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TITLE: Generic Protocol for Decisions Regarding Packages Possibly Containing a Chemical, Biological or Radiological [CBRN] Agent [A 'Package of Concern']

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The following component part numbers comprise the compilation report:

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9. GENERIC PROTOCOL FOR DECISIONS REGARDING PACKAGES POSSIBLY CONTAINING A CHEMICAL, BIOLOGICAL OR RADIOLOGICAL (CBRN) AGENT (A 'PACKAGE OF CONCERN')

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DEFINITION:

A 'Package of Concern' is a letter, bag, canister or box that may contain a maliciously placed biological, chemical or radiological hazard. The suspicion may be raised in a number of ways, e.g. a threatening letter or phone call, odd markings or shape, leakage, unusual odour, immediate adverse health effects in package handlers, suspicious placement of the package (e.g. adjacent to the ventilation system).

SOME POSSIBLE SCENARIOS:

- Unopened, contents not visible (e.g. a shipping box labelled 'Anthrax');
- Opened, contents not visible (e.g. partially opened envelope with suspicious contents);
- Opened, leaking, contents visible (e.g. a box with white powder inside, or an envelope leaking a red/brown substance);
 - Threat note plus package/s in a different location or in multiple locations in the same building, town or in different cities;
 - A combination of two or more types of contents: explosive, biological, radiological and/or chemical;
 - Location: mail room vs airport terminal vs cargo warehouse.
 - Exposed versus non-exposed persons;

GUIDING PRINCIPLES

- Assume the 'worst case scenario' until it can be ruled out, then gradually scale back as the information/evidence allows;
- The critical initial decision-making/response actions and the incident commander must be local/on site (with advice from experts in other locations if warranted);
- Use all available evidence/information to decide on the course of action;
- Stop further exposure, e.g. of initial handlers, emergency responders, transporters, laboratory personnel, others;
- Determine the nature of the contents expeditiously, but safely;
- Preserve the forensic 'chain of evidence' (evidence tape, signatures, photographs, etc).

The sequence of investigation is usually: *Explosives* ~ *ILTC* chemical agent* ~ *radiological agent* ~ *biological agent*, but this may be changed according to individual circumstances. Local responders should take into consideration all information when deciding what aspects of the decision algorithm will be applied and how they will be applied. Information could include the existence and nature of a threatening note, recent history of similar threats or packages, the credibility of a specific threat, whether significant exposure has occurred, the likelihood of biological or chemical contents, the resources available, and the advice of experts.

ILTC* = *Immediately Life Threatening Chemical Agent*.

IMMEDIATE ACTION ADVICE to package handlers: reduce further contact with the package, e.g. do not handle it further and do not open it. Leave it where it lies, evacuate the immediate area, secure the area. Wash your hands and report to security. Stay available for possible decontamination, information gathering or treatment.

THE LOCAL CBRN RESPONSE TEAM

This is the appointed local public safety group assigned to respond to a CBRN release or incident. It could include fire, police, hazardous material (HAZMAT) and/or ambulance groups who have additional training to deal with these specific incidents.

They should be prepared:

- to determine whether an explosive hazard exists,
- to safely contain and secure the package to prevent further exposure,
- to provide appropriate personnel decontamination,
- to collect samples/trace back information on package/sender,
- to make an initial determination of whether a hazard exists and if possible, the approximate nature of that hazard (a triage function only),
- to assess the dangers to the initial package handlers & building occupants,
- to decontaminate the environment/area if needed, and
- to preserve forensic evidence (to assist the investigation of a terrorist act).

MEDICAL NOTIFICATION (each country may have different priorities):

The local medical authorities should be informed of a possible CBRN event immediately, so that they can contact exposed people.

The provincial public health authority should be notified when the immediate life-threatening situation has subsided. What health actions are being taken? Is a standard operational procedure (SOP) being followed?

The federal health authorities should be notified - they can provide technical advice and maintain a database. [The Centre for Emergency Preparedness and Response in Ottawa is the federal centre for Health Canada].

RISK ASSESSMENT

This is based on the package,/letter/phone call. Using intelligence sources and advice from experts, make an assessment and rank the level of your response (low, medium or high). Is the threat credible? The police or other law enforcement people have the primary responsibility to make the initial risk assessment.

THE PROTOCOL

Note: The protocol cited below may be varied. It is the prerogative of each nation and province/region to decide what will work best in each situation.

Appropriate training is imperative for all named situations.

