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ABSTRACT

Noting that lead poisoning is a preventable disease, this report details a coordinated federal program to eliminate childhood lead poisoning in the United States. The report describes how lead poisoning harms children, how pervasive lead poisoning is, and how lead paint hazards in housing could be eliminated in 10 years. Following information on the President's Task Force on Environmental Health Risks and Safety Risks to Children and lists of the members of the Task Force and the Lead Poisoning Prevention Workgroup, the report presents an executive summary and a budget summary. The report's introduction details sources of lead poisoning and information on incidence. Current and on-going federal programs and activities to control lead poisoning and identify lead paint hazards are described. The report then proposes a 10-year plan that will create 2.3 million lead-safe homes for low-income families with children. The report compares the costs of short- and long-term hazard controls and discusses the benefits of eliminating childhood lead poisoning. The following recommendations are put forth as keys to a successful lead hazard control strategy: (1) act before children are poisoned; (2) identify and care for lead-poisoned children; (3) conduct research; and (4) measure progress and refine lead poisoning prevention strategies. The report concludes with a list of resources. Appended is information on the methodology used to project numbers of lead poisoned children and trends in the American housing stock. (Contains 31 endnotes and 63 other references.) (KB)

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Eliminating Childhood Lead Poisoning:

A Federal Strategy Targeting Lead Paint Hazards

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President's Task Force on Environmental Health Risks and Safety Risks to Children

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Eliminating Childhood Lead Poisoning:

A Federal Strategy Targeting Lead Paint Hazards

February 2000

President's Task Force on Environmental Health Risks and Safety Risks to Children

Preface

The following story is true. Lead poisoning can be prevented by identifying whether lead hazards in a home are present and by learning how to safely address them.

One Family's Story

Like any other parent, the most important priority in my life is to provide my three children, Damien, Samuel, and Nathan, with a happy and healthy home—a place where they can grow, learn, and develop into productive adults. What I didn't know was that our home would threaten my children's health.

In April of 1996, my family and I managed to save enough to buy our own home. Within four months of moving in, our pride and joy evaporated when Samuel, then 10 months old, was diagnosed with a blood lead level of 32 micrograms per deciliter (μg/dL). I soon learned that my son's blood lead level was three times above the limit thought to cause future learning problems. A greater shock was that the lead paint, dust and soil in and around our treasured home was the culprit.

Worse yet, a month later, Samuel's lead level had risen to 50 μg/dL. He was hospitalized that same afternoon and for three long, agonizing days he stayed in the hospital and began treatment. During Samuel's hospitalization, my husband and I spent many hours attempting to make our home lead safe, all the while keeping vigil over Sam. For nearly 4 years, Sam had his blood tested every two months. We continued to improve our home through repair loans to make it safe. Today, our house has new windows, and lead abatement has been completed on the interior and exterior of our home. Samuel's blood lead level has dropped below 10 μg/dL. To see Samuel, now 4 years old, you would never know what this happy, beautiful little boy has had to endure. Our son's lead poisoning could have been prevented if we had known to check for lead and how to keep our home lead safe. Today, families receive this information when they buy or rent an older home. It is critical that parents receive this information so that they can take the necessary steps to protect their family. I share my story with the hope that other families and their children will learn about the dangers of lead, and that one day soon, lead poisoning will be a disease of the past.

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About the President's Task Force on Environmental Health Risks and Safety Risks to Children

In recognition of the growing body of scientific information demonstrating that America's children suffer more than adults from environmental health risks and safety risks, President William Jefferson Clinton issued Executive Order 13045 on April 21, 1997, directing each federal agency to make it a high priority to identify, assess, and address those risks. In issuing this order, the President also created the Task Force on Environmental Health Risks and Safety Risks to Children, co-chaired by Donna E. Shalala, Secretary of the U.S. Department of Health and Human Services, and Carol M. Browner, Administrator of the U.S. Environmental Protection Agency. The Task Force was charged with recommending strategies for protecting children's environmental health and safety.

This Strategy has been developed by an interagency work group of the President's Task Force on Environmental Health Risks and Safety Risks to Children. Workgroup representatives are listed on page five.

The goal of the workgroup was to develop a set of recommendations to eliminate childhood lead poisoning in the United States as a major public health problem by the year 2010. This report focuses primarily on expanding efforts to correct lead paint hazards (especially in low-income housing), a major source of lead exposure for children.

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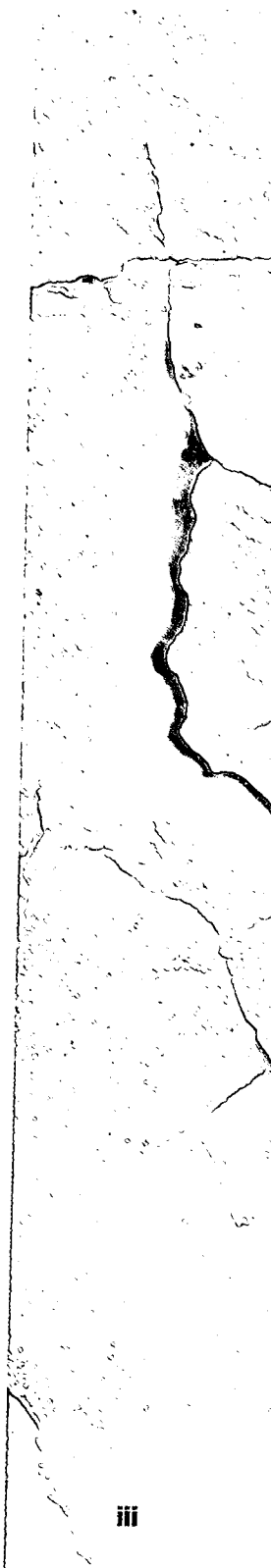

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Executive Summary

This report, for the first time, presents a coordinated federal program to eliminate childhood lead poisoning in the United States. It describes how lead poisoning harms children, how pervasive lead poisoning is, and how lead paint hazards in housing can be eliminated in 10 years. To achieve the goal of making children safe from lead hazards, the President's FY2001 budget increases federal funding for several agencies, including the Environmental Protection Agency (EPA) and the Department of Justice (DoJ), and provides for a 50% increase in lead hazard control grants issued by the U.S. Department of Housing and Urban Development (HUD). The budget also maintains the current level of funding for lead programs at the Department of Health and Human Services (DHHS). In this report, we are proposing a 10-year plan that will create 2.3 million lead-safe homes for low-income families with children, thereby resulting in net benefits of $8.9 billion, as estimated by HUD.

- Lead poisoning is a completely preventable disease.
- Residential lead paint hazards in homes of children can be virtually eliminated in 10 years.
- Every child deserves to grow up in a home free of lead paint hazards.

Recommendations: The following recommendations are key to a successful lead hazard control strategy:

- **Act before children are poisoned:** Target federal grants for low-income housing and leverage private and other non-federal funds to control lead paint hazards; promote education for universal lead-safe painting, renovation, and maintenance work practices; and ensure compliance and enforcement of lead paint laws.
- **Identify and care for lead-poisoned children:** Improve early intervention by expanding blood lead screening and follow-up services for at-risk children, especially Medicaid-eligible children.
- **Conduct research:** Improve prevention strategies, promote innovative ways to drive down lead hazard control costs and quantify the ways in which children are exposed to lead.
- **Measure progress and refine lead poisoning prevention strategies:** Implement monitoring and surveillance programs.

(See page 29 for the full list of recommendations.)

The Lead Problem

Lead is highly toxic, especially to young children. It can harm a child's brain, kidneys, bone marrow, and other body systems. At high levels, lead can cause coma, convulsions, and death. The National Academy of Sciences has reported that comparatively low levels of lead exposure are harmful. Levels as low as 10 micrograms of lead per deciliter of blood (μg/dL) in infants, children, and pregnant women are associated with impaired cognitive function, behavior difficulties, fetal organ development, and other problems.[1] In addition, low levels of lead in children's blood can cause reduced intelligence, impaired hearing and reduced stature.[2] Lead toxicity has been well-established, with evidence of harmful effects found in children whose blood lead levels exceed 10 μg/dL.[3,4]

No single definition of "lead poisoning" suits all purposes. From a public health perspective, the key questions are: 1) At what level does lead poisoning have a preventable adverse impact on health? and 2) What is the magnitude of the health problem? In this report, the term "lead poisoning" is used to describe blood lead levels of 10 μg/dL or above in children under six.

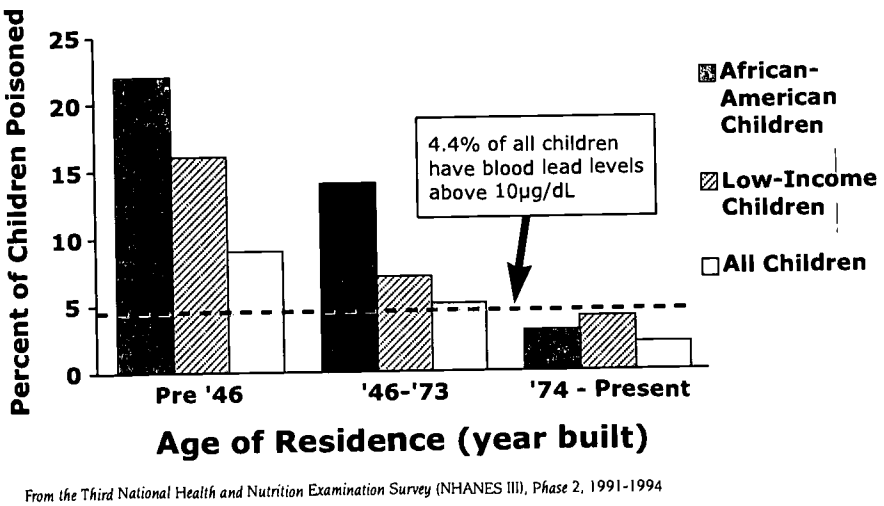
Lead Paint In Housing - Particularly Low-Income Housing

The most current national survey shows that nearly 1 million children are lead poisoned.[5] A large body of evidence shows that the most common source of lead exposure for children today is lead paint in older housing and the contaminated dust and soil it generates.[6-14] Poisoning from lead paint has affected millions of children since this problem was first recognized more than 100 years ago[15, 16] and it persists today despite a 1978 ban on the use of lead in new paint.[17] Although all children living in older housing (where lead paint is most prevalent) are at risk, low-income and minority children are much more likely to be exposed to lead hazards. For example, 16% of low-income children living in older housing are poisoned, compared to 4.4% of all children (see Figure 1).[5] Therefore, eliminating lead paint hazards in older low-income housing is essential if childhood lead poisoning is to be eradicated.

Other Sources Of Childhood Lead Poisoning

Lead exposure among young children has been dramatically reduced over the last two decades because of the phase-out of lead from gasoline, food and beverage cans, and new house paint, and because of reductions of lead in industrial emissions, drinking water, consumer goods, hazardous waste sites, and other sources. As a result of these past and ongoing efforts, children's blood lead levels have declined over 80% since the mid-1970s.[5] In 1978 there were about 14.8 million poisoned children in the United States. By the early 1990s, that number had declined to 890,000 children. The long-term vision of this strategy is to eliminate childhood lead poisoning in the United States.

Figure 1
National Blood Lead Levels



From the Third National Health and Nutrition Examination Survey (NHANES III), Phase 2, 1991-1994

Vision:

Eliminate childhood lead poisoning in the United States

Further Efforts Needed To Eliminate Lead Poisoning In Children

Despite progress, lead poisoning remains one of the top childhood environmental health problems today.[14] Without further action, over the coming decades large numbers of young children may be exposed to lead in amounts that could impair their ability to learn and to reach their full potential. To help accelerate the progress in eliminating this disease, this report has been compiled to examine what needs to be done to make children's housing lead-safe and to provide early intervention for children at highest risk. Specifically, it examines what actions need to be taken *before* children are poisoned. This report shows that the number of poisoned children can be greatly reduced over the next decade as a result of demolition, renovation, regulation, and increased federal subsidy and leveraged private funding (Figure 2). Additional efforts will continue to address exposures from other sources, such as lead in exterior soil and dust, drinking water, and air emissions.

Goals: This Strategy advances two goals:

1. By 2010, eliminate lead paint hazards in housing where children under six live. This goal can be accomplished through the following:

- federal grants and leveraged private funding to identify and eliminate lead paint hazards in order to produce an adequate supply of lead-safe housing for low-income families with children;
- outreach and public education to increase awareness of lead hazards and how to address them; and
- enforcement of lead safety laws and regulations.

