill and fainted as she attempted to leave the emergency room. Another two nurses slumped to the floor. In all, 24 emergency department staff members were affected by the fumes emanating from the patient. Hospital administrators declared an “internal emergency” and ordered the evacuation of all emergency room patients to the parking lot. A skeleton crew stayed behind to save the patient’s life, but she succumbed at 8:50 pm. A team of chemists from a nuclear weapons lab later determined that a chain of chemical reactions may have caused the patient’s body to release a type of nerve gas. <em>(Source: The Washington Post, September, 1994)</em></td>
</tr>
</tbody>
</table>
**Annex B**

**Patient Decontamination Preparedness Committee Roles**

*(Health Authority Level)*

The following table suggests the role of each member of the recommended Patient Decontamination Preparedness Committee at the Health Authority level.

<table>
<thead>
<tr>
<th>Position</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCAS Supervisor</td>
<td>• Ensure consistency and interoperability between the patient decontamination plans of BCAS and the health authority.</td>
</tr>
<tr>
<td></td>
<td>• Provide technical input via BCAS Provincial Coordinator.</td>
</tr>
<tr>
<td>Chief Medical Health Officer /</td>
<td>• Ensure plans comply with public and environmental health safety standards (e.g., water run-off collection and containment).</td>
</tr>
<tr>
<td>Environmental Health Officer</td>
<td></td>
</tr>
<tr>
<td>Director Communications</td>
<td>• Report activities of the Committee to the CEO, as required.</td>
</tr>
<tr>
<td></td>
<td>• Provide advice on matters involving public affairs.</td>
</tr>
<tr>
<td>Director Education &amp; Training</td>
<td>• Assist and support the needs of patient decontamination training.</td>
</tr>
<tr>
<td>Director Health Emergency Management</td>
<td>• Co-chair Committee activities with the Project Manager.</td>
</tr>
<tr>
<td></td>
<td>• Report to and liaise with HEM Council, MoHS - Emergency Management Unit, and local first responder agencies, as required.</td>
</tr>
<tr>
<td>Director Human Resource</td>
<td>• Advise on matters of labour relations and human resources.</td>
</tr>
<tr>
<td></td>
<td>• Coordinate interface with unions as required.</td>
</tr>
<tr>
<td>Director Infection Control</td>
<td>• Provide guidance on infection control measures.</td>
</tr>
<tr>
<td>Director Logistics (Support Services)</td>
<td>• Guide discussion and planning as it relates to health authority logistic services delivery and support programs.</td>
</tr>
<tr>
<td>Director Nuclear Medicine / Radiation Safety Officer</td>
<td>• Provide subject matter expertise / technical support in development of the Patient Decontamination Program.</td>
</tr>
<tr>
<td>Director Nursing (Acute Care)</td>
<td>• Ensure the Patient Decontamination Program aligns with professional practice and corporate guiding principles in the delivery of patient care.</td>
</tr>
<tr>
<td>Director Occupational Health and Safety</td>
<td>• Ensure compliance with regulatory OH&amp;S policies and regulations.</td>
</tr>
<tr>
<td></td>
<td>• Provide technical advice.</td>
</tr>
<tr>
<td>Emergency Room Physician / Nursing Manager</td>
<td>• Direct Committee regarding role and response of Emergency Department staff.</td>
</tr>
<tr>
<td>Project Manager</td>
<td>• Assume overall responsibility for the successful planning and execution of the Patient Decontamination development project.</td>
</tr>
<tr>
<td>Psychiatry / Director Social Work</td>
<td>• Ensure DPS provisions are included in planning (e.g., inclusion of a Family Room and a treatment area for DPS casualties).</td>
</tr>
</tbody>
</table>
Annex C
Medical Screening Questionnaire
for Users of Powered Air Purifying Respirator (PAPR)
– Patient Decontamination –

Date: __________________________
Name: __________________________ Decon Unit Function: __________________________

Intent: To identify medical conditions that can potentially affect the ability to safely use PAPR or PPE.

1. Are you in good general health? ______ Yes ______ No

2. Have you ever been treated by a physician for any of the following medical conditions?
   a. Dizziness or fainting spells or sudden loss of consciousness ______ Yes ______ No
   b. Chronic respiratory illness (asthma, emphysema, shortness of breath) ______ Yes ______ No
   c. Claustrophobia or anxiety reaction ______ Yes ______ No
   d. Heart disease ______ Yes ______ No
   e. Poorly controlled high blood pressure ______ Yes ______ No
   f. Anaphylaxis or acute allergic reactions ______ Yes ______ No

3. Have you experienced any of the following ailments within the last 15 days?
   a. Dizziness, fainting spells, loss of consciousness ______ Yes ______ No
   b. Upper respiratory tract infection (nasal congestion, runny nose, sneezing) ______ Yes ______ No
   c. Asthma ______ Yes ______ No
   d. Shortness of breath, frequent cough ______ Yes ______ No
   e. Chest pain, irregular heart rate ______ Yes ______ No
   f. High blood pressure (poorly controlled) ______ Yes ______ No
   g. Rashes, open sores ______ Yes ______ No
   h. Gastrointestinal illness ______ Yes ______ No
   i. Medical condition requiring use of medication immediately, such as inhaler or oral medication ______ Yes ______ No
   j. Psychological condition, anxiety ______ Yes ______ No

4. Have you ever worn an air purifying respirator in the past? ______ Yes ______ No

If yes, did you have difficulty using it or an adverse reaction before, during or after wearing the respirator?

   Yes ______ No ______

Comments:
__________________________________________________________________________
__________________________________________________________________________

Vital Signs:
Time In (PAPR on) ___________ Pulse _______ B/P ___________ RR ___________
Time out (PAPR off) ___________ Pulse _______ B/P ___________ RR ___________
Annex D

Patient Decontamination Infrastructure

The infrastructure for patient decontamination in each health authority must provide the security, privacy, environmental control, and size that allows for rapid progression through triage, disrobing, decontamination, and gowning, while embracing comprehensive safety measures that conform to WorkSafe BC regulations.

Location of Decontamination Infrastructure

Decontamination infrastructure should be fixed to the external structure of the facility, providing an area separate from the main health care facility and, therefore preventing facility contamination. Without an external decontamination facility; physicians, and staff members are exposed to the risk of cross contamination. Portable decontamination units may be established in conjunction with fixed or semi-fixed decontamination infrastructures, or as stand-alone elements.

An external location includes areas within close proximity to the health care facility that will eliminate the risk of secondary contamination to the patient treatment areas, the staff and physicians, as well as others already within the building. Suggested sites include external alleyways, parking garages adjacent to health facility buildings, courtyards or covered walkways, and external walls of buildings (using retractable awnings and side walls with tarps) to provide privacy and climate protection.

The American Institute of Architects recommends that health facilities designate specific areas for the initial treatment of chemical exposure.\textsuperscript{10} The AIA guidelines suggest that:

- Facilities may designate an outdoor area adjacent to the emergency department to serve as a primary decontamination/contamination reduction area, which should include appropriate plumbing fixtures and drainage;
- Utilization of screens and tents may be needed;
- Contingencies may require airborne infection isolation, application and removal of therapeutic substances, and temporary container storage of contaminated materials;
- Hand-washing and shower capabilities will usually be of paramount importance in chemical and biohazard control efforts.

Rapid Activation

The most important aspect of decontamination at the site is the timely and effective removal of the agent from affected person(s). The precise methods used to remove the agent are not as important as the speed by which the agent is removed. The decontamination equipment or infrastructure should be pre-constructed or capable of simple assembly and rapid utilization.

