



Education Guidelines for the  
**PREVENTION AND MANAGEMENT**  
**OF LEAD POISONING**  
in Children



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# Contents

*Preface* . . . . . **iii**  
*Acknowledgments* . . . . . **iv**

## 1. Introduction

*Why is learning about lead exposure in children important?* . . . . . **1**  
*History of lead poisoning — an overview* . . . . . **2**  
*Scientific Evidence* . . . . . **3**  
*Lead Exposure: A Contributor to the Achievement Gap in Connecticut* . . . . . **4**  
*Prevalence of Childhood Lead Poisoning in the U.S. and Connecticut* . . . . . **5**  
*Primary Prevention Goals and Persistence of Lead Poisoning* . . . . . **6**  
*Public Health Standard for Intervention* . . . . . **7**

## 2. Educational Implications

*What can schools do?* . . . . . **10**  
*Step 1: Develop school district policy and procedures* . . . . . **10**  
*Step 2: Educate school personnel* . . . . . **11**  
*Step 3: Collaborate with parents and community partners to educate families and students* . . . . . **12**  
*Step 4: Immediately refer any children known to have exposure to lead to their medical provider and, if appropriate, refer for housing assistance. Students with symptoms consistent with lead toxicity should be referred for urgent medical evaluation.* . . . . **13**  
*Step 5: Use Child Find processes to locate, identify and refer as early as possible children with disabilities and their families who are in need of Early Intervention Program (Part C) or Preschool Special Education (Part B) services of the Individuals with Disabilities Education Improvement Act (IDEA).* . . . . . **14**  
*Step 6: Refer and monitor children and young people birth to 21 who are at high risk for lead poisoning but do not have evidence of a BLL equal to or greater than 5 mcg/dL* . . **16**  
*Step 7: Obtain a lead history for all students ages 3-21 identified as having a BLL equal to or greater than 5 mcg/dL* . . . . . **16**  
*Step 8: Develop a monitoring plan within a Scientific Research-Based Intervention (SRBI) framework, addressing the needs of all students ages 3–21, as appropriate, with a history of BLLs equal to or greater than 5 mcg/dL.* . . . . . **17**  
*Step 9: Refer preschoolers and young school-age children with a history of BLLs equal to or greater than 5 mcg/dL for enrichment opportunities as indicated* . . . . . **18**  
*Step 10: Refer students, when indicated, to a Section 504 team or PPT for determination of a disability under Section 504 of the Rehabilitation Act or the Individuals with Disabilities Education Act* . . . . . **18**

### 3. Professional Development Opportunities for Educators

*Lead Awareness and Management Challenge: A Funding and Workshop Opportunity . . . . .* 24  
*Lead Poisoning: Limiting the Ability to Learn . . . . .* 24  
*The Health Education Lead Poisoning (H.E.L.P.) Course Series. . . . .* 24

### 4. Lead Prevention and Intervention: Resources and Services for Parents

*Connecticut Department of Public Health: Resources for Prevention, Screening, and Education . . . . .* 28  
*Connecticut State Department of Education: Resources on Section 504 and special education (IDEA) . . . . .* 30  
*Connecticut Resources for Education, Medical Treatment, and Housing . . . . .* 33  
*U.S. Centers for Disease Control and Prevention: Education and General Information . . . . .* 33

### 5. Lead Prevention and Intervention: Resources for Educators

*Best Review Article . . . . .* 36  
*Articles Providing a General Overview of Lead Poisoning in Children and Lead Poisoning Prevention . . . . .* 36  
*Articles Related to Lead and Neuropsychological, Cognitive and Learning Deficits . . . . .* 38  
*Articles Related to Lead and Behavior . . . . .* 41  
*Articles on Lead and Other Clinical Issues . . . . .* 42  
*Articles Related to Sources of and Risk Factors for Lead Exposure . . . . .* 43  
*Articles Related to Nutrition . . . . .* 44  
*Articles on Lead and Children with Pervasive Developmental Disorders . . . . .* 45  
*Articles on Lead and Maternal/Prenatal Exposure . . . . .* 45  
*Other Articles . . . . .* 46  
*Other Publications . . . . .* 46

### 6. Appendixes

*Appendix A: Connecticut State Department of Education Health Assessment Record (HAR-3)50*  
*Appendix B: Blood Lead Level History Form . . . . .* 51  
*Appendix C: Sample Assessment Model for Lead Poisoning . . . . .* 53  
*Appendix D: Sample Assessment Model for Lead Poisoning – Preschool Children . . . . .* 55  
*Appendix E: Connecticut Department of Public Health Lead Provider Letter . . . . .* 57  
*Appendix F: Connecticut Department of Public Health Requirement and Guidance for Childhood Lead Screening by Health Care Professionals in Connecticut. . . . .* 59  
*Appendix G: Connecticut Department of Public Health Lead Educational Handouts . . . . .* 61

### 7. Endnotes

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## Preface

### *A Call to Action!*

Childhood lead poisoning remains a critical environmental health concern in Connecticut. Childhood lead exposure has been linked to a number of adverse cognitive outcomes, including reduced performance on standardized intelligence quotient tests, decreased performance on cognitive functioning tests, adverse neuropsychological outcomes, neurobehavioral deficits, decreased end-of-grade test scores and classroom attention deficit behaviors.

In response to these health concerns, the Connecticut State Department of Education (CSDE) and the State Department of Public Health (DPH) engaged researchers at Duke University's Children's Environmental Health Initiative to conduct an analysis of the effects of early childhood lead exposure on test performance among Connecticut schoolchildren.

Results from this study include the following:

- early childhood lead exposure negatively affected Connecticut Mastery Test scores in both reading and mathematics;
- disparate exposures by race suggest that exposure to lead may account for part of the achievement gap among Connecticut schoolchildren; and
- negative associations were statistically significant at blood lead levels well below the current Centers for Disease Control and Prevention's blood lead action level of 10µg/dl.

The importance of these results prompted the CSDE's development of the *Education Guidelines for the Prevention and Management of Lead Poisoning in Children* to inform the practice within school districts in:

- lead prevention;
- early identification of students exposed and affected by lead; and
- educational programming in response to lead exposure in order to mitigate existing or potential deficits.

The *Education Guidelines for the Prevention and Management of Lead Poisoning in Children* is available on the CSDE's Health Promotion Services/School Nurse Web site at <http://www.sde.ct.gov/sde/cwp/view.asp?a=2678&q=320768>. For more information, contact:

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# Introduction

# 1

## Why is learning about lead exposure in children important?

Lead is a poisonous metal found in small amounts in the earth's crust. It is ever-present in the human environment today because of industrialization.<sup>1</sup> Lead provides no known physical benefit for human beings, and its toxic effects, which are extensive, are especially dangerous for children. Children are more vulnerable than adults are to these toxic effects because:

- a greater proportion of ingested lead is absorbed from the gastrointestinal tract of children than of adults;
- a greater proportion of lead circulating in the body gains access to the brains of children, especially those 5 years of age or younger, than of adults; and
- the developing nervous system is far more vulnerable to lead's toxic effects than the mature brain.<sup>2</sup>

Lead poisoning, for the most part, is silent: most poisoned children have no symptoms and the vast majority of cases go undiagnosed and untreated. Although lead poisoning is disproportionately a problem of inner city and minority children, no socioeconomic group, geographic area, or racial or ethnic population is spared.<sup>3</sup> While lead poisoning can affect every system in the body, it is especially dangerous to the developing brains and nervous systems of unborn children and children under 6 years old.

Lead poisoning in children presents a critical challenge for educators because even at very low levels of exposure evidence shows that:



- it can cause serious, permanent damage to a child's developing brain;
- its neurotoxic effects can interfere with a child's ability to think, learn, pay attention, and behave appropriately;
- it is directly associated with lower IQ scores and lower scores on standardized performance tests; and
- research shows that it is a contributing factor to the achievement gap among Connecticut children.



It is also important for educators to address because:

- lead poisoning is entirely preventable;
- its neurotoxic and behavioral effects may be ameliorated by early enrichment; and
- educators have abundant opportunity, in collaboration with others, to contribute to the prevention and effective management of lead poisoning in children.

## History of lead poisoning — an overview

The toxic effects of lead exposure in children were observed and reported in the medical literature as early as the late 1800s. Initially, the most severe cases were recognized by major symptoms such as seizures and other neurological abnormalities, mental retardation, coma, and death. As physicians in the 1920s and 1930s were better prepared to recognize the symptoms of lead poisoning, including milder symptoms such as vomiting, colic, abdominal pain and irritability, the majority of cases still went undiagnosed because symptoms were easily confused with those related to other conditions, such as meningitis, brain tumors, and gastrointestinal conditions. Nevertheless, before 1940, both the medical community and the lead industry recognized that lead posed a major public health problem, especially for children.

Early in the 1900s, paint containing lead was recognized internationally as a major source of lead poisoning in young children, and by the end of the 1920s, several countries had banned the use of lead paint indoors and on certain products such as cribs and toys. By the 1940s, the lead industry in the United States had begun to decrease the amount of lead used in interior paints, but it was not until 1978 that lead-based paint was actually banned from use and subsequently phased out. Most homes built before 1978, like so many in Connecticut, were painted both inside and out with lead paint. In 1998, of the 16.4 million US homes with one or more children younger than 6 years, 25 percent still had significant amounts of lead-contaminated deteriorated paint, dust, or adjacent bare soil.<sup>4</sup>



It takes very little exposure to cause high blood lead levels.

Dust and soil become a final resting place for airborne lead from gasoline and dust from old paint and industrial sites. Lead in dust and soil can re-contaminate cleaned houses and contribute to elevating blood lead concentrations in children who play on bare, contaminated soil.<sup>5</sup> When old paint deteriorates,

or during remodeling, paint dust becomes prevalent in the environment. Exposed pregnant women can inhale the dust, increasing lead in their blood and in the blood of the fetus. Exposed young children can breathe in paint dust and ingest it by putting their dust-covered hands and toys to their mouths. They may also be exposed to lead by playing with paint chips or contaminated soil, or chewing on painted toys, cribs, or windowsills. It takes very little exposure to cause high blood lead levels.

While dust from old paint is not the only source of potential lead exposure for children, today it is the main source of high-dose exposure.<sup>6</sup> Contaminated soil and water from lead pipes also continue to be sources of lead exposure. Leaded gasoline was considered the greatest source of environmental lead contamination in the United States from the 1950s through the 1980s; it was phased out for use in cars starting in 1973 and completely banned for use in on-road vehicles in 1996. This phase-out resulted in an estimated 78 percent drop in average blood lead levels in this country between 1976 and 1991. Leaded gas can still be sold for off-road uses, such as farm equipment, racing cars, and aircraft. Furthermore, individual children may still be exposed to airborne lead in fumes or breathable dust resulting from sanding or heating old paint, burning or melting automobile batteries, or melting lead for use in a hobby or craft.<sup>7</sup>

## Scientific Evidence

The Centers for Disease Control and Prevention (CDC) defines lead poisoning according to the amount of lead found in a person's blood; it is measured in micrograms (mcg) per deciliter (dL). Over time, the CDC has identified a "blood lead level of concern" based on available scientific evidence. This level of concern, which designates the standard for diagnosis and intervention by public health officials and physicians, has significantly changed over time. In 1960, the CDC minimum level of concern was 60 mcg/dL; in 1985, it was 25 mcg/dL, and in 1991, it was decreased to 10 mcg/dL. In June 2012, the CDC eliminated the term "blood lead level of concern" and adopted the term "reference value." The "reference value" is based on the population of children ages 1–5 years in the United States whose blood lead levels are in the highest 2.5 percent of children tested. Today, that level is 5 mcg/dL. However, current scientific evidence has established that there is no safe level of lead in a child's body.<sup>8</sup>



Any lead is too much lead!<sup>9</sup>

Scientific research findings provide evidence that blood lead levels (BLLs) in children between 1 mcg/dL and 5 mcg/dL and 5 mcg/dL and 9 mcg/dL cause a more precipitous drop in IQ than BLLs in ranges above 10 mcg/dL.<sup>10, 11</sup> Of greater concern, research demonstrates that even when the drop in IQ is small (two to three points),

there can be significant neuropsychological deficits in one or more domains of brain function.<sup>12, 13, 14</sup> Research in children further suggests that the adverse health effects of BLLs less than 10 mcg/dL extend beyond cognitive function to include cardiovascular, immunological, and endocrine effects. The evidence is based on studies with large numbers and diverse groups of children with low BLLs and associated IQ and neuropsychological deficits. Effects at BLLs under 10 mcg/dL are also reported for behavioral domains, particularly attention-related behaviors and academic achievement, and do not appear to be confined



Effective interventions to improve cognitive functioning in children with lead poisoning must be multifaceted.

to lower socioeconomic status populations.<sup>15, 16, 17</sup>

Research confirms that elevated lead concentrations in the blood are more common among children living in poverty and provides some evidence that socioeconomic status and parenting influence associations between lead and child outcomes.<sup>18, 19</sup> Micronutrients that have been shown to influence the effects of lead include iron and zinc, indicating a relationship between lead poisoning and nutritional status. Also of importance, research findings indicate that effective interventions to improve child cognitive functioning must be multifaceted, including identification and reductions of toxins in the environment; monitoring and addition of appropriate nutrients in children's diets; parental education to increase involvement and other parenting skills such as limit setting and effective requests for child compliance,<sup>20</sup> and early enrichment.

Despite strong evidence of the harmful effects of lead poisoning in children demonstrated through population-based research, individual case studies also confirm that there can be considerable variability in functional outcomes among children with lead poisoning. One child with exposure to lead resulting in BLLs between 5 mcg/dL and 9.9 mcg/dL may sustain brain damage resulting in significant neurocognitive and behavioral deficits, while another child with an exposure level resulting in BLLs far exceeding 10 mcg/dL may not show any functional deficits in cognition or behavior.<sup>21, 22</sup> The reasons for this variability in functional outcomes are not fully understood, and are likely to be multifactorial. Furthermore, study outcomes vary on the relative importance of duration of exposure, peak BLL, and age of exposure.

Several studies indicate that concurrent (current BLL of school age child) or lifetime average blood lead concentrations are better predictors of children's IQ scores than measures taken in early childhood.<sup>23</sup> In any event, a blood lead level alone is not a reliable biomarker of total lead exposure, except for short-term exposure, since the half-life of lead in the blood is 36 days. From the blood stream, lead is deposited in the brain, other soft tissues of the body, bones, and teeth, where it may remain for years; some of it is eliminated through the kidneys and gastrointestinal tract. Blood lead levels do not measure lead deposits in the brain or other tissues of the body. Additionally, lead stored in the bones and other tissues can leach back into the blood stream and recirculate through the body under certain circumstances, for example, during pregnancy.

The next section discusses research specific to the effects of lead exposure on Connecticut children.

## Lead Exposure: A Contributor to the Achievement Gap in Connecticut

In response to the health concerns cited by experts in Connecticut and nationally, the Connecticut State Department of Education (CSDE) in collaboration with the State Departments of Public Health (DPH) and Social Services engaged researchers at Duke Uni-



One child with exposure to lead resulting in BLLs between 5 mcg/dL and 9.9 mcg/dL may sustain brain damage resulting in significant neurocognitive and behavioral deficits, while another child with an exposure level resulting in BLLs far exceeding 10 mcg/dL may not show any functional deficits in cognition or behavior.

versity's Children's Environmental Health Initiative (CHEI) to conduct an analysis of the effects of early childhood lead exposure on test performance among Connecticut school children. Early in 2011, the first phase of the study results were released in a report titled, *The Impact of Early Childhood Lead Exposure on Educational Test Performance among Connecticut Schoolchildren, Phase I Report* (also referred to as "The Miranda Study"). Phase II of the Miranda Study was released in 2013 (<http://www.sde.ct.gov/sde/lib/sde/pdf/deps/student/health/linking.lead.and.education.data.phaseii.pdf>). Based on scientific analysis of the Connecticut data, Dr. Marie Lynn Miranda and other researchers at CHEI found the following:

- early childhood lead exposure negatively affected Connecticut Mastery Test scores in reading and mathematics;
- disparate exposures by race suggest that exposure to lead may account for part of the achievement gap among Connecticut schoolchildren;<sup>24</sup> and
- negative associations were statistically significant at blood lead levels below the current Centers for Disease Control and Prevention's blood lead action level of 5 mcg/dL.<sup>25</sup>

These results emphasize the ongoing, critical necessity of protecting children from lead exposure, and underscore important implications for Connecticut's students and educators. Indeed, the study's outcomes provided the motivating force for the development of these guidelines and collaborative statewide efforts to inform practice within school districts regarding:

- lead poisoning prevention;
- effects of lead exposure on early childhood development;
- early identification of students with a history of exposure to lead;
- educational programming in response to lead exposure in order to mitigate or eliminate existing and potential deficits; and
- educational resources available for educators.

## Prevalence of Childhood Lead Poisoning in the U.S. and Connecticut

Approximately 250,000 children in the United States today are identified with blood levels equal to or greater than 10 mcg/dL.<sup>26</sup> Approximately 450,000 U.S. children have BLLs at or above 5 mcg/dL, almost double the total number with BBLs at or above 10 mcg/dL.

In Connecticut, state and local officials follow the current CDC standard for public health and medical interventions (see appendixes E and F). Based on the 2011 Connecticut screening data, 84,008 children, age birth to 6 years, were screened in 2011.<sup>27</sup> Of the 84,008 children tested, 4,365 (6.5%) had blood lead levels (BLLs) between 5 mcg/dL and 9.9 mcg/dL, 355 (0.8%) had BLLs between 10 mcg/dL and 14.9 mcg/dL, 153 (0.3%) had BLLs between 15 mcg/dL and 19.9 mcg/dL, and 111 (0.1%) had BLLs greater than or equal to 20 mcg/dL.



In Connecticut, public health officials follow the current CDC standard of BLL equal to or greater than 5 mcg/dL to activate public health and medical interventions for children with lead poisoning.

## Primary Prevention Goals and Persistence of Lead Poisoning

In 1991, the U.S. Department of Health and Human Services made eradication of lead poisoning in children a public health goal for the nation.<sup>28, 29</sup> Also in 1990–91, the U.S. Department of Housing and Urban Development and the Environmental Protection Agency released plans dealing with the elimination of lead hazards. Eradication of lead poisoning in children was also included in *Healthy People 2010: Objectives for Improving Health*, as a priority health goal for the nation to achieve within the 2000–2010 decade.<sup>30</sup>

Eradication of lead paint and dust in housing and soil was deemed the best method of primary prevention because it eliminates the source of the problem before exposure occurs. Early screening of young children and rapid intervention to prevent lead poisoning as defined by the CDC was recognized as the next best step in prevention efforts.



Despite the significant reduction in average BLLs in recent decades, exposure in unborn and young children persists, as do racial and income disparities.