2. By 2010, elevated blood lead levels in children will be eliminated through:

- increased compliance with existing policies concerning blood lead screening; and
- increased coordination across federal, state and local agencies responsible for outreach, education, technical assistance, and data collection related to lead screening and abatement.

Infrastructure Now Exists

Title X of the 1992 Housing and Community Development Act, otherwise known as the Residential Lead-Based Paint Hazard Reduction Act (Public Law 102-550), mandated the creation of an infrastructure that would correct lead paint hazards in housing. Title X also redefined "lead paint hazards" and how they can be controlled. Based on scientific research in the 1980's, Congress defined a "hazard" to include deteriorated lead paint and the lead-contaminated dust and soil it generates. The infrastructure has been developed and includes the following:

- Grant programs to make homes lead safe, now active in over 200 cities
- Training of thousands of workers doing housing rehabilitation, remodeling, renovation, repainting, and maintenance to help them do their work in a lead-safe way
- Licensing of inspectors and abatement contractors
- Compliance with and enforcement of lead safety laws and regulations
- Disclosure of lead paint problems before sale or lease
- National and local education and outreach programs

- Promulgation of federal standards of care
- Worker protection regulations

Modern Lead-Safe Methods

New low-cost methods are now available to identify and fix hazardous housing. Field studies have shown that modern lead hazard control methods have been effective in reducing levels of lead-contaminated house dust by an average of 60%, with an average decline in blood lead levels of about 25%.[19] House dust is the most common exposure pathway through which children are exposed to lead paint. Older housing is continually being demolished, renovated, or abated. Current projections show that, without this further action, several million children would be poisoned over the next several decades. Figure 2 depicts the potential impacts of various actions on the number of lead poisoned children.

HUD indicates that 2.3 million housing units will be at risk of lead paint hazards in 2010, if current trends continue (Table 1). Direct federal financial assistance for housing occupied by low-income families will continue to be needed.[14] These funds can be used to leverage private resources to create lead-safe housing. In some jurisdictions, it may be possible to create enough lead-safe housing for families, yet not necessarily address all housing units with lead paint. In other jurisdictions, virtually all housing will need to be made lead-safe to protect children.

Economic Costs And Benefits Of Making Homes Lead Safe

Ideally, lead paint in housing would be permanently abated. However, the challenge today is to quickly eliminate lead paint hazards in as many dwellings as possible.

Figure 2
Potential Impacts of Various Actions on the Number of Low-Income Lead Poisoned Children

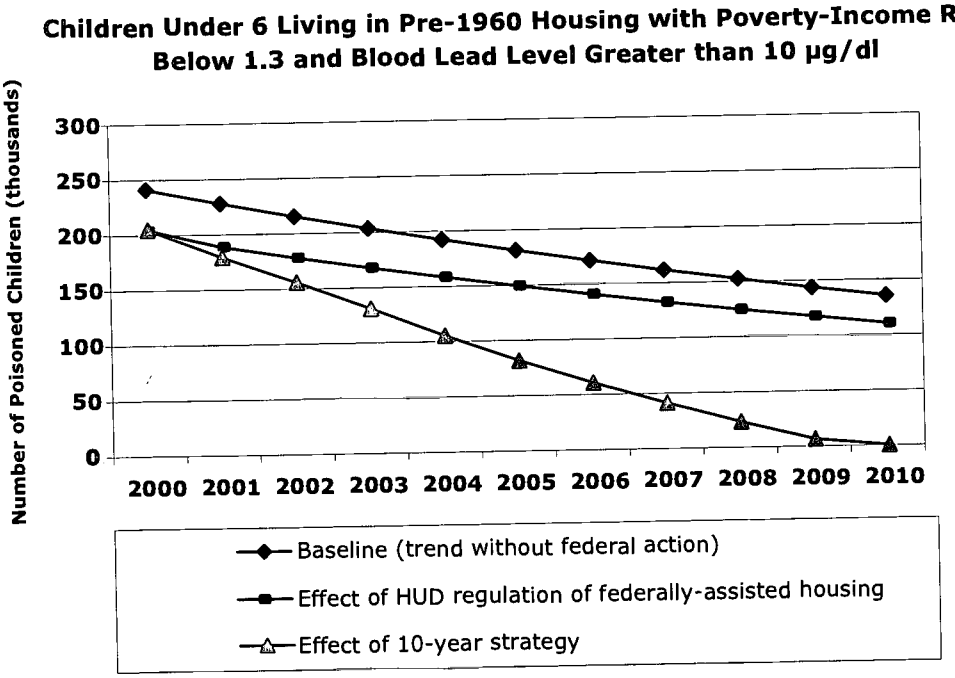


Table 1
Pre-1960 Units at Risk of Having Lead Paint Hazards in 2010

Housing Stock	Number of Housing Units (millions)
Total Units at Risk of Lead Paint Hazards in 1999	24.0
Reduction Due to Demolition, 2000-2010	-1.8
Reduction Due to Substantial Renovation, 2000-2010	-3.8
Subtotal *(Total Units at Risk of Lead Paint Hazards in 2010)*	18.4
20% of Subtotal Occupied by Low-Income Families	3.7
Reduction Due to HUD Regulation of Federally-Assisted Housing, 2000-2010	-1.4
Total Low-Income Units in 2010 At Risk of Lead Paint Hazards	2.3

Source: American Housing Survey, Current Population Survey, Residential Energy Consumption Survey (Appendix)

Abatement alone is unlikely to achieve this goal, absent significant funding from non-federal sources. Interim controls (specialized maintenance and safe repainting and renovation work practices) followed by ongoing management provide the best opportunity for success to leverage private funding to the fullest extent possible and thereby protect the largest number of children in the near term. If ongoing management is not implemented consistently, lead hazards could reappear. Lead paint must be safely managed until the building is demolished, renovated, or abated.

HUD compared the costs of two approaches to controlling lead paint hazards: 1) managing lead paint on an ongoing basis to ensure

Table 2
Estimated Average Annual Costs of Options to Address Lead Paint Hazards in Pre-1960 Housing, 2001–2010

Pre-1960 Housing Stock	Lead Hazard Screening and Interim Controls ($1,000 per unit)	Inspection/Risk Assessment and Full Abatement of Lead Paint ($9,000 per unit)
All Pre-1960 Housing at Risk of Lead Paint Hazards (1.84 million units/year)	$1.84 billion	$16.6 billion
Pre-1960 Housing Occupied by Low-Income Families Not Covered by HUD Regulation (230,000 units/year)	$230 million	$2.1 billion

Source: Evaluation of the HUD Lead Hazard Control Grant Program; The Economic Analysis for the HUD Lead Paint Regulation for Federally Assisted Housing (see Appendix)

it does not become hazardous (interim controls); and 2) permanent abatement for all pre-1960 housing with lead paint and for low-income housing where risks are greatest (Table 2). The Department determined that the benefits of eliminating lead hazards greatly exceed the costs for all cases.

Based on conservative assumptions, the quantifiable monetary benefit (which does not include all benefits) of eliminating lead paint hazards through interim controls in the nation's pre-1960 low-income housing stock over the next 10 years will be $11.2 billion at a 3% discount rate ($3.5 billion at a 7% discount rate). The *net* benefits of interim controls are $8.9 billion at a 3% discount rate and $1.2 billion at a 7% discount rate. The monetary benefit of *abatement* of low-income housing is estimated at $37.7 billion at a 3% discount rate [$20.8 billion at a 7% discount rate (see Appendix)]. The benefit of permanently abating lead paint is considerably greater because more children would benefit over a considerably longer time span. The quantified monetary benefits may underestimate the actual benefits because of the many unquantifiable benefits associated with eliminating childhood lead paint poisoning.

Other Key Federal Activities

Table 3 presents a summary of federal agency programs and duties for dealing with lead poisoning.

In addition to expanding the HUD lead hazard control grant program, this strategy recognizes other important federal activities that need to be continued or increased to confront childhood lead poisoning.

Enforcing lead regulations is important to reduce exposure to lead hazards. This strategy recommends increasing enforcement of the Lead Paint Disclosure Rule, concentrating on housing with a history of lead-poisoned children, or that has physical or management problems indicating the likely presence of lead paint hazards. Other lead paint rules addressing certification and training, pre-renovation education, use of safe and reliable work practices, and management and disposal of lead-based paint debris also need to be implemented using integrated strategies that combine compliance assistance, incentives, monitoring and enforcement.

Even with a substantial expansion of resources for residential lead hazard control, a significant number of dwellings that could house families with young children will remain with lead hazards. The public health benefits of hazard control activities should be increased by outreach programs to identify at-risk families—especially those with pregnant women or young infants who live in homes with lead hazards—and link them to existing lead safe housing and resources for hazard control.

Improving early intervention by expanding blood lead screening and follow-up services for at-risk children is a key component of this strategy. Recommendations include ensuring that targeted case management for lead poisoned Medicaid children includes coordination of medical treatment services with environmental, housing, and social interventions to identify and eliminate sources of lead exposure.

Research to develop new cost-effective lead hazard control technologies, evaluate hazard control techniques for urban lead contaminated soil and exterior dust, and improve portable blood lead analyzer technology is also advocated. In addition, monitoring programs to measure progress and refine lead poisoning prevention strategies are needed.

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Table 3
Federal Agency Roles on Lead Poisoning Prevention

Agency	Programs and Duties
Department of Housing and Urban Development	Lead Hazard Control Grant Program, enforcement of Disclosure Rule (with EPA and DoJ) and Federally-Assisted Housing Lead Paint Regulations, National Survey of Lead Paint in Housing, Lead Hotline (with EPA), Internet listing of lead paint professionals, public education and training of housing professionals and providers and others, technical assistance, research.
Department of Health and Human Services:	
Centers for Disease Control and Prevention (CDC)	Blood Lead Screening Grant Program, public education to medical and public health professionals and others, National Health and Nutrition Examination Survey, quality control for laboratories analyzing blood lead specimens, research.
Health Care Financing Administration (HCFA)	Covers and reimburses for lead screening and diagnosis, lead poisoning treatment, and follow-up services for Medicaid-eligible children.
National Institute of Child Health and Human Development (NICHHD)	Conducts and supports laboratory, clinical, and epidemiological research on the reproductive, neurobiologic, developmental, and behavioral processes including lead poisoning related research.
Health Resources and Services Administration (HRSA)	Directs national health programs to assure quality health care to under-served, vulnerable, and special need populations including children with lead poisoning.
The Agency for Toxic Substances and Disease Registry (ATSDR)	Undertakes the study of blood lead in populations near Superfund sites and funds State health agencies to undertake this type of work.
Food and Drug Administration (FDA)	Enforces standards for lead in ceramic dinnerware; monitors lead in food.
National Institutes of Health (NIH)	Basic research on lead toxicity.

Table continues on next page

Table 3 (continued)
Federal Agency Roles on Lead Poisoning Prevention

Agency	Programs and Duties
Environmental Protection Agency	Authorizes States to license lead paint professionals; environmental laboratory accreditation; enforcement of disclosure Rule (with HUD and DOJ) and Pre-Renovation Notification Rule; Hazardous Waste Regulation; public education to parents, environmental professionals, and others; training curriculum design; Lead Hotline (with HUD); research; addresses lead contamination at industrial waste sites including drinking water and industrial air emissions.
Department of Justice	Enforces Federal Lead Paint Disclosure Rule (with HUD and EPA), defends Federal lead paint regulations, enforces pollution statutes including hazardous waste laws.
Consumer Product Safety Commission	Enforces ban of lead paint; investigates and prevents the use of lead paint in consumer products; initiates recalls of products containing lead that present a hazard; conducts dockside surveillance and intercepts imported products that present a risk of lead poisoning; recommends elimination of lead from consumer products through Guidance Policy on lead.
Occupational Safety and Health Administration	Worker protection regulations.
Department of the Treasury	Evaluates financial incentives (such as tax credits) for lead hazard control.
Department of Energy	Conducts weatherization activities in a lead-safe manner.
Department of Defense	Administers lead-based paint/lead hazard management programs in 250,000 family housing and child-occupied facilities worldwide, administers childhood lead poisoning prevention programs on installations worldwide, administers research and development programs to develop new cost-effective technologies for lead paint management and abatement, partner with other Federal agencies to develop policies and guidance for lead hazard management on a national level.

