# Pyrethroid Exposure Survey and Testing (PEST) Study


WASHINGTON Environmental Biomonitoring SURVEY

# Objectives

## Main Objectives:

- To measure urinary pyrethroid metabolite levels in a high risk population
- Investigate how work practices affect pyrethroid exposures

## Secondary Objective:

- Determine whether urine testing can be a practical screening tool for pyrethroid exposures

# Uses of Data

- Compare findings to state and national levels
  - NHANES
  - Washington State general population data collected in 2010-2011
- Use findings to develop new materials for pesticide safety continuing education classes
  - In partnership with Washington State University - Cooperative Extension

# Population

## Pest Management Professionals

- Licensed by WSDA
- 5 urban counties
- Residential and commercial pest control
- >90% male, mostly white, English speaking
- Mostly small employers (93% ≤20 applicators)

# Pyrethroid Pesticides


- Common insecticides: ants, fleas, spiders, lice, cockroaches.
- Permethrin, phenothrin, cypermethrin, cyfluthrin, bifenthrin, cyhalothrin, deltamethrin

# Pyrethroid biomarkers in urine.

Common metabolites

Rapid excretion in urine

| | | CDC Panel | | | | Schettgen lab | |
|---|---|---|---|---|---|---|---|
| **Parent pyrethroid** | **Reported use (days)** | **3-PBA** | **4F-3-PBA** | **cis/trans DCCA** | **DBCA (cis Br2CA)** | **TFP acid** | **2-MPA** |
| bifenthrin | 118 | | | | | X | X |
| cyfluthrins | 89 | | X | X | | | |
| deltamethrin | 39 | X | | | X | | |
| cyhalothrin | 31 | X | | | | X | |
| permethrin | 24 | X | | X | | | |
| phenothrin | 5 | X | | | | | |
| cypermethrins | 4 | X | | X | | | |
| fenvalerate | 4 | X | | | | | |
| tetramethrin | 4 | | | | | | |

# Outreach to Industry

- Critical
- Developed and worked with advisory committee of industry leaders
- Washington State Pest Management Association (WSPMA)
  - Attended meetings
  - WSPMA newsletters
- Mailed information to companies that were not WSPMA members
- We received reluctant support among WSPMA leadership– study viewed as first step in restricting pyrethroid use

THE PEST INTELLIGENCER

The Newsletter of the Washington State Pest Management Association

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NOW! Read The Newsletter Online at WWW.WSPCA.ORG

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Auction night and the formal banquet of the Pacific Northwest Pest Management Conference. Sharing this table are Willard's Pest Control, Fly Bye Bird Control Products, Weaver Exterminating Service & Eden Advanced Pest Technologies/Spokane. The house was packed. The food was fantastic. The auction was lively. More conference pictures on pages 4 & 5.

PRESIDENT'S REPORT
STEVE ROGERS

We have made it through one of the coldest and wettest starts to spring that we have had in a very long time. As I sit here writing to you, finally seeing some sunshine through my office window, I find myself wondering what happened to that global warming thing? I remember being told that the climate was going to change and the temperatures were going to start rising… well, maybe next year.

I wanted to bring you all up to speed on a very important item that the board has been approached with. For those of you that were not at the Hood River meeting last month I will recap: Carrie Foss from WSU in Puyallup asked to address the members at this meeting. She asked the members to support and to take part in a study that was being done by the Department of Health and paid for by Center for Disease Control on Pyrethroid exposure. She explained that the DOH was looking for volunteers for bio-monitoring and urine collection to determine levels of Pyrethroid exposure in the field. Needless to say, the conversation in the room was not the most pleasant.

The basic concern of the room was that this would be the first step in banning the product. It was explained that they are looking for more data to insure the safety of owners and employees that use the product in the field. Some of the questions asked to Carrie were, " Is there a problem now with the product?"..."What will happen with the information in the future?"..Could it be used by L&I or even the Toxic Coalition?" Because of the reaction from the room, there was no resolve at the meeting.

