

Saint Louis University

Laboratory Projects and Initiatives



Environmental Health
Research Laboratory

SAINT LOUIS UNIVERSITY

Roger Lewis, PhD (PI)
Kee-Hean Ong, PhD
Brett Emo, MPH
Jason Kennedy, MS
Julie Gary, MPH
Dipti Subramaniam, MPH
Dana Hage
Matthew Dahm

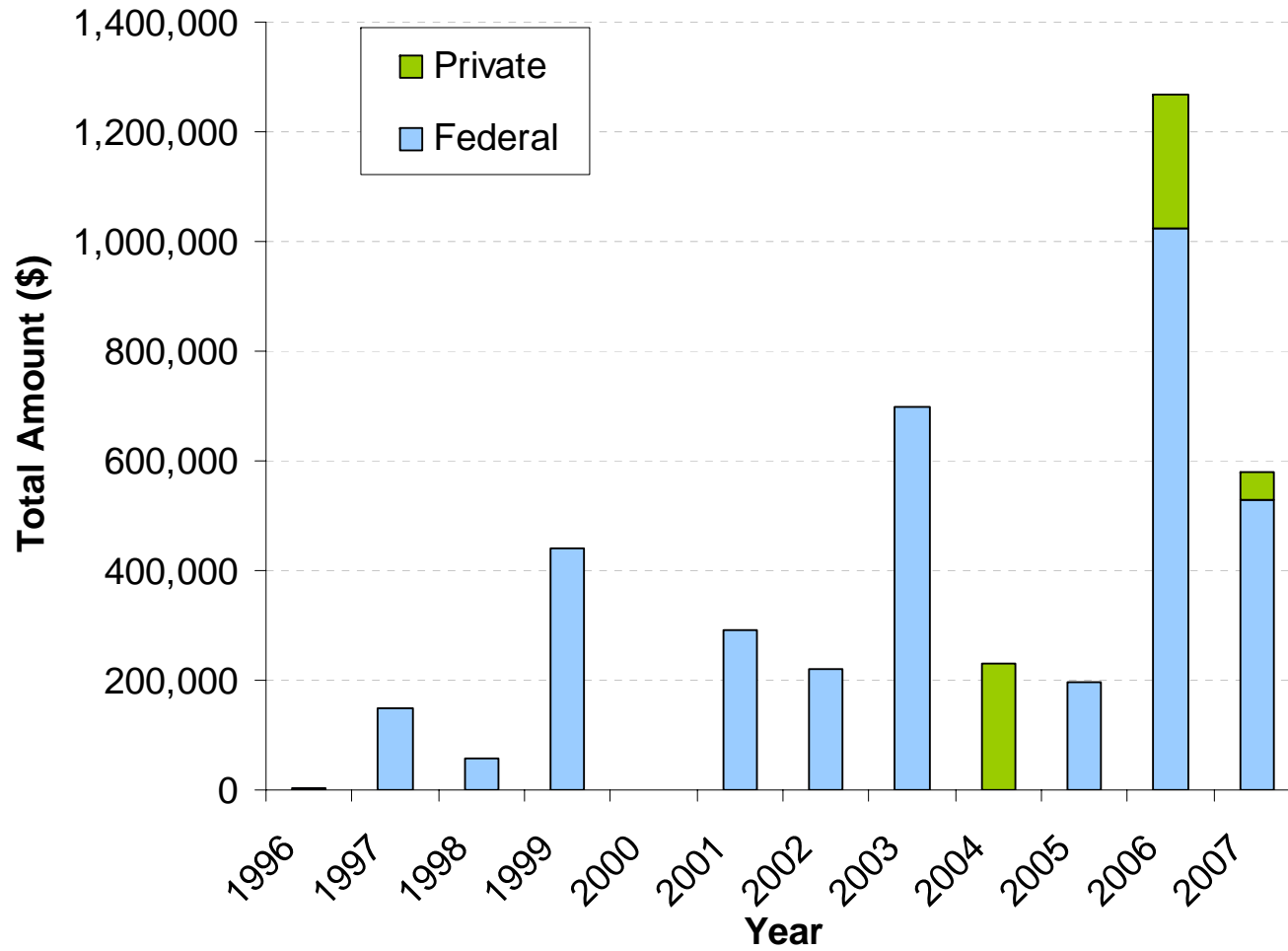
Laboratory Mission

Characterize sources, pathways, and controls for environmental contaminants associated with allergies, asthma, lead poisoning, and waterborne disease – *exposures that primarily affect children*