Although progress has been made with state and federal funding targeted both to educational programs about lead poisoning, housing improvement and abatement projects, and early childhood screening and intervention programs, many children in Connecticut and across the country continue to live and play in homes where they are exposed to lead. In the objectives for environmental health in *Healthy People 2020*, the U.S. Department of Health and Human Services states:

*The number of children with elevated blood lead levels in the U.S. is steadily decreasing. As a result, determining stable national prevalence estimates and changes in estimated prevalence over time...is increasingly difficult. **Eliminating elevated blood lead levels in children remains a goal of utmost importance to public health.** The sample sizes available...preclude the ability to have a viable target for HP2020...Efforts must and will continue to reduce blood lead levels and to monitor the prevalence of children with elevated blood lead levels.*<sup>31</sup>

Thus, reducing lead poisoning remains a high public health priority at the federal, state, and local levels for the 2011–2020 decade. While a priority objective, it is unclear what level of funding will be available to support ongoing primary prevention programs over this decade.

Despite the significant reduction in average BLLs in recent decades, exposure in unborn and young children persists, as do racial and income disparities.<sup>32, 33</sup> According to the ACCLPP report, racial and income differences can be traced to differences in housing quality, environmental conditions, nutrition, and other factors.<sup>34</sup> Others point out that those who are poor and disadvantaged are more likely to:

- live in lead-contaminated environments, especially in dilapidated housing with flagrant lead paint hazards;
- live in urban neighborhoods where years of traffic have left tons of lead deposits from leaded gasoline; and
- live near point sources of lead, such as smelters, or hazardous waste sites.<sup>35</sup>

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## Public Health Standard for Intervention

“In January 2012, the Advisory Committee on Childhood Lead Poisoning Prevention (ACCLPP) recommended that the CDC change its ‘blood lead level of concern,’ which has been 10 micrograms of lead per deciliter. Over the last several years, a growing body of scientific evidence has suggested adverse effects in children with BLLs below 10 micrograms of lead per deciliter of blood. On May 16, 2012, the ACCLPP officially announced their agreement with that recommendation and the change in the CDC policy.

The ACCLPP recommends that CDC eliminate the term ‘level of concern.’ Instead, the committee recommends linking elevated blood lead levels to data from the National Center for Environmental Health (NCEH) National Exposure Report to identify children living or staying for long periods in environments that expose them to lead hazards. This new level, called a ‘reference value,’ is based on the population of children aged 1-5 years in the United States whose blood lead levels are in the highest 2.5 percent of children tested. Today, that level is 5 micrograms of lead per deciliter of blood.

For more than 20 years, NCEH’s work to eliminate lead poisoning in children has been one of CDC’s most visibly successful initiatives. It has contributed significantly to lowering blood lead levels, increasing the number of children tested for elevated blood lead levels, and promoting state and local lead screening plans and abatement laws.”<sup>36</sup>





# Educational Implications

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**B**ASED ON CURRENT RESEARCH FINDINGS RELATED TO THE EFFECTS OF LEAD POISONING ON THE LEARNING AND behavior of individual children, schools have a responsibility to contribute to primary prevention and early intervention efforts to eliminate the occurrence of lead poisoning and address its effects on children. It is critical that communities work together to:

- prevent lead exposure in children through elimination of lead paint in old homes, improvement of dilapidated housing, enhancing the nutrition status of at-risk children and parent education (primary prevention); and
- intervene rapidly when exposure has occurred to counteract potential toxic effects on neurocognitive development, learning, and behavior (early intervention).



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The purpose of these guidelines is to clarify the role of schools in meeting the needs of children and families affected by lead.

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While much work to prevent and to intervene early with lead poisoning in children has already been achieved through public health, housing, and medical officials, the role of schools in identifying and providing appropriate educational services to children who may have been exposed to lead has been less clear. The purpose of these guidelines is to clarify that role and assist educators in meeting the needs of children and families affected by lead.

## What can schools do?

There are important steps that school districts can take to contribute to both primary prevention and early intervention efforts on behalf of children in their communities. Those steps are listed below. Specific details and issues related to each of these steps are then provided in individual sections that follow. In addition, two flowcharts are provided to visually demonstrate the process for steps 4 and 7 through 10; one is for preschoolers and the second is for students in kindergarten through Grade 12.

1. Develop school district policy and procedures regarding children who may be affected by lead.
2. Educate school personnel.
3. Collaborate with parents and community partners to educate families and students.
4. Immediately refer any child known to have exposure to lead to their medical provider and if appropriate, referral for housing assistance. Students with symptoms consistent with lead toxicity should be referred for urgent medical evaluation.
5. Use Child Find processes to locate, identify and refer as early as possible children with disabilities and their families who are in need of Birth-to-Three (Part C) or Preschool Special Education (Part B) services of the Individuals with Disabilities Education Improvement Act (IDEA).
6. Monitor children and young people birth to 21 who are at high risk for lead poisoning but do not have evidence of a BLL equal to or greater than 5 mcg/dL.
7. Obtain a lead history for all students ages 3–21 identified as having a BLL equal to or greater than 5 mcg/dL.
8. Develop a monitoring plan within a Scientific Research-Based Intervention (SRBI) framework, addressing the needs of all students ages 3–21, as appropriate, with a history of BLLs equal to or greater than 5 mcg/dL.
9. Refer preschoolers and young school-age children with a history of BLLs equal to or greater than 5 mcg/dL for enrichment opportunities as indicated.
10. Refer students, when indicated, to a Section 504 team or PPT for determination of a disability and eligibility under Section 504 of the Rehabilitation Act or the IDEA.



### *Step 1: Develop school district policy and procedures*

A policy addressing students affected by lead poisoning should briefly state a school district's commitment to collaboration with parents and community partners to identify and intervene early with children who have been exposed to lead. Alternatively, if the district already has a policy on educating students with special health care needs, lead poisoning can be one of the health conditions that is addressed within the broader policy.

School district policy and procedures regarding students who may be affected by lead should include:

- a. staff education;

- b. collaboration with community partners;
- c. parent education strategies;
- d. child find identification of children suspected of having a disability;
- e. referral of identified students to the appropriate school team for monitoring;
- f. referral of identified students for enrichment opportunities, lead screening, medical care, public health interventions and housing assistance; and
- g. when indicated, referral for an evaluation to determine eligibility for special education or accommodations/modifications under Section 504.

Generally school districts already have procedures in place for Child Find, general education accommodations (e.g., individualized health care plans), SRBI, Section 504, and special education. Districts should review those procedures and ensure that they properly address the prevention, early intervention, or other needs of students with a positive history of lead exposure at BLLs equal to or greater than 5 mcg/dL. A district can use the steps outlined in these guidelines to develop new procedures specific for these students or revise existing ones to include the recommended actions.

### *Step 2: Educate school personnel*

All members of a school team need to understand that:

- a. Lead poisoning, even at low levels of exposure (under 10 mcg/dL), may cause serious, permanent damage to an individual child's developing brain and interfere with a child's ability to:
  - i. think
  - ii. learn
  - iii. pay attention
  - iv. behave appropriately
- b. Lead poisoning can be found in any child regardless of race, socioeconomic status or location of home.
- c. Lead poisoning disproportionately affects urban and minority populations.
- d. A history of lead exposure, even with BLLs levels at higher levels, does not, in an individual child, automatically indicate adverse effects.
- e. Interventions to improve child outcomes should be multifaceted.
- f. Prevention and early intervention strategies, such as enrichment, good nutrition, and effective parenting skills, can improve learning and behavior outcomes.
- g. Educational interventions must be provided equitably within the context of applicable laws and regulations.

Many health and education providers today are not knowledgeable about the continuing existence of lead poisoning among children in Connecticut or the current research that provides evidence of neurotoxic effects of lead on the developing brain, even at low levels of exposure previously considered safe. It is important for staff to learn about the current research, understand the potential for permanent harm in affected children, and recognize their responsibilities in the prevention, identification of children exposed to lead, and early interventions to counteract the harmful effects of lead poisoning.

Staff members also need guidance in understanding both the obligations and the limitations for addressing the needs of children with lead poisoning that federal law and regulation impose on school districts, particularly those related to discrimination and the education of children with disabilities. These guidelines are intended to help educators pursue best practice standards for educational interventions given those obligations and restrictions.

It may be helpful for school districts to identify a core group of professional staff (i.e., school nurses, school psychologists, school social workers and school counselors) to be responsible for providing consistent professional development programs within the district.

This core group must first gain knowledge about lead poisoning and a more in-depth understanding of the research and its implications for education than other staff may require. They can review the resources for educators discussed in [section 3](#), use the PowerPoint provided in the Lead Action for Medicaid Primary Prevention (LAMPP) program, discussed in that section, and access some of the professional literature regarding the effects of lead poisoning on children.

### *Step 3: Collaborate with parents and community partners to educate families and students*

Schools should collaborate with parents and community partners to educate families and students about:

- a. lead poisoning;
- b. lead exposure prevention strategies;
- c. sources of lead exposure;
- d. lead screening;
- e. the importance of enrichment and effective parenting; and
- f. resources for education and intervention.



Primary prevention of lead poisoning and early intervention with those affected by lead's presence in the environment require a broad community approach.

Primary prevention of lead poisoning and early intervention with those affected by lead's presence in the environment require a broad community approach. Schools can contribute to primary prevention programs already established by local health departments and housing and medical providers funded to provide such programs in several ways. They can:

- a. incorporate lead poisoning prevention information into health and science curricula for students;
- b. collaborate with public health officials and pediatric medical providers in delivering educational programs for parents on lead poisoning prevention and effective parenting skills, and distributing educational information to families in the community;
- c. alert staff, parents and community partners of known or potential lead hazards affecting the community or a segment of the community; and
- d. identify children at high risk for lead poisoning and intervene through collaborations with public health officials before exposure occurs.

Schools can — and are obligated to — contribute to early intervention efforts through Child Find activities, which are discussed in the next subsection. Schools should also establish working relationships

with providers of preschool enrichment opportunities, such as Head Start and School Readiness programs, to facilitate referral and placement.

***Step 4: Immediately refer any children known to have exposure to lead to their medical provider and, if appropriate, refer for housing assistance. Students with symptoms consistent with lead toxicity should be referred for urgent medical evaluation.***

School personnel are often in a good position to identify children who may have been exposed to lead. When this information comes to their attention, school personnel should make a referral to the child's medical provider and refer the family for housing assistance, if indicated. It is important to make these referrals as early as possible since lead poisoning often occurs with no obvious symptoms and, therefore, goes unrecognized.<sup>37</sup>

Signs and symptoms, if any, usually do not appear until dangerous amounts of lead have accumulated in the child's brain and body. Severe symptoms of acute lead poisoning are rare, and are usually seen at levels of 70 mcg/dL and above. They require emergency intervention and include:

- a. seizures;
- b. unconsciousness;
- c. paralysis; and
- d. swelling in the brain.

Children may show symptoms after extended periods of blood lead levels at lower levels. The following symptoms, while not specific to lead poisoning, may be indicative of lead poisoning, and should be considered by school nurses and other educators in assessing students who demonstrate:

- a. irritability;
- b. loss of appetite;
- c. weight loss;
- d. fatigue;
- e. sluggishness, lethargy;
- f. abdominal pain;
- g. vomiting;
- h. constipation;
- i. learning difficulties; and
- j. behavior problems, including hyperactivity and aggression.

Students with symptoms should be referred for medical evaluation and, if not already provided, a BLL screening.



Schools should establish working relationships with providers of preschool enrichment opportunities, such as Head Start and School Readiness programs, to facilitate referral and placement.

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State law requires that health care providers consider blood lead testing for any child regardless of age with the following: unexplained seizures, neurologic symptoms, hyperactivity, behavior disorders, growth failure, abdominal pain, or other symptoms consistent with lead poisoning or associated with lead exposure; recent history of ingesting, or an atypical behavior pattern of inserting, any foreign object (even if the foreign object is unleaded) into a body orifice.

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***Step 5: Use Child Find processes to locate, identify and refer as early as possible children with disabilities and their families who are in need of Early Intervention Program (Part C) or Preschool Special Education (Part B) services of the Individuals with Disabilities Education Improvement Act (IDEA).***

Schools must actively use Child Find processes and collaborate with parents and community partners to identify, locate, and evaluate children from birth through age 21 who are suspected of having a disability or who have a known disability. This includes children who have a history of exposure to lead or a BLL equal to or greater than 5 mcg/dL. While not mandated by Child Find under IDEA or Section 504, school districts can also help identify children in the community at high risk for lead exposure and refer them for housing and public health assistance.

School districts are required under Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Amendments Act of 2008 and the IDEA of 2004 to actively identify children who may have a disability, as defined in the laws, and who may require accommodations in the classroom or special education. Because children who have BLLs equal to or greater than 5 mcg/dL may have sustained permanent brain damage, they should be identified through Child Find activities in collaboration with community providers such as Birth to Three, local hospitals, pediatric providers, public housing authorities, child care providers, school readiness programs, and nursery schools.

Among children from birth to attendance in kindergarten, Child Find activities may include:

- a. identifying all infants, toddlers, and preschoolers with elevated BLLs equal to or greater than 5 mcg/dL;
- b. monitoring those identified for early identification of neuropsychological and behavioral deficits or developmental delays that may develop, indicating the need for further assessment; and
- c. referring families of those identified for assistance with parent education, housing, medical care, social services, and child enrichment opportunities, such as Head Start and School Readiness programs.



#### **Child Find**

The Child Find process is used to identify, locate, and evaluate children from birth through age 21 who are suspected of having a disability or who have a known disability.

To attend early childhood programs in Connecticut, attendees must provide the program with the state mandated Early Childhood Health Assessment (“yellow” form) completed by their health care provider. This form asks for information on the child’s BLL screening results at one and two years and the health care provider must check “yes” or “no” to indicate if the child had a BLL equal to or greater than 5 mcg/dL. Community preschool providers, including public schools, should review those forms and identify children who should receive monitoring and referral services as identified above. That applies to all those meeting the current CDC standard of equal to or greater than 5 mcg/dL.

Infants and toddlers from birth to 3 years are automatically eligible for IDEA Part C early intervention

supports when a BLL greater than 45 mcg/dL has been confirmed. Infants and toddlers with lower BLLs are eligible when two standard deviations (SD) below the mean is found in one developmental domain or a 1.5 SD below the mean is found in two or more developmental areas, whether or not the delay is due to lead exposure. It is critical to collaborate with Birth to Three providers to ensure a smooth transition to school services and to request any information they may have regarding a child's BLL history, which may be shared with parent consent. This information can help Child Find teams to identify children with a history of lead exposure for monitoring and referral purposes as described above.

Early identification as well as Child Find efforts to identify students in kindergarten through Grade 12 also require collaborative parent and community partnerships since it may be parents, pediatric providers, hospitals, public health officials and housing authorities who can alert schools to a family that is newly exposed to lead (e.g., through building reconstruction or industry) or a school-age child who is newly diagnosed with lead poisoning. Educational programs for parents and periodic communications with community partners are useful strategies.

School nurses have a special role to play in the early identification and Child Find processes for students entering public schools, regardless of age. At entry into school, every child is required to have a health assessment documented on either the Early Childhood Health Assessment Record ("yellow") form or the Health Assessment Record (HAR-3) ("blue") form. The HAR-3 has been revised to ask health care providers to document whether a student has a *history* of BLL equal to or greater than 5 mcg/dL, rather than the student's current BLL (see [appendix A](#)). Since school nurses should always review these forms for health information relevant to school attendance and learning, this is not an added burden for school districts and nurses. See the next subsection on obtaining a lead history for children with a BLL equal to or greater than 5 mcg/dL.

All school personnel must understand their responsibilities under the Child Find requirements. Any staff member who has a reason to suspect that a child may have been exposed to lead or has had elevated BLLs equal to or greater than 5 mcg/dL, should notify the appropriate school team, which includes any of the following:

- Child Find
- Preschool
- General education team
- SRBI
- IHCP (individualized health care plan) team
- Building pupil services team
- Section 504 team
- Planning and Placement Team (PPT)



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School nurses have a special role to play in the early identification of children exposed to lead and in the Child Find process for students entering public schools, regardless of age.

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The team may now ask the school nurse to gather more specific lead and other health history informa-



tion before meeting to decide the next appropriate action.

***Step 6: Refer and monitor children and young people birth to 21 who are at high risk for lead poisoning but do not have evidence of a BLL equal to or greater than 5 mcg/dL***

For children at high risk for lead poisoning due to their environment, but without evidence of a blood level at or above 5 mcg/dL, it is important to:

- a. Ensure that they have been screened appropriately for blood lead. If not, referral for screening and medical monitoring is critical.
- b. Refer, as appropriate, to social services, public health officials and medical providers for information regarding and assistance with prevention, housing, parenting, and financial, nutritional, and health care needs.
- c. Monitor for screening results and changes in health status or living arrangements.
- d. Re-refer as needed.

At-risk infants and toddlers (under age 3) are followed by their medical providers and may also be followed by local public health and social service officials.

***Step 7: Obtain a lead history for all students ages 3-21 identified as having a BLL equal to or greater than 5 mcg/dL***

For all students ages 3–21 attending school and identified as having a BLL equal to or greater than 5 mcg/dL, the school nurse at a minimum should:

- a. obtain a focused BLL history from the child’s pediatrician or health care provider (see [appendix B](#) for a sample Blood Lead History form); and
- b. refer the child to the appropriate school team after obtaining the child’s complete lead history.



While it is neither required nor appropriate to evaluate every child who has been exposed to lead, it is reasonable and important to monitor them for early signs of a disability.

A history of a child’s blood lead levels over time is a much better indicator of overall exposure to lead than a single blood lead level (see [Scientific Evidence](#) in the Introduction). Even though the child may not show a functional deficit at an early age, research supports that educators should have a very high level of suspicion of brain damage from lead poisoning, including BLLs below 10 mcg/dL. Only individual assessment provides evidence of such effects and their specific nature in any given child. Deficits may persist<sup>38</sup> and not be evident until the child is older<sup>39</sup> and learning tasks are more challenging. While it is neither required nor appropriate to evaluate every child who has been exposed to lead, it is reasonable and important to monitor them for early signs of a disability.

In the case of a child with a complex health or education history, it may be appropriate to request

permission from the parent to complete a comprehensive health history and summary for the school team before referral is made to determine a child's eligibility for special education or accommodations/modifications under Section 504. A comprehensive health history includes the lead history. The school nurse, in consultation with the school nurse supervisor, school district medical advisor and other team members as appropriate, should make this decision.

For students in prekindergarten through Grade 12 attending public schools or private, nonprofit schools receiving health services through the public schools, the school nurse may obtain the information in any of the following ways:

- a. the health care provider checks "yes" to the question of "history of elevated BLL" on the HAR-3 ("blue") form;
- b. the health care provider indicates a BLL at or above 5 mcg/dL on the Early Childhood Health Assessment Record ("yellow") form; or
- c. a parent or community partner reports that a child has a BLL equal to or greater than 5 mcg/dL.