Detailed decontamination capability takes time to set up and deploy. Therefore, the facility should be prepared with immediately accessible, gender-segregated, environmentally sheltered areas for undress. This would allow patients to commence gross decontamination by removing their clothing and washing their body without staff assistance. The decontamination system may be modular, so that an adequate capability can be

\textsuperscript{9} Science Applications International Corporation, Homeland Security Support Division
\textsuperscript{10} American Institute of Architects. 2006. Guidelines for Design and Construction of Health Care Facilities
easily and quickly available for just one or two victims, and easily expanded to full operational capability for mass casualty situations, if required.

**Self Decontamination and Privacy**

If the incident involves sudden presentation of victims, capabilities should allow immediate onset of a patient self-decontamination shower external to the emergency department, while the emergency code is being activated and responded to. The decontamination process must also provide separation of male and female patients during the disrobing, decontamination, and re-dressing processes, as well as being prepared to respond to youth and infant decontamination protocols.

The set-up must promote rapid patient movement through the decontamination process, allow visual control of ambulatory patients by the staff, and discourage prolonged showers when other victims are waiting for decontamination. The facility must have the capacity to decontaminate multiple patients at a time. It must also be configured so that a slow victim or one that becomes ill does not hinder other victims. Features that may address these needs include avoiding private shower enclosures, separating soap stations from the showerheads, and signs or repeated voice directions.

The health care facility should also provide a means of decontamination for non-ambulatory patients, in addition to those who are ambulatory. Wheelchairs and portable showerheads must be available to assist non-ambulatory patients, the elderly, and others with mobility restrictions.

**Patient Safety**

Patients should be decontaminated on some form of minimally elevated walkway to prevent walking in rinsate and to minimize slip hazards. In most cases, the quantity of run-off of the agent present on human skin is miniscule, and rinsate is too dilute to pose significant risk to the environment. Wastewater containment and disposal should be pre-arranged through the appropriate regulatory agency.

**Temperature Controls**

Decontamination locations should be pre-established to offer environmental protection from the elements. When identifying decontamination locations and the type of system that best suits the facility, planners should keep in mind the body's response to ambient temperatures. The decontamination facility must provide privacy and protection from cold, excessive heat, rain, snow, and wind. The health care facility may need to establish multiple decontamination locations in the event that external temperatures prohibit a safe environment for decontamination.

**Ventilation**

The external location should incorporate a dedicated ventilation capability, the ability to keep fumes from entering the health care facility or the Cold Zone of the decontamination facility, and allow patients to access the location without entering the health care facility. The external decontamination facility should provide environmental protection, lighting, and privacy, with the ability to become active at all hours. Equipment and supplies that are part of the decontamination infrastructure must be kept operational and readily accessible at all times. The storage room or area should be in close proximity to the designated decontamination zone. The equipment and supplies should be clearly identified in containers or on shelving. Regular inventory inspections should be conducted by a designated department.
Infrastructure and Supplies

All emergency facilities in BC are advised to have outside or sheltered shower facilities for decontamination. Ideally, the receiving facility can provide immediate containment of contaminated patients, climate controlled shelter, gender-segregated areas in which to remove contaminated clothing, the ability to secure belongings, and the ability to provide immediate medical screening and life-saving intervention.

Emergency treatment centres must have the supplies, equipment, plans, and processes needed to provide safe response in such events.

Health care facilities need to identify ancillary staff capable of assisting in the deployment of equipment and execution of the decontamination system. Non-patient care/ancillary personnel (i.e., housekeeping, maintenance, engineering, security) could be trained to assist in the rapid execution of decontamination system set-up. The specific requirements for patient decontamination infrastructure at BC emergency departments, assuming the use of portable systems, are highlighted in the following table.

**Infrastructure to Support Portable Decontamination**

<table>
<thead>
<tr>
<th>Hot Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Parking area for potentially contaminated vehicles delivering victims;</td>
</tr>
<tr>
<td>• Level paved area, with surfaces that slope away from entrance to facility and from patient arrival area;</td>
</tr>
<tr>
<td>• Decontamination facility to be set-up on non-porous surface;</td>
</tr>
<tr>
<td>• External showers for gross decontamination (minimum two lines);</td>
</tr>
<tr>
<td>• Adjustable hot and cold water sources (both fixed and portable showerheads) in an easily isolated area;</td>
</tr>
<tr>
<td>• Water connections for decontamination tent;</td>
</tr>
<tr>
<td>• External emergency lighting;</td>
</tr>
<tr>
<td>• Electrical power (e.g., for heating units);</td>
</tr>
<tr>
<td>• Bolts and hooks to quickly hang tarps / sheeting;</td>
</tr>
<tr>
<td>• Curb to contain waste water runoff, in compliance with regulatory agency guidelines;</td>
</tr>
<tr>
<td>• Signage in appropriate languages.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Warm Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Area to set up tent with three lines of movement;</td>
</tr>
<tr>
<td>• Curb to contain waste water runoff, in compliance with regulatory agency guidelines;</td>
</tr>
<tr>
<td>• Level paved area, with surfaces that slope away from entrance to facility;</td>
</tr>
<tr>
<td>• External emergency lighting;</td>
</tr>
<tr>
<td>• Electrical power (e.g., for heating units);</td>
</tr>
<tr>
<td>• Bolts and hooks to quickly hang tarps / sheeting;</td>
</tr>
<tr>
<td>• Signage in appropriate languages.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cold Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Holding area for observation of decontaminated patients;</td>
</tr>
<tr>
<td>• Internal storage room for decontamination equipment, PPE, respiratory protection, communications;</td>
</tr>
<tr>
<td>• External storage shed adjacent to Hot and Warm Zones for storage of tarps.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>All Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Signage, multiple language, aids etc for hearing impaired, visually impaired, ethnic groups.</td>
</tr>
</tbody>
</table>
### Annex E

