



Coos Bay Children's Academy  
Pesticide Exposure Incident  
Investigation Report

Pesticide Exposure Safety & Tracking

Public Health Division

Oregon Health Authority

October 2017

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## EXECUTIVE SUMMARY

### Introduction

On May 12, 2017, the Coos Bay Children's Academy day care closed after children and employees reported symptoms following a pesticide application during the week of May 1. Concerned employees and parents notified the Coos (County) Health & Wellness Public Health Division during that week. Coos County informed the Oregon Department of Education's Office of Childcare and sought advice from the National Pesticide Information Center. The Pesticide Analytical and Response Center, which coordinates state agency review of pesticide incidents, learned about the incident through an article published in The Oregonian and mobilized all relevant agencies. Oregon Health Authority, Oregon Department of Agriculture and Oregon Occupational Safety and Health Administration each initiated investigations.

The focus of Oregon Health Authority's investigation was to determine whether a causal association existed between the pesticide applications and the reported symptoms.

### Results

Coos Bay Children's Academy had 24 employees and an estimated 117 daycare attendees. Oregon Health Authority staff surveyed 49 individuals who reported symptoms and reviewed 17 medical records. Coughing was the most common symptom reported, followed by eye irritation and runny nose. Based on the questionnaire responses and medical record review Oregon Health Authority classified 30 of the children and adults as cases of acute pesticide poisoning (21% of the children and employees who visited Coos Bay Children's Academy during the week following the initial pesticide application). The cases are of "low" severity since symptoms were mild and resolved on their own after a short time.

Sixty percent of individuals classified with acute pesticide poisoning started experiencing their first symptom on Monday, May 1 (shortly after the first pesticide application on Saturday, April 29) followed by Tuesday and Wednesday in a clear decay pattern. There were no spikes in symptoms or cases on Thursday, May 4, after a second pesticide application. Thus, it is likely that the first pesticide application was largely responsible for the reported symptoms.

### Agencies' response

Oregon Department of Agriculture issued civil penalties and violations to Coos Bay Children's Academy, the owner of the facility and the pesticide applicator for performing pesticide applications in a faulty, careless or negligent manner.

Oregon Occupational Safety and Health Administration issued civil penalties and violations to Coos Bay Children's Academy for failure to comply with hazard communication rules requiring employers to train their employees to recognize chemical hazards and to take the necessary precautions to protect themselves, and failure to establish and maintain a safety committee for employees.

Pesticide Analytic and Response Center developed a plan to outreach to all Oregon state agencies, informing them how to report pesticide-related incidents and concerns to the Center.

Oregon Health Authority is updating guidelines for investigating pesticide poisoning incidents and working to remind local health authorities of requirements to report pesticide poisoning incidents.

## BACKGROUND

### The pesticide exposure incident

On May 12, 2017, the Coos Bay Children's Academy (CBCA) day care closed after children and employees reported symptoms following a possible pesticide exposure during the week of May 1, 2017. Coos Bay Children's Academy had 24 employees and an estimated 117 daycare attendees. Concerned employees and parents notified the Coos (County) Health & Wellness Public Health Division during that week; Coos County informed the Oregon Department of Education's Office of Childcare and sought advice from the National Pesticide Information Center located at Oregon State University. Concerned employees and parents also notified The Oregonian, which published an [article](#) on May 16, 2017 about the incident. Soon afterwards, the Pesticide Analytical and Response Center, which coordinates state agency review of pesticide incidents, mobilized all relevant agencies (Oregon Health Authority, Oregon Department of Agriculture and Oregon Occupational Safety and Health Administration), each initiating their own investigation. The US Environmental Protection Agency and US Occupational Safety and Health Administration were notified.

### Exposure Timeline

The following timeline summarizes the pesticide exposure period at Coos Bay Children's Academy:

1. The owner purchased Tempo® SC Ultra (active ingredient beta-cyfluthrin of the pyrethroid class of insecticides) and applied it at the facility on the morning of Saturday, April 29, 2017 to treat for fleas (application 1).
2. Children returned to the day care the following Monday morning (5/1/17). Some children began experiencing upper respiratory and eye symptoms; the flea problem persisted.
3. The facility hired Western Exterminators, a professional pesticide applicator, to treat the facility Wednesday evening (5/3/17, application 2).
4. Parents learned about the pesticide applications during the week of May 1. Some were concerned that symptoms their children were experiencing could be the result of pesticide exposure.
5. Carpet cleaners came to the facility Friday evening (5/5/17) to remove any pesticide residue on the carpets. Staff reported they cleaned walls and toys.
6. The Coos Bay Children's Academy permanently closed on the following Friday, May 12.

### Oregon Health Authority's Investigation

All suspected or confirmed cases of pesticide poisoning are reportable to Oregon Health Authority, and Oregon Health Authority may investigate these, as outlined in Oregon Administrative Rules (OAR) 333-018, 333-019 (Investigation and control of Diseases, 2017).

The Pesticide Exposure Safety and Tracking program at Oregon Health Authority investigates cases of pesticide poisoning resulting from acute exposures, termed acute pesticide poisonings, after all immediate threats to safety and health have been addressed. The Pesticide Exposure Safety and Tracking program focuses on acute pesticide exposure since the effects of chronic exposures can be difficult to confirm. These investigations use protocols developed by the National Institute of Occupational Safety and Health's (NIOSH) Sentinel Event Notification System for Occupational Risk (SENSOR) program to focus on population-based pesticide illness and injury surveillance (NIOSH, 2017). These investigations aim to determine whether a causal association exists between an exposure and reported symptoms. The investigations take pesticide toxicity, symptom type and duration and

resolution, route of exposure, length of exposure, proximity to the application site, and other factors into consideration.

## Pesticides & Health

Adverse health effects from a pesticide exposure vary, depending on the pesticide's chemical composition and several exposure factors, including route and duration.

Pesticides can affect both children and adults, although children may be more susceptible because of their smaller size, which results in a larger dose from a given exposure, and their different behavior patterns, which might increase their likelihood of exposure. Moreover, children's internal organs are still developing and their enzymatic, metabolic, and immune systems may provide less natural protection than those of an adult (EPA, 2002).

## Pesticide Applications

Tempo® SC Ultra Premise Spray (EPA Reg. No. 11556-124) was the first pesticide used at Coos Bay Children's Academy to treat for fleas. Coos Bay Children's Academy applied the pesticides around the baseboards and carpet on Saturday, April 29. This pesticide is designed to control a broad spectrum of insect pests in and around animal housing, warehouses and processing and packing plants (EPA, 2017). ODA's investigation closely focused on pesticide use according to the label. Tempo® SC Ultra Premise Spray has a "caution" signal word, the lowest level of toxicity that the EPA can assign any registered pesticide. Its active ingredient is Beta-cyfluthrin (11.8% before dilution), a low-toxicity pyrethroid.

After Tempo® SC Ultra Premise Spray proved to be ineffective at eliminating fleas, Coos Bay Children's Academy contracted completion of a second pesticide application on the evening of Wednesday, May 3. This application, applied by a professional, focused on the interior baseboards and exterior perimeter. It contained three different pesticides: NyGuard IGR Concentrate (EPA Reg. No. 1021-1603), Onslaught Fast Cap Insecticide (EPA Reg. No. 1021-2574) and Suspend Polyzone (EPA Reg. No. 432-1514). These pesticides are designed to control a broad spectrum of insect pests, including fleas, in indoor and outdoor areas (EPA, 2017). All three have a "caution" signal word. Their active ingredients were pyriproxyfen (10.0%), esfenvalerate (6.4%), prallethrin (9.6%) and deltamethrin (4.75%). All but the pyriproxyfen are low-toxicity pyrethroids.

