

# Medical Management of Exposure or Suspected Exposure to an Environmental and Industrial Health Hazard or Public Health Concern

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## Background

1. This document supersedes MSI CF 8000-111 “Medical Management of Exposure or Suspected Exposure to an Environmental and Industrial Health Hazard or Public Health Concern” which was originally issued and effective on 03 May 05. This Instruction applies to all CF personnel, Department of National Defence (DND) Public Servants, contractors and sub-contractors who provide health services to CF members.

## Table of Abbreviations

<b>Acronyms/Abbreviation</b>	<b>Term in Full</b>
ACGIH	American Conference of Government Industrial Hygienists
BEI	Biological Exposure Indices
CF H Svcs Gp	CF Health Services Group
CF H Svcs Gp HQ	CF Health Services Group Headquarters
CLC	Canadian Labour Code
CO	Commanding Officer
COSH	Canada Occupational Safety and Health
D FHP	Director – Force Health Protection

<b>Acronyms/Abbreviation</b>	<b>Term in Full</b>
D Safe G	Director of General Safety
EIHH	Environmental and Industrial Health Hazards
HCP	Health Care Provider(s)
MO	Medical Officer
NATO	North Atlantic Treaty Organization
OHAG	Occupational Health Assessment Guide
OSH	Occupational Safety and Health
PHC	Public Health Concern
PFT	Pulmonary Function Test
PMed Tech	Preventive Medicine Technician
ROTA	Release Other than Attack
SMA	Senior Medical Authority
SST	Specialist Support Team
TB	Treasury Board
TIB	Toxic Industrial Biological
TIC	Toxic Industrial Chemicals
TIM	Toxic Industrial Materials
TIR	Toxic Industrial Radiation
TLV	Threshold Limit Values

## **Definitions**

2. Definitions are for the purposes of this instruction.

### **Biological Hazards**

3. Biological hazards are micro organisms (e.g.: bacteria, viruses, fungi, protozoa) and their associated toxins that are capable of causing adverse health effects. The risk of adverse health effects from biological hazards is dependent on several factors, such as the nature of the hazard, exposure, and individual characteristics.

### **Chemical Hazards**

4. Chemical hazards are elements, compounds, or chemical mixtures, both naturally occurring or synthetic, that are capable of causing adverse health effects. The risk of adverse health effects from chemical hazards is dependent on several factors, such as the nature of the hazard, exposure, and individual characteristics.

### **Environmental and Industrial Health Hazards (EIHH)**

5. Naturally occurring and/or man-made physical (see definition), chemical, or biological hazards. Encompasses the NATO term TIM, which includes TIB, TIC, TIR and ROTA.

### **EIHH or PHC Management File**

6. All information related to the management of an EIHH or PHC scenario is to be documented in the EIHH and PHC Management File, a copy of which is to be provided to and archived by CF H Svcs Gp HQ/D FHP. This includes details of the nature of the EIHH or PHC, the actions of CF H Svcs Gp personnel in managing the event and all other pertinent information. Personal health information identifying individual CF members is to be placed on their Medical Record (CF2034) and is not to be duplicated in the EIHH or PHC Management File.

### **Exposure**

7. Exposure refers to any contact of an individual with a physical, chemical, or biological hazard. In the case of a chemical hazard, exposure occurs when a substance is introduced onto or into the body through ingestion, inhalation or contact with the skin or by some other means. In the case of a biological (infectious) hazard, exposure occurs if the proximity or contact with the source of a disease agent is sufficient to permit effective transmission of the agent or harmful effects of the agent. Simply being in the presence of a hazard does not necessarily mean that the individual is exposed, and a known exposure (even if above established standards) does not necessarily mean that a harmful effect will ensue.

### **Hazard**

8. A condition or situation that has the potential to result in illness or disease.

### **Physical Hazards**

9. Physical hazards are sources of energy that, if strong enough, may cause injury or disease. Examples include ionizing radiation, non-ionizing radiation (e.g.: radiofrequency radiation, microwave radiation, infrared radiation, ultraviolet light), noise, vibration, hypo or hyperbaric pressure, temperature extreme, and electricity. The risk of adverse health effects from physical hazards is dependent on several factors, such as the nature of the hazard, exposure, and individual characteristics.

