



# Putting Data to Work

Oregon Worker Illness and Injury Prevention Program (OWIIPP)

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Putting Data to Work is produced by the Oregon Worker Illness and Injury Prevention Program (OWIIPP)

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## Responding to pesticide-related emergency events

### Did you know?

Emergency responders\* (ER) are twice as likely to develop an occupationally related acute pesticide illness as compared to all other non-agricultural workers. From 2000 – 2005, nine cases of Oregon emergency responders becoming ill after being exposed to pesticides while on the job were reported to the Pesticide Poisoning Surveillance Program at the Oregon Public Health Division, Department of Human Services.

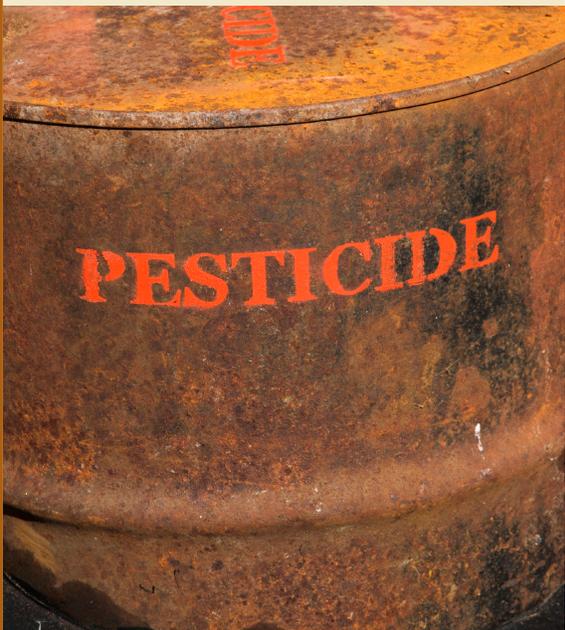
### What is a pesticide?

The US Environmental Protection Agency (EPA) defines pesticides as “any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects, rodents, nematodes, fungi, or weeds, or any other forms of life declared to be pests; any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant.”<sup>1</sup>

Pesticides come in all forms and are a diverse group of chemicals. In the US, approximately one billion pounds of pesticide active ingredient are used annually, and over 16,000 different pesticide products are available.<sup>2</sup>

### Why are emergency responders at risk?

- » They are the first care providers on the scene and information may not be available on what substance(s) are involved in the incident
- » A facility storing pesticides may be fully involved in a fire; therefore chemical identification may be difficult
- » Victims as well as responders may not know the pesticide product involved in an incident
- » Even when the EPA registration number is known, the MSDS (Material Safety Data Sheet) may not be readily available
- » Proper personal protective equipment (PPE) may not be provided to the responder
  - Law enforcement personnel are not normally provided with PPE beyond latex gloves



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- » The responder may feel their PPE is effective when it is not
  - Turn out gear may not be effective in preventing dermatological and respiratory exposure to pesticides
  - Surgical or dust masks do not protect from pesticide vapors
- » The need to rescue and give aid to those who are in danger is a primary focus, but can be a detriment to the health of the responder
- » Pesticides are a readily available product that could be used in a terrorist attack

## How are emergency responders exposed?

- » Not surprisingly, firefighters and law enforcement officers are most commonly exposed while responding to fires or to other releases of pesticides (e.g. motor vehicle crashes)<sup>3</sup>
- » The long term health effects of exposure to smoke from burning pesticides are not well understood
- » Emergency Medical Technicians (EMTs) have the greatest risk of pesticide exposure from handling a contaminated patient<sup>3</sup>
  - » Clothes, skin, and bodily fluids are all potential sources of contamination
- » For all ERs, entry into a structure recently treated with pesticides before proper ventilation and without proper PPE can result in inhalation exposures

## A real world example

On June 29, 2005, a commercial applicator treated a home in Florence, Oregon using a mixture of two types of pesticides: a pyrethroid (esfenvalerate) and a pyrethrin (formulated with the synergist-piperonyl butoxide and N-octyl bicycloheptene dicarboximidate) to the interior of the residence for pest control. An exterior application of Dragnet (36.8% permethrin) was also made.

Approximately 3 and 1/2 hours post application, the residents returned home. Within minutes of entry, both residents began coughing uncontrollably. One resident, an elderly woman with preexisting cardio-pulmonary disease, experienced severe respiratory distress, and fell to the floor unconscious. Responders were unable to revive her and the woman was pronounced dead at the scene.

The woman's spouse, two neighbors, two police officers, and three EMTs also experienced upper respiratory symptoms (dyspnea, mucous production, throat constriction, and coughing) when they entered the home to provide aid. Their symptoms improved upon exiting with complete resolution within several hours. The spouse was hospitalized overnight for observation.