Parental permission signed on the HAR-3 and Early Childhood Health Assessment Record form permits the school nurse to follow up with the child's health care provider regarding details of the child's history of elevated BLLs. Nevertheless, best practice is to inform the parent in advance of the nurse's concern, plan to communicate with the physician, and anticipated next steps.

In the case of a preschooler attending a program not receiving health services through the public schools (e.g., a community nursery school), parental permission signed on the Early Childhood Health Assessment Record form permits the program's health/nurse consultant/coordinator to contact the health care provider for the lead history.



See pages 21 and 22 for flowcharts that demonstrate the process schools should follow for steps 7 through 10; one is for preschoolers and the second is for students in kindergarten through Grade 12.

As above, best practice is to inform the parent, in advance, of the consultant or coordinator's concern, plan to communicate with the physician, and anticipated next steps. Next steps in this situation should include, with parental permission, sharing the information with the family's local school district Child Find coordinator. The school district's Child Find coordinator, preschool nurse, or other staff member should be designated to follow up on the history obtained and the need for a monitoring or other action plan.

***Step 8: Develop a monitoring plan within a Scientific Research-Based Intervention (SRBI) framework, addressing the needs of all students ages 3–21, as appropriate, with a history of BLLs equal to or greater than 5 mcg/dL.***

Students with a history of BLLs equal to or greater than 5 mcg/dL should be monitored as discussed above. The plan can be very simple, for example,

*The general education team will meet to review the child's progress on an annual basis, or more frequently (e.g., at progress monitoring intervals within the SRBI framework) should changes in health status, learning, or behavior occur.*

These monitoring plans can be IHCPs, SRBI plans, student success plans, or if eligible, part of a Section 504 plan or IEP.

***Step 9: Refer preschoolers and young school-age children with a history of BLLs equal to or greater than 5 mcg/dL for enrichment opportunities as indicated***

Since the research demonstrates that early enrichment and effective parenting skills can significantly enhance neuropsychological outcomes for students exposed to lead, school district teams should actively seek enrichment opportunities for these students. For preschoolers, districts can work with local program administrators of such programs, for example Head Start and School Readiness, to establish and facilitate placement of lead poisoned children in these programs. Young school age students with lead exposure may also benefit from enrichment through afterschool programs in the school district or community.

School teams should facilitate parental participation in educational programs related to enrichment activities at home and effective parenting skills when available.

***Step 10: Refer students, when indicated, to a Section 504 team or PPT for determination of a disability under Section 504 of the Rehabilitation Act or the Individuals with Disabilities Education Act***

If at any point in the Child Find process, regardless of age or grade, a staff member or team *suspects* that a child may have a disability related to lead exposure, the staff member or team must refer the child to a Section 504 team or PPT for determination of eligibility under Section 504 of the Rehabilitation Act or the IDEA. The respective team must decide what evaluation is needed in order to determine eligibility and should follow established policy and procedures for making decisions regarding evaluation and eligibility.

If a 504 team determines that a child has an impairment (lead poisoning) and the impairment, without the use of mitigating measures, substantially affects learning, or another major life activity such as attention that in turn substantially limits learning, the 504 team should refer the child for evaluation under IDEA.



Intelligence tests alone are unsatisfactory for evaluating children with lead poisoning because they do not satisfy the requirements of a comprehensive evaluation and are not sufficiently sensitive to the effects of brain injury.

If the PPT is considering whether a child may be disabled due to lead poisoning, best practice suggests a two-step evaluation.<sup>40</sup> The first step should be an evaluation to confirm deficient performance in the area where the deficiency is suspected. If a deficiency is confirmed, the PPT should consider if the child with a history of lead poisoning needs a comprehensive neuropsychological evaluation to look for other cognitive and functional deficits.<sup>41, 42</sup> Brain injury from lead poisoning is similar to other types of brain injury where there is no single cognitive profile. Therefore, specific areas of the brain affected and the extent of the damage in any one area are variable child to child. The results of a neuropsychological assessment help the team to understand the discrete areas of the brain affected, including specific deficits, as well as compensatory strengths. This information helps the team to develop an appropriate IEP to meet the child's individual learning needs.

Intelligence tests alone do not satisfy the requirements of a comprehensive evaluation and, therefore, are unsatisfactory for evaluating children with lead poisoning. They are not sufficiently sensitive to the effects of brain injury. IQ or its equivalent is a single number that is determined based on the child's overall performance on a battery of subtests that assess multiple and often unrelated functions. Brain injury, whether from trauma, oxygen deprivation or toxic exposures such as lead, frequently affects functioning in a limited number of neurobehavioral systems. Intelligence test batteries underestimate the effects of such injuries.<sup>43</sup>

It is for this reason that, once a deficit is identified in one area, consideration of a neuropsychological assessment of all areas is warranted. These areas include, depending on the age of the child:

- Executive function
- Working Memory Capacity
- Processing Speed
- Attention
- Memory
- Language - Perception
- Language - Reading
- Language - Speech Comprehension
- Language - Expressive Speech
- Language - Writing
- Perceptual - Motor
- Social/Emotional Behavior
- Adaptive Behavior<sup>44</sup>

See [appendix C](#) for a sample neuropsychological assessment model for lead poisoning. This model is especially targeted for school-age students.

In preschoolers, comprehensive developmental assessment is the best method for identifying neuropsychological deficits.<sup>45</sup> This assessment should include the following domains:

- Measure of intelligence
- Executive functioning
- Working memory capacity
- Processing speed
- Attention
- Memory
- Language – perception
- Language – early reading
- Language – speech comprehension
- Language – expressive speech
- Language – early writing
- Perceptual-motor
- Social-emotional behavior<sup>46</sup>

See [appendix D](#) for a sample assessment model for lead poisoning in preschool children. This model is very comprehensive. The PPT can use this model as guidance in developing an evaluation for an individual child.

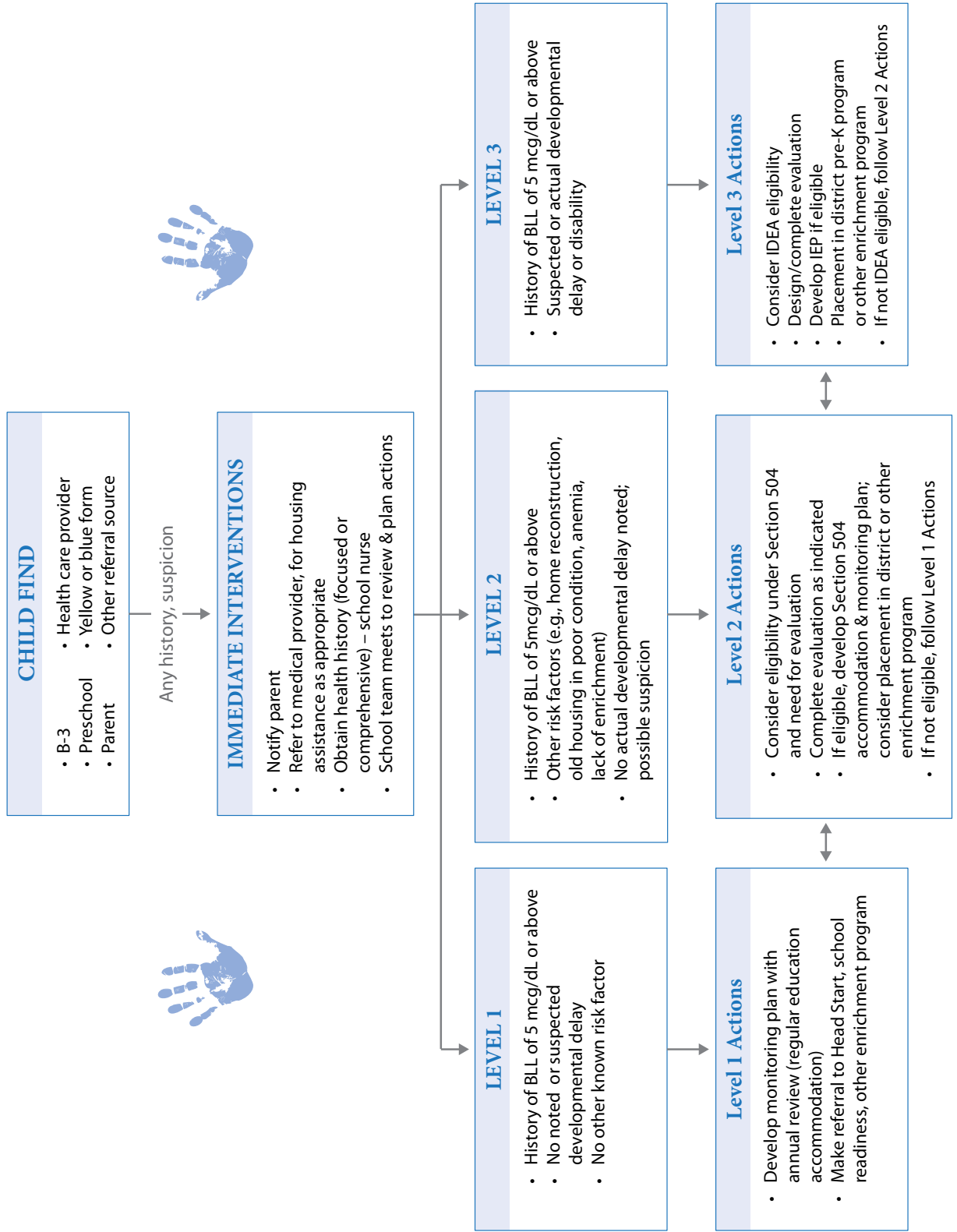
Eligibility determination for special education must be made according to the evaluation results. Children with lead poisoning may be found eligible under the category “Other Health Impairment.” Lead poisoning is one chronic condition mentioned in the definition as defined in the federal regulations:

*Other health impairment means having limited strength, vitality or alertness, including a heightened alertness to environmental stimuli, that results in limited alertness with respect to the educational environment, that—(i) Is due to chronic or acute health problems such as asthma, attention deficit disorder or attention deficit hyperactivity disorder, diabetes, epilepsy, a heart condition, hemophilia, lead poisoning, leukemia, nephritis, rheumatic fever, and sickle cell anemia; and (ii) Adversely affects a child’s educational performance.<sup>47</sup>*

In addition, children may be found eligible under other categories, such as “Specific Learning Disability,” “Developmental Delay (3 through 5 years of age),” and “Speech or language impairment.” It is the evaluation results, rather than the history of lead poisoning per se, that should determine the most appropriate category for eligibility.

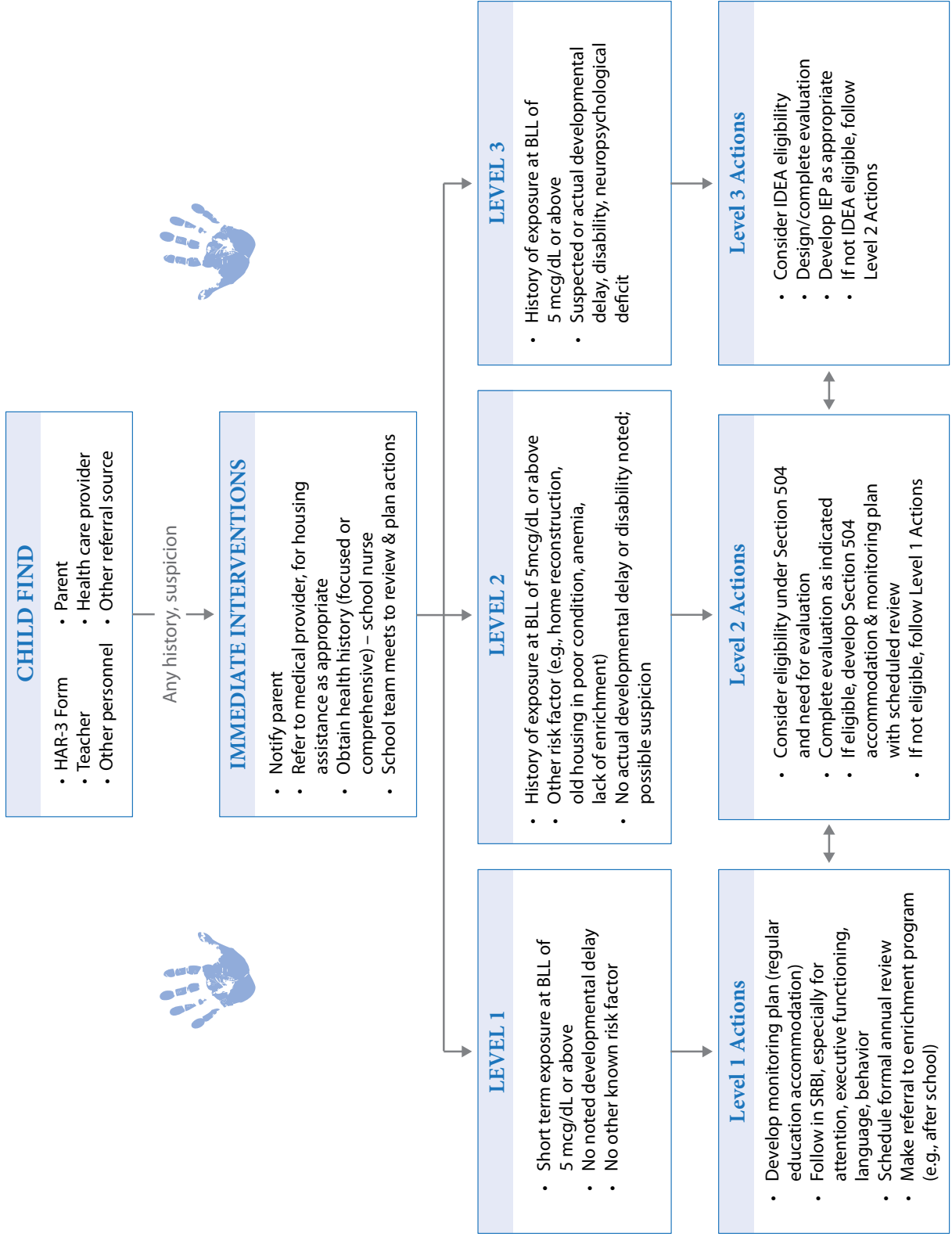
# MANAGING PRESCHOOL STUDENT WITH LEAD EXPOSURE

*Every child presents differently.*



# MANAGING K-12 STUDENT WITH LEAD EXPOSURE

*Every child presents differently.*





# Professional Development Opportunities for Educators

## 3

**E** DUCATORS, IN COLLABORATION WITH FAMILIES AND OTHER PROFESSIONALS, CAN MAKE A SIGNIFICANT DIFFERENCE for children who have been exposed to lead. To do so, they need to be well informed about lead poisoning, especially:

- educators' roles in prevention;
- current research establishing the relationship between early lead exposure and neurocognitive deficits, learning disabilities, and negative behavioral outcomes *even at very low levels of exposure*;
- its general presentation and course; and
- individual differences in presentation and course.

Connecticut currently has available three educational programs for educators. The first is a funding and workshop opportunity (see *Lead Awareness and Management Challenge: A Funding and Workshop Opportunity* below).

The other two programs are both online courses that address lead poisoning prevention and management in children and the effects of lead exposure on child development, learning and behavior. These online courses are different. Both are valuable, and educators can read the descriptions below to determine if one or both courses are appropriate for their professional background, level of responsibility, knowledge, and interest. Each course is described below: *Lead Poisoning: Limiting the Ability to Learn* and *The Health Education Lead Poisoning (H.E.L.P.) Course Series*.

## Lead Awareness and Management Challenge: A Funding and Workshop Opportunity

In May 2012, the Connecticut State Department of Education (CSDE), in collaboration with the Connecticut State Department of Public Health (DPH) offered a funding opportunity for public school districts and private non-profit schools, titled the *Lead Awareness and Management Challenge*. This funding opportunity provided support for school districts to form “Lead Advisory Teams,” and released the teams to participate in a “train-the-trainer” workshop on lead poisoning prevention and intervention for educators. The advisory teams were expected to assist their agency to develop policy and procedures related to the education of staff and the prevention and management of lead poisoning among students. The CSDE may offer additional workshops in 2012, 2013, and 2014 so long as funding continues to be available. Accordingly, school superintendents will receive information regarding the *Lead Awareness and Management Challenge*.



## Lead Poisoning: Limiting the Ability to Learn

*Lead Poisoning: Limiting the Ability to Learn* is an awareness training course for educators regarding lead poisoning in children. This training was developed for the LAMPP Project (Lead Action for Medicaid Primary Prevention Project) by the Healthy Environments for Children Initiative, Department of Extension, University of Connecticut and is available on the Connecticut Children’s Medical Center’s Web site at <http://www.connecticutchildrens.org/community-child-health/lampp-green-healthy-homes-project/lead-poisoning-training/>.

This course provides content developed specifically for administrators, educators, and child care personnel. It covers current research, prevention, interventions, and specific implications for teaching and learning. The complete course takes a little more than one hour. It has both a PowerPoint and audiovisual component; both the PowerPoint and audio script are available for download and make excellent resources for staff awareness and professional development programs from the homepage. Also available on the homepage (see above), the course provides a certificate of completion (not continuing education units) and additional resources for parents. The information is up-to-date and pertinent for all educators.

## The Health Education Lead Poisoning (H.E.L.P.) Course Series

The Health Education Lead Poisoning (H.E.L.P.) Course Series is sponsored in partnership with Connecticut Television Network (CT-N), the Foundation for Educational Advancement, Inc., Connecticut State Department of Public Health and Central Connecticut State University. The course information and directions for accessing continuing education units is found at <http://feact.org/training/help.html>. It is also available at the Connecticut Department of Public Health (DPH) Lead Poisoning and Control Program Web

site under education and Training: [http://www.ct.gov/dph/cwp/view.asp?a=3140&q=387550&dphNav\\_GID=1828&dphPNavCtr=%7C#47067](http://www.ct.gov/dph/cwp/view.asp?a=3140&q=387550&dphNav_GID=1828&dphPNavCtr=%7C#47067).

The course is made up of eight separate modules. Each module consists of an audiovisual presentation by an expert in the field of lead poisoning, along with the expert's PowerPoint slides. These presentations were delivered in Connecticut between 2006 and 2008. Neither the PowerPoint slides nor the audiovisual program are available for download. Each module has additional reading material available, primarily professional, peer-reviewed articles from medical and scientific journals, authored by the presenters. These articles may be downloaded.