Shortly thereafter I received an email from Barbara Morrissey, with the Washington State Department of Health, asking for a conference call to explain a little bit more about the study. She felt the outline of the study needs to be explained again because of the reception that Carrie received from the members at the Hood River meeting. The Board agreed and Tim Baker and I were on the call. During the call, Barbara explained that this study is a five year study and they are now in the second year.

(continued on page 2)

# Study Recruitment

- Obtained home address from WA Dept. of Agriculture database in 5 target counties
- Mailed introductory letter/brochure
- Asked them to contact us to set up an appointment or to opt out (toll-free number, email or text)
- Field staff went to home address if licensee did not respond within about a week

**Results**

- Recruited 56 participants , May – October, 2012
- 185 observation days
- CASRO response rate: 21.2%

# PEST study Participants

| Variable | Group | WSDA licensed applicators in study area | PEST study participants |
|---|---|---|---|
| No. applicators | | 580 | 56 |
| Gender | Male | 89-94% | 95% |
| Age | 18-25 | 5% | 7% |
| | 26-35 | 30% | 34% |
| | 36-45 | 25% | 25% |
| | 46 and over | 40% | 34% |
| Years licensed | Less than 5 years | 39% | 23% |
| | 5-10 years | 26% | 34% |
| | More than 10 years | 35% | 43% |
| Company size | <5 licensed PCOs | 17% | 20% |
| | 5-15 licensed PCOs | 30% | 30% |
| | 15+ licensed PCOs | 51% | 50% |
| | Unknown | 2% | 0% |

# Participants asked to:

- Collect 3 urine samples on day they used pyrethroid at work
  1. right after work
  2. before bed
  3. 1st morning void
- Fill out work practices questionnaire for that day
- Keep samples  frozen until pickup
- Participate for up to 3 days (expanded to 6)

