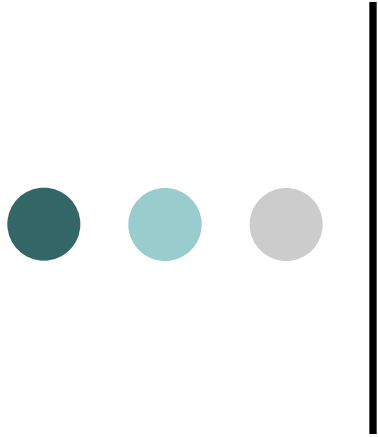


# Firefighter Occupational Exposures (FOX) Project

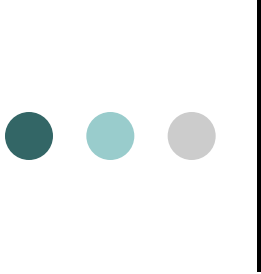


Rupali Das, MD, MPH  
California Department of Public Health  
Scientific Guidance Panel Meeting  
May 24, 2010  
Oakland, California



# Overview

- Current project status
- Project design
- Questionnaires and other materials
- Project timeline



# FOX Project - an exposure assessment pilot

## ○ Collaborators

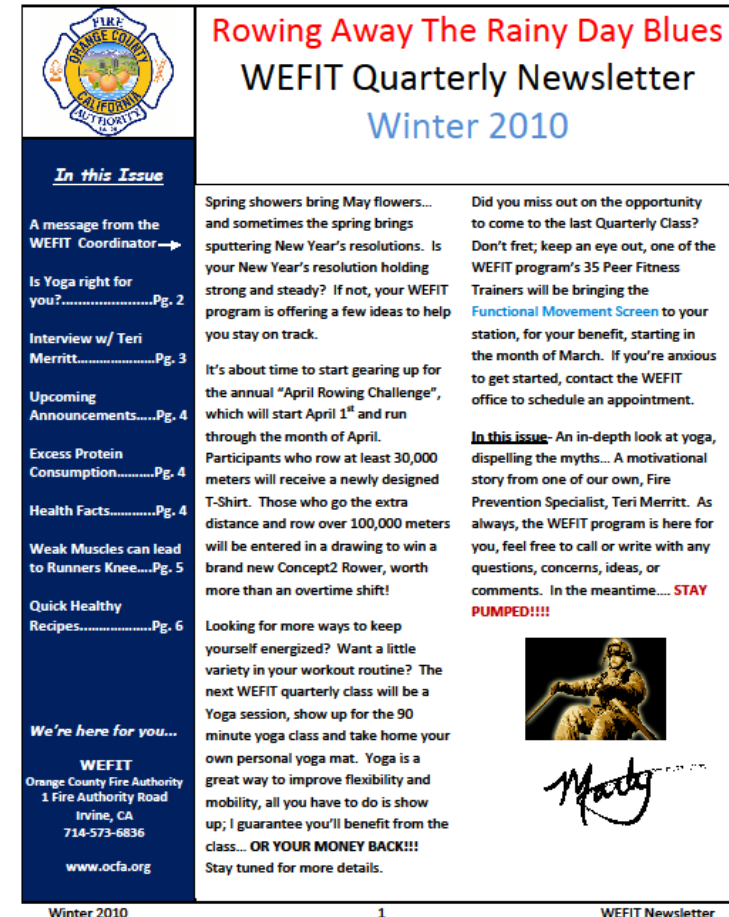
- Biomonitoring California (CECBP)
- UC Irvine, Center for Occupational and Environmental Health
  - Leslie Israel, DO, MPH
- Orange County Fire Authority (OCFA)
  - Wellness and Fitness (WEFIT) Program

## ○ Funding - \$75,000

- CDC Cooperative Agreement (Year 2)
- State special fund

# Wellness & Fitness (WEFIT) Program

- Components:
  - Wellness and Fitness Medical Evaluation\*
  - Peer fitness trainers
  - Rehabilitation
  - Health and Fitness education
- Oversight Committee
  - Labor-management collaboration
  - Letter of support
- Firefighter liaison: Marty Driscoll



\* Performed at UC Irvine



# Project Aims

- **Assess levels of ~40 chemicals in blood and urine collected from 50-100 firefighters in Orange County, California**
- **Measure a subset of these chemicals in dust from 3 Orange County fire stations**



## Project Aims (cont.)

- **Develop and test protocols/procedures applicable to a larger firefighter study**
  - Recruitment/enrollment
  - Exposure assessment questionnaire
  - Biospecimen collection/processing/shipping
  - Laboratory analyses
  - Report results to participants
  - Participant response to results
  - Lessons may apply to other occupational studies



# Chemicals of Interest

Analysis by Environmental Chemistry Lab/DTSC

- Brominated flame retardants (PBDEs, etc.)
- Newer brominated flame retardants (DBDPE, etc.)
- Perfluorinated chemicals (PFCs)
- Polychlorinated biphenyls (PCBs)
- Organochlorine pesticides (DDT, hexachlorocyclohexane, hexachlorobenzene, etc.)



