

# The SENSOR-Pesticides Program

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**Methodologies to identify work-related diseases –  
Review on sentinel and alert systems: Seminar to  
discuss the current approaches**

**European Agency for Safety and Health at Work**

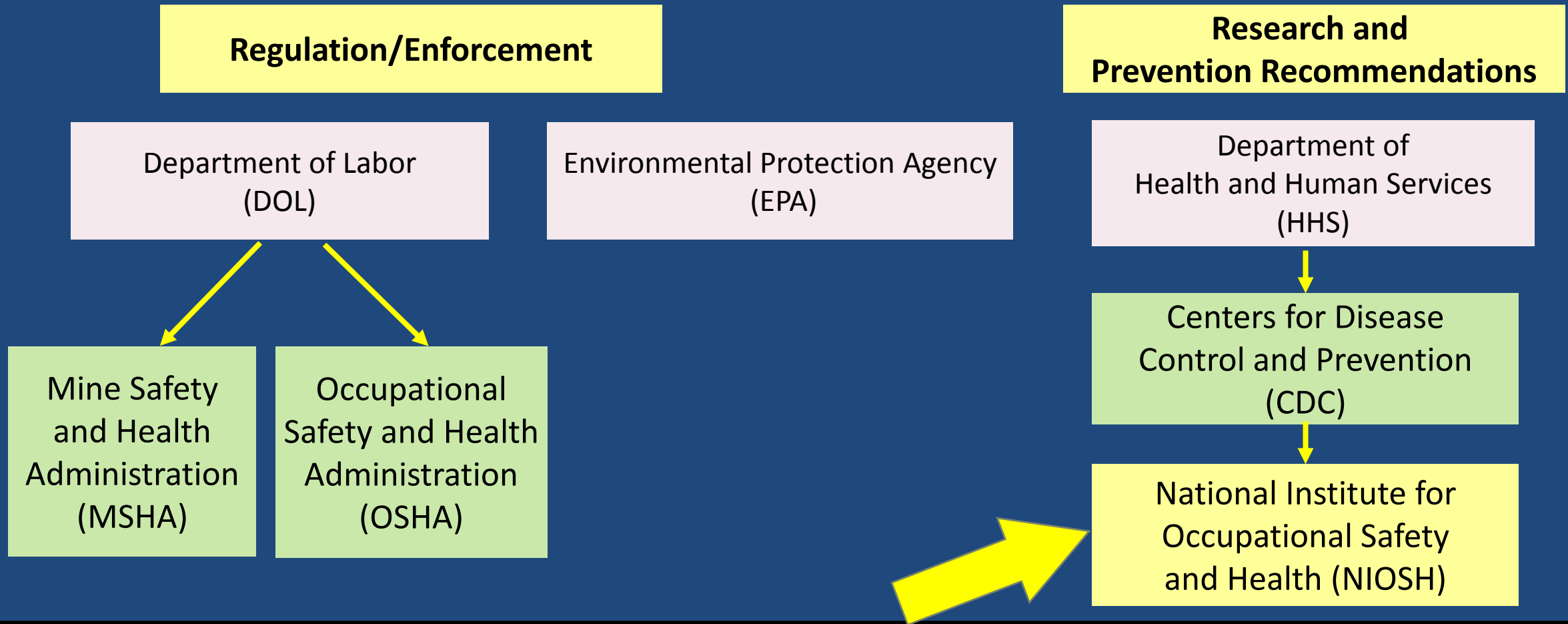
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The findings and conclusions in this presentation have not been formally disseminated by the National Institute for Occupational Safety and Health and should not be construed to represent any agency determination or policy.

# Outline

- 1) Introduction (pesticides and surveillance)
- 2) SENSOR-Pesticides program
- 3) Uses and impact of SENSOR-Pesticides program
- 4) Conclusion

# Occupational safety and health framework in the USA



# Surveillance

The ongoing collection,  
analysis,  
interpretation, and  
dissemination of data to  
prevent and control disease.

Thacker and Berkelman, 1988

# Why conduct pesticide poisoning surveillance?

- Ongoing concern about pesticide toxicity
  - >16,000 pesticide products/~600 active ingredients
  - Approx. 2.1 billion pounds (952,543,977 Kg) used annually in US
- Pre-market testing of pesticides isn't comprehensive
- Useful for identifying emerging pesticide hazards

# Surveillance systems for acute pesticide-related illness in the U.S.A.

- State-based surveillance systems
  - **SENSOR-Pesticides**
    - California Department of Pesticide Regulation
- Other systems used by US EPA
  - National Poison Data System
  - Data submitted under FIFRA Section 6(a)(2)

# SENSOR

## Sentinel Event Notification System for Occupational Risk

- "Sentinel" case identification and follow-up
- State-based surveillance program
- Provides timely opportunities for prevention and intervention
- Develop state-based models for national implementation