Budget Summary

President's Task Force on Environmental Health Risks and Safety Risks to Children Lead Poisoning Prevention Strategy Budget Summary

FY99 Enacted		FY2000 Enacted Budget		FY2001 President's Budget	
Area/Activity	**$**	**Area/Activity**	**$**	**Area/Activity**	**$**
Environmental Protection Agency					
■ Inspection, Enforcement and Compliance	$1M	■ Inspection, Enforcement and Compliance	$1M	■ Inspection, Enforcement and Compliance	$3M
■ Education and Outreach	$2M	■ Education and Outreach	$2M	■ Education and Outreach	$2M
■ Decrease Toxic Waste	$1M	■ Decrease Toxic Waste	$1M	■ Decrease Toxic Waste	$1M
	$4M		$4M		$6M
Department of Housing and Urban Development					
■ Hazard Control Grants in Private Low-Income Housing	$60M	■ Hazard Control Grants in Private Low-Income Housing	$60M	■ Hazard Control Grants in Private Low-Income Housing	$90M
■ Public Education, Technical Assistance, Research	$10M	■ Public Education, Technical Assistance, Research	$10M	■ Public Education, Technical Assistance, Research	$10M
■ Healthy Homes Initiative	$10M	■ Healthy Homes Initiative	$10M	■ Healthy Homes Initiative	$10M
■ (Enforcement)	(not a separate line item)	■ (Enforcement)	(not a separate line item)	■ Enforcement	$10M
	$80M		$80M		$120M
Department of Health and Human Services (CDC only)					
■ Screening, Medical and Env. Management, Outreach and Education	$38M	■ Screening, Medical and Env. Management, Outreach and Education	$38M	■ Screening, Medical and Env. Management, Outreach and Education	$38M
Department of Justice					
■ Enforcement	$0.1M	■ Enforcement	$0.1M	■ Enforcement	$0.3M
Consumer Product Safety Commission					
■ Inspection, Enforcement and Compliance	$0.1M	■ Inspection, Enforcement and Compliance	$0.1M	■ Inspection, Enforcement and Compliance	$0.1M
■ Education and Outreach	$0.1M	■ Education and Outreach	$0.1M	■ Education and Outreach	$0.1M
	$0.2M		$0.2M		$0.2M
Department of Defense					
Not Available					
Total	**$122.3M**		**$122.3M**		**$164.5M**

The Lead Poisoning Problem

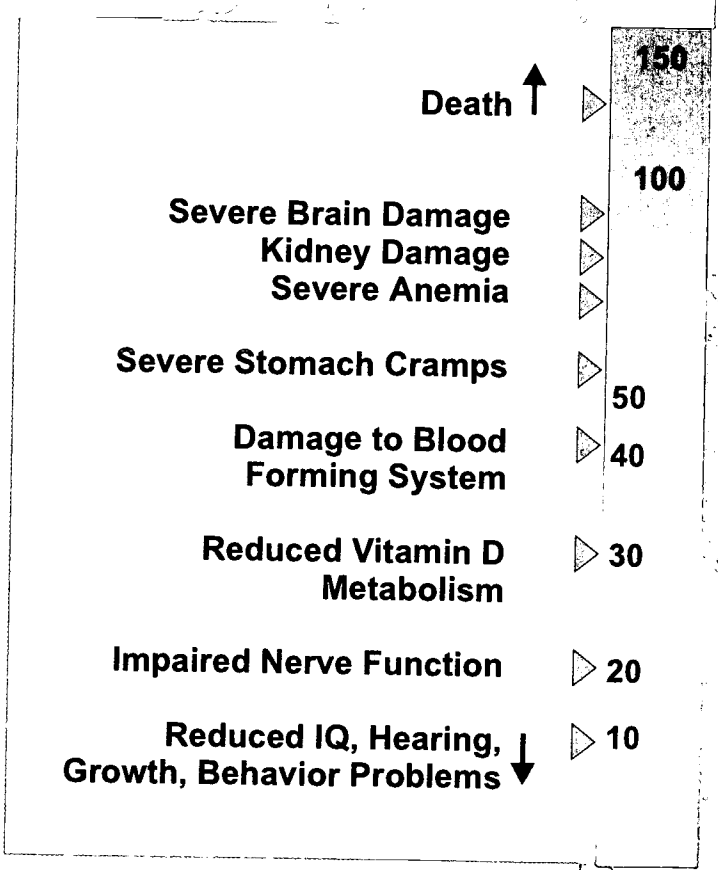
Lead poisoning is entirely preventable. However, nearly 1 million children living in the United States have blood lead levels high enough to impair their ability to think, concentrate, and learn.[5] Lead is highly toxic and affects virtually every system of the body. It can damage a child's kidneys and central nervous system and cause anemia. At very high levels, lead can cause coma, convulsions, and death. Even low levels of lead are harmful. Levels as low as 10 micrograms of lead per deciliter of blood (μg/dL) are associated with decreased intelligence, behavior problems, reduced physical stature and growth, and impaired hearing (see Figure 3).[1,2] A child is estimated to lose 2 IQ points for each 10 μg/dL increase in blood lead level.[4] One study suggests that lead exposure may be associated with juvenile delinquent behavior.[20] Lead toxicity has been well-established, with evidence of harmful effects found in children whose blood lead levels exceed 10 μg/dL.[3,4,21]

No single definition of "lead poisoning" suits all purposes. From a public health perspective, the key questions are: 1) At what level does a preventable adverse impact on health occur? and 2) What is the magnitude of this health problem? In this report, the term "lead poisoning" is used to describe blood lead levels of 10 μg/dL or above in children under six.

Lead is most hazardous to the nation's roughly 24 million children under the age of 6. Their still-developing nervous systems are particularly vulnerable to lead, and their normal play activities expose them to lead paint hazards and lead-contaminated dust and soil. Children between ages one and three are at greatest risk because of normal hand-to-mouth activity and the increase in mobility during their second and third years which make lead hazards more accessible to them.

Major progress on lead poisoning has been achieved through a combination of primary prevention measures that have eliminated major sources of lead exposure and through secondary prevention programs that ensure screening and interventions for children who have already been poisoned. These changes were brought about through the efforts and collaborations of many federal agencies (see Table 3) and their State, local, and private-sector partners. As reported in the National Health and Nutrition Examination Survey (NHANES), the proportion of children age 1-6 with lead poisoning fell to 4.4% in 1991-94. This was a more than 80% decline from 1976-80.[5]

Figure 3
Toxicity of Blood Lead Concentration in Blood (μg Pb/dL) in Children



Adapted from ATSDR, *Toxicological Profile for Lead*

Despite these accomplishments, nearly 1 million children in the United States have lead poisoning. This remaining problem is especially acute in certain population groups. For example, among children living in pre-1946 dwellings (when the use of lead in paint was most common), the prevalence of lead poisoning is five times higher than among children living in homes built after 1973 (most of which do not have lead paint)[5] Nationally, children in Medicaid also represent a high-risk group, comprising 80% of children with blood lead levels 15 μg/dL and above.[22]

Although any child is potentially at risk, low-income children living in deteriorated older housing (especially in inner-city neighborhoods) shoulder a disproportionately larger share of lead-poisoning cases. For example, 16% of low-income children living in housing built prior to 1946 are lead poisoned.[5] Without new prevention and control efforts, a large number of young children may continue to be exposed to lead paint hazards over the coming decades.

Sources of Lead Poisoning

Potential sources of lead exposure in children vary greatly in magnitude. Many of these sources have already been addressed and have directly contributed to the dramatic decline in blood lead levels to date. The U.S. Environmental Protection Agency (EPA) has virtually eliminated lead in gasoline, and has placed strict limits on the amount of lead in drinking water and on lead emitted from industrial facilities. EPA has also phased out lead in pesticides and, with the Department of Justice (DoJ), has addressed lead contamination at many Superfund sites. In cooperation with the Food and Drug Administration (FDA), food processors virtually eliminated the use of lead solder in domestically-canned food and beverages. FDA also has established strict standards concerning the amount of lead that can leach from ceramicware into beverages and foods. The Occupational Safety and Health Administration (OSHA) has regulated lead exposure for workers, which also benefits the children of those workers who may have been placed at risk via take-home exposures (such as lead dust on work clothing). Lead in residential paint was phased out and completely banned by the Consumer Product Safety Commission (CPSC) in 1978. In addition, CPSC has addressed lead contamination in children's toys, miniblinds, playground equipment, and other sources, and continues to conduct special dockside inspections to look for imported children's products containing lead that present hazards. Public education efforts have been launched to publicize the dangers of lead in folk remedies, pottery glazing, art supplies, cosmetics, fishing sinkers, and other products.

A large body of evidence indicates that the most important remaining exposure sources for children are lead hazards in their residential environment—deteriorated lead paint, house dust, and lead-contaminated soil.[6-14] Lead paint poisoning was first identified over 100 years ago.[15, 16] Even

though lead paint has been banned in the United States since 1978, the Department of Housing and Urban Development (HUD) estimated in 1990 that it still remains in about 64 million dwelling units.[17,23] Exposure to this paint poses a threat to children, especially as the paint deteriorates or is disturbed during renovation activities.

Children are exposed to lead from paint either directly by eating paint chips[10] or indirectly by ingesting lead-contaminated house dust or soil through normal hand-to-mouth contact.[11, 12] Unless proper precautions are followed, lead paint can contaminate dust or soil when it deteriorates or is disturbed during maintenance, repainting, remodeling, demolition, or lead paint removal.[13, 14] In fact, dust and soil contaminated from lead paint are now the main sources of lead exposure for children. Residences with exterior lead paint are more than three times as likely to have higher levels of lead in the surrounding soil (exceeding 500 parts per million) than are dwellings without exterior lead paint (21% versus 6%).[17, 23] For buildings with deteriorating exterior lead paint, soil contamination is eight times more common (48%) than at residences without exterior lead paint.[17,23]

Without measures to prevent children's exposure to contaminated dust and debris, extensive removal of lead paint from homes of poisoned children has been shown to cause increases in children's blood lead levels.[24,25,26] Consequently, federal, state, and local regulations and guidelines have prohibited certain hazardous paint removal methods and required safe-work practices, cleaning, and lead dust testing ("clearance") prior to re-occupancy.[27]

Recent long-term studies[19,28,29] of lead hazard controls have evaluated strategies that combined measures to repair deteriorated lead paint with other measures to reduce and prevent re-accumulation of lead dust. The studies showed that these treatments resulted in substantial, sustained reductions in interior lead dust and children's blood lead levels.

Federal Resources and Leveraged Private Resources to Create Lead-Safe Housing

After receiving a $3.0 million lead hazard control grant from HUD, The City Council of Milwaukee passed a local ordinance requiring all housing units in two high-risk neighborhoods to be made lead-safe. HUD funds and approximately $400,000 in leveraged private funds are being used to partially defray landlords' costs of complying with the ordinance. So far, about one-fourth of all units in the targeted neighborhoods have been made lead-safe. When completed, the program will make nearly 1,000 homes safe for children.

Boston has leveraged $3.7 million in non-federal funds with $7.7 million in HUD lead-hazard control grants.

Protecting All Children

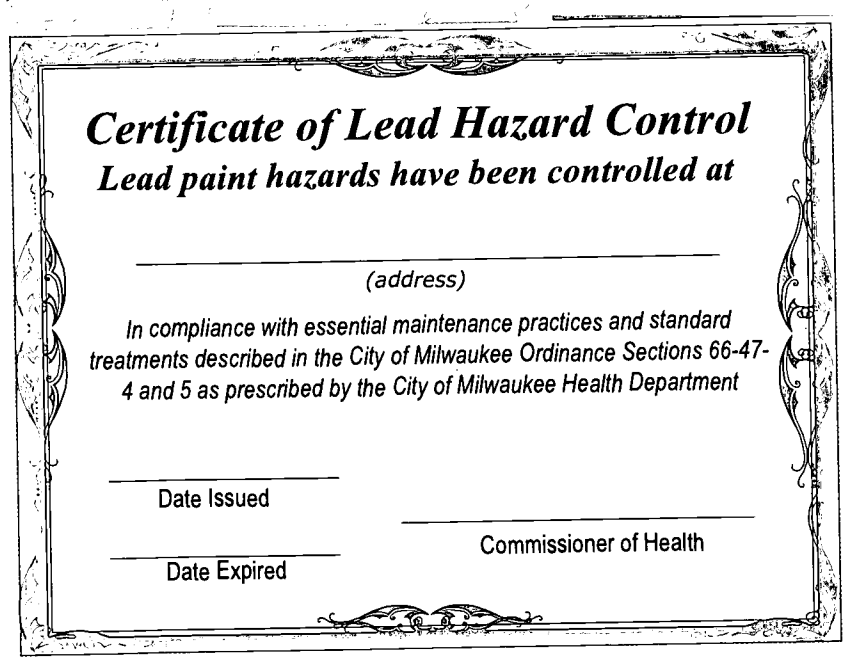
Although the risks are greatest for low-income children living in older housing, *all* children should grow up in lead-safe homes. Targeted education and training of painters, renovators, remodelers, maintenance workers, landlords, parents, and others, combined with tax or other financial incentives, can be used to protect children not directly served by federal grants and leveraged private financial assistance. Promoting universal lead-safe remodeling and repainting work practices, occupant protection, and cleanup and dust testing can ensure that no child need be exposed to lead paint hazards.

