

Environmental Concerns and Assessment In the School Setting

Slides
before 1st
Section
Divider

Defining
Pediatric
Environmental
Health

Children as
an "At Risk"
Population

Environmental
Assessment

Environmental
Considerations

Now
What?

Disclaimer





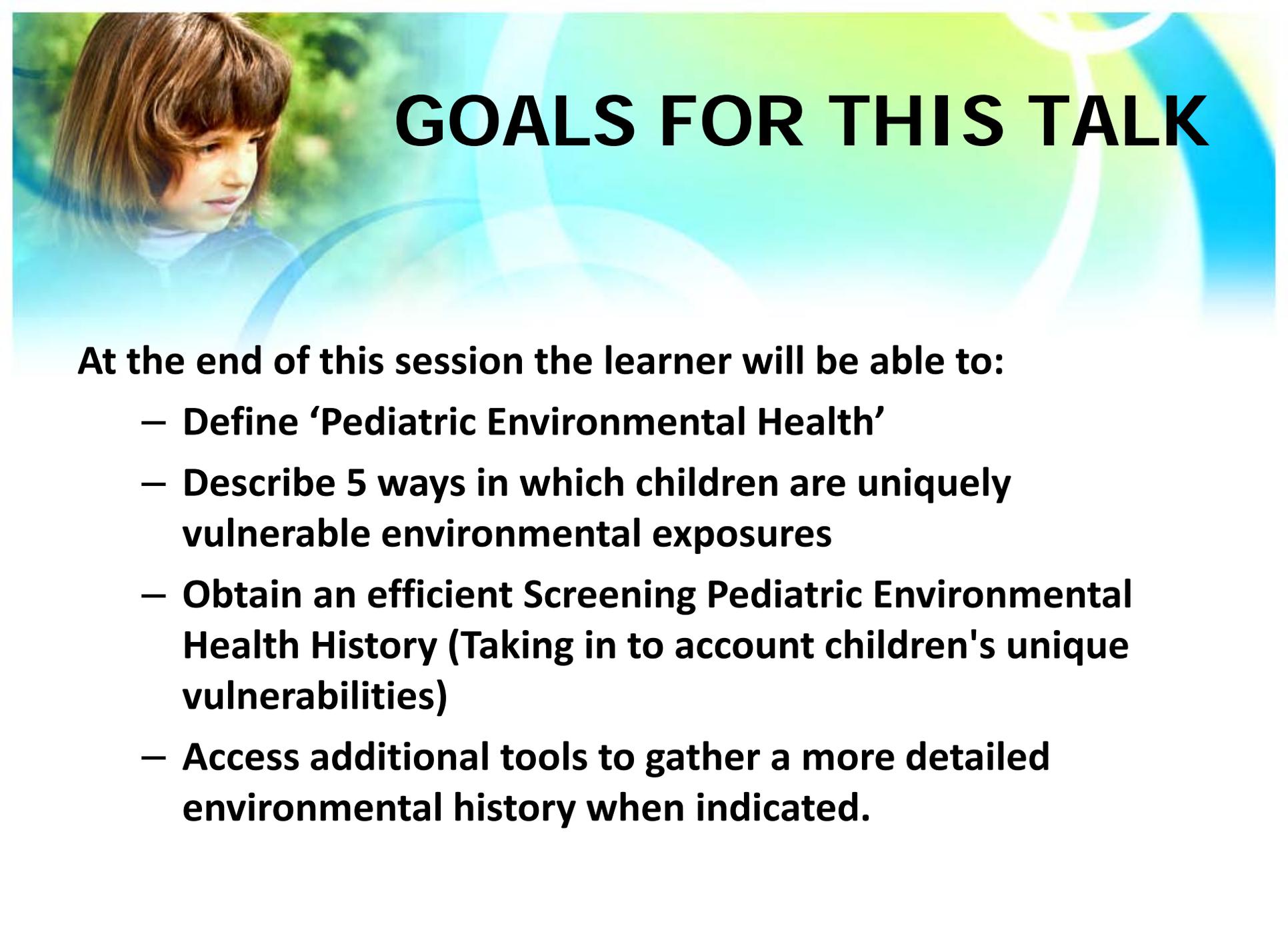
Environmental Concerns and Assessment in the School Setting

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Southwest Center for Pediatric Environmental Health



GOALS FOR THIS TALK

At the end of this session the learner will be able to:

- Define ‘Pediatric Environmental Health’**
- Describe 5 ways in which children are uniquely vulnerable environmental exposures**
- Obtain an efficient Screening Pediatric Environmental Health History (Taking in to account children's unique vulnerabilities)**
- Access additional tools to gather a more detailed environmental history when indicated.**



What is Pediatric Environmental Health

- 
- **Environmental health is the field of science that studies how the environment influences human health and disease**

- *NIEHS Definition*

<http://www.niehs.nih.gov/oc/factsheets/pdf/e-health.pdf>

- 
- “Environmental health includes both the *direct pathological effects* of chemicals, radiation and some biological agents, and the *effects (often indirect)* on health and *wellbeing of the broad physical, psychological, social and aesthetic environment* which includes housing, urban development, land use and transport.”

- ***World Health Organization Definition***

http://www.euro.who.int/eprise/main/WHO/Progs/HEP/20030612_1



An Operational Definition of Pediatric Environmental Health

- The *Diagnosis, Treatment, and Prevention of Illness* due to Pediatric Exposure to Environmental Hazards
- The *Creation of Healthy Environments* for Children



