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Public Health Nursing Case Management

The public health nurse as a member of the public health team is involved in the **prevention, detection, and case management** of lead-poisoned children. As such, she/he will be an integral participant in all of the activities and will team up with the child's physician, parents/family, environmental assessor etc., in an effort to assist with medical management

Not enough can be said regarding the importance of using a holistic team approach to managing lead-poisoned children. Often the needs of these children and families are complex and require a multi-disciplinary effort. Team members should be able to assess the abilities of the child and family as a whole in determining strengths and weaknesses in dealing with all issues related to the elevated blood lead child. In today's complex medical system, families find difficulty just "navigating" the system itself and are not always capable of overcoming obstacles to care and treatment as they present themselves. The team approach to managing lead cases requires individuals that have good assessment, communication, thinking, and problem solving skills. The nurse case manager, child, family/caregiver, child's primary care physician, health plan, nutritionist, licensed risk assessor, and other community resource agencies should come together and work as a team to achieve desired goals/outcomes. Effective usage of manpower, strong collaboration and financial resources can lead to prevention and reduction of lead poisoning, along with healthier children, and stronger, more knowledgeable/responsible families and communities.

The nurse's role is defined by the nursing profession and professional standards, which guide nursing practice.

The American Nurses' Association establishes the following nine standards for the public health nurse.

- STANDARD I. The nurse applies theoretical concepts as a basis for decisions in practice.
- STANDARD II. The nurse systematically collects data that is comprehensive and accurate.
- STANDARD III. The nurse analyzes data collected about the individual, family, and community in an effort to determine diagnoses.
- STANDARD IV. At each level of care management, the nurse develops plans that specify nursing actions unique to client needs.
- STANDARD V. The nurse, guided by the plan, intervenes to promote, maintain, or restore health, to prevent illness, and to effect rehabilitation.
- STANDARD VI. The nurse evaluates responses of the individual, family, and community as they relate to specific interventions in order to determine progress toward goal achievement and to revise the database, diagnoses, plan and goals if indicated.

STANDARD VII. The nurse participates in peer review and other means of evaluation to assure quality of nursing practice. The nurse assumes responsibility for professional development and contributes to the professional growth of others.

STANDARD VIII. The nurse collaborates with other health care providers, professionals, and community representatives in assessing, planning, implementing, and evaluating programs for community health.

STANDARD IX. The nurse contributes to theory and practice improvements in community health nursing through research.

As the professional nurse applies these standards to lead poisoning prevention activities, he/she is in a position to detect environmental hazards, (of which lead is an example) and help clients learn how to maintain a safe environment. Often the nurse administers preventive screening tests, and teaches the client and family about the changes in lifestyle that can minimize or eliminate the environmental hazard.

Lead Poisoning Screening

A complete lead screen consists of a verbal/written risk assessment, physical evaluation, and blood test(s) when required. Additionally, comprehensive screening of children for the presence of lead includes two steps: the interview assessment to determine risk status, and the blood test to determine lead level. In screening, blood is usually collected by the capillary method (*see Subsection 2.6*). Confirmation of an elevation (10 micrograms /deciliter or greater) is then done by venous collection (*see Subsection 2.7*). In some situations, however, it is appropriate to collect a venous specimen initially rather than the capillary specimen. If the Risk Assessment process indicates a definite high risk (i.e. more than one identified risk factor, such as other lead-poisoned children in the home, a lead-poisoned parent, or a known lead-contaminated environment), the health care professionals should use their judgment to determine the most appropriate collection method. *Always discuss sampling methods with the child's parent/guardian BEFORE performing the procedure. Medicaid children must have a blood test at 12 and 24 months regardless of the response to the health-screening questionnaire or at any time between 12 and 72 months of age if the child has not been previously tested for lead. DHSS recommends all children be tested at least twice in the first 24 months of life at 12 and 24 months of age regardless of payor source. See DHSS Childhood Blood Lead Testing and Follow Up Guidelines.

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Periodicity Screening Guidelines for Medicaid Eligible Children HCY Screening Guide

(DMS REVIEW)

Medical Screening Requirements for EPSDT/HCY Full Medical Screen

Missouri has adopted the American Academy of Pediatrics' (AAP) schedule for preventive pediatric health care as a minimum standard for frequency of providing full HCY screens for Medicaid eligible children and youth between the ages of birth and 21 years. The periodicity schedule for dental screens is more frequent than the AAP recommendation.

A full medical HCY Screen must include the components shown on the sample HCY Screening Tool and must be fully documented in the patient's medical record. Providers are encouraged to use the HCY Screening Guide to document the screening service provided.