This course is targeted to all health and education professionals interested in accessing original sources to learn about lead poisoning, its history in this country and toxic effects on the development of fetuses and young children, especially brain development, as well as the scientific research that has provided evidence of lead poisoning effects on learning, behavior, and lifelong achievement. It takes several hours to complete all eight modules, including the audio-video presentations and related journal articles for each module, but participants may complete the modules separately and may revisit each module repeatedly. Three continuing education units (CEUs) — or 30 professional development contact hours — are available for completion of the course if the participant registers for CEUs at the beginning of the course. To take the course for CEUs, it is essential to click on the button at the top of the course homepage (above) to get directions for how to sign up for the CEUs. Each module has a posttest to assess the participants' understanding of the material. CEUs are provided through the Foundation for Educational Advancement Inc., a provider of CEUs through the Connecticut State Department of Education.

Through collaboration with the DPH, this Course series is available online through *TRAIN Connecticut*, a learning resource targeted to the public health community. *TRAIN Connecticut* is an active member of and participant in *TRAIN*, the nationwide learning resource available for the benefit of all members of the public health community. Courses and content available through *TRAIN* include those established by state providers and by the CDC as well. Access to this particular course in *TRAIN Connecticut* is easiest via the two Web sites provided above. It is also possible to access the course at the Web site for *TRAIN Connecticut* at <https://ct.train.org/DesktopShell.aspx?tabid=1>; click on the "Search" tab, and in the search box, enter "Modules 1–8 H.E.L.P". This search should bring up all eight modules.



## Lead Prevention and Intervention: Resources and Services for Parents

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**B**ECAUSE OF THE NATIONAL OBJECTIVES IN *HEALTHY PEOPLE 2000, 2010* AND *2020* RELATED TO ERADICATING LEAD poisoning in children, funding has been made available to state and local agencies to:

- develop educational literature and training programs for parents and health and education professionals;
- support housing improvement and abatement projects;
- ensure medical monitoring of poisoned children; and
- provide screening programs to identify affected children and assess the success of prevention activities.


Since these funding opportunities have resulted in the development of prevention and intervention programs and educational resources in and beyond Connecticut, the purpose of this section is to identify and assist parents to access some of those services and resources. This section can also assist educators in collaborating with others in helping parents access public health, housing, social service and medical resources in their communities, and making appropriate referrals.

Resources for parents are numerous. Many of them in Connecticut are listed below, first by agency provider and type of resource, as follows:

- Connecticut Department of Public Health: resources for prevention, screening, and education
- Connecticut Department of Education: resources on Section 504 and special education (IDEA)
- Other Connecticut resources: education, medical treatment, and housing

A few national resources are also provided following the Connecticut resources.

## Connecticut Department of Public Health: Resources for Prevention, Screening, and Education

- a. The Connecticut State Department of Public Health (DPH), Lead Poisoning and Control Program homepage, provides links to many prevention and intervention resources, relevant laws and standards, the mandated lead poisoning screening program, educational programs on lead poisoning and other information. It is located online at <http://www.ct.gov/dph/lead>.
- b. The specific statutes and regulations relating to lead in Connecticut are available online at <http://www.ct.gov/dph/cwp/view.asp?a=3140&q=387554>.
- c. **Universal Blood Lead Screening:** Connecticut law requires that health care providers screen for blood lead all children at age 12 months and again at age 24 months using a blood lead test. Health care providers are also required to screen any child between 25–72 months of age who has not previously been screened, regardless of risk. Additional blood lead screening is indicated for any child less than 72 months of age with developmental delays, especially if associated with pica. Finally, all children six–72 months of age in HUSKY Part A Medicaid must be assessed for risk, and at a minimum, screened at 12 months and 24 months of age per federal requirements. In addition, blood lead testing must be considered for any child regardless of age with the following: unexplained seizures, neurologic symptoms, hyperactivity, behavior disorders, growth failure, abdominal pain, or other symptoms consistent with lead poisoning or associated with lead exposure; recent history of ingesting, or an atypical behavior pattern of inserting, any foreign object (even if the foreign object is unleaded) into a body orifice.A photograph showing two young children, a girl and a boy, sitting at a table and playing with several toy animals. The girl is on the left, looking at a white toy sheep. The boy is on the right, looking at a black toy elephant. They are both wearing blue shirts. The background is slightly blurred, showing what appears to be a play area with colorful toys.
  - d. For information on Connecticut screening results for 2010, the most recent data available, see online at [http://www.ct.gov/dph/lib/dph/environmental\\_health/lead/pdf/CY\\_2010\\_Surveillance\\_Report\\_final\\_12-21-2012.pdf](http://www.ct.gov/dph/lib/dph/environmental_health/lead/pdf/CY_2010_Surveillance_Report_final_12-21-2012.pdf) (it may be necessary to copy and paste this URL into your computer URL address box).  
A map of towns indicating the rate of screening by town is provided on page 8 of the report, Map #1. Prior years are available at <http://www.ct.gov/dph/cwp/view.asp?a=3140&q=387576>.
  - e. Officials in the DPH Lead Program and in local health departments are very knowledgeable about lead poisoning prevention, screening and intervention. Local school district personnel are encouraged to collaborate with local health department representatives in identifying educational, prevention and intervention resources for families in their community. Find your local health department at <http://www.ct.gov/dph/lead>.

f. Educational Literature for Parents

- The DPH Lead Poisoning and Control Program's homepage provides links to many resources for families and professionals. The following link brings the reader to that homepage: [http://www.ct.gov/dph/cwp/view.asp?a=3140&q=387550&dphNav\\_GID=1828&dphPNavCtr=%7C](http://www.ct.gov/dph/cwp/view.asp?a=3140&q=387550&dphNav_GID=1828&dphPNavCtr=%7C).
- In the same location, there is an educational form for parents, *Birth to Three Developmental Milestones*, or click on [http://www.ct.gov/dph/lib/dph/environmental\\_health/lead/pdf/b-2-3\\_letter\\_milestones.pdf](http://www.ct.gov/dph/lib/dph/environmental_health/lead/pdf/b-2-3_letter_milestones.pdf).

- **Educational documents**

On the Lead Program's Homepage ([http://www.ct.gov/dph/cwp/view.asp?a=3140&q=387550&dphNav\\_GID=1828&dphPNavCtr=%7C](http://www.ct.gov/dph/cwp/view.asp?a=3140&q=387550&dphNav_GID=1828&dphPNavCtr=%7C)), many DPH documents are provided under the Resources link. There are educational documents. Many of those listed below are available in Spanish and the top three are available in many other fact sheets in many different languages as well. To access any of these documents, including translated versions, it will be necessary to have a PDF reader to open the files. The Adobe Acrobat Reader can be downloaded free from [get.adobe.com/reader/](http://get.adobe.com/reader/).

**Child prevention topics**

Keep Your Child Safe From Lead: [http://www.ct.gov/dph/lib/dph/environmental\\_health/lead/pdf/Keep\\_Your\\_Child\\_Safe\\_From\\_Lead.pdf](http://www.ct.gov/dph/lib/dph/environmental_health/lead/pdf/Keep_Your_Child_Safe_From_Lead.pdf)

Protect your Child from Lead Poisoning: [http://www.ct.gov/dph/lib/dph/environmental\\_health/lead/pdf/Protect\\_your\\_Child\\_LP.pdf](http://www.ct.gov/dph/lib/dph/environmental_health/lead/pdf/Protect_your_Child_LP.pdf)

Keep Your New Baby Lead Safe

Toys and Childhood Lead Exposure: [http://www.ct.gov/dph/lib/dph/environmental\\_health/lead/pdf/NCHH\\_Factsheet\\_-\\_Toys\\_and\\_Childhood\\_Lead\\_Exposure.pdf](http://www.ct.gov/dph/lib/dph/environmental_health/lead/pdf/NCHH_Factsheet_-_Toys_and_Childhood_Lead_Exposure.pdf)

Lead Poisoning Prevention

How Eating Right Helps Fight Lead Poisoning

**Housing topics**

Protect your Family from Lead in your Home

Lead in your Home: A Parents Reference Guide

A Parent's Guide for the Interim Control of Lead Hazards in Housing

What You Need to Know About Childhood Lead & Imported Vinyl Mini Blinds

Ways to Reduce Lead Dust in your Home or Apartment

How to Check for Lead Hazards in your Home

Reducing Lead Hazards in the Home

A Landlord's Guide for the Interim Control of Lead Hazards in Housing

**Other Topics**

Lead Poisoning and Pregnancy

A Resource for Child Day Care Providers - Fact Sheet

Preventing Childhood Lead Poisoning in Connecticut



Testing for Lead Poisoning  
Occupations & Hobbies May Expose You to Lead  
What is Lead Paint Abatement?

**Other documents** not listed here, such as technical information on encapsulation, may also be found at <http://www.ct.gov/dph/cwp/view.asp?a=3140&q=387548>.

## Connecticut State Department of Education: Resources on Section 504 and special education (IDEA)

Parents are encouraged to ask representatives from their local schools for written resources on Section 504 and IDEA (special education), including information on the rights of students with disabilities under each law. They may also want to review school district procedures implementing these federal laws, and speak with a school official regarding questions they may have. Parents can also make a referral to the school team if they suspect that their child has a disability.

An excellent resource for parents is the State Education Resource Center (SERC) in Middletown, Connecticut. Parents can become members at no cost and can request information and publications for review. SERC is located at 25 Industrial Park Road, Middletown, CT, near exit 21 off Interstate 91 in Cromwell. Parents can also call SERC for assistance at 860-632-1485.

The best publication for parents to request for information on special education is *A Parent's Guide to Special Education in Connecticut* (2007).

See the list below for further information with links to the Parents Guide, as well as other CSDE publications.

Special Education Publications	Best Practice Resources; Eligibility Documents; Guidance Documents/Topic Briefs; Parent/Family Resources; and Secondary Transition Resources.	<a href="http://www.sde.ct.gov/sde/cwp/view.asp?a=2626&amp;q=322672">http://www.sde.ct.gov/sde/cwp/view.asp?a=2626&amp;q=322672</a>
<i>The State Board of Education's Position Statement On the Education of Students with Disabilities</i> (2001)	Position Statement On the Education of Students with Disabilities	<a href="http://www.sde.ct.gov/sde/LIB/sde/pdf/board/disabilities.pdf">http://www.sde.ct.gov/sde/LIB/sde/pdf/board/disabilities.pdf</a>
CSDE's Division of Legal and Governmental Affairs Law: <i>Individuals with Disabilities Education Act (IDEA)</i>	Individuals with Disabilities Education Act (IDEA)	<a href="http://www.sde.ct.gov/sde/cwp/view.asp?a=2683&amp;q=320334">http://www.sde.ct.gov/sde/cwp/view.asp?a=2683&amp;q=320334</a>

<i>A Parent's Guide to Special Education in Connecticut</i> (2007)	Provides information for parents, guardians and other family members about laws, regulations, and policies affecting special education programs and services.	<a href="http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Special/Parents_Guide_SE.pdf">http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Special/Parents_Guide_SE.pdf</a>
<i>Before, During &amp; After the PPT Meeting</i>  <i>Preparing for the PPT Meeting &amp; Development of The Individualized Education Program</i> (2008)	Planning and Placement Team (PPT) Checklist	<a href="http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Special/Before_PPT.pdf">http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Special/Before_PPT.pdf</a>
<i>PPT 101: Understanding the Basics of the Planning and Placement Team Meeting</i>	Provides information on the process and procedure for referral and eligibility for special education; Individualized Education Programs; PPT; and parent's role in the PPT process.	<a href="http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Special/PPT101.pdf">http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Special/PPT101.pdf</a>
<i>Making the PPT Process More Effective for You and Your Child</i>	Provides information on the PPT process.	<a href="http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Special/PPT_Process.pdf">http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Special/PPT_Process.pdf</a>
<i>IEP Manuals and Forms</i> (2010)	CSDE's guidance to school districts in Connecticut to assist in utilizing the IEP forms.	<a href="http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Special/IEPManual.pdf">http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Special/IEPManual.pdf</a>
<i>Writing Standards-based IEP Goals and Objectives</i>	This multimedia presentation is designed to provide a tool and a process for helping Connecticut educators develop standards-based IEPs.	<a href="http://ctserc.org/s/index.php?option=com_content&amp;view=article&amp;id=516:using-a-word-bank-process-to-develop-standards-based-iep-goals-a-objectives-&amp;catid=51:8-professional-development&amp;Itemid=144">http://ctserc.org/s/index.php?option=com_content&amp;view=article&amp;id=516:using-a-word-bank-process-to-develop-standards-based-iep-goals-a-objectives-&amp;catid=51:8-professional-development&amp;Itemid=144</a>
<i>Guidelines for Identifying Children with Learning Disabilities</i> (2010)	This document provides a comprehensive description of the changes in IDEA 2004 regarding the identification and eligibility determination of children with a specific learning disability.	<a href="http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Special/2010_Learning_Disability_Guidelines_Acc.pdf">http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Special/2010_Learning_Disability_Guidelines_Acc.pdf</a>

The most current information regarding the rights of students with disabilities under Section 504 is found online at the following two sites:

- <http://www2.ed.gov/about/offices/list/ocr/docs/dcl-504faq-201109.pdf>
- <http://www2.ed.gov/about/offices/list/ocr/504faq.html>

The following list provides other publications about Section 504 with associated links.

CSDE's Circular Letter C-13, Series 2008-09, <i>Section 504 of the Rehabilitation Act of 1973: Procedural Safeguards Reissue of CIRCULAR LETTER C-9, Series 2000-2001</i>	Section 504 of the Rehabilitation Act of 1973: Procedural Safeguards	<a href="http://www.sde.ct.gov/sde/lib/sde/pdf/circ/circ08-09/c13.pdf">http://www.sde.ct.gov/sde/lib/sde/pdf/circ/circ08-09/c13.pdf</a>
Protecting Students With Disabilities: Frequently Asked Questions About Section 504 and the Education of Children with Disabilities	This document is a revised version of a document originally developed by the Chicago Office of the Office for Civil Rights (OCR) in the U.S. Department of Education (ED) to clarify the requirements of Section 504 of the Rehabilitation Act of 1973, as amended (Section 504) in the area of public elementary and secondary education. The primary purpose of these revisions is to incorporate information about the Americans with Disabilities Act Amendments Act of 2008 (Amendments Act), effective January 1, 2009, which amended the Americans with Disabilities Act of 1990 (ADA) and included a conforming amendment to the Rehabilitation Act of 1973 that affects the meaning of disability in Section 504.	<a href="http://www2.ed.gov/about/offices/list/ocr/504faq.html">http://www2.ed.gov/about/offices/list/ocr/504faq.html</a>
CSDE's Division of Legal and Governmental Affairs Law: <i>Section 504</i>	Section 504 Law	<a href="http://www.sde.ct.gov/sde/cwp/view.asp?a=2683&amp;q=320334">http://www.sde.ct.gov/sde/cwp/view.asp?a=2683&amp;q=320334</a>
<i>CSDE's Accommodating Special Dietary Needs in School Nutrition Programs</i> (2011)	Contains information on providing meals for children with special dietary needs, based on federal laws, U.S. Department of Agriculture regulations and Connecticut laws and regulations.	<a href="http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Student/NutritionEd/AccommodatingSpecialDiets.pdf">http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Student/NutritionEd/AccommodatingSpecialDiets.pdf</a>
School Readiness Technical Assistance Alert (1999), Number TA/SR # 99-02: Serving 3-, 4-, and 5-year-old Children with Disabilities	Section 504 and School Readiness Programs	<a href="http://www.sde.ct.gov/sde/LIB/sde/pdf/deps/readiness/SR/TA_SR_99_02.pdf">http://www.sde.ct.gov/sde/LIB/sde/pdf/deps/readiness/SR/TA_SR_99_02.pdf</a>
<i>CSDE's Guidelines for Managing Life-Threatening Food Allergies in Connecticut Schools</i>	Allergy management in schools	<a href="http://www.sde.ct.gov/sde/lib/sde/PDF/deps/student/health/Food_Allergies.pdf">http://www.sde.ct.gov/sde/lib/sde/PDF/deps/student/health/Food_Allergies.pdf</a>
<i>CSDE's Guidelines for Blood Glucose Self-Monitoring in School</i>	Diabetes management	<a href="http://www.sde.ct.gov/sde/lib/sde/PDF/deps/student/health/GlucoseGuidelines.pdf">http://www.sde.ct.gov/sde/lib/sde/PDF/deps/student/health/GlucoseGuidelines.pdf</a>

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## Connecticut Resources for Education, Medical Treatment, and Housing

- Connecticut Children’s Medical Center, Lead Action for Medicaid Primary Prevention (LAMPP): see general information and “Related Links” related to housing and education at [http://www.connecticutchildrens.org/body\\_dept.cfm?id=1183&fr=true](http://www.connecticutchildrens.org/body_dept.cfm?id=1183&fr=true). For treatment, see information at [http://www.connecticutchildrens.org/body\\_dept.cfm?id=66](http://www.connecticutchildrens.org/body_dept.cfm?id=66).
- Hartford Regional Lead Treatment Center at St. Francis Hospital: See temporary housing information and links to prevention and treatment information at [http://www.saintfranciscare.org/Lead\\_Treatment\\_Center.aspx](http://www.saintfranciscare.org/Lead_Treatment_Center.aspx).
- Yale-New Haven Children’s Hospital Lead Poisoning and Regional Treatment Center: See information on local resources for treatment, housing and education at <http://www.ynhh.org/yale-new-haven-childrens-hospital/medical-services/lead-program-regional-treatment-center.aspx>.

## U.S. Centers for Disease Control and Prevention: Education and General Information

- Prevention Tips: <http://www.cdc.gov/nceh/lead/tips.htm>
- Lead Recalls: <http://www.cdc.gov/nceh/lead/Recalls/default.htm>
- CDC’s Childhood Lead Poisoning Prevention Program: <http://www.cdc.gov/nceh/lead/about/program.htm>



# Lead Prevention and Intervention: Resources for Educators

# 5

**B**ECAUSE EDUCATORS WORK CLOSELY WITH CHILDREN AND FAMILIES, THEY ARE LIKELY TO KNOW OF A FAMILY OR child in the community who may be at high risk for exposure to environmental lead or who has recently been identified as having an elevated blood lead level. Because preventive education and early intervention are critical in reducing the toxic effects of lead on children, educators should become familiar with the resources and services for families identified in section 4 “Lead Prevention and Intervention: Resources and Services for Parents.” Educators must be knowledgeable about these resources in order to provide or direct families to them, and to refer families to appropriate medical, public health, social service, and housing services. Educators should also review the DPH screening data and map indicating the rate of screening by town (see [section 4](#) under *Connecticut Department of Public Health: Resources for Prevention, Screening, and Education*). In towns where compliance has been low, school districts should encourage provider and parent compliance with mandated screening requirements.

This section contains citations for many professional articles published in peer-reviewed professional journals and a few related publications covering a variety of topics on lead poisoning in children, prevention and intervention, and the effects of lead exposure on the developing brains of children, including effects related to intelligence, learning, and behavior. For articles where a link for access to a free copy existed at the time of publication of the guidelines, that link is provided. If the link does not work directly, the reader can copy the URL and paste it into a computer’s URL address box.