### **Public Health Concern (PHC)**

10. Conditions and situations that spread communicable diseases and other illnesses through food, water, or air, or by insect, rodent, or animal vector.

### **Respiratory Sensitizer**

11. A substance that has the potential to induce an immunologic hypersensitivity response, manifested as asthma, in susceptible individuals. Susceptible individuals can develop asthmatic symptoms following exposure to doses of a respiratory sensitizer well below occupational exposure limits for that particular substance.

## **Risk**

12. The potential that a chosen action, inaction, activity or lack of activity may result in an undesirable or unwanted outcome. Implicit is the understanding that choice is a major factor influencing the range of outcomes.

## **Risk Assessment**

13. This is a multi-step process for estimating the probabilities, magnitudes, and consequences of undesirable effects resulting from the exposure to physical, chemical, or biological hazards. The general risk assessment process consists of four steps:
  - a. Hazard Identification (What are the health problems caused by exposure to this hazard, and how good is the evidence to support this causal association?)
  - b. Dose-Response Assessment (What health problems can be expected at various exposure levels?)
  - c. Exposure Assessment (What was the magnitude, frequency, and duration of exposure to the hazard?)
  - d. Risk Characterization (Based on the preceding three steps, what is the extra risk to health attributable to this exposure, both for individuals and populations?)

**Note:** Refer to Reference G.

## **DND General Compliance**

14. It is a leadership responsibility to ensure that DND personnel have a safe and healthy working environment. This includes command responsibility for adherence to all relevant regulations and policies, and utilization of all available methods to protect subordinate personnel from known occupational hazards, including physical, chemical, or biological hazards.
15. As a matter of law, DND civilian employees are subject to the CLC Part II and COSH regulations as well as the TB OSH Directives through collective agreements, and members of the CF must apply these standards at all times when responsible for the supervision or management of DND civilian employees.
16. Although not a legal requirement, it is CF policy to apply federal workplace health and safety regulations to CF members. Therefore, unless otherwise stated, the application of this Instruction in garrison and similar settings will comply with:
  - a. Reference J;
  - b. Reference K;
  - c. Reference L.

"... where the application of such requirements does not place a serious limitation on the capability to fulfill CF operational commitments." (Reference L)

### **Authority to Override**

17. Good judgment and leadership in assessing the relative significance of operational health threats are required in the application of this instruction. In some operational and training circumstances, the strict application of established health and safety standards might be impossible or could result in exposure to a relatively greater health hazard. A commander may therefore override a standard if it places a serious limitation on the capability to fulfill a CF operational or training commitment (Reference I, and para 7, chapter 5, Volume 1 of Reference L)
18. When the nature or urgency of an operational or training situation requires a departure from General Safety Policy or Standards, the Commander will employ recognized risk management practices to determine an appropriate course of action and must be prepared to justify the decision. When the departure from General Safety Policy or Standards will be of a continuing nature, the Commander must seek approval from Higher Headquarters for the continued action.

### **Applicability of Exposure Standards**

19. CF Medical authorities may also determine that different exposure standards should be applied in some unique military operational scenarios. In such circumstances, the exposed CF population as well as the nature, duration, and types of hazardous exposures might differ significantly from those relevant to civilian workplace settings and for which civilian standards were derived. There are also many potential exposures for which no standard has been established by civilian Canadian health authorities. The CF Surgeon General may, therefore, recommend the application of exposure standards that are more appropriate to the health protection of CF members when justified by the balance of health risks and the unique nature of certain operational environments.

### **CLC Part II and the CF H Svcs**

20. Within the DND/CF, the occupational health aspects of CLC Part II are applied by the CF H Svcs Gp in support of Base/Wing commanders and COs, who have overall responsibility for providing a safe working environment for members of the CF (Reference H, replacement DAOD in development).