Approach

- Find and educate the best Masters and Doctoral level students in EOH and EOH/EPI
- Develop team effort while building leaders that can problem-solve and devise new approaches to evaluating environmental exposures
- Emphasize surface contaminants; their evaluation, transmission, and control
- Create synergies – engineering, aerosol science, health, and environmental justice

Funding



EHRL Research Activities

- Lead
 - Removal from hard and soft surfaces
 - Chemifluorescent dyes
 - GIS – prediction model of lead exposure
- Microbiology
 - Dust mite
 - Dust mite allergen
 - Mold
- Aerosol
 - Carpet vs. hard floor
 - Vacuum emissions
- Epidemiology
 - Military environmental exposures and clinical effects
- Water and Biofilms
 - Water filtration
 - Sustainable business models for water filter sales

HUD Funded Research Activities



Recent HUD Funded Projects

- Removal of lead contaminated dust from hard surfaces and carpet

OUTCOMES

- Recommendations for effective remediation of lead from various surfaces
- Comparisons of old and new technologies for removing lead

Current HUD Funded Projects

- Field study of microbe and allergen cleaning methods

OUTCOMES

- Develop a practical and effective cleaning method that the public can adopt to improve their indoor environment
- Method that could potentially become federal recommendation for reducing indoor microbial loading

Current HUD Funded Projects

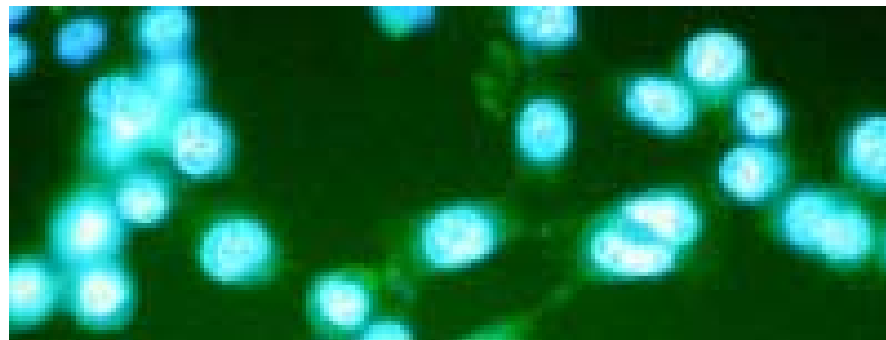
- GIS modeling lead exposure for children in the city of St. Louis

OUTCOMES

- Develop a predictive model to focus policy makers and health specialists on areas of the city with the greatest potential for lead exposure
- Produce a tool that could potentially be used by other cities to do the above

Current HUD Funded Projects

- Concluding HUD Funded Project
 - Chemifluorescent detection of lead in house dust
 - Utilizes Leadmium Dyes developed by Dr. Kyle Gee of Invitrogen for flow cytometry
 - Same dyes were used to estimate intracellular lead concentration in yeast

