Clinical Lab Response to a Public Chemical Exposure Incident

Overview

A chemical exposure incident occurs when a poisonous or otherwise toxic chemical is released and causes death or injury to a large number of people. Examples of such an exposure would be train wrecks and chemical terrorism. Injured or potentially exposed people will present at clinics and other medical facilities seeking care, where the first receiver medical staff will treat the casualties using their best professional judgment. The Centers for Disease Control and Prevention (CDC) has developed the Rapid Toxic Screen (RTS) Laboratory to test human chemical exposure specimens to determine the patient's exposure levels. The Oregon State Public Health Laboratory (OSPHL) will work with medical professionals to facilitate the process of gathering and transporting clinical samples from large numbers of potentially exposed patients. The RTS is particularly useful for assessing people who are marginally exposed and may be asymptomatic, and also for those whose exposure-like symptoms may likely be stress-related rather than due to an actual chemical exposure. Laboratory results are primarily for the victims, but they're also used for epidemiological tracking, criminal investigations, as well as relieving pressure on medical facilities' resources.

Medical Facility Responsibility *Prior* to a CT Event

Some planning on the part of the facility must address the following possibilities:

- The need to decontaminate large numbers of casualties.
- The need for extra staff or volunteers trained in phlebotomy, and transcribing and managing patient data.
- The need to keep staff and volunteers safe from possible contamination or off-gassing from exposed patients.

The medical facility must maintain a file of core information documents:

- **Chemical Terrorism Event Specimen Collection (flowchart)**
- **Shipping Instructions for Samples Collected from People Potentially Exposed to Chemical Terrorism Agents (text) and Shipping Instructions (flowchart – blood & urine)**
- **Shipping manifests for blood and urine.**

Oregon-specific chemical exposure response documents are available on http://www.healthoregon.org/lrn (go to Chemical Preparedness on left). Every medical facility should have hard copies on file of these documents.

Similar national-level core information is also available through the Centers for Disease Control and Prevention website:
http://www.bt.cdc.gov/chemical/lab.asp

The Medical Facility's Responsibility *During* a CT Event

If the medical facility is informed or suspects that victims are presenting as a result of an exposure event, call 911.
(See other emergency response numbers listed below).

The medical facility's immediate response will be to ensure the safety of its own first-receiver personnel. Contaminated clothing or off-gassing of the toxin from patients could incapacitate first-receivers, thus disabling the entire medical facility. Medical staff or first receivers must ensure that victims are decontaminated and are "exam ready" prior to entering a medical facility.

Obvious symptomatic victims will receive treatment in accordance with professional medical protocol. CDC's RTS is not intended to be an immediate pre-treatment diagnostic. A cohort of 40 initial exposed-patient specimens should be tested at the CDC- RTS lab to determine what chemical caused the event. All other exposed and potentially exposed triaged patients would have specimens held for further exposure testing. Most agents are excreted up to 8 hours after exposure for blood; 4 – 8 hours for urine. But, for example Thiodiglycol (a break-down product of mustard) may be detected in the urine up to 2 weeks following exposure. The CDC-EOC consultation services (see phone numbers below) can help determine when blood and urine samples should be taken (the sooner the better). Specimens must be properly labeled, and sealed with "Evidence Tape." A Chain Of Custody (COC) form must be initiated (one COC is sufficient for the entire batch). ***Children*** *will have only urine specimens obtained*. Blood is refrigerated (4 °C) and urine is frozen (-70 °C—dry ice temperature or -20 °C if -70 °C is not available) as soon as possible. Samples drawn outside the window of opportunity may cause a negative or erroneous result.

OSPHL's Responsibilities *During* a CT Event

OSPHL will provide telephone consultation from a specialist (CT Coordinator) 503-693-4100. The CT Coordinator's primary mission is to ensure that all clinical samples are properly collected, labeled, packaged, and shipped to the OSPHL (LRN-C Level Three facility). The clinical samples will be transported using all strategies available (OSPHL state-wide courier service 503-693-4100, military, law enforcement, medical facility courier, OSPHL staff, commercial courier…..)

When the clinical samples arrive at the OSPHL, each sample will be entered into the OSPHL database and then shipped to the CDC or other laboratories for testing. When laboratory results are returned to OSPHL, they will be available to the medical facilities, either electronically at https://phlws.hr.state.or.us/ , by fax, or some other means.

