

## **THE MASSACHUSETTS CHILDHOOD LEAD POISONING PREVENTION PROGRAM STATEWIDE SCREENING PLAN**

### **INTRODUCTION**

Lead poisoning continues to be one of the most common and preventable pediatric health problems today. If untreated, lead poisoning can interfere with brain cell development and cause problems with growth and development, hearing, and intelligence. Despite significant progress toward the elimination of lead poisoning, children remain at greatest risk and continue to experience the harmful effects of lead. This document summarizes the scope of the lead problem in Massachusetts and describes the services provided by the Massachusetts Childhood Lead Poisoning Prevention Program (MACLPPP).

### **SCOPE OF THE PROBLEM**

In Massachusetts the leading source of lead poisoning in young children is from lead paint ingestion. Efforts over the past 30 years have resulted in remarkable progress in reducing the incidence of childhood lead poisoning. However, it is clear that the state still has a population at risk.

Massachusetts' children face a significant and enduring lead poisoning risk, due to the state's extraordinarily old housing stock. As the CDC's 1997 Screening Guidance document states, "Housing built before 1950 poses the greatest risk of exposure to children." Massachusetts is second among U.S. states in percentage of housing built

before 1950, at 46.8%, compared to 27%, the national average for pre-1950 housing stock. Most of Massachusetts' housing is very old with 83% of the housing built before 1950, or 960,742 units built before 1939. Deteriorated lead paint and the resulting lead dust is the medium through which the overwhelming majority of children are lead poisoned through hand to mouth activity. Massachusetts' housing is overwhelmingly of woodframe construction, dramatically increasing its chances of having been painted with lead paint on the exterior as well as interior surfaces.

Massachusetts is a densely populated, largely urban state, made up of many cities of detached multi-family housing constructed during the Industrial Revolution. Such a housing stock presents the greatest risk of lead poisoning to young children.

Massachusetts has the highest percentage of tenant-occupied housing built before 1950 in the U.S., at 51%, compared to the national average of 28%. In addition, it is second only to California, a state many times its size, for having the most cities among the U.S.

Department of Housing and Urban Development's list of top U.S. cities for pre-1950 housing (23 cities to California's 24).

The correlation between age and type of housing and children's blood lead levels has been made in a number of studies, and is reflected in MACLPPP's surveillance data. In the top 20 Massachusetts cities for elevated blood lead levels among children (i.e., high-risk communities), 63% of the housing was built before 1950. About 30% of the state's housing and one-third of its population of children less than six years old is located in those 20 cities. Of the 33% of Massachusetts children living in the state's top 20 high-

risk communities-where old housing, low-income, minority, non-English speaking and Medicaid families are all significantly above the statewide average- it is clear that Massachusetts has a significant at-risk population. Newly released 2000 U.S. Census data indicates that there have been dramatic increases in Massachusetts' minority populations, and these increases are concentrated in the 20 high risk cities.

### **THE PLAN**

For over thirty years, the MACLPPP has coordinated a program of prevention, screening and case management for children up to 72 months of age. The Massachusetts Lead Law has promoted primary prevention through preventive deleading of pre-1978 homes of all children under six. MACLPPP's primary prevention work has been to encourage compliance with the Lead Law. That includes development, oversight, collaboration and evaluation of numerous strategies toward that end. Today, the key elements of the MACLPPP plan include screening, surveillance, data management, assessment, policy development and assurance.

### **STATEWIDE SCREENING ADVISORY COMMITTEE**

In 1990 and more recently in January, 1998, MACLPPP convened an inclusive Screening Advisory Committee (SAC). The purpose of this advisory committee was to examine the Massachusetts screening schedule and determine whether changes to the schedule (at that time, annual screening of all children between the ages of 9 and 48 months regardless of risk) were warranted. For Massachusetts, this could represent a

shift from universal to targeted screening, as recommended by the CDC. If a change were recommended, the committee would also assist in fashioning the change.