For other articles, readers can search for access to a free copy online and seek assistance from a medical library. School nurses can access most, if not all, of these articles through the Yale School of Nursing

School “Information Resources for School Nurses” program. Information is available at [http://doc.med.yale.edu/school\\_nursing/](http://doc.med.yale.edu/school_nursing/). School nurses can contact a librarian for assistance from this online location.

The articles cited below include those where controversy exists among experts, particularly related to the effects of lead exposure on brain development. It is important to read many of these articles in order to understand all sides of the controversies regarding lead, its effects in children, and the research methodologies used to identify those effects. Past controversies are critical to understand and must also be considered in light of the current literature and the breadth and depth of the research available today.

## Best Review Article

The following article is recommended as an excellent overview of the state of knowledge, as of 2003, related to lead exposure in children, dispersion of lead in the body, effects on the brain, effects on cognitive/behavioral development, and strengths and limitations of related research. It is available online, if not by clicking directly on the “Full Text (PDF)” option, then by copying the URL and pasting it into your computer’s URL address box. Readers are advised to read other articles, especially those published after this one for more recent studies.



Lidsky TI; Schneider JS. Lead neurotoxicity in children: basic mechanisms and clinical correlates. *Brain*. 2003;126(1):5-19. AbstractFull TextFull Text (PDF). Available online at <http://brain.oxfordjournals.org/content/126/1/5.full.pdf>.

## Articles Providing a General Overview of Lead Poisoning in Children and Lead Poisoning Prevention

Advisory Committee on Childhood Lead Poisoning Prevention. (January, 2012). *Low Level Lead Exposure Harms Children: A Renewed Call for Primary Prevention*. U.S. Centers for Disease Control and Prevention, U.S. Department of Health and Human Services: [http://www.cdc.gov/nceh/lead/ACCLPP/Final\\_Document\\_010412.pdf](http://www.cdc.gov/nceh/lead/ACCLPP/Final_Document_010412.pdf).

Bellinger DC. Effect modification in epidemiological studies of low-level neurotoxicant exposures and health outcomes. [Review]. *Neurotoxicol Teratol* 2000; 22: 133±40.

Centers for Disease Control and Prevention (CDC) Ten great public health achievements--United States, 2001-2010. *MMWR Morb Mortal Wkly Rep*. 2011 May 20;60(19):619-23. Available online at <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6019a5.htm>.



Committee on Environmental Health, American Academy of Pediatrics. (2005; reaffirmed, 11/2008). Lead Exposure in Children: Prevention, Detection, and Management. *Pediatrics* Vol. 116 No. 4, pp. 1036 -1046. Available free online in full text at <http://pediatrics.aappublications.org/content/116/4/1036.abstract>.

Lanphear BP, Dietrich KN. and Berger, O. Prevention of Lead Toxicity in US Children. *Ambulatory Pediatrics*, Volume 3, Issue 1, January–February 2003, Pages 27–36.

Lanphear BP. Childhood lead poisoning prevention—too little, too late. *JAMA*. 2005;293 (18):2274-6.

Lin-Fu JS. Undue absorption of lead among children: a new look at an old problem. *N Engl J Med*. 1972;286(13):702-10.

Moyer PA, Pivetz T, Dignam TA, et al. CDC Centers for Disease Control and Prevention (CDC). Surveillance for elevated blood lead levels among children - United States 1997-2001. *MMWR*. 2003;52(SS10):1-21.

Needleman H. Lead poisoning. *Annu Rev Med*. 2004;55:209-22.

Nicholson, JS. Get the lead out: Reducing lead exposure for children in poverty.

*Dissertation Abstracts International: Section B: The Sciences and Engineering*. Vol.72(4-B), 2011, pp. 2468.

Rosen J, Mushak P. Primary prevention of lead poisoning—the only solution. *N Engl J Med*. 2001;344 :1470– 1471.

Silbergeld, E.K. Preventing Lead Poisoning in Children. *Annu. Rev. Public Health*. 1997. 18:187–210. Available free online at [https://docs.google.com/viewer?a=v&q=cache:5EskDZayaAAJ:www.rst2.edu/ties/lead/university/resources/experts/pdf\\_articles/3leadpoisoningbysilbergeld.pdf+History+of+lead+poisoning+eradication+in+US&hl=en&gl=us&pid=bl&srcid=ADGEEsisfBUqeQyAn1uL2VXmFblez\\_OL-Mj52hADktoZC132DDQYjJvtGzwJblO3ImOWMlfulrn1jQKoWlt4hqbloryu\\_c-xhe8XxkwktZNEk6zM2Kz-6PsZEXOROUKT4h2s1luE-l\\_7H1&sig=AHIEtbRp8XsFvK1NPzdXxkR2QkE8GKeJ4w&pli=1](https://docs.google.com/viewer?a=v&q=cache:5EskDZayaAAJ:www.rst2.edu/ties/lead/university/resources/experts/pdf_articles/3leadpoisoningbysilbergeld.pdf+History+of+lead+poisoning+eradication+in+US&hl=en&gl=us&pid=bl&srcid=ADGEEsisfBUqeQyAn1uL2VXmFblez_OL-Mj52hADktoZC132DDQYjJvtGzwJblO3ImOWMlfulrn1jQKoWlt4hqbloryu_c-xhe8XxkwktZNEk6zM2Kz-6PsZEXOROUKT4h2s1luE-l_7H1&sig=AHIEtbRp8XsFvK1NPzdXxkR2QkE8GKeJ4w&pli=1).

Warniment C, Tsang K, Galazka SS. Lead poisoning in children.

*Am Fam Physician*. 2010 Mar 15;81(6):751-7. Available online at <http://www.aafp.org/afp/2010/0315/p751.html>.

## Articles Related to Lead and Neuropsychological, Cognitive and Learning Deficits

See also “Best Review Article” above by Lidsky and Schneider.

Adler, T. Questioning Lead Standards: Even Low Levels Shave Points off IQ. *Environ Health Perspect.* 2005 July; 113(7): A473–A474. Available online at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1257668/>.

Bellinger, DC. Lead . *Pediatrics.* 2004;113(Supplement\_3):1016-1022. Available online at website for Abstract.

Bellinger, DC. Interpreting the literature on lead and child development: The neglected role of the “experimental system.” *Neurotoxicology and Teratology.* Volume 17, Issue 3, May–June 1995, Pages 201–212.

Bellinger DC, Stiles KM, Needleman HL. Low-level lead exposure, intelligence and academic achievement: a long-term follow-up study. *Pediatrics.* 2001;90(6):855–861. Free full text PDF available online at [http://pediatrics.aappublications.org/content/90/6/855?ijkey=3f28349db7394f3ea6a49ac80aa096010c198452&keytype=tf\\_ipsecsha&linkType=ABST&journalCode=pediatrics&resid=90/6/855](http://pediatrics.aappublications.org/content/90/6/855?ijkey=3f28349db7394f3ea6a49ac80aa096010c198452&keytype=tf_ipsecsha&linkType=ABST&journalCode=pediatrics&resid=90/6/855).

Bellinger D, Hu H, Titlebaum L, Needleman HL. Attentional correlates of dentin and bone lead levels in adolescents. *Arch Environ Health* 1994; 49: 98±105.

Canfield RL, Henderson CR Jr, Cory-Slechta DA, Cox C, Jusko TA, Lanphear BP. Intellectual impairment in children with blood lead concentrations below 10 µg per deciliter. *N Engl J Med.* 2003;348 :1517– 1526. Available online at <http://www.nejm.org/doi/full/10.1056/NEJMo022848>.

Canfield, RL; Kreher, DA; Cornwell, C; Henderson, CR Jr. Low-level lead exposure, executive functioning, and learning in early childhood. *Child Neuropsychology.* Vol.9(1), Mar 2003, pp. 35-53.

Chen, A; Cai, B; Dietrich, KN; Radcliffe, J; Rogan WJ Lead Exposure, IQ, and Behavior in Urban 5- to 7-Year-Olds: Does Lead Affect Behavior Only by Lowering IQ? *Pediatrics.* 2007;119(3):e650-e658. Available online at <http://pediatrics.aappublications.org/content/119/3/e650.full.html>.

Chandran, et al. (2010). Poisoning: Basics and New Developments. *Pediatr. Rev.* 2010; 31:10 399-406

Chiodo LM, Jacobson SW, Jacobson JL. Neurodevelopmental effects of postnatal lead exposure at very low levels. *Neurotoxicology.* 2004;26(3):359-71.

Coscia, Juliet M; Ris, M. Douglas; Succop, Paul A; Dietrich, Kim N.

Cognitive development of lead exposed children from ages 6 to 15 years: An application of growth curve analysis. *Child Neuropsychology.* Vol.9(1), Mar 2003, pp. 10-21.

Ernhart, C. Effects of Lead on IQ in Children” Environ Health Perspect. 2006 February; 114(2): A85–A86. (an answer to Lanphear, 2005 below).

Gentile, Jennifer K. Relationship between pediatric lead poisoning and executive system functioning. Dissertation Abstracts International: Section B: The Sciences and Engineering. Vol.67(5-B), 2006, pp. 2834.

Goldstein GW. Lead poisoning and brain cell function. Environ Health Perspect. 1990 Nov; 89:91-4. Available online at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1567775/?tool=pubmed>.

Hornung RW, Lanphear BP, Dietrich KN. Age of greatest susceptibility to childhood lead exposure: a new statistical approach. Environ Health Perspect. 2009 Aug;117(8):1309-12. Epub 2009 May 7. Available online at <http://ehp03.niehs.nih.gov/article/info:doi/10.1289/ehp.0800426>.

Hubbs-Tait, L., Mulugeta, A., Bogale, A., Kennedy, T.S., Baker, E.R., Stoecker, B.J. Main and interaction effects of iron, zinc, lead, and parenting on children’s cognitive outcomes. Developmental Neuropsychology. Volume 34, Issue 2, March 2009, Pages 175-195.

Hubbs-Tait, L., Nation, J.R., Krebs, N.F., Bellinger, D.C. Neurotoxicants, micronutrients, and social environments individual and combined effects on children’s development ( Review ). Psychological Science in the Public Interest, Supplement.

Volume 6, Issue 3, December 2005, Pages 57-121.

Kaufman, A.S. How dangerous are low (not moderate or high) doses of lead for children’s intellectual development? (Review) Archives of Clinical Neuropsychology Volume 16, Issue 4, 2001, Pages 403-431.

Kaufman, A.S. Do low levels of lead produce IQ loss in children? A careful examination of the literature Archives of Clinical Neuropsychology Volume 16, Issue 4, 2001, Pages 303-341

Koller K, Brown T, Spurgeon A, Levy L. Recent developments in low-level lead exposure and intellectual impairment in children. Environ Health Perspect. 2004 Jun;112 (9):987-94. Available online at <http://www.ncbi.nlm.nih.gov/pubmed/15198918>.

Lanphear BP, Hornung R, Khoury J, et al. Low-level environmental lead exposure and children’s intellectual function: an international pooled analysis. Environ Health Perspect. 2005;113(7):894–899. WEB OF SCIENCE | PUBMED.

Lanphear BP, Hornung R, Khoury J, et al Lead and IQ in Children: Lanphear et al. Respond Environ Health Perspect. 2006 February; 114(2): A86–A87.

Lanphear BP, Dietrich K, Auinger P, Cox C. Cognitive deficits associated with blood lead concentrations <10mg/dl in US children and adolescents. Public Health Rep 2000; 115: 521±9.

- Lidsky, T I, and J S Schneider. Adverse effects of childhood lead poisoning: the clinical neuropsychological perspective. *Environmental research* 100.2 (2006):284-293.
- Liu, et al. Do Children With Falling Blood Lead Levels Have Improved Cognition? *Pediatrics*. 2002;110(4):787-791. Abstract
- Mendelsohn, AL; Dreyer, BP; Fierman, AH; Rosen, CM; Legano, LA; Kruger, HA; Lim, SW; Barasch, S; Au, L; Courtlandt, CD. Low-level lead exposure and cognitive development in early childhood. *Journal of Developmental and Behavioral Pediatrics*. Vol.20(6), Dec 1999, pp. 425-431.
- Min, MO., Singer, LT., Kirchner, HL, Minnes, S., Short, E., Hussain, Z. and Nelson, S. Cognitive development and low-level lead exposure in poly-drug exposed children. *Neurotoxicology and Teratology*. Volume 31, Issue 4, July–August 2009, Pages 225–231
- Miranda ML, Kim D, Reiter J, Overstreet Galeano MA, Maxson P. Environmental contributors to the achievement gap. *Neurotoxicology*. 2009 Nov;30(6):1019-24. Epub 2009 Jul 28. Available online at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2789840/?tool=pubmed>.
- Needleman HL, Bellinger D. Studies of lead exposure and the developing central nervous system: a reply to Kaufman. *Arch Clin Neuropsychol*. 2001 May;16(4):359-74. Available online at <http://www.science-direct.com/science/article/pii/S0887617700000871>.
- Needleman HL, Gunnoe, C, Leviton, A, Reed, R, Peresie, H, Maher, C, and Barrett, P. Deficits in Psychologic and Classroom Performance of Children with Elevated Dentine Lead Levels. *N Engl J Med* 1979; 300:689-695. Available at <http://www.nejm.org/doi/full/10.1056/NEJM197903293001301> (cut and paste URL).
- Needleman HL, Schell A, Bellinger D, Leviton A, Allred EN. The long-term effects of exposure to low doses of lead in childhood: an 11-year follow-up report. *N Engl J Med*.1990;322 :83– 88.
- Rogan WJ Intellectual impairment in children with blood lead concentrations below 10 microg per deciliter. et al. *J Pediatr*. Nov;143(5):687-8 (2003).
- Ruff, Holly A. Population-based data and the development of individual children: The case of low to moderate lead levels and intelligence. *Journal of Developmental and Behavioral Pediatrics*. Vol.20(1), Feb 1999, pp. 42-49.
- Surkan PJ, Zhang A, Trachtenberg F, Daniel DB, McKinlay, S. and Bellinger DC. Neuropsychological function in children with blood lead levels <10 µg/dL.
- NeuroToxicology*, Volume 28, Issue 6, November 2007, Pages 1170–1177.
- Tellez-Rojo MM, Bellinger DC, Arroyo-Quiroz C, Lamadrid-Figueroa H, Mercado-Garcia, A, Schnaas-Arrieta L, Wright RO, Hernandez-Avila M, and Hu H. Longitudinal Associations Between Blood Lead Concentra-

tions Lower Than 10 µg/dL and Neurobehavioral Development in Environmentally Exposed Children in Mexico City. August 1, 2006. *Pediatrics* Vol. 118 No. 2 pp. e323 -e330. Available online at <http://pediatrics.aappublications.org/content/118/2/e323.abstract>.

Tong S, Baghurst PA, Sawyer MG, Burns J, McMichael AJ. Declining blood lead levels and changes in cognitive function during childhood: the Port Pirie Cohort Study. *JAMA*.1998;280 :1915 Available online at <http://jama.ama-assn.org/content/280/22/1915.full>.

Wasserman, GA; Factor-Litvak, P; Liu, X; Todd, AC; Kline, JK; Slavkovich, V; Popovac, D; Graziano, JH. The relationship between blood lead, bone lead and child intelligence. *Child Neuropsychology*. Vol.9(1), Mar 2003, pp. 22-34.

Wasserman GA, Factor-Litvak P. Methodology, inference and causation: environmental lead exposure and childhood intelligence. *Arch Clin Neuropsychol*. 2001 May;16(4):343-52. Available online at <http://www.sciencedirect.com/science/article/pii/S0887617700000858>.

## Articles Related to Lead and Behavior

Bellinger D, Leviton A, Allred E, Rabinowitz M. Pre- and postnatal lead exposure and behavior problems in school-aged children. *Environ Res*. 1994;66:12–30.

Fergusson D M , Boden J M , Horwood L J. Dentine lead levels in childhood and criminal behaviour in late adolescence and early adulthood *J. Epidemiol. Community Health*. 2008;62(12):1045-1050. Abstract available online at <http://jech.bmj.com/content/62/12/1045.abstract?sid=badecd62-ffe0-4e33-a9d7-7cabd8bd897a>.

Marcus, David K; Fulton, Jessica J; Clarke, Erin J. Lead and conduct problems: A meta-analysis. *Journal of Clinical Child and Adolescent Psychology*. Vol.39(2), Mar 2010, pp. 234-241.

Mendelsohn, AL; Dreyer, BP; Fierman, AH; Rosen, CM; Legano, LA; Kruger, HA; Lim, SW; Courtlandt, CD. Low-Level Lead Exposure and Behavior in Early Childhood. *Pediatrics* Vol. 101 No. 3 March 1, 1998 pp. e10. Available online at <http://pediatrics.aappublications.org/content/101/3/e10.full>.

Narag, RE, Pizarro J, Gibbs, C. Lead Exposure and Its Implications for Criminological Theory *Criminal Justice and Behavior*. 2009;36(9):954-973. Abstract.

Needleman HL, McFarland C, Ness RB, Fienberg SE, Tobin MJ. Bone lead levels in adjudicated delinquents. A case control study. *Neurotoxicol Teratol*.2002;24 :711– 717 CrossRefMedlineWeb of Science.

Needleman HL, Riess JA, Tobin MJ, Biesecker GE, Greenhouse JB. Bone lead levels and delinquent behavior. *JAMA*.1996;275 :363– 369. Free full text PDF available online at [http://jama.ama-assn.org/content/275/5/363.abstract?ijkey=faacefbb534c4946d4a3b29e5429575dce03ffec&keytype=tf\\_ipsecsha](http://jama.ama-assn.org/content/275/5/363.abstract?ijkey=faacefbb534c4946d4a3b29e5429575dce03ffec&keytype=tf_ipsecsha).

Needleman, Herbert L. The neurobehavioral consequences of low lead exposure in childhood. *Neurobehavioral Toxicology & Teratology*. Vol.4(6), Nov-Dec 1982, pp. 729-732.

Nevin, Rick. Understanding international crime trends: the legacy of preschool lead exposure. *Environmental Research*. 104(3):315-36, 2007 Jul.

Olympio KP, Gonçalves C, Günther WM, Bechara EJ. Neurotoxicity and aggressiveness triggered by low-level lead in children: a review. *Rev Panam Salud Publica*. 2009 Sep;26(3):266-75. Available online at [http://www.scielo.org/scielo.php?script=sci\\_arttext&pid=S1020-49892009000900011&lng=en&nr=iso&tlng=en](http://www.scielo.org/scielo.php?script=sci_arttext&pid=S1020-49892009000900011&lng=en&nr=iso&tlng=en).

Shaheen, Sandra J. Neuromaturation and behavior development: The case of childhood lead poisoning. *Developmental Psychology*. Vol.20 (4), Jul 1984, pp. 542-550.

