Study of Health Insurance for Lead Poisoning Screening

A Report to the Governor and the Legislature of the State of Hawaii

Submitted by

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Foreword

In recent years, an increasing number of proposals have been introduced for the Legislature to expand mandatory health insurance benefits. The purpose of this assessment is to provide the Legislature with an independent review of the social and financial consequences of requiring health insurance coverage for lead poisoning screening.

We wish to express our appreciation for the cooperation and assistance of those state agencies, private insurers, and other interested organizations and individuals contacted during the course of this assessment.

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Chapter 1
Introduction

This special report was prepared in response to a request from the Senate Health and Human Services Committee of the 1992 Legislature asking the Office of the Auditor to assess the social and financial impact of requiring health insurance coverage to screen children for lead poisoning. The Legislature has become concerned about the increasing number of proposals to mandate specific health insurance benefits and their impact on the cost and quality of health care. Our analysis in this report is based on criteria in sections 23-51 and 23-52 of the Hawaii Revised Statutes on the social and financial consequences of proposals to mandate health insurance benefits.

Scope of the Study

It is important to note that this study examines the impact of requiring *insurance* for lead screening and not the impact of lead screening itself. The criteria for assessing social impact and financial impact are listed below.

Social impact

1. The extent to which screening for lead poisoning is used by a significant portion of the population.

2. The extent to which insurance coverage for lead poisoning screening is already available.

3. The extent to which the lack of coverage prevents individuals from getting screened for lead poisoning.

4. The extent to which the lack of coverage results in unreasonable financial hardship.

5. The level of public demand for lead poisoning screening.

6. The level of public demand for insurance coverage for lead poisoning screening.

7. The level of interest of collective bargaining organizations in this coverage.

8. The impact of indirect costs other than premium and administrative costs on the question of the costs and benefits of coverage.

Financial impact

1. The extent to which the proposed coverage might increase the use of screening for lead poisoning.
2. The extent to which insurance coverage might increase or decrease the cost of lead poisoning screening.
3. The extent to which screening for lead poisoning might be an alternative to more expensive treatment or service.
4. The impact of coverage for lead poisoning screening on the total cost of health care.
5. The extent to which insurance coverage for lead poisoning screening might increase or decrease the insurance premiums of policyholders and the administrative expenses of insurers.

Methodology

We conducted a general literature search for information and data regarding lead poisoning; examined relevant federal and state statutes, rules, and regulations; contacted the U.S. Centers for Disease Control, various national organizations, and different states for information and materials; and interviewed physicians, health professionals, representatives from the insurance industry, individuals from collective bargaining organizations, and other persons.

Organization of the Report

This report consists of three chapters. Chapter 1 is this introduction. Chapter 2 provides background on lead poisoning and screening for lead poisoning. Chapter 3 assesses the social and financial impact and includes our concluding observations.

Chapter 2

Background on Lead Poisoning and Screening

This chapter provides some background on lead poisoning, on screening for lead poisoning, and on some of the benefits and concerns relating to screening.

Lead Poisoning

Lead poisoning is a serious and widespread environmental disease that affects millions of children in the United States. Despite the known hazards of lead, it remains widely used. Lead is found in such products as paint, gasoline, batteries, cosmetics, cans, ceramic glazes, enamels, plumbing fittings and fixtures, ammunition, and cable sheathing. According to the Agency for Toxic Substances and Disease Registry of the U.S. Public Health Service, more than three million children in the country have blood-lead levels high enough to cause neurobehavioral and other health problems.

Lead enters the body through inhalation, ingestion, and absorption through the skin. Because the body cannot use or metabolize lead, it is stored in blood or in such body tissues as bone and teeth. The body tends to accumulate lead because the half-life of lead in bone is quite long, and lead is excreted slowly. Lead poisoning is silent—most poisoned children exhibit no symptoms and many cases go undiagnosed and untreated.

Federal regulations and other actions have resulted in a significant reduction of blood lead levels in the United States. One important advance has been the virtual elimination of lead from gasoline. A correlation has been found between the decline in the use of leaded gasoline and declines in the blood-lead levels of children and adults between 1976 and 1980. Lead levels in food have also declined significantly because of the decreased use of lead solder in cans and the decreasing lead levels in the air.