**Inventory – Patient Decontamination Equipment**

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity for Limited Capacity</th>
<th>Quantity for Full Capacity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backboards, impermeable</td>
<td>1</td>
<td>2</td>
<td>For each non-ambulatory decontamination corridor, and each ambulatory decontamination corridor (see 3-Line Portable Decontamination Facility inventory)</td>
</tr>
<tr>
<td>Bags, biohazard &quot;red&quot;</td>
<td>12</td>
<td>24</td>
<td>For each trash can plus replacements (Hospital Stockpile)</td>
</tr>
<tr>
<td>Bags, plastic, large, trash type</td>
<td>12</td>
<td>24</td>
<td>As needed to cover expensive equipment (Hospital Stockpile)</td>
</tr>
<tr>
<td>Blankets, hospital</td>
<td>10</td>
<td>50</td>
<td>Of each at Cold Zone entrance (Hospital Stockpile)</td>
</tr>
<tr>
<td>Booms, wastewater containment, metres</td>
<td>10</td>
<td>20</td>
<td>As needed to control run-off down drains. (Hospital Stockpile as well as see 3-Line Portable Decontamination Facility inventory)</td>
</tr>
<tr>
<td>Bucket, plastic, 10 litre</td>
<td>2</td>
<td>4</td>
<td>For holding wash water for non-ambulatory decontamination</td>
</tr>
<tr>
<td>Bucket, trash, 4 litre</td>
<td>3</td>
<td>6</td>
<td>Placed with every toilette box (for used toillettes)</td>
</tr>
<tr>
<td>Can, garbage, 200 litre, plastic</td>
<td>3</td>
<td>6</td>
<td>For each decontamination corridor</td>
</tr>
<tr>
<td>Cart, laundry hamper, for bagged clothing</td>
<td>1</td>
<td>1</td>
<td>For each ambulatory and non-ambulatory corridor plus multiple available replacements (Hospital Stockpile)</td>
</tr>
<tr>
<td>Chairs for staff to sit in while dressing in PPE, impermeable</td>
<td>2</td>
<td>6</td>
<td>Varies per number of PPE staff (Hospital Stockpile)</td>
</tr>
<tr>
<td>Clipboards</td>
<td>5</td>
<td>10</td>
<td>For Triage &amp; Safety Officers’ notes, and for Registration Logs</td>
</tr>
<tr>
<td>Cones, orange hazard 30 cm high</td>
<td>12</td>
<td>12</td>
<td>As needed to demarcate Primary Triage and decontamination areas (Hospital Stockpile)</td>
</tr>
<tr>
<td>Cones, traffic</td>
<td>12</td>
<td>12</td>
<td>As needed to demarcate vehicle traffic access and egress areas (Hospital Stockpile)</td>
</tr>
<tr>
<td>Container, waste, HAZMAT approved, 300 litre</td>
<td>2</td>
<td>4</td>
<td>For holding the contained waste water</td>
</tr>
<tr>
<td>Containment bladder</td>
<td>0</td>
<td>1</td>
<td>When waste water is required to be contained (see 3-Line Portable Decontamination Facility inventory)</td>
</tr>
<tr>
<td>Extension cords – heavy utility/outdoors</td>
<td>3</td>
<td>6</td>
<td>As needed for lights, fans and other equipment (Hospital Stockpile)</td>
</tr>
<tr>
<td>Fan, free standing, heavy duty</td>
<td>1</td>
<td>2</td>
<td>Hospital Stockpile</td>
</tr>
<tr>
<td>Flooring, raised, metres</td>
<td>4</td>
<td>8</td>
<td>As needed to keep patients above wash water (see 3-Line Portable Decontamination Facility inventory)</td>
</tr>
<tr>
<td>Item</td>
<td>Quantity for Limited Capacity</td>
<td>Quantity for Full Capacity</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>------------------------------</td>
<td>---------------------------</td>
<td>-------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Gown kit, pre/post decon, large</td>
<td>20</td>
<td>200</td>
<td>Contains green and red plastic coveralls/towel/comb/valuables bag/clothing bag/matching barcodes</td>
</tr>
<tr>
<td>Gown kit, pre/post decon, regular</td>
<td>30</td>
<td>300</td>
<td>Contains green and red plastic coveralls/towel/comb/valuables bag/clothing bag/matching barcodes</td>
</tr>
<tr>
<td>Gown kit, pre/post decon, youth</td>
<td>20</td>
<td>200</td>
<td>Contains green and red plastic coveralls/towel/comb/valuables bag/clothing bag/matching barcodes</td>
</tr>
<tr>
<td>Gowns &amp; booties, hospital on linen carts</td>
<td>20</td>
<td>200</td>
<td>Of each at Cold Zone entrance (Hospital Stockpile)</td>
</tr>
<tr>
<td>Heaters, free standing, heavy duty</td>
<td>1</td>
<td>4</td>
<td>Hospital Stockpile</td>
</tr>
<tr>
<td>Hoses, low pressure/high volume</td>
<td>Depends on site</td>
<td>Depends on site</td>
<td>As needed to run from warm water source to accessory decontamination area (for wash down of pets, wheelchairs, etc.)</td>
</tr>
<tr>
<td>Lamps, halogen/on stands</td>
<td>2</td>
<td>4</td>
<td>As needed to provide adequate lighting</td>
</tr>
<tr>
<td>Lighting, zone, such as &quot;PowerFlares&quot;</td>
<td>4</td>
<td>24</td>
<td>Colour coded lighting showing zones for site control in the dark</td>
</tr>
<tr>
<td>Log book, registration and waterproof pen</td>
<td>1</td>
<td>1</td>
<td>For each decontamination corridor, on clipboard</td>
</tr>
<tr>
<td>Radios, two-way or phones, water resistant</td>
<td>2</td>
<td>8</td>
<td>As needed to maintain communication between Hot/Warm/Cold Zones, Safety Officer, Command Post, and Emergency Department, etc.</td>
</tr>
<tr>
<td>Scissors, heavy duty safety</td>
<td>2</td>
<td>10</td>
<td>For cutting away patients clothing (Hospital Stockpile)</td>
</tr>
<tr>
<td>Signs, directional, with hanging tape</td>
<td>2</td>
<td>2</td>
<td>To assist patients in moving to the appropriate locations</td>
</tr>
<tr>
<td>Signs, graphic decontamination Instruction</td>
<td>2</td>
<td>2</td>
<td>Provides illustrated instructions (and two-sided tape pre-set on back of signs for the decontamination process for hanging)</td>
</tr>
<tr>
<td>Soap containers, 1 litre€</td>
<td>1</td>
<td>1</td>
<td>For each ambulatory shower, 2 per non-ambulatory decontamination station large volume dispenser (Hospital Stockpile)</td>
</tr>
<tr>
<td>Soap, liquid, 5 litre</td>
<td>1</td>
<td>1</td>
<td>Or large supply of liquid hand or dish soap or adequate amount to fill and re-fill Soap Dispensers shampoo (Hospital Stockpile)</td>
</tr>
<tr>
<td>Sponges</td>
<td>6</td>
<td>12</td>
<td>For patient decontamination</td>
</tr>
<tr>
<td>Stand/saw horses with clips</td>
<td>1</td>
<td>4</td>
<td>For each non-ambulatory decontamination corridor; for holding backboards during decontamination</td>
</tr>
<tr>
<td>Stretchers, with locking wheels</td>
<td>1</td>
<td>2</td>
<td>For Cold Zone only (Hospital Stockpile)</td>
</tr>
</tbody>
</table>
| Tape, chemical, 60 m roll                      | 1                            | 3                         | For sealing PPE suits and for PPE name/ags. (Recommend Hazmaster Environment Controls, Part # 99402) }
<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity for Limited Capacity</th>
<th>Quantity for Full Capacity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tape, duct tape, large roll</td>
<td>2</td>
<td>4</td>
<td>For general purpose use (NOT to be used for sealing PPE suits etc. Duct tape tends to break down when wet and is not resistant to chemicals)</td>
</tr>
<tr>
<td>Tape, yellow barrier, roll</td>
<td>1</td>
<td>2</td>
<td>As needed to demarcate Primary Triage and decontamination areas</td>
</tr>
<tr>
<td>Towlettes, disposable, box of 220</td>
<td>1</td>
<td>2</td>
<td>For every two ambulatory shower, 1 per non-ambulatory decontamination station (Hospital Stockpile)</td>
</tr>
<tr>
<td>Vacuum pump or wet/dry vacuum</td>
<td>1</td>
<td>1</td>
<td>For draining containment pools (see 3-Line Portable Decontamination Facility inventory)</td>
</tr>
<tr>
<td>Vests, reflective</td>
<td>4</td>
<td>12</td>
<td>For staff in Cold Zone and general traffic/pedestrian areas external to the decon zones</td>
</tr>
<tr>
<td>Walkers</td>
<td>1</td>
<td>2</td>
<td>For each ambulatory decontamination corridor (Hospital Stockpile)</td>
</tr>
<tr>
<td>Wheelchairs</td>
<td>1</td>
<td>2</td>
<td>For each ambulatory decontamination corridor (Hospital Stockpile)</td>
</tr>
</tbody>
</table>

**Personal Protective Equipment (PPE)**

- Breathe Easy Model PAPR
- Battery Pack (BP-15) *
- Battery Charger for 1 Unit**
- Tyvek Head Cover
- Tyvek Hood Cover
- PAPR Breathing Tube for BE-12-3 Head Cover
- RBE-57 Canister
- Air-Flow Test Meter**
- Nitril Gloves (Hospital stockpile)
- North Butyl Gloves
- Dupont Tychem BR Model Coveralls
- Hazmax EZ-Fit Boot
- Thermal Vest?
- Gel packs for thermal vests
- N-95 HEPA masks
- Face Shield
- Goggles
- Baby Powder (large bottles)

For each Decontamination Team member, plus backup replacement units

(complies with WorkSafe BC Occupational Health and Safety Regulations)

*It is recommended that disposable batteries are used. Rechargeable batteries present maintenance issues (i.e., regular charging and discharging to maintain battery memory)