The HUD lead paint hazard control grant program is not an entitlement for all housing with lead paint hazards, but rather a limited funding pool. The program can be used to not only address lead paint hazards directly, but also to leverage private funding and prompt market forces. As more lead-safe housing is created, more landlords and homeowners may be motivated to address lead paint hazards in their units in order to realize increased property values associated with lead hazard control in a competitive market.

In addition, landlord motivation can be increased by providing an easily-understood "seal of approval" showing which units are lead-safe (and conversely, which are not). Rhode Island, Milwaukee, and a few other jurisdictions already provide such certificates (see Figure 4 for the certificate used in Milwaukee). Such measures will promote increased competition, especially in markets where landlords have difficulty attracting tenants, and will help to increase property values and marketing appeal. In some areas, it may not be necessary to make all units lead-safe, but rather to create enough units so that families can find them without incurring significantly greater costs.

In other jurisdictions, however, competitive market forces may not be sufficient to prompt significant private funding of lead-hazard controls, because landlords and low- and middle-income homeowners are unlikely to be able to take on additional debt. In such circumstances, direct federal subsidies and/or tax incentives may need to be considered.

Figure 4
Certificate of Lead Hazard Control



Certificate of Lead Hazard Control

Lead paint hazards have been controlled at

_____

(address)

In compliance with essential maintenance practices and standard treatments described in the City of Milwaukee Ordinance Sections 66-47-4 and 5 as prescribed by the City of Milwaukee Health Department

_____
Date Issued

_____
Commissioner of Health

_____
Date Expired

Current and Ongoing Federal Programs and Activities

Lead Paint Hazard Identification And Control

Federal programs addressing lead poisoning involve standards and regulations for lead paint inspections, risk assessments, and abatement; enforcement and compliance with lead regulations; grants to States, cities, and counties to control lead paint hazards in low-income privately-owned housing; grants to States, territories, and Indian tribes to run EPA-approved programs for accreditation of training providers and certification of lead paint professionals; inspections for lead paint hazards in high-risk residential units; evaluation of lead paint detection and abatement methods; development of new technologies; and laboratory accreditation. Virtually all of these activities were authorized under Title X of the 1992 Housing and Community Development Act (The Residential Lead Hazard Reduction Act).

Lead Paint Regulations

EPA regulations cover training, certification (licensing) of lead paint professionals (inspectors, risk assessors, abatement contractors, and workers), and accreditation of training providers by State and Tribal governments (or by EPA in the absence of a State/Tribal program). Published in 1996, these regulations include requirements to ensure that lead inspection and abatement professionals are capable of and required to use work practices that are safe, reliable, and effective. HUD's Lead Paint Hazard Control Grant Program requires that certified workers be used in its grant program for low-income privately-owned dwelling units. Today 36 States, plus the District of Columbia, Puerto Rico, and two Indian tribes have enacted lead paint certification laws. In those States that do not have such laws, EPA will implement certification programs in March 2000 under the authority of Title X. Tens of thousands of inspectors; risk assessors; abatement contractors; painting, renovation, and maintenance workers; and others across the country have been trained or certified, and the system is in place to train many more. HUD provides a grant to maintain a nationwide listing (by State) of certified firms via the Internet (www.leadlisting.org) and a toll-free automated telephone system (1-888-LEADLIST) to help the public locate qualified firms to address lead paint concerns. The Federal Lead Paint Hotline (1-800-424-LEAD) also provides important information.

The Disclosure Rule and Pre-Renovation Education Rule are aimed at providing information to tenants and homeowners. Published jointly by EPA and HUD in 1996, the lead paint Disclosure Rule requires sellers, landlords, and agents to provide lead hazard information and to disclose information about the presence of known lead paint and/or lead paint hazards to prospective homeowners and tenants in pre-1978 housing prior to their housing purchase or rental decision. This rule also gives buyers the opportunity to have the homes tested for lead prior to purchase. Attorney General Janet Reno joined HUD Secretary Andrew Cuomo, EPA Administrator Carol Browner, District of Columbia Mayor Anthony Williams, and local enforcement personnel at a press conference on July 15, 1999, to announce the first judicial actions and nationwide enforcement actions against landlords who had violated this rule.

The lead paint Pre-Renovation Education Rule, which became effective June 1, 1999, requires persons conducting renovations for compensation to distribute awareness information to those receiving renovation services concerning potential hazards created when paint is disturbed. These regulations are an important component of public education activities.

Federally-Assisted Housing

HUD has issued hazard control requirements for housing receiving federal assistance and for federally-owned housing that is being sold. This new regulation, published on September 15, 1999, will take effect one year after publication. For the first time, modern lead paint hazard control will become an integral part of most federally-assisted housing programs. For example, clearance examinations, which ensure that a property is safe for children following repair or hazard control work, will now be required for all housing rehabilitation and maintenance programs receiving federal assistance whenever lead paint may be disturbed.

Grants

HUD operates the Lead Paint Hazard Control Grant Program to control lead paint hazards in privately-owned housing occupied by low-income families and to build local lead abatement and inspection capacity. Additional eligible activities include relocation during hazard control work (to ensure that children are not inadvertently exposed to lead in the course of the work), public education, job training and job creation programs to enable low-income residents to become employed in the lead abatement and associated construction trades, and blood lead testing (if not reimbursable from another source).

These grants, which are now active in over 200 cities, are awarded competitively each year to ensure that communities with the greatest need and capacity are served first. The grants stimulate the effective collaboration of local health, housing, and community development agencies as well as local community-based organizations. They also stimulate leveraging of additional private-sector funding.

The Department of Health and Human Services (DHHS), through the Centers for Disease Control and Prevention (CDC), provides grants to support childhood lead poisoning prevention programs. These grants, mainly to support secondary prevention efforts, are provided to State and local health departments.

In some jurisdictions, HUD grant funds are being used to remediate lead hazards in dwellings where poisoned children have been identified. In addition, CDC works with HUD to promote collaboration with local health agencies that administer lead-poisoning prevention programs.

EPA provides grants to States, territories, tribes, and the District of Columbia to develop and implement programs to accredit training providers, certify lead paint workers and firms, and enforce work-practice standards to ensure that risk assessments, inspections, and abatement of lead-based paint hazards are properly performed by a well-trained and experienced workforce.

Compliance Assurance And Enforcement Of Lead Regulations

Enforcing lead regulations is an important component of programs established to reduce exposure to lead hazards. Most of the new rules mandated by Title X have now been successfully promulgated. Compliance assistance, compliance monitoring, and enforcement of these new rules are critical to producing the full benefits of these regulations. DoJ, HUD, and EPA are responsible for enforcing the new requirements. The strategy for enforcing the Disclosure Rule targets properties with a history of lead-poisoned children, buildings where lead paint hazards may exist, instances of substantial non-compliance, or places for which tips and complaints have been filed through the National Lead Information Clearinghouse (1-800-424-LEAD). To promote enforcement actions that are already underway across the country, DoJ has provided each of its U.S. Attorneys' Offices with guidance on how cases can be investigated, developed, and resolved.

To help regulated communities comply with lead regulations, EPA and HUD undertake compliance assistance activities such as targeted and mass mailings, seminars/ workshops, collaboration with trade associations, and on-site assistance. In March 1999, EPA began enforcing the accreditation requirements for training providers. Beginning in March 2000, EPA will enforce certification work practice requirements in States that do not have an authorized program.

CPSC has banned residential paint that contains more than 0.06% lead as well as toys and other articles intended for use by children that bear lead-containing paint in excess of 0.06% by weight. CPSC continues to investigate and prevent the use of lead-containing paint in consumer products. For example, the Commission has provided guidance to State health officials and others about identifying and controlling lead paint on public playground equipment. CPSC has also identified a number of disparate products that present a risk of lead poisoning from sources other than paint. These products, which include vinyl miniblinds, crayons, and children's jewelry, are intended for use by children or are simply used in or around the household or in recreation. The determination that a product presents a risk of lead poisoning may result in a recall or replacement with a substitute. In addition, the Commission has issued an official guidance policy that urges manufacturers to eliminate lead in consumer products (16 CFR s 1500.230).

CPSC's contribution to protecting children from lead poisoning involves a collaboration with the U.S. Customs Service to conduct surveillance as products enter the United States and to intercept imported children's products that may present a risk of lead poisoning.

Education And Outreach

Educating the public on the dangers of exposure to lead is an important component of reducing childhood lead poisoning. Title X specifically mandates federal agencies to conduct public education and outreach efforts.

Current federal activities include the bilingual Lead Hotline (1-800-424-LEAD); the National Lead Information Clearinghouse; numerous publications and pamphlets (many in both Spanish and English) targeted to parents, homeowners, and building managers; a major Hispanic outreach program (including Spanish public service announcements, specially designed materials, etc.); and advertising campaigns using local bus and subway systems, movie theaters, and mass media. In addition, in FY 2000 EPA is initiating a new grant program for education and outreach in Indian Country.

HUD has provided grants to train painters, renovators, remodelers, maintenance workers, landlords, and others to recognize and control lead hazards. Working with EPA and HUD, CPSC communicates vital information on lead to the public through its hotline, website, and health and safety information disseminated through the Commission's State Partners Program (a cooperative program with State and local governments).

In addition to encouraging screening and follow-up of lead-poisoned children, CDC's Childhood Lead Poisoning Prevention grants support education and outreach efforts. Local grantees use a variety of individual and community-level strategies. Educational materials are developed for health-care providers, managed-care organizations, and parents to communicate the importance of lead screening in high-risk children, especially Medicaid-eligible children. Other DHHS agencies, such as the Health Resources and Services Administration (HRSA) and the Administration for Children and Families (ACF), also conduct childhood lead-poisoning prevention outreach and education efforts for at-risk populations. For example, HRSA's Maternal and Child Health Branch, in conjunction with CDC, supports the National Lead Training and Resource Center in Louisville, KY. This Center provides

education and training to health-care professionals (at federal, state, and local levels) who work in the field of childhood lead-poisoning prevention.

Identification And Early Intervention For Children With Lead Poisoning

The programs just described are oriented toward identifying and controlling hazards in housing before they poison children. An immediate response is also needed, however, to help children who have already been poisoned. These children must be screened to identify and correct the source of their lead exposure and thereby prevent further increases in blood lead levels. Medical treatment, nutritional interventions, and early intervention to address developmental consequences of lead poisoning may also be required.

CDC, through its National Childhood Lead Poisoning Prevention Grant Program, provides grants to State and local health departments to promote screening of at-risk children and to ensure appropriate medical and environmental case management is provided for lead poisoned children. In addition, CDC provides management and technical assistance to grantees to build their program and surveillance capacity. All these programs focus on identifying and screening high-risk children (through blood lead testing) and ensuring the provision of case management services. An important part of case management is to ensure that investigations are conducted to identify sources of lead exposure and to ensure their remediation. Because CDC grants may not be used to pay for lead hazard remediation work, these programs face a significant challenge to identify public and private resources to finance such work in low-income housing.

In November 1997, CDC released new screening guidance, "Screening Young Children for Lead Poisoning: Guidance for State and Local Health Officials,"[30] that specifically addresses the issue of reaching high-risk children, including children enrolled in Medicaid. CDC requires all State-level lead poisoning prevention grantees to develop screening plans consistent with CDC guidance. CDC's prevention efforts are supported by the Health Care Financing Administration's (HCFA) Medicaid program, which has required lead screening as part of the Early and Periodic Screening, Diagnostic and Treatment (EPSDT) general health screening guidelines since April 1990.