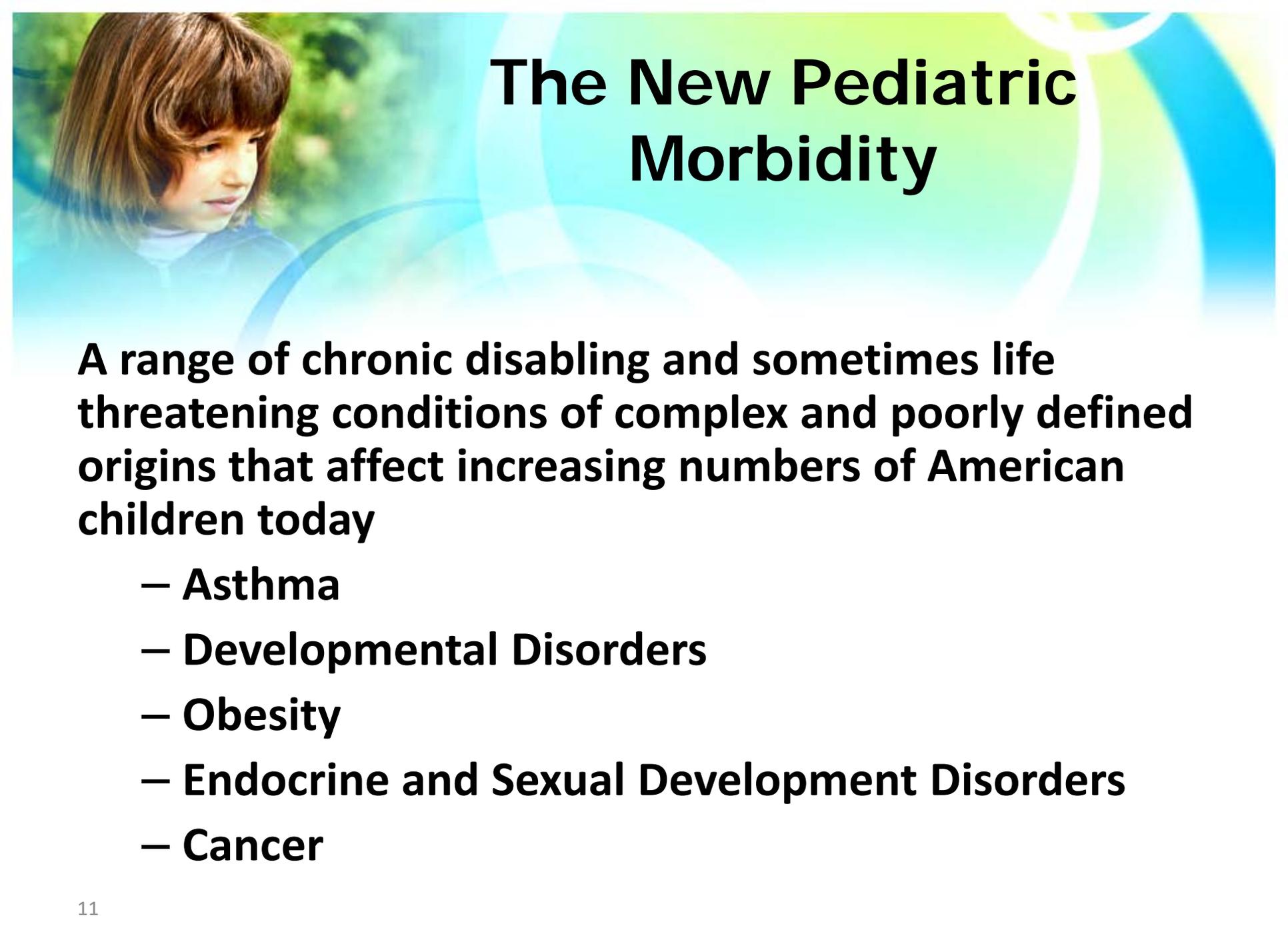
GENE ENVIRONMENT INTERACTIONS

- **Gene-environment interactions can shift the balance between health and disease**
- ***“Genetics loads the gun...but environment pulls the trigger”¹***
- **Gene-environment interactions are influenced by gender and age**



ENVIRONMENTAL HEALTH HAZARDS

- **Children often more susceptible**
- **Among parents' top health worries**
- **Concerns about environment and**
 - **Asthma**
 - **Developmental disabilities**
 - **Obesity**
 - **Birth defects**
 - **Pediatric cancer**



The New Pediatric Morbidity

A range of chronic disabling and sometimes life threatening conditions of complex and poorly defined origins that affect increasing numbers of American children today

- Asthma**
- Developmental Disorders**
- Obesity**
- Endocrine and Sexual Development Disorders**
- Cancer**



Environmental Related Disease Is *Expensive*

- The US Department of Education spent \$36 billion on special education services in the US in 1996
- Charges for Asthma Hospitalization in NYC for 1 – 4 year olds was \$33.4 million in 2000
- Total annual costs are estimated to be \$54.9 billion (range \$48.8-64.8 billion): \$43.4 billion for lead poisoning, \$2.0 billion for asthma, \$0.3 billion for childhood cancer, and \$9.2 billion for neurobehavioral disorders



Environmental Exposures Are *Preventable*

- **Lead can be abated. Practices that create hazards can be avoided**
- **CO poisoning can be prevented with inexpensive detectors (New NYC Law 11/1/2004)**
- **Pesticides can be avoided – IPM**
- **Less toxic cleaning products can be chosen**
- **Radon can be detected and remediated**
- **Mold can be abated and prevented (Moisture control)**
- **Diet can be altered to reduce mercury and pesticide exposure**
- **Water can be tested for solvents and treated or replaced**



THE THEORY OF CHILDREN'S UNIQUE VULNERABILITY

***Why children are not just little
adults when it comes to
environmental exposures***



Unique Vulnerabilities of Children

- **Children consume more food, drink more water, and breathe faster than adults**
- **Children have unique behaviors, diets, and are closer to the ground**
- **Children have immature metabolic pathways**
- **Young children have unique windows of vulnerability – particularly in neurodevelopment**
- **Children have a very long ‘shelf life’**



Greater Exposure

- Children can have greater exposure to environmental toxins than adults.

Pound for Pound of body weight children drink more water, eat more food, and breath more air than average American adults.



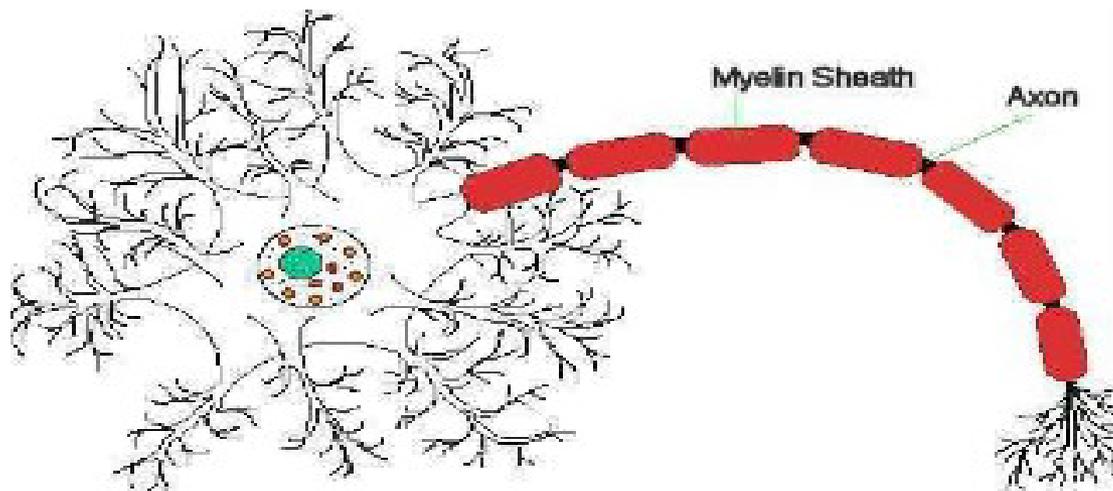
Unique Behaviors

- **Hand to mouth behavior.**
- **Children play close to the ground.**
- **Unique diet.**



