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# Health Effects of Acute and Chronic Chlorpyrifos Exposure

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ENVIRONMENTAL PUBLIC HEALTH  
Public Health Division

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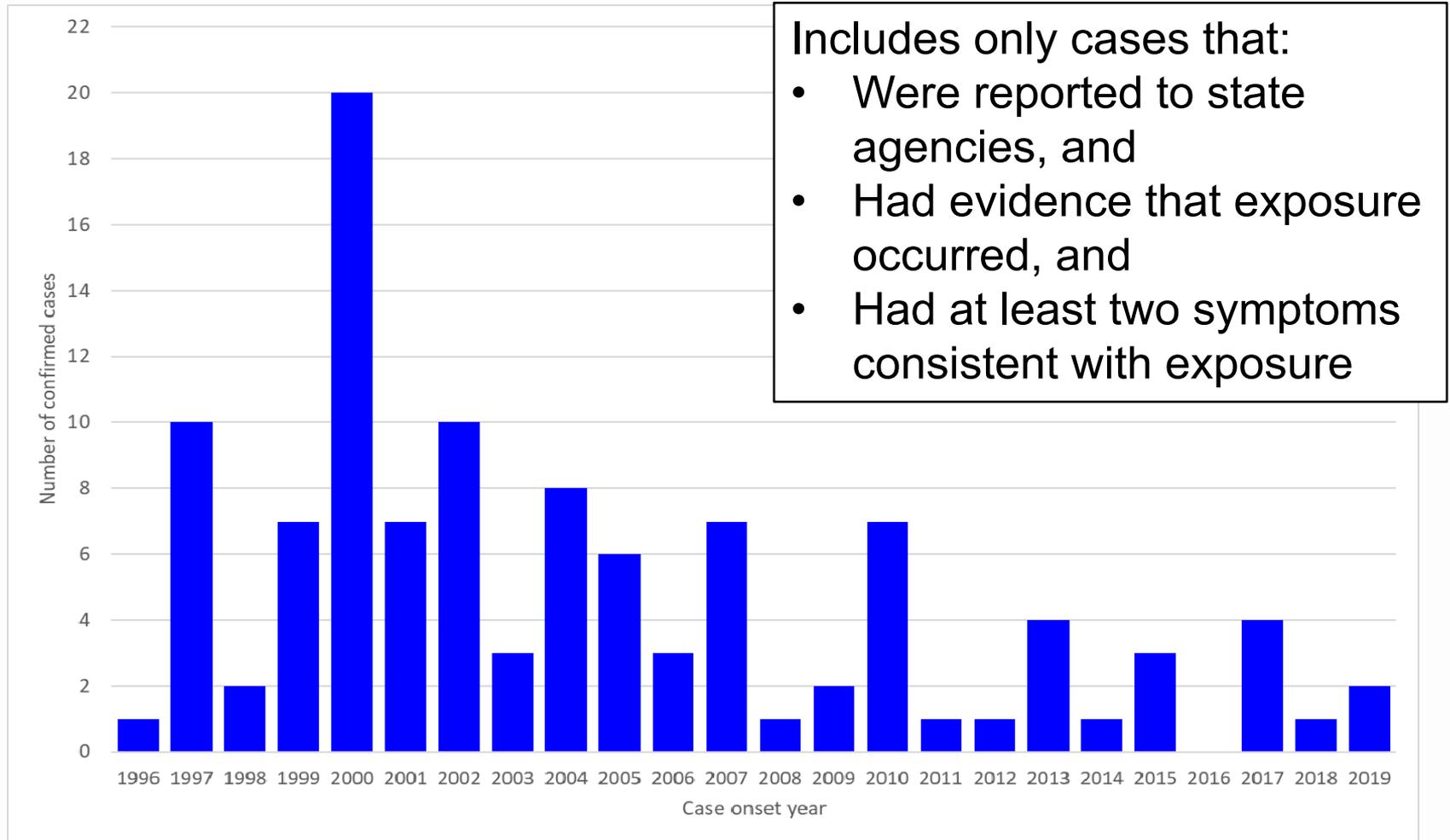
# Overview

- Health effects of acute exposure
- Acute exposures in Oregon
- Health effects of chronic exposure
- How we know what we know

# Health Effects of Acute Exposure to Chlorpyrifos

- Headaches
- Blurred vision, watering of the eyes,
- Excessive salivation
- Runny nose
- Dizziness
- Confusion
- Muscle weakness or tremors
- Nausea and diarrhea
- Sudden changes of heart rate
- Severe sweating
- Loss of bowel control
- Seizures
- Loss of consciousness
- Death

# Confirmed Acute Exposures in Oregon



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# Health Effects of Chronic Exposure to Chlorpyrifos - Adults

- Loss of peripheral nerve function (organophosphates)
- Poorer performance on neurological function tests (specific to chlorpyrifos) - termite pesticide applicators
- Headache, fatigue, insomnia, tension, irritability, dizziness, depression and numbness in the hands and feet (organophosphates) – Farm workers
- Exacerbation of asthma (Chlorpyrifos) – farm workers

# Health Effects of Prenatal Exposure to Chlorpyrifos - Children

- Mental delay
- Psychomotor delay
- Attention disorders
- ADHD
- Pervasive developmental disorders

# How We Know What We Know

- Observed neurodevelopmental effects in:
  - Epidemiological studies in exposed humans
  - Animal studies

# Human studies

- EPA's 2016 Risk Assessment
  - Comprehensive literature review
  - 3 high quality epidemiological studies
  - 7 supporting epidemiological studies

# 3 Epidemiological Studies Are High Quality Because:

- Prospective cohort studies
- Biomarkers of exposure as well as exposure history
- Consistency in findings across different populations using similar standardized exposure and outcome measures
- Strength of the associations found
- Objective measures of exposure and standardized, validated measures of outcomes

## 3 Epidemiological Studies Are High Quality Because: (Continued)

- Control for multiple confounding variables
- Dose-response effect (i.e. higher dose = stronger effect)
- Minimized chance for bias in assessing outcomes (people testing outcomes didn't know exposure history)
- Attempts to assess genetic pre-dispositions to effects

# Animal studies

- California EPA's 2018 Risk Assessment
  - 5 animal studies showing neurodevelopmental toxicity relevant to findings in human epi studies

# EPA 2016 Risk Assessment Findings

- Current regulations and label restrictions are not adequately protective of public health
  - All occupational/applicator scenarios showed unacceptable risk even using maximum personal protective equipment requirements on the label
  - Occupational re-entry intervals were mostly at least 18 days to avoid unacceptable risk
  - All spray application scenarios showed that even a 300 foot buffer posed unacceptable risk due to drift
  - Existing food tolerances showed unacceptable risk for all populations analyzed with 1-2 year old children having the highest risk.
  - Golfers exposure scenarios showed unacceptable risk

# California EPA 2018 Risk Assessment Findings

- Current regulations and label restrictions related to foliar applications are not adequately protective of public health (Did not evaluate non-spray applications to soil)
  - Spray application showed unacceptable risk due to drift for any exposed population closer than ¼ mile downwind of application area.
  - Dietary and drinking water scenarios showed unacceptable risk for sensitive populations
  - Combined spray drift and dietary/drinking water scenarios all showed unacceptable risk.

# Overall Summary

Existing regulations and label instructions may not be adequately protective of the neurodevelopmental health effects observed in epidemiological and animal studies.