Today, lead-based paint is the major source of high-dose lead poisoning in the United States. Children become exposed when they ingest paint chips and flakes (which can contain as much as 50 percent lead by weight). Children also commonly ingest dust contaminated by lead paint in hand-to-mouth activities. The Consumer Products Safety Commission limited the lead content of new residential paint in 1978, but millions of houses still contain old leaded paint. The Department of Housing and Urban Development estimates that about 3.8 million homes with young children living in them have either lead-based paint or high levels of lead in dust.

A hazard for children

Lead accumulates over time in the bodies of children. Exposure to small amounts of lead can result in a large long-term accumulation. Lead toxicity affects almost every system in the body. Young children are particularly vulnerable because of a number of factors:

- Children ingest and inhale more lead per unit of body weight than adults.
- Children, unlike adults, will ingest paint, soil, and dust by putting these substances into their mouths.
- Children seem to have higher lead absorption rates than adults—40 percent for infants compared to 5 to 15 percent for adults.
- Children seem to retain more absorbed lead than adults.
- Children have less bone tissue in which to store lead so more lead in the blood is free to exert toxic effects on body organs.
- Nutritional deficiencies, more likely to be found in growing children, can contribute to higher lead absorption levels.
- The nervous system of children (especially the blood-brain barrier) is not fully developed.
- The cognitive effects of lead occur at lower levels in children.

A primary target of lead toxicity is the brain or central nervous system, especially in young children. Other key targets in children are the body hemeforming system (critical to the production of heme and blood), and the vitamin D regulatory system, which involves the kidneys and plays an important role in calcium metabolism.

Severe lead poisoning can result in coma, convulsions, profound and irreversible mental retardation, seizures, and even death. A number of epidemiological studies indicate a relationship between lower levels of lead exposure and impairments in central nervous system functioning, including delayed cognitive development, reduced IQ scores, and impaired hearing. Fetuses also appear to be vulnerable to lead toxicity, possibly even more so than children.

Although generally less vulnerable than children, adults are not immune to the hazards of lead poisoning. In 1985, the Environmental Protection Agency classified lead as a probable human carcinogen. It has been linked to ovulation problems, delayed sexual maturity, impotence, sterility, spontaneous abortion, and elevated blood pressure.

Lead threshold lowered

Medical thinking has varied on the level of lead in the blood at which adverse effects occur. In the 1960s, medical care providers were concerned about blood lead levels greater than 60 micrograms per deciliter (mg/dL). By the 1970s, the level of concern was set at 40 mg/dL. By the middle 1980s, it was lowered to 25 mg/dL. Recently, in October 1991, the U.S. Centers for Disease Control (CDC) revised the intervention level downwards to 10 mg/dL.

The CDC has replaced a single definition of childhood lead poisoning with a multitier approach. According to the CDC, a child with a blood lead level less than 9 mg/dL is not considered to be lead poisoned. Prevention activities should be triggered by blood lead levels above 10 mg/dL. All children with blood lead levels greater than 15 mg/dL should receive individual case management including nutritional and educational interventions and more frequent screening. Medical evaluation and environmental investigation should be done for all children with blood lead levels above 20 mg/dL. A child with blood lead levels above 45 mg/dL needs both medical and environmental interventions including chelation therapy, a form of chemotherapy for metal poisoning. A child with a reading above 70 mg/dL is a medical emergency. Medical and environmental management must begin immediately.

Screening

Screening for lead levels in blood is the primary method of prevention. Monitoring blood lead levels is crucial because early lead toxicity is reversible and many children show no symptoms. A childhood lead poisoning screening program would identify children with elevated blood lead levels and allow them to be treated. Screening would also generate data on sites and populations at high risk for lead poisoning. The data can help define areas with the greatest need for abatement programs.

The CDC recommends a phase-in of universal screening. The CDC reports: "Because almost all U.S. children are at risk for lead poisoning (although some children are at higher risk than others), our goal is that all children should be screened, unless it can be shown that the community in which these children live does not have a childhood lead poisoning problem."[1]

Screening priority

According to the CDC, priority for screening should be given to those children at highest risk for lead poisoning—children younger than 72 months of age, particularly those less than 36 months old. Younger children are at high risk for lead exposure since they engage in the most hand-to-mouth activity. They also have the most rapidly developing

nervous systems, making them more vulnerable to the effects of lead poisoning.