When the HCY Screening Guide is used to document a full medical screening service, it is important to remember that this form is only a guide to the age appropriate activities or levels of achievement addressed during the screen. The professional judgment of the physician or nurse practitioner is always necessary for the determination of appropriate screening measures. In some instances, it is not always possible to complete all components of the full medical HCY screening service. For example, immunizations may be medically contraindicated or refused by the caregiver. The caregiver may also refuse to allow their child to have a lead blood level test performed. When the caregiver refuses immunizations or appropriate lab tests the provider should attempt to educate the caregiver with regard to the importance of these services. The HCY screening form is mandatory to be kept in the patient's file. If the caregiver continues to refuse the service, the child's medical record must document the reason the service was not provided. Documentation may include a signed statement by the caregiver that immunizations, lead blood level tests, or lab work was refused. By fully documenting in the child's medical record the reason for not providing these services, the provider may bill a full medical HCY Screening service even though all components of the full medical HCY Screening service were not provided. Only a physician or nurse practitioner may provide full medical screening.

Components of a Full HCY Medical Screen

- A comprehensive unclothed physical examination
- A comprehensive health and developmental history including assessment of both physical and mental health development
- Health education (including anticipatory guidance)
- Appropriate immunizations according to age
- Laboratory tests as indicated (appropriate according to age and health history unless medically contraindicated)
- Lead screening according to established guidelines
- Hearing screening
- Vision screening
- Dental screening

NOTE: Reimbursement for immunizations and laboratory procedures is not included in the screening fee and may be billed separately

(DMS REVIEW) PERIODICITY SCHEDULES

The HCY Program makes available to Medicaid recipients under the age of 21 a full HCY screening examination during each of the age categories in the following periodicity schedule:

Full HCY Medical Screen

Newborn (2-3) days	3 years
By one month	4 years
2-3 months	5 years
4-5 months	6-7 years
6-8 months	8-9 years
9-11 months	10-11 years
12-14 months	12-13 years
15-17 months	14-15 years
18-23 months	16-17 years
24 months	18-19 years
3 years	20 years

The periodicity schedule represents the minimum requirements for frequency of full medical screening services. Its purpose is not to limit the availability of needed treatment services between the established intervals of the periodicity schedule.

Children may be screened at any time the physician, nurse practitioner, or nurse midwife feels it is medically necessary to provide additional services. If it is medically necessary for a full medical screen (W0025XC or W0025XD) to occur more frequently than the suggested periodicity schedule, then the screen should be provided. There must, however, be documentation in the patient’s medical record that indicates the medical necessity of the additional full medical screening service.

Partial Screens

Segments of the full medical screen may be provided by different providers. The purpose of this is to increase the access to care for all children and to allow providers reimbursement for those separate screens. When expanded HCY services are accessed through a partial or interperiodic screen, it is the responsibility of the provider completing the partial or interperiodic screening service to have a referral source to refer the child for the remaining components of a full screening service.

Dental Screens

Age appropriate dental screens are available to children, from birth until they become 21 years of age, on a periodicity schedule that is different from that of the full HCY medical screen.

A child's first visit to the dentist should occur no later than 12 months of age so that the dentist can evaluate the infant's oral health, intercept potential problems such as nursing caries, and educate parents in the prevention of dental disease in their child. It is recommended that preventive dental services and oral treatment for children begin at age 6-12 months and be repeated every six months or as medically indicated.

When a child receives a full medical screen by a physician or nurse practitioner it includes an oral examination, which is not a full dental screen. A referral to a dental provider must be made where medically indicated when the child is under the age of 1 year. When the child is 1 year of age or older a

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referral must be made, at a minimum, according to the dental periodicity schedule. The physician or nurse practitioner may not bill the dental screening procedure (99429 or 99429 uc) separately.

Vision Screening Schedule

This screen can include observations for blinking, tracking, corneal light reflex, papillary response, and ocular movements. To test for visual acuity, use the Cover test for children under 3 years of age. For children over 3 years of age utilize the Snellen Vision Chart.

Hearing Screening Schedule

This screen can range from reports by parents assessments of the child’s speech development through the use of audiometry and tympanometry.

If performed, audiometry and tympanometry tests may be billed and reimbursed separately. These tests are not required to complete the hearing screen.

Immunizations

Immunizations must be provided during a full medical HCY screening unless medically contraindicated or refused by the parent or guardian of the patient. When an appropriate immunization is not provided, the patient's medical record must document why the appropriate immunization was not provided. Immunization against Inactivated Polio, Measles, Mumps, Rubella, Pertussis, Diphtheria, Tetanus, Haemophilus influenza type b, Hepatitis B, [Hepatitis A, and Influenza in selected populations] Varicella and Pneumococcal are recommended to be provided according to the most current schedule which incorporates the Advisory Committee on Immunization Practices (ACIP), American Academy of Pediatrics (AAP) and Centers for Disease Control (CDC) (www.cdc.gov) recommendations. (Immunization listing taken from the United States 2004 Schedule)

Mandatory Screening for Lead Poisoning

- All children MUST receive a blood lead level screen at 12 and 24 months.
- All children between the ages of 12 months and 72 months of age who have not received a lead screen MUST be screened at their next HCY (well child) screening regardless of the risk factor.