Windows of Vulnerability

- **Young children are undergoing rapid growth and critical neurologic development**



A Long 'Shelf Life'

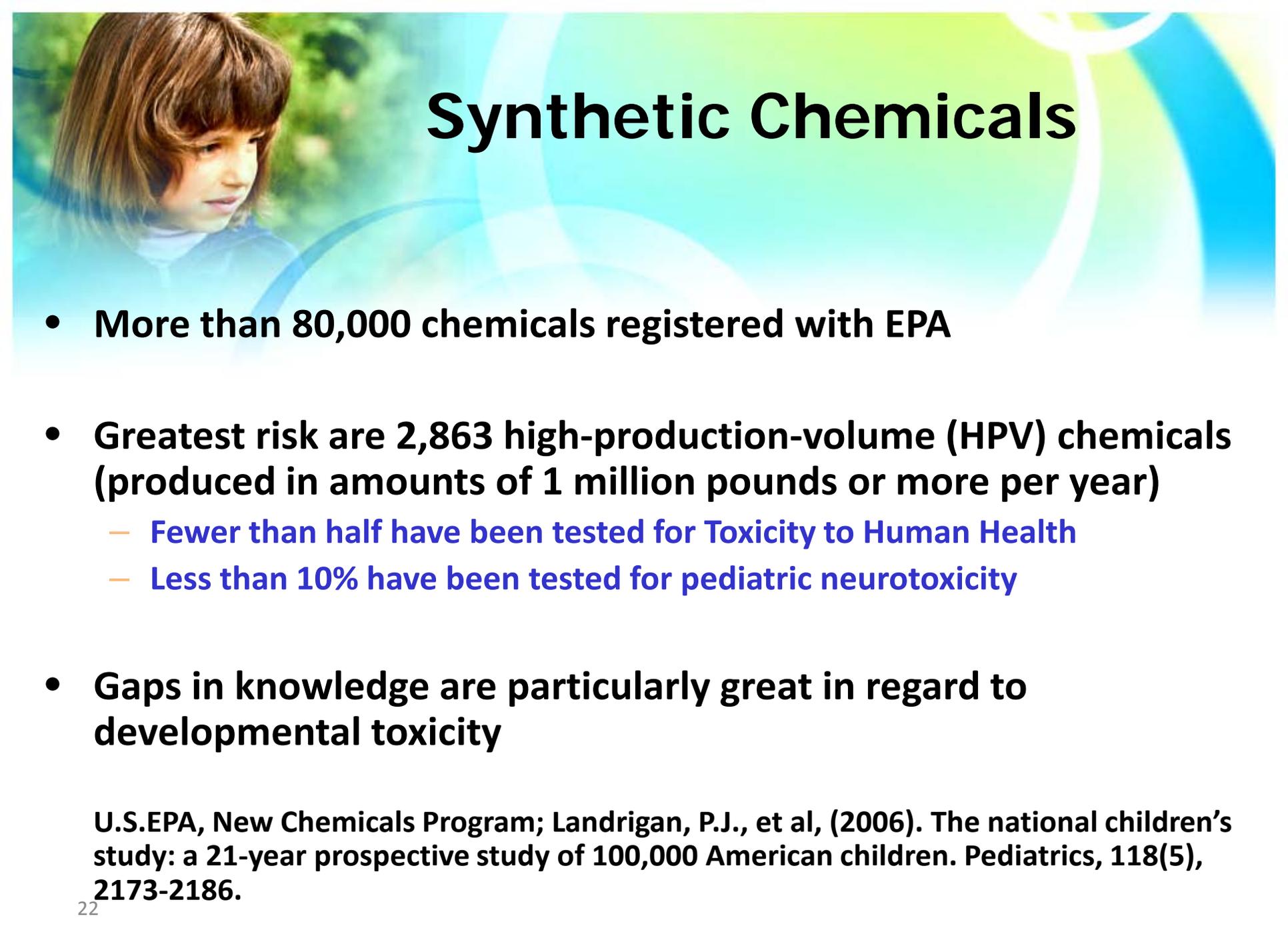
- Children have a longer “shelf-life.”
 - They have more future years ahead to develop illnesses with a long latency from the inciting or contributing exposure.





IS IT REALLY TRUE?

**Recent Evidence That Supports This Theory
of Children's Unique Vulnerability to
Environmental Toxins**



Synthetic Chemicals

- **More than 80,000 chemicals registered with EPA**
- **Greatest risk are 2,863 high-production-volume (HPV) chemicals (produced in amounts of 1 million pounds or more per year)**
 - **Fewer than half have been tested for Toxicity to Human Health**
 - **Less than 10% have been tested for pediatric neurotoxicity**
- **Gaps in knowledge are particularly great in regard to developmental toxicity**

U.S.EPA, New Chemicals Program; Landrigan, P.J., et al, (2006). The national children's study: a 21-year prospective study of 100,000 American children. Pediatrics, 118(5), 2173-2186.



Evidence of Children's Increased Exposure

- In the CDC's 3rd National Report on Human Exposure to Environmental Chemicals (part of NHANES) **many chemicals are found in greater amounts in children than adults** suggesting that children really are exposed to a greater degree

<http://www.cdc.gov/exposurereport/>



ENVIRONMENTAL HEALTH HAZARDS

- **Questions about the environment are basic to a complete pediatric history**
- **During much of the last century, doctors made house calls and could observe the child's environment - this is no longer common practice**
- **Now, *asking* about physical surroundings is needed to identify some exposures, prevent others**



WHEN TO TAKE AN ENVIRONMENTAL HISTORY

- **Health Supervision Mandated Screenings**
 - Hearing, Vision, and/or Flu Vaccination
- **Routine urgent visits by Staff or Students**
 - Asthma, Stomach Illnesses
- **Other visits for illness**
 - Unusual presentations
 - Persistent or puzzling/non-specific symptoms
 - Multiple persons with same symptoms



INTEGRATING QUESTIONS ABOUT ENVIRONMENT INTO THE HISTORY

- Many areas of questioning are already part of the history
- Using Screening History Form can ensure completeness
- Supplemental Form provides additional information



NEEF Tools to Guide the Pediatric Environmental History

- **Primer**
 - The Importance of the school nurse and teachers roles
- **Screening Form**
 - should be standard practice in assessment
- **Additional History**
 - probe for more if concerns arise in the screener
use as an educational opportunity
- **Environmental History for Asthma**



Pediatric Environmental History (0-18 Years of Age)

The Screening Environmental History

For all of the questions below, most are often asked about the child's primary residence. Although some questions may specify certain locations, one should always consider all places where the child spends time, such as daycare centers, schools, and relative's houses.