Children between 6 months and 72 months who live in or frequently visit old, deteriorated homes or buildings are a high priority group. Children in older homes that are being remodeled or renovated are also at high risk. Parents whose hobbies or occupations involve working with lead (steel cutting, welding, battery manufacturing, ship and bridge building, paint removal, etc.) pose a hazard for their children. Lead can be brought home on skin, shoes, and clothing. Finally, children living near lead smelters or other lead-related industries may be at a high risk for lead poisoning.

Screening method

Experts believe that testing blood lead levels is the most accurate and reliable measure of lead poisoning. Two types of blood tests are commonly used to screen for lead poisoning: the erythrocyte protoporphyrin (EP) test and the venous blood test.

The EP test, which is taken by pricking a patient's finger, has generally been the standard test for lead poisoning. The EP test is not costly and provides immediate results. Concerns have been raised, however, that the EP test is not an accurate measure of long-term lead exposure and fails to detect low-level lead poisoning. Some caution that a significant number of children with lead poisoning may be missed if only EP tests are used for screening.

According to the CDC, screening should be done using a venous blood lead test. The CDC reports:

> Since erythrocyte protoporphyrin (EP) is not sensitive enough to identify more than a small percentage of children with blood lead levels between 10 and 25 mg/dL and misses many children with blood lead levels below 25 mg/dL (McElvaine et al., 1991), measurement of blood lead levels should replace the EP test as the primary screening method. Unless contamination of capillary blood samples can be prevented, lead levels should be measured on venous samples.[2]

The CDC cautions that the quality of blood lead measurements is affected by such factors as contamination by the large amount of lead in the environment, and variations in laboratory analysis. The reliability of blood lead measurements, especially at low concentrations, can be ensured by using appropriate analytical standards, maintaining equipment, training personnel, and participating in external proficiency programs.

According to the CDC, blood collected by the venous blood test has a low likelihood of contamination compared to blood collected by pricking

a finger. Venous blood is the preferred specimen for analysis and should be used for lead measurement whenever practicable. Also, venous specimens provide a larger volume for analysis and are less prone to clotting and other problems that can be encountered with capillary specimens. The CDC cautions that elevated blood lead results obtained from capillary specimens should be considered presumptive and must be confirmed using venous blood.

Screening schedule

The CDC recommends a minimum screening schedule for children from ages 6 months to 36 months and from 36 months to 72 months. The schedule, the CDC cautions, is not rigid but should be used as a guide for health care providers in conjunction with other relevant information to determine when a child should be tested.

For children between 6 months and 36 months a questionnaire should be used at each routine office visit to determine the potential for high-dose lead exposure and the need for a blood lead test. A child at low risk for exposure should have an initial blood test at 12 months. Based on the results of that initial blood test, the child should be retested every 3 or 4 months or at 24 months. A child found to be at high risk for exposure should have an initial blood lead test immediately. Again, based on the results of that initial blood test, the child should be retested every 3, 4 or 6 months.

A questionnaire should also be used at each routine office visit for children between 36 months and 72 months of age. Any high risk child who has not previously been tested should be given a blood lead test. These children and those testing above 15 mg/dL should be screened at least once a year until 72 months of age. Children should also be rescreened any time exposure has increased.

Generally, children with blood lead levels above 15 mg/dL should be screened every 3 to 4 months, the family should receive education and nutritional counseling, and a detailed environmental history should be taken to identify sources of lead exposure.

Treatment

All children with confirmed venous blood lead levels above 20 mg/dL require medical evaluation. The need for further medical treatment depends on the blood lead level and whether symptoms are present. According to the CDC, the decision to initiate medical management should almost always be based on a venous blood lead reading. A first test based on a capillary blood sample should be confirmed using a venous blood test.

Symptoms of lead poisoning in a child with an elevated blood lead level is a medical emergency, and the child should be hospitalized. Acute lead encephalopathy is marked by some or all of these symptoms: coma, seizures, bizarre behavior, apathy, vomiting, loss of consciousness, and subtle loss of recently acquired skills. Any one or a mixture of these symptoms associated with a high blood lead level is an acute medical emergency. Even when identified and promptly treated, lead encephalopathy may result in severe and permanent brain damage.

Several drugs are used to treat lead poisoning. These drugs, capable of binding or chelating lead, reduce the level of lead in the soft and hard (skeletal) tissues and lower its acute toxicity. They have potential side effects and must be used cautiously. The FDA recently approved succimer, a promising drug for treating children with high blood lead levels. Succimer appears to be an effective oral chelating agent with high selectivity for lead but low selectivity for essential trace metals.

