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# Environmental Challenges

Bisphenol A (BPA)

Lead extent/illness

Chinese Wallboard

# BANNED

- Persistent Organic Pollutants
- Perfluorooctane Sulfonic Acid (PFOS)
- Lindane

# OBJECTIVES

At end of this presentation,

You should be able to :

Describe Chemicals associated with imported drywall

Report symptoms associated with some drywall exposure

Indicate some precautions that are newly required in lead remediation

Indicate potential problems associated with Bisphenol A liquid containers

## Lawsuits mount over 'problem' drywall imported from China



### About Real Estate

BY DAVID MYERS  
SYNDICATED  
COLUMNIST

**Dear Mr. Myers:** We purchased a newly built home last year. Soon after we moved in, we started noticing a weird "rotten-egg" smell that gave us constant headaches and sometimes made us vomit. The situation is still the same. 17 months later. We hired two different mold experts to inspect our house and also called out a technician from the gas company, but they found no problems. What could it be?

**Answer:** I am not a doctor, nor an expert in home construction. But if your family's health problems are not being caused by mold or leaking gas, the culprit may be the very walls of your home.

A growing number of homeowners across the nation are suffering similar maladies, which they blame on drywall imported from China when the housing market was booming and construction hit all-time highs. Millions of large sheets of gypsum were imported from dozens of vendors, and many are believed to have been contaminated with various sulfur compounds that can cause a variety of illnesses.

More than 300 lawsuits have been filed by Louisiana homeowners alone. A Federal District Court judge there will begin hearing testimony in a consolidated class-action suit next year. Florida health officials have received more than 500 complaints.

In addition to medical problems, many homeowners claim the drywall makes appliances and other metal objects in their homes corrode quickly. It's not only ugly, but can lead to dangerous situations stemming from corroded wiring around the house and frequent failures of copper piping in air-conditioning units.

The U.S. government recently banned all imports of Chinese drywall, and the

Associated Content.com Member Robert P. ...

mission has been working to develop a preferred method for homeowners to deal with the problems the gypsum may cause. But many experts believe a solution will be neither quick nor inexpensive: The tainted food and dangerous toys from China that have been the subject of recalls in the past were soon removed from store shelves, but drywall typically runs throughout the entire house, and therefore can't be easily removed and replaced.

Until a preferred remediation plan is formalized, the CPSC suggests you consult a physician if you believe your drywall is making you ill, and contact state and local authorities to report the problems and see what type of help is available in your particular area. If you also have concerns about the potential electrical and fire-safety issues that problem drywall can cause, the agency says you should contact your electric or gas supplier and a licensed electrician or building inspector as soon as possible.

You also should consider reporting the problems to your insurer and home builder, and file a report with the agency itself at [www.cpsc.gov/cgibin/drywall.aspx](http://www.cpsc.gov/cgibin/drywall.aspx).

**Dear Mr. Myers:** I am a first-time landlord. My tenant, who gave me a \$500 security deposit when he moved in a year ago, left behind \$1,250 in damages when he moved out last month. Can I sue him for the \$750 difference in small-claims court?

**Answer:** Yes, landlords in most areas can sue if damage caused by a tenant who moves out exceeds the amount of the security deposit he provided when he first moved in. Call your local rent board or apartment owners' association for more information. //

### Have a question?

Send questions to David Myers,  
P.O. Box 2960, Colver City, CA 90231, and  
he will try to respond in a future column.

# Drywall Update

Investigation Spring 2009

CDC/CPSC/ATSDR/EPA

1501 total complaints since 12/2008

76% Florida





# CHINESE DRYWALL

## SYMPTOMS

IRRITATED /ITCHY EYES

DYSPNEA/COUGH

BLOODY/RUNNY NOSES

RECURRENT HEADACHES



# Findings

Noxious, Rotten Egg Smell

Corrosion of Metal (esp. Copper) Items

Upper Respiratory Irritation



# CHINESE DRYWALL

- FORMALDEHYDE
- CARBON DISULFIDE
- CARBONYL SULFIDE
  
- Symptoms are non specific
- (Sulfides-Olfactory Fatigue)