Adverse health effects associated with acute pyrethroid exposures can include moderate eye and skin irritation, headaches, dizziness, coughing, and difficulty breathing (EPA, 2013). There is no evidence that pyrethroids cause birth defects or affect the reproductive systems in humans (ATSDR, 2003). Some animal studies have suggested that, when consumed in very large amounts over a lifetime, pyrethroids may cause cancer (ATSDR, 2003).

In addition to the adverse health effects associated with pyrethroid exposures, pyriproxyfen exposure is associated with diarrhea (Toxnet, 2016). There is no evidence that pyriproxyfen is carcinogenic to humans (EPA, 2016).

## METHODS

### Collaboration

Pesticide Exposure Safety and Tracking collaborated with toxicologists and Acute and Communicable Disease Prevention epidemiologists within Oregon Health Authority as well as Pesticide Analytical and

Response Center member agencies (Oregon Occupational Safety and Health - OR-OSHA, and Oregon Department of Agriculture - ODA) to investigate the Coos Bay Children's Academy pesticide exposure incident. All Pesticide Analytical and Response Center member agencies completed their own investigations.

### Outreach

Oregon Health Authority requested incident and contact information for Coos Bay Children's Academy employees and enrolled students from the Coos County Health Department (Coos Health & Wellness) and Oregon Department of Education Early Learning Division, Office of Child Care. Thirty-six employees (24 recent and 12 others) and 117 enrolled children were identified. Contact information included employees, child and parent names; phone numbers, email addresses; and mailing addresses.

### Data Collection

Oregon Health Authority developed a seven-question online screening survey using Survey Monkey to identify the children and employees that had reported symptoms potentially consistent with pesticide exposure after attending Coos Bay Children's Academy the week of May 1, 2017 (Appendix A). On May 25, 2017, Oregon Health Authority staff sent out an email to every parent for whom an email address was available, stating the purpose of our investigation and requesting that the parent follow a link to complete the screening survey. Staff sent two reminder emails during the following week.

Oregon Health Authority staff contacted all parents who responded that their child/children had experienced any of these symptoms after attending Coos Bay Children's Academy during the week of May 1, 2017. Oregon Health Authority staff asked these parents to complete a more in-depth phone questionnaire (APPENDIX B). The investigative team, comprised of Pesticide Exposure Safety and Tracking and Acute and Communicable Disease Prevention staff, developed questionnaires to collect pesticide exposure and health outcome information for each individual (APPENDIX C). There were 41 questions related to demographics, exposure periods, health outcomes and other relevant information. This included a list of eighteen symptoms commonly associated with the active ingredients found in the pesticides that were applied (Toxnet, 2008; Toxnet, 2009; Toxnet, 2012; Toxnet, 2016). Staff followed calling protocols and left two callback voice messages if parents did not answer.

The investigative team directly contacted all employees by phone and asked them to complete a questionnaire, since the employee list was much shorter than the enrolled student list. The investigative team left two voice messages on individuals' phone requesting a call back if we were unable to reach them. Oregon Health Authority sent an additional reminder text message to parents and employees who had not responded to our calls on May 31.

Oregon Health Authority requested the pesticide-related medical records of all the individuals who reported seeking medical attention after attending Coos Bay Children's Academy the week of May 1.

### Acute Pesticide Poisoning Classifications

Oregon Health Authority followed National Institute for Occupational Safety and Health protocols to classify cases of acute pesticide poisoning using completed phone questionnaires and available medical records (NIOSH, 2017). The acute pesticide poisoning case definition requires: 1) a reported exposure, and 2) post-exposure symptoms (1 dermal or 1 ocular or 2 systemic symptoms) that are consistent with the current literature. Symptoms that began before the exposure were considered attributable

symptoms if they worsened after the exposure. Oregon Health Authority gave each case a “certainty” and a “severity” index to reflect the level of confidence that pesticide exposure actually caused the symptom and the degree of the signs and symptoms. The acute pesticide poisoning “certainty” index has eight classifications that range from “definite” to “unrelated” (APPENDIX D). This protocol classifies individuals with “definite”, “probable”, “possible”, or “suspicious” certainty indexes as acute pesticide poisoning cases.

The acute pesticide poisoning “severity” index has four classifications: death, high severity illness or injury, moderate severity illness or injury, and low severity illness or injury (Appendix E).

Pesticide Exposure Safety and Tracking staff reviewed all case classifications containing medical records with a medical epidemiologist and two toxicologists at Oregon Health Authority. A toxicologist audited ten percent of all cases without medical records. This case review team reached full agreement on all the reviewed cases before assigning a final certainty and severity index to each case (APPENDIX F).

### Data Analysis

Oregon Health Authority entered all of the questionnaire and acute pesticide poisoning classification data into an Excel file and performed our analyses using The R Project for Statistical Computing software (version 3.4.0).

In this report, a “child” is any student enrolled at Coos Bay Children’s Academy. An “adult” is any employee or parent. An “Individual” is anybody who we completed a questionnaire for and included in our analyses, unless otherwise specified.

Oregon Health Authority considered the overall “exposure period” to be from Monday, May 1 through Friday, May 5, including the first pesticide application on Saturday, April 29 through carpet cleaning on Friday, May 5. The exposure period specific to the second, professional application that occurred on the evening of Wednesday, May 3 was from Thursday through Friday of that week.

Oregon Health Authority excluded symptoms that preceded exposure and did not worsen after it occurred, and those that began more than 48 hours past a last exposure.

Only medical visits related to Coos Bay Children’s Academy after an exposure (May 1 – May 5) were included in the analyses.

Oregon Health Authority made several assumptions during data analysis. First, Oregon Health Authority estimated an individual’s total exposure time by including any day an individual spent time in the facility as a whole day. Oregon Health Authority made this assumption because it was difficult to determine an individual’s exact location and time within the facility. Second, only the symptoms clearly identified by individuals were included in the analyses. A symptom was not included if individuals were unsure of whether they or their child had experienced it. Finally, Oregon Health Authority used National Institute for Occupational Safety and Health protocols to identify cases of acute pesticide poisoning. While many individuals reported post-exposure symptoms, Oregon Health Authority only considered those that met the criteria of cases of acute pesticide poisoning. The acute pesticide poisoning case count may thus underestimate some pesticide-related symptoms.



## RESULTS

### Respondents

An estimated 117 children attended Coos Bay Children’s Academy during the week of May 1. Coos Bay Children’s Academy employed twenty-four employees during the week of May 1, though it is unclear how many total adults (employees plus parents) visited Coos Bay Children’s Academy during that period.

The investigative team completed 49 (49/142 = 35%) questionnaires. Each survey took 15 – 45 minutes to complete. The median (minimum, maximum) age of individuals was 4 (1, 65) years. Twenty-four of the individuals (49%) were male. The median (minimum, maximum) days of pesticide exposure for individuals was 4 (1, 5) days.

### Health Outcomes

Individuals reported post-exposure symptoms with the following categories: respiratory problems (47%), eye problems (35%), dizziness, headache, nausea or fever (24%), and skin problems (16%). 96% of individuals reported at least one symptom (Table 1). Fourteen individuals sought medical attention.