### **Direction**

21. The CF H Svcs Gp will take active measures to effectively manage CF members' exposure or suspected exposure to an environmental and industrial health hazard or public health concern.

### **Policy Overview**

22. This instruction provides guidance to medical personnel concerning the medical management of exposure, or suspected exposure, to an EIHH or PHC.

## **Context**

23. Military work activities and work environments may entail exposure to physical (see definition), chemical, or biological hazards. Whether or not an exposure will result in a risk to health is dependent on the hazard, the characteristics of the exposure, and the health status of the individual. Exposure to hazards represents definite areas of concern that must be properly evaluated to determine if acute or chronic exposure could result in adverse health effects to individuals and whether or not mitigation measures should be employed to limit their impact on individuals and on CF operational capability.

**Note:** Refer to references C, D, E.

## **Early Action Essential**

24. In the event of a suspected EIHH or PHC incident, it is essential to proceed as soon as possible with an appropriate health risk assessment. The objectives of this systematic process are to identify the hazard, eliminate or limit exposure to the hazard, and provide direction for investigation and management of individuals' health concerns. HCPs are to be mindful of the importance of acknowledging members' concerns relating to the incident, of communicating factual and contextual information regarding health risks as soon as possible, and of using professional judgement in determining the appropriate level of investigation and care.

## **Symptoms and Exceptions**

25. Individuals exposed to a significant EIHH or PHC hazard, which might result in long-term complications, typically experience acute clinical signs and/or symptoms. Exceptions are described further under "Delayed Signs and Symptoms."

## **Fear of the Unknown**

26. EIHH or PHC incidents require the HCP to be aware of the patient's perceptions of the incident, including fear of the unknown and the unfamiliar. This is most notable when dealing with chemicals and radiation. Even if a chemical is identified and its toxicology is well understood it may be difficult to reassure the exposed individual about the minimal long-term risks resulting from the exposure.

**Note:** Refer to Reference F.

## **Clinician-Patient Mutual Feedback is Important**

27. At all times it is important to learn details of the event, listen to the concerns of the individual and provide as much factual information and understanding as possible. In the

absence of such care, understanding, and information, individuals often seek and receive conflicting, sensationalized and unsubstantiated information from various sources, which increases their anxiety. While conventional medicine and science may not have answers to all the questions, the alternative sources readily provide answers with a certainty that may cause the individual to doubt the credibility of CF H Svcs Gp HCP. Adherence to the facts and timely medical support will do much to ensure optimal outcomes and enhance trust in CF HCPs.

## **Reproductive and Developmental Hazards**

28. Reproductive and developmental hazards require special attention if the exposed individual is pregnant or is concerned about pregnancy. Short-term exposures to reproductive toxins are not usually of clinical significance unless there is systemic toxicity resulting in symptoms to the mother. However, research into human reproductive and developmental hazards is limited, and referral to a specialist may be prudent if there are significant concerns on the part of the woman or the assessing physician about conception, pregnancy, or breast-feeding.

**Note:** *Refer to reference B.*

## **Limit Laboratory Investigations**

29. Laboratory investigations should be limited to those that are clinically indicated, medically necessary, and scientifically valid. Overuse of tests in patients involved in low-dose EIHH or PHC incidents has been shown to lead to a perception of illness and heightened anxiety.

**Note:** *Refer to references C, D, E.*

## **Record Keeping**

30. Record keeping is a vital part of health care and is critical to support the future evaluation of potential exposure-illness linkages. As such, all EIHH and PHC incidents managed by the CF H Svcs are to be appropriately documented in the EIHH and PHC Management File, a copy of which is to be provided to and archived by CF H Svcs Gp HQ/D FHP. This instruction is to be read in conjunction with the Source Reference, which provides direction on reporting and documentation of exposures to EIHH or PHC on International Operations.
31. Details of the EIHH or PHC incident should be recorded in individual medical records if:
- a. The exposure or suspected exposure is raised as a concern during a clinician-patient encounter, or
  - b. The HCP determines, in consultation with D FHP as necessary, that a credible exposure occurred or could have occurred, and the exposure or potential exposure was of the type and degree to be of potential health significance.