Committee membership consisted of 25 individuals who had a direct or indirect interest in lead screening. Among the members were representatives from the pediatric provider community including pediatricians, pediatric nurses and nurse practitioners. The Massachusetts State Lead laboratory and representatives from two of the largest private laboratories were on the committee. Managed care organizations represented were Harvard Pilgrim and Blue Cross/Blue Shield of Massachusetts. The three remaining childhood lead poisoning treatment clinics in the state of Massachusetts were present. The Department of Medical Assistance (Medicaid) was represented by their Early and Periodic Screening and Developmental Testing (EPSDT) coordinator. Community agencies and advocates who worked with lead poisoned children were also represented. From the MACLPPP staff, membership consisted of the director, assistant director, case management staff, the assistant director for policy and regulatory development, and the program's epidemiologist.

The last time MACLPPP convened a statewide screening committee was in 1990. Six members from the 1990 committee were represented at the 1998 committee. New to the committee were the health maintenance organizations and the private laboratory industry. A pediatrician from a large suburban practice that used the newly approved FDA office based lead analyzer LeadCare was also a participant.

A total of 5 quarterly meetings took place over the course of 15 months beginning in January 1998. Despite our efforts to arrange a best time and place to accommodate all members, we were unable to achieve 100% attendance at any one meeting. On average, the 25 members of the committee attended approximately 50% of the meetings. For members who were unable to attend a meeting, all meeting materials were mailed after the meetings.

The first meeting provided members with an historic overview of lead poisoning in Massachusetts. The assistant director for policy and regulation gave a timeline of key events from the enactment of the Massachusetts Lead Law to the latest amendments from 1993. Screening data from the last several fiscal years was presented. In addition, challenges to data surveillance were discussed.

Screening trends from 1987 to 1997 were presented by the director for case management. The correlation between age and type of housing and children's blood lead levels has been made in a number of studies, and was also reflected in MACLPPP's surveillance data. In the top 20 Massachusetts cities for elevated blood lead levels among children (i.e., high risk communities), 63% of the housing is built before 1950. About 30% of the state's housing and one-third of its population of children under six years old are located in those 20 cities. Thus, as successful as Massachusetts has been in reducing the incidence of childhood lead poisoning, the age, type and density of its housing stock require sustained lead poisoning prevention efforts in order to protect the children who must live in this housing.

According to 1995 U.S. Census estimates, Massachusetts had 446,876 children between the ages of six months and six years. In 1997, 58% of those under six were tested for lead exposure. More than 7,500 of those tested had blood lead levels of 10ug/dL or greater, for a statewide prevalence rate of 3.1%. Among the top 20 high risk communities, an average 62% of children under six were screened in 1997, and the average prevalence rate of blood lead levels of 10ug/dL or greater was 5.9%, above the 4.4% estimate in NHANES III as the national average. For two year olds in these communities, the average prevalence rate was 7.9%. The geometric mean blood lead level of Massachusetts children under the age of six was 3.8ug/dL in 1997, higher than 2.7 ug/dL geometric mean blood lead level of U.S. children found by NHANES III in 1991-1994. For children under six living in the top 20 high-risk communities, the average geometric blood lead level in 1997 was 4.4 ug/dL in 1997; for two year olds in these communities, it was 4.9ug/dL.

Also at the first meeting of the Statewide Advisory Committee, MACLPPP consultant physician Michael Shannon provided the committee with the published results of his work with LeadCare, the office based blood lead analyzer. Dr. Shannon and Nadir Rifai, Ph.D. participated in clinical trials at Children's Hospital Medical Center in Boston using LeadCare. Outcomes of their research suggested that capillary blood analyzed using this portable instrument was accurate (*Ambulatory Child Health* (1997) 3:249-254).

At the second meeting, the MACLPPP epidemiologist presented incidence, prevalence and screening data for children from birth to five years for FY 97 (table one). Data was

also presented for the top 20 high risk communities. Most blood lead elevations  $>9\text{ug/dL}$  occurred between 1 and 3 years of age.