Children who undergo chelation treatment require long-term follow-up care. Providers include pediatricians, nutritionists, environmental specialists, and community outreach workers. Once the child is released to a safe environment, frequent follow-up is mandatory. Generally, most children who undergo chelation therapy must be followed closely for at least one year or longer.

Chapter 3

The Social and Financial Impact of Insurance Coverage for Lead Poisoning Screening

This chapter assesses the social and financial impact of requiring insurance coverage to screen children for lead poisoning. This assessment is followed by our concluding observations.

Summary of Findings

1. Despite the health benefits of lead poisoning screening, its current use is low. Additionally, there is little demand for coverage.

2. Screening costs may be a barrier to some individuals; however, cost is not the only barrier. Insurance alone may not guarantee that more people will get screened.

3. Requiring insurance coverage for lead poisoning screening will probably increase the cost of health care and insurance rates.

4. Without adequate data, it is difficult to determine the extent of the problem in Hawaii. However, the State Department of Health may be able to provide this type of valuable data in the near future.

Social Impact

The extent to which screening for lead poisoning is used by a significant portion of the population. Despite the health benefits of screening for lead poisoning, a significant portion of the population does not appear to use this service. Physicians, other health professionals, insurance industry representatives, and representatives from collective bargaining organizations that we interviewed acknowledged that few individuals are getting screened for lead poisoning. Little hard data is available in this area, but according to the State Department of Health, only about 40 children were screened for lead poisoning in Hawaii between 1989 and 1991. According to the Hawaii Medical Services Association (HMSA), during the first six months of 1991, about 33 individuals sought screening or treatment for lead poisoning.

The extent to which insurance coverage for lead poisoning screening is already available. Screening for lead poisoning may be covered for some individuals. Under existing state Medicaid guidelines, eligible individuals may be screened for lead poisoning when a physician has reason to believe this screening is medically necessary. According to Medicaid figures from the Department of

Human Services, 15 individuals were screened for lead poisoning in fiscal year 1991.

In Hawaii, health screening services are not usually reimbursable. However, HMSA says that it has provided coverage for lead poisoning screening or treatment when a physician has reason to believe that this screening or treatment is medically necessary. The physician must be able to justify this service. General screening for lead poisoning is currently not covered by HMSA. Kaiser Permanente will also provide lead poisoning screening when medically indicated.

Massachusetts and California are the only two states that mandate universal childhood screening for lead poisoning. In 1990, Massachusetts made both screening and insurance coverage mandatory. Likewise, in California, Assembly Bill No. 1979 mandates that on or after January 1, 1993, health insurers and health maintenance organizations will cover the costs of screening children.

The extent to which the lack of coverage prevents individuals from getting screened for lead poisoning. It appears that not many individuals are getting screened for lead poisoning. This lack of demand for screening does not seem to be due solely to the absence of insurance coverage. The main reason may be the public's lack of awareness or concern about the hazards of lead poisoning. Similarly, physicians, especially pediatricians, may not be convinced of the health hazards of lead and may not recommend screening for patients. Unless the public becomes aware of the dangers of lead poisoning, only a limited number of people will seek screening even if it were covered by insurance.

The extent to which the lack of coverage results in unreasonable financial hardship. Although precise dollar figures are unavailable, it has been estimated that it would cost approximately $30 to $100 to screen a child for lead poisoning using a blood lead test. Cost may be a deterrent for some, but for most people the cost should not pose an unreasonable financial hardship.

The level of public demand for lead poisoning screening. The current public demand for this procedure is low. It is anticipated, however, that with increased public awareness and the willingness of more doctors to recommend this screening, the demand will grow. Several individuals we interviewed stressed that any kind of screening program must be integrated with an intensive public education effort. Unless the public and physicians are educated about the health hazards of lead, few people will be interested in screening. One health professional succinctly described this general ignorance of the lead hazard as a "poverty of awareness."

The level of public demand for insurance coverage for lead poisoning screening. Given the lack of public awareness about lead poisoning screening, we found little interest in this area. Lead poisoning is not a major health issue in Hawaii.

The level of interest of collective bargaining units in negotiating for screening coverage. Collective bargaining units showed little interest in including screening for lead poisoning under health insurance coverage. These groups recognized the health benefits of screening, but were more concerned with strengthening existing basic health benefits.

