

# OHA's PEST Program – Finding the Elusive Pesticide Exposure Pathway

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# PEST's Primary Responsibilities

- A. Consultant **Pesticide Analytical Response Center (PARC)** & I develop key materials for human PARC cases
  
- B. Annually, PEST receives ~90-130 exposure reports meeting case definition. Reports investigated are those that reportedly:
  - 1) Involve a death
  - 2) Involve a hospital, ER, EMS or other healthcare provider
  - 3) Are referred by PARC
  - 4) 2+ people
  - 5) Are occupationally-related
  
- C. PEST investigation comprised of:
  - 1) location of medical records (if available)
  - 2) Interest in PARC referral (for those NOT coming from PARC)
  - 3) PEST Exposure Pathway

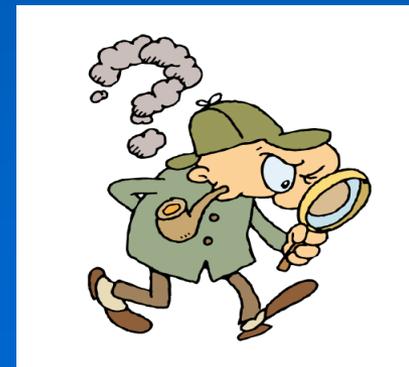
# Acute Pesticide Poisoning (APP): Is There A Causal Connection?

- Each reported exposure/illness requires development of an exposure pathway based on the available evidence:

Symptoms + Exposure + Product Toxicology = Likelihood of APP?

- **PEST Case Definition for APP:**

**1 eye or 1 skin or 2 systemic (cough, headache, vomiting, etc.) signs/symptoms or a PARC referral**



# Want to Investigate While Trail is Hot!

...before time & perspective-change leave it cold...

## Key Data on Reported Symptoms & Exposure Pathway

- Feeling sick beforehand?
- Pesticide reported as? (Product Name - EPA Reg. No. – AI & %)
- Date/Time of Application? - Date/Time of Exposure?
- Activity when exposed? - HOW exposure happened?
- Est. Distance from Application Site (any barriers between)?
- Felt on skin? - Duration of exposure? - Weather?

SYMPTOM

Onset Date/Time

Resolution Date/Time

A

B

C

**PEST interview > PEST Exposure Pathway > sent to PARC**

# NIOSH Case Classification Criteria

## 1. Exposure Confirmation?

- Confirmed by medical lab or environmental evidence
- Reported by HCP
- Reported by case themselves

## 2. Health Effects Confirmation?

- Diagnosis from HCP
- Self-report of post-exposure symptoms

## 3. Evidence of Causal Relationship?

- Is exposure pathway present ?
- Fits known toxicology of product?
- Ruled out because of non-pesticide agent or cause?
- Sufficient toxicological information available?

# PEST Cases Classified with NIOSH SENSOR-Pesticides Criteria – 2009-2011 (n=256)

Want criteria? Google "SENSOR-Pesticides Program"

Categories	Frequency	Percent
<b>Cases</b>	<b>178</b>	<b>69.5%</b>
<b>Definite</b>	9	
Probable	21	
Possible	148	
<b>Not Cases</b>	<b>78</b>	<b>30.5%</b>
Suspicious	12	
Unlikely	27	
Insufficient Info.	32	
Unrelated	7	

# Occupationally-Related APP Reported to PEST, 2009-2011 (n=29)

<b>Activity reported when exposed:</b>	<b>No. of Cases</b>	<b>Percent</b>
Routine on-the-job activity (not involving pesticide use)	18	62.1%
Applying pesticides	6	20.7%
Mixing/loading & pesticides		6.9%
Unknown	2	6.9%
Not applicable	2	3.4%
Total	29	100%

# Oregon's Occ-related APP sent to SENSOR-Pesticides

- Combined with those of 10 other states
- Google - "SENSOR-Pesticides Program Peer-reviewed articles"
- Second Google result
- Look for abstracts with Oregon authors or co-author names:
  - JK Walters, L Mabee & J. Waltz

# Questions and Comments?

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# PEST Reported Exposure Pathway (E.P.)