NEEF Screening Tool

Where does your child live and spend most of his/her time? _____

What are the age, condition, and location of your home? _____

Does anyone in the family smoke? Yes No Not sure

Do you have a carbon monoxide detector? Yes No Not sure

Do you have any indoor furry pets? Yes No Not sure

What type of heating/air system does your home have?
 Radiator Forced air Gas stove Wood stove Other _____

What is the source of your drinking water?
 Well water Citywater Bottled water

Is your child protected from excessive sun exposure? Yes No Not sure

Is your child exposed to any toxic chemicals of which you are aware? Yes No Not sure

What are the occupations of all adults in the household? _____

Have you tested your home for radon? Yes No Not sure

Does your child watch TV, or use a computer or video game system more than two hours a day? Yes No Not sure

How many times a week does your child have unstructured, free play outside for at least 30 minutes? _____

Do you have any other questions or concerns about your child's home environment or symptoms that may be a result of his or her environment? _____

Follow up/ Notes

The Screening Environmental History is taken in part from the following sources:

- American Academy of Pediatrics Committee on Environmental Health. Pediatric Environmental Health 2nd ed. Etzel RA, Balk SJ, Eds. Elk Grove Village, IL: American Academy of Pediatrics; 2003. Chapter 4: How to Take an Environmental History.
- Balk SJ. The environmental history: asking the right questions. *Contemp Pediatr.* 1996;13:19-36.
- Frank A, Balk S, Carter W et al. Case Studies In Environmental Medicine. Agency for Toxic Substances and Disease Registry, Atlanta GA. 1992, rev. 2000. Taking an Exposure History.

This screening environmental history is designed to capture most of the common environmental exposures to children. The screening history can be administered regularly during well-child exams as well as to assess whether an environmental exposure plays a role in a child's symptoms. If a positive response is given to one or more of the screening questions, the primary care provider can consider asking further questions on the topic provided in the Additional Categories and Questions to Supplement the Screening Environmental History.





Pediatric Environmental History (0-18 Years of Age)

Additional Categories and Questions to Supplement The Screening Environmental History

For all of the questions below, most are often asked about the child's primary residence. Although some questions may specify certain locations, one should always consider all places where the child spends time, such as daycare centers, schools, and relative's houses.

NEEF Additional History Form

General Housing Characteristics (For lead poisoning, refer to Table 3-2 in Managing Elevated Blood Lead Levels Among Young Children)

Do you own or rent your home?	_____
What year was your home built? (Or: Was your home built before 1978? 1950?)	_____
Has your child been tested for lead?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Is there a family member or playmate with an elevated blood lead level?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Does your child spend significant time at another location? (e.g. baby sitters, school, daycare?)	_____

Indoor home environment (For asthma, refer to Environmental History Form for Pediatric Asthma Patient)

If a family member smokes, does this person want to quit smoking?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Is your child exposed to smoke at the baby sitters, school, or daycare center?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Do regular visitors to your home smoke?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Have there been renovations or new carpet or furniture in the home during the past year?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Does your home have carpet?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Is the room where your child sleeps carpeted?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Do you use a wood stove or fire place?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Have you had water damage, leaks, or a flood in your home?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Do you see cockroaches in your home daily or weekly?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Do you see rats and/or mice in your home weekly?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Do you have smoke detectors in your home?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure

Air Pollution/Outdoor Environment (For asthma, refer to Environmental History Form for Pediatric Asthma Patient)

Is your home near an industrial site, hazardous waste site, or landfill?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Is your home near major highways or other high traffic roads?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Are you aware of Air Quality Alerts in your community?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Do you change your child's activity when an Air Quality Alert is issued?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Do you live on or near a farm where pesticides are used frequently?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure

NEEF Additional History Form

Food and Water Contamination

If you use well water for drinking, when was the last time the water was tested?

Coliform bacteria _____ Other microbials _____ Nitrites/nitrates _____ Arsenic _____ Pesticides _____

For all types of water sources:

Have you tested your water for lead? _____

Yes No Not sure

Do you mix infant formula with tap water? _____

Yes No Not sure

Which types of seafood do you normally eat? _____

How many times per month do you eat that particular fish or shellfish? _____

How many times a week do you eat any of the following types of fish?

Shark _____ Swordfish _____ Tile fish _____ King mackerel _____ Albacore tuna _____ Other _____

How often do you wash fruits and vegetables before giving them to your child? _____

What type of produce do you buy? Organic Local Grocery store Other _____

Toxic Chemical Exposures (Also refer to Taking an Environmental History and Environmental and Occupational History in Recognition and Management of Pesticide Poisonings)

Consider this set of questions for patients with seizures, frequent headaches, or other unusual or chronic symptoms

How often are pesticides applied inside your home? _____

How often are pesticides applied outside your home? _____

Where do you store chemicals/pesticides? _____

Do you often use solvents or other cleaning or disinfectant chemicals? _____

Do you have a deck or play structure made from pressure treated wood? _____

Yes No Not sure

Have you applied a sealant to the wood in the past year? _____

Yes No Not sure

What do you use to prevent mosquito bites to your children? _____

How often do you apply that product? _____

Occupations and Hobbies

What type of work does your child/teenager do? _____

Do any adults work around toxic chemicals? _____

Yes No Not sure

If so, do they shower and change clothes before returning home from work? _____

Yes No Not sure

Does the child or any family member have arts, crafts, ceramics, stained glass work or similar hobbies? _____

Yes No Not sure

Health Related Questions

Have you ever relocated due to concerns about an environmental exposure? _____

Yes No Not sure

Do symptoms seem to occur at the same time of day? _____

Yes No Not sure

Do symptoms seem to occur after being at the same place every day? _____

Yes No Not sure

Do symptoms seem to occur during a certain season? _____

Yes No Not sure

Are family members/neighbors/co-workers experiencing similar symptoms? _____

Yes No Not sure

Are there environmental concerns in your neighborhood, child's school, or day care? _____

Yes No Not sure

Has any family member had a diagnosis of any of the following?

Asthma Autism Cancer Learning disability

Does your child suffer from any of the following recurrent symptoms?