The impact of indirect costs other than premiums and administrative costs. No specific data were available regarding the impact of indirect costs of insurance coverage for lead poisoning screening. Some health prevention proponents cautioned that the absence of screening could result in a failure to detect neurobehavioral deficiencies or cognitive problems which could lead to more costly and possible long-term specialized care. Regarding this issue, the CDC reports:

> ...the benefits of preventing exposure to lead in children and fetuses are the avoided costs that would have been incurred had exposure occurred. The benefits for which we provide monetary values are 1) reduction in medical care costs incurred by poisoned children, 2) reduction in special education costs for poisoned children, 3) reduction in future lost productivity due to cognitive deficits in children, and 4) reduction in neonatal mortality due to prenatal lead exposure. The above benefits are only a few of the benefits of preventing lead exposure. Many benefits cannot be described in monetary term (e.g., avoiding the emotional costs to families of having a lead-poisoned child).[1]

Financial Impact

The extent to which insurance coverage might increase the use of screening for lead poisoning. Providing coverage might encourage people to be screened for lead poisoning since they would not have to pay for the procedure. When cost is removed as a barrier, use of the service could be expected to increase. However, because there is a general lack of awareness about the hazards of lead poisoning, few individuals might demand the service unless the screening program is integrated with a public education effort.

The extent to which insurance coverage might increase or decrease the cost of lead poisoning screening. Cost data are not readily available. If lead poisoning screening were covered by insurance, the volume of use might be expected to increase over time. This would

probably have the effect of containing and possibly even lowering the cost of the screening, which now ranges between $30 and $100. The cost of a screening includes the process of taking a blood sample and the actual laboratory analysis of the sample. If large numbers of blood-lead screenings were being done, laboratories might offer bulk rates. In addition, the Department of Health might be able to develop an in-house mechanism to analyze these samples. Both approaches have the potential to lower the cost of screening.

The extent to which screening for lead poisoning might be an alternative to more expensive treatment or service. The purpose of screening is to detect lead poisoning in its early stages when prognosis is good and treatment could be more conservative. Although actual cost figures are unavailable, it could be expected that the cost of screening should be significantly less than the costs of chelation therapy which might include hospitalization, physican fees, medication, and follow-up services.

The impact of coverage for lead poisoning screening on the total cost of health care. Cost data in this area are unavailable. Some increase in the total cost of health care is possible since usage generally increases with an expansion in coverage. This increased use, in turn, would probably result in some increase to the total health-care cost. However, the extent of any overall increase in total costs is unknown.

The extent to which insurance coverage for lead poisoning screening might increase or decrease the insurance premiums of policyholders and the administrative expenses of insurers. Our study indicates that insurance rates would probably be increased to meet screening costs. Although bulk laboratory and analysis rates might lower individual screening costs, the savings might not fully offset the total cost of providing coverage for this screening.

One insurer stated that screening would likely result in higher administrative costs, staff, and personnel costs. Claims and related administrative work would probably increase; policies and procedures would have to be changed; quality assurance and utilization reviews would be expanded; and data processsing changes might have to be implemented to track users.

Concluding Comments

Few definite answers could be given to the questions regarding the impact of mandating insurance coverage for lead poisoning screening. We were handicapped by the lack of data on the problem in Hawaii. There is little information on how many children in the State have

elevated blood lead levels. A joint study in 1988 by the CDC and the State Department of Health was very limited. It found that some 13 percent of the children tested had blood levels above 10 mg/dL, but the sample consisted of only 93 children, all were from the Big Island.

The Department of Health recently initiated a study in March 1992 which should provide some valuable data. The study will obtain and analyze blood lead specimens from 500 children between the ages of one and five years. These children will be from various sites throughout the State. Some data should be available by the end of summer 1992. Other data may also be available in the future. The department hopes to obtain a grant from the CDC to implement a three-year lead prevention program in Hawaii. It would consist of screening children in 18 communities deemed at "high risk" and developing and implementing a health education component.

Until these kind of data are available, an assessment of the impact of mandatory insurance coverage will be incomplete and limited. At this time, there is no evidence of any significant need or demand for health insurance coverage for screening children for lead poisoning.

Notes

Chapter 2

1. U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, *Preventing Lead Poisoning in Young Children: A Statement by the Centers for Disease Control,* Atlanta, October 1991, p. 39.

2. Ibid., p. 41.

Chapter 3

1. U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, *Strategic Plan for the Elimination of Childhood Lead Poisoning*, Atlanta, February 1991, Appendix II, p. 1.