Stretesky PB; Lynch MJ. The Relationship Between Lead Exposure and Homicide. *Arch Pediatr Adolesc Med*. 2001;155(5):579-582. AbstractFull TextFull Text (PDF) Available online at <http://archpedi.ama-assn.org/cgi/content/full/155/5/579>.

Wright, J.P., Boisvert, D, and Vaske, J. Blood Lead Levels in Early Childhood Predict Adulthood Psychopathy. *Youth Violence and Juvenile Justice* July 2009 7: 208-222, first published on May 11, 2009.

## Articles on Lead and Other Clinical Issues

Dietrich KN, Ware JH, Salganik M, Radcliffe J, Rogan WJ, Rhoads GG, Fay ME, Davoli CT, Denckla MB, Bornschein RL, Schwarz D, Dockery DW, Adubato S, Jones RL; Treatment of Lead-Exposed Children Clinical Trial Group. Effect of chelation therapy on the neuropsychological and behavioral development of lead-exposed children after school entry. *Pediatrics*. 2004 Jul;114(1):19-26. Available online at <http://pediatrics.aappublications.org/content/114/1/19.long>.

Fadowski JJ, Navas-Acien A, Tellez-Plaza M, Guallar E, Weaver VM, Furth SL.

Blood lead level and kidney function in US adolescents: The Third National Health and Nutrition Examination Survey, *Arch Intern Med*. 2010 Jan 11;170(1):75-82. Available online at <http://archinte.ama-assn.org/cgi/content/full/170/1/75>.

George M; Heeney MM; Woolf AD. Encephalopathy from lead poisoning masquerading as a flu-like syndrome in an autistic child. *Pediatric Emergency Care*. 26(5):370-3, 2010 May.

- Piomelli S. Childhood lead poisoning. *Pediatric Clinics of North America*. 49(6):1285-304, vii, 2002 Dec.
- Sood A, Midha V, Sood N. Pain in abdomen-do not forget lead poisoning. *Indian J Gastroenterol*. 2002;21(6):225-226.
- Woolf AD, Goldman R, Bellinger DC. Update on the clinical management of childhood lead poisoning. *Pediatr Clin North Am*. 2007;54(2):271-294.

## Articles Related to Sources of and Risk Factors for Lead Exposure

- Brown MJ, Raymond J, Homa D, Kennedy C, Sinks T. Association between children's blood lead levels, lead service lines, and water disinfection, Washington, DC, 1998-2006. *Environmental Research*. 111(1):67-74, 2011 Jan.
- Centers for Disease Control and Prevention (CDC). Childhood lead poisoning associated with lead dust contamination of family vehicles and child safety seats - Maine, 2008.
- MMWR - Morbidity & Mortality Weekly Report. 58(32):890-3, 2009 Aug 21.
- Centers for Disease Control and Prevention (CDC). Childhood lead poisoning from commercially manufactured French ceramic dinnerware-- New York City, 2003.
- MMWR Morb Mortal Wkly Rep. 2004 Jul 9;53(26):584-6. Available online at <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5326a4.htm>.
- Eisenberg KW, van Wijngaarden E, Fisher SG, Korfmacher KS, Campbell JR, Fernandez ID, Cochran J, Geltman PL. Blood lead levels of refugee children resettled in Massachusetts, 2000 to 2007. *Am J Public Health*. 2011 Jan;101(1):48-54. Epub 2010 Nov 18. Available online at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3000732/?tool=pubmed>.
- George M, Heeney MM, Woolf AD. Encephalopathy from lead poisoning masquerading as a flu-like syndrome in an autistic child. *Pediatric Emergency Care*. 26(5):370-3, 2010 May.
- Gorospe EC, Gerstenberger SL. Atypical sources of childhood lead poisoning in the United States: a systematic review from 1966-2006. *Clinical Toxicology: The Official Journal of the American Academy of Clinical Toxicology & European Association of Poisons Centres & Clinical Toxicologists*. 46(8):728-37, 2008 Sep.
- Jacobs DE, Clickner RP, Zhou JY, et al. The prevalence of lead-based paint hazards in U.S. housing. *Environ Health Perspect*. 2002;110 :A599- A606



Khan DA, Qayyum S, Saleem S, Ansari WM, Khan FA. Lead exposure and its adverse health effects among occupational worker's children. *Toxicol Ind Health* 2010; 26:8 497-504. AbstractFull Text (PDF)

Lambrinidou Y, Triantafyllidou S, Edwards M. Failing our children: lead in U.S. school drinking water. *New Solutions*. 20(1): 25-47, 2010.

Lin CG, Schaider LA, Brabander DJ, Woolf AD. Pediatric lead exposure from imported Indian spices and cultural powders. *Pediatrics*. 2010 Apr;125(4):e828-35. Epub 2010 Mar 15. Available online at <http://pediatrics.aappublications.org/content/125/4/e828.long>

Miranda ML, Anthopolos, R and Hastings, D. 2011 October. A Geospatial Analysis of the Effects of Aviation Gasoline on Childhood Blood Lead Levels., *Environ Health Perspect.*: 119(10): 1513–1516. Published online 2011 July 13. doi: 10.1289/ehp.1003231

Rabito, F A, Iqbal, S, Shorter, C F, Osman, P, Philips, P E, Langlois, E, White, L E. The association between demolition activity and children's blood lead levels.

*Environmental Research*. 103(3):345-51, 2007 Mar.

Sharmer L, Northrup-Snyder K, Juan W. Newly recognized pathways of exposure to lead in the middle-income home. *Journal of Environmental Health*. 70(3):15-9, 48; quiz 51-2, 2007 Oct.

Zierold KM, Havlena J, Anderson H. Exposure to lead and length of time needed to make homes lead-safe for young children. *American Journal of Public Health*. 97(2):267-70, 2007 Feb.

## Articles Related to Nutrition

See also above, Best Review Article by Lidsky and Schneider.

Hubbs-Tait, L., Nation, J.R., Krebs, N.F., Bellinger, D.C. Neurotoxicants, micronutrients, and social environments individual and combined effects on children's development (Review). *Psychological Science in the Public Interest, Supplement Volume 6, Issue 3, December 2005, Pages 57-121.*

Kwong WT, Friello P, Semba RI. Interactions between iron deficiency and lead poisoning: epidemiology and pathogenesis. *Sci Total Environ*. 2004;330(1-3):21-37.

Liu J, McCauley L, Compher C, Yan C, Shen X, Needleman H, Pinto-Martin JA. Regular breakfast and blood lead levels among preschool children. *Environ Health*. 2011 Apr 1;10:28.. Available online at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3079601/?tool=pubmed>.



Ramos CL, Barros HM, Stein AT, Costa JS. Risk factors contributing to childhood poisoning. *J Pediatr (Rio J)*. 2010 Sep-Oct;86 (5):435-40.

[Article in English, Portuguese]. Available online at <http://www.jped.com.br/ArtigoDetalhe.aspx?varArtigo=2129>.

## Articles on Lead and Children with Pervasive Developmental Disorders

Accardo P, Whitman B, Caul J, et al. Autism and plumbism. A possible association. *Clin Pediatr (Phila)*. 1988;27(1):41-44. SFX [Context Link]

George M, Heeney MM, Woolf AD. Encephalopathy from lead poisoning masquerading as a flu-like syndrome in an autistic child. *Pediatric Emergency Care*. 26(5):370-3, 2010 May.

Kaiser MY, Kearney G, Scott KG, DuClos C, Kurlfink J. Tracking childhood exposure to lead and developmental disabilities: examining the relationship in a population-based sample. *Journal of Public Health Management & Practice*. 14(6):577-80, 2008 Nov-Dec.

Shannon M, Graef JW. Lead intoxication in children with pervasive developmental disorders. *J Toxicol Clin Toxicol*. 1996;34:177.

## Articles on Lead and Maternal/Prenatal Exposure

Cleveland LM, Minter ML, Cobb KA, Scott AA, German VF. Lead hazards for pregnant women and children: part 1: immigrants and the poor shoulder most of the burden of lead exposure in this country. Part 1 of a two-part article details how exposure happens, whom it affects, and the harm it can do. *American Journal of Nursing*. 108(10):40-9; quiz 50, 2008 Oct.

Jedrychowski W, Perera F, Maugeri U, Miller RL, Rembiasz M, Flak E, Mroz E, Majewska R, Zembala M. Intra-uterine exposure to lead may enhance sensitization to common inhalant allergens in early childhood: a prospective prebirth cohort study.

*Environ Res*. 2011 Jan;111(1):119-24. Epub 2010 Nov 20. Available online at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3079601/?tool=pubmed>.

Patel, AB; Mamtani, MR; Thakre, TP; Kulkarni, H. Association of umbilical cord blood lead with neonatal behavior at varying levels of exposure. *Behavioral and Brain Functions*. Vol.2 Jun 2006, ArtID 22.

## Other Articles

Bellinger, DC. Interpreting epidemiologic studies of developmental neurotoxicity: Conceptual and analytic issues. *Neurotoxicology and Teratology*. Volume 31, Issue 5, September–October 2009, Pages 267–274.

Bernard SM. McGeehin MA. Prevalence of blood lead levels  $\geq 5$  micro g/dL among US children 1 to 5 years of age and socioeconomic and demographic factors associated with blood of lead levels 5 to 10 micro g/dL, Third National Health and Nutrition Examination Survey, 1988-1994. *Pediatrics*. 112(6 Pt 1):1308-13, 2003 Dec.

Chung EK. Webb D. Clampet-Lundquist S. Campbell C. A comparison of elevated blood lead levels among children living in foster care, their siblings, and the general population. *Pediatrics*. 2001 May. 107(5):E81,

Lin-Fu JS. Undue absorption of lead among children—a new look at an old problem. *N Engl J Med*. 1972;286(13):702-710.

Muennig P. The social costs of childhood lead exposure in the post-lead regulation era.

*Arch Pediatr Adolesc Med*. 2009 Sep;163(9):844-9. Available online at <http://archpedi.ama-assn.org/cgi/content/full/163/9/844>.

Raymond JS. Anderson R. Feingold M. Homa D. Brown MJ. Risk for elevated blood lead levels in 3- and 4-year-old children. 2009 Jan. *Maternal & Child Health Journal*. 13(1):40-7.

Schmidt CW. Poisoning young minds. *Environ Health Perspect*. 1999 Jun;107(6):A302-7. Available online at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1566584/?tool=pubmed>

## Other Publications

DPH 2010 surveillance report, [http://www.ct.gov/dph/lib/dph/environmental\\_health/lead/pdf/CY\\_2010\\_Surveillance\\_Report\\_final\\_12-21-2012.pdf](http://www.ct.gov/dph/lib/dph/environmental_health/lead/pdf/CY_2010_Surveillance_Report_final_12-21-2012.pdf)

Miranda ML Kim D; Osgood C; Hastings D. The Impact of Early Childhood Lead Exposure on Educational Test Performance among Connecticut Schoolchildren, Study Phase 1, 2011, February 14. Children's Environmental Health Initiative, Duke University: Durham, North Carolina. Available at [http://www.sde.ct.gov/sde/lib/sde/pdf/deps/student/health/linking\\_lead\\_and\\_education\\_data.pdf](http://www.sde.ct.gov/sde/lib/sde/pdf/deps/student/health/linking_lead_and_education_data.pdf)

Fiedler, Nancy L. Gender (sex) differences in response to prenatal lead exposure. In Lewis, Michael [Ed]; Kestler, Lisa [Ed]. (2012). *Gender differences in prenatal substance exposure*. (pp. 171-185). xviii, 227 pp. Washington, DC, US: American Psychological Association; US.

Stanford, Lisa D. Lead Astray: The Controversies of Childhood Lead Poisoning. Heilbronner, Robert L [Ed]. (2005). Forensic Neuropsychology Casebook. (pp. 218-235). xiv, 370 pp. New York, NY, US: Guilford Press; US.

Morley, R. (Reviewer). The Cost of Being Poor: Poverty, Lead Poisoning, and Policy Implementation. Review in JAMA 2006; 295:14 1711-1712 .

Richardson, JW. The Cost of Being Poor: Poverty, Lead Poisoning, and Policy Implementation. 2005. 204 pp, ISBN 0-275-96912-6, Praeger: Westport, Conn.



# Appendixes

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6

## Appendix A

### *Connecticut State Department of Education Health Assessment Record (HAR-3)*

Located on the CSDE Health Promotion Services/School Nurse Web site at <http://www.sde.ct.gov/sde/cwp/view.asp?a=2678&q=320768>.

## Appendix B

### Blood Lead Level (BLL) History Form (to be completed by child/student's health care provider)

To the Attention of the Parent/Guardian: (Please complete this section)

Child/student's Name: (last) \_\_\_\_\_ (first) \_\_\_\_\_ DOB: \_\_\_\_\_

Parent/Guardian's Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

To the Attention of the Health Care Provider: (Please answer the following questions)

1. What was the age and blood lead level when diagnosed with elevated BLL (BLLs  $\geq$  5mcg/dL)? \_\_\_\_\_
2. What is the highest BLL this child/student has had? \_\_\_\_\_
3. What was the duration of exposure to lead (if known)? \_\_\_\_\_
4. What was the duration of the child/students' BLL? \_\_\_\_\_
5. What kind of treatment did the child/student have? \_\_\_\_\_ AND  
How many courses of treatment? \_\_\_\_\_

Please complete this section by listing all documented BLL results for this child/student (continue over)

Blood Lead Test Date	Blood Lead Results ( <i>Indicate if venous or capillary</i> )		
	_____ mcg/dL	_____ Venous or	_____ Capillary
	_____ mcg/dL	_____ Venous or	_____ Capillary
	_____ mcg/dL	_____ Venous or	_____ Capillary
	_____ mcg/dL	_____ Venous or	_____ Capillary
	_____ mcg/dL	_____ Venous or	_____ Capillary
	_____ mcg/dL	_____ Venous or	_____ Capillary
	_____ mcg/dL	_____ Venous or	_____ Capillary
	_____ mcg/dL	_____ Venous or	_____ Capillary

Name of Health Care Provider: \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

Telephone \_\_\_\_\_ Email \_\_\_\_\_

Child/student's Name: (last) \_\_\_\_\_ (first) \_\_\_\_\_ DOB: \_\_\_\_\_

Blood Lead Test Date	Blood Lead Results ( <i>Indicate if venous or capillary</i> )		
	_____ mcg/dL	_____ Venous or	_____ Capillary
	_____ mcg/dL	_____ Venous or	_____ Capillary
	_____ mcg/dL	_____ Venous or	_____ Capillary
	_____ mcg/dL	_____ Venous or	_____ Capillary
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	_____ mcg/dL	_____ Venous or	_____ Capillary
	_____ mcg/dL	_____ Venous or	_____ Capillary

Name of Health Care Provider: \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

*This form was adapted with permission from the work of Dr. Vivian Cross, Education / Health Consultant and Executive Director of the Foundation for Educational Advancement, Inc., Dr. Helen Binns, Director, Lead Evaluation Clinic and the Nutrition Evaluation Clinic; Professor of Pediatrics, Northwestern University Feinberg School of Medicine and Francesca Provenzano, Health Program Supervisor for the CT State Department of Public Health, with additional contributions from Dr. Sherin Stahl, Director of Psychological Services, Yale Child Study Center and Lead Poisoning and Regional Treatment Center at Yale New Haven Children's Hospital.*



## Appendix C

### *Sample Assessment Model for Lead Poisoning*

While criteria referenced, curriculum referenced, and informal assessments can be employed to identify specific deficiencies, a comprehensive assessment is recommended employing norm referenced tests with adequate validity and reliability and preferably yielding scaled scores or standard scores with confidence intervals and percentile scores. The following is a suggested model for a comprehensive evaluation of mental abilities.

<b>FUNCTION/DOMAIN</b>	<b>TEST/SCALE EXAMPLES</b>
Measure of Intelligence	WISC-IV, KABC-II
Executive	D-KEFS, WCST, BRIEF, BASC-2 Executive
Working Memory Capacity	WISC-IV Working Memory, CMS Working Memory
Processing Speed	WISC-IV Processing Speed, W/J-III (NU) Processing Speed or Academic Fluency Clusters
Attention	Connors-3, BASC-2 scales, PADDs, CPT-II, NEPSY-2
Memory	CMS, WRAML-2
Language - Perception	CTOPP, W/J-III Phonemic Awareness, Visual Matching, LAC-3
Language - Reading	W/J-III (NU), WIAT-III, GORT-4, GSRT
Language - Speech Comprehension	PPVT-4, OWLS Listening Comprehension CASL, CELF-4
Language - Expressive Speech	CASL, WIAT-III, W/J-III (NU), CELF-4
Language - Writing	WIAT-III, W/J-III (NU), TOWL-4
Perceptual-Motor	NEPSY-2, Rey-Osterrieth Complex Figure,
Social/Emotional Behavior	BASC-2, Connors-3, M-PACI, SMALSI, CAIR
Adaptive Behavior (optional)	VADS- II

The suggested tests are not meant to constitute endorsements for using those methods. Mental processes and domains of cognitive abilities are multi-dimensional. Alternative or additional measures may be employed, particularly when specific deficiencies have been identified.

## Key to Test Abbreviations

BASC-2	Behavioral Assessment System for Children - Second Addition
BRIEF	Behavioral Rating Inventory of Executive Function
CAIR	Clinical Assessment of Interpersonal Relationships
CASL	Comprehensive Assessment of Speech and Language
CELF-4	Clinical Evaluation of Language Fundamentals - Fourth Edition
CMS	Children's Memory Scale
CPT-II	Conners Continuous Performance Test - Second Edition
CTOPP	Comprehensive Test of Phonological Processing
D-KEFS	Delis-Kaplan Executive Function System
GORT-4	Gray Oral Reading Test - Fourth Edition
GSRT	Gray Silent Reading Test
KABC-II	Kaufman Assessment Battery for Children - Second Edition
LAC-3	Lindamood Auditory Conceptualization Test - Third Edition
M-PACI	Millon Pre-Adolescent Clinical Inventory
NEPSY-II	(Not an acronym - "neuropsychological" assessment battery)
OWLS	Oral and Written Language Scales
PADDIS	Pediatric Attention Disorders Diagnostic Screener
PPVT-4	Peabody Picture Vocabulary Test - Fourth Edition
SMALSI	School Motivation and Learning Strategies Inventory
WCST	Wisconsin Card Sorting Test
WIAT-III	Wechsler Individual Achievement Test - Third Edition
WISC-IV	Wechsler Intelligence Scale for Children - Fourth Edition
W/J-III (NU)	Woodcock-Johnson Psychoeducational Battery - Third Edition (Norms Updated)
VADS-II	Vineland Adaptive Behavior Scales - Second Edition

## Appendix D

### *Sample Assessment Model for Lead Poisoning – Preschool Children*

While criteria referenced, curriculum referenced, and informal assessments can be employed to identify specific deficiencies, a comprehensive assessment is recommended employing norm referenced tests with adequate validity and reliability and preferably yielding scaled scores or standard scores with confidence intervals and percentile scores. The following is a suggested model for a comprehensive evaluation of mental abilities.