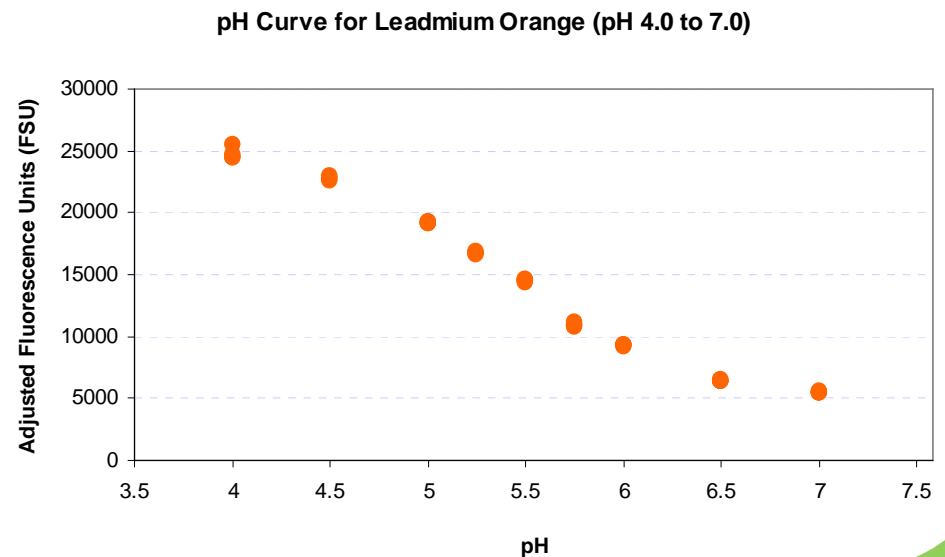


Current HUD Funded Projects

- HUD funded, two year effort to develop new lead sampling technology
- Project Goal
 - Develop and test a new fluorescent method for the detection of lead in house dust
 - Specificity (low rate of false negatives)
 - Field portable
 - Low cost alternative to current methods

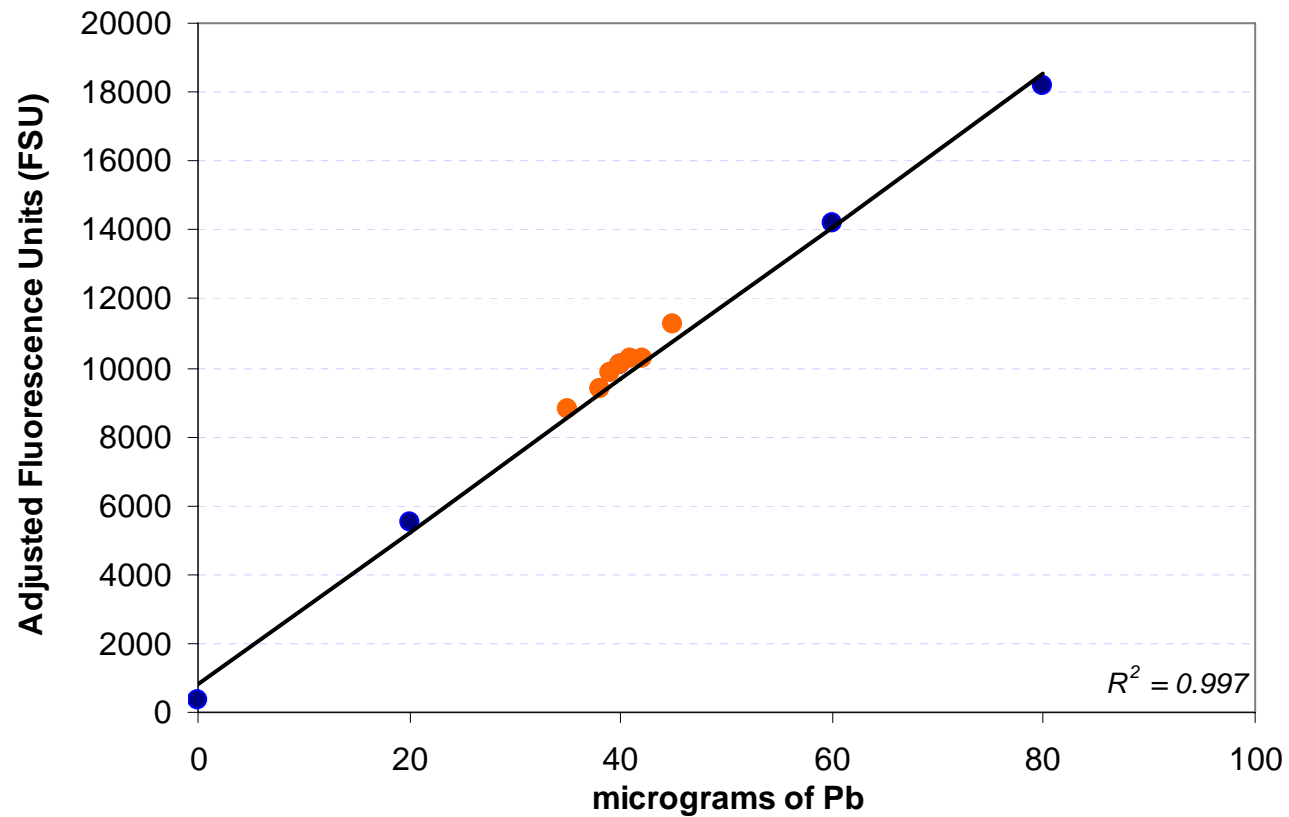
Current HUD Funded Projects

- Challenges Encountered
 - Sample extraction
 - Interference from co-contaminates
 - Temperature dependence
 - Potential toxicity
 - pH dependence