Symptom	Total N=49 (Count, %)
Skin problems (irritation, burning, pain or rash)	8 (16%)
Dizziness, headache, nausea or fever	12 (24%)
Eye problems (irritation, burning, tearing, discharge, blurring or double vision)	17 (35%)
Respiratory problems (cough, sore throat, runny nose, sneezing, wheezing, difficulty breathing, burning nose or throat)	23 (47%)
Any symptom	47 (96%)

*Table 1. Symptom Profile (Table of all reported symptoms after attending Coos Bay Children’s Academy that may have been related to the pesticide applications between Monday, May 1 and Sunday, May 7. Total percentages do not add up to 100% because individuals often reported multiple symptoms).*

### Acute Pesticide Poisoning Classification

Oregon Health Authority calculated acute pesticide poisoning attack rate with the assumption that the entire population of children and employees was potentially exposed. The attack rate calculation included self-identified exposed non-employee adults and excluded other non-employee adults with the assumption that their potential for exposure was relatively limited.

Oregon Health Authority classified thirty people (21% of those assumed to be exposed) as cases of acute pesticide poisoning. The NIOSH acute pesticide poisoning “certainty” index has eight classifications that range from “definite” to “unrelated” (APPENDIX D). This protocol classifies individuals with “definite”, “probable”, “possible”, or “suspicious” certainty indexes as acute pesticide poisoning cases. Oregon Health Authority assigned the following certainty classifications:

- Definite: two individuals (1% of total, “definite” cases have documented exposure and post-exposure adverse health effects that are consistent with those described in the literature, and included supporting evidence from a medical evaluation or environmental sampling),
- Probable: one individual (1% of total, “probable” cases have either the exposure or the post-exposure adverse health effects confirmed through a medical evaluation or environmental sampling),
- Possible: 25 individuals (18% of total, in “possible” cases an individual reports an exposure and post-exposure adverse health effects, though the reports are unconfirmed),
- Suspicious: two individuals (1% of total, in “suspicious” cases, there is insufficient evidence from the literature to support a causal relationship).

Oregon Health Authority considered all acute pesticide poisoning cases as “low” severity, since symptoms (e.g., skin, eye or upper respiratory irritation) were mild, transient and resolved spontaneously (NIOSH, 2017).

Oregon Health Authority classified the remaining 19 respondents and all 93 non-respondents as not acute pesticide poisoning cases. Oregon Health Authority assigned the following certainty classifications to the non-cases:

- Unlikely: eight individuals (6% of total, “unlikely” means that the described post-exposure symptoms are not in line with those described in the literature),
- Insufficient information: eight individuals (6% of total, “insufficient information” applies if insufficient data are available on the exposure or post-exposure symptoms),
- Exposed but asymptomatic: two individuals (1% of total, “exposed but asymptomatic” applies if the person had no post-exposure findings),
- Not a case (since the individual did not attend Coos Bay Children’s Academy during the week of May 1): one individual (1% of total),
- Non-respondents: 93 individuals (66% of total).

We assumed respondents declined to complete the questionnaire because they were not present during the exposure period or were asymptomatic. This final assumption may bias results towards lower acute pesticide poisoning attack rates if respondents were exposed and symptomatic but declined to complete the questionnaire for other reasons.

### Epidemic Curve

Eighteen acute pesticide poisoning cases (60%) reported experiencing their *first* symptom after attending Coos Bay Children’s Academy on Monday, May 1 (Figure 1). Five (19%), three (11%) and one (4%) cases reported experiencing their first post-exposure symptom the following Tuesday through Thursday, respectively (Figure 1). Many cases, including those who reported their first symptom before attending Coos Bay Children’s Academy, also experienced additional symptoms after their first.

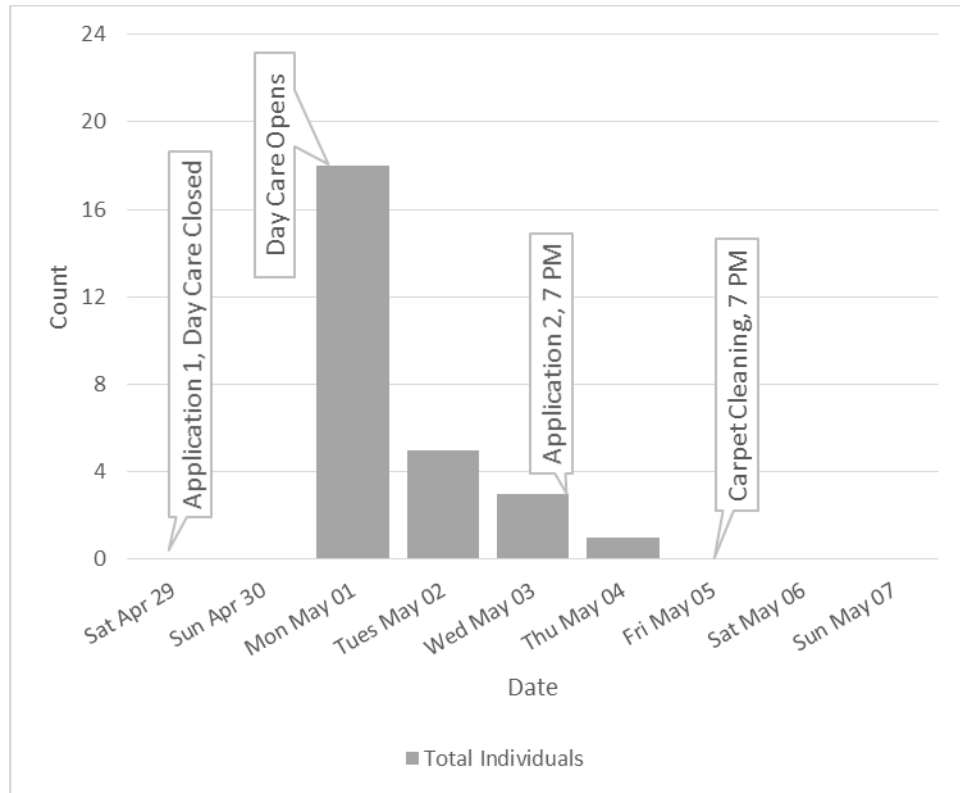


Figure 1. Epidemic Curve for Acute Pesticide Poisoning Cases at Coos Bay Children’s Academy – First Symptom (Excludes first symptoms that were not new but worsened post-exposure, symptoms with unclear start dates and additional reported symptoms).

### Alternative Causes

Thirty-nine percent of all respondents had other medical conditions, such as allergies or asthma, which might explain their symptoms. This did not differ between cases and non-cases.

## DISCUSSION

### Acute Pesticide Poisoning Cases

Oregon Health Authority classified 30 of the 49 respondents as low-severity acute pesticide poisoning cases. Most of these acute pesticide poisoning cases had a certainty index of “possible,” since individuals reported attending Coos Bay Children’s Academy during the exposure period and afterwards experiencing adverse health effects, but this was unverified by a medical professional. Symptoms also resolved on their own without medical attention.

Most respondents not classified as having acute pesticide poisoning had a certainty index of “unlikely” or “insufficient information”. This indicates that many had symptoms that started or worsened before their first day back at Coos Bay Children’s Academy or that their symptoms were not among those known to be caused by the pesticides’ active ingredients. Other individuals did not have clear recollections of when they first attended Coos Bay Children’s Academy or when their symptoms started.