# Chemicals of Interest

Analysis by Environmental Health Lab/CDPH

- Metals (Pb, Hg, Cd, As)
- Pesticide metabolites
  - Organophosphates (TCPy)
  - Pyrethroids (3-PBA)
- Polycyclic aromatic hydrocarbon (PAH) metabolite (3-Phen)





# Project Design Components and Funding Sources

- Focus group and individual interviews to evaluate project materials
- Recruitment/Informed consent/Enrollment
- Exposure questionnaire
- Biospecimen (blood and urine) collection, processing and shipping
- Biospecimen chemical analysis –  
Biomonitoring California labs

Green = CA special fund

Purple = CDC coop agreement

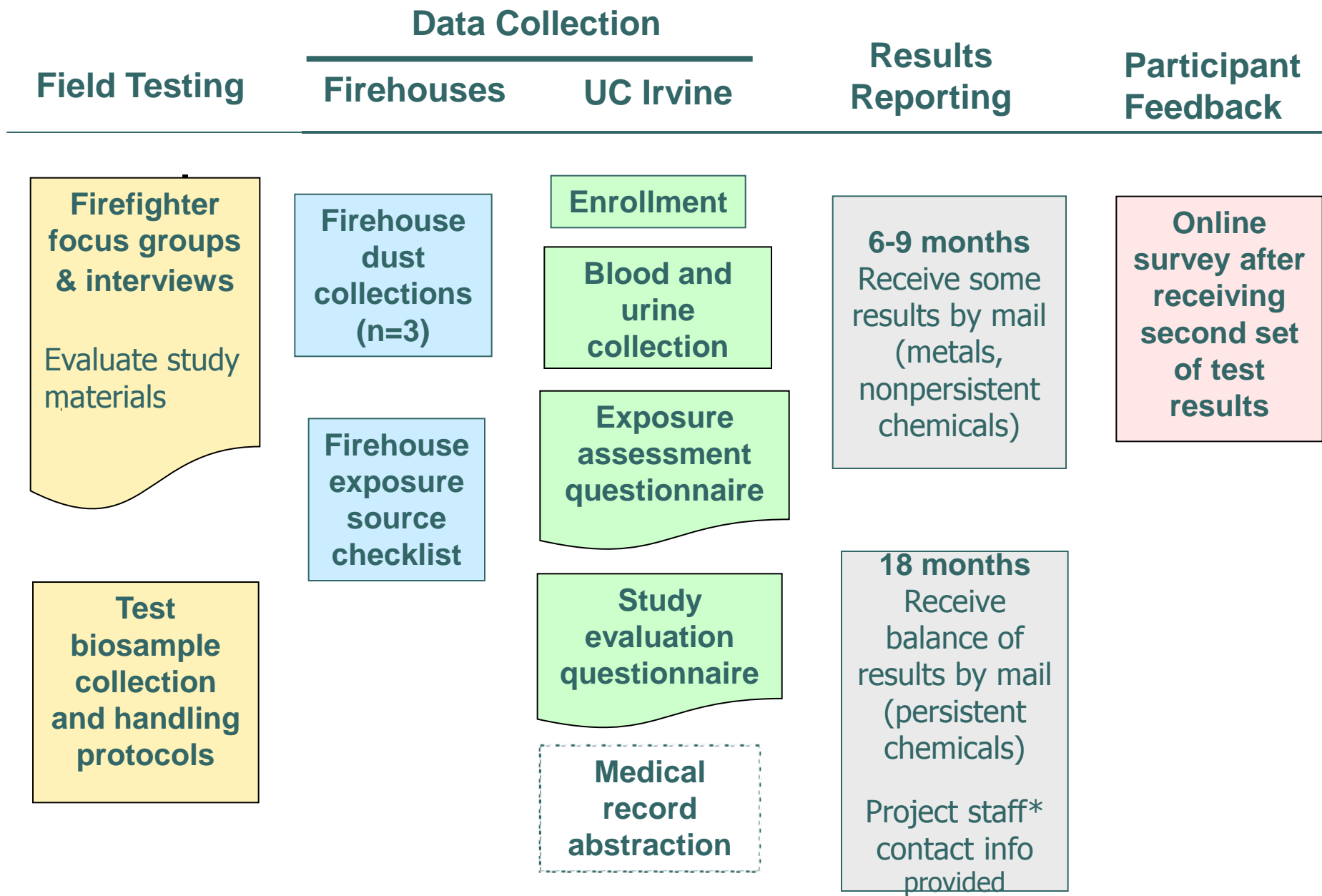


# Project Components (cont.)

- Fire station walk-through with checklist
- Fire station dust collection and analysis
- Data analyses /Report generation
- Results report-back
  - Online survey to assess understanding