Compensation

- $25 Visa card for each day of participation

# Questionnaire

**12)** How often did you use the following **non-powered** equipment to apply pyrethroids today?

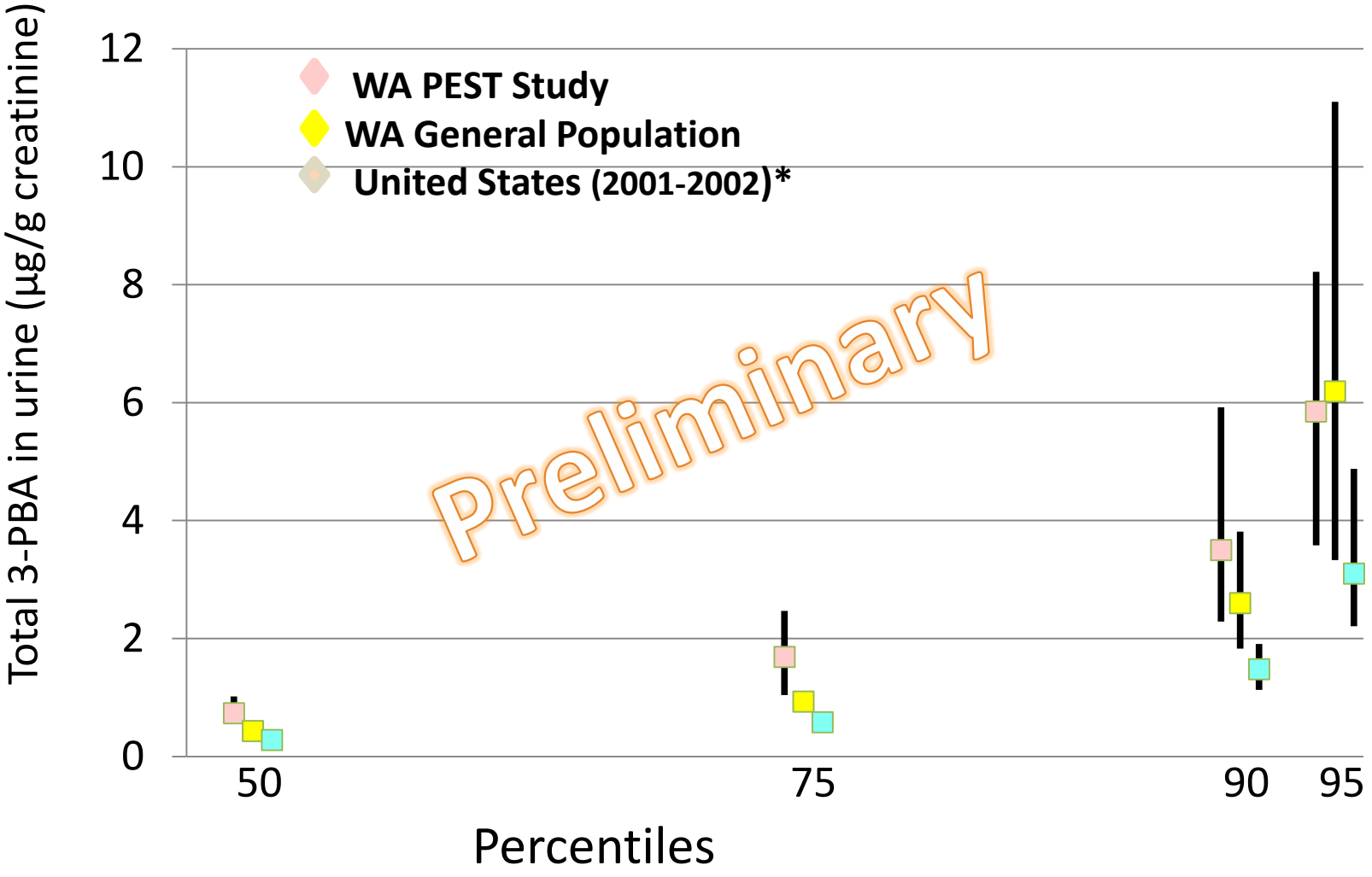
| | Examples |
|---|---|
| 1) Hand pump sprayer<br>1 Didn't use<br>2 Used for less than 30 minutes<br>3 Used for 30 minutes to 3 hours<br>4 Used for more than 3 hours | |
| 2) Hand duster<br>(bulb, bellows or plunger design)<br>1 Didn't use<br>2 Used for less than 30 minutes<br>3 Used for 30 minutes to 3 hours<br>4 Used for more than 3 hours | |
| 3) Foamer<br>(injects into wall voids)<br>1 Didn't use<br>2 Used for less than 30 minutes<br>3 Used for 30 minutes to 3 hours<br>4 Used for more than 3 hours | |
| 4) Aerosol can<br>(hand-held spraying)<br>1 Didn't use<br>2 Used for less than 30 minutes<br>3 Used for 30 minutes to 3 hours<br>4 Used for more than 3 hours | |

- Included questions about their pyrethroid use and work practices that day:
  - Application equipment
  - Time spent applying
  - Product names (check-list)
  - Personal protective equipment
  - Time spent in scenarios with potentially higher exposure

# Reporting Study Results

- Based on feedback from industry and uncertainty in interpreting urinary levels, we decided not to report individual results to participants
  - Final report of overall results will be mailed to participants in December 2013
- We plan to discuss preliminary results with industry – Early December

# 3-PBA concentration (µg/g creatinine) in urine




* 2001-02 NHANES Survey: CDC Fourth National Report on Human Exposure to Environmental Chemicals, 2009

# Acknowledgements


- Carrie Foss, WSU Extension, Puyallup
- Margaret Tucker - Washington State Dept. of Agriculture
- Industry Advisory Group members – 7 companies
- WSPMA
- Participants
- Field Team: Denise LaFlamme, Jan Naragon, Lena Seino, Katie Curl, Reed Sorensen and Jenny Whitten