The director for case management also introduced MACLPPP's newest outreach effort, the "10-14 ug/dL Parent Letter Campaign" during this meeting. This program reaches out to the parents of children with a BLL between 10 and 14ug/dL via a formal letter. Its purpose is three-fold. First, the letter informs the parent/legal representative this this is a "level of concern" as defined by CDC. Second the letter instructs the parent/legal representative to follow-up and return to the child's pediatrician to have a repeat venous blood lead level within 90 days. Lastly, the letter includes MACLPPP literature to further educate the parent/legal representative on the issue of lead poisoning prevention. Approximately 250 parent letters are mailed monthly.

At the third committee meeting, the MACLPPP epidemiologist presented follow-up data specifically requested by the committee. This consisted of the subsequent experience of Massachusetts children tested normal ( $\text{BLL} < 10 \text{ ug/dL}$ ) at age two (table two). Data presented was from FY96.

The screening rate for FY 96 was 74% for children between 9-48 months. A total of 39,004 children had tested normal at age one and two. Of these children 71% (27,841) were reported to have a subsequent test beyond age two. . From this subset, a total of 661 children (2.4%) went on to develop a blood lead level  $>9\text{ug/dL}$  on subsequent testing after age two. Forty of these children had blood lead levels  $>19\text{ug/dL}$ .

Also at this meeting a review of private laboratory reporting methods was presented. Next, LeadCare utilization trends in Massachusetts were analyzed. A member of the committee representing a large private physician practice summarized his experience with LeadCare and reported satisfaction with this new technology.

At the fourth meeting of the committee, the newly released Medicaid report by the Government Accounting Office was discussed. The committee member from the Massachusetts Department of Medical Assistance provided insight into the Medicaid status of the 40 children (discussed above) who had tested normal at age one and two and then went on to develop a BLL  $>19\mu\text{g}/\text{dL}$  on subsequent testing at age three. Of the forty, 50% or 21 children were known to be enrolled in Medicaid either currently or at some time in the past.

At the last meeting, MACLPPP presented data from the FY98 screening and incidence statistics. Data suggested that as a child advances in age (3&4 year olds), they are less likely to be tested regardless of where they live.

The program director then began a discussion of the current statewide screening plan. Members put forward the following proposals for change:

1. Screen 1,2, and 3 year olds.
2. Screen 1 and 2 year olds with a modified plan for 3 and 4 year olds along with a renewed emphasis on primary prevention efforts.

3. Universal screening for all children up to age 4 regardless of risk.

A ballot was mailed to all committee members. Committee consensus was to recommend to the legislature that all children (universal) would be screened for lead poisoning at ages one, two and three and targeted screening for four year olds at high risk or who resided in one of the 20 high risk communities.

### **THE PLAN IN ACTION**

MACLPPP works with state and local community development agencies and the private lending community to advocate for greater financial assistance for property owners to delead their homes. We work with the Department of Housing and Community Development (DHCD) and Massachusetts Housing to maximize the use of a \$6,000,000 annual state appropriation for lead abatement. In addition, 16% of all HUD awards go to communities in Massachusetts including Springfield, Boston, Malden, Quincy, Lowell, Somerville, Cambridge and the "High Risk Consortium" (Lawrence, Chelsea, Brockton and New Bedford). These awards total over \$50 million.

MACLPPP trains, licenses, and oversees the work of 200 to 300 private lead inspectors performing more than 12,000 inspections a year, to make sure they are providing quality services. MACLPPP staff certifies, oversees and audits private training providers, directly provides refresher-training, audits inspections, investigates complaints about inspectors, and follows up with necessary education or discipline. MACLPPP works with local boards of health and other sanitary code enforcement agencies to make sure

pre-1978 homes with children under six are inspected upon tenant requests, and the lead violations are identified in these routine housing code inspections. MACLPPP's focus on training new board of health and code enforcement staff has resulted in the training and licensing of over 290 local health inspectors providing lead determinations in approximately 132 of Massachusetts' cities and towns, including all of the communities considered "high-risk" for childhood lead poisoning.