Cough Headaches Fatigue Unexplained pain _____

Environmental History Form for Pediatric Asthma Patient

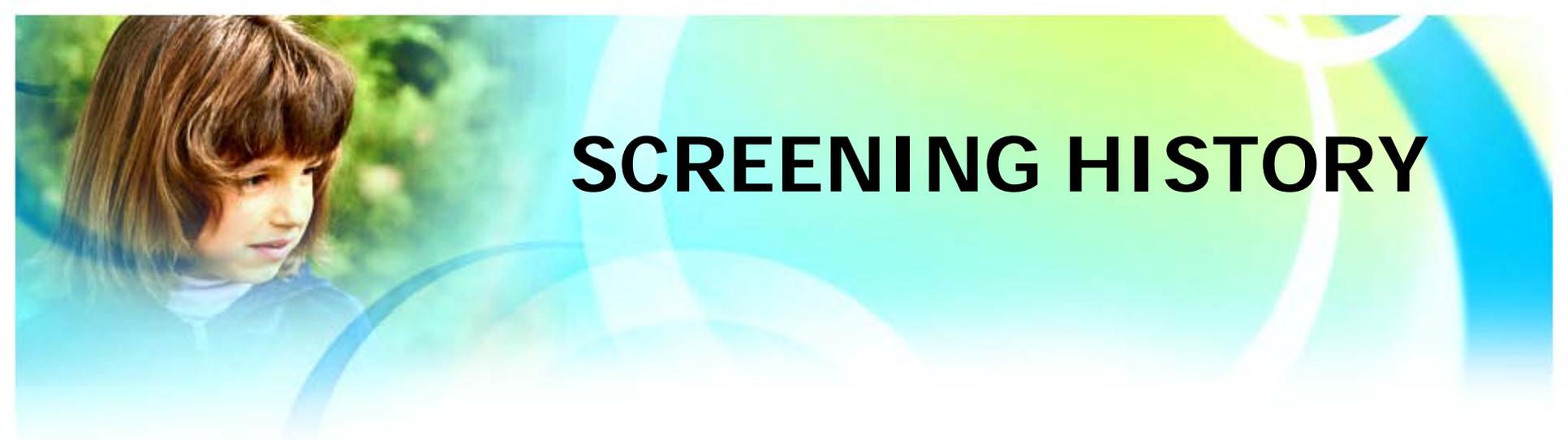
Specify that questions related to the child's home also apply to other indoor environments where the child spends time, including school, daycare, car, school bus, work, and recreational facilities.

NEEF Asthma Patient Tool

	Follow up/ Notes
Is your child's asthma worse at night?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Is your child's asthma worse at specific locations? If so, where? _____	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Is your child's asthma worse during a particular season? If so, which one? _____	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Is your child's asthma worse with a particular change in climate? If so, which? _____	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Can you identify any specific trigger(s) that makes your child's asthma worse? If so, what? _____	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Have you noticed whether dust exposure makes your child's asthma worse?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Does your child sleep with stuffed animals?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Is there wall-to-wall carpet in your child's bedroom?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Have you used any means for dust mite control? If so, which ones? _____	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Do you have any furry pets?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Do you see evidence of rats or mice in your home weekly?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Do you see cockroaches in your home daily?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Do any family members, caregivers or friends smoke?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Does this person(s) have an interest or desire to quit?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Does your child/teenager smoke?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Do you see or smell mold/mildew in your home?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Is there evidence of water damage in your home?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Do you use a humidifier or swamp cooler?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Have you had new carpets, paint, floor refinishing, or other changes at your house in the past year?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Does your child or another family member have a hobby that uses materials that are toxic or give off fumes?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Has outdoor air pollution ever made your child's asthma worse?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Does your child limit outdoor activities during a Code Orange or Code Red air quality alert for ozone or particle pollution?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Do you use a wood burning fireplace or stove?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Do you use unvented appliances such as a gas stove for heating your home?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
Does your child have contact with other irritants (e.g., perfumes, cleaning agents, or sprays)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
What other concerns do you have regarding your child's asthma that have not yet been discussed?	

NEEF Pediatric Asthma Initiative





SCREENING HISTORY

- **Where child lives or spends time**
- **Exposure to secondhand smoke (SHS)**
- **Water source; food exposures**
- **Sun exposure**
- **Exposure related to parents' occupations**
- **Other concerns elicited from parent**



What Comprises the 'Environment'

- **The natural environment**
 - Includes physical, chemical and biological things that occur naturally in our surroundings (air, water, food, soil)
- **The man-made or “built” environment**
 - Includes physical structures where people live, work and play and the consequences of human alteration to the natural environment (e.g. pollution)
- **The social environment**
 - Encompasses lifestyle factors such as diet and exercise, SES and other societal influences that may affect health
 - NIEHS



WHERE THE CHILD LIVES OR SPENDS TIME

- **Community**
- **Housing**
 - Home
 - Child care
 - School
- **Outdoors**
- **Work (for employed teens)**