## Epidemic Curve

Sixty percent of acute pesticide poisoning cases reported onset of symptoms the Monday and Tuesday following the first pesticide application. Some cases experienced their first symptom before the exposure period. Oregon Health Authority considered these individuals to be a case only if they had an increase in the intensity of symptoms, or additional symptoms developed, during the exposure period. No acute pesticide poisoning cases experienced their first symptom after Wednesday, May 3. Total symptoms (first and additional) showed a similar pattern, with no increase in symptom intensity seen after the second pesticide application, though there were a few new symptoms reported.

Cases of acute pesticide poisoning likely resulted from the first pesticide application, though some symptoms may have been associated with the second application. The observed decrease in cases over time might stem from cleaning efforts and dispersion from foot traffic. Since cyfluthrin has an estimated half-life of 23-114 weeks depending on temperature, humidity and other factors, natural product decay was likely minimal (Noble & Hamilton, 1985).

## Alternative Causes

More individuals who reported having allergies and asthma were classified as acute pesticide poisoning cases than those who did not report these conditions, though our sample size was too small to determine whether this difference was significant. Still, the most commonly reported symptoms (cough, eye irritation, pain or burning, and runny nose) were symptoms associated with allergies, asthma and other illnesses. Moreover, Oregon Health Authority did not ask individuals about environmental tobacco exposure, known to cause adverse health effects similar to those associated with pesticide exposure (Saha et al., 2007). While Oregon Health Authority did not take the presence or absence of these conditions into account during acute pesticide poisoning case classifications, those conditions may have contributed to the number and severity of reported symptoms.

## Limitations

It's important to note that these acute pesticide poisoning classifications were developed for population-based surveillance purposes and use a certainty scale that is often determined by what individuals, not medical professionals, are reporting (e.g. "definite," "possible," "unlikely," "insufficient information," etc.). As a result, some of these classifications may be inaccurate.

The investigation had several other limitations. Notably, Oregon Health Authority first learned about the Coos Bay Children's Academy pesticide incident and began contacting individuals almost a month after the incident. Some respondents were unclear about their specific exposure and symptom dates, making it difficult to classify cases of acute pesticide poisoning. Six Oregon Health Authority staff conducted phone questionnaires, which could have led to some discrepancies. Oregon Health Authority trained staff members and shared calling protocols in an attempt to standardize our outreach.

Second, though Oregon Health Authority sent out an initial online screening survey to all the parents on our contact list, staff only completed follow-up phone questionnaires and acute pesticide poisoning classifications with the parents who responded saying that their child had attended Coos Bay Children's Academy during the exposure period and afterward experienced symptoms. It is possible that Oregon Health Authority missed some acute pesticide poisoning cases among employees or symptomatic students whose parents chose not to respond to outreach efforts.

Moreover, Oregon Health Authority was unable to assess intensity of exposure since recall bias prevented collection of accurate information about the amount of time spent at Coos Bay Children's Academy on each day of exposure or track what areas of the facility people visited. Oregon Health Authority assumed a symptom was possibly related to pesticides if it occurred within 48 hours of an individual attending Coos Bay Children's Academy during the exposure period (May 1 – May 5) and if the symptom was documented in the literature as one known to be associated with exposure to the pesticides used.

Finally, many of the available toxicological studies on pesticide exposure were based on adult populations. Symptom profiles and symptom time windows may slightly differ among children, a known vulnerable population. Oregon Health Authority partially accounted for a difference in response to exposure by increasing the symptom resolution times from around 24 hours to 48 hours.

## CONCLUSION

The investigation showed that 30 individuals at Coos Bay Children's Academy (21% of the assumed exposed population) experienced acute pesticide poisoning after attending the facility during the week of May 1, 2017. Oregon Health Authority classified 25 of these individuals as "possible" acute pesticide poisoning cases, since their exposure and symptoms were self-reported and not corroborated by medical professionals. There were two cases of "definite" acute pesticide poisoning (1.4% of the total exposed population). Most acute pesticide poisoning cases experienced their first adverse health effect on Monday, May 1 or Tuesday, May 2, after the first pesticide application. No acute pesticide poisoning cases experienced their first symptom after the second pesticide application on Wednesday evening. Oregon Health Authority classified all acute pesticide poisoning cases as "low" severity.

The investigation supports the conclusion that an outbreak of acute pesticide poisoning occurred at Coos Bay Children's Academy after an application of pesticide Tempo® SC Ultra to treat for fleas. The outbreak affected 21% of employees and children. While all cases were low severity, this outbreak underscores the importance of appropriate application of pesticides, achievable by following label instructions and warnings. The National Pesticide Information Center at Oregon State University provides objective, science-based information about pesticides and pesticide-related topics to enable people to make informed decisions about pesticides and their use (see Resources section).

Resulting from independent investigations, Oregon Department of Agriculture issued civil penalties and violations to Coos Bay Children's Academy, the owner of the facility and the pesticide applicator for performing pesticide applications in a faulty, careless or negligent manner. Oregon Occupational Safety and Health Administration issued civil penalties and violations to Coos Bay Children's Academy for failure to comply with hazard communication rules requiring employers to train their employees to recognize chemical hazards and to take the necessary precautions to protect themselves, and failure to establish and maintain a safety committee for employees. The Pesticide Analytic and Response Center developed a plan to outreach to all Oregon state agencies, informing them how to report pesticide-related incidents and concerns to the Center.

The Pesticide Exposure Safety & Tracking Program is updating guidelines for investigating pesticide poisoning incidents and working to remind local health authorities of requirements to report pesticide poisoning incidents.

## RESOURCES

### **Emergencies**

*Call 911 during an emergency.* After you address all immediate health and safety concerns, visit your health care provider.

### **Oregon Poison Center (OPC)**

The Oregon Poison Center provides free, confidential, expert medical advice 24/7. The public and health care providers generally access OPC services to ask about treatment after an exposure.

<https://www.ohsu.edu/xd/outreach/oregon-poison-center/>

1-800-222-1222

### **Pesticide Analytical and Response Center (PARC)**

The Pesticide Analytical and Response Center coordinates investigations of pesticide releases that may have harmed human health, animal health or the environment. Pesticide Analytical and Response Center ensures that appropriate agencies (including Pesticide Exposure Safety and Tracking) address pesticide concerns.

<http://www.oregon.gov/ODA/programs/Pesticides/Pages/PARC.aspx>

[PARC@oda.state.or.us](mailto:PARC@oda.state.or.us)

211 (24/7 hotline, PARC will contact you within one business day)

503-986-6470 (your phone call will forward to 211)

### **Pesticide Exposure Safety & Tracking**

The Pesticide Exposure, Safety and Tracking Program tracks and investigates health effects reported by people exposed to pesticides. This helps us to identify trends in acute (i.e. sudden) pesticide poisonings and emerging pesticide hazards to guide education efforts for prevention, and to inform policymakers.

<http://healthoregon.org/pesticide>

[pesticides.health@state.or.us](mailto:pesticides.health@state.or.us)

971-673-0400

### **National Pesticide Information Center (NPIC)**

NPIC provides objective, science-based information about pesticides and pesticide-related topics to enable people to make informed decisions about pesticides and their use. NPIC is a cooperative agreement between Oregon State University and the U.S. Environmental Protection Agency. Their website has many resources including research papers, frequently asked questions, annual reports, outreach materials, podcasts and other resources available to the public. They also have a free hotline Monday-Friday 8am – 12pm where individuals can call and speak with someone directly.