MACLPPP also provides comprehensive secondary prevention services to children with elevated blood lead levels (EBLLs). In order to identify these children and assess the childhood lead poisoning problem, Massachusetts required universal screening of children between the ages of nine months and four years on an annual basis, with more frequent screening up to age six for children determined to be high-risk by health care providers. MACLPPP has achieved the highest screening penetration rate in the nation. In July, 2001, revised screening regulations were promulgated and now mandate annual screening of all one, two and three year olds (universal). Targeted screening is now mandated for all four year olds who reside in one of the twenty high risk communities or are otherwise determined to be at high risk.

#### **SURVEILLANCE/ DATA MANAGEMENT ACTIVITIES**

All laboratories performing blood lead screening analysis of specimens from Massachusetts children under six must report their data to the State Laboratory. This forms the basis for MACLPPP's statewide surveillance system. This system is critical for MACLPPP's assessment of the state's lead poisoning problem, prioritizing and

directing resources, evaluating program effectiveness and designing policy. MACLPPP staff use this data to perform trend analysis of high-risk communities and generate reports on the prevalence of elevated blood lead levels. Massachusetts data is also included in the CDC National Lead Surveillance system.

MACLPPP maintains seven data bases containing over 229,000 environmental records that track private lead inspections, deleading notifications, numbers of delead properties, number of properties under interim control, private inspector licensing, inspector complaints and investigations, and unauthorized deleading investigations. These databases are vital to MACLPPP's ability to monitor lead inspection and deleading activity and can be linked to the blood lead data.

MACLPPP continues to provide case management and follow-up services to children with BLLs > 14mcg/dL, serving approximately 2000 children through this system at any given time. Families of children with BLLs > 24mcg/dL routinely receive a home lead inspection by law from a licensed code enforcement lead inspector. These families also receive an educational home visit from a MACLPPP social worker, a community based family lead counselor or a visiting nurse depending on the needs of the family. Families of children with lead levels between 15-24mcg/dL are offered an inspection or lead determination by a local board of health or code enforcement inspector. These families also receive an educational home visit from a culturally sensitive family lead counselor, social worker or local visiting nurse.

MACLPPP has a strong state lead poisoning prevention statute with a primary prevention mandate. The program benefits immensely from its medical consultants, Dr. Michael Shannon, Director of Toxicology at Children's Hospital in Boston. Children's Hospital runs the largest Lead Clinic in the Commonwealth. Dr. Shannon is a member of the CDC's Lead Poisoning Prevention Advisory Committee, EPA's Children's Health Advisory Committee, Massachusetts' Governor's Advisory Committee, and has authored a number of studies on lead poisoning. Dr. Hillary Branch, Director of the Lead Clinic at Bay State Medical Center in Springfield, provides consultation to providers in western Massachusetts. Both clinicians offer vast experience with the lead poisoning problem in Massachusetts. They are available to provide expert consultation to health care providers throughout the Commonwealth on lead poisoning treatment and prevention issues, as well as to MACLPPP staff and grantees.

MACLPPP has developed a comprehensive, multi-faceted, statewide surveillance system. It provides critical support in carrying out and evaluating MACLPPP's secondary and primary prevention efforts. Environmental, blood lead screening, and case management databases provide necessary information to ensure that children with elevated blood lead levels receive appropriate and timely services. The same data systems also support MACLPPP's initiatives for primary prevention. This allows assessment of prevention efforts, inspection and abatement of housing, and monitoring all cases of lead poisoning. Additionally, health education systems serve to identify groups in need of education and to allow MACLPPP to assess outreach initiatives. In doing so, MACLPPP can monitor the success of its education and public information initiatives.

## **MEDICAL DATABASES**

Blood Lead Screening – All children residing in Massachusetts are required to have blood lead screening (universal) annually between the ages of 12 and 36 months. At 48 months, universal screening is replaced with targeted screening for children who reside in one of the 20 high risk communities as determined annually by MACLPPP. Clinicians are expected to screen any child at any time if indicated after completing the risk questionnaire. A blood lead screen is necessary for entry into kindergarten. The regulations state the only exception to the screening test is by parents who object to the test on religious grounds. Parents must put this objection and rationale in writing.