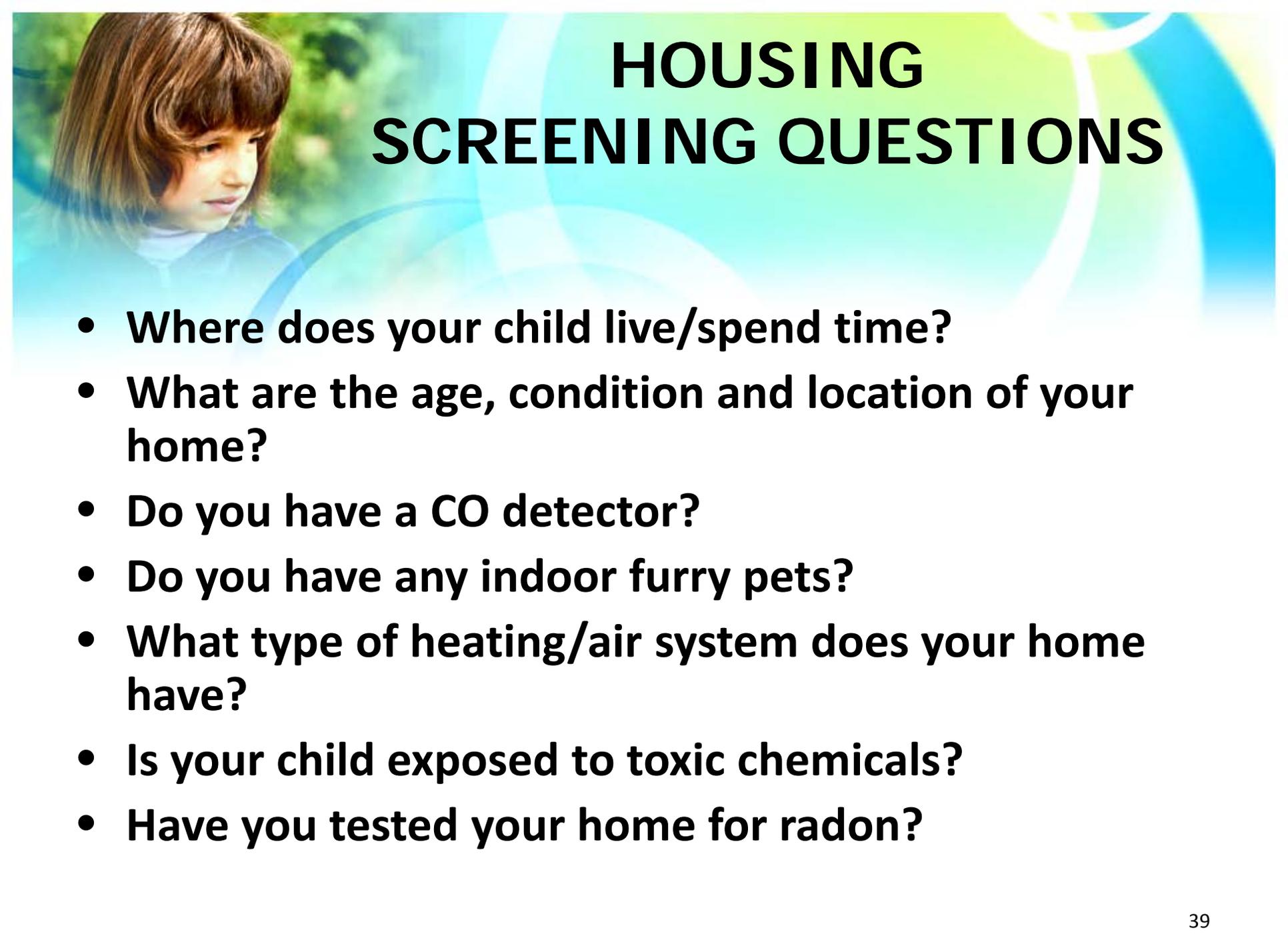
COMMUNITY

- **Toxic hazards may exist in the community**
 - **Industrial/hazardous waste sites, landfills**
 - **Toxic hazards are often more prevalent in poorer communities**
- **More broadly, community factors impacting health include housing, land use and transportation**



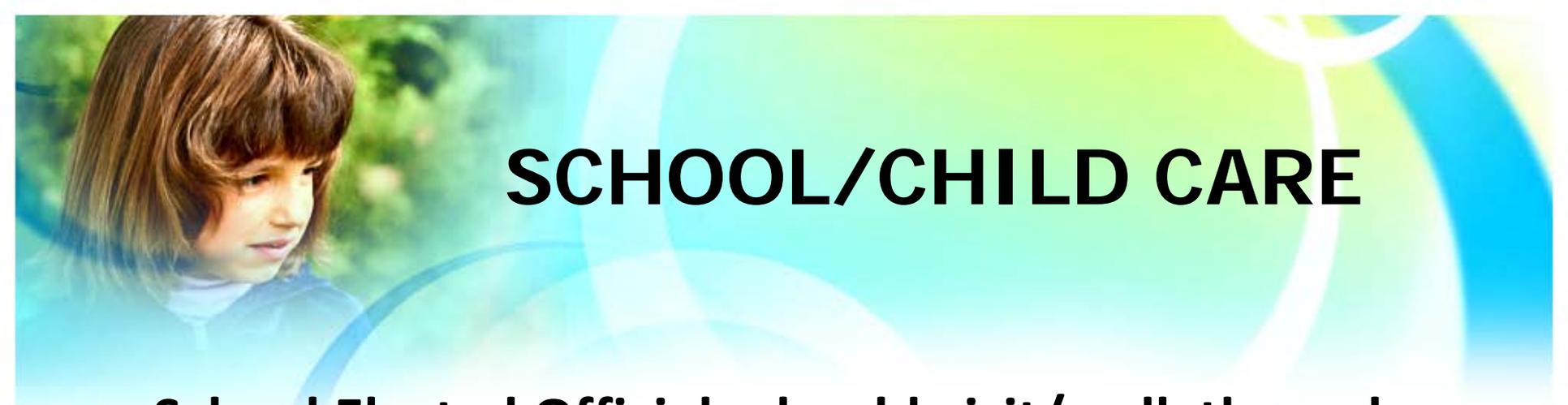
HOUSING

- **Home/child care/relatives' homes**
 - Infants/young children are mostly indoors
 - Lead paint
 - Air pollutants: carbon monoxide, heating sources, radon, allergens
 - Toxic chemicals (including indoor/outdoor pesticides)
- **School exposures**



HOUSING SCREENING QUESTIONS

- **Where does your child live/spend time?**
- **What are the age, condition and location of your home?**
- **Do you have a CO detector?**
- **Do you have any indoor furry pets?**
- **What type of heating/air system does your home have?**
- **Is your child exposed to toxic chemicals?**
- **Have you tested your home for radon?**



SCHOOL/CHILD CARE

- **School Elected Officials should visit/walk through the school/child care setting at periodic intervals throughout the school year**
- **They can look for**
 - **Mold or water damage**
 - **Pets in the classroom**
 - **If newly renovated areas are cleaned up or aired out for safe occupancy**
 - **The smell of harsh/hazardous cleaning products**