According to the General Accounting Office (GAO), the Medicaid population accounts for a high proportion of lead poisoned children.[22] HCFA, CDC, HRSA, and other DHHS agencies have been working together to increase lead screening of enrolled Medicaid and other vulnerable children and to improve access to, and the provision of, needed follow-up services for lead-poisoned children. Key elements of the ongoing interagency work are to: 1) ensure compliance with federal lead-screening policies, 2) develop better State-specific data on lead screening and blood lead levels in children, 3) develop a strategy for educating providers and the public about lead poisoning; and 4) promote working relationships with federally-funded programs involved in childhood lead poisoning issues and other activities. For example, federally-subsidized Community Health Centers (CHCs) are an important source of care for Medicaid children and other high-risk populations. HRSA plans to update and reissue a Lead Policy Information Notice to all CHCs in the near future.

Head Start programs, which serve approximately 800,000 low-income children 3-5 years of age across the country, represent an important opportunity to ensure screening of low-income children who were not previously screened at ages 1 and 2. The Administration for Children and Families (ACF) works to ensure that grantees implement Head Start Performance Standards concerning lead screening.

In June 1991, the Report of the House Committee on Appropriations, which

accompanied H.R. 2521 to the 1992 Department of Defense (DOD) Appropriations Bill, tasked DOD to organize a Lead Paint Task Force, to coordinate activities with other federal agencies, and to follow guidance established by CDC regarding lead paint activities and childhood lead poisoning prevention. Since that time, policies and guidance for lead hazard management and childhood lead poisoning prevention programs for military personnel have been coordinated by DOD, as well as within the individual services, on an ongoing basis.

DOD has administered childhood blood lead screening programs since 1992. As required by DOD policy, military installations have proactive lead hazard management programs that include health risk assessments of facilities, health screening of children and workers, and lead hazard controls. The blood lead screening results, one measure of the effectiveness of these programs, indicate that these programs are working. According to DOD Office of Health Affairs data from 1992 to the present, blood lead levels above 10 μg/dL of military dependents are consistently below 2%, well under the general population (4.4%).

Research

HUD is conducting the nation's largest study of the effectiveness of modern lead-hazard control methods used by its grantees.[19] The study involves nearly 3,000 dwelling units, hundreds of which have been followed for at least 3 years. The main outcome measures are children's blood lead levels and levels of lead in house dust. HUD has sent several interim reports on the evaluation to Congress, with a major report expected in 2001. Preliminary data show that children's blood lead levels declined by an average of about 25% and dust lead levels on floors, window sills, and window troughs declined by an average of about 60% (see Table 8 on p. 27). These sustained declines have been replicated in a smaller study at Johns Hopkins University.[28,29]

HUD is also conducting research on lead paint hazard evaluation and control methods. This research includes: 1) improving, in conjunction with EPA, on-site inspection methods such as spot test kits and x-ray fluorescence (XRF) instruments; 2) improving laboratory methods used for risk assessments, such as collection and analysis of dust wipe and soil samples; 3) assessing the hazards of lead soil and lead dust in carpets, upholstery, air ducts, and other places where lead can accumulate; 4) improving risk assessments in single-family and multifamily housing; 5) assessing the lead risks to residents from construction, repair, and maintenance projects; 6) using surveys of lead hazard control projects and programs to assess and improve lead hazard control methods, and using laboratory and field testing to evaluate likely candidates for improvements in specific control techniques; and 7) assessing public awareness and understanding of lead paint hazard issues, and identifying approaches for increasing this understanding.

EPA has conducted research that focuses on lead remediation in soils in four areas: 1) identification of mineral forms of lead in soil, 2) effects of mineral forms on bioavailability, 3) *in vitro* and *in vivo* measures of lead bioavailability, and 4) conversions of lead minerals in soil systems. EPA has been evaluating chemical reactions of metals in soil to allow appropriate exposure assessments and to develop environmentally non-intrusive amendments to soil that reduce bioavalability and mobility. In 1999, EPA researchers discovered a method to render lead-contaminated soil safe for humans by immobilizing lead, potentially reducing its bioavailability. This method could potentially decrease the number of children suffering from lead poisoning.

EPA also evaluates (in conjunction with HUD) detection and abatement methods including encapsulants, test kits, and x-ray fluorescence (XRF) lead paint analyzers. In addition, EPA plans to assess existing impediments and barriers to developing new

technologies and the need for new methods to promote development of new lead detection and abatement technologies. As regulations are developed that establish standards for renovation, remodeling, and deleading on buildings and superstructures, EPA will use its authority under Title X to evaluate products used for detection, abatement, and deleading.

CDC is conducting and supporting applied research in preventing lead poisoning. Examples of current projects include three randomized trials of primary prevention strategies to avoid increases in blood lead levels. In each study, interventions begin prenatally in order to reduce exposure before infants become mobile and begin ingesting contaminated dust and soil.

CDC is undertaking research to improve the quality of blood lead measurements and to develop new technology to provide immediate results with portable, low-cost blood lead analyzers. Under the Blood Lead Laboratory Reference System (BLLRS), CDC sends blood lead specimens for quarterly analysis to over 275 laboratories worldwide. The results are then compared to known reference values. Participating laboratories are advised of their performance, and consultation is offered to improve performance.

In collaboration with DOE, EPA, and industry partners, DoD has developed many new technologies in the areas of encapsulation and abatement, training, and soil remediation. The U.S. Army is currently conducting demonstrations and validations of these technologies. The thermal spray vitrification (TSV) process was developed by the Army to remove hazardous lead paint from steel structures. Because of the environmental stability of the waste, vitrification has been designated the Best Demonstrated Available Technology (BDAT) by the EPA. The U.S. Navy funded the development of a real-time lead-dust monitor to analyze airborne lead exposure during construction and abatement activities. The Army is working on developing environmentally-friendly paint strippers and innovative technologies, such as chemical stabilization and phytoextraction, for the abatement of lead in soil.

Surveillance And Monitoring

The National Health and Nutrition Examination Survey (NHANES), which is administered by CDC, is the only source of periodic nationally-representative data on blood lead levels in the U.S. population. Data from the NHANES are used to track trends in blood lead levels, identify high-risk populations, and support regulatory and policy decisions. The next NHANES survey will, for the first time, include a measurement of lead in house dust that will provide valuable data on the population distribution of this important source of exposure. This effort is funded by HUD and was designed collaboratively by CDC and HUD.

CDC provides funding and technical assistance for States to develop laboratory-based surveillance systems to determine blood lead levels in children. Data from these State systems can be linked to data from the State Medicaid Agency (SMA) to monitor SMA compliance with HCFA policy. CDC uses data submitted by State systems to form a national surveillance database.

The Agency for Toxic Substances and Disease Registry (ATSDR) is the public health arm of the Superfund Program. ATSDR undertakes the study of blood lead in populations near Superfund sites and funds State health agencies to undertake this type of work. ATSDR's work in this area has helped to guide development of policies covering the cleanup of sites contaminated with lead.

Vision:

Eliminate childhood lead poisoning in the United States

Increased efforts to control lead paint hazards in older housing are needed to eradicate childhood lead poisoning. Lead hazards should be controlled before children are poisoned. The need for additional resources is greatest in deteriorated low-income housing, where lead hazards are especially common. Other ongoing efforts will continue to control exposure from other lead sources and to focus attention on expanding efforts to provide early intervention for children at highest risk.

The foundation for solving this problem has been established over the past decade. A qualified, licensed pool of inspection and hazard control contractors now exists, and the system for training and certifying more people is in place. Hazard control techniques have been implemented and shown to be effective in over 200 cities through HUD's grant program for privately-owned low-income housing. A standard of care has been established through HUD's new regulation published on September 15, 1999 covering all federally-assisted housing. Known lead paint hazards now must be disclosed at the time of sale or lease of most pre-1978 residential properties where children may reside. Despite these and other advances, more must be done if the nation is to achieve the vision of eradicating childhood lead poisoning.

This document estimates the additional resources needed over the next 10 years to eliminate lead paint hazards in housing with young children. Projections are based on the third National Health and Nutrition Examination Survey (NHANES)—Phase 2, the 1997 American Housing Survey, the 1999 Economic Analysis accompanying the HUD regulation covering federally-assisted housing, the Residential Energy Consumption Survey, U.S. Geological Survey data on the historical use of lead in paint, and the 1990 HUD National Survey of Lead paint in Housing (see the Appendix to this report for a detailed description of the methodology used to make these projections).

Number Of Housing Units With Lead Paint Hazards That Need To Be Addressed

Any house with lead paint could eventually pose a hazard to young children. Most such houses, however, do not contain immediate lead hazards. Although about 60% of the nation's housing stock contains lead paint, only 4.4% of all children under 6 have blood lead levels above 10 μg/dL.[5,17]

Between 86-95% of all lead in paint is contained in housing built before 1960 (see Tables 4 and 5). Therefore, resources to address residential lead paint hazards

- ☐ Lead poisoning is a completely preventable disease.
- ☐ Residential lead paint hazards in homes of children can be virtually eliminated in 10 years.
- ☐ Every child deserves to grow up in a home free of lead paint hazards.

Table 4
Lead Consumption in Housing per Decade

	Lead Consumption (thousands of tons)	Decade-End Occupied Units (millions)	White Lead per Unit (pounds)	1991 AHS Units (millions)	Lead Paint In Housing (thousand tons)		Percent of All Lead Paint
					Before Rehab	After Rehab	
1914-23*	1340	24.35	110	9.02	496	413	49.1%
1920-29	1663	29.91	87	5.06	221	184	21.9%
1930-39	1158	34.86	42	5.98	126	104	12.4%
1940-49	1665	42.83	22	7.67	84	72	8.6%
1950-59	1012	53.02	7	12.51	44	37	4.5%
1960-69	863	63.45	3	14.52	22	20	2.4%
1970-79	654	80.39	1	21	11	10	1.2%
					1,004	841	100%

Source: U.S. Geological Survey, American Housing Survey (see Appendix)

* White lead data from 1914-1923 is used to estimate consumption between 1910 and 1920 because 1914 is the earliest year of available data.

Table 5
HUD National Lead Paint Survey Data (1990)

		Pre-40	1940-1959	1960-1978	Total
Lead Paint Surface Area (million sq. feet)					
	Interior	15,912	8,247	5,279	29,438
	Exterior	25,969	12,635	10,502	49,106
Average Lead Paint Concentration (mg/sq.cm)					
	Interior	5.7	2.5	2.0	
	Exterior	6.1	4.2	3.2	
Total Lead in Lead Paint (1000 tons)		255	75	45	376
	Interior	93	21	11	125
	Exterior	162	54	34	251
Percent of Total Lead in Paint		68%	20%	12%	100%
	Interior	74%	17%	9%	100%
	Exterior	65%	22%	14%	100%

Source: HUD *National Survey of Lead Paint in Housing*[17]

should be targeted to pre-1960 units, with the oldest or most-deteriorated houses being treated first.

Analysis of American Housing Survey data (see Appendix) indicates that there are about 24 million pre-1960 dwelling units in 1999 at risk of having lead paint hazards. These are units with interior lead paint that have not undergone major renovation (e.g., total window replacement). The number of demolitions and renovations through 2010 in Table 6 is based on rates experienced between 1989 and 1997 as reported in the American Housing Survey conducted by the Bureau of the Census.

In addition to demolition and renovation (including private hazard control), additional units will undergo hazard control as a result of HUD's regulation for federally-assisted housing. Based on the Economic Analysis for the rule, HUD estimates that it will produce 1.4 million pre-1960 lead-safe units during the 10 years from 2000 to 2010.

Table 6 shows that about 5.6 million units will undergo demolition and renovation over

Table 6
Pre-1960 Units at Risk of Having Lead Paint Hazards in 2010

Housing Stock	Number of Housing Units (millions)
Total Units at Risk of Lead Paint Hazards in 1999	24.0
Reduction Due to Demolition, 2000-2010	-1.8
Reduction Due to Substantial Renovation, 2000-2010	-3.8
Subtotal (Total Units at Risk of Lead Paint Hazards in 2010)	18.4
20% of Subtotal Occupied By Low-Income Families	3.7
Reduction Due to HUD Regulation of Federally-Assisted Housing	-1.4
Total Low-Income Units in 2010 Requiring Federal Assistance	2.3

See Appendix for methods and data sources used to derive these estimates.

the next 10 years, assuming current trends continue. In short, this means that by the year 2010, 18.4 million pre-1960 units will remain at risk of having lead paint that could one day pose a threat to children if nothing more is done.