The blood lead level requisition form, completed at the clinician's office, and attached to the blood sample for analysis, is the basis for the MACLPPP screening and case management database systems. The form contains the following variables: child name, parent name, child's address, date of birth, gender and race. Providers and laboratories are required by regulation to report results to the State Lead Laboratory (SLL) within five business days. This database is used for the following: to identify a poisoned child and commence case management services, to identify a child with a "level of concern" (>9mcg/dL) and commence early intervention and counseling/educational services, to determine the incidence rate of lead poisoning annually, and to determine the statewide screening rate and identify the top 20 high-risk communities.

Reimbursement for lead screening is required by law. The Massachusetts Department of Transitional Assistance (Medicaid) requires screening and follow-up according to MACLPPP regulations and not just according to HCFA guidelines (age 1 and 2).

There are approximately 300,000 blood lead test results entered into the database annually. About 1.5 million records are available electronically. Quality assurance (QA) is ongoing and includes review of variables for completeness of information, timeliness of reporting and overall accuracy of information.

#### **CASE MANAGEMENT RECORDS**

Case management services have been ongoing since 1982, when case management began. MACLPPP nurses are responsible for coordinating the care for all children entering case management with blood lead levels  $>14\text{mcg/dL}$ . Approximately 2,000 children receive case management services annually. QA is maintained through monthly peer review under the guidance of the Director of Case Management.

#### **BLOOD LEAD ANALYSIS BY PUBLIC AND PRIVATE LABORATORIES**

Massachusetts clinicians have several options when ordering a blood lead level. They can have the sample analyzed by Massachusetts' own state laboratory, a private laboratory or in their office using the portable LeadCare instrument. Regardless of the method, all clinicians and laboratories are mandated to report lead levels within 5 business days to MACLPPP electronically unless a waiver has been issued. In the case of a poisoned child, the report must be made within three business days.

On a daily basis, all screening data reported to MACLPPP is entered electronically into the lead screening data base. From here it is distributed to the MACLPPP central and regional offices. Information is also forwarded to the Boston Childhood Lead Poisoning Prevention Program (BCLPPP). The screening surveillance data is checked daily for incomplete and missing information. Health care providers are contacted to verify and complete any missing information. Careful monitoring of laboratory reporting performance and follow-up is a continuous quality improvement exercise.

#### **DATA REPORTING AND DISSEMINATION**

Every year MACLPPP produces a report of the Annual Screening and Incidence Statistics. It is published on MACLPPP's web site and mailed out upon request to any interested party. Communities at high risk for childhood lead poisoning are identified at this time and ranked. Each high risk community is notified and given a copy of the report.

MACLPPP also provides summary and individual data in response to requests from local academic institutions, children and community advocacy groups and the general public. Data requests are mainly to support research activities by students and investigators, to complete needs assessment in grant proposals and to satisfy the general public needs.

#### **STATEWIDE PLANNING AND COLLABORATION**

MACLPPP collaborates with a numbers of partners that represent a broad range of interests including health care providers, housing agencies, lenders, real estate professionals, property owners, other government agencies and community based organizations. MACLPPP partners with the Boston Childhood Lead Poisoning Prevention Program (BCLPPP), working jointly on all aspects of lead poisoning prevention.

Another critical partner is the Division of Medical Assistance (DMA), the state Medicaid agency. Collaboration efforts have placed MACLPPP's screening requirements directly into this agency's Early, Periodic Screening and Diagnosis and Treatment (EPSDT) requirement. DMA is committed to working with MACLPPP to improve prevention efforts to its' constituents. A review of case management records shows that 55-60% of children who have elevated blood lead levels are enrolled in Medicaid. Further collaboration with data bases revealed 65% of Medicaid enrolled children had been screened for lead poisoning.