Alberta Health Services - Calgary

**For verifying air supply and battery strength prior to putting on respirator

Hospital Stockpile

For use in boots and gloves for ease of removal. (Hospital Stockpile)
<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity for Limited Capacity</th>
<th>Quantity for Full Capacity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Portable Decontamination Facilities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-Line Portable Decontamination Unit includes:</td>
<td></td>
<td></td>
<td>For each full-capacity facility</td>
</tr>
<tr>
<td>• Decon spray/washing system</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Water Heater (340,000 BTU)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Water booms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Catch basin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Floor risers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Waste water pump (18 gail/min)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• patient conveyor units</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• transfer boards</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• fluorescent lights</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Testing and Monitoring Equipment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chem/Bio Agents and Toxic Industrial Chemicals Detector</td>
<td>1</td>
<td>2</td>
<td>For each facility</td>
</tr>
<tr>
<td>Radiation Survey Meter (LCD 500)</td>
<td>1</td>
<td>2</td>
<td>For each full-capacity facility</td>
</tr>
<tr>
<td>Personal Dosimeter &amp; Charger</td>
<td>20</td>
<td>30</td>
<td>For each Decontamination Team member wearing PPE, plus backup replacement units</td>
</tr>
</tbody>
</table>
Annex F
Sample Patient Decontamination Plan

The following actions are presented as a guide for site response in the event of hazardous substance threat of contamination. The tasks may vary according to individual site requirements and capacity.

**Notification / Activation**
- Prepare to receive patients from site (decontaminated by BCAS, but backup protection should be in place at the emergency department to receive walk-ins, as well as testing BCAS patients for any contaminants prior to emergency department admission);
- Notify the health authority, e.g., the local Administrator on Call, and make any other local contacts for resources;
- Consult the BC Centre for Disease Control (e.g., Poison Control, Radiation Safety) as needed;
- Activate the facility EOC to support decontamination, depending on incident size, length of time, and resources required. Utilize E-Team to enhance communications with stakeholders;
- Establish a 24/7 link with the BCAS Technical Advisor in the region;
- Arrival by a patient may be the first notification that a contamination event has occurred. Security personnel that intercept incoming patients may become contaminated;
- Activate the Code Response (New Provincial code required);
- Notify Security of the Decontamination Zone set up who are required to initiate facility lock-down procedures restricting access to the building;
- Determine information on decontamination needs prior to set up;
- Determine level of decontamination required (gross decontamination and technical OR just technical decontamination);
- Determine contaminant (could potentially determine solution used in Individual Decontamination process);
- In most cases, there is no need to hold and decontaminate vehicles used to deliver patients. The risk of contamination is not high enough to warrant a distinct procedure for this function. If a vehicle must be found for decontamination, staff could perform a trace-back.

**Set Up**
- Notify BCAS Dispatcher that re-routing of vehicles is occurring at the site;
- Place external shower or showers for gross decontamination in a pre-designated place(s) and connect to hot and cold water taps. Water temperature should be carefully checked and adjustable at the faucet. Consider the use of heat blowers;
- Place traffic cones and caution tape to form two (male and female) decontamination lanes at pre-designated places;
- Set up technical decontamination tent in close proximity to emergency room. Buckets, solution, sponges and patient valuable kits will be required;
- Set up cones and tape at pre-designated locations to mark off area for contaminated patient valuables and evidence collection/documentation.

**Incident Command Structure**
- The Security Supervisor should serve as IC until relieved of that post by a more qualified person;
- Adopt an Incident Command structure to meet the demands of the situation, and consider activating the following functions:
Operations

Patient Processing
- Rapid, orderly processing requires that patients understand the procedures, follow directions, and move quickly with a minimum of questions;
- Experience shows that disrobing and giving up personal valuables are two processes that can take longer than expected. Same-gender privacy and a visible security system for the personal valuables helps to hasten the process;
- Patient processing consists of the following steps:
  o Patients line up in the queue designated by their initial triage and by gender;
  o Patient receives Gown Kit, which comes in three sizes, large/medium and paediatrics. The kits come in plastic bags, the tear-off opening strip is tied around the patients' wrist and the empty bag is used for the patients' valuables. Both components have a matching bar-code for post decon matching and return of valuables;
  o Patient steps into the disrobe section, and is instructed to disrobe completely, placing valuables in the bag, and putting clothes in a large bag. Patients put on the red gown if they must wait for the decontamination shower;
  o The marked bags are placed on a cart, with security of bags maintained at all times;
  o After completing the decontamination shower and drying, patients put on the green gowns;
  o Patients sign-up on a log, including their name and one other identifier (e.g., date of birth, driver's license number).

Decontamination
- Removing contaminated clothing can reduce the quantity of contaminant associated with patients by an estimated 75 to 90 percent;
- Time requirements for decontamination can be estimated as follows:

<table>
<thead>
<tr>
<th>Process</th>
<th>Ambulatory</th>
<th>Non-Ambulatory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disrobe and tag valuables</td>
<td>5 mins</td>
<td>3 mins</td>
</tr>
<tr>
<td>Shower rinse</td>
<td>1 min</td>
<td>1 min</td>
</tr>
<tr>
<td>Soap, including hair</td>
<td>2 mins</td>
<td>2 mins</td>
</tr>
<tr>
<td>Shower rinse</td>
<td>2 mins</td>
<td>2 mins</td>
</tr>
<tr>
<td>Dry and gown</td>
<td>1 min</td>
<td>1 min</td>
</tr>
<tr>
<td>Moved to Transfer Station</td>
<td>-</td>
<td>1 min</td>
</tr>
<tr>
<td>TOTAL</td>
<td>11 mins</td>
<td>10 mins</td>
</tr>
</tbody>
</table>

Source: Barbera, et. al.
- Depending on the patient's condition, the number of casualties, the environment and personnel resources, the decision may be made to perform technical decontamination to more thoroughly clean each patient. This will be done in the Warm Zone of the decontamination area;
- Note: Alert and oriented ambulatory casualties could perform the technical decontamination on themselves under direct supervision of the Ambulatory Decontamination Nurse;
- The casualty will be washed from head to toe using water and a liquid soap with good surfactant properties, e.g. Ivory dish soap (water, with flour or oatmeal, may be used if radiological agent is suspected);
- Sponges should be used to clean the casualty in a systematic fashion, starting at the head. Particular attention should be paid to areas of hair growth, i.e. head, axilla, and genitalia;
- Gentle brushing should be done in a fashion to remove the product but not lead to abrading or irritation of the skin;
- The casualty should rinse in a systematic fashion after washing avoiding overspray and cross-contamination;
- Cover open wounds with dressings and/or bandages after decontamination is completed;
• Eye irritation should be conducted using normal saline running through either a nasal cannula or Morgan Lens (placed over an anaesthetized eye). Decontamination solutions other than normal saline are not to be used to decontaminate a patient’s eyes;
• Have the patient dry off and put on the green plastic gown provided; then, direct them to the Cold Zone through the Emergency Department doors;
• Showering with tepid water and a liquid soap with good surfactant properties is widely considered an effective (and preferred) method for removing the remaining hazardous substance from patients' skin and hair (Goozner et al, 2002; MacIntyre et al., 2000). (Edmonton Plan, p. 15);
• As a final step in minimizing first-receiver exposure to hazardous substances, the accepted industrial hygiene practice is for the health care workers also to shower following contact with contaminated patients and cleanse equipment as part of decontamination procedures.

Medical Treatment
• Include specific protocols for management of paediatric casualties, and should include paediatricians in planning at every organizational level. Establish paediatric doses (Source: The Youngest Patients);
• No one is released. Asymptomatic patients are sent to a comfortable holding area for prolonged observation. This is important because some agents, such as phosgene and mustard, can have delayed manifestation of symptoms. The observation period should be used to provide information to the patients, and to register them into a surveillance system;
• Once patients have been adequately decontaminated, their care is similar to any other disaster situation.