# CHINESE DRYWALL

## ■ CARBON DISULFIDE:

- Neurotoxicity
- (Viscose Rayon Workers)
- Mood Swings
- Pressure of Speech
- Insomnia

# CPSC Investigation in China

10/09 Chemical Investigation Chamber  
Testing

11/09 Indoor Investigation

Also: Electrical and Fire Safety

# Preliminary

Hydrogen Sulfide

Carbon Disulfide

Carbonyl Sulfide  
(only in houses)

# Preliminary

Formaldehyde

Acetaldehyde

Elemental Sulfur

Strontium



# Chinese Drywall Differences

Strontium

Elemental Sulfur

Sulfur → Olfactory → Fatigue

H<sub>2</sub>S → Drop Attacks

Particle board release of  
Formaldehyde is increased with  
increased Relative Humidity

PVC backing on carpet tiles  
increases release of alcohols with  
increased Relative Humidity

# CHINESE DRYWALL

- Information for Clinicians

- CDC: [cdcinfo@cdc.gov](mailto:cdcinfo@cdc.gov)

- Reporting Cases:

- CPSC: 800 638 8095 (Clinicians)

- 800 638 2772 (Public)

# BISPHENOL A

- Two phenol functional groups with two methyl groups bridging

# BISPHENOL A

- A polycarbonate plastic
- epoxy coating of food/beverage cans
- lining of water pipes
- [3-antioxidant in plasticizers for PVC]

# BISPHENOL A

- Solid at Room Temperature
- “Phenolic” Hospital odor
  
- Used for molded devices:
  - pure-water bottles, baby bottles
  - Mixed-coating lacquers, dental sealants
  
- Recycle symbol “7” or “PC”



# BISPHENOL A

- 1-PETE, PET
  - Polyethylene Terephthalate
  - Plastic thread for plastic
- 2-HDPE
  - Hard Plastic
  - Plastic/wood decking
- 3-PVC
  - Juice Bottles
- 4-LDPE
  - Squeeze Bottles

# BISPHENOL A

- 5-PP
  - Polypropylene
  - Microwavable dishes
- 6-Polystyrene
  - Disposable
  - Packing Peanuts
- 7-Others
  - Polycarbonates
  - Bisphenols

# BISPHENOL A

## ■ SOURCES

- Leachate from lining of food cans
- Leachate from Polycarbonate plastics
  - Increased with detergents, heat
- From thermal paper
  - Tickets, receipts

# BISPHENOL A

## ■ INTAKE

- Infant 0-6 months
  - Formula Fed 1-11 ug/Kg/day
  - Breast Fed 0.2-1 “
- Infant 6-12 months 1.65-13 “
- Child 0.043-14.7 “
- Adult 0.008-1.5 “

# BISPHENOL A

■ ?Endocrine Disrupter?

# BISPHENOL A

- In polycarbonate plastics, including some water bottles and baby bottles, & lining of some canned goods
- FDA:: “Safe at typical exposure levels from food and drink” (2008)
- FDA Final Report is not out yet; no comment yet about hormone effects specifically

# BISPHENOL A

FDA: “... present consensus among regulatory agencies in the United States, Canada, Europe, and Japan is that current levels of exposure to BPA through food packaging do not pose an immediate risk to the general population, including infants and babies”



# BISPHENOL A

- Natural Resources Defense Council:  
(NRDC)
- FDA has consistently ignored science and sound policy...It's time for the FDA to protect infants and pregnant women.

# BISPHENOL A

- CANADA (late October 2008): BPA banned in baby bottles
- FDA: Canadian action taken “out of abundance of caution”
- No proof of harm to babies with typical exposure to BPA

# BISPHENOL A

- Ryan
- Estrogen Effects are minute; much too low to be meaningful
- Much work is “Bad Science”
- Toxicological Sciences 2010. 114(1):1-4
-

# BISPHENOL A

- American Chemistry Council (Plastic Industry Trade Group): If FDA determines that existing margins of safety are insufficient in infant applications, we will promptly phase out use of BPA in baby bottles and infant formula packaging