Sample Routing

In a chemical emergency event, and when the OSPHL receives blood and urine specimens resulting from an exposure event, the blood specimens are refrigerated and

the urine specimens are frozen before they are transported to the CDC or another laboratory. At the CDC's direction, 40 samples (maximum) will be sent to the CDC laboratory in Atlanta. This laboratory has the capability of identifying hundreds of chemical toxins with a very small sample size in a very short time. Once the qualitative assessment is made and the proper analytical method is determined, OSPHL will be directed to send the remainder of the samples to various state (LRN-C Level One or Two facility) laboratories throughout the United States to provide quantitative results for each sample. This specimen routing scheme utilizes the vast laboratory resource available nationally, alleviating the surge capacity problem that would otherwise stifle the output of sample results. This scheme has been determined by CDC to minimize turn-around time for a maximum sample load.

Chemical Laboratory Response Network (LRN-C)

The CDC has built a system of state laboratories called the Laboratory Response Network. State, territorial and metropolitan public health laboratories are members of the chemical component (LRN-C) of the network. The participating laboratories vary in their capability to analyze human clinical specimens and are therefore designated LRN-C Level-One, Two, and Three. The CDC laboratory is the highest complexity Rapid Toxic Screening lab with 10 smaller RTS labs located in state public health labs and designated as a LRN-C Level-One laboratories; LRN-C Level-Two provides more limited RTS analysis in almost every state public health lab; LRN-C Level-Three serves as a clearing-house for receiving and shipping clinical samples and data processing but provides no testing. OSPHL is a Level-Three facility. CDC directs the sample flow from Level-Three laboratories to appropriate Level 1 and 2 laboratories for analysis. Because such analyses are complex and the number of trained personnel in each laboratory is limited, the sample load is spread throughout the country to solve the surge capacity problem and provide a reasonable one or two-day turn around time.

Important Numbers On Next Page:

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Oregon Emergency Response System (OERS): call 911
Local public safety agencies such as law enforcement, fire and emergency medical services normally provide the first response to an incident. Access to this local assistance is through 9-1-1. Once notified, local public safety agencies would call OERS at 800-452-0311 or Salem Area 503 378 6377 . If necessary, responsible parties would then call the National Response Center at 800-424-8802.
http://www.oregon.gov/OMD/OEM/tech_resp/oers.shtml

Your County Public Health Program:
http://public.health.oregon.gov/ProviderPartnerResources/LocalHealthDepartmentResources/Documents/CD_Reporting.pdf

Oregon Public Health Emergency Preparedness Duty Officer on-call:
Pager: 503-938-6790 [On-call Duty Cell Phone 971-246-1789].
http://public.health.oregon.gov/Preparedness/pages/index.aspx

Oregon Poison Center (for medical consultation and patient information):
1-800-222-1222
http://www.ohsu.edu/poison/

Oregon State Epidemiologist on-call:
(24/7) 971-673-1111 (this is also the after-hours number for the OSPHL)
http://www.oregon.gov/DHS/ph/acd/index.shtml

Oregon State Public Health Lab (OSPHL) Laboratory Response Network (LRN) for specimen handling and shipping consultation:
24/7 main phone: 503-693-4100 or 503-693-4123 CT Coordinator
3150 NW 229th Ave., Hillsboro, OR 97124
(The after-hours OSPHL phone number is the Oregon State Epidemiologist on-call number 971-673-1111).
http://www.oregon.gov/DHS/ph/lrn/index.shtml

CDC-Emergency Operations Center (EOC)-Activation of the Rapid Toxic Screening (RTS) Lab: 770-488-7100 -- Ask for the National Center for Environmental Health-Dr Jerry Thomas (770-488-7279) to consult or activate the CDC Rapid Response Team asset to fly in and transport specimens to the CDC Rapid Toxic Screening Lab.
http://www.bt.cdc.gov/emcontact/
http://www.bt.cdc.gov/chemical/lab.asp

ATSDR-Agency for Toxic Substance and Diseases Registry:
For ATSDR consult, contact the CDC-EOC or link to comprehensive toxic substances information at: http://www.bt.cdc.gov/Agent/AgentlistChem.asp

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