According to interviews and police reports, the EMT responders as well as the police officers had been warned by an affected neighbor about the potentially hazardous indoor air prior to entering. This is an example of a preventable respiratory hazard associated with entering an enclosed space that had been treated with potentially toxic products. In this case, the police officers, who responded first and were warned by the neighbors, and the three EMTs, who were warned by the affected neighbors and police officers, did not use PPE to reduce the risk of exposure. This outcome could have been more serious if the chemicals used were different. Responders should use PPE when reasonable information suggests a potential hazard, or if a hazard is suspected.

## A fumigant of concern



In Oregon, aluminum phosphide (AIP) is a fumigant that has been involved in two explosions resulting in serious injuries, and another incident resulting in inhalation poisoning. AIP is commonly used to fumigate goods and products and as a rodenticide. When AIP comes in contact with oxygen it releases phosphine gas which can spontaneously explode or catch fire. When inhaled, phosphine gas typically causes pulmonary edema and blisters. Other symptoms include: nausea, vomiting, diarrhea, palpitations, dyspnea, skin irritation or burns, headache, dizziness and staggering.<sup>6</sup>

Beginning in January 2003, a Fumigation Management Plan, which includes notification of local fire departments each time AIP is used, was established in Oregon but it is rarely filed. This product is extremely accessible and is present across the State of Oregon. ERs should take particular care if AIP is known or suspected to be involved in an incident.

## What to do if you encounter a call involving pesticide(s) or other chemicals

### THINK.

*DO YOU HAVE ANY PRE-EXISTING CONDITIONS, SUCH AS PREGNANCY OR ASTHMA, THAT MAY INCREASE YOUR RISK OF ILLNESS OR INJURY?*

### ASSESS THE SCENE BEFORE ACTING!

*ONLY PERSONNEL WITH PROPER PPE SHOULD ENTER THE SCENE TO ASSIST VICTIMS OF THE INCIDENT.*

**In order to prevent secondary contamination, only personnel with proper PPE should attend patients prior to decontamination.<sup>4</sup>**

Proper PPE includes:

- » Chemical resistant gloves, boots, and suit
- » Full face mask
- » Respirator with an organic vapor cartridge

If you begin to experience any symptoms while responding:

- » Remove yourself from the contaminated area to fresh air
  - Stay up-wind and up-ground from the contaminated area
- » Remove all contaminated clothes, including boots, and wash thoroughly with soap and water
- » If you continue to experience symptoms after leaving the area, seek medical attention

## WHAT KINDS OF SYMPTOMS ARE ASSOCIATED WITH PESTICIDES?

Pesticides cause a variety of signs and symptoms that may be difficult to differentiate from other common causes of illness.

### Common Non-Differential Health Effects of Pesticides

- Rash
- Respiratory Distress
- Seizures
- GI Symptoms
- Eye Irritation
- Headache

A key step in determining whether a pesticide exposure is causing the symptoms is taking a thorough occupational and environmental history.

Supplemental info, such as labels, MSDS, and application records should be obtained to help identify the product, dilution, and formulation.

For the majority of pesticides, treatment should be geared toward decontamination, stabilization, and relief of symptoms.

Specific antidotes are available for only a handful of pesticides.

## If there are victims involved in the incident:

### PRIORITY 1: Prevent Rapid and Continuous Absorption by the Victim

- » Remove from exposure
- » Provide Basic Life Support
- » Remove contaminated clothing.
  - Removing contaminated clothing can reduce the quantity of contaminant associated with victims by 75 - 90%.<sup>3</sup>
- » Call the Oregon Poison Center (OPC) for Emergency Medical Support guidance
- » DO NOT evacuate GI Tract unless instructed to do so by OPC
- » Wash contaminated area(s) 3 times with soap and water
  - Include the hair: It can act as a continuous source of exposure

- » Flush eyes
- » Double bag patient's personal belongings in poly bags<sup>5</sup>

### PRIORITY 2: Prevent Secondary Contamination to Emergency Responders<sup>4</sup>

- » Protect yourself from exposure
  - A combination of gloves, such as butyl gloves worn over nitrile gloves, are often the best option for use during emergencies because of availability
  - Wear chemically resistant clothing and gloves while handling the patient during decontamination steps
- » Wear a fit-tested respirator to protect against off-gassing via body fluids and exhalations while treating ingestion cases, or when entering an enclosed space that was recently treated with pesticides
- » Decontaminate transport vehicle and treatment rooms to prevent further exposure

## WHY REPORT ACUTE CASES OF OCCUPATIONALLY RELATED PESTICIDE ILLNESS?

### *The Oregon Pesticide Poisoning Surveillance Program (OPPSP)*

#### **Our Goal:**

“Through surveillance, prevent and/or reduce future pesticide illnesses through education and preventive measures.”