# BISPHENOL A

- Brain, Behavior, Prostate Gland in fetuses and infants N'tl Toxiciry Program 2008 "Some Concern"
- Obesity
- Brain FDA 2010 "some concern"
- Thyroid
- Ovarian Development
- Binds to Estrogen Binding Receptor Gamma

# BISPHENOL A

- In polycarbonate plastics, including some water bottles and baby bottles, & lining of some canned goods
- 2.3 Billion pounds used
- in Unites States in 2004,
- Most in polycarbonate plastics and resins

# BISPHENOL A

FDA: “... present consensus among regulatory agencies in the United States, Canada, Europe, and Japan is that current levels of exposure to BPA through food packaging do not pose an immediate risk to the general population, including infants and babies”

2007





# BISPHENOL A

- ?CAN IT AFFECT HUMAN DEVELOPMENT OR REPRODUCTION?

- POSSIBLY

- Draft NTP Brief on Bisphenol A

- June 11, 2008

- NIEHS, NIH, US HHS



# BISPHENOL A

- FDA:: “Safe at typical exposure levels from food and drink” -- Summer 08
- FDA Final Report is not out yet; no comment yet about hormone effects specifically
- Banned in Minnesota
  - 2010-Manufacturing
  - 2011-Retail
  -

# BISPHENOL A

- CANADA (late October): BPA banned in baby bottles
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# BISPHENOL A

## USA

- 9/08 “Some Concern” [Lang Study]
- 5/09 BPA banned Minnesota/Chicago
- 6/09 FDA to reconsider
- BPA banned in Connecticut
- 7/09 “Insufficient Data” California

# BISPHENOL A

- FDA (January 2010)
- FDA is taking steps to reduce human exposure to BPA in food:
  - Efforts to stop production of BPA containing baby bottles, infant cups and use in lining of infant formula cans; to replace BPA linings in other food cans



# BISPHENOL A

## –WHAT TO TELL PATIENTS:

–Still a very questionable exposure; trend is clearly away from allowing exposure to this, especially growing infants and children

# BEETLE BAILEY





# Lead Poisoning

- Lead has no known biological function.
- Lead  $Pb^{++}$ , competes with  $Ca^{++}$ ,  $Fe^{++}$
- It is cheap, useful, easy to mine, therefore
- Lead is ubiquitous- in air, food, water, soil, ceilings etc.
- There is no consensus for safe lower limit for lead.



