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Protecting Children From Lead Poisoning and Building Healthy Communities

Lead's toxicity to human organs and systems has been extensively documented for over 2 millennia. The 20th century is remarkable for the dispersal of lead throughout the human environment, making lead poisoning a community health problem of global dimensions.[1] Young children are at highest risk because of lead's neurotoxic effects, which reduce intelligence and attention span and cause learning difficulties and behavior problems.[2,3] Blood lead screening and surveillance are important tools, but primary prevention requires controlling sources of exposure. Although the challenge varies from country to country, the steps needed to eliminate this disease are now apparent.

Evidence That Environmental Controls Work

Over the past quarter century, progress on childhood lead poisoning in the United States has been remarkable: the mean blood lead level of US children fell by 80%, and the number of children with elevated blood leads declined by 90%.[4,5] These changes did not occur spontaneously or by chance. Strict regulation of many lead uses, enacted after decades of determined industry opposition, has gradually detoxified the air, water, and food supply. The evidence is clear that controlling ongoing sources of lead exposure produces immediate and significant health benefits, which typically far outweigh the costs.[6] The difficulty of cleaning up once lead contaminates the environment underscores the urgency of controlling it at the source.

The Legacy of Lead-Based Paint

Despite impressive progress, lead poisoning remains a serious environmental health hazard in the United States: 4.4% of all children aged 1 to 5 years have elevated blood lead levels (≥10 μg/dL).[5] Lead-based paint in nearly two thirds of all US housing poses by far the greatest remaining challenge.[7] (In particular communities and populations, a variety of other sources and pathways also expose children to lead.) While children can be severely poisoned by eating paint chips, the principal pathway is chronic exposure to settled lead dust, which gets on children's hands and toys and is ingested through normal hand-to-mouth behavior.[8] Recent research has confirmed the important role of interior lead dust and the need for more protective standards.[9]

Two distinct scenarios account for most lead poisoning in US children: paint deterioration because of poor maintenance and remodeling projects that inadvertently release lead particles. Remodeling and repainting projects that fail to control and clean up lead dust likely account for 5% to 10% of poisonings,[10] a challenge that conventional health education and limited training can overcome. The dominant scenario of poisoning among US children is unattended deteriorating paint and lead dust hazards in older, low-income housing. Water damage and excessive moisture are the principal causes of paint deterioration as well as of a multitude of other health hazards. For example, moisture encourages the growth of mold, mildew, mites, and microbes, which contribute to asthma and other respiratory problems.[11]

In the 1980s, many considered the presence of leaded paint a health hazard. Paralyzed by the insuperable difficulties of full removal (the cost alone is estimated at $500 billion),[12] the public health response was confined almost entirely to belatedly reacting to already poisoned children. Despite its appeal at many levels, literally "getting the lead out" of US housing is not a feasible primary prevention strategy. Research has validated the effectiveness of strategies that safely manage leaded paint in place[13–15] and has shown that poor paint condition is a stronger predictor of risk than the paint's lead content.[8] Rather than removing lead paint from a few properties, the more effective path to protecting children at risk is to make housing lead safe, a formidable but surmountable public health challenge.

Protecting Children At Risk Requires New Approaches

Continuation of current strategies is unlikely to provide near-term protection to children living in low-income housing in distressed communities, who are at highest risk for lead poisoning. Four shifts in approach are required to eradicate childhood lead poisoning in the United States.

Make Lead Safety an Integral Part of Housing Activities

Recognition that poor housing condition is a root cause of lead hazards demands a shift from the traditional approach whereby experts deal with one environmental hazard at a time. Rather than being viewed as the province of a small corps of experts conducting one-time interventions, lead safety in older housing must be integrated into various activities. While "abatement contractors" are needed for complex projects, techniques for controlling moisture and lead dust must be incorporated into all housing activities, such as maintenance, repair, repainting, remodeling, and vacancy treatments. Basic training in moisture control and lead safety will arm painters, remodelers, and maintenance staff with vital skills and can help build indigenous capacity within communities at high risk for lead poisoning. Housing codes must be updated and enforced to ensure control of moisture and lead dust hazards.

Identify and Control Lead Hazards Before Poisoning Occurs

Preventing poisoning requires demystifying the detection of property-specific lead hazards, the vast majority of which have never been identified, much less controlled. While only a certified lead expert can declare a property "safe" for legal purposes,[16] visual inspections for maintenance deficiencies can trigger corrective preventive measures. Sending a chip of peeling paint or a single "dust wipe" to an environmental laboratory for analysis (about $5 per sample) is sufficient to detect a hazard in a high-risk property. Because deteriorated paint and dust lead levels on floors and other surfaces are strong predictors of risk, health departments need to screen high-risk housing as well as test children's blood lead levels. Parents, property owners, contractors, and community residents can be trained in a single day to conduct visual maintenance checks and environmental sampling. Environmental samples provide property-specific information that can transform the federal lead-based paint "right-to-know" law from an empty promise to a catalyst for action.[17]

Secure New Resources for Prevention

Both the public and private sectors need to dedicate additional resources to controlling housing-related health hazards. The lead, petroleum, and paint industries need to contribute their share to prevention through either the courts or the Congress. Managed care providers can reduce health care costs for asthma and lead poisoning by making strategic investments to address environmental hazards in housing before children are exposed. In particular, the Medicaid program, which serves children at high risk for lead poisoning,[18] should explore ways to support the early identification and control of health hazards in high-risk housing. Medicaid must also start screening all young children as required[19] and provide the recommended follow-up services.[20] Government support for affordable housing should be increased to recognize the importance of decent housing in controlling environmental health hazards and reducing health care and education costs.

Make Healthful Housing a National Environmental Priority

Protecting at-risk children from lead hazards in their homes requires reintegrating housing into public health and environmental health practice. The environmental and public health communities and those who fund their research, advocacy, and policy work must begin to shift attention from the ambient environment to confront the reality that substandard housing in distressed communities is the leading environmental health threat to US children. There is no more chilling example of environmental injustice than concentrations of substandard housing in low-income urban neighborhoods, reflected by the fact that low-income children and Black children are at 8 times and 5 times higher risk for lead poisoning, respectively, than other US children.[5] Without leadership by the environmental, public health, medical, and philanthropic communities, the accelerating deterioration of housing in distressed communities will increasingly threaten health, spread blight, and devastate low-income families.

The Global Challenge

The causes of lead poisoning vary country by country and community by community.[21] Because significant sources of lead exposure remain largely unregulated in most countries, both developed and developing, lead poisoning is typically more widespread and severe in other countries than in the United States.

A common excuse for delaying control at the source is the perceived need to determine the exact extent of the problem and the specific contribution of each source. Environmental and health officials must not allow industry's demands for screening, surveillance, or epidemiological studies to preempt or postpone the control of obvious and serious sources of exposure. Where dispersive uses of lead continue, the self-evidence of both the problem and the remedy demands action. The ready availability of superior, practicable alternatives makes the continued use of lead inexcusable in any product with the potential for broad exposure (e.g., gasoline, paint, plumbing supplies, food cans, printing ink, fertilizer, and children's toys).

Leaded gasoline, the foremost cause of global lead exposure, is the obvious first candidate for control in the more than 150 countries in which it is still in use.[22] All automobile engines can operate on unleaded gasoline,[23] and superior, cost-competitive alternatives are readily available to replace lead or reduce engine octane demand.[24] Removing lead from gasoline is the single greatest step to preventing lead poisoning as well as a prerequisite to achieving other air quality improvements through the introduction of catalytic converters and modern engine technology.[25] There is no excuse for leaded gasoline use to continue in any country after the end of this century. □

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