32. In the event that non-medical authorities wish to document suspected exposures that do not satisfy the points in bullets one and two above, then pertinent details should be recorded on a CF 98.

## **EIHH and PHC Incident Management**

### **Managing Specific Scenarios**

33. EIHH and PHC scenarios can be very frightening, highly volatile, and extremely variable. The response of CF H Svcs personnel must consequently be well organized, swift and flexible. Annex A provides direction to CF H Svcs personnel on how to manage an EIHH and PHC incident.

### **Medical Assessment**

34. The medical assessment should include:
- a. Detailed documentation of the risk assessment as described at Annex A.
  - b. A history of the event and use of personal protection equipment as well as medical history and symptoms as outlined in the Health Questionnaire at Annex B.
35. Related aide-memoires are provided in Annexes C and D.

### **Delayed Signs and Symptoms**

36. Medical personnel should be cognizant of delayed signs and symptoms that may occur following an exposure. Affected individuals may appear clinically well or only mildly affected at first, but their condition may worsen significantly over a short period of time (hours to days). Examples include delayed upper airway compromise following smoke inhalation injury and pulmonary sequelae such as pneumonitis, pulmonary edema, or pneumonia following acute high-dose inhalation exposure to irritant gases. Exposure to ionizing radiation and some infectious agents can also lead to delayed clinical effects. These delayed effects may be life threatening and patients should be treated with a high index of suspicion if their initial presentation and exposure history is suggestive of potential delayed effects.
37. Longer-term chronic health effects may occur after acute high-dose exposures. For example: neuropsychiatric effects such as memory impairment and personality change has been observed following acute carbon monoxide exposure; a large irritant gas or vapour exposure may result in chronically hyper-responsive airways; high non-lethal exposures to radiological agents may increase an individual's risk for malignancy.
38. Longer-term chronic health effects from chronic exposures have typically only been observed in populations exposed for many years at levels well above currently accepted occupational health and safety standards. Exceptions are usually those of an allergic nature, such as the development of asthma after repeated low-level exposures to a potent respiratory sensitizer.



39. The exposure history and knowledge of the particular hazard should dictate the requirements for medical monitoring.

### **Refer to Occupational Health Assessment Guide for Hazardous Exposures**

40. If a physical examination and/or detection maneuver is called for, the physician should refer to the Occupational Health Assessment Guide for Hazardous Exposures as published by Health Canada, in Appendix 2 of the current OHAG and Reference C. For substances not covered in the Health Canada Guide or Reference C, or if there is considerable uncertainty regarding appropriate management, the physician should follow applicable clinical practices and, where necessary, consult with a specialist in occupational medicine or an internist.

### **Follow-up Using Appropriate Biological Exposure Indices (BEI)**

41. Individuals exposed to chemical compounds above the TLVs may require follow-up using appropriate BEI as published in the most current ACGIH on TLVs for "Chemical substances and Physical Agents and Biological Exposure Indices". The majority of BEIs are of limited value in acute exposure situations, however. Urine samples for some BEIs, as specified in the ACGIH booklet, can be frozen if the physician requires time to decide if the BEIs are indicated.

## **Responsibility**

### **Responsibility Table**

42. The table below identifies the primary responsibilities for medical management of exposure or suspected exposure to an environmental and industrial health hazard or public health concern.

<b>The...</b>	<b>Is responsible for...</b>
DGHS	<ul style="list-style-type: none"><li>• Directing that appropriate policies and procedures be developed to effectively manage exposure or suspected exposure to an environmental and industrial health hazard or public health concern.</li></ul>
Surgeon General	<ul style="list-style-type: none"><li>• Determining professional-technical policy regarding the management of exposure or suspected exposure to an environmental and industrial health hazard or public health concern.</li></ul>
D FHP	<ul style="list-style-type: none"><li>• Developing and evaluating the effectiveness of protocols, procedures and detailed instructions dealing with the management of exposure or suspected exposure to an environmental and industrial health hazard or public health concern.</li><li>• Providing relevant professional-technical advisory support to CF H Svcs elements.</li></ul>

Local Senior  
Medical  
Authority

- Maintaining a central CF archive of EIHH/PHC files.
- Implementing protocols, procedures and detailed instructions dealing with the management of exposure or suspected exposure to an environmental and industrial health hazard or public health concern.