<http://npic.orst.edu>

[npic@ace.orst.edu](mailto:npic@ace.orst.edu)

1-800-858-7378 (M-F 8 AM – 12 PM)

The National Pesticide Information Center (NPIC) and the American Association of Poison Control Centers (AAPCC) have safety resources regarding the use of disinfectants, insect repellents, and other common products used in childcare settings.

<http://www.aapcc.org/prevention/daycare-school-poison-safety>

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Suggested citation

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## APPENDIX

### APPENDIX A. SCREENING SURVEY

The Oregon Health Authority (OHA) is investigating what individuals might have been exposed to a pesticide application at the Coos Bay Children's Academy between 4/22/17 and 5/12/17. If you were an employee or if your child attended this facility, we ask that you **please complete this short survey even if you do not think you were exposed or experienced adverse health effects** from this incident. This will allow us to 1) account for all students and staff, and 2) compare the experience of those who became ill with those who did not. One of our staff members will contact you, if appropriate.

Thank you,

[Pesticide Exposure Safety and Tracking \(PEST\) Program](#)

Oregon Health Authority  
[Pesticides.health@state.or.us](mailto:Pesticides.health@state.or.us)

971-673-0440 (Mon- Fri 8:00 AM to 5:00 PM)

1. Your Name: \_\_\_\_\_

2. Were you an employee or a parent/guardian of an enrolled child at Coos Bay Children's Academy?

- Staff member
- Parent/guardian of an enrolled child Child's Name (if applicable)

3. Did you or your child visit the Coos Bay Children's Academy from April 22, 2017 to May 12, 2017 at any time?

- Yes
- No
- Not Sure

4. If so, did you or your child become sick or have unusual symptoms during or after this time?

- Yes
- No
- Not sure
- NA

5. If applicable, an OHA staff member will contact you to follow up. What days and times work best for you? \_\_\_\_\_

6. Preferred contact number: \_\_\_\_\_

7. Comments: \_\_\_\_\_

## APPENDIX B. QUESTIONNAIRE CALLING SOP

### Coos Bay Children's Academy Pesticide Incident – Exposure Pathway Calls

This document is intended to support our efforts to conduct Exposure Pathway interviews for the Coos Bay Children's Academy. The following includes introductory phone and voicemail scripts for childcare employees and parents/guardians of attendees, as well as a modified exposure pathway form.

Note on the form: We will obtain application data from the investigators, we know the location of the exposure, we've narrowed down the types and routes of exposure, etc. Highlighted areas on the reverse side of the questionnaire are critical for efforts to retrieve medical records, if they exist. If interviewees seem impatient, it's advised to ask whether they've seen a healthcare provider and skip to the highlighted area before continuing.

#### PHONE SCRIPTS

##### Parents and guardians

-Voicemail message:

"This message is for \_\_\_\_\_. This is \_\_\_\_\_ from the Oregon Public Health Division, and I'm calling about a public health concern. I'd appreciate it if you would call us back at [Interviewer Number] and ask for [Interviewer Name]. If you reach my voice mail, please let me know of the best number & time to reach you during the day. Thank you very much."

-Introductory message on call:

"This is \_\_\_\_\_ from the Oregon Public Health Division. I'm looking for \_\_\_\_\_."

Once you have reached the correct person:

"I'm calling regarding a report of a pesticide incident that occurred at the Coos Bay Children's Academy during the week of May 1. I apologize if other agencies already contacted you regarding this incident; the focus of our call is health. I'd like to talk with you, mainly to see how \_\_\_\_ (exposed adult or name of child) is feeling, but also to see if you can help us prevent this from happening to other people in Oregon."

**For households lacking prescreening, first complete the Survey Monkey.** One survey should be completed per each child if there were multiple children exposed in a household.

**If children attended CBCA during the specified dates and experienced adverse health effects** (they answered "yes" or "not sure" to questions 3 & 4 of the Survey Monkey), **proceed to questionnaire...**

"I'd like to ask more questions about your child's health and experience at the Children's Academy. We'll need only 20 minutes. Is this okay?"

## Childcare facility employees

-Voicemail message:

“This message is for \_\_\_\_\_. This is \_\_\_\_\_ from the Oregon Public Health Division, and I’m calling about a public health concern. I’d appreciate it if you would call us back at [Interviewer Number] and ask for [Interviewer Name]. If you reach my voice mail, please let me know of the best number & time to reach you during the day. Thank you very much.”

-Introductory message on call:

“This is \_\_\_\_\_ from the Oregon Public Health Division. I’m looking for the \_\_\_\_\_.”

Once you have reached the correct person:

“I’m calling regarding a report of a pesticide incident that occurred at the Coos Bay Children’s Academy during the week of May 1. I apologize if other agencies have already contacted you regarding this incident; the focus of our call is health. I’d like to talk with you, mainly to see how you are feeling, but also to see if you can help us prevent this from happening to other people in Oregon.”

**For households lacking prescreening, first complete the Survey Monkey.** One survey should be completed per employee/adult if there were multiple adults exposed per household.

**If employees attended CBCA during the specified dates and experienced adverse health effects** (they answered “yes” or “not sure” to questions 3 & 4 of the Survey Monkey), **Proceed to questionnaire...**

“I’d like to ask more questions about your health and experience at the Children’s Academy. We’ll need only 20 minutes. Is this okay?”

APPENDIX C. QUESTIONNAIRE

Staff questionnaire example. Wording was slightly different on child questionnaires (e.g. “Were you at CBCA...” vs “Was your child at CBCA...” ).

**Coos Bay Children’s Academy (CBCA) – Staff Questionnaire**

Respondent First Name: \_\_\_\_\_ Last Name: \_\_\_\_\_

Interviewer name: \_\_\_\_\_

*Instructions:* Use this questionnaire to collect information related to exposure and symptoms for staff members of Coos Bay Children’s Academy (CBCA) possibly related to pesticide applications on April 29 and May 3, 2017 and carpet cleaning May 5, 2017. Make all dates in MM/DD/YY format and times in hh:mm format. You may refer medical toxicology questions to the Oregon Poison Center at 800-222-1222.

**PEST Investigation - Reported Exposure Pathway – Part A**

*Instructions:* Complete the grid and related questions below to track communications with the subject. If you do not hear back from an individual after leaving 3 voice messages, make a note of it and move on to the next case.

Date of Contact	Time	Outcome (e.g., left voice mail, started interview, completed interview, etc.)

What is the respondent’s main phone number? ( \_\_\_\_\_ ) \_\_\_\_\_ - \_\_\_\_\_

Interview start Date: \_\_\_\_/\_\_\_\_/\_\_\_\_ Interview Start time \_\_\_\_:\_\_\_\_

*Instructions:* Ask the following questions:

Date of birth \_\_/\_\_/\_\_ Sex:  M  F

What is your mailing address? \_\_\_\_\_

Were you at the CBCA anytime during April 29 through May 12<sup>th</sup>?  YES ?  NO - No need to continue filing out this form

**Reported Exposure:**

During which days were you inside the building from April 29<sup>nd</sup> through May 12? (check the corresponding boxes below)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						a. <input type="checkbox"/> April 29
b. <input type="checkbox"/> April 30	c. <input type="checkbox"/> May 1	d. <input type="checkbox"/> May 2	e. <input type="checkbox"/> May 3	f. <input type="checkbox"/> May 4	g. <input type="checkbox"/> May 5	h. <input type="checkbox"/> May 6
i. <input type="checkbox"/> May 7	j. <input type="checkbox"/> May 8	k. <input type="checkbox"/> May 9	l. <input type="checkbox"/> May 10	m. <input type="checkbox"/> May 11	n. <input type="checkbox"/> May 12	

On average at CBCA, how many hours per day were you indoors? \_\_\_\_\_ hours

On average at CBCA, how many hours per day did you spent on carpeted areas? \_\_\_\_\_ hours

On average at CBCA, how many hours per day were you within 3 feet of baseboards? \_\_\_\_\_ hours

Did you come in contact with an irritating substance at CBCA?  YES ?  NO

6b. If yes, on what date? \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_ 6c. How?