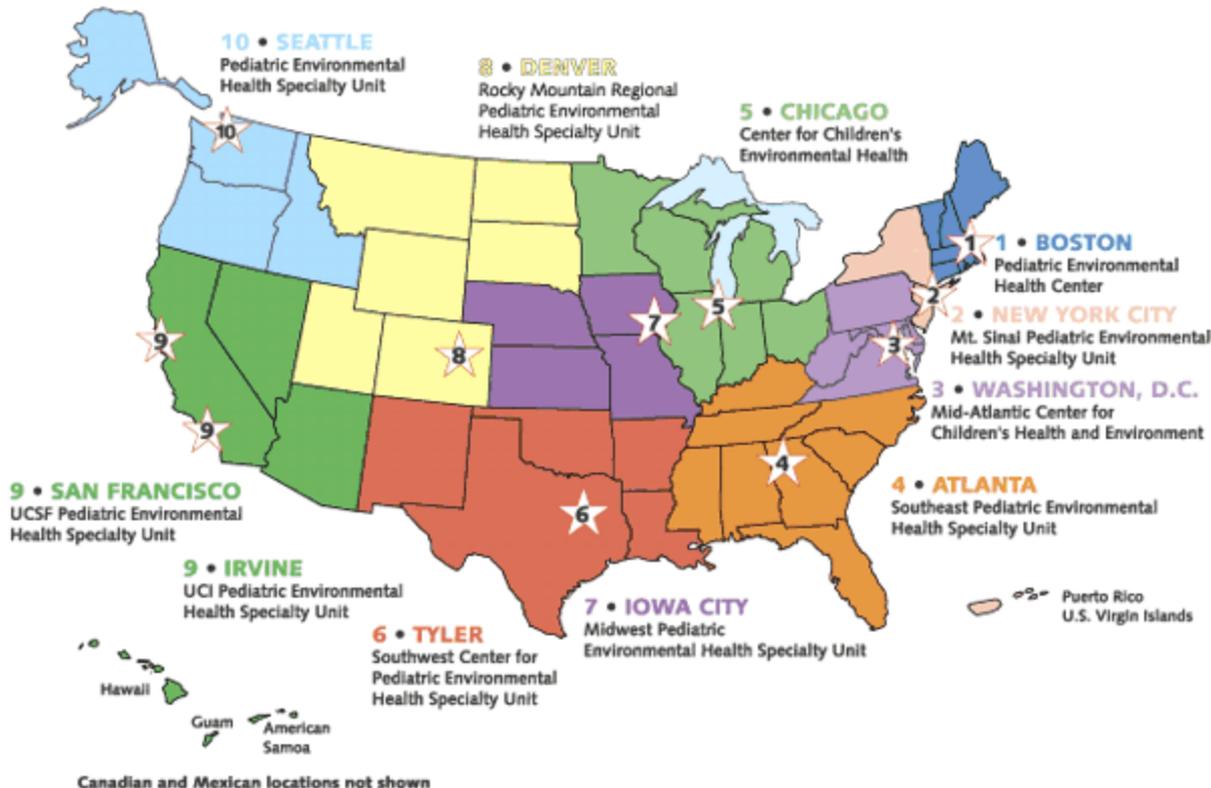


BEYOND HISTORY AND ADVICE..

- **Eliciting a positive history is the first step in detecting an environmental hazard**
- **Abatement advice may help**
- **It may be necessary to enlist lawyers and other advocates to solve environmental problems resulting from poor housing**
- **Pediatric Environmental Health Specialty Units are useful resources**

PEHSU's

Locations of Pediatric Environmental Health Specialty Units



EPA Tools for Schools Program



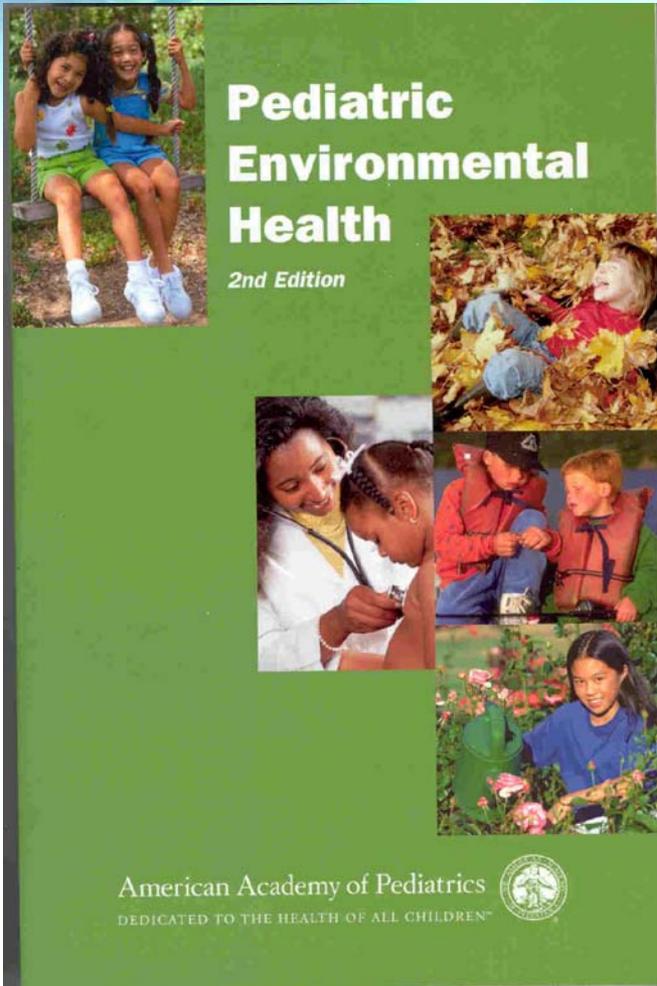
- **Helps Maintain a Healthy Environment**
- **Provides Free Resources for Implementation**
- **Increases Student Performance & Attendance**
- **Increases Revenue**
- **Decreases Costs**

<http://www.epa.gov/iaq/schools/index.html>



RESPONDING TO CONCERNS

- **Parents and or Staff may have questions and concerns about environmental hazards**
- **Resources are available**



Pediatric Environmental Health, November 2003

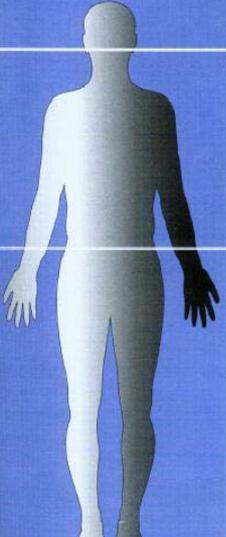
ATSDR CASE STUDIES

- ***Taking an Exposure History, March 2000***



Case Studies in Environmental Medicine

Course: SS3046
Revision Date: March 2000
Original Date: October 1992
Expiration Date: June 30, 2003