## References:

1. CEFCOM, web site
2. [CF H Svcs Gp PD 4440-20](#), Reproductive Hazards
3. CF H Svcs Gp PD 4440-06, Hazardous Trades (in development)
4. [CF H Svcs Gp PD 4440-01](#), Chemical Hazards Surveillance Program
5. [CF H Svcs Gp PD 4440-16](#), Physical Hazards Surveillance Program
6. CF H Svcs Gp PD 4400-31, Health Risk Communication (in development)
7. CF H Svcs Gp PD 4440-15, Occupational Health Risk Assessment (in development)
8. [CFAO 34-23](#), Occupational Health
9. DAOD on Occupational Health (to be promulgated)
10. *Canada Labour Code* (CLC), Part II
11. [TB Directives: Occupational Safety and Health – Directives and Standards](#)
12. D Safe G General Safety Program, Volume 1, Policy and Program (A-GG-040-001/AG-001) and Volume 2, General Safety Standards (C-02-040-009/AG-001).

## Annexes:

1. [Annex A](#) - Medical Management Process Following an Exposure or Suspected Exposure to an EIHH or PHC.
2. [Annex B \(DOC, 35 Kb\)](#) - Exposure Health Questionnaire
3. [Annex C](#) - Aide-Memoire – Medical Assessment for Potential Exposures to an EIHH or PHC
4. [Annex D](#) - Aide-Memoire Assessing the Hazard in an EIHH or PHC Scenario
5. [Annex E](#) - Bibliography

## Annex A to CF H Svcs Gp PD 4440-12

### Medical Management Process Following an Exposure or Suspected Exposure to an EIHH or PHC

The onsite SMA must take immediate action to identify the hazard and prevent inadvertent exposure of CF members to the EIHH or PHC. The following actions are recommended:

- Obtain details regarding the potential EIHH or PHC from the individual(s), if indicated, perform a medical assessment of the individual(s), assist individual(s) in the completion of the Exposure Health Questionnaire at Annex B and address individual(s) immediate health concerns. A medical assessment aide-memoire is included at Annex C. A hazard assessment aide-memoire is included at Annex D.
- Initiate an EIHH or PHC Management File. The completed file is to be forwarded to D FHP. All pertinent information related to the EIHH or PHC must be documented on the EIHH or PHC management File. This may include, but is not limited to:
  - 1) who, what, where, when, and how of the exposure/suspected exposure;
  - 2) preventive Medicine reports, EIHH Specialist Support Team (SST) reports;
  - 3) relevant laboratory reports;
  - 4) summary of signs/symptoms of exposed individuals, treatment, follow-up;
  - 5) action taken to eliminate hazard or limit exposure; and,
  - 6) any other pertinent information.
- If in doubt, include it.
- Notify the Commanding Officer of the situation.
- Request assistance from other CF H Svcs Gp personnel (i.e. PMed Tech, MO).
- Initiate measures to prevent exposure of CF members to the potential EIHH or PHC.
- Assess the hazard (refer to aide-memoire at Annex D).
- Once preliminary fact-finding has been completed, contact D FHP for advice on how to proceed with measures to prevent exposure, how to conduct sampling, how to eliminate/contain the hazard, what baseline investigations may be indicated (as required). The contact number for D FHP is (613) 945-6701 or CSN 319-6701. During silent hours contact the National Defence Command Centre at 996-9898/992-2708 or CSN 319-9898/319-2708.
- Brief your chain of command frequently and provide as much information as possible to local CF members. This will reinforce preventive measures and alleviate undue anxiety.