### **ENVIRONMENTAL DATABASES**

MACLPPP has established a number of environmental databases to store, analyze, and report information on sources of lead in the environment. This data is not only essential to support and evaluate the success of the case management system for lead poisoned children, but also provides us with important information regarding the successes and gaps in our primary prevention strategies. Existing databases include the following:

**Deleading Notifications** – Regulations require a ten-day written notification to be provided to MACLPPP and other affected parties prior to the commencement of any deleading activity. These notifications provide us with information regarding the address of the home, who is performing the work (licensed deleader, trained homeowner or agent), who performed the lead inspection, the expected timeframe for completion of the work, and the deleading methods to be used. Although the primary purpose of the notification is to allow occupants time to prepare for deleading, the notifications are a tool used to assess both the quantity and the quality of deleading activity (both preventive and in response to a poisoned child) within the state. For example, notifications are used to monitor deleading activity with site visits to ensure compliance with regulations and safety policies.

Deleading notifications sent by the contractor and/or homeowner to MACLPPP are reviewed for logic and for missing information; clarifications and missing data are obtained before recording an entry into the database. Currently MACLPPP receives approximately 3,000 deleading notifications per year. The deleading notification database contains 45,022 records. The structure of the database is address specific.

**Environmental Records** - Environmental activities in homes of children with BLLs > 19mcg/dL within MACLPPP's case management system are tracked through the environmental records database. MACLPPP lead inspectors submit weekly written activity reports. These are then entered into the database. Database information includes: child's name, address, inspector assigned, date of referral into case management, date of

initial home inspection, presence of lead hazards in home, dates of re-inspection, name of deleader, dates of deleading, and dates of code enforcement. Information from this database can be used for example, to get instant updates on the environmental status of open cases.

MACLPPP's senior inspector reviews the weekly reports for completeness. Deficiencies are resolved with the inspector before the data is entered. Currently, the environmental database includes 7,277 address specific records, with 4000 records added yearly. Environmental investigations handled by non-MACLPPP staff (including 7 boards of health and 3 contracted community-based agencies) are not currently in this database, and represent about 100 cases per year.

**Private Inspections** - Environmental activities conducted by the 152 licensed private inspectors in the state are stored in the private inspection database. Private inspectors are required to report inspection and compliance letters to MACLPPP for inclusion into the database. The database can be used to assess the numbers of homes inspected and the numbers of homes in compliance, on both a statewide and community basis.

Regulations and policies require that inspectional activity and compliance documents be reported to MACLPPP on a biweekly basis. Failure to fulfill notification requirements is a violation that results in an inspector complaint. Reporting requirements are discussed at all trainings required of inspectors who have not been fulfilling notification requirements.

**Inspector Complaints** - Complaints received against licensed inspectors (both private and public) are recorded in the inspector complaint database. Complaints come from the public, other inspectors, deleders or as a result of a routine audit. Currently, the inspector database contains 2,576 records, with approximately 120 new records added yearly.

**Unauthorized Deleading** - All reports of unauthorized deleading (deleading work conducted by an untrained or unlicensed person) are tracked in an unauthorized deleading database. Licensed inspectors are required to report any case where there is evidence of unauthorized deleading to a MACLPPP housing specialist for investigation. Data includes: property address, inspector's name, owner's name, occupant's name, worker's name, dates and nature of work performed, dates and results of investigation, dates and nature of response, dates and nature of code enforcement activities, and date of final compliance. Housing specialists use this database to respond to consumer inquiries regarding the compliance history of a home and to track repeat offenders and determine appropriate penalties. The address-specific unauthorized deleading database contains approximately 2000 records with 100 added yearly.

**Waivers** - MACLPPP housing specialists handle hundreds of request from property owners, inspectors, and deleaders for waivers from certain regulatory requirements annually. Waiver requests and responses are given to an administrative assistant who reviews the forms and resolves any discrepancies or obtains missing information from the housing specialist responsible for the waiver before entering the information into the log.

**Inspector Licensing** -The licensing database contains information on every person who has met at least a portion of the requirements to become licensed as a lead inspector or risk inspector in Massachusetts. Information includes: name, license number and category, home and business address, completion of classroom training, completion of field apprenticeship, fulfillment of medical requirements, fulfillment of continuing education requirements, exam scores, and any licensing actions such as renewals and suspensions.