Households with incomes less than 1.3 times the poverty level [Poverty Income Ratio (PIR) <1.3] occupy about 20% of all units. A PIR<1.3 was used here because it was the definition of low-income used in NHANES and because it is a good approximation of the low-income eligibility criterion used in the HUD grant program (see Appendix). Applying this percentage to the 18.4 million units with lead paint that exist prior to the implementation of the HUD rule results in 3.7 million units occupied by families with incomes less than 1.3 times the poverty level. Subtracting the 1.4 million units affected by the HUD rule (because virtually all these will be occupied by families with incomes of PIR≤1.3) yields a remainder of 2.3 million units. Thus, over a 10-year period, an average of 230,000 units would need to be evaluated and any identified lead paint hazards controlled each year.

Many of these remaining 2.3 million units may not pose any problem if they are maintained in such a way that the lead paint does not become hazardous. Tax credits, market forces, public education, and other incentives can encourage moderate- and upper-income owners to address lead paint before it becomes hazardous. For low-income families, however, direct federal financial assistance and leveraged private funding will continue to be needed because no other effective option exists.[18]

Cost Of Controlling Children's Exposure To Lead Paint In Housing

The cost of controlling lead paint hazards in any given house depends on the unit's condition, extent of lead hazards, type of building components coated with lead paint, and type of hazard control method employed. Economies of scale also exist for multifamily housing.

Housing is kept viable through both capital improvements and ongoing maintenance. Similarly, short-term (interim controls) and long-term (abatement) methods are employed to control lead paint hazards. Definitions for these methods can be found in Title X of the 1992 Housing and Community Development Act. Both methods have been shown to be effective in controlling childhood exposures to lead. Interim controls involve the repair of deteriorated paint and require continuing evaluation and management to ensure that the lead paint remains intact and non-hazardous. Abatement, a more permanent solution, involves the removal of painted building components, construction of a durable enclosure or covering, and/or paint removal.

Table 7 presents the estimated average annual costs of addressing residential lead paint in pre-1960 housing over the next 10 years. Costs are estimated for two approaches: 1) interim control of lead paint hazards identified through lead hazard screening (a low-cost way to identify the likelihood of lead hazards), and 2) abatement of lead paint identified through a complete inspection/risk assessment of all lead paint and all lead paint hazards). Average costs are based on the HUD Economic Analysis[31] presented in the regulation on federally-assisted housing and the evaluation of the HUD Lead Paint Hazard Control Grant Program,[19] which are currently the most complete sources of cost data for this field. The cost estimates are from actual cost data obtained from HUD grantees and from interviews with lead hazard control contractors.

For the interim controls approach, these data show an average cost of $120/unit for lead hazard screening and an average hazard control cost of $2,500 per unit (to cover paint stabilization, window work, cleanup, and clearance). To arrive at an overall average cost, these costs are applied to one-third of the units to be addressed because the Economic Analysis of the HUD rule indicates that about one-third of pre-60 units with lead paint will have lead paint hazards (see Appendix). Thus, per-unit interim control costs are $120 + (32% x $2500) = $920 (or about $1,000).

The $2,500 estimate for the interim controls approach includes $1,000 for exterior paint stabilization, $500 for interior paint stabilization, $300 for window work (to repair friction surfaces that produce lead-contaminated dust), $350 for cleanup, $150 for clearance testing, and $200 for relocation, administrative, and other costs. These

Table 7
Estimated Average Direct Annual Costs of Options to Address Lead Paint in Pre-1960 Housing, 2001-2010

Pre-1960 Housing Stock	Lead Hazard Screening and Interim Controls ($1,000 per unit)	Inspection/Risk Assessment and Full Abatement of Lead Paint ($9,000 per unit)
All Pre-1960 Housing with Lead Paint (1.84 million units/year)	$1.84 billion	$16.6 billion
Pre-1960 Housing Occupied by Families with PIR<1.3, Not Covered by HUD Regulation (230,000 units/year)	$230 million	$2.1 billion

Source: *Evaluation of the* HUD *Lead-Hazard Control Grant Program; The Economic Analysis for the* HUD *Lead Paint Regulation for Federally Assisted Housing (see Appendix)*

costs do not include any other housing rehabilitation costs that may also be incurred at the time of hazard control.

For the more-permanent abatement approach, an average cost of $500/unit for the lead paint inspection and risk assessment is applied to all units to be addressed, as well as an average abatement cost of $8,500 per unit (including cleanup and clearance), because virtually all units have some lead paint. Thus, per-unit abatement costs are $8,500 + $500 = $9,000.

Comparing The Costs Of Short- And Long-Term Hazard Controls

Investments in housing consist of ongoing maintenance activities and capital improvements. Specialized short-term maintenance (interim controls) can eliminate lead paint hazards as long as such maintenance is continued. Lead paint hazards can also be permanently controlled through long-term abatement methods. Short-term maintenance activities include repair of deteriorated paint and cleanup, treatment of painted friction surfaces (e.g., windows) that create lead-contaminated dust, followed by dust testing. Long-term methods include removal of building components coated with lead paint (e.g., window replacement), enclosure (e.g., new siding), and other methods. Both interim controls and abatement have been shown to produce lead-safe dwellings.

To leverage private funding to the fullest extent possible, this report recommends that low-income housing be made lead-safe using interim controls followed by ongoing management until the building is either demolished or abated. If ongoing management is not implemented consistently, however, lead hazards may reappear. The challenge today is to eliminate lead paint hazards in as many dwellings as possible. Ideally, all housing with lead paint would be permanently abated. Abatement alone, however, is unlikely to achieve this goal within the foreseeable future, unless significant funding is provided from non-federal sources. Because resources are limited, interim controls followed by either ongoing management and/or abatement provide the best opportunity for success and permit local entities to implement a strategy consistent with local needs.

Benefits Of Eliminating Childhood Lead Poisoning

Using conservative assumptions, the quantifiable monetary benefit (which does not include all benefits) of eliminating lead paint hazards through interim controls in the nation's pre-1960 low-income housing stock over the next 10 years will be $11.2 billion at a 3% discount rate ($3.5 billion at a 7% discount rate). The net benefit is therefore approximately $8.9 billion at a 3% discount rate (or $1.2 billion at a 7% discount rate). The monetary benefit of abatement of low-income housing is estimated at $37.7 billion using a 3% discount rate [$20.8 billion using a 7% discount rate (see Appendix)]. The benefit of permanently abating lead paint in all housing is considerably greater because more children would benefit over a considerably longer time span.

The quantified monetary benefits include savings associated with avoided medical care, avoided special education, increased lifetime earnings due to increased cognition, and market benefits due to improvements in housing. Other more intangible benefits may exist, but they have not been fully studied and are not included in this total. These benefits may include avoided hypertension in later life; improvements in children's height, physical stature, hearing, and vitamin D metabolism; and expenses and emotional costs involved in caring for poisoned children. In short, the quantified monetary benefits cited may underestimate the actual benefits because of the many unquantifiable benefits associated with eliminating childhood lead paint poisoning.

The overall benefit of this 10-year strategy is displayed in Figure 5, which shows that

childhood lead paint poisoning can be drastically reduced by 2010 through expanded prevention efforts. Without such efforts, about 135,000 children from low-income families living in pre-1960 housing will continue to be poisoned annually at the end of the next decade.

Federal Funding

Federal funds can be used to leverage private resources to create lead-safe housing. In some jurisdictions, it may be possible to create enough lead-safe housing for families, yet not necessarily address all housing units with lead paint. In other jurisdictions, virtually all housing will need to be made lead-safe to protect children.

Public and private funding should be increased substantially to help control lead paint hazards in housing. The HUD Lead-Hazard Control Grant program is currently funded at $60 million/year. Beginning in FY 2001, the Administration will request an increase of 50%, to $90 million. Funding in later years needs to be increased further based in part on the ability to leverage private financing and on updated surveys of children's blood lead levels and lead paint hazards in housing. The FY 2001 President's Budget also funds lead programs in other federal agencies including EPA, DHHS, DoJ, and DoD. (See budget summary on page 9)

Evaluation Of The HUD Lead Hazard Control Grant Program

Table 8 shows preliminary data on blood lead levels in resident children and lead levels in house dust. The preliminary data compiled in the evaluation of the HUD lead paint grant program show that modern hazard control techniques employed by cities and States receiving HUD grants are effective in drastically reducing both blood lead and dust lead levels. A major report on these findings will be completed in 2001.

Figure 5
Potential Impacts of Various Actions on the Number of Low-Income Lead Poisoned Children

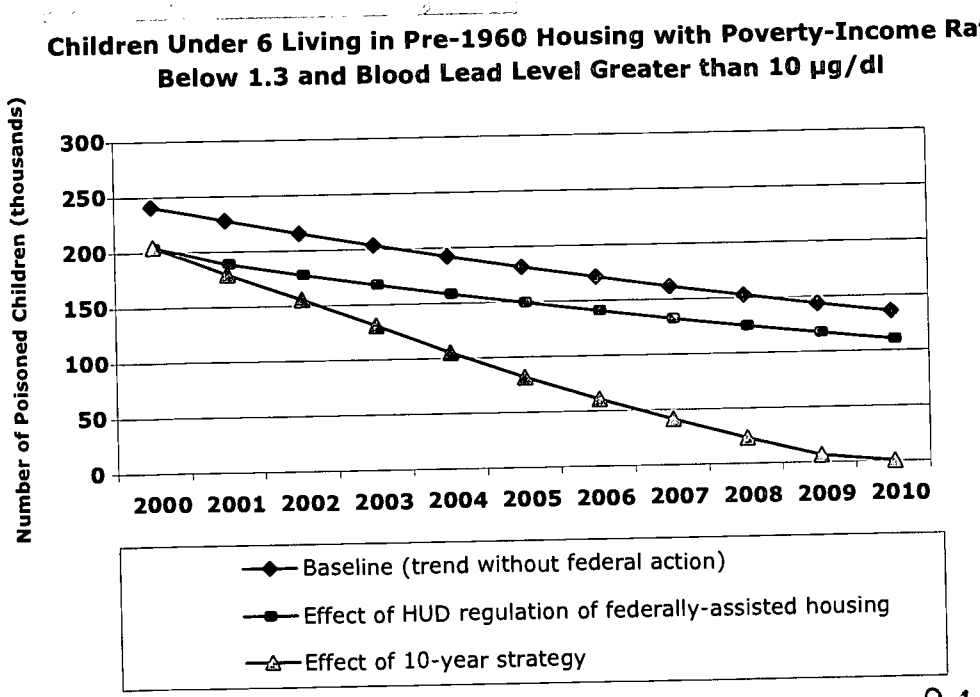


Table 8 Preliminary Outcome Data for HUD Lead Paint Hazard Control Grant Program Evaluation (Vacant and Occupied Dwelling Units Combined)

		Blood (n=485 children)			Dust					
		Decline in Median Blood lead Level (% of baseline)	% of Children With Increases Greater Than 3 µg/dL Compared to Baseline	% of Children With Decreases Greater Than 3 µg/dL Compared to Baseline	Median % of Lead Dust Decline Comparing Baseline and Clearance (n=1,943 dwelling units)			Median % of Lead Dust Decline Comparing Baseline and 2 Years After Control (n=568 units)		
	Strategy*	All measured at 12 months			Floors	Sills	Troughs	Floors	Sills	Troughs
Interior	02	25%	9%	43%	14%	80%	98%	43%	64%	57%
	03	31%	10%	58%	10%	68%	91%	57%	68%	88%
	04	26%	6%	59%	33%	92%	100%	73%	79%	96%
	05	17%	7%	38%	68%	97%	100%	66%	92%	96%
	06	**	**	**	93%	95%	97%	**	**	**
Exterior	02	28%	8%	55%	67%	94%	100%	69%	88%	94%
	03	17%	6%	42%	35%	96%	100%	79%	92%	99%
	04	24%	3%	55%	49%	94%	100%	58%	81%	95%
Site	01	**	**	**	38%	91%	100%	85%	89%	88%
	02	**	**	**	62%	95%	100%	92%	92%	93%
	03	**	**	**	46%	92%	99%	86%	76%	**

* *Strategy codes refer to increased intensity of hazard control*

***Less than 15 results*

Median baseline blood lead level = 10 µg/dl

Median baseline dust lead level. Floors=22 µg/sq.ft., Sills=316 µg/sq.ft., Troughs=5,665 µg/sq.ft

Blood and dust data from February 1999 dataset

The budget proposals of federal agencies are accompanied by performance goals and measures for their programs and activities. These annual performance goals and measures will be used to assess progress toward the goals presented here. Longer-term progress toward the vision of the Strategy - to eliminate lead poisoning in children in the United States - will be measured through the National Survey of Lead Paint Hazards in Housing and the National Health and Nutrition Examination Survey (NHANES).