Disaster: Psychosocial Health Care
• Provide “step-wise” information to patients as it becomes available: Initially what is going to happen, steps that will be taken to provide facts, and providing accurate, credible information as it becomes available;
• Stress the positive actions being taken, and known information about the agents involved and their effects, if known;
• Explain that they will be observed for a period of time to be sure they do not have delayed symptoms;
• Provide individual evaluation by mental health workers and treatment as indicated by patient behaviour or verbalization;
• Provide small group and individual counselling (as available) for those who request it;
• Provide written information on stress and stress-control resources, including contact telephone numbers for further assistance;
• Determine the needs for DPS care among families and friends of patients.

Clean Up
• It is important for staff, patient, and community confidence to have the facility cleaned and certified safe by an independent technical expert;
• Preserve evidence collected in the Warm Zone and hand over to the law enforcement agency;
• Dispose of contaminated clothing and personal valuables that will not be decontaminated. Follow health authority hazardous waste policies for disposal;
• Initiate (Code Brown) procedures to decontaminate the decontamination area;
• Decontaminate or dispose of equipment in the Warm Zone as per Code Brown procedures;
• Notify BCAS Dispatcher of the return to normal operations at the emergency treatment facility;
• Decontamination of BCAS vehicles used to transport contaminated patients falls to BCAS;
• Activate the re-supply systems to re-stock equipment and materials consumed during the response.
Demobilization

- Provide an immediate incident “review” opportunity for all staff going off shift;
- Provide all available information on the agent involved in the event, and characterize the symptoms of exposure;
- Establish a health surveillance system for all potentially exposed workers for medical and stress consequences;
- Schedule follow-up incident reviews and stress debriefings for staff to provide updates of information and to minimize stress effects;
- Schedule a technical review of the facility response to the incident to improve response plans and capabilities.
Annex G

Checklists for

Patient Decontamination Unit

The following roles/checklists are intended to be used in the site planning effort. Each role can be customized as needed to the specific site. Additional roles may be required depending the scope of the incident. The requirement for a second shift is not addressed here but does need to be considered in planning to replace the initial team responding to the emergency code in long term incidents.

All

☐ Be aware of signs of on-site toxic exposure or adverse reactions from wearing PPE. Notify Decontamination Safety Assistant immediately and prepare for removing PPE.
☐ Report to your immediate supervisor for assigned duties.
☐ When instructed by Decontamination Safety Assistant, or if symptomatic, remove PPE.

Patient Decontamination Unit Leader

☐ Assume overall control of the Decontamination Area and operations staff.
☐ Ensure each member of the decontamination unit is given a brief overview of the roles and aware of their responsibilities. Remind them to give a report to their relief.
☐ Provide information to Operations Section Chief (or IC) on the approximate number and condition of arriving casualties, any anticipated need for additional resources, and other important information.

Safety Assistant

☐ Evaluate the incident for agents or contamination levels to determine if they exceed the protective capabilities of the staff PPE and respiratory protection.
☐ Monitor all set-up, patient care, and demobilization activities to ensure safe practices. Resolve any slip, trip, or fall hazards, electrical hazards, etc.).
☐ Perform individual safety check to ensure each decon unit member is properly wearing PPE.
☐ Ensure all personnel are marked with name, function, and time PPE was put on (duct tape and markers work well).
☐ Brief decon unit members of safety issues.
☐ Ensure that no staff members remain in the PPE for more than one-hour.
☐ Observe all responders in PPE regularly for signs of toxic exposure or adverse reactions from wearing PPE.
☐ Ensure all staff exposed to the contaminating agent are isolated and rapidly assessed. Depending on the contaminant and exposure, these staff may require decontamination. Document all staff exposures and treatment.

Patient Tracking Assistant

☐ Register patients with their identification, including BC Care Card number, if available.
☐ Patient entry into registry must be completed before final patient discharge.

Personnel Staging Team Manager

☐ Report to decontamination storage area and distribute decontamination PPE.
☐ Assess the vitals (BP, P, RR) of the decontamination unit prior to putting on PPE and document on Medical Screening Form.
☐ Assist by applying tape to boot, zipper, and glove interfaces to staff members.
☐ Inspect all staff members for PPE integrity prior to allowing them into the Hot or Warm Zones.
Using a waterproof thick black pen, mark the name of the decontamination team member and their designated role on their left chest area and on their back. Write over coloured tape designating, role of physician, nurse, security, maintenance.

Document on medical screening form the time that staff members applied PPE.

Provide communication link with emergency department.

Document on Medical Screening Form time staff remove PPE.

Log staff as they dress in decon gear by listing their full name, planned location of operation, functional assignment, and time of entry into gear.

Pair staff to set up a “buddy-system” for safety checks.

Monitor time in suits, needs for re-hydration, fatigue, etc. Indicate to the Patient Decontamination Unit Leader the potential need to replace personnel as required.

Ensure that pregnant females are excluded from tasks requiring PPE.

Decontamination Team

Gross Decontamination

Ambulatory Patients

- Prominently mark decontamination areas to prevent accidental entry or exposure.
- Direct patients to an undressing area that provides enough privacy to remove contaminated clothing.
- Issue Gown Kits with instructions.
- Depending on the patient’s condition, the number of casualties, the environment and personnel resources, the decision may be made to perform technical decontamination to more thoroughly clean each patient. This will be done in the Warm Zone of the decontamination area.
- Note: Alert and oriented ambulatory casualties could perform decontamination on themselves under direct supervision of the Decontamination Team.
- The casualty should rinse in a systematic fashion after washing avoiding overspray and cross-contamination.
- Have casualties remove clothing, place in clear plastic bag and label with the casualty’s name and unique identifier.
- Secure bagged valuables in personal valuables/evidence area.
- Casualties should shower for 5 minutes with tepid water, rinsing from head to toe.
- Ensure each individual understands decontamination procedure before entering shower system. Ensure patient valuables are put in clear plastic bag.
- Coordinate entry into shower system based on triage classification.
- Direct and assist ambulatory casualties into male and female lanes of the shower system.
- Monitor shower time of each patient, 5 minutes minimum.
- Patient is then to proceed to technical decontamination area in one of two lanes, male or female.

Non-Ambulatory Patients

- Once inside the centre decontamination alley of the shelter, the patient, on a backboard, shall be placed on the rollers.
- Remove the patient’s clothing, cutting it off moving outward starting at the neck area. Dispose of the clothing and personal valuables in a clear plastic bag, label with the casualties name, if known, and unique identifier. Dentures and hearing aids to remain with the patient.
- The airway should be established and protected and oxygen administered via non-rebreather facemasks.
- If a C-spine injury is suspected and a C collar is available, apply the collar as soon as possible.
- The patient will be washed from head to toe using water and liquid soap with good surfactant properties e.g. Ivory dish soap.
- Sponges should be used for washing in a systematic fashion from top to bottom or highest to lowest.
- The patient should be rinsed in a systematic fashion avoiding overspray and cross-contamination.
- Open wounds should be covered with dressings and/or bandages after decontamination is completed.
- Assure the back, axilla, and genitalia are thoroughly washed and rinsed. Rolling the casualty from side to side.
- Carefully rinse the backboard, unless a transfer onto a clean board is planned before the patient is taken into the Cold Zone.
Eye irrigation should be conducted using normal saline running through either a nasal cannula or Morgan Lens (placed over an anaesthetized eye).
- Quickly dry off the casualty and cover with a blanket in an encapsulatory fashion.
- Depending on the patient’s condition, the number of casualties, the environment, and personnel resources, the decision may be made to perform technical decontamination to more thoroughly clean each patient.