Green = CA special fund

Red = In-kind support



# FOX Project Design



# Peer Evaluation of Project Materials

## Focus group discussions or interviews

- Firefighters from Orange County Fire Authority
  - May or may not subsequently become FOX biomonitoring participants
  - Timeline - June/July 2010
- Objectives:
  - Review document content and style
  - Evaluate comprehension of test results report-back materials



# Recruit/Consent/Enroll

- **Inclusion criteria**

- Firefighter employed by OCFA  $\geq 1$  year
- Scheduled for routine Wellness & Fitness (WEFIT) exam September through December 2010

- **Recruitment - flyer**

- Electronic reminder for WEFIT appointment
- Fire stations
- OCFA newsletter

- Participants consented & enrolled at beginning of WEFIT appointment



# **Project Design: Informed Consent**

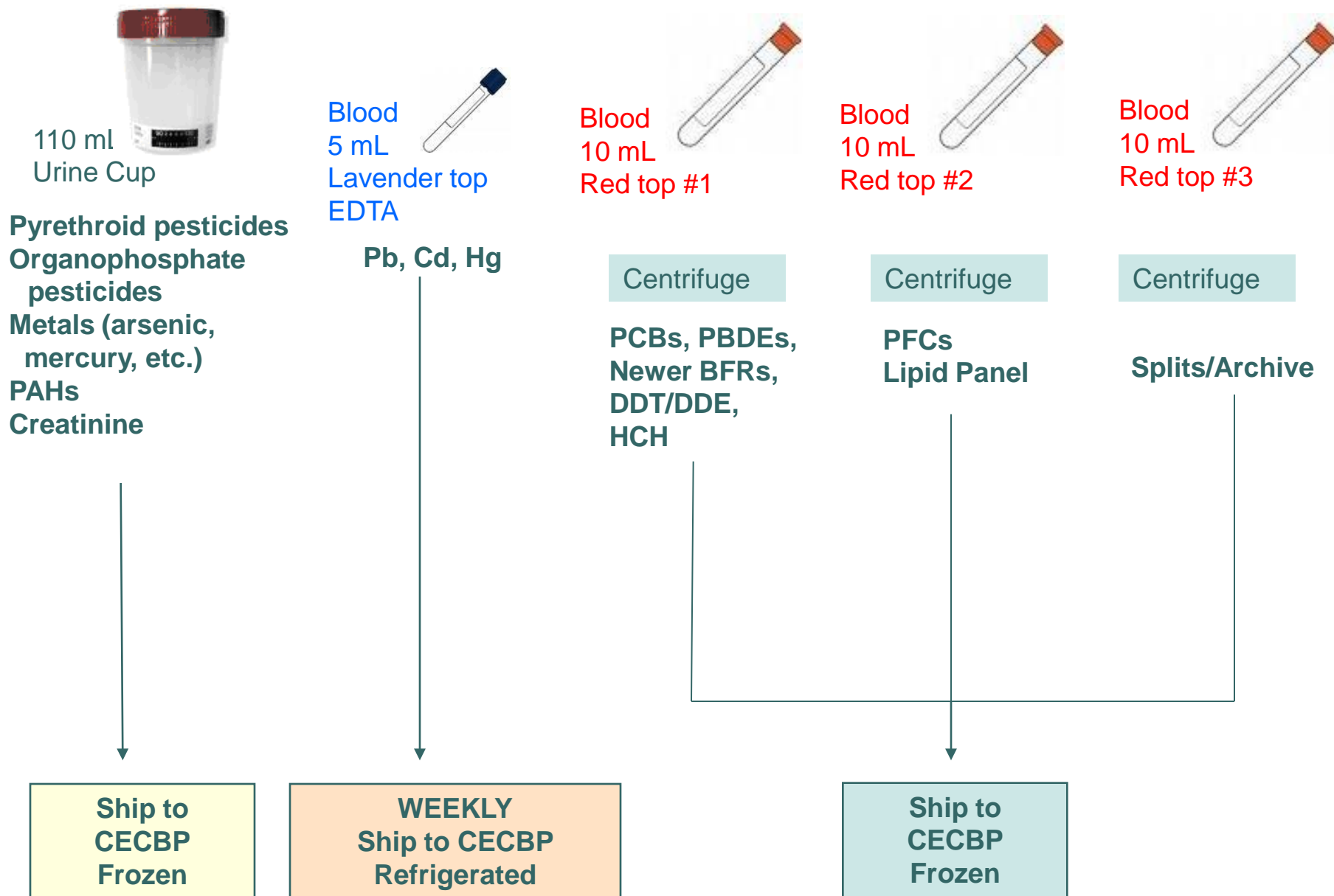
- **Participant is given choice to:**
  - Participate in the FOX Project
  - Receive individual results
    - In addition to summary findings
  - Donate unused blood and urine samples along with de-identified personal data for future studies
- **Participants will be compensated**