# SENSOR-Pesticides program is 30 years old: 1987 - 2017!





# SENSOR-Pesticides Program

- The SENSOR-Pesticides program began in 1987
- Mission: To build and maintain occupational illness & injury surveillance capacity within state health departments
- “Sentinel” case identification and follow-up
- Funding provided by NIOSH and EPA



# States Participating in SENSOR-Pesticides

<u>1988-1997</u>	<u>1998-2000</u>	<u>2001-2006</u>	<u>2007-2010</u>	<u>2011-2012</u>	<u>2013-2016</u>	<u>2017</u>
California (88-92)	Arizona*	Arizona*	Arizona*	California	California	California
New York (93-97)	California	California	California	Florida	Florida	Florida*
Oregon	Florida	Florida*	Florida*	Louisiana	Louisiana	Louisiana*
Texas	Louisiana*	Louisiana*	Louisiana*	Iowa	Iowa*	Illinois
	New York	Michigan	Iowa	Michigan	Michigan	Iowa*
	Oregon	New York	Michigan	New Mexico*	Nebraska*	Michigan
	Texas	Oregon	New Mexico*	New York	New Mexico*	Nebraska*
		Texas	North Carolina	North Carolina	New York	New Mexico*
		Washington	Oregon*	Oregon*	North Carolina	New York*
			N. Carolina*	Texas*	Oregon*	North Carolina*
			Oregon*	Washington	Texas*	Oregon*
			Texas*		Washington	Texas
			Washington			Washington

\*= receives no federal support

# SENSOR-Pesticides Program Case Definition

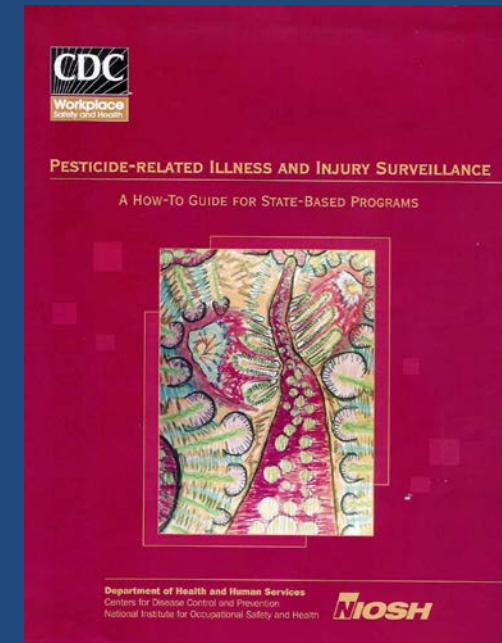
- Consists of three parts:
  - Determination of pesticide exposure
  - Determination of health effects
  - Evidence of causal relationship between pesticide exposure and observed health effects
- Case classification category based on strength of exposure and health effects information
  - Definite
  - Probable
  - Possible
  - Suspicious
  - Not a case

# Standardized variables

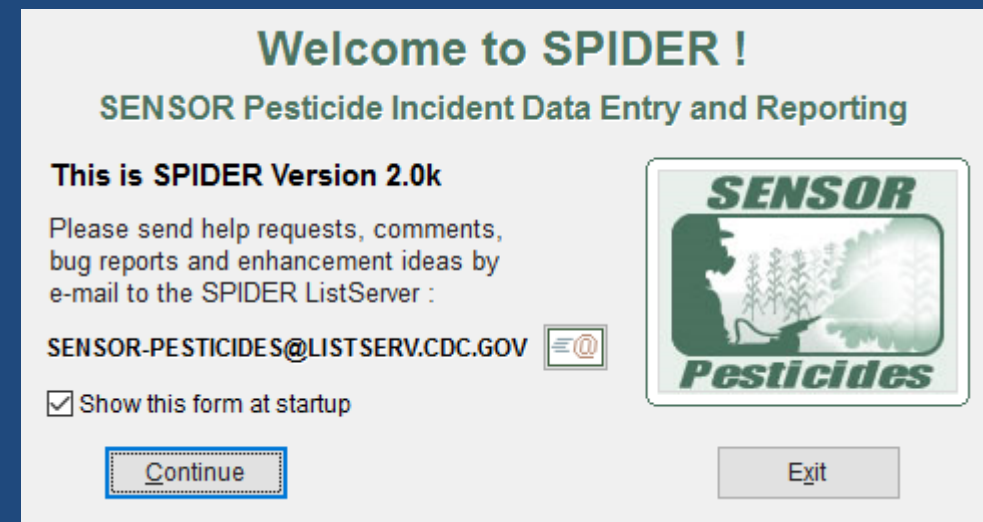
Standardized variables for state surveillance of pesticide-related illness and injury

- Pesticide product information (EPA registration number, name, active ingredients, ...)
- Health effects and severity index
  - Flow diagram for assigning severity to cases
  - Table of signs and symptoms by severity category
- Industry, occupation, exposure source
- **Root causes of pesticide poisonings**

**How-to guide** for pesticide poisoning surveillance (2005). For developing and maintaining a state-based occupational / environmental surveillance program.