# U.S. Lead Situation 1

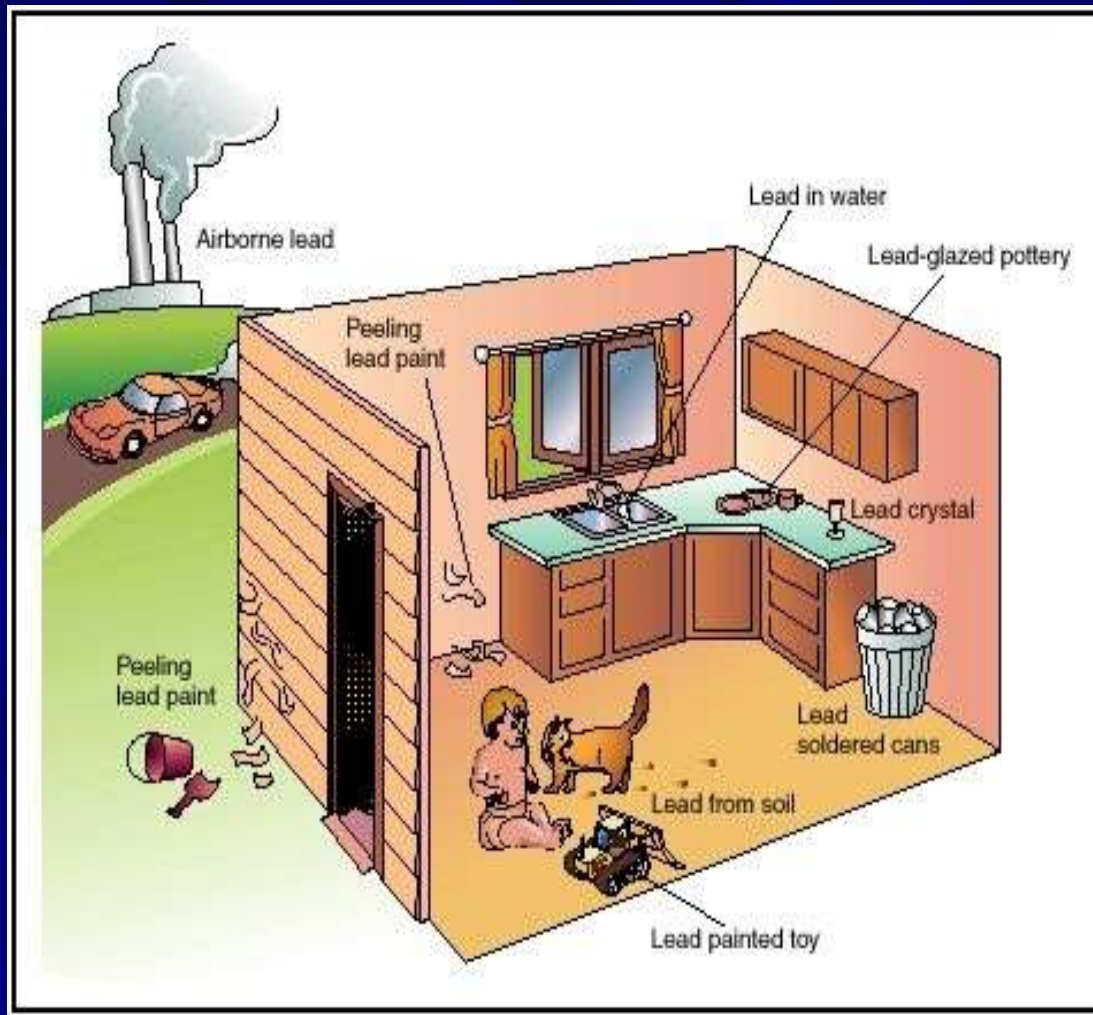
- 1. 1978 Lead banned from paint
- 2. 1980's- Levels higher than Australia
- 3. Late 1980's Removal of lead from gasoline
- 4. 1980's Universal questionnaire screening
- 5. 1991 Universal blood testing
- 6. 1990's Public housing program
- 7. 1990's Private housing program
- 8. 1990's Massive EPA environmental program

# Uses and Sources of Lead

- Paint (until 1970)
- Household dust (via settlement of air pollution, paint removal)
- Ceiling dust
- Occupational
- Solder
- Ceramic glazes
- Mines, smelters

# More Uses and Sources of Lead

- TV's, Computer monitors
- Batteries, Bullets Sinkers
- Aviation
- X-ray shields
- Crystal-ware (high levels in decanters)
- Explosives
- Non-stick linings of pots (in the past)
- Plastic colouring (wire, blinds)
- Pewter



Google Images. [http://img.tfd.com/GEM/gem\\_0003\\_0003\\_0\\_img0397.jpg](http://img.tfd.com/GEM/gem_0003_0003_0_img0397.jpg)  
August 23, 2008.

# Home Lead Testing



# Lead movement

- In childhood, blood lead levels reflect the environmental lead level, ie exogenous lead.
- Protection requires placing barriers between the child and the lead.



# Lead movement

- In adults, lead levels reflect the release of **endogenous** lead from bone, as well as the intake of **exogenous** lead.
- Protection requires **prevention** of exposure plus **preservation** of bone density.

# Absorption of Lead

- Lead goes down iron or calcium absorption pathway in GIT.
- Children absorb lead well orally (~50%) cf adults poorly (~10%). Children also have more hand to mouth activity.
- Lead absorption is enhanced if diet is poor in iron or calcium.
- Pica is one of the worst risk factors.
- Lead can be inhaled.
- [Tetraethyl lead can be absorbed via skin].



# LEAD HAZARD 2010



PAINT



DUST



SOIL



CONTROL!