**Key data sought from individual reporting exposure:**

**Pesticide EVENT (application, spill, etc.), including:**

- EPA Reg. # and A.I. of products; sampling confirmation by ODA/ODF (as available)
- Date & Time of Event; Site type of Event

**Reported pesticide EXPOSURE:**

- Date/time of exposure reported
- Reported distance away from Event Site; wind speed; duration of exposure; felt product on skin?
- Individual's report of symptom, its onset & duration
- Signs & symptoms from healthcare provider on medical record

# Key data sought for EP (con't)

- D.O.B?
- Health just before application?
- Other household members ill just before Event?
- Known pre-existing conditions?
- PPE - what kind? & who provided?
  
- OCCUPATIONAL EXPOSURE?
  - Job title?
  - Activity when reported exposure occurred?
  - Name employer & location of reported exposure site?
  - Supervisor?
  - Symptoms result in time away from work? How many days?

# PEST's 1<sup>0</sup> Responsibilities (con't)

- D. Advise OHA representative to PARC on APP-related & PARC-related topics, as needed
  - i. Prepare for & attend PARC Prepare documents for PARC Case Classifications, as needed
  
- E. Connect inquiries (both public and professional) on APP to appropriate resources, including: NPIC, TIC at CROET, PARC & OPC

# Objectives & Functional Authority of PEST (through OHA)

Goal: Track & investigate reported incidents of acute pesticide related illness/injury (APP) in Oregon

## Objectives:

- Track and investigate reports of APP in Oregon
- Input

## OHA's Functional Authority for Pesticides:

Health care providers must report suspected/confirmed pesticide poisonings to a local health agency or the Oregon Health Authority within 24 hours

[ORS 409.050, 433.004 & 433.006]

# PEST Investigations (con't)

- Investigation queries part of “conversation” with reporter of exposure
- Conversational tangents redirected to:
  - 1) gaining information on implicated product, exposure pathway & symptom time points
  - 2) seeking interest in PARC referral
- PEST’s document of investigation queries now one page (from ten-page questionnaire in 2006)
- PARC referral solicited on basis of altruism – no promises made!
- Providing reporter with “levers to push” i.e. community mediation & NPIC

# Timeline of PEST Deliverables for PARC

- After Receiving **PARC** Cases
  - Within 5 b-days, PEST contacts individual at least once
- After Receiving **OPC** Cases (involving medical interaction)
  - Within 3 to 7 b-days, PEST contacts individual or healthcare reporter for individual's information
- Email PARC Reported **Exposure Pathway (EP)**
  - Within 2 b-days
  - Please send EP to relevant PARC agencies as soon as possible

# PEST Wish List for PARC Coordinator

- Continue to be the “hub” among 8 state agencies to ensure that involved agencies exchange information for PARC incident/case
- Use unique position at ODA to ensure that ODA Pesticide Investigators refer incidents to PARC **ASAP!**
- Regularly (interval TBD) email PEST finalized Pesticide Complaint Logs, F500 Reports, etc.
- Let agency contacts know if PARC processes can be improved or made more efficient

# “Likely” Cases of Acute Pesticide Poisoning Reported to Oregon Public Health Division, 2002-2007

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# APP Reported to PEST, 2002-2007

- For 2007-2009 ODA funded PEST (\$56K) for pesticide education of the public
  - MOA's Scope of Work included a basic, descriptive analysis of PEST case data
- No such analysis of total cases reported to PEST done since 2001, so I did one for exposures reportedly occurring 2002 thru 2007
- Details in “Descriptive Analysis of PEST Cases, 2002-2007” on PEST's website

# Overview of APP Reported to PEST 2002-2007

- 1708 incidents of APP reported to PEST



- 1038 individuals reporting exposure that met PEST case definition



- 689 determined “likely” (**definite, probable, possible**) using classification criteria from NIOSH’s SENSOR-Pesticides Program