I. Primary Prevention Recommendations: Prevent Lead Exposure In Children

Goal

By 2010, lead paint hazards in housing where children under six live will be eliminated through:

- Federal grants and leveraged private funding to be used for the identification and elimination of lead paint hazards to produce an adequate supply of lead-safe housing for low-income families with children
- Outreach and public education
- Enforcement and compliance assistance and monitoring

Increase the availability of lead-safe dwellings by increasing federal funding of HUD's lead hazard control grant program and by leveraging private and other non-federal funding.

The HUD grant program should be expanded to enable local governments and others involved to accelerate the production of lead-safe housing units. The program should continue to emphasize control of lead paint hazards in pre-1960 low-income privately-owned housing units where young children are expected to reside.

Over the past decade, HUD grants have been provided to local and State governments to enable them to eliminate lead paint hazards in low-income privately-owned dwellings. In most cases, these are the only financial resources available to make such dwellings safe for resident children in this housing. Each year for the past 4 years, HUD funds were available to make an award to an average of only one in four applicants.

Active HUD lead paint hazard control grant programs now exist in 200 cities across the country. These programs have helped create a large trained workforce, local lead-poisoning prevention ordinances, job creation and job training programs for low-income residents, new collaboration between local housing and health departments, and locally-driven public education and outreach campaigns. Because the capacity now exists, the future grants can be restructured in several ways. Specifically, the 3-year-grant period can be reduced to 2 years because most future grantees will not need the planning period to organize the work. Grants should continue to be awarded competitively to target the funds to jurisdictions with the greatest need and capacity. Grants should also be used to leverage private and non-federal resources.

Increase compliance monitoring and enforcement of lead paint regulations.

New federal regulatory responsibilities demand a new emphasis on enforcement. In addition to authorizing federal grants to owners of low-income privately-owned housing to correct lead paint hazards, Title X also provides for streamlined and more effective federal regulations that collectively provide a comprehensive framework for eliminating lead paint hazards. Most of the new regulations mandated by Title X have now been issued in final form. Together, compliance with these regulations:

- ensures that parents receive the information they need to protect their children before they are obligated under a new sales or lease contract or before renovation work is begun in their residence;
- provides a skilled, trained, and licensed workforce to implement safe work practices that will prevent renovation and hazard control activities from inadvertently poisoning children;
- creates new standards of care to protect resident children from lead paint hazards; and
- ensures safe management and disposal of lead paint debris.

The disclosure rule requires sellers, landlords, and agents to provide lead hazard information and to disclose information about known lead paint and lead paint hazards to prospective homeowners and tenants in pre-1978 housing prior to their rental or purchase decisions. This rule also gives buyers the opportunity to conduct an inspection for lead paint hazards. A 1998 HUD-funded survey conducted through the Bureau of the Census showed poor compliance with this rule. At least 36% of survey respondents were certain that they did not receive the required information when they bought or rented pre-1978 housing, and another 52% were uncertain. Enforcement of the disclosure rule, which cannot be delegated to the States, rests with EPA, HUD, and DoJ. Enforcement can take the form of administrative actions by EPA or HUD, and civil or criminal referrals to DoJ.

Efforts to enforce the disclosure rule need to be increased to prompt improved compliance. Enforcement actions should continue to be concentrated in housing with a history of lead poisoned children, in housing with physical or management problems that indicate the likely presence of lead paint hazards, and in places for which tips and complaints are received from the public. Targeted inspections and enforcement efforts should be increased through close federal cooperation with local health departments to identify landlords of housing with lead-poisoned children as well as through cooperation with local law enforcement authorities responsible for enforcing local lead paint ordinances.

EPA will have responsibility for enforcing four other lead paint rules in those States and on tribal lands without authorized programs. These rules will address certification and training, pre-renovation education, use of safe and reliable work practices at expanded locations, and management and disposal of lead paint debris. The Agency should encourage States, tribes, and territories to adopt approved programs, given the critical role they play in protecting children from lead poisoning.

The Federal Government should expand its use of integrated strategies that combine compliance assistance, incentives, monitoring, and enforcement. These techniques, which have been effective in addressing environmental and compliance problems in other program areas, will complement the more traditional enforcement efforts.

These national and regional integrated initiatives should be tailored to the pertinent lead rule involved and include an appropriate mix of the following:

- **Compliance assistance,** which includes targeted and mass mailings, seminars/ workshops, collaboration with trade associations and local groups, on-site assistance, and publicizing the toll-free phone number (800-424-LEAD) to report tips and complaints;

- **Compliance incentives,** such as a window of opportunity to audit, disclose, and correct violations as well as to receive penalty waivers or reductions in accordance with EPA's auditing and small-business policies;

- **Compliance monitoring,** including coverage of urban and low-income neighborhoods and follow-up to tips and complaints, with a priority focus on sites inhabited by children or pregnant women; and

- **Targeted enforcement actions.**

The new regulation for federally-assisted housing, which takes effect September 2000, will also require enforcement. During the year-long phase-in period, HUD will conduct a wide variety of training and educational activities for HUD constituents such as non-profit housing providers, public housing authorities, landlords enrolled in rental subsidy and other programs, and organizations using HUD-funded housing rehabilitation, maintenance, and finance programs.

Without this increased enforcement, the full benefits of lead paint regulations will not be realized. Increased enforcement will raise awareness of the precautions that can be taken to protect children from lead poisoning and to reduce both lead paint hazards and children's exposure to lead.

Conduct education and environmental intervention for families with children at high risk for future lead poisoning and provide a link between education and public health programs so that families have access to assistance programs.

Community-Level

National campaigns to educate parents, landlords, renovation and remodeling workers, housing inspectors, public health professionals, and others about lead poisoning should be expanded. In 1999 the Senate passed a resolution establishing the last week in October as National Childhood Lead Poisoning Prevention Week and the President issued a message of support.

Individualized Education Through Public Health Agencies

Even with a substantial expansion of resources to control residential lead hazards, a significant number of dwellings that could house families with young children will remain with lead hazards for several years. Outreach programs on the public health benefits of hazard control activities should be extended to identify at-risk families, especially those with pregnant women or young infants who live in homes with lead hazards. These outreach programs should be linked to existing lead-safe housing programs and resources for hazard control.

Federally-supported State and local childhood lead poisoning prevention programs currently focus their limited resources to ensure screening and follow-up of children with elevated blood lead levels. With additional federal support and leadership, such programs should expand their efforts to identify at-risk families and provide services to them before children are poisoned. To best serve at-risk families, such efforts should be coordinated with existing

programs such as Women and Infant Care (WIC) and Healthy Start. Families identified should receive education about lead poisoning prevention, be offered lead hazard assessments of their homes, and be assisted in obtaining appropriate services (such as HUD lead hazard control grants) to remediate identified lead hazards. Programs should also provide social services and other assistance to families for which relocation to lead-safe housing is the best alternative. Neighborhood lead exposure sources should be assessed and addressed in collaboration with State and local environmental agencies and community organizations.

Conduct a study of lead hazards in child-care centers.

CPSC, in collaboration with HUD and EPA, should consider conducting a study of children in both home-based and institutional child-care centers to determine if they are being exposed to lead hazards. If children in the centers are at risk, child-care centers should be included in the strategy to prevent lead poisoning in children while they are at the centers.

Coordinate federal weatherization and lead-hazard control programs.

DOE provides funds to more than 970 local governments and non-profit organizations annually to weatherize and reduce energy consumption in approximately 67,000 low-income housing units. The DHHS low-income energy-assistance program also funds weatherization projects. Some communities are already leveraging funds from both HUD's lead hazard control program and these weatherization programs to cost-effectively reduce the use of energy and control lead paint hazards simultaneously. As a part of this strategy, HUD, DOE, HHS, and EPA have begun to identify and implement additional actions to ensure weatherization activities are consistent with modern lead hazard control techniques, and increase the collaboration between these successful programs to yield additional health benefits and cost savings. This collaboration should actively continue. Specifically:

- DOE and HHS, in partnership with HUD and EPA, should ensure all federally-funded weatherization activities are conducted in a manner consistent with modern lead hazard control techniques. This includes providing lead hazard control education and training opportunities for all weatherization workers.

- DOE, HHS, and HUD should consider conducting a study of the cost and health benefits of simultaneously conducting weatherization and lead hazard control activities, including an assessment of the types of weatherization activities that provide the greatest energy savings and lead hazard reduction (e.g., window replacement).

- DOE, HHS, and HUD should emphasize collaboration between their respective weatherization and lead hazard control grant programs to ensure their grantees combine these two activities in a cost-effective and safe manner.

- HUD and EPA should include information about the energy savings associated with lead hazard reduction activities in their relevant educational programs and materials.

Explore the use of financial incentives (such as tax credits or deductions) or federal grants to control lead paint hazards in housing occupied by low- and moderate-income families with young children not served by HUD grants.

The HUD grant program targets assistance to residences with lead paint hazards that are occupied by low-income families with children under the age of six. Since public funds may not be available for some low-

The costs of deleading an owner-occupied residence cannot be deducted, but may be added to the basis of the property if the deleading costs are capital expenditures. Deleading costs incurred by landlords of residential and non-residential property are either currently deducted, or must be capitalized and recovered over the useful life of the property. Whether deleading costs are deductible or must be capitalized depends on the facts and circumstances of the situation.

In general, removing lead paint and replacing it with non-lead paint is considered a repair and is currently deductible by landlords. The paint can be either inside or outside the building. If a $10,000 expense can be currently deducted (expensed), then the taxpayer can include $10,000 as a deduction on the tax return for the year the expenditure was paid or incurred. Replacing all the windows in a building generally would be a capital expenditure. Thus, if the property is initially purchased for $200,000 and $10,000 is incurred to replace all the windows, then the basis in the property is $210,000 ($200,000 + $10,000). This $210,000 basis may be recovered through depreciation over the useful life of the building or upon its sale. Replacing some windows may be a repair and currently deductible or it may be a capital expenditure, depending upon whether the replacements are determined to have materially added to the value or prolonged the useful life of the building. For a family with a young child who suffers or had suffered from lead poisoning, the cost of removing or covering lead paint in areas of the dwelling in poor repair and readily accessible to the child may be a deductible medical expense. Medical expenses are deductible to the extent that they exceed 7.5 percent of annual income. Expenses that would otherwise be considered capital expenditures may be deducted in the current year to the extent that the cost exceeds the resulting increase in the value of the property. In other cases, the costs of deleading an owner-occupied residence cannot be deducted, but may be added to the basis if the deleading costs are capital expenditures.

and moderate-income families with children, additional financial incentives may be warranted. This recommendation calls for further work to determine the specific federal grants or tax incentives that would most efficiently encourage proper control of hazards in homes occupied by low- and moderate-income families.

Given federal resource constraints and the financial capacity of higher-income families to pay for proper hazard control, the financial incentives should be targeted to low- and moderate-income families or to owners of residential rental property serving these families. Further exploration on the specifics of the financial incentives would enable a careful weighing of the advantages and disadvantages of each proposal.

II. Secondary Prevention Recommendations: Increase Early Intervention For Lead-Poisoned Children

Goal

By 2010, eliminate elevated blood lead levels in children through:

- increased compliance with existing policies concerning blood lead screening; and
- increased coordination across federal, state and local agencies responsible for outreach, education, technical assistance, and data collection related to lead screening and lead hazard control*

*Note: HCFA, CDC, and CDC's Advisory Committee on Childhood Lead Poisoning Prevention will be developing criteria to evaluate requests from State Medicaid Agencies (SMAs) to waive the current Medicaid requirement to screen all Medicaid-eligible children. These waiver requests are based on data provided by SMAs on the prevalence of elevated blood lead levels in their Medicaid-eligible population.

Increase compliance with existing HCFA policies concerning blood lead screening.