**SPIDER** (SENSOR-Pesticides Incident Data Entry and Reporting). Software for incident data entry and reporting.



# Sources of Cases

- Poison control centers (PCC) and the National Poison Data System (NDPS)
- State department of agriculture
- Workers' compensation
- Other: Physician and other health care professional reports, hospital discharge, lab reports (cholinesterase test), death certificates.

# Current uses of PCC data and the National Poison Data System (NPDS)

- PCCs are an important source of case reports, especially for nonoccupational pesticide poisonings
- All SENSOR-Pesticides states have strong collaborations with PCCs
- NIOSH uses NPDS data to track acute work-related pesticide poisonings
- Some NPDS limitations: high financial cost and lack of some important variables (industry and occupation of case, EPA registration number, and root cause )

# Workers' Compensation (WC)

- Can be a valuable source of information about occupational pesticide poisoning cases
- Form of insurance. Premiums covered by employers
- WC Laws exist in all states, details differ from state to state
- Submitted claims for:
  - medical-only (reimbursement of medical expenses only) and
  - Lost time cases (reimbursement for medical expenses and to recover lost wages)



# Uses and impacts of the SENSOR-Pesticides program



# Uses of SENSOR-Pesticides data for Surveillance

- Estimate magnitude and trend of problem
- Determine geographic distribution of poisonings
- Detect emerging problems
- Generate hypotheses, stimulate research
- Evaluate control measures
- Facilitate planning
- **Inform policy change** (examples in next slides)

# Worker Protection Standard

- Intent is to protect agricultural workers from pesticides
- Amendment to FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act)
- Worker Protection Standard, 2015 revision
  - First major WPS revision since 1992
  - Revision proposed in March 2014
  - Finalized in November 2015
  - Compliance with most items required by Jan 2, 2017
  - Revisions include:
    - Annual training of farmworkers, requirements for respirator use, age restrictions for pesticide handlers, establish buffer zones, enhanced record-keeping and notification requirements
  - Inspector General plans review of the standard.

# SENSOR-Pesticides and the Worker Protection Standard

- EPA used several SENSOR-Pesticides studies to justify the WPS-2014 revisions
  - Calvert et al. Acute pesticide-related illnesses among working youths, 1988-1999. *Am J Public Health* 2003; 93:605-610.
  - Calvert et al. Case report: Three farmworkers who gave birth to infants with birth defects... *Environ Health Perspect* 2007; 115:787-791.
  - Calvert et al. Acute pesticide poisoning among agricultural workers in the US. *Am J Ind Med* 2008; 51:883-898.
  - Lee et al. Acute pesticide illnesses associated with off-target pesticide drift from agricultural applications. *Environ Health Perspect* 2011; 119:1162-1169.

# Certification of Pesticide Applicators Rule

- Intent is protect workers who apply the riskiest pesticides (i.e. restricted use pesticides)
  - Ensure standards adequately protect applicators, the public, and the environment
- Amendment to FIFRA
  - Revision proposed in August 2015
  - First major WPS revision since 1974
  - Finalized in December 2016 (but frozen on Jan 26, 2017)
- Revisions include:
  - improve the competency of certified RUP applicators, increase protection for noncertified RUP applicators operating under supervision of a certified applicator through enhanced training and standards for supervision of noncertified applicators, and establish a minimum age requirement for applicators

# SENSOR-Pesticides and Certification of Pesticide Applicators Rule

- EPA used several SENSOR-Pesticides studies to justify the 2016 revisions
  - ~120 cases from SENSOR-Pesticides states in 2009-2010 that involved RUP exposure
    - Used to calculate value of incidents avoided, based on illness severity
  - Lee et al. Acute pesticide illnesses associated with off-target pesticide drift from agricultural applications. *Environ Health Perspect* 2011; 119:1162-1169.
  - Calvert et al. Acute pesticide-related illnesses among working youths, 1988-1999. *Am J Public Health* 2003; 93:605-610.
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# Recent EPA Actions: Paraquat

- Announced in March 2016
- Finalized in December 2016
  - Intent is to protect workers
- Actions include:
  - Label changes
  - Closed system for mixing and loading application equipment
  - Enhanced training for certified applicators
  - Only certified applicators can apply
- SENSOR data used to support these actions



# Other important impacts by SENSOR-Pesticides (before 2015)

- After we published an article in The JAMA, at least five states passed laws requiring schools to control pests using methods with the least possible health hazards
- SENSOR-Pesticides findings have led to label changes for many pesticide products to enhance clarity and improve safety
- SENSOR-Pesticides findings have led to passage of state laws in CA, FL and NC to provide greater protection from pesticide hazards
- USDA adopted our recommendations to prevent Medfly infestations



# CONCLUSION

## The SENSOR-Pesticides is an important program

- Addresses widespread concern about pesticides
- Has been productive and has made many meaningful contributions
- Builds on CDC's long history of collaboration with state departments of health
- “Best” national surveillance system for acute occupational pesticide poisoning