<b>FUNCTION/DOMAIN</b>	<b>TEST/SCALE EXAMPLES</b>
Measure of Intelligence	WPPSI-IV, KABC-II, DAS-2
Executive Functioning	BRIEF-P, BASC-2, NEPSY-2
Working Memory Capacity	WPPSI-IV Working Memory, DAS-2 Working Memory Cluster
Processing Speed	WPPSI-IV Processing Speed, DAS-2 Processing Speed Cluster
Attention	BASC-2, NEPSY-2
Memory	WJ-III(NU) Memory for Words, Memory for Sentences, Retrieval Fluency; NEPSY-2, DAS-2
Language - Perception	W/J-III Sound Awareness, CTOPP
Language – Early Reading	W/J-III (NU) (Letter-Word Identification, Passage Comprehension, Word Attack), KTEA-2 Letter and Word Recognition, DAS-2 School Readiness Cluster
Language - Speech Comprehension	PPVT-4, OWLS Listening Comprehension CASL, CELF-4, KTEA-2 Listening Comprehension, PLS-5, NEPSY-2 Comprehension of Instructions
Language - Expressive Speech	CASL, W/J-III (NU), OWLS Oral Expression, CELF-4, KTEA-2 Oral Expression, KTEA-2 Oral Fluency Composite, PLS-5, EVT-2
Language – Early Writing	OWLS Written Expression, KTEA-2 Written Expression
Perceptual-Motor	NEPSY-2, Beery-Buktenica Developmental Test of Visual-Motor Integration (VMI)

Social/Emotional Behavior	BASC-2, ITSEA
Adaptive Behavior (optional)	VABS- II

The suggested tests are not meant to constitute endorsements for using those methods. Mental processes and domains of cognitive abilities are multi-dimensional. Alternative or additional measures may be employed, particularly when specific deficiencies have been identified.

Suggested tests/subtests are not necessarily appropriate for all ages of the preschool years, and care should be used in selecting tests/subtests that are suitable. In some situations, developmental testing may be preferable.

### **Key to Test Abbreviations**

BASC-2	Behavioral Assessment System for Children - Second Addition
BRIEF-P	Behavioral Rating Inventory of Executive Function – Preschool Version
CASL	Comprehensive Assessment of Speech and Language
CELF-4	Clinical Evaluation of Language Fundamentals - Fourth Edition
CTOPP	Comprehensive Test of Phonological Processing
DAS-2	Differential Abilities Scales – Second Edition
EVT-2	Expressive Vocabulary Test – Second Edition
KABC-II	Kaufman Assessment Battery for Children - Second Edition
KTEA-2	Kaufman Test of Educational Achievement – Second Edition
NEPSY-II	(Not an acronym - “neuropsychological” assessment battery)
OWLS-2	Oral and Written Language Scales
PLS-5	Preschool Language Scales – Fifth Edition
PPVT-4	Peabody Picture Vocabulary Test - Fourth Edition
WPPSI-IV	Wechsler Preschool and Primary Scales - Fourth Edition (As of Fall, 2012)
W/J-III (NU)	Woodcock-Johnson Psychoeducational Battery – third Edition (Norms Updated)
VABS-II	Vineland Adaptive Behavior Scales - Second Edition

## Appendix E

### Connecticut Department of Public Health Lead Provider Letter

# STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

Jewel Mullen, M.D., M.P.H., M.P.A.  
Commissioner



Dannel P. Malloy  
Governor  
Nancy Wyman  
Lt. Governor

April 12, 2013

Dear Clinical Partners:

On January 4, 2012, the national Advisory Committee on Childhood Lead Poisoning Prevention (ACLPP) released a report to the U.S. Department of Health and Human Services, Centers for Disease Control and Prevention (CDC) which acknowledged the cumulative scientific evidence concerning a range of health impacts associated with blood lead levels less than 10µg/dL in children. The ACLPP recommendations and the CDC responses can be found on the CDC website at: [www.cdc.gov/nceh/lead/ACCLPP/CDC\\_Response\\_Lead\\_Exposure\\_Recs.pdf](http://www.cdc.gov/nceh/lead/ACCLPP/CDC_Response_Lead_Exposure_Recs.pdf).

Specific recommendations that were made by the ACLPP and accepted by the CDC were to:

- (1) base blood lead re-testing requirements and timelines on a 'reference value'<sup>1</sup> of 5 µg/dL; and
- (2) have clinicians take the primary role in educating families about *preventing* childhood lead exposure during well-child visits prior to blood lead testing occurring.

The Connecticut Department of Public Health (CT DPH) reconvened the state's Childhood Lead Poisoning Prevention Screening Advisory Committee to revise Connecticut's blood lead screening requirements and medical follow-up guidelines to align with the national recommendations. The two-page advisory entitled, *Requirements and Guidance for Childhood Lead Screening by Health Care Professionals in Connecticut* are attached.

Major revisions to the requirements and guidelines include: (1) lowering the blood lead level for retesting from 10µg/dL to 5µg/dL; (2) testing and re-testing timelines; and (3) streamlining the risk assessment questions.

The CT DPH has developed a simple educational packet, to be provided at well child visits, consisting of two informational sheets that cover the basics about lead poisoning prevention and nutrition. The information included is: *Lead Poisoning Prevention* and *Eating Right Helps Fight Lead Poisoning*.



*If you require aid or accommodation to participate fully and fairly in this meeting, please phone (860) 509-7293*

Phone: (860) 509-7299 • Fax: (860) 509-7295 • VP: (860) 899-1611

410 Capitol Avenue, P.O. Box 340308

Hartford, Connecticut 06134-0308

[www.ct.gov/dph](http://www.ct.gov/dph)

*Affirmative Action/Equal Opportunity Employee*

To summarize, CT DPH seeks your assistance with:

1. Reminding parents that there is no safe blood lead level.
2. Reminding parents that it is the law to have their child tested.
3. Ensuring medical re-testing according to established timelines when a child is identified as having a blood lead level at or above the new 'reference value.'
4. Providing lead poisoning prevention educational information during well child visits.

Primary prevention is paramount in our collective efforts to reduce and eliminate childhood lead poisoning and clinicians are essential to this effort. Your collaboration on this effort is critical to the health of your patients.

Please feel free to contact the CT DPH Lead and Healthy Homes Program at 860-509-7299 if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Jewel Mullen", with a long horizontal flourish extending to the right.

Jewel Mullen, MD, MPH, MPA  
Commissioner

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<sup>1</sup>The reference value is based on the 97.5th percentile of the blood lead level distribution in children 1-5 years of age in the U.S. Based upon current data the reference value blood lead level is 5µg/dL.

# Appendix F

## Connecticut Department of Public Health Requirement and Guidance for Childhood Lead Screening by Health Care Professionals in Connecticut



www.ct.gov/dph

### Requirements and Guidance for Childhood Lead Screening by Health Care Professionals in Connecticut Lead Poisoning Prevention and Control Program

Revised April 2013

#### A. Universal Blood Lead Testing is Mandated

Test children:

- Between 9 months and 36 months of age, each year for elevated blood lead levels
  - Most providers test at 12 months and 24 months of age
- Between 25-72 months of age, if not previously been tested, regardless of risk
- < 72 months of age, with developmental delays (especially if associated with pica)

#### B. Diagnostic Testing and Follow-up

If result of screening test (µg/dl) is	Perform Venous Blood test within:
5-19	3 months
20-44	1 month-1 week*
45-59	48 hours
60-69	24 hours
≥ 70	Immediately

\*The higher the result on the capillary test, the more urgent the need for venous testing.

Blood Lead Level (µg/dl)	Early follow-up (1 <sup>st</sup> 2-4 tests after identification) test within:	Late follow-up (after BLL begins to decline) test within:
5-14	3 months <sup>b</sup>	6 - 9 months
15-19	1 - 3 months <sup>b</sup>	3 - 6 months
20-24	1 - 3 months <sup>b</sup>	1 - 3 months
25-44	2 weeks - 1 month	1 month
> 45	As soon as possible	Chelation and follow-up

<sup>a</sup> Seasonal variations of BLLs exists and may be more apparent in colder climates. Greater exposure in the summer months may necessitate more frequent follow ups.  
<sup>b</sup> Some case managers or PCPs may choose to repeat blood lead tests on all new patients within a month to ensure that their BLL is not rising more quickly than anticipated.

- If a capillary blood test is elevated (equal to or greater than 5µg/dL), confirm with a diagnostic (venous) blood lead test.
- Children with an elevated diagnostic blood lead test require additional follow-up blood testing at appropriate intervals.
- Children should be tested according to schedule above until BLL is below the reference value of <5µg/dl.
- Providers can contact one of Connecticut’s Regional Lead Treatment Centers for guidance and assistance with clinical management of a lead poisoned child (see below).

**Consultation and supportive services are available by contacting:**  
 Hartford Regional Lead Treatment Center, (860-714-5184)  
 Yale-New Haven Regional Lead Treatment Center, (203-764-9106)

**For more information contact:**  
 State of CT Department of Public Health Lead Poisoning Prevention and Control Program  
 (860-509-7299)

**C. Provide Anticipatory Guidance to Families**

- Provide educational information about lead poisoning
- Written materials, along with verbal education, should be provided in the family's primary language (at an appropriate reading level)
- Resources available at [www.ct.gov/dph/lead](http://www.ct.gov/dph/lead)

**D. Risk Assessment**

- In addition to testing children at the recommended time intervals, at each well-child visit, health care providers shall evaluate children 6 months to 72 months of age for risk of lead exposure using the following risk assessment questions.

**Risk Assessment Questions**

1. Does your child live in or regularly visit a house built before 1978?
2. Does your child have a brother or sister, housemate, or playmate being followed or treated for lead poisoning?
3. Does your child frequently come in contact with an adult whose job or hobby involves exposure to lead (e.g., construction, welding, automotive repair shop, other trades, stained glass making; using lead solder, artist paints or ceramic glazes; etc.)?
4. Has your child been exposed to any imported products (spices, foods/vitamins, ethnic home remedies, or ethnic cosmetics)?
  - Some examples include: azarcon (also known as rueda, Maria Luisa, alarcon, liga); albayalde; greta; pay-loo-ah; ghasard; bala goli; kandu; kohl; litargirio; bebetina; chyawan prash.

Ask any additional questions that may be specific to situations that exist in a particular community (e.g. operating or abandoned industrial sources; waste disposal sites; drinking water; has your child ever lived outside the U.S.; does your family use pottery for cooking, eating or drinking; etc.?).

**If the answer to any of the above questions is YES or UNKNOWN, then the child is considered to be at risk and should be tested.**

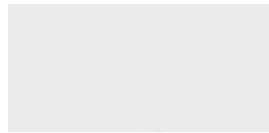
**NOTE: Blood lead testing shall also be considered for any child regardless of age, with:**

- Unexplained seizures, neurologic symptoms, hyperactivity, behavior disorders, growth failure, abdominal pain, or other symptoms consistent with lead poisoning or associated with lead exposure;
- Recent history of ingesting, or an atypical behavior pattern of inserting, any foreign object (even if the foreign object is unleaded) into a body orifice.



# Appendix G

Connecticut Department of Public Health Lead Educational Handouts



CT DPH LEAD & HEALTHY HOMES PROGRAM

FACT SHEET

## Lead Poisoning Prevention

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### Where is Lead Found?

- **Paint:** Lead can be found in paint that was made before 1978. This paint can be on any painted surface in your home, like doors, windows, and porches.
- **Dust:** Lead dust in the home is comes from lead painted surfaces that are chipping and peeling. Sanding and scraping old paint when repainting or remodeling can also cause a lead dust problem.
- **Soil:** Old paint that has fallen off the outside of your house onto the ground may have left lead in the soil.
- Lead can also be found in ceramic dishes, crystal, food cans from outside the U.S., water pipes, solder and fittings, and some ethnic cosmetics and home remedies.
- Some jobs and hobbies can expose children and adults to lead. Some examples are painters, house remodelers, plumbers, mechanics, bridge workers, making jewelry, ceramic/pottery or stained glass, and going to indoor firing ranges.

---

### Is Your Child At Risk For Lead Poisoning?

If you answer yes to any of these questions you may want to have your child tested, even if your child is older.

- Does your child live in or often visit a building built before 1960?
- Does your child live in or often visit a building built before 1978 that is being or was just repaired or remodeled?
- Does your child live in or often visit a building that has peeling or chipping paint?
- Does your child live with an adult or often visit an adult whose job or hobby exposes them to lead?
- Does your family eat or drink from dishes made outside the U.S.?
- Does your family use home remedies?

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### How does a child get lead poisoned?

- Lead poisoning usually happens when children ingest (eat) dust that has lead in it. Children may also eat chips of lead paint or soil that has lead in it.

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### What Does Lead Do to the Body?

- No amount of lead in the body is safe. The damage lead can cause is forever! Lead can damage the brain. It can cause growth problems, hearing loss, and learning problems.
  - Many children do not show signs of lead poisoning. Some signs of high levels of lead poisoning are the same as other childhood illnesses, like the common cold or teething.
-

### What Does Lead Do to the Body? (continued)

- If a pregnant woman is around lead, she and her unborn child may become lead poisoned. Lead can cause lasting damage to the mother and her baby.

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### How Can You Reduce The Risk?

Replace, fix or manage all lead hazards in a lead safe way.

#### Steps you can take to prevent children from being lead poisoned:

- Keep children and pregnant women away from all lead hazards.
- Clean up lead dust and paint chips by wet wiping window sills and window wells or wet mopping floors. Do NOT dry sweep or vacuum, this will spread the lead dust.
- Block places with peeling or chipping paint. Do not use windows that have chipping paint.
- Move your child's bedroom or play area to a room that has no peeling or chipping paint.
- Place washable mats inside and outside entry doors.
- Have people remove their shoes before coming in the home.
- Do not let your child (or pet) play in dirt.
- Wash and dry your child's hands, toys and pacifiers often. Wash and dry your child's hands before playing, eating, and bedtime.
- Use cold water from the tap for drinking, cooking and making formula. Let water run for 1-2 minutes before using.
- Give your child healthy meals and snacks to eat. An empty stomach takes in lead faster than a full stomach.

#### Steps adults can take to help prevent themselves or children from becoming lead poisoned from their job or hobby:

- Don't eat, drink or smoke in your work/hobby area.
- Wash your hands and face before eating, smoking or drinking.
- Wear protective clothing (such as disposable gloves, hat, and shoe covers) when you work with lead. Use a NIOSH-approved respirator.
- Shower, wash your hair, and change into clean clothes and shoes before you leave the work area. Leaving dust on your clothes can contaminate your home and car.
- Put your work clothes and shoes in sealed plastic bags.
- Wash work clothes in a different load than the family's laundry.

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### Does your child need to be tested for lead poisoning?

- Yes, all children, at about ages one and two, must be tested for lead poisoning...it's the law!
- Blood tests will tell how much lead is in your child's blood at the time of the test. If the level is high, your child will need more testing.
- If your child is at risk at other ages, have your child tested at those times too.

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### Connecticut Lead and Healthy Homes Program

(860) 509-7299

[www.ct.gov/dph/lead](http://www.ct.gov/dph/lead)

[www.ct.gov/dph/healthyhomes](http://www.ct.gov/dph/healthyhomes)





## Eating Right Helps Fight Lead Poisoning

Lead tricks the body into thinking it is iron, calcium or zinc. Eating healthy can help decrease the lead from staying in the body.

Don't let your child go through the day on an empty stomach!

### Five Basic Food Groups

- Breads, cereals and grains
- Vegetables
- Fruit
- Milk and milk products
- Meat, chicken, fish, nuts, and beans



### Foods Rich in Calcium

- Milk
- Yogurt
- Cheese (*for snacks, in cooking such as macaroni and cheese, pizza, tortillas, vegetables*)
- Foods made of milk (*pudding, soup, ice cream, custard*)
- Sardines or canned salmon (*with bones*)
- Green vegetables (*kale, collard greens, broccoli*)



### Foods Rich in Zinc

- Chicken or turkey
- Lean meat
- Fish
- Milk and cheese
- Clams, oysters, mussels, crab
- Dried beans and lentils
- Eggs



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### Foods Rich in Iron

- Lean red meat, chicken, turkey and fish
- Iron-fortified hot and cold cereals
- Clams, oysters or mussels (*use canned to make soup or sauce for pasta*)
- Dark green leafy vegetables
- Dried beans, split peas, and other beans (*pinto, red, navy, kidney, garbanzo*)
- Eggs
- Dried fruit



*The iron in vegetables, grains, beans, nuts and eggs may be made more usable to the body when you eat a food high in Vitamin C at the same meal. Oranges, grapefruit, strawberries, cantaloupe, green peppers, cauliflower, broccoli and potatoes are some foods high in Vitamin C.*

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### Healthy Tips:

- Don't fry foods. Bake or broil them.
  - Try not to eat high fat foods. When you do eat them, eat small portions.
  - Vitamin C helps your body absorb iron.
  - Children under the age of 2 should have whole milk after they no longer drink formula or breast milk. Most children 2 and older can have lower fat milk. Children with milk allergies can have tofu, leafy green vegetables, sardines, or canned salmon for their calcium needs.
  - Younger children need smaller servings than older children or adults. More active people need larger numbers of servings from each of the 5 food groups.
- 

**Connecticut Lead and Healthy Homes Program**

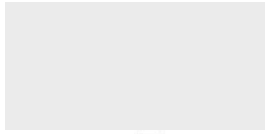
**(860) 509-7299**

**[www.choosemyplate.gov](http://www.choosemyplate.gov)**

**[www.ct.gov/dph/lead](http://www.ct.gov/dph/lead)**

**[www.ct.gov/dph/healthyhomes](http://www.ct.gov/dph/healthyhomes)**





## Prevención de envenenamiento por plomo

### ¿Dónde se encuentra el plomo?

- **Pinturas:** es posible hallar plomo en las pinturas fabricadas antes de 1978. Estas pinturas pueden encontrarse en cualquier superficie pintada de su hogar, como puertas, ventanas y porches.
- **Polvo:** el polvo con plomo en el hogar proviene de las superficies pintadas con pinturas a base de plomo que se están desprendiendo y descascarando. El lijado y rasqueteo de la pintura vieja cuando se vuelve a pintar o remodelar un lugar también pueden generar un problema con el polvo que contiene plomo.
- **Tierra:** la pintura vieja que se ha desprendido de la parte exterior de la casa sobre el suelo puede haber dejado residuos de plomo en la tierra.
- El plomo también se halla en los platos hechos de cerámica, los cristales, las latas de alimentos de países extranjeros, las cañerías del agua, las soldaduras y accesorios, en ciertos productos cosméticos para pieles de distintos orígenes étnicos y en los remedios caseros.
- Ciertos empleos y hobbies pueden exponer a los niños y adultos al plomo. Entre los ejemplos se encuentran los pintores, los remodeladores, los plomeros, los mecánicos, las personas que trabajan en puentes, en la fabricación de joyas, cerámicas, alfarería o vitrales y quienes ingresan a polígonos de tiro bajo techo.