**Technical Decontamination**
- Provide direction into the Decontamination Shower System.
  - First lane ambulatory females
  - Second lane for non-ambulatory patients
  - Third lane for ambulatory males
- Provide decontamination of non-ambulatory casualties in the center lane of shower system with soap and water.
- Use roller system to move contaminated casualties through shower system always using four personnel. Ensure transfer board decontaminated.
- The casualty will be washed from head to toe using water and a liquid soap with good surfactant properties, e.g., Ivory dish soap.
- Responsible for assisting and ensuring the Decontamination of ambulatory casualties in the outer lanes of the shower system for a minimum of 5 minutes per patient with soap and water.
- Sponges should be used to clean the casualty in a systematic fashion, starting at the head. Particular attention should be paid to areas of hair growth, i.e., head, axilla, and genitalia.
- Cover open wounds with dressings and/or bandages after decontamination is completed.
- Conduct eye irrigation using normal saline running through either a nasal cannula or Morgan Lens (placed over an anaesthetized eye). Decontamination solutions other than normal saline are not to be used to decontaminate a patient’s eyes.
- Have the patient dry off and put on the green plastic gown provided; then, direct them to the Cold Zone through the Emergency Department doors.

**Valuables / Evidence**
- Collect patient’s personnel valuables from decontamination shelter, document and place in secure area.
- Maintain the chain of evidence for all valuables until notified otherwise by law enforcement authorities.
- Inform patients on clothing and valuables decontamination procedures when these items are returned to them.
- Professional decontamination may be necessary for items of clothing and valuables. Patients must authorize this process for cost recovery from patient.

**Decon Assistant**
- Assist patients through the decontamination process, as needed.
- Instruct patients on the use of gown kits and the security of their valuables.
- Provide information to patients on the steps in the decontamination process.
- Direct decontaminated patients to appropriate services in the Cold Zone.

**Treatment Team Manager**

**Triage**
- Triage patients as they arrive according to the START Triage System and using a bold marker write large sized letter on patients right hand:
  - Red: Critical
  - Yellow: Immediate
  - Green: Minor
  - Black: DOA
Affix the Triage Tag to patient.
- Provide controlled access through the decontamination area as per triage status.
- Identify the symptoms and countermeasures associated with an agent by consulting the Poison Control Centre, Material Safety Data Sheets, and available algorithms. Appropriate medical countermeasures will be indicated by the agent involved.
- Provide controlled access through the technical decontamination area as per triage status.

The START triage method uses Respirations, Pulse, and Mental Status to categorize the patient according to a colour code:

<table>
<thead>
<tr>
<th>RESPIRATIONS</th>
<th>PULSE</th>
<th>MENTAL STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>Red</td>
<td>Red</td>
</tr>
<tr>
<td>No respirations with patent airway</td>
<td>Pulse - No radial pulse, or</td>
<td>Confused or Unconscious</td>
</tr>
<tr>
<td>Respirations &lt;10 or &gt;30, go to Pulse</td>
<td>Pulse present, go to Mental Status</td>
<td>Alert</td>
</tr>
<tr>
<td>Green</td>
<td>Yellow</td>
<td>Red</td>
</tr>
<tr>
<td>Able to walk</td>
<td>Alert</td>
<td>Confused or Unconscious</td>
</tr>
</tbody>
</table>

1 Some hospitals follow the Canadian ED Triage and Acuity Scale (CTAS)

Urgent Treatment
- Responsible for any immediate life-saving act, such as intubation, prior to decontamination.
- Assist intubated patient through the Decontamination non-ambulatory shower system immediately, so further treatment can be provided in the emergency department.

Detection and Monitoring Team Manager

Hot to Warm Zone
- If a radiological agent is suspected and detection equipment is available, perform head-to-toe sweep noting the level and reporting results to the Safety Assistant and/or the treatment team.
- Ensure casualties have been decontaminated. If still contaminated re-direct back into the shower system.
- Re-triage if needed post decontamination.
- If Detection/Monitoring Staff are not immediately available, patients could be decontaminated without testing and held until confirmed they are clean at a later time.
- Before transferring the patient into the Cold Zone, remove all treatment equipment used on the patient and dispose of them in the trash barrels.
- Transfer the patient to properly protected treatment personnel in the Cold Zone.

Warm to Cold Zone
- Direct casualties into the emergency department.

Environmental Team Manager
- Monitor wastewater concentrations of agents, appropriate to the type of contaminant.
- Notify the BC Ministry of Environment and/or wastewater receiver (e.g., sewage treatment plant) of event and nature of contaminant, including dilution levels.
- Consult with regulatory agencies regarding the need for and methods of wastewater containment.
- Consult health support services to determine the appropriate packaging of waste prior to being placed directly in an incinerator.

Security Team Manager

Area Control
- Re-direct arriving potentially contaminated patients to the Hot Zone for initial triage, and vehicles to the pre-designated parking area for contaminated vehicles.
Place signs in appropriate locations to promote the correct flow of patients.
- Initiate facility lock-down procedures restricting access to the building.
- Control access to the emergency department and other entrances to the treatment facility.
- Notify by radio the Security Team Manager of the need for decontamination of the patient and the Security Officer that was exposed, and immediate coverage of the Security Officer’s duties.
- Ensure everyone remains outside until triaged.
- Maintain orderly fashion of entry into decontamination area after triage classification.
- Maintain ongoing communication with Security Team Manager.
- Responsible for crowd control of patients waiting to be triaged for decontamination.
- Assure that current patients, their families, and facility staff who are leaving are guided through safe exits to avoid contamination.
- Use megaphone to communicate with crowds.

Traffic Control
- Control traffic at the emergency department.
- Re-route emergency vehicles to alternate drop off points outside of ambulance bay area take top priority.
- Request all non-emergency vehicle owners to move their vehicles to a designated parking lot or underground parking lot.
- Arrange to tow vehicles that cannot be moved from the emergency department.
- Ongoing communication with Security Team Manager.
- Prevent vehicle access to ambulance bay area.
- Isolate any vehicle used to transport contaminated patients until appropriate decontamination can be carried out.

Staff Security (Safety)
- Handle any security issues in the Warm Zone.
- Control disruptive patients or family members to maintain staff safety and security.
Annex H
Disaster Psychosocial Health

Overview

Hazardous substance incidents will likely produce more than medical challenges for BC hospitals. The number of psychological casualties will most likely exceed medical casualties, and may challenge the operational and physical capacity of the Emergency Department to deal with them effectively.

Hazardous substance events, like other mass casualty incidents, will compel BC hospitals to manage three related aspects:
- The surge of injured, worried-but-well, and others at hospital doors;
- The need to sort incoming medical and psychological casualties;
- Providing support for all who present at the hospital.

Untreated self-evacuee casualties are likely to rapidly leave the scene of the mass casualty incident before site perimeter control can be established. Self-evacuees may converge on local hospitals before emergency protocols can be activated to receive individuals with a wide range of needs.

Following such an event, anxiety and alarm can be expected from injured patients, their families, health care workers, and the worried-but-well. Psychological responses may include anger, fear, panic, unrealistic concerns about infection or contamination, paranoia, and social isolation. During the timeframe of surge at the hospital, distress among current inpatients within the hospital may also occur.

It is estimated that for every physical casualty caused by a terrorist incident, there may be between 4 and 20 psychosocial victims. This phenomenon effectively moves the incident from the incident site to the emergency treatment facility, which can paralyze a health facility where the emergency department is unprepared for the surge or has no effective response to decontamination protocols.

The early arrival of self-evacuated and perhaps uninjured casualties at emergency departments has the potential to unduly commit medical resources simply because they arrive before more critically injured persons. The severely injured will take longer to arrive due to triage at the scene and awaiting ambulance transportation. Self-presenters have the potential to drain the resources of the emergency department or completely overwhelm it prior to the arrival of casualties more in need of medical care.

