Improving Environmental Quality in Child Care

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Today’s Talk

• Overview of environmental concerns in child care;
• Pesticide use and pest management in California child care facilities;
• Research highlights from environmental monitoring;
• Regional and national trends.
Why is the quality of the environment in ECE so important?

- ~13,000,000 children in childcare nationally

In California:
- ~50,000 licensed facilities
- 146,000 staff
Childcare and preschool environments may be better than where the child lives:

- Substandard housing is common, especially in low-income communities;
- Daycare/preschool environments may offer healthier environment to children;
Cockroach feces in home environment.
Why Concerns About Children?

- Higher exposures:
  - Frequent contact with the ground or floor
  - Hand-to-mouth activity
  - Less varied diet
  - Eat, drink, and breathe more per kg
  - Spend most of their time indoors
- Physiologically immature
  - Metabolic pathways undeveloped
- Neural architecture not yet in place

Children are more vulnerable than adults.
Specific Concerns

- Asthma
- Chemical Hazards
- Environmental Tobacco Smoke
- Green Cleaning
- Indoor Air Quality
- Lead
- Mercury
- Mold
- Pesticides
- Plastics
- Disinfectants
My Daughter’s preschool had peeling lead paint adjacent to an eating area = 125,000 ppm. The standard is 600 PPM.

Nationwide = 14% (EPA/HUD)
Research Highlights
Pest Management and Pesticide Use
in California Child Care Centers

Prepared for THE CALIFORNIA DEPARTMENT OF PESTICIDE REGULATION
by THE CENTER FOR CHILDREN'S ENVIRONMENTAL HEALTH RESEARCH,
UC BERKELEY SCHOOL OF PUBLIC HEALTH

June 2010
90% reported at least one pest problem.
What are the most common indoor pests in California Child Care Centers?

Pesticide Use in California Child Care Centers

Used any pesticide at least once: 55%
Used spray or fogger (non-exempt): 47%
Used exempt pesticide: 21%
Used at least 1 IPM method: 68%
Pesticide Application Frequency

- Weekly Applications ($n=2$) 0.3%
- Monthly Applications 20%
- Occasional 29%
Figure 3-4. Who Applies Pesticides?

- Facility Staff: 25%
- Property Owner: 9%
- Custodial Staff: 25%
- Pest Control Company: 69%
- Other: 12%
First National Survey of Environmental Health in Child Care Centers (HUD/EPA) (n=123)

- 75% used pesticides
- Up to 10 different pesticides
- Used as often as 107 times annually (median=12)
- Very toxic OPs, pyrethroids, and other compounds detected
Air and dust samples collected from 40 childcare facilities. Tested for:

- Particles
- Pesticides
- Flame Retardants
- PFCs
- Phthalates
- VOCs
- Carbonyls
Research Highlights
Volatile Organic Carbons

- ~70 VOCs quantified
- Trend of higher levels inside.
- VOCs related to cleaning products, building materials, traffic (e.g., benzene, octane).

Preliminary Data..
Indoor vs. Outdoor Formaldehyde Concentrations

Preliminary Data. Do not cite or distribute.
Several VOCs may exceed Prop. 65 guidelines

Based on child-adjusted OEHHA NSRL:

- Benzene
- Chloroform
- Ethylbenzene
- Acetaldehyde
- Formaldehyde

Preliminary Data. Do not cite or distribute.
VOC Measurement Challenges

Unknowns

• Up to 60% or more of mass;

• Many unknown peaks in chromatograms;

Preliminary Data..
Identifying Unknown VOCs

- **Unknowns**
- **Mass from quantified analytes**

![Bar chart showing chemical mass as toluene (ug) for different child care facilities.](chart)

Preliminary Data.
Identifying Unknown VOCs

Quantification Strategy

• Linked to NIST spectral library;
• Accepted if >80% certainty of match;
• Quantified using toluene calibration model;

Preliminary Data..
130 Additional VOC Chemicals Likely Present

Quantified Versus Predicted VOC

\[ y = 1.48 + 0.69x; \quad R = 0.87 \]

1:1 Line

Preliminary Data..
Rich Area for Future Research

- Unknowns
- Mass from quantified analytes

Preliminary Data.

<table>
<thead>
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<th>Child Care Facility</th>
<th>Chemical Mass as Toluene (ug)</th>
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<tr>
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<tr>
<td>B</td>
<td>132</td>
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</tbody>
</table>
Other Measurements

Cooking Events Were Determinants of Ultrafine Particle Levels:

Real-time Ultrafine Particle Concentrations:

Preliminary Data. Do not cite or distribute.
BDE-209 Was Dominant PBDE Congener

BDE Congener Contribution to Total ECE

Preliminary Data. Do not cite or distribute.
Child care environments are relatively unstudied; indoor exposures likely overlap with school, residential, and commercial environments; unique factors – e.g., heavier use of disinfectants and cleaners; more vulnerable population.

More research needed to quantify exposures, effects on health, strategies to reduce exposures.
Regional and National Trends
Healthy Schools Act regulating pesticide use extended to child care centers (2007)
Department of Pesticide Regulation supporting curriculum development, outreach, and education
State resources to support research
County lead poisoning prevention programs targeting child care
Green certification programs
Provider agencies supporting outreach and education.
Children’s Environmental Research Centers.

Growing interest.
INTEGRATED PEST MANAGEMENT TOOLKIT FOR EARLY CARE & EDUCATION PROGRAMS
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OVERVIEW

A. Healthy Schools Act

B. Background
   - Pests
   - Pesticides
   - The health risks of pesticides to children & the environment

C. Integrated Pest Management
California Policy Directions

- Extend Healthy Schools Act to cover family day in homes
- Development of community college/state college curriculum
- Outreach to pest management professionals (PMPs)
- Requirement that PMPs servicing child care receive training/IPM certification
Nationally

• Several states have or are developing programs to improve child care environments

• EPA web site consolidating access to available resources

• Groups such as the CEHN and National Center for Healthy Homes are developing training resources and networks

• Expect exponential growth in resources over the next 5 years

• Major challenge to reach individual providers
Environmental Health in Child Care: What each facility should have

- Designated person responsible for environmental health
- Written policies
- Trained employees
- Documentation that policies are followed
Hopes for the future:

- Comprehensive resources and training available to ECE providers nationally

- Recognition of the important role that child care providers can play in improving environments in their community
Programs to reduce exposures work:
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NIEHS

United States Environmental Protection Agency

California Environmental Protection Agency

Air Resources Board

California Department of Pesticide Regulation

cerch
Additional Resources

CERCH
http://cerch.org/research-programs/child-care/

UCSF California Child Care Health Program
http://www.ucsfchildcarehealth.org/index.htm

California Department of Pesticide Regulation
http://apps.cdpr.ca.gov/schoolipm/

Children’s Environmental Health Network
http://www.cehn.org/ehcc

Pennsylvania Integrated Pest Management
http://extension.psu.edu/ipm/directory/ljg5

U.S. EPA Child Care Web Site
http://epa.gov/childcare/