Current HUD Funded Projects

Assessment of Linearity (LO, pH 5.8)



Other EHRL Research Activities



Recent Projects Continued

- Mold management of wetted carpet
- Mold reduction using steam

OUTCOMES

- Recommendations for effective mold reduction on wetted carpet
- Comparisons of steam vapor, detergent, and commercial extractor
- Effects of steam on moldy carpet

Recent Projects Continued

- Development of portable water filter and implementation in rural Honduras

OUTCOME

- Field studies confirm lab results that development of biofilm after 6 weeks leads to complete removal of total coliform bacteria

Recent Projects Continued

- Diarrheal disease prevalence in rural DR

OUTCOMES

- Interview methods and gender influence findings
- Placement of public health in medical model is difficult
- Diarrhea is present and effects childhood mortality but is difficult to confirm through survey methods

Current Projects Continued

- Devise a business model to develop sustainable use of portable water filters in the DR

OUTCOME

- Increase entrepreneurial opportunities for people living in small communities while growing the ability to distribute portable water filters and reduce waterborne disease

Areas of Interest for Future Research Activities



Future Projects

Microvolume blood lead analyzer

ANTICIPATED OUTCOMES

- Expand on a published approach for analyzing blood lead utilizing flow-injection coupled chemiluminescence or chemifluorescence
- Produce a new tool for blood lead analysis which is reliable, accurate, and operable at low cost compared to alternatives

Future Projects

White paper on Environmental Exposures and Risk Assessment in Schools – CIRI

ANTICIPATED OUTCOME

Provide evidence based public health basis for clean or “green” schools

Future Projects

Method Development

Reproducible bio-contaminated environmental samples

ANTICIPATED OUTCOMES

Develop standard methods capable of:

- evaluating approaches for *assessing* microbial contamination
- evaluating approaches for *eliminating* microbial contamination

Focus primarily on schools and hospitals

Future Projects

GIS as tools for hospitals and communities

ANTICIPATED OUTCOMES

- Develop a tool that public health practitioners can use to track the relationship between hospital versus community acquired diseases
- Targeted prevention program and evaluation
- Hospital foot traffic flow and the risk of contamination leading to nosocomial infection

Future Projects

Comparison of Lead Assessment Methods

ANTICIPATED OUTCOMES

- A thorough comparison of XRF, FAAS, ICP and chemifluorescence
- Literature to inform policy and public health practitioners regarding the most reliable and cost efficient methods of lead assessment