CDC recommends that State and local jurisdictions develop screening guidelines to target children at high risk of lead poisoning based on community and individual risk factors. Data from phase II of the third National Health and Nutrition Examination Survey (NHANES II, 1991-1994) show that children in Medicaid represent a high-risk group comprising 83% of all children with blood lead levels of 20 μg/dl and above. As of October 1998, HCFA policy requires that all children enrolled in Medicaid receive a screening blood lead test at age 12 and 24 months. Data reflecting this 1998 policy on lead screening in the Medicaid population are not yet available. A GAO study, based on claim data from 1994 and 1995, was conducted in 15 States prior to the new policy. This study showed that less than 20% of Medicaid children had been screened nationally (based on NHANES data) and that screening rates varied widely from State to State but were less than 50% in all cases.[22]

The following discussion recommends a number of additional measures. After GAO issued a report indicating that about half of the written policies on lead screening were inconsistent with HCFA policy, HCFA released a letter to State Medicaid Directors (SMDs) reiterating the HCFA policy on lead screening and the importance of such screening. In addition, HCFA plans to individually contact States not currently in compliance with HCFA policy and work with their SMDs to bring policies into compliance.

Lead screening in the Medicaid population should be routinely monitored to track compliance with HCFA and SMA policies. Most States, however, do not have systems to routinely monitor screening penetration and the prevalence of elevated blood lead levels in the Medicaid population. HCFA Form-416 used by SMAs to report services provided under EPSDT should be revised to promote the development of data systems for identifying Medicaid children who have received blood lead screening. CDC and HCFA should continue and expand upon ongoing efforts to support and assist State health departments and SMAs to link blood lead surveillance data to Medicaid data. Such efforts will improve the quality of data needed to monitor the penetration and prevalence of lead screening. HCFA should require SMAs to monitor and report on lead screening penetration. In cooperation with CDC, HCFA should develop specific performance goals for lead screening and require

SMAs to develop plans for improvement when performance goals are not met.

HCFA and CDC should continue to provide guidance and technical assistance to SMAs to ensure that lead screening requirements are incorporated into Medicaid-managed care contracts and that adherence to such requirements is monitored.

Because the risk of lead poisoning varies substantially among geographic areas and demographic groups, the risk among Medicaid populations in different states also will likely vary substantially. It is further expected that some SMAs will request waivers from HCFA's lead screening policy. HCFA is currently working with CDC and CDC's Advisory Committee on Childhood Lead Poisoning Prevention to develop criteria for reviewing such waivers based upon actual data on blood lead levels in a State's Medicaid-eligible population.

Support community-based outreach, education, and advocacy efforts for lead screening of Medicaid-eligible children.

In addition to the intervention through health-care-providers, an important part of the efforts to increase the use of clinical preventive services involves the education and empowerment of consumers of health care to enable them to seek out preventive care. Efforts should be expanded to inform Medicaid-eligible families with young children of the need for lead screening. CDC should encourage the lead poisoning prevention programs of State and local health departments to partner with community-based organizations (CBOs) in such outreach and education efforts. Logical partners in this effort would include CBOs currently involved in outreach and education activities to increase immunization coverage and those working to increase enrollment of eligible families in the Medicaid program and related health insurance entitlements. SMAs may fund the latter as an administrative expense under HCFA rules.

Ensure compliance with Medicaid policy on case-management services and one-time on-site identification of the source of lead among Medicaid-eligible children with lead poisoning.

The most important part of the treatment of childhood lead poisoning is the identification and elimination of the sources of lead exposure. In addition, case management services are needed to coordinate interventions related to environmental, housing, medical, and social factors. GAO found that most SMAs did not reimburse for environmental and case-management services, perhaps because current HCFA policy indicates that these may be covered services. The October 22, 1999, letter from HCFA to SMAs clarified HCFA policies regarding the coverage of investigations to determine the source of lead and case-management services. It is recommended that HCFA actively encourage SMAs not currently covering environmental and case-management services to provide this benefit and that CDC and HCFA provide technical assistance to SMAs for implementing such a benefit.

Encourage and provide technical assistance to SMAs to explore options for covering additional environmental treatment services for children with lead poisoning.

Essential environmental services needed to identify and control lead exposure in the environment of children with elevated blood lead levels may not be routinely covered under current HCFA policy. For example, HCFA regulations do not permit reimbursement for laboratory analysis of environmental samples such as dust, paint, soil, or water. Although visual inspection of paint

and on-site x-ray fluorescence (XRF) analysis to measure lead in paint may be covered services, research and current guidelines developed by HUD (together with CDC) indicate that laboratory measurements, especially of lead in house dust, bare soil, and drinking water, are necessary to identify sources of exposure. One possible option for coverage of additional environmental services for Medicaid-eligible children with elevated blood lead levels is through a 1115 demonstration waiver, whereby Medicaid savings can be applied to the provision of additional benefits. For example, Rhode Island was approved to expand its Statewide 1115 Medicaid demonstration waiver to cover the cost of replacing windows in the homes of children diagnosed with lead poisoning. Although replacing windows is not a covered item under the "regular" Medicaid program, Rhode Island was able to obtain HCFA approval for this because it financed the program with Medicaid savings created through other aspects of its 1115 waiver. This innovative program is expected to improve the health of lead poisoned children by removing a major source of contamination from their homes. Under the HHS lead initiative, HCFA has committed to provide technical assistance to SMAs developing such waiver applications.

III. Research

Develop and evaluate new cost-effective lead paint hazard control technologies.

New technologies are continually being developed to make lead paint hazard identification and control services more affordable. Research is needed to help develop, evaluate, and market new products. For example, x-ray fluorescence technologies may be able to provide rapid on-site analysis of lead levels in house dust. Use of this technology would eliminate the need for laboratory analysis. New durable coating products may render lead paint inaccessible for long periods of time and may reduce the amount of dust generated. Further research also is needed to develop methods of removing lead paint in ways that do not generate dust, thus reducing occupational exposures and the need for extensive cleanup following lead hazard control work.

Extend field-based housing studies on the longevity of lead paint hazard controls.

For the past several years, HUD has sent an annual report to Congress measuring the cost-effectiveness of the grant program. The main outcome measures in this report are blood lead levels in resident children and levels of lead in house dust. Current plans are to follow the trends in the houses studied over a 3-year period, with a major report due in 2001. Preliminary data indicate that large reductions in house-dust lead levels have been achieved and maintained (see Table 8)

To evaluate the full longevity potential of the modern hazard control techniques employed by HUD's grantees, the study should be extended for another 7 years to fully measure the relative cost-effectiveness of different hazard control methods. These data will also be crucial to understanding the long-term durability of interim control methods.

Develop hazard control techniques for evaluating exterior urban lead-contaminated soil and dust.

Research has shown that soil and dust from a number of sources of lead, including fallout from leaded gasoline, paint, and hazardous waste sites are important contributors to childrens' exposure. Even though lead in gasoline was banned in the late 1970s, the soil in urban settings (especially near roadways) that have not been disturbed for long periods may still contain elevated levels of lead.

Although not tested for their effectiveness, specific actions might reduce exposure to lead in some situations. For example, soil

with a thin layer of contaminated lead may be tilled to reduce lead concentration to acceptable levels. These and other methods require further study.

Determine the extent to which activities such as building demolition, aging paint deterioration, and industrial paint removal from buildings and structures contribute to urban soil contamination and dust loadings.

Additional efforts are needed to more fully understand the complex problem stemming from the release and movement of lead in the environment. Particular attention needs to be paid to sources of exterior contamination, how they contribute to soil and dust exposures, and the resulting exposure to children.

Although significant efforts have been made to gain an understanding of residential environments and exposure pathways related to lead paint and lead-contaminated interior dust, more research is needed to understand the external environment.

For lead contamination already in place, the critical public health question concerns the best methods for remediation. Limited data indicate that building demolition and deterioration or removal of leaded paint from buildings and other large structures such as bridges may also contribute to ongoing contamination. Additionally, efforts to reduce exposure to existing contamination may be ineffective if neighborhoods are recontaminated by uncontrolled emissions from paint deterioration, paint removal, or demolition of buildings and structures. Thus, additional research is needed to determine the amount of contamination associated with these activities and to achieve effective controls.

Support further research and development to improve portable blood lead analyzer technology.

The LeadCare™ hand-held blood lead analyzer can almost immediately determine a blood lead level in a clinic or field setting, thereby allowing faster retesting and follow-up as appropriate. Although this development has the potential to increase the penetration of lead screening, two technical problems need to be addressed prior to the wider use and utility of this instrument. First, because the only commercially available device is classified as "moderately complex," clinical providers must acquire Clinical Laboratory Improvement Act (CLIAA) certification. A simpler "CLIAA-waived" device would make portable blood lead instruments more attractive to clinical providers. Second, to ensure that lead screening results from physician offices can be easily reported to health authorities for monitoring and follow-up purposes, technology should be further developed to allow these instruments to provide easy and secure electronic transmissions of demographic and blood lead data.

IV. Surveillance And Monitoring

Support State-based blood lead surveillance systems and the capacity to use data linkage to monitor lead screening in the Medicaid population.

The goals of CDC's childhood blood lead surveillance activity are to: 1) assist States in developing laboratory-based systems for surveying blood lead levels among children, 2) help States in the analysis and dissemination of lead surveillance data, and 3) use data from State systems to form a national surveillance database. To achieve these goals, CDC provides technical assistance, develops and provides computer software, provides funding through grants, and

compiles surveillance data submitted by State programs. To support efforts to monitor and increase screening in high-risk groups, especially among Medicaid children, CDC currently funds four State projects to estimate the prevalence of elevated blood lead levels and screening penetration in the Medicaid population. CDC should continue to support such efforts.

Repeat the National Survey of Lead Paint Hazards in Housing by 2005.

HUD conducted surveys of the prevalence of lead paint in the nation's housing stock in 1991 and again in 1999-2000. Results of the most recent survey, which includes data from 830 homes chosen to represent the entire U.S. housing stock, are expected to be available by late 2000. The survey should be repeated in 2005 to assess progress toward the 2010 goal.

Continue blood lead measurements in future NHANES.

The National Health and Nutrition Examination Survey (NHANES) administered by CDC represents the only source of periodic, nationally representative data on blood lead levels in the U.S. population. Data from the NHANES have been invaluable in tracking trends in blood lead levels, identifying high-risk populations, and supporting regulatory and policy decisions. The last available NHANES covered the period 1991-1994. NHANES is now being implemented as a continual survey that will provide data from a representative sample of the U.S. population every year. As this strategy is implemented, it is crucial that blood lead measurements remain a part of the NHANES in order to track the success of the overall prevention effort at the national level.

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Hotlines

The National Lead Information Center
1-800-424-LEAD (5323)
(EPA, HUD, CDC)

EPA's Safe Drinking Water Hotline
1-800-426-4791

HUD's Healthy Homes Hotline
1-800-HUDS-FHA

Web sites

Environmental Protection Agency:
www.epa.gov/lead

US Department of Housing & Urban Development: **www.hud.gov/lea**

Listing of Lead Service Providers:
www.leadlisting.org (or 1-888-LEADLIST)

Centers for Disease Control
(888-232-6789):
www.cdc.gov/nceh/ncehhome.htm

Consumer Product Safety Commission
(800-638-2772): **www.cpsc.gov**

Key Publications

Protect Your Family From Lead in Your Home (EPA, CPSC, HUD), EPA 747-K-99-001, April 1999 (disclosure pamphlet) **Available in Spanish**

Lead in Your Home: A Parent's Reference Guide (EPA), EPA 747-B-99-003, May 1999 (70-page comprehensive guide)

Lead Poisoning and Your Children (EPA), EPA 800-B-92-002, February 1995 (trifold with foldout poster of tips) **Available in Spanish**

Runs Better Unleaded – How to Protect Your Children From Lead Poisoning (EPA), EPA 747-F-99-005A, August 1999 (trifold brochure for parents, caregivers)

Lead Paint Safety: A Field Guide for Painting, Home Maintenance, and Renovation Work, HUD, EPA, CDC, HUD Office of Lead Hazard Control, HUD-1779-LHC, June 1999

Guidelines for the Evaluation and Control Of Lead-Based Paint Hazards in Housing, HUD-1539-LBP, July 1995; updated Chapter 7, 1997, 700 pages

How to Check For Lead Hazards In Your Home, HUD, EPA, Consumer Federation of America, HUD Office of Lead Hazard Control

Moving Toward A Lead-Safe America: A Report to the Congress of the United States, HUD Office of Lead Hazard Control, Feb. 1997

Putting the Pieces Together: Controlling Lead Hazards in the Nation's Housing, Lead-Based Paint Hazard Reduction and Financing Task Force, HUD-1542-LBP, June 1995

Lead-Based Paint Training Curriculum for Maintenance and Renovation Workers (from www.hud.gov/lea)

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