## **Annex C to CF H Svcs Gp PD 4440-12**

### **Aide-Memoire – Medical Assessment for Potential Exposures to an EIHH or PHC**

**The member is asymptomatic or within incubation period for infectious disease:**

<b>Step</b>	<b>Action</b>
1	Document route and circumstances of exposure (duration, intensity and concentration over time)
2	Identify source of exposure (e.g.: human, animal, environment), if known, and conduct appropriate testing, if possible
3	Establish or re-establish baseline tests if indicated (e.g.: serologic antibody titres, pulmonary function tests)
4	Update history: past infections, immunizations, allergies, medical history, family history

<b>Step</b>	<b>Action</b>
5	Perform a physical examination if indicated Laboratory tests: based on suspected agent Blood: draw and store serum sample for baseline antibody testing
6	Other: as indicated
7	Consider post exposure prophylaxis, immunization or treatment, if appropriate

The member is symptomatic or beyond incubation period for infectious disease:

<b>Step</b>	<b>Action</b>
1	Document route and circumstances of exposure (duration, intensity and concentration over time)
2	Identify source of exposure (e.g.: human, animal, environment), if known, and conduct appropriate testing, if possible
3	Update history: past infections, immunizations, allergies, medical history, family history
4	Symptoms: nature and pattern
5	Medical diagnosis prior to consultation if any; treatment if any
6	Physical examination: vital signs, other, as appropriate
7	Laboratory tests: consult a laboratory early on specimens and specimen collection appropriate for the suspected agent, consider PFT for respiratory effects
8	Consider post exposure prophylaxis, immunization or treatment, if appropriate

## **Annex D to CF H Svcs Gp PD 4440-12**

### **Aide-Memoire – Assessing the Hazard in an EIHH or PHC Scenario**

Situations involving exposures or suspected exposures to EIHH or PHC necessitate a swift, well organized approach to hazard assessment. Although speed is of the essence, proceed with caution when considering a site assessment of a potential or identified hazard. Seek the assistance of Preventive Medicine Technicians and other experts to assist you and take every precaution to prevent yourself or others from becoming casualties. A thorough and accurate hazard assessment will guide preventive measures and direct prophylaxis and treatment of exposed individuals. In addition, appropriate documentation is vital for future reference. Obtaining answers to the following questions will greatly simplify the task at hand:

1. What is the hazard (chemical, biological, radiological, physical)?
2. What form is the hazard in (e.g.: solid, liquid, gas or airborne)?
3. Where is the hazard?

4. Has anyone been exposed or is anyone at risk of exposure?
5. What protective measures were initiated at the time of exposure (e.g.: personal protective equipment, fire suppression device, etc.)
6. If exposure has occurred, what were the date, time, and duration of the event?
7. How many individuals were exposed?
8. Are any exposed individuals experiencing signs or symptoms? (provide details)
9. What prophylaxis/treatment has been initiated?
10. What measures have been taken to prevent further exposures to the hazard?

## **Annex E to CF H Svcs Gp PD 4440-12**

### **Bibliography**

Occupational Health Assessment Guide (OHAG) – hard copy available in English or French at a cost of \$75.00 from:

Diane Farley  
Database Administrator  
Occupational Health and Safety Agency  
Health Canada  
P.L. 1903A1  
Jeanne Mance Building  
3rd Floor  
Tunney's Pasture  
Ottawa, Ontario, K1A 0L3  
Tel. (613) 941-9153  
Fax. (613) 954-5822

The electronic copy is available online at: [http://publiservice.gc.ca/services/rapb-dgrp/psohp-pstfp/index\\_e.html](http://publiservice.gc.ca/services/rapb-dgrp/psohp-pstfp/index_e.html)

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices (TLV's and BEI's) – ISBN 1-882417-40-2 - available at a cost of approximately \$30.00 US from:

American Conference of Governmental Industrial Hygienists (ACGIH)  
1330 Kemper Meadow Drive  
Cincinnati, OH 45240-1634  
Tel. (513) 742-2020  
Fax. (513) 742-3355  
[ACGIH Website \(english only\)](#)  
E-mail address: [customerservice@acgih.org](mailto:customerservice@acgih.org)

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