Future Projects

Figure 3.1 - Laboratory Sample Generation – Method Comparison

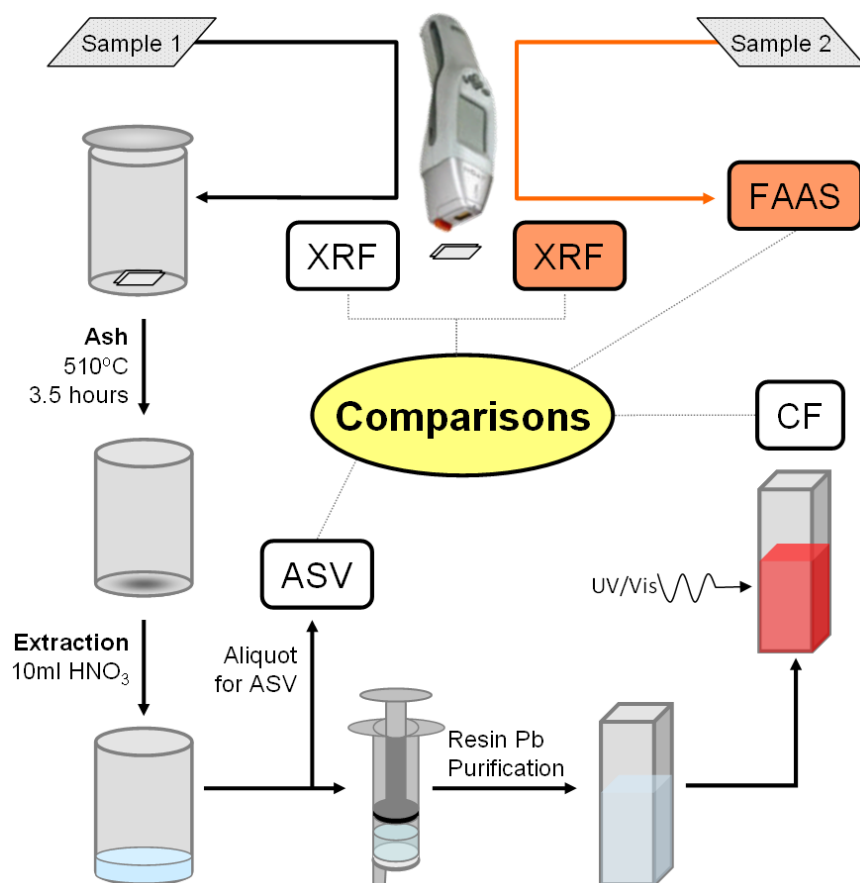
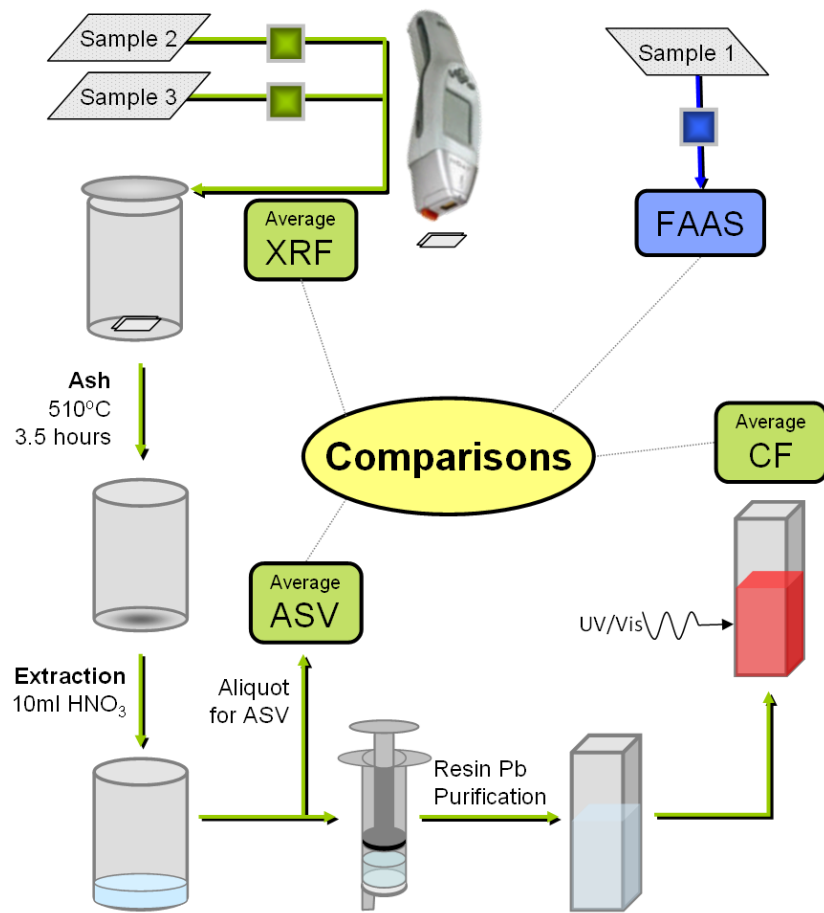


Figure 3.3 - Field Sample Evaluation – Method Comparison



Questions?

**Thank you for visiting the
Environmental Health
Research Laboratory at Saint
Louis University, School of
Public Health**

If you have any further questions or requests, please contact
Roger Lewis at lewisrd@slu.edu or at (314) 977-8151