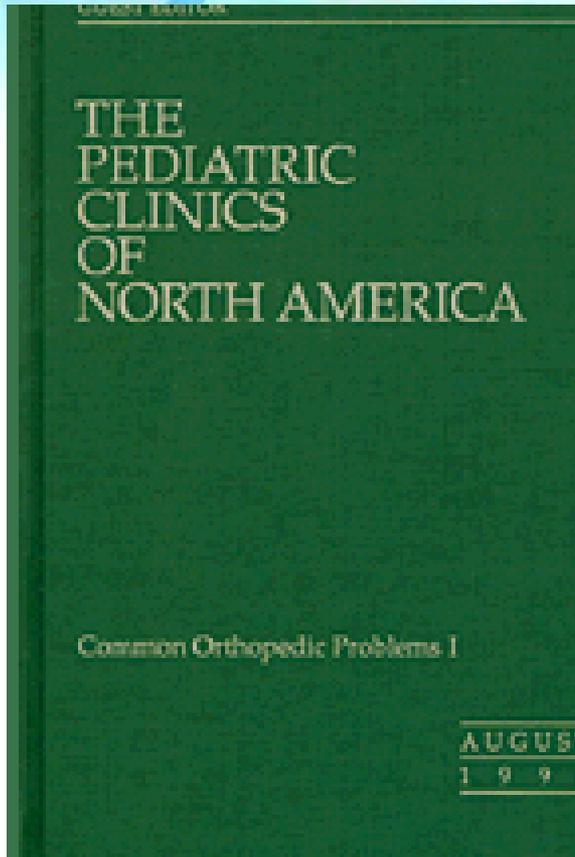
TAKING AN EXPOSURE HISTORY

Environmental Alert

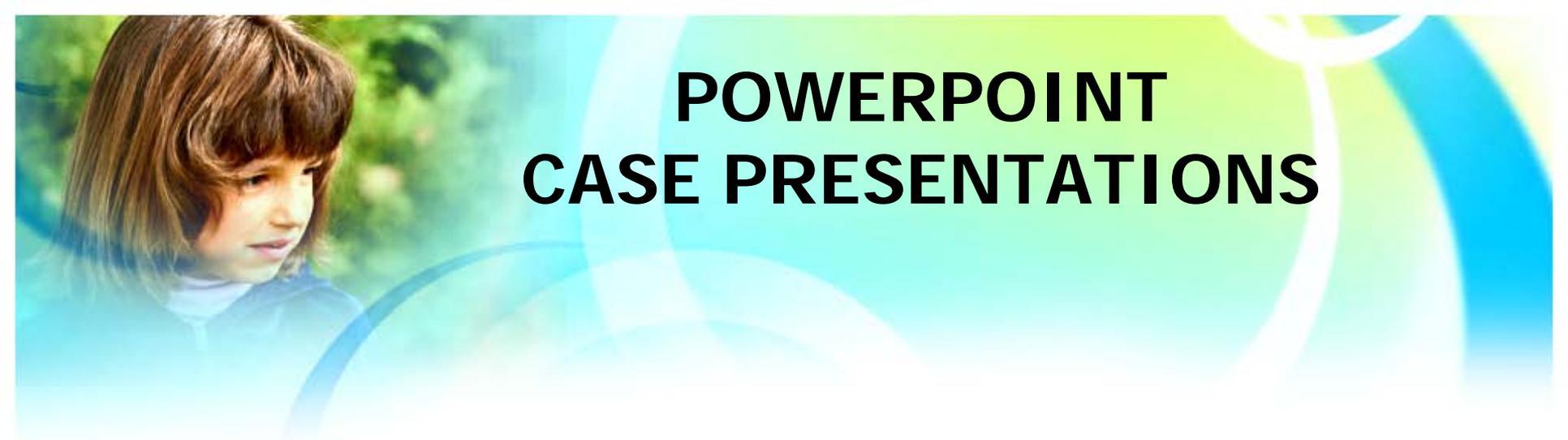
- Because many environmental diseases either manifest as common medical problems or have nonspecific symptoms, an exposure history is vital for correct diagnosis. By taking a thorough exposure history, the primary care clinician can play an important role in detecting, treating, and preventing disease due to toxic exposure.

http://www.atsdr.cdc.gov/HEC/CSEM/exphistory/goals_objectives.html

PEDIATRIC CLINICS OF NORTH AMERICA



- *Environmental Health, October 2001*
- *Jerome Paulson, MD, Editor*



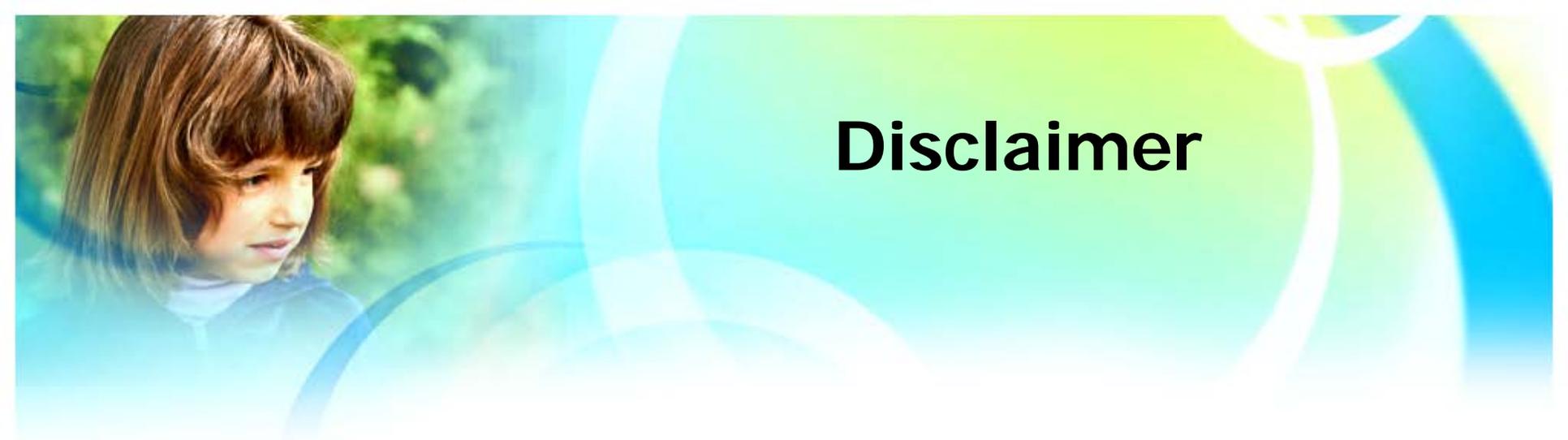
POWERPOINT CASE PRESENTATIONS

- **Pediatric Environmental Health History by R Goldman, M Shannon, A Woolf**
- **Gives a detailed approach to gathering information when the child has a symptom**
- **Developed by the PEHSU of Cambridge Hospital and Children's Hospital, Boston, supported by AOEC and ATSDR**
- www.aoec.org/content/resources_1_3_8.htm



ORGANIZATIONS

- **American Academy of Pediatrics**
 - Committees on Environmental Health
 - www.aap.org
- **National Environmental Education Foundation**
 - Pediatric Environmental Health Initiative
 - <http://www.neefusa.org/health/PEHI/index.htm>
- **Physicians for Social Responsibility**
 - Pediatric Environmental Health Toolkit
 - www.igc.org/psr
- **Healthy Schools Network**
 - www.healthyschools.org



Disclaimer

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