Community resources, such as municipal reception centres staffed by Emergency Social Services (ESS) volunteers, are typically not available immediately following a major incident. Furthermore, ESS services are not often known to the public as a resource where they can receive psychological support. Other community partners, such as the Canadian Red Cross, St. John Ambulance, and others cannot be immediately available to render support to those in need of psychological care.

With self-evacuees that are not transported by ambulance in mind, each hospital emergency department has procedures to triage patients to the START standard, and will attach the universal START tags to individuals.

---

Psychosocial Assessment of Incoming Persons

While BC hospitals practice the START system for medical casualties, there is a need for all emergency departments to develop the capacity of trained staff to respond to an influx of psychological casualties and family members during the surge from a hazardous substance event.

Untreated and self-referred psychological casualties who arrive at treatment centres may be processed at a triage station as soon as it is activated in response to an incident. This triage station should be located away from the high activity area of the emergency department.

The following figure offers an illustration of the role of hospital triage in hazardous substance events and other mass casualty incidents.

Schematic of Receiving and Sorting Psychological Casualties and Family Members

The hospital health care team should take a multi-disciplinary approach to triage, and include psychiatrists, psychologists, social workers, chaplains, and psychiatric nurses on their triage teams to assist with psychological assessment. Clerical staff would also be required for the usual registration of patients. Psychosocial health expertise should be incorporated into staffing at all stages of treatment for medical casualties.
The ability to effectively sort, stage and separate incoming patients requiring DPS counselling and rapid treatment is a critical component of patient decontamination and must be carefully planned in advance, included in emergency plans, and exercised on a regular basis.

The figure above highlights two service options for managing these requirements:

**Support Centres** address the needs of those with symptoms of psychological harm but lack physical injuries. Early intervention and the provision of psychological first aid targets acute stress reactions and reduce initial distress. Support Centres focus on stabilizing the DPS of the patient, mitigating any harm, and referring the patient to more advanced psychological care, as needed.

**Family Centres** assist family members searching for missing or injured loved ones, and in providing psychological first aid. Qualified mental health providers and relief workers sustain the operation of hospital Family Centres. In addition, a wide range of community resources can support Family Centres during protracted events.

Planning to support DPS should become an integral part of emergency preparedness for every emergency treatment facility. Greater levels of preparedness may be expected at larger centres that are more likely to receive mass casualty incidents, but all emergency departments should have plans to triage and support medical casualties, psychological casualties, and family members.

Research highlights the importance of DPS preparedness for all mass casualty incidents, not just for hazardous substance events. Plans, training, and exercises should reflect this requirement.
Annex I

Training and Exercises for Patient Decontamination

Patient decontamination requires education and awareness around two main focus areas. First, physicians and staff who are trained in decontaminating patients are better able to protect themselves, other employees, other patients, and the facility in general when faced with a contaminated patient. Training and the requirement to maintain decontamination certificates and credentials are all essential components of any health authority’s successful decontamination program.

Decontamination protocols and training should be standardized throughout the province because health workers are mobile and are less likely to be effective if they encounter different systems in different settings. In addition, health authorities may provide equipment and trained staff outside their jurisdictions under mutual aid agreements, necessitating standardized equipment, procedures, and terminology. Overall, provincial standardization helps develop a long-term culture of safety in BC’s health care system.

Second, the use of PPE during patient decontamination is required by WorkSafe BC. Working in a contaminated environment while wearing PPE can present significant worker hazards, such as limited visibility, reduced dexterity, claustrophobia, restricted movement, suit breach, insufficient air supply, dehydration, effects of heat and cold, impaired communication, physical and psychological stress.

Training and exercise sessions that include “hands-on” demonstration on the proper uses of PPE will raise the awareness of these noted challenges, enhance familiarity with the equipment, and standardize the protocols for responding in a safe manner. For these reasons and others, personnel must not use PPE without adequate training.

Legal Requirements

British Columbia’s regulatory agencies overseeing workplace safety require that all employees who may be exposed to hazardous materials receive training that mitigates their risk of exposure. WorkSafe BC requires that staff be trained to perform their anticipated job duties without endangering themselves or others.

Regulations pertaining to chemical exposures and related safety training are contained in the WorkSafe BC Occupational Health and Safety Regulation (OHSR). The following sections are particularly relevant:

Section 5.102 – Training and Drills – The employer must (a) provide training in the appropriate emergency procedures to all workers who may be affected, and (b) conduct drills to test the adequacy of procedures and to ensure that workers and supervisors are familiar with their roles and responsibilities.

Section 8.7 – PPE Instruction – The employer must ensure that a worker who wears personal protective equipment is adequately instructed in the correct use, limitations and assigned maintenance duties for the equipment to be used.

Under provincial legislation, training in emergency procedures, PPE and respiratory protection is mandatory for anyone who has a designated role in patient decontamination. Health authority officials can expect to be asked to prove this when requested by regulatory agencies, e.g. WorkSafe BC.

Training Topics
Two levels of training have been found to be among the best practices in other jurisdictions: Awareness (Basic Level), and Operations (Advanced Level).

**Awareness Level Training (Basic)**

The Awareness Level training for first-receivers is designed for individuals who are likely to witness or discover the arrival of a contaminated patient, and who would be expected to initiate an emergency response sequence by following prescribed procedures.

All staff directly or indirectly involved with patient decontamination must be trained to the Awareness Level at a minimum. Topics covered in the Awareness Level training include:

- Types of hazardous substances;
- Personnel risks and safety procedures;
- Activation of patient decontamination;
- Potential for facility contamination, exposure control procedures, lockdown;
- Organization structure of the Decontamination Team;
- Role of Disaster Behaviour Health in contamination incidents.

Additionally, all staff should be aware of the health facility’s role in patient decontamination. Awareness Level training should be made available to every employee, ideally during new employee orientation.

**Operations Level Training (Advanced)**

The Operations Level training for first-receivers is designed for individuals who will have duties in the Hot and Warm Zones of the decontamination area. Operations Level training provides a common understanding of decontamination procedures, with primary emphasis on personal safety.

In the Operations Level component, the trainees are expected to prove proficiency in the use of PPE including respirators, and understand the functions of the decontamination facility. Training at the Operations Level includes all of the topics addressed in the Awareness Level training session.

Decontamination team members (physicians, nursing staff) who perform hands-on patient decontamination must be trained in the following areas:

- Awareness of risks;
- Types of hazardous substances, agents;
- Different levels of PPE and respirators;
- Putting on and removing PPE and respirators in a safe manner (“donning and doffing”);
- Establishing and setting-up decontamination facilities;
- Patient decontamination procedures;
  - Gross decontamination
  - Technical decontamination
- ICS and response organization;
- Patient decontamination Emergency Response Plan;
- Work practice exposure control, e.g., lockdown procedures;
- Disaster Psychosocial Health.
Training Levels by Position

Different levels of training are designed to reflect the role of the responder, in direct relation to the complexity of each position. All personnel who may be expected to receive contaminated patients must be trained in decontamination procedures, the use of decontamination equipment, and the safe use of PPE and respiratory protection.

Training should include staff from various departments in the emergency treatment centre, such as facilities personnel. The following table summarizes the training level requirements for different positions in the health care system.