# LEAD HAZARD-PAINT

- 
- Friction Surface
  - Abrasion to dust
- Impact Surface
  - Door Knob/ Door Frame
- Chewable Surface
  - Tooth Marks
- Deteriorated Paint Surface: inside >2 sq ft
- Child occupied outside >20 sq ft

# LEAD HAZARD-DUST

- 
- Surface Dust
  - Floors  $>40\text{ug/sq ft}$
  - Window Sills  $>250\text{ ug/g (ppm)}$
- [wipe samples]

# LEAD HAZARD-SOIL



■ Bare soil



>400 ug/gram soil (ppm)



# LEAD HAZARD

- Training-as approved by the EPA
- All firms and renovators must be trained
- Work Practices specified
- Inspection

# LEAD HAZARD

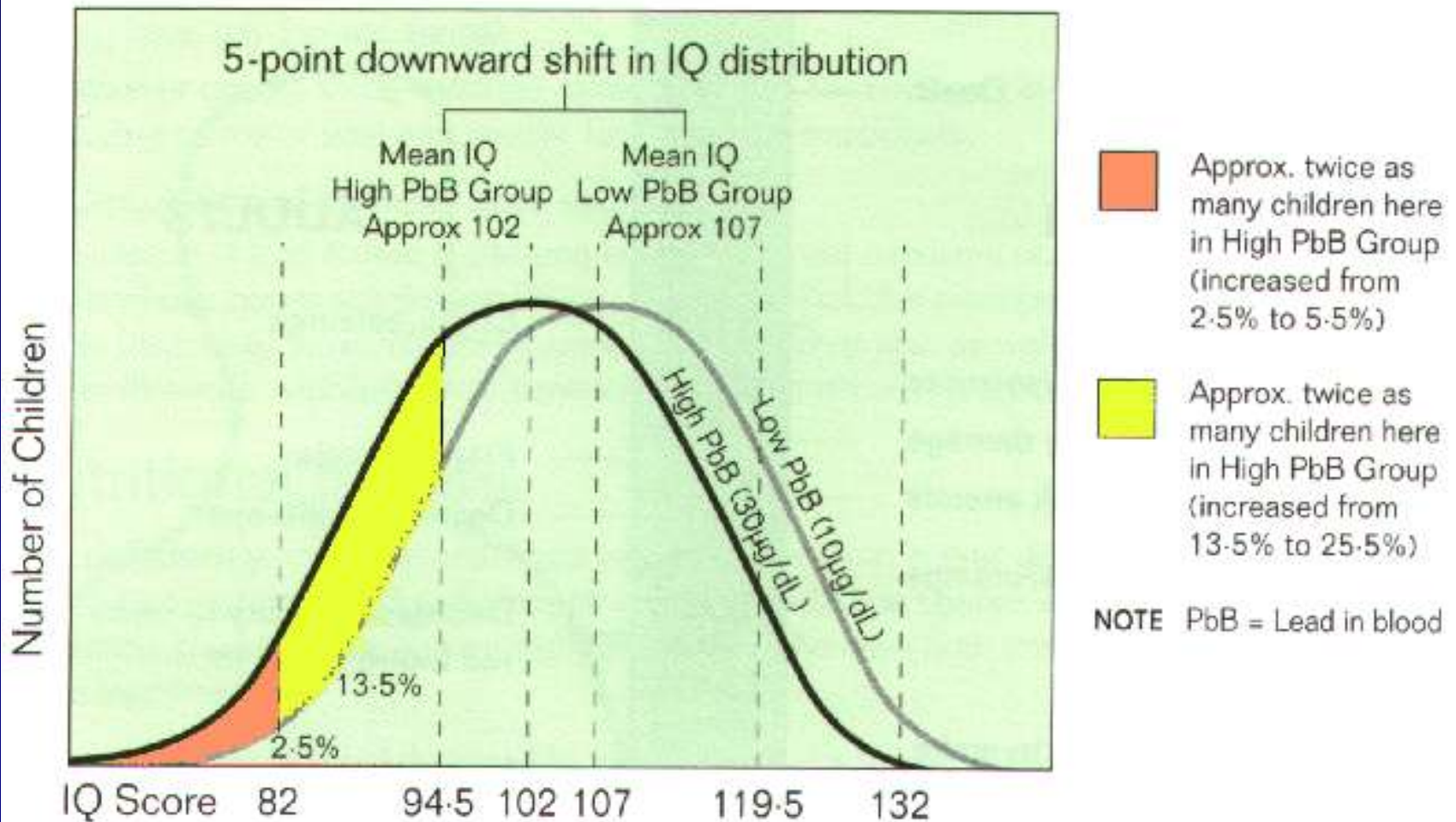
- 60 day advance notice
- Mandated pamphlet
  - to: owner & occupant
  - All parents of children
- Renovation signage
-