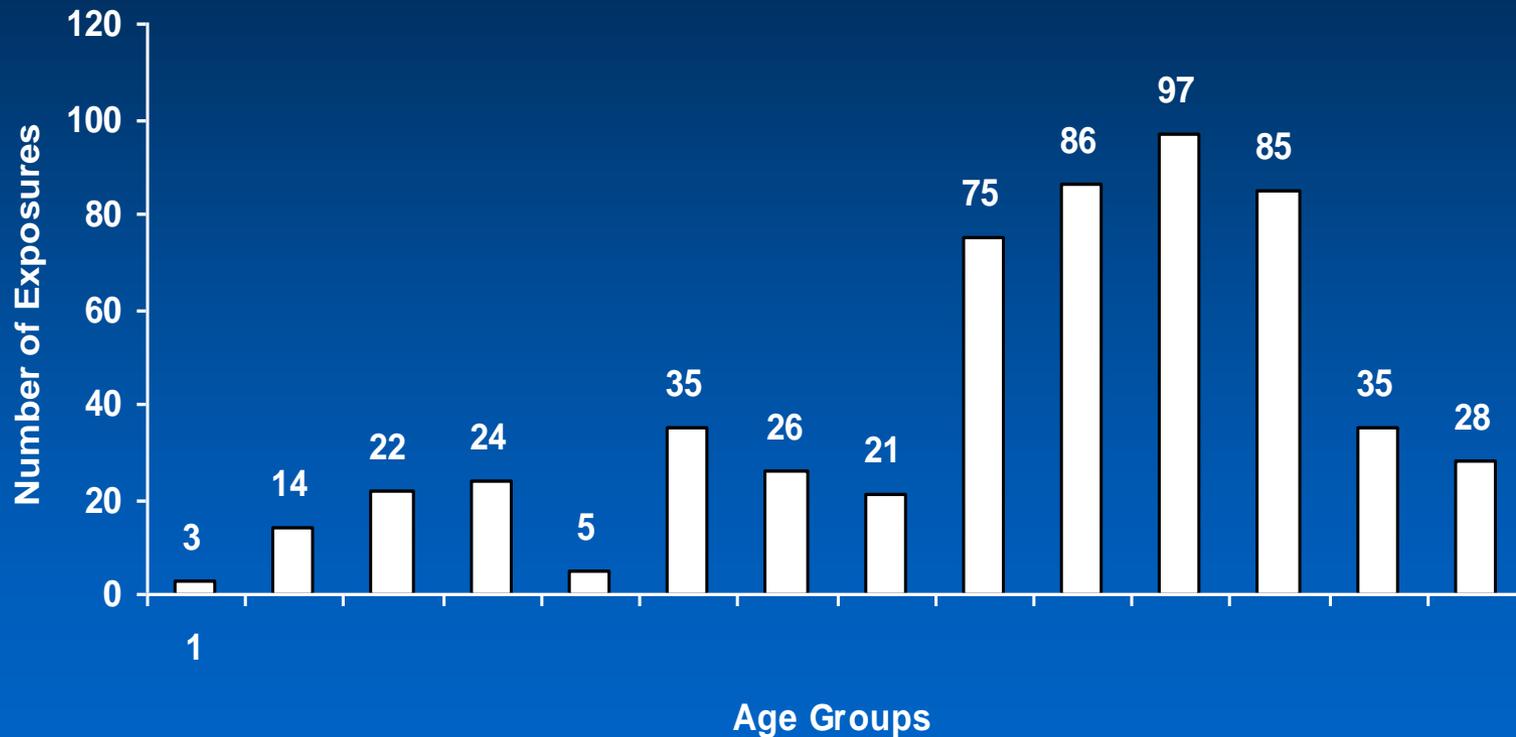
So what did the initial analysis tell us?