<table>
<thead>
<tr>
<th>Health Care Position</th>
<th>Training Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Awareness</td>
</tr>
<tr>
<td>Communications / Public Affairs</td>
<td>✓</td>
</tr>
<tr>
<td>Emergency department staff — medical, nursing and patient care support service staff</td>
<td>✓ ✓</td>
</tr>
<tr>
<td>Engineering / Plant Services</td>
<td>✓</td>
</tr>
<tr>
<td>Environmental Health (Public Health)</td>
<td>✓</td>
</tr>
<tr>
<td>Health Authority management staff designated roles for incident coordination or emergency management roles in an EOC.</td>
<td>✓</td>
</tr>
<tr>
<td>Health emergency management staff</td>
<td>✓</td>
</tr>
<tr>
<td>Hospital Occupational Health and Safety, or those nominated to fulfill a Safety Officer role</td>
<td>✓ ✓</td>
</tr>
<tr>
<td>Laboratory Services</td>
<td>✓</td>
</tr>
<tr>
<td>Medical Imaging</td>
<td>✓</td>
</tr>
<tr>
<td>Patient Registration and Placement Department</td>
<td>✓</td>
</tr>
<tr>
<td>Radiation Safety Officers</td>
<td>✓ ✓</td>
</tr>
<tr>
<td>Reception in Emergency Department</td>
<td>✓</td>
</tr>
<tr>
<td>Security personnel</td>
<td>✓ ✓</td>
</tr>
<tr>
<td>Social Workers, Clergy, and Psychiatry</td>
<td>✓</td>
</tr>
</tbody>
</table>

In addition, members of local and regional fire services and BCAS should be invited to participate with health professionals in integrated training sessions.

PPE Training

Under no circumstances should a worker be allowed to wear PPE unless they have been trained, qualified, and certified to do so. The integrity of PPE protection depends on complete adherence to WorkSafe BC Regulations and manufacturer instructions for dressing in, using, and removing the equipment, which requires training and practice.

All physicians and staff who could be called on to perform duties in the Hot or Warm Zones during patient decontamination (identified for Operations Level training in Figure 1 above) must be trained in the use of
PPE and respirators. PPE and respirator refresher training should be conducted at least annually for health care workers trained at the “Awareness Level” and the “Operations Level,” according to OSHA Best Practices for Hospital-Based First-Responders of Victims-2005.

**Functional Training for Decontamination Team**

In conjunction with Operations Level training, members of the decontamination team should be instructed in the functions they could undertake when responding to an event. For example, those responsible for decontaminating non-ambulatory patients should be trained in Technical Decontamination procedures and equipment.

**Training Delivery Options**

Consistent and reliable training methods are needed to ensure standardization of decontamination procedures among all health authorities, and to support timely implementation of the overall provincial program.

1. **Train-the-Trainer**

Selected staff from each health authority should attend available training sessions to become qualified to instruct Decontamination Team members in their home jurisdictions. They would deliver both classroom and practice sessions in patient decontamination. Developing in-house training capacity is consistent with the long-term goals of a cost-effective and sustainable Patient Decontamination Program, including the requirement for succession planning.

It would be ideal to have CAS Paramedic staff serve a role in providing training. This would help develop the overall capacity for the BC health system to respond to contamination events and could become part of the Technical Assistant program mandate.

A training cascade is also possible under this option, where designated sub-trainers in specific functions would train others within their facilities, following an approved curriculum and using a standardized set of training materials.

These options anticipate the use of the train-the-trainer course component for patient decontamination from the Hospital Emergency Response Training for Mass Casualty Incidents (HERT/MCI) course. This course is offered by the US Federal Emergency Management Agency (FEMA) through the Center for Domestic Preparedness in Anniston, Alabama.

Health Canada and the Canadian Emergency Management College in Ontario, currently do not currently deliver patient decontamination training programs specifically for health care workers as first-responders.

The BCAS currently offers a basic level of awareness training in the “The First Responder Training Program,” developed by the federal government. The purpose of this course is to instruct students in how to recognize and respond to, but not intervene, in a potential hazardous substance incident, while taking the necessary precautions and calling in the appropriate special resources.

2. **Contracted Training Delivery**

Under this option, a contracted instructor would deliver training at designated locations within each health authority. Decontamination team members requiring training would travel from their facilities to attend these sessions. Contracted training is expected to include both classroom and practice sessions.
It is possible for the Justice Institute of BC to play an important role in coordinating contract training, including the selection of qualified instructors, developing a suitable curriculum, and scheduling training sessions. The JIBC may assume a leadership role in contract training, which could include creating partnerships with expert trainers and organizations, such as FEMA.

3. Mobile Patient Decontamination Training

In this alternative, a dedicated and specialized team of physicians, nurses, and BC Ambulance personnel would deliver patient decontamination training at various facilities throughout the province. Once they receive qualified Train-the-Trainer training, either through the FEMA course or through other means, team personnel could serve as a mobile unit for the delivery of patient decontamination training throughout BC. This group of trainers would travel where needed and as requested by individual health authorities to provide the required training.

This mobile unit could also serve as a resource during mass casualty incidents that require patient decontamination anywhere in the province. Coordination and scheduling of province-wide training under this option may be a challenge, but could be managed by the MoHS or through the Justice Institute of BC.

4. Electronic Courses

As with other instruction subjects, health authorities may consider E-Learning mechanisms for delivering some aspects of patient decontamination training, including refresher and recertification courses. On-line training would be appropriate for some topics, such as hazard awareness, signs and symptoms of contaminations, and response organization structure. However, decontamination training programs require some degree of hands-on experience, including how to use equipment, dressing in and removing PPE, and communicating with team members.

The Justice Institute of BC currently offers a range of E-learning course for health care workers, including the ICS, the BC Emergency Response Management System, and the Introduction to HEM.12

Training Records

Records of training and certification must authenticate the type of training each person has received and the dates when instruction occurred. All medical records related to respiratory protective equipment should be maintained in the employee’s file.

The US Occupational Safety and Health Administration (OSHA) requires the employer to certify that staff and physicians receive Awareness Level and Operations Level training. OSHA also mandates annual refresher training and demonstrations of competency.

Exercises

Any health care facility’s ability to respond to the extraordinary demands of patient decontamination depends on pre-event preparedness, planning and exercising for such events. An exercise provides a realistic training environment to test procedures for receiving, decontaminating, and treating contaminated casualties. Exercises promote competency in personal safety and patient care delivery programs.

Properly designed exercises cultivate cooperation, coordination, inter-operability and communication among health care staff, BCAS, and other agencies involved in patient decontamination incidents.

12 See: www.jibc.ca/emergency/Programs_Courses/Online_Learning.htm
Exercises should be conducted directly following any training sessions. Each exercise should involve physicians and staff in practicing their roles and responsibilities in patient decontamination and patient care using speciality purpose-built patient decontamination infrastructure and allocated equipment.

There are three categories of exercise to consider in support of patient decontamination training:

**Table-Top Exercises** – The table-top exercise is an effective and relatively inexpensive method for testing patient decontamination procedures, personnel, and equipment. Participants would consist of key members of the hospitals, the health authority and public health who participate and work through the decision-making issues raised during the fictional, yet realistic scenario. Invitations to tabletop exercises should extend to senior representatives and Technical Assistants of the BCAS in the region, and other key first responder agencies, such as the local or regional fire department.

**Functional Drills** – Functional drills allow critical activities or functions to be practiced and tested independently. Where table-top exercises may be limited in scope, and time may not permit full testing of all functions, the functional drill targets a specific component of the overall decontamination plan. Examples of functional drills for patient decontamination may include among others:

- Decontamination facility setup;
- Dressing in and removing PPE;
- Patient decontamination.

**Full-Scale Exercises** – The full-scale exercise simulates an emergency event in real-time, with scenarios as realistic as possible. It involves all patient decontamination functions and requires full deployment of equipment and personnel. Full scale exercises fully demonstrate the use and capabilities of new equipment, and test the training and proficiency of first-receivers.

A full-scale exercise would typically require staff to deploy the Decontamination Team, establish an incident command structure, and activate the EOC. Observers and Evaluators should be on hand to note personal safety actions and to correct any deficiencies. This type of exercise should include BCAS, Public Health personnel, fire and other organizations as identified in the scenario.

Health authorities would benefit from templates for table-tops, drills, and full-scale exercises, as well as facilitation to ensure consistent outcomes across the province. The Justice Institute prepares and facilitates a range of exercises for other agencies including Health, and may be able to fulfill this requirement.