# Exposure Questionnaire

- **Purpose** – identify occupational factors and work behaviors
  - Incident response frequency
  - Incident activities conducted
  - Personal protective equipment use and maintenance
- **Chemicals targeted:**
  - Flame retardants
  - Perfluorinated chemicals
  - PAHs
- **Challenge** - acquire useful data from a 15-minute survey

# Firefighter Specimen Collection and Analysis







# Critical Values/Follow-Up

- **Comparison with clinical reference values**
  - Lead:  $\geq 10$  ug/dL for adults
  - Mercury: to be determined
  - Other: to be determined
- **Protocol for follow-up**
  - Review by UC Irvine or CDPH staff
  - Contact participant by phone and mail immediately if needed
  - Contact information provided for Dr. Das at CDPH and Dr. Israel at UC Irvine

# Fire Station Dust Collection

## ○ Purpose:

- Evaluate protocols/procedures for indoor dust collection, processing and analysis as a potential source of persistent chemical exposure





# Fire Station Dust Collection

## ○ Protocol:

- Select 3 fire stations for sample collection
- Industrial hygiene (IH) walk-through to identify chemical sources
- At each station collect:
  - Vacuum cleaner bag
  - Three hard surface dust samples



# Fire Station Dust Collection

- **Analysis of vacuum cleaner bag contents**
  - PBDEs, PFCs, newer brominated flame retardants, PCBs, organochlorine pesticides
  - Metals: lead, mercury, arsenic + 15 others



# Fire Station Checklist

- Characterize selected environmental factors in specified fire stations
  - Non-stick cookware (perfluorinated chemicals)
  - Electronic devices, fire vehicles with ripped foam seats, furniture with foam padding, foam pillows, carpeting (flame retardants)
  - Pesticide application in past 30 days
  - Station heating source, number of fire vehicles (PAHs)
- Completed by IH and/or firefighter



# Results Report-Back

- Participants who chose to receive results
- Receive by mail at two time points
  - Up to a year after biospecimen collection
    - Blood and urine metals
    - Nonpersistent chemicals (PAH, OP-specific and pyrethroid pesticide metabolites)
  - Up to two years after biospecimen collection
    - PBDEs, PFCs, organochlorine pesticides
- Participants will be provided contact information for designated UC Irvine and CECBP staff



# Results Interpretation Survey

- **Purpose** - learn what firefighters think of their results, evaluate report-back materials and methods
- **Timing** - after second set of results are returned
- **Plan** -
  - 5-minute online survey
  - Monetary incentive



# Data Analysis

- Descriptive analyses
  - Presence and distribution of chemical levels measured in firefighters
- Comparisons
  - NHANES data for adults
  - Other studies in adult or occupational groups where data is available
  - California Occupational Blood Lead Registry
  - World Trade Center firefighter study participants
    - Lead, cadmium, PAH metabolite (*Edelman et al. 2003*)





# Project Timeline

|                |   |
|----------------|---|
| May 2010       | CDPH/UC Irvine Institutional Review Board (IRB) submissions |
|                | Collect 1 <sup>st</sup> set of firehouse dust samples       |
| June-July 2010 | Field test instruments and procedures                       |
| Sept 2010      | Begin recruitment   |
| Jan 2011       | Complete all data and biospecimen collection                |
| Jan 2011       | Begin data analysis   |
| Aug-Dec 2011   | Return participant lab results #1                           |
| Aug-Dec 2012   | Return participant lab results #2                           |
| Dec 2012+      | Prepare project report                                      |



# Project Staff

- CECBP staff
- Other CDPH staff
  - Lori Copan
  - Dina Dobraca
  - Kate Kelsey
- UC Irvine Center for Occupational & Environmental Health
  - Leslie Israel, DO, MPH
  - Cristina Fan, OHNP
  - Hannah Nguyen
  - Idalia Reynoso
- Orange County Fire Authority/
- WEFIT
  - Marty Driscoll
  - Bob James
  - Joe Kerr
  - Fausto Reyes
- Others
  - Kate Durand, CIH
  - Joe Fedoruk, CIH
  - Elaine Vaughan, PhD



Questions?