\_\_\_\_\_

6d. Did you feel wet carpets or walls when people were in the facility??  YES ?  NO

**PEST Investigation - Reported Exposure Pathway – Part B**

After entering the building from April 29 through May 12 did you experience:	a. y/n	b. What date did it start?	c. What time did it start?	d. What date did it end?	e. What time did it end?	f. <u>B</u> etter, <u>w</u> orse, or the <u>s</u> ame upon waking in the morning?
7. Tingling or numbness?	<input type="checkbox"/> YES <input type="checkbox"/> ? <input type="checkbox"/> NO					<input type="checkbox"/> B <input type="checkbox"/> W <input type="checkbox"/> S <input type="checkbox"/> ?
8. Skin irritation, burning, or pain?	<input type="checkbox"/> YES <input type="checkbox"/> ? <input type="checkbox"/> NO					<input type="checkbox"/> B <input type="checkbox"/> W <input type="checkbox"/> S <input type="checkbox"/> ?
9. Rash?	<input type="checkbox"/> YES <input type="checkbox"/> ? <input type="checkbox"/> NO					<input type="checkbox"/> B <input type="checkbox"/> W <input type="checkbox"/> S <input type="checkbox"/> ?
10. Dizziness?	<input type="checkbox"/> YES <input type="checkbox"/> ? <input type="checkbox"/> NO					<input type="checkbox"/> B <input type="checkbox"/> W <input type="checkbox"/> S <input type="checkbox"/> ?
11. Headache?	<input type="checkbox"/> YES <input type="checkbox"/> ? <input type="checkbox"/> NO					<input type="checkbox"/> B <input type="checkbox"/> W <input type="checkbox"/> S <input type="checkbox"/> ?
12. Nausea?	<input type="checkbox"/> YES <input type="checkbox"/> ? <input type="checkbox"/> NO					<input type="checkbox"/> B <input type="checkbox"/> W <input type="checkbox"/> S <input type="checkbox"/> ?
13. Fever?	<input type="checkbox"/> YES <input type="checkbox"/> ? <input type="checkbox"/> NO					<input type="checkbox"/> B <input type="checkbox"/> W <input type="checkbox"/> S <input type="checkbox"/> ?
14. Blurred or double vision?	<input type="checkbox"/> YES <input type="checkbox"/> ? <input type="checkbox"/> NO					<input type="checkbox"/> B <input type="checkbox"/> W <input type="checkbox"/> S <input type="checkbox"/> ?
15. Increased tearing?	<input type="checkbox"/> YES <input type="checkbox"/> ? <input type="checkbox"/> NO					<input type="checkbox"/> B <input type="checkbox"/> W <input type="checkbox"/> S <input type="checkbox"/> ?
16. Eye discharge?	<input type="checkbox"/> YES <input type="checkbox"/> ? <input type="checkbox"/> NO					<input type="checkbox"/> B <input type="checkbox"/> W <input type="checkbox"/> S <input type="checkbox"/> ?
17. Eyes irritation, pain, or burning?	<input type="checkbox"/> YES <input type="checkbox"/> ? <input type="checkbox"/> NO					<input type="checkbox"/> B <input type="checkbox"/> W <input type="checkbox"/> S <input type="checkbox"/> ?



18. Cough ?	<input type="checkbox"/> YES <input type="checkbox"/> ? <input type="checkbox"/> NO					<input type="checkbox"/> B <input type="checkbox"/> W <input type="checkbox"/> S <input type="checkbox"/> ?
19. Sore Throat?	<input type="checkbox"/> YES <input type="checkbox"/> ? <input type="checkbox"/> NO					<input type="checkbox"/> B <input type="checkbox"/> W <input type="checkbox"/> S <input type="checkbox"/> ?
20. Runny Nose?	<input type="checkbox"/> YES <input type="checkbox"/> ? <input type="checkbox"/> NO					<input type="checkbox"/> B <input type="checkbox"/> W <input type="checkbox"/> S <input type="checkbox"/> ?
21. Sneezing?	<input type="checkbox"/> YES <input type="checkbox"/> ? <input type="checkbox"/> NO					<input type="checkbox"/> B <input type="checkbox"/> W <input type="checkbox"/> S <input type="checkbox"/> ?
22. Wheezing?	<input type="checkbox"/> YES <input type="checkbox"/> ? <input type="checkbox"/> NO					<input type="checkbox"/> B <input type="checkbox"/> W <input type="checkbox"/> S <input type="checkbox"/> ?
23. difficulty breathing? _____	<input type="checkbox"/> YES <input type="checkbox"/> ? <input type="checkbox"/> NO					<input type="checkbox"/> B <input type="checkbox"/> W <input type="checkbox"/> S <input type="checkbox"/> ?
24. Burning nose or throat? _____	<input type="checkbox"/> YES <input type="checkbox"/> ? <input type="checkbox"/> NO					<input type="checkbox"/> B <input type="checkbox"/> W <input type="checkbox"/> S <input type="checkbox"/> ?
25. Other: _____	<input type="checkbox"/> YES <input type="checkbox"/> ? <input type="checkbox"/> NO					<input type="checkbox"/> B <input type="checkbox"/> W <input type="checkbox"/> S <input type="checkbox"/> ?
26. Other: _____	<input type="checkbox"/> YES <input type="checkbox"/> ? <input type="checkbox"/> NO					<input type="checkbox"/> B <input type="checkbox"/> W <input type="checkbox"/> S <input type="checkbox"/> ?

**Medical History**

Has a health care provider ever told you that you have:

27. Seasonal Allergies?  YES ?  NO      27b. If yes, what seasons? Spring Summer  Fall Winter

28. Asthma?  YES ?  NO

29. Any other medical conditions?  YES ?  NO      29b. If yes, please specify:

\_\_\_\_\_

30. Did you take medicines anytime from April 29 through May 12?  YES ?  NO

30 a. If yes, what medicines?

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31. Did household members have similar symptoms first?  YES ?  NO

32 Potential route(s) of Exposure (Interviewer's Judgement):  Dermal  Inhalation  Ingestion  
 Ocular  Other  Unknown

33. Did you seek medical care?  NO  Yes

34. Clinic/hospital: \_\_\_\_\_

35. Address/Clinician/Number:

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36. What date(s)? a. \_\_\_\_ / \_\_\_\_ / \_\_\_\_ , b. \_\_\_\_ / \_\_\_\_ / \_\_\_\_ ,  
c. \_\_\_\_ / \_\_\_\_ / \_\_\_\_ , d. \_\_\_\_ / \_\_\_\_ / \_\_\_\_

**Occupational Report:**

38. What is your Job title? \_\_\_\_\_

39. Did you wear personal protective equipment (PPE, e.g. gloves)?  YES  NO.

40. What kind of PPE? \_\_\_\_\_

41. Did your symptoms result in time away from work?  YES 41.b. How many days?  NO

Interview End Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Interview End time \_\_\_\_ : \_\_\_\_

**Notes:**

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## APPENDIX D. NIOSH ACUTE PESTICIDE POISONING CERTAINTY CLASSIFICATION

Sample document from NIOSH's Guidelines for Building a State-based Pesticide Surveillance Program (2007).