# Severity of “Likely” Cases

Severity Levels	Case Classification			Total
	Definite	Probable	Possible	
Death	1	0	0	1
High	3	1	0	4
Moderate	8	7	8	23
Low	36	46	579	661
Total	48	54	587	689

# Basic Demographics about “Likely” Cases (n=689)

- 51.4% Female, 48.6% Male
- Age Distribution of “likely” cases by known age group (n=556)\*



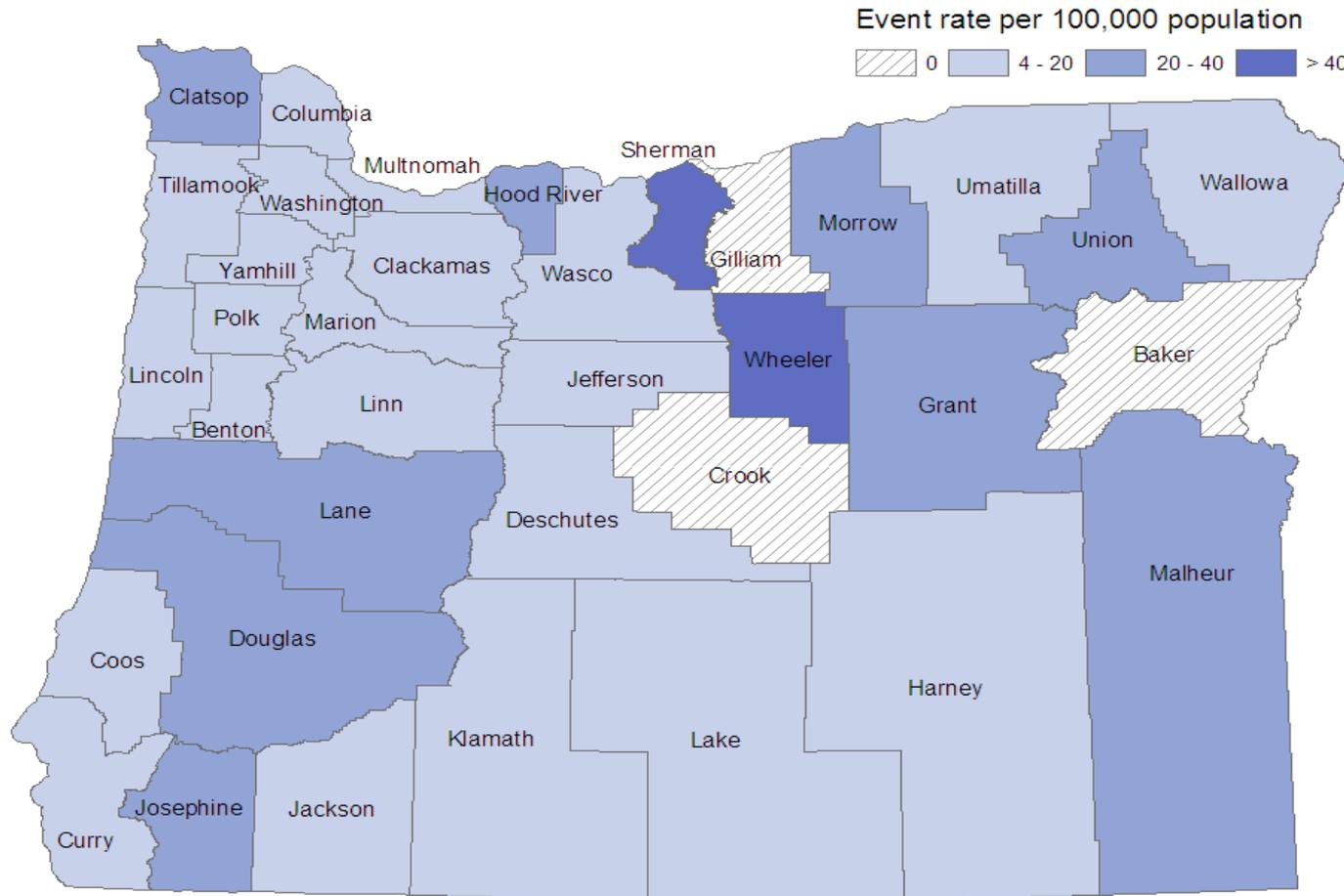
\*Ages or dates of birth for 133 (19.3%) of the 689 cases are unknown.