Public health surveillance is an important component to public safety to define trends in preventable disease, illness and injury to find ways to effectively target prevention resources. While pesticide exposure may be fairly rare, there is a need for awareness of the risks associated with pesticides.

## WHY EMERGENCY RESPONDERS SHOULD REPORT WHEN THEY EXPERIENCE AN EXPOSURE

Known or suspected cases of pesticide illness are reportable in Oregon to OPPSP under OAR 333.17.000-333.19.415.

The OPPSP tracks pesticide cases to identify high risk populations.

This information is valuable in efforts to decrease the incidence of workers exposed to pesticides on the job in Oregon.

## Who should you call?

#### » **Immediate health concerns:**

Oregon Poison Center  
Available 7 days, 24 hours  
Phone: 1-800-222-1222

#### » **To report impacts to health and/or the environment:**

Pesticide Analytical Response Center  
Available weekdays, 8:00AM - 5:00PM  
Phone: 503-986-6470 Email: [parc@oda.state.or.us](mailto:parc@oda.state.or.us)

Oregon Pesticide Poisoning Surveillance Program  
Public Health Division, Department of Human Services  
Available weekdays, 8:00AM - 5:00PM  
Phone: 971-673-1217

#### » **To report a pesticide spill or release:**

Oregon Emergency Response System  
Available 7 days, 24 hours  
Phone: 1-800-452-0311 OR 503-378-6377

#### » **To get scientific information about a pesticide product:**

National Pesticide Information Center  
Available 7 days, 6:30AM - 4:30PM  
Phone: 1-800-858-7378 Email: [npic@ace.orst.edu](mailto:npic@ace.orst.edu)

#### » **For questions about an occupational safety or health issue:**

Toxicology Information Center (TIC) at the Center for Research on Occupational and Environmental Toxicology (CROET) at Oregon Health Sciences University (OHSU)  
Phone: (503) 494-7366 Email: [croettic@ohsu.edu](mailto:croettic@ohsu.edu)

\* Emergency Responders refers to firefighters, law enforcement, HAZMAT teams, and ambulance service personnel

## REFERENCES

1. [www.cdc.gov/niosh/topics/pesticides/](http://www.cdc.gov/niosh/topics/pesticides/)
2. Kiely, T., Donaldson, D., Grube, A. "Pesticide Industry Sales and Usage: 2000 – 2001 Market Estimates"; US-EPA; May 2004.
3. Calvert, G. et al. "Acute Pesticide-Related Illness Among Emergency Responders, 1993 – 2002"; AJIM 2006; 49: 383 – 393.
4. [http://osha.gov/dts/osta/bestpractices/html/hospital\\_firstreceivers.html](http://osha.gov/dts/osta/bestpractices/html/hospital_firstreceivers.html)
5. [www.epa.gov/pesticides/health/emergency.htm#human](http://www.epa.gov/pesticides/health/emergency.htm#human)
6. NIOSH Alert: Preventing Phosphine Poisoning and Explosions during Fumigation. DHHS (NIOSH). Publication No. 99-126.

### THINK.

## Assess the scene before acting!

### A breath in an IDLH atmosphere could be your last

An unexpected release or inappropriate application of any hazardous chemical, including pesticides, especially in an enclosed area, can have dangerous consequences within seconds. Exposure to hazardous chemicals can result in indoor or outdoor air becoming Immediately Dangerous to Life or Health (IDLH). An IDLH atmosphere exists when the concentration of any hazardous airborne material is either not known or the levels reach NIOSH established IDLH levels. IDLH atmospheres can result in explosions, asphyxiation, poisoning, burning, and incapacitation due to exposure to highly hazardous airborne vapors or gases. As an emergency responder, this is an environment that you could be exposed to when responding to a call. Do not attempt to rescue victims in an IDLH environment without proper PPE, or you too could become a victim.

The best action you can take is to know how to respond to these dangers.

- » Make sure other people do not enter.
- » Stay away or out of the area or enclosure and stay up-wind from the incident.
- » Notify dispatch of the urgency.
- » Wait-- appropriately equipped and trained help is on the way.

Removing or rescuing anyone from an IDLH atmospheric exposure needs to be done with proper Personal Protection Equipment (PPE), including Self Contained Breathing Apparatus (SCBA). Only personnel with proper PPE should enter the scene to assist victims of the incident.

First responders wearing a minimum of Level B respiratory protection, such as SCBA should attempt rescue. This is the type of PPE worn by fire fighters and haz-mat teams; these first responders have been specifically trained and equipped to enter IDLH atmospheres safely.

If you have any questions about the proper PPE and training you may need to safely do your work call OR-OSHA Consultative Services at (800)922-2689 or visit [www.cbs.state.or.us/external/osha/consultation.htm](http://www.cbs.state.or.us/external/osha/consultation.htm) for a free safety and health consultation to help you assess your needs.