### **Case Definition for Acute Pesticide-Related Illness and Injury Cases Reportable to the National Public Health Surveillance System**

#### Clinical Description

This surveillance case definition refers to any acute adverse health effect resulting from exposure to a pesticide product (defined under the Federal Insecticide Fungicide and Rodenticide Act [FIFRA]<sup>1</sup>) including health effects due to an unpleasant odor, injury from explosion of a product, inhalation of smoke from a burning product, and allergic reaction. Because public health agencies seek to limit all adverse effects from regulated pesticides, notification is needed even when the responsible ingredient is not the active ingredient.

A case is characterized by an acute onset of symptoms that are dependent on the formulation of the pesticide product and involve one or more of the following:

- Systemic signs or symptoms (including respiratory, gastrointestinal, allergic and neurological signs/symptoms)
- Dermatologic lesions
- Ocular lesions

This case definition and classification system is designed to be flexible permitting classification of pesticide-related illnesses from all classes of pesticides. Consensus case definitions for specific classes of chemicals may be developed in the future.

A case will be classified as occupational if exposure occurs while at work (this includes: working for compensation; working in a family business, including a family farm; working for pay at home; and, working as a volunteer Emergency Medical Technician (EMT), firefighter, or law enforcement officer). All other cases will be classified as non-occupational. All cases involving suicide or attempted suicide should be classified as non-occupational.

A case is reportable to the national surveillance system when there is (see the Classification Criteria section for a more detailed description of these criteria):

- Documentation of new adverse health effects that are temporally-related to a documented pesticide exposure; AND
- Consistent evidence of a causal relationship between the pesticide and the health effects based on the known toxicology of the pesticide from commonly available toxicology texts, government publications, information supplied by the manufacturer, or two or more case series or positive epidemiologic investigations; OR
- Insufficient toxicologic information available to determine whether a causal relationship exists between the pesticide exposure and the health effects

### Laboratory criteria for diagnosis

If available, the following laboratory data can confirm exposure to a pesticide:

- Biological tests for the presence of, or toxic response to, the pesticide and/or its metabolite (in blood, urine, etc.);
  - Measurement of the pesticide and/or its metabolite(s) in the biological specimen
  - Measurement of a biochemical response to the pesticide in a biological specimen (e.g. cholinesterase levels)
- Environmental tests for the pesticide (e.g. foliage residue, analysis of suspect liquid);
- Pesticide detection on clothing or equipment used by the case subject.

### Classification Criteria

Reports received and investigated by state programs are scored on the three criteria provided below (criteria A, B and C). Scores are either 1, 2, 3, or 4, and are assigned based on all available evidence. The classification matrix follows the criteria section (Table 1). The matrix provides the case classification categories and the criteria scores needed to place the case into a specific category. Definite, probable, possible and suspicious cases (see the classification matrix) are reportable to the national surveillance system. Additional classification categories are provided for states that choose to track reports that do not fit the criteria for national reporting. (Appendix 1 contains frequently asked questions (FAQs) that provide additional clarification on the classification criteria and use of the classification matrix. Appendix 2 lists the characteristic signs and symptoms for several pesticide active ingredients and classes of pesticides.)

#### A. Documentation of Pesticide Exposure

1. Laboratory, clinical or environmental evidence corroborate exposure (*at least one of the following must be satisfied to receive a score of A1*):

- a. analytical results from foliage residue, clothing residue, air, soil, water or biologic samples;
- b. observation of residue and/or contamination (including damage to plant material from herbicides) by a trained professional  
[Note: a trained professional may be a plant pathologist, agricultural inspector, agricultural extension agent, industrial hygienist or any other licensed or academically trained specialist with expertise in plant pathology and/or environmental effects of pesticides. A licensed pesticide applicator not directly involved with the application may also be considered a trained professional.];
- c. biologic evidence of exposure (e.g. response to administration of an antidote such as 2-PAM, Vitamin K1, Vitamin E oil preparation, or repeated doses of atropine);
- d. documentation by a licensed health care professional of a characteristic eye injury or dermatologic effects at the site of direct exposure to a pesticide product known to produce such effects (these findings must be sufficient to satisfy criteria B.1 under documentation of adverse health effect);
- e. clinical description by a licensed health care professional of two or more post-exposure health effects (at least one of which is a sign) characteristic for the pesticide as provided in Appendix 2.

2. Evidence of exposure based solely upon written or verbal report (*at least one of the following must be satisfied to receive a score of A2*):
  - a. report by case;
  - b. report by witness;
  - c. written records of application;
  - d. observation of residue and/or contamination (including damage to plant material from herbicides) by other than a trained professional;
  - e. other evidence suggesting that an exposure occurred.
3. Strong evidence that no pesticide exposure occurred.
4. Insufficient data.

## B. Documentation of Adverse Health Effect

1. Two or more new post-exposure abnormal signs and/or test/laboratory findings reported by a licensed health care professional.
2. At least one of the following must be satisfied to receive a score of B2:
  - a. Two or more new post-exposure abnormal symptoms were reported. When new post-exposure signs and test/laboratory findings are insufficient to satisfy a B1 score, they can be used in lieu of symptoms toward satisfying a B2 score.
  - b. Any new illness or exacerbation of pre-existing illness diagnosed by a licensed physician, but information on signs, symptoms and/or test findings are not available or insufficient for a B1 or B2a score.
3. No new post-exposure abnormal signs, symptoms, or test/laboratory findings were reported.
4. Insufficient data (includes having only one new post-exposure abnormal sign, symptom, or test/laboratory finding).

## C. Evidence Supporting a Causal Relationship Between Pesticide Exposure and Health Effects

1. Where the findings documented under the Health Effects criteria (criteria B) are:
  - a. characteristic for the pesticide as provided in Appendix 2, and the temporal relationship between exposure and health effects is plausible (the pesticide refers to the one classified under criteria A), and/or;
  - b. consistent with an exposure-health effect relationship based upon the known toxicology (i.e. exposure dose, symptoms and temporal relationship) of the putative agent (i.e. the agent classified under criteria A) from commonly available toxicology texts, government publications, information supplied by the manufacturer, or two or more case series or positive epidemiologic studies published in the peer-reviewed literature;
2. Evidence of exposure-health effect relationship is not present. This may be because the exposure dose was insufficient to produce the observed health effects. Alternatively, a temporal relationship does not exist (i.e. health effects preceded the exposure, or occurred too long after exposure). Finally, it may be because the constellation of health effects are not consistent based upon the known toxicology of the putative agent from information in commonly available toxicology texts, government publications, information supplied by the manufacturer, or the peer-reviewed literature;

3. Definite evidence of non-pesticide causal agent;

4. Insufficient toxicologic information is available to determine causal relationship between exposure and health effects. (This includes circumstances where minimal human health effects data is available, or where there are less than two published case series or positive epidemiologic studies.)

## APPENDIX E. NIOSH ACUTE PESTICIDE POISONING SEVERITY CLASSIFICATION

Sample document from NIOSH's Guidelines for Building a State-based Pesticide Surveillance Program (2007).