### ¿Su hijo corre riesgo de envenenarse con plomo?

Si responde afirmativamente a cualquiera de las siguientes preguntas, tal vez desee someter a su hijo a un análisis, aunque ya sea mayor.

- ¿Su hijo vive o visita con frecuencia un edificio construido antes de 1960?
- ¿Su hijo vive o visita con frecuencia un edificio construido antes de 1978 que está en proceso de reparación o remodelación o que ha sido reparado o remodelado recientemente?
- ¿Su hijo vive o visita con frecuencia un edificio cuya pintura se está desprendiendo o descascarando?
- ¿Su hijo vive con un adulto o visita con frecuencia a un adulto cuyo trabajo o hobby lo expone al plomo?
- ¿Su familia come o bebe utilizando platos o vasos fabricados fuera de los EE. UU.?
- ¿Su familia utiliza remedios caseros?

### ¿Cómo se envenena por plomo un niño?

- El envenenamiento por plomo suele ocurrir cuando los niños ingieren polvo que contiene plomo. Los niños también pueden comerse restos de pintura o tierra con plomo.

### ¿Qué provoca el plomo en el cuerpo?

- Ninguna cantidad de plomo en el cuerpo es segura. ¡El daño provocado por el plomo es para siempre! El plomo puede dañar el cerebro. Puede causar problemas de crecimiento, pérdida de audición y trastornos de aprendizaje.
- Muchos niños no exhiben signos de envenenamiento por plomo. Algunos signos de niveles altos de envenenamiento por plomo son los mismos que en otras afecciones infantiles, como el resfriado común o la dentición.

### ¿Qué provoca el plomo en el cuerpo? (cont.)

- Si una mujer embarazada se encuentra en un ambiente donde hay plomo, ella y el bebé por nacer pueden envenenarse por plomo. El plomo puede causar un daño prolongado a la madre y al bebé.

---

### ¿Cómo se puede reducir el riesgo?

Reemplace, arregle o gestione todos los peligros relacionados con el plomo en forma segura.

#### Pasos a seguir para evitar que los niños se envenenen por plomo:

- Mantener a los niños y a las mujeres embarazadas alejadas de todo peligro relacionado con el plomo.
- Limpiar el polvo con plomo y la pintura desprendida en los alféizares y huecos de las ventanas con un paño húmedo o limpiar los pisos con agua. NO limpiar en seco ni usar una aspiradora, ya que esto puede esparcir el polvo que contiene plomo.
- Bloquear los lugares donde hay pintura desprendida o descascarada. No usar ventanas con pintura desprendida.
- Trasladar la habitación o el área de juegos de los niños a un espacio donde no haya pintura desprendida o descascarada.
- Colocar felpudos lavables dentro y fuera de las puertas de entrada.
- Hacer que las personas se quiten los zapatos antes de ingresar a la casa.
- No permitir que los niños (o mascotas) jueguen con tierra.
- Lavar y secar las manos, los juguetes y chupetes de los niños a menudo. Lavar y secar las manos de los niños antes de jugar, de comer y al acostarse.
- Usar agua fría de la canilla para beber, cocinar y preparar la leche de fórmula. Dejar correr el agua entre 1 y 2 minutos antes de usarla.
- Ofrecer a los niños comidas y bocadillos sanos. Si una persona tiene el estómago vacío, el plomo se absorbe con más rapidez que con el estómago lleno.

#### Pasos que los adultos pueden seguir para ayudar a evitar que ellos o niños se envenenen por plomo debido a su trabajo o hobby:

- No comer, beber ni fumar en su lugar de trabajo o hobby.
- Lavarse las manos y el rostro antes de comer, fumar o beber.
- Usar vestimenta de protección (como guantes descartables, gorra y fundas para zapatos) al trabajar con plomo. Usar un espirador aprobado por el Instituto Nacional de Salud y Seguridad Ocupacional (NIOSH).
- Ducharse, lavarse el cabello y colocarse ropa y zapatos limpios antes de dejar el área de trabajo. Si queda polvo en la vestimenta, puede contaminar su casa y automóvil.
- Colocar la ropa y los zapatos de trabajo en bolsas de plástico selladas.
- Lavar la ropa de trabajo en una carga separada de la ropa sucia de la familia.

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### ¿Es necesario someter su hijo a la prueba para detectar envenenamiento por plomo?

- Sí, todos los niños que tengan entre 1 y 2 años de edad deben someterse a la prueba de detección de envenenamiento por plomo. ¡Es la ley!
- Los análisis de sangre indicarán la cantidad de plomo en la sangre de su hijo al momento del análisis. Si el nivel es alto, su hijo necesitará pruebas adicionales.
- Si su hijo está en riesgo en otras edades, también debe someterlo a los análisis en esos momentos.

**Programa sobre Plomo y Salud en el Hogar de Connecticut**

**(860) 509-7299**

**[www.ct.gov/dph/lead](http://www.ct.gov/dph/lead)**

**[www.ct.gov/dph/healthyhomes](http://www.ct.gov/dph/healthyhomes)**





CT DPH LEAD & HEALTHY HOMES PROGRAM

HOJA DE DATO

## Comer Saludable Ayuda Prevenir El Envenenamiento De Plomo

El plomo engaña el cuerpo haciéndole creer que es hierro, calcio o cinc. Comer saludable para que el cuerpo absorbe menos plomo.

¡No deje que su niño esté con el estómago vacío!

### Cinco Grupos Básicos de Alimentos

- Pan, cereal y granos
- Verduras
- Frutas
- Leche y productos lácteos
- Carne, pollo, pescado, nueces y frijoles o lentejas



### Alimentos Ricos en Calcio

- Leche (al menos 2 pero no más de 3 tazas al día)
- Yogur
- Queso (para entrecomidas, para cocinar fideos, pizza, tortillas, verduras)
- Comidas hechas con leche (budín, sopa, helado, natilla)
- Sardinas o salmon en lata (con espinas)
- Verduras verdes (col, col verde, broccoli)



### Alimentos Ricos en Cinc

- Pollo o pavo
- Carne sin grasa
- Pescado
- Leche y queso
- Almejas, ostras, mejillones y cangrejo
- Frijoles y lentejas
- Huevos



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### Alimentos Ricos en Hierro

- Carne roja sin grasa, pollo, pavo y pescado
- Cereal frío y caliente fortificado con hierro
- Almejas, ostras y mejillones (en lata para sopa o salsa para pasta)
- Verduras de hoja verde oscuro
- Frijoles, garbanzos o lentejas (pintos, rojos, azules, morados, garbanzo)
- Huevos
- Frutas secas



*El hierro que contienen las verduras, los granos, los frijoles, las nueces y los huevos puede ser mejor aprovechado por el cuerpo si se come con un alimento alto en contenido de Vitamina C en la misma comida. Las naranjas, las toronjas, las fresas, los melones, los pimientos verdes, la coliflor, el broccoli y las papas son alimentos altos en contenido de Vitamina C.*

---

### Healthy Tips:

- No fría alimentos. Hornee o áselos.
  - Trate de no comer alimentos con mucha grasa. Cuando coma ellos, coma pequeñas porciones.
  - La vitamina C ayuda su cuerpo absorbe hierro.
  - Los niños menores de 2 años deben tomar leche sin desnatar después de dejar la fórmula o el pecho. La mayoría de los niños de 2 años o mayores pueden tomar leche desnatada. Los niños con alergia a la leche pueden comer tofu, verduras de hoja verde y sardinas o salmón en lata para satisfacer sus necesidades de calcio.
  - Los niños pequeños necesitan porciones más pequeñas que los niños grandes o los *adultos*, y *las personas más activas necesitan porciones más grandes de cada uno de los 5 grupos de alimentos.*
- 

Connecticut Lead and Healthy Homes Program

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[www.ct.gov/dph/lead](http://www.ct.gov/dph/lead)

[www.ct.gov/dph/healthyhomes](http://www.ct.gov/dph/healthyhomes)





# Endnotes

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1. Agency for Toxic Substances & Disease Registry. Online at <http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=22>
2. Lidsky TI; Schneider JS. Lead neurotoxicity in children: basic mechanisms and clinical correlates. *Brain*. 2003;126(1):5-19. AbstractFull TextFull Text (PDF). Available online at <http://brain.oxfordjournals.org/content/126/1/5.full.pdf>
3. US Dep. Health Hum. Serv., Public Health Serv. Centers for Disease Control and Prevention. 1991. Healthy People 2000: National Health Promotion and Disease Prevention Objectives. DHHS Publ. (PHS) 91-5022.
4. Jacobs DE, Clickner RP, Zhou JY, et al. The prevalence of lead-based paint hazards in U.S. housing. *Environ Health Perspect*. 2002;110 :A599– A606
5. Committee on Environmental Health, American Academy of Pediatrics. (2005, reaffirmed, 11/2008). Policy Statement: Lead Exposure in Children: Prevention, Detection, and Management. *Pediatrics*, 116(4):1036–1046. Available online at <http://pediatrics.aappublications.org/content/116/4/1036.full>
6. Lanphear BP, Dietrich KN. And Berger, O. Prevention of Lead Toxicity in US Children. *Ambulatory Pediatrics*, Volume 3, Issue 1, January–February 2003, Pages 27–36

7. Committee on Environmental Health, American Academy of Pediatrics. (2005, reaffirmed, 11/2008). Policy Statement: Lead Exposure in Children: Prevention, Detection, and Management. *Pediatrics*, 116(4):1036–1046. Available online at <http://pediatrics.aappublications.org/content/116/4/1036.full>
8. Advisory Committee on Childhood Lead Poisoning Prevention. Recommendations of the Advisory Committee on Childhood Lead Poisoning Prevention. January 4, 2012. Atlanta: U.S. Centers for Disease Control and Prevention.
9. Enton, E. Any lead is too much lead. *The Atlantic*. January 12, 2012. Available online at [www.theatlantic.com/health/archive/2012/01/any-lead-is-too-much-lead/251226/](http://www.theatlantic.com/health/archive/2012/01/any-lead-is-too-much-lead/251226/)
10. Tellez-Rojo MM, Bellinger DC, Arroyo-Quiroz C, Lamadrid-Figueroa H, Mercado-Garcia, A, Schnaas-Arrieta L, Wright RO, Hernandez-Avila M, and Hu H. Longitudinal Associations Between Blood Lead Concentrations Lower Than 10 µg/dL and Neurobehavioral Development in Environmentally Exposed Children in Mexico City. August 1, 2006. *Pediatrics* Vol. 118 No. 2 pp. e323–e330. Available online: <http://pediatrics.aappublications.org/content/118/2/e323.abstract>
11. Hubbs-Tait, L., Mulugeta, A., Bogale, A., Kennedy, T.S., Baker, E.R., Stoecker, B.J. Main and interaction effects of iron, zinc, lead, and parenting on children’s cognitive outcomes. *Developmental Neuropsychology*. Volume 34, Issue 2, March 2009, Pages 175-195.
12. Lanphear BP, Dietrich K, Auinger P, Cox C. Cognitive deficits associated with blood lead concentrations <10mg/dl in US children and adolescents. *Public Health Rep* 2000; 115: 521±9.
13. Koller K, Brown T, Spurgeon A, Levy L. Recent developments in low-level lead exposure and intellectual impairment in children. *Environ Health Perspect*. 2004 Jun;112 (9):987-94. Available online at <http://www.ncbi.nlm.nih.gov/pubmed/15198918>
14. Lanphear BP, Hornung R, Khoury J, et al. Low-level environmental lead exposure and children’s intellectual function: an international pooled analysis. *Environ Health Perspect*. 2005;113(7):894–899. WEB OF SCIENCE | PUBMED
15. Advisory Committee on Childhood Lead Poisoning Prevention. Recommendations of the Advisory Committee on Childhood Lead Poisoning Prevention. January 4, 2012. Atlanta: U.S. Centers for Disease Control and Prevention.
16. Hubbs-Tait, L., Mulugeta, A., Bogale, A., Kennedy, T.S., Baker, E.R., Stoecker, B.J. Main and interaction effects of iron, zinc, lead, and parenting on children’s cognitive outcomes. *Developmental Neuropsychology*. Volume 34, Issue 2, March 2009, Pages 175-195.
17. Surkan PJ, Zhang A, Trachtenberg F, Daniel DB, McKinlay, S. and Bellinger DC. Neuropsychological function in children with blood lead levels <10 µg/dL. *NeuroToxicology*, Volume 28, Issue 6, November 2007, Pages 1170–1177
18. Hubbs-Tait, L., Nation, J.R., Krebs, N.F., Bellinger, D.C. Neurotoxicants, micronutrients, and social environments individual and combined effects on children’s development (Review). *Psychological Science in the Public Interest, Supplement*. Volume 6, Issue 3, December 2005, Pages 57-121.

19. Hubbs-Tait, L., Mulugeta, A., Bogale, A., Kennedy, T.S., Baker, E.R., Stoecker, B.J. Main and interaction effects of iron, zinc, lead, and parenting on children's cognitive outcomes. *Developmental Neuropsychology*. Volume 34, Issue 2, March 2009, Pages 175-195.
20. Hubbs-Tait, L., Mulugeta, A., Bogale, A., Kennedy, T.S., Baker, E.R., Stoecker, B.J. Main and interaction effects of iron, zinc, lead, and parenting on children's cognitive outcomes. *Developmental Neuropsychology*. Volume 34, Issue 2, March 2009, Pages 175-195.
21. Personal communication with Armin Thies, April 5, 2012
22. Ruff, Holly A. Population-based data and the development of individual children: The case of low to moderate lead levels and intelligence. *Journal of Developmental and Behavioral Pediatrics*. Vol.20(1), Feb 1999, pp. 42-49.
23. Lanphear BP, Hornung R, Khoury J, et al Lead and IQ in Children: Lanphear et al. *Respon Environ Health Perspect*. 2006 February; 114(2): A86–A87.
24. Miranda Study Phase I, 2012. Available at [http://www.sde.ct.gov/sde/lib/sde/pdf/deps/student/health/linking\\_lead\\_and\\_education\\_data.pdf](http://www.sde.ct.gov/sde/lib/sde/pdf/deps/student/health/linking_lead_and_education_data.pdf).
25. Miranda Study Phase II, 2013. Available at <http://www.sde.ct.gov/sde/lib/sde/pdf/deps/student/health/linking.lead.and.education.data.phaseii.pdf>.
26. <http://www.cdc.gov/nceh/lead/>.
27. <http://www.cdc.gov/nceh/lead/> and Report of the Advisory Committee.
28. Silbergeld, E.K. Preventing Lead Poisoning in Children. *Annu. Rev. Public Health*. 1997. 18:187–210.
29. US Dep. Health Hum. Serv., Public Health Serv. 1991. Healthy People 2000: National Health Promotion and Disease Prevention Objectives. DHHS Publ. (PHS)91–5022.
30. [http://www.cdc.gov/nchs/healthy\\_people/hp2010/hp2010\\_final\\_review.htm](http://www.cdc.gov/nchs/healthy_people/hp2010/hp2010_final_review.htm)
31. <http://healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=12>
32. Advisory Committee on Childhood Lead Poisoning Prevention. (January, 2012). Low Level Lead Exposure Harms Children: A Renewed Call for Primary Prevention. U.S. Centers for Disease Control and Prevention, U.S. Department of Health and Human Services: [http://www.cdc.gov/nceh/lead/ACCLPP/Final\\_Document\\_010412.pdf](http://www.cdc.gov/nceh/lead/ACCLPP/Final_Document_010412.pdf)
33. <http://healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=12>
34. Advisory Committee on Childhood Lead Poisoning Prevention. (January, 2012). Low Level Lead Exposure Harms Children: A Renewed Call for Primary Prevention. U.S. Centers for Disease Control

- and Prevention, U.S. Department of Health and Human Services: [http://www.cdc.gov/nceh/lead/ACCLPP/Final\\_Document\\_010412.pdf](http://www.cdc.gov/nceh/lead/ACCLPP/Final_Document_010412.pdf)
35. Mushak P, Davis JM, Crocetti AF, Grant LD. 1989. Prenatal and postnatal effects of low-level lead exposure: integrated summary of a report to the US Congress on childhood lead poisoning. *Environ. Res.* 50:11–36; and Silbergeld, E.K. Preventing Lead Poisoning in Children. *Annu. Rev. Public Health.* 1997. 18:187–210.
  36. CDC Response to Advisory Committee on Childhood Lead Poisoning Prevention Recommendations in “Low Level Lead Exposure Harms Children: A Renewed Call of Primary Prevention” . May 16, 2012 [http://www.cdc.gov/nceh/lead/ACCLPP/CDC\\_Response\\_Lead\\_Exposure\\_Recs.pdf](http://www.cdc.gov/nceh/lead/ACCLPP/CDC_Response_Lead_Exposure_Recs.pdf)
  37. CDC. Available online at [www.cdc.gov/lead/](http://www.cdc.gov/lead/)
  38. Needleman HL, Schell A, Bellinger D, Leviton A, Allred EN. The long-term effects of exposure to low doses of lead in childhood: an 11-year follow-up report. *N Engl J Med.*1990;322 :83– 88
  39. Tong S, Baghurst PA, Sawyer MG, Burns J, McMichael AJ. Declining blood lead levels and changes in cognitive function during childhood: the Port Pirie Cohort Study. *JAMA.*1998;280 :1915
  40. Communication with Dr. Armin Thies, PhD, ABPP/ABCN, Associate Clinical Professor and Clinical Neuropsychologist, Yale School of Medicine; Consultant, Westport Public Schools, April 5, 2012.
  41. *ibid*
  42. Communication with Dr. Sherin Stahl, PhD, Director of Psychological Services, Yale New Haven Regional Lead Treatment Center and Healthy Homes Program, May 1, 2012.
  43. Lidsky TI; Schneider JS. Lead neurotoxicity in children: basic mechanisms and clinical correlates. *Brain.* 2003;126(1):5-19, p. 11 AbstractFull TextFull Text (PDF). Available online at <http://brain.oxford-journals.org/content/126/1/5.full.pdf>
  44. Communications with Dr. Armin Thies, April, 2012.
  45. Communications with Dr. Armin Thies, April 5, 2012 and Dr. Sherin Stahl, May 1, 2012.
  46. Communication with Dr. Sherin Stahl, May, 2012
  47. 34 Code of Federal Regulations § 300.8(c)(9)

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