If you find yourself at a suspected IDLH incident and do not have an approved SCBA, training, or other equipment to safely enter an IDLH atmosphere, you too could become a victim.

### Choosing the right PPE\*

The purpose of PPE is to shield or isolate you from the chemical, physical, and biologic hazards you may encounter on-site. No single combination of protective clothing and equipment is capable of protecting against all hazards; therefore, PPE should be used in conjunction with (not in place of) engineering controls and safe work practices. Choosing appropriate PPE is a complex process. The Incident Commander will determine the appropriate level of PPE for the incident.

### LEVEL OF PROTECTION A (Most protective)

#### Recommended equipment:

- » Pressure-demand, full-face piece SCBA or pressure-demand supplied-air respirator with escape SCBA
- » Fully-encapsulating, chemical-resistant suit
- » Inner chemical-resistant gloves
- » Chemical-resistant safety boots/shoes
- » Two-way radio communications

#### Protection provided:

This is the highest available level of respiratory, skin, and eye protection

#### Limiting criteria:

Fully encapsulating suit material must be compatible with the substances involved

### LEVEL OF PROTECTION B

#### Recommended equipment:

- » Pressure-demand, full-face piece SCBA or pressure-demand supplied-air respirator with escape SCBA
- » Chemical-resistant clothing (overalls with long sleeved jacket; hooded, chemical splash suit; disposable chemical-resistant one-piece suit)
- » Inner and outer chemical-resistant gloves
- » Chemical-resistant safety boots/shoes
- » Hard hat
- » Two-way radio communications

#### Protection provided:

Same level of respiratory protection but less skin protection than Level A

**Limiting criteria:**

Use only when the vapor or gases present are not suspected of containing high concentrations of chemicals that are harmful to skin or capable of being absorbed through the intact skin

**LEVEL OF PROTECTION C****Recommended equipment:**

- » Full-face piece, air-purifying, canister equipped respirator
- » Chemical-resistant clothing (overalls and long-sleeved jacket; hooded, chemical splash suit; disposable chemical-resistant one-piece suit)
- » Inner and outer chemical-resistant gloves
- » Chemical-resistant safety boots/shoes
- » Hard hat
- » Two-way radio communications

Use of escape mask in initial entry is optional only after characterization (29 CFR 1910.120(c)(5)(ii))

**Protection provided:**

The same level of skin protection as Level B, but a lower level of respiratory protection

**Limiting criteria:**

The atmosphere must contain at least 19.5% oxygen

**LEVEL OF PROTECTION D (Least protective)****Recommended equipment:**

- » Coveralls
- » Safety boots/shoes
- » Safety glasses or chemical splash goggles
- » Hard hat

**Protection provided:**

No respiratory protection and minimal skin protection

**Limiting criteria:**

This level should not be worn in the Exclusion Zone and the atmosphere must contain at least 19.5% oxygen.

Rules and guidelines for the use of PPE are established for employers to protect their employees from hazards in the workplace. Information in this technical note relates to HAZWOPER code 190.120(q), and OSHA Regulations and Standards – 29 CFR, more specifically OSHA PPE requirements (1910.132) and OSHA Respiratory Protection (1910.134).

- » To read the complete standard visit [www.osha.gov/comp-links.html](http://www.osha.gov/comp-links.html)
- » To read Oregon specific information related to HAZWOPER code 190.120(q) visit [www.orosha.org/pdf/rules/division\\_2/1910-120.pdf](http://www.orosha.org/pdf/rules/division_2/1910-120.pdf)

**Additional resources:**

**“2004 Emergency Response Guidebook: A Guidebook for First Responders During the Initial Phase of a Dangerous Goods/ Hazardous Materials Incident”** published by U.S. Department of Transportation (To order copies visit [www.wtbtraffic.com](http://www.wtbtraffic.com))

- » Aids first responders in identifying a hazard upon arrival at an incident scene in order to protect themselves and the public from harm
- » Helps identify the material and its potential hazard; the type of public safety measures, such as evacuation distances and type of PPE; and who to call for assistance

**“Pocket Guide to Chemical Hazards”** published by NIOSH (Publication No. 97-140)

- » Provides specific chemical information including information on exposure limits, IDLH values, and PPE selection
- » Also provides information on first aid and the nature of the health hazard associated with the chemical

**“Breathe Right!: Oregon OSHA’s Guide to Developing a Respiratory Protection Program for Small-Business Owners and Managers”** published by Oregon OSHA

- » Discusses the different types of respirators and respiratory PPE as well as how to set up a respiratory protection program

\*Adapted from EPA Publication No. 9285.1-03, "Standard Operating Safety Guides, Chapter 5," Office of Emergency and Remedial Response, USEPA, 1992.