1. Rule out an *explosive device* (police/military unit: ticking, detonator, putty-like feel?).
2. Test for an *Immediately Life Threatening Chemical Agent* (ILTC, the obvious ones being the nerve gasses such as Sarin or Tabun, and blister agents such as Mustard. Even a sealed envelope may leak a deadly gas. If ILTC triage is positive, transfer a sample to a chemical laboratory that is equipped to provide definitive analysis.
3. Rule out a *radiological hazard* with a radiation survey meter that can detect alpha, beta and gamma radiation:

- a. before opening the package, check for a high penetration radiological hazard, such as gamma rays (e.g. Cesium¹³⁷ or Cobalt⁶⁰) and some beta particles. If detection is negative then there is no high penetration hazard present or it is well contained.
 - b. after opening it, check for a low penetration hazard, such as some beta particles (e.g. strontium⁹⁰) or alpha particles e.g. (plutonium¹³⁸; americium²⁴¹ - used in smoke detectors). Precautions taken to prevent exposure to chemical or biological agents in the laboratory should be sufficient to protect against inhalation and skin absorption from these low penetration radiologic hazards.
4. If there is concern that a *biological hazard* may exist, the samples may be split, one portion being irradiated and sent for chemical analysis, the other being sent to a CL3 laboratory.

Note: If the package has not been opened, or has been opened, but then re-closed by the first responders, it should not be opened/re-opened at the scene; it would be wise to remove it to a secure location (eg a CL# laboratory) before opening. When opening the package, sufficient precautions should be taken to protect the handlers against an inhalation hazard and skin contamination, and to prevent spread of the contents. Recent practical experiments using a fluorescent powder in a letter resulted in widespread dissemination of the contents when it was opened. [An alternative is to destroy the package without opening it].

A table for chemical / biological differentiation and a procedural decision algorithm have been placed at the end of this paper.

EMERGENCY RESPONSE ASSISTANCE PLAN (ERAP) TEAMS

These teams are specially trained to respond to a spill that may contain biological agents. There are 15 teams in Canada (at least one in every province and territory); they are on call 24 hours a day and 7 days a week to go anywhere in Canada for a package emergency.

Functions of an ERAP team:

initial triage to rule out a bio-hazard,
package biological samples for transportation according to the IATA regulations*,
alert the relevant authorities,
determine the need for site decontamination,
assist in the determination of post-exposure prophylaxis of those people who came into contact with the agent,
do regular preparedness training and exercises,
are experts at containment, neutralization, clean-up of spills and preservation of evidence.

TRANSFER OF A BIOLOGICAL PACKAGE:

Deliver the package to a level 3 containment facility and initiate triage; then if needed, package it for onward transport (e.g. to a CL 4 lab) as per the International Air Transport Association (IATA) Dangerous Goods Regulations* or federal/provincial ground transportation regulations that determine the packaging, labeling and documentation of specimens. Specimens need to be prepared for transfer, and transferred to meet:

public safety regulations,
timeliness, and
forensic evidence ('chain of custody').

Life Forms: the first laboratory triage determines if there are likely to be biologic agents in the specimen. Gram staining and electron microscopy will provide important initial information to guide further examination of the sample and the prophylaxis of those people exposed to the agent. The minimum microbiological containment level recommended for first line examination of an unknown biological threat agent is level 3 (CL3 lab).

LABORATORIES

There are four levels of containment appropriate to the 4 risk groups of infectious agents. Here follows an abbreviated description of a level 3 lab:

CL3 (for high individual risk, low community risk agents such as anthrax, plague, tularemia, brucellosis, glanders, Q-fever, typhus and VEE): In addition to level 1 and 2 requirements (eg a Class 2 type B2 biological safety cabinet, preferably with a charcoal filter), some of the requirements of this level include specialized design and construction, break-resistant glass, controlled access through change/shower rooms with self-closing doors, negative air pressure with a dedicated, sealed exhaust system; specialized, solid-front, dedicated lab clothing with a combination HEPA and chemical filter for the breathing device, plus chemical resistant gloves eg nitrile, if initial chemical triage is to be performed, and specific training regarding the handling of organisms for lab staff, as well as medical surveillance. The lab must undergo annual performance testing and verification.

UNKNOWN AND COMBINATION HAZARDS (e.g. level 3 and/or 4 organisms, or biological and chemical agents). Where do you send them?

As mentioned previously, samples can be split, one part being sent for biological evaluation and the other being irradiated and then sent for chemical analysis. In Canada we have a facility that can test for both CL3 and CL4 biological agents and another that can test for both CL3 biological agents and chemical warfare agents. We also have a specialized military mobile team that can deal with chemical agents, contain biological agents and test for radiation.

For possible chemical analysis, consider:

- a forensic laboratory,
- an environmental lab,
- an occupational health lab,
- a toxicology lab.

If you still cannot decide:

- destroy the package, or
- send it to a CL3 lab, where the staff can open it with chemical precautions.

KEY WORDS

Package, chemical/biological agent, protocols

ERAP team = Emergency Response Assistance Plan Team

CBRN = Chemical, biological, radiological and nuclear.

TABLES & FIGURES:

Figure 1: Decision Algorithm for a package of concern.

Table 1: Chemical / Biological Differentiation.

Chemical / Biological Differentiation:

Criteria	Chemical	Biological
Deaths or immediate illness	+	-
Powder	-	+
Liquid	+	+/-
Explicit threat	+	+
On-scene detection	+	NA

+ = more likely; - = less likely; NA = not available

Figure 1 Package of Concern – Decision Algorithm