# Work-Related Activity Accompanying Exposures (n=124)\*



\*Not shown are four exposures where the activity is unknown or not applicable.

# Reported Events by Oregon County, Per Capita, Resulting in “Likely” Cases of APP, 2002-2007 (n=529)\*



\*Does not include 85 events where the county was unknown

## Top 10 Reported Known Event Sites for “Likely” Cases (Total n = 614 events)

NIOSH Site Category	Frequency	% of Total “n”
Farm	31	5.0
Forest	8	1.3
Office/business (non-retail, non-industrial)	10	1.6
Park	5	0.8
Residence*	428	69.7
Road/trail	4	0.7
School	7	1.1
Service Establishment	10	1.6
Plant Nursery	11	1.8
Other	12	2.0

\*Single-family home, mobile home/trailer, apartments, housing for laborers, and unspecified private residences (includes grounds of property)

## Top 10 Reported Known Exposure Sites of “Likely” Cases (Total n = 689 exposures)

NIOSH Site Category	Frequency	Percent of Total “n”
Farm	29	4.2
Livestock production facility	5	0.7
Office/business (non-retail, non-industrial)	18	1.5
Other institution	5	0.7
Residence*	498	72.3
Retail establishment	6	0.9
School	10	1.5
Service Establishment	18	2.6
Nursery	10	1.5
Other	14	2.0

\*Single-family home, mobile home/trailer, apartments, housing for laborers, and unspecified private residences (includes grounds of property)

# Select Categories of “Likely” Cases (Exposures) Where Event & Exposure Sites Were Identical

<b>NIOSH Exposure Site</b>	<b>Percent Identical</b>	<b>Ratio</b>
<b>Schools</b>	<b>100%</b>	<b>10 of 10</b>
<b>Farm</b>	<b>97%</b>	<b>28 of 29</b>
<b>Residences</b>	<b>92%</b>	<b>457 of 498</b>
<b>Office/business</b>	<b>83%</b>	<b>15 of 18</b>
<b>Forest</b>	<b>75%</b>	<b>3 of 4</b>

# Available Functional Classes of Pesticide Products Reportedly Associated with “Likely” Cases

Functional Class of Product	Frequency	Percent of Product Class Total
Insecticide	384	55.4%
Insect Growth Regulator	2	0.3%
Herbicide/algacide	145	20.9%
Disinfectant	35	5.1%
Insect repellent	33	4.8%
Insecticide + Fungicide	17	2.5%
Insecticide + Other	17	2.5%
Functional Class Undetermined	16	2.3%
Other (plant growth regulators)	13	1.9%
Fungicide	19	2.7%
Rodenticide	6	0.9%
Herbicide + Fungicide	3	0.4%
Fumigant	2	0.3%
Multiple function (product in multiple classes, not above)	1	0.1
<b>Total</b>	<b>693</b>	<b>100%</b>

# Limitations

- Funding limited effort to a basic overview of 02-07 data
- Reporting sources:
  - OPC's data collected for emergencies, not tracking
  - **Possible reporting bias for residential exposures since OPC reports 80% of PEST cases yet most OPC calls are from households**
- NIOSH's database geared to occupational incidents, not household, so may not track causes of household exposures
- Effects of “other” ingredients not always considered
- Lack of consistency for specifying pesticide formulation
  - Best identifier is product's EPA Registration No., but this usually not known
  - Brand name not reliable as active ingredients change frequently

# Highlights of Findings

- Healthcare providers are not reporting suspected or confirmed cases of APP (yet are legally required to do so under ORS 431.004)

[Evidence that medical attention was sought in at least **211 confirmed cases of APP** reported to PEST, 2002-2007.]

- Most reported work-related APP occur to bystanders not directly working with pesticides or pesticide equipment.
- Most (92%) of “likely” exposures occurring in residences were connected to a pesticide event at the residence
- Some rural counties are disproportionately burdened by APP