### **Severity Index for Use in State-based Surveillance of Acute Pesticide-Related Illness and Injury**

**Purpose:** The purpose of the severity index is to provide simple, standardized criteria for assigning severity to cases of acute pesticide-related illness and injury.

**Rationale:** It is important to assign a severity category to each case of acute pesticide-related illness and injury. An understanding of illness severity will be useful for evaluating the morbidity of acute pesticide-related illness and injury, for assessing its impact on society, and to assist the targeting of limited intervention/prevention resources toward the most pressing pesticide problems.

**Description:** This severity index is based upon existing systems for ranking severity of poisonings, including pesticide illness. 1,2,3,4 It takes into account the following: signs and symptoms; whether medical care was sought; whether the individual was hospitalized; and, whether there was lost time from work or usual activities. Severity should only be assigned to acute pesticide-related illnesses or injuries classified as definite, probable, possible, or suspicious. As such, this severity index should be used in conjunction with the Case Definition for Acute Pesticide-Related Illness and Injury Cases Reportable to the National Public Health Surveillance System<sup>5</sup>.

The *Figure* is the flow diagram that should be used as a guide for assigning severity. The *Figure* often refers to the *Table*. The *Table* is a listing of signs and symptoms that correspond to the different severity categories. Many of the signs and symptoms in the *Table* are included in the Standardized Variables for Pesticide Poisoning Surveillance<sup>6</sup>. When using the *Table*, only signs and symptoms related to the pertinent acute pesticide-related illness or injury should be considered (i.e. only consider those signs and symptoms used to classify the acute pesticide-related illness and injury as definite, probable, possible, or suspicious).

The list of signs and symptoms provided in the *Table* is not comprehensive, but instead provides examples to assist in assessing severity. In addition, a given health effect may appear in more than one of the *Table's* severity columns. In such instances, the health effect observed as a sign (i.e. a health effect observed and described by a licensed health care professional) will be considered as having greater severity compared to the health effect reported as a symptom (i.e. a health effect perceived and reported by the patient but not observed by a licensed health care professional).

This severity index provides standardized criteria to ensure inter-rater uniformity in assigning severity. However, we recognize that this severity index cannot address all conceivable clinical situations. Therefore, it is not realistic to insist on strict adherence to these criteria. The user must be flexible when using this severity index, given that the user will not infrequently need to employ judgement and experience when assigning severity.

A brief description of each of the four severity categories follows

## S-1 Death

This category describes a human fatality resulting from exposure to one or more pesticides.

## S-2 High severity illness or injury

The illness or injury is severe enough to be considered life threatening and typically requires treatment. This level of effect commonly involves hospitalization to prevent death. Signs and symptoms include, but are not limited to, coma, cardiac arrest, renal failure and/or respiratory depression. The individual sustains substantial loss of time (> 5 days) from regular work (this can include assignment to limited/light work duties) or normal activities (if not employed). This level of severity might include the need for continued health care following the exposure event, prolonged time off of work, and limitations or modification of work or normal activities. The individual may sustain permanent functional impairment.

## S-3 Moderate severity illness or injury

This category includes cases of less severe illness or injury often involving systemic manifestations. Generally, treatment was provided. The individual is able to return to normal functioning without any residual disability. Usually, less time is lost from work or normal activities ( $\geq$  3-5 days), compared to those with severe illness or injury. No residual impairment is present (although effects may be persistent).

## S-4 Low severity illness or injury

This is the category of lowest severity. It is often manifested by skin, eye or upper respiratory irritation. It may also include fever, headache, fatigue or dizziness. Typically the illness or injury resolves without treatment. There is minimal lost time (<3 days) from work or normal activities.

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1 AAPCC, 1992. Toxic Exposure Surveillance System (TESS) Manual. American Association of Poison Control Centers, Washington, D.C.

2 Washington Department of Health, 1999. 1998 Annual Report, Pesticide Incident Reporting and Tracking Review Panel. Washington State Department of Health, Office of Environmental Health and Safety, Olympia, WA.

3 EPA, 1998. Expanded Explanation for the new FIFRA 6(a)(2)'159.814 (5)(i)(A-E) and (5)(ii)(A-E) Exposure Severity Categories.

4 Persson HE, Sjoberg GK, Haines JA, de Garbino JP. 1998. Poisoning severity score. Grading of acute poisoning. Clin Toxicol 36:205-213.

5 NIOSH, 2000. Case definition for acute pesticide-related illness and injury cases reportable to the national public health surveillance system. Cincinnati, OH: National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention. 2000. Unpublished.

6 NIOSH, 2000. Standardized variables for state surveillance of pesticide-related illness and injury. Cincinnati, OH: Cincinnati, OH: National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention. 2000. Unpublished.



## APPENDIX F. ACUTE PESTICIDE POISONING CLASSIFICATION FORM

Person ID: \_\_\_\_\_ Event ID: \_\_\_\_\_ Exposure ID: \_\_\_\_\_

Classified by: \_\_\_\_\_ Date: \_\_\_\_\_ Source(s) referenced: \_\_\_\_\_

### Certainty Classification

\_\_\_ A. Documentation of Exposure

1. Confirmed by: (a) positive enviro. samp (b) residue/damage profess. observed  
(c) clinical expo evidence (d) injury at contact site  
(e) 2+ findings (at least 1 is a sign) by med. staff
2. Reported by: (a) case (b) witness  
(c) written application records.  
(d) residue/damage non-profess. Observed (e) other evidence
3. Strong evidence of no exposure
4. Insufficient data (e.g. unknown chemical, type/date of exposure and effects, etc.)

\_\_\_ B. Documentation of Health Effects

1. 2+ signs and/or lab findings by medical staff
2. 2+ abnormal systemic symptoms or 1 ocular symptom or 1 dermatological symptom
3. No post exposure findings
4. Insufficient data

\_\_\_ C Evaluation of Causal Relationship

- 1a. Characteristic by Appendix 2
- 1b. Consistent with literature
2. Inconsistent cause effect
3. Cause/effect ruled out
4. Insufficient data [or unknown symptom times]

Classification Results	Outcome
A = 1      B = 1      C = 1	Definite (1)
A = 1      B = 2      C = 1 A = 2      B = 1      C = 1	Probable (2)
A = 2      B = 2      C = 1	Possible (3)
A = 1      B = 1 <b>C = 4</b> A = 1      B = 2 <b>C = 4</b> A = 2      B = 1 <b>C = 4</b> A = 2      B = 2 <b>C = 4</b>	Suspicious (4)
A = 1      B = 1 <b>C = 2</b> A = 1      B = 2 <b>C = 2</b> A = 2      B = 1 <b>C = 2</b> A = 2      B = 2 <b>C = 2</b>	Unlikely (5)
<b>A = 4</b> B = X      C = X A = X <b>B = 4</b> C = X	Insufficient Information (6)
A = X <b>B = 3</b> C = X	Exposed/Asymptomatic (7)
<b>A = 3</b> B = X      C = X A = X      B = X <b>C = 3</b>	Unrelated (8)

NIOSH Classification: \_\_\_\_\_ Alternate Classification: \_\_\_\_\_

Comments/Justifications:

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**Severity Classification:**

(Classify severity only for Definite, Probable, Possible, and Suspicious cases)

\_\_\_ 1 Fatal    \_\_\_ 2 High    \_\_\_ 3 Moderate    \_\_\_ 4 Low    \_\_\_ 8 Evaluated, not applicable