# LEAD HAZARD

- Contained Work Area
  - Inside: Plastic sheeting inside
  - Closed Exterior openings
- Outside : ground cover for >10 ft
- No flame/grinding
- Waste Removal
- Detailed Post Remediation Inspection
- Records requirement (3 years)



# Lead and IQ



# Symptoms from lead are rare!

## Symptoms at a glance

Below 45 µg/dL (2.17 µmol/L) in children and 60 µg/dL (2.90 µmol/L) in adults, lead exposure is usually asymptomatic. (See page 23 for who should be tested.)

MODERATE	SEVERE	MEDICAL EMERGENCY
Children > 25 µg/dL (1.2 µmol/L) Adults > 60 µg/dL	Children 55 to 70 µg/dL (2.64 to 3.38 µmol/L)	Children > 70 µg/dL+ (3.38+ µmol/L) Adults > 80 µg/dL+
Muscle pains Paresthesia Mild fatigue Aggressiveness Irritability Lethargy Abdominal discomfort	Arthralgia General fatigue Poor concentration Tremor Headache Diffuse abdominal pain Constipation Weight loss	Paresis or paralysis Paralysis Brain oedema Stupor or coma Fits and vomiting Gingival lead line Colic Death

# Release of lead during osteolysis

- Pregnancy increases mobilization of lead from maternal skeleton

Gulson BL, Jameson CW, Mahaffey KR, Mizon KJ, Korsch MJ, Vimpani G.. J Lab Clin Med 1997a;130:51-62

- Mobilization of lead from the skeleton during the post-natal period is larger than during pregnancy.

Gulson BL, Mahaffey KR, Jameson CW, Mizon KJ, Korsch MJ, Cameron MA, Eisman JA. J Lab Clin Med 1998a;131:324-9

- Lead is released in menopausal bone loss
- Lead levels have second peak in middle age- more in men than women (NHANES 3).
- Lead follows calcium into and out of bone.





# CHILDHOOD SCREENING

- Action Levels for Young Children (6 months-6 years)
- 9-12 months, 36 months- test
- 36-72 months-never tested
- Test Immediately
- Verbal Risk Assessment Questions-
- If “YES” or “I DON’T KNOW”

# Verbal Risk Assessment for Lead Poisoning

- 1. Does child live in a building built before 1978 with peeling/ chipping paint or with recent or ongoing remodeling?
- 2. Does child have sibling/playmate who has or did have lead poisoning?
- 3. Do you (or family member work on a farm; in a bridge, tunnel, or high construction area; with batteries, ammunition, or visit a firing range?
- 4. Do you use any folk remedies that may

# Renovate Right

- Important lead information for Families, Child Care Providers and Schools
- US Environmental Protection Agency
- EPA-740-F-08-002
- !-800-424-LEAD ( 5323)







# RENOVATE RIGHT

US Environmental Protection Agency  
Publication EPA-740-F-08-002

Important Lead Hazard Information for  
Families, Child Care Providers and  
Schools March 2008

1-800-424-LEAD (5323)

# Reduction of Lead hazards in the home



# Childhood Risk Factor Questionnaire

**Does your child....**

**Have a brother or sister, housemate or playmate with an elevated blood lead level?**

**No  
Yes**

**Sometimes eat non-food items such as soil or paint?**

**No  
Yes**

**Have any of the following conditions sometimes associated with lead poisoning, eg iron deficiency anaemia, behaviour problem, learning problem or developmental delay?**

**No  
Yes**

# BEETLE BAILEY