For all Medicaid children between 6 months and 72 months, the provider must attempt to determine at the initial visit whether or not there are risk factors present which would expose the child to lead. If there are risk factors present, the provider must perform blood lead level testing. Thereafter, the HCY Lead Screening Guide must be used at each HCY screening interval to determine that there have been no changes in the child's living arrangements or that none of the other risk factors have changed since the last screen.

[HCY Lead Screening Guide](#)

The HCY Lead Screening Guide must be used to complete the lead risk assessment component of the HCY full or partial screen for children ages six to seventy two months of age that are enrolled in the Medicaid program. It may also be used with children not enrolled in the Medicaid program. The HCY Lead Screening Guide may be ordered from GTE Data Services, P.O. Box 5600, Jefferson City, MO 65102, or by checking the appropriate item on the Claims Form/Labels Reorder Form. It may also be ordered by calling Medicaid Provider Relations at 1-800-392-0938.

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(DMS REVIEW) Case Management Activity for Managed Care Clients with an Elevated blood lead Level

For those children who are enrolled in the MC+ Managed Care Program the health plan will be responsible for provision of the lead case management services, per Medicaid Managed Care Policies.

- A. Case Management is an activity under which responsibility for locating, coordinating and monitoring necessary and appropriate services for a recipient rests with a specific individual or organization. It centers on the process of collecting information on the health needs of the child, making (and following up on) referrals as needed, maintaining a health history, and activating the examination/diagnosis/treatment “loop.”
- B. Children with blood lead levels of greater than 20 micrograms/deciliter or greater OR two confirmed blood lead levels of 15 micrograms per deciliter or greater, taken at least three months apart must receive lead case management services.
- C. A minimum of three-client/family case management encounters, all face-to-face, are mandatory.

Local health departments who want to continue to provide lead case management services must enter into agreements with the health plans. The health plans are not being required by the Department of Medical Services to contract with any particular outside entities for HCY or case management of children with elevated blood lead levels.

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Case Management/Care Coordination Actions Guidance Standards/ Medicaid Guidelines for Lead Case Management

Lead Case Management Self-Assessment Tool

All case management should be child and family centered. It should recognize the vital role that families play in ensuring the health and well being of children. Family centered care empowers families, fosters independence, supports family care giving, and decision-making. It also respects family choices, builds on family strengths and involves families in all aspects of the planning, delivery and evaluation of the health care services.

A hallmark of effective case management is ongoing communication with the caregivers and other service providers, and a cooperative approach to solving any problems that may arise during efforts to decrease the child's BLL and eliminate lead hazards in the child's environment. Case management is not simply referring a child to other service providers, contacting caregivers by telephone, or other minimal activities.

The current model of case management has eight components: client identification and outreach; individual assessment and diagnosis; service planning and resource identification; the linking of clients to needed services; service implementation and coordination; the monitoring of service delivery; advocacy; and evaluation. Once an eligible child is identified, the case manager should do the following:

- Visit the child's residence.
- Assess factors that may impact the child's BLL (including sources of lead, nutrition, access to services, family interaction, and caregiver understanding).
- Oversee the activities of the case management team.
- Develop a written plan for intervention.
- Coordinate the implementation of the plan.
- Evaluate compliance with the plan and the success of the plan. (CDC Managing Elevated Blood Lead Levels Among Young Children, March 2002)

An environmental risk assessor should also visit the child's residence, with the case manager if possible, to conduct a thorough assessment of the site and identify sources of environmental lead exposure. The case management team can then use the results of this assessment to develop a plan to protect the child and correct hazardous conditions. Although environmental services may be provided by the case manager, the environmental risk assessor, or other program staff, the case manager is responsible for ensuring that a child receives services in a timely fashion. (CDC Managing Elevated Blood Lead Levels Among Children, March 2002)

Case management should also consist of active coordination with the parents/caregivers, licensed environmental risk assessor, along with the medical provider, social worker, community resource individual etc. Assessments and home investigations are conducted to identify the source of lead, and the family's strengths and needs.

If chelation is indicated, coordination is essential with the medical provider and environmental provider. Home visits are of particular value if outpatient oral chelation is prescribed. It may be necessary to interpret physician's/ medical regime to family, monitor for compliance of medical regime and environmental recommendations, and assure that anticipatory guidance and parental education on primary prevention are provided.

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(DMS REVIEW) Medicaid Criteria for Care Coordination of Elevated Blood Levels in Children

Ongoing care coordination of Medicaid children with elevated blood levels of ≥ 20 $\mu\text{g/dL}$ OR two venous results 15 $\mu\text{g/dL}$ or greater that are at least 3 months apart should be comprehensive in nature. A home visit is recommended for all newly identified Medicaid children with levels as noted above. Child/Family case management encounters, all face to face, are mandatory per Medicaid as part of reimbursable case management. The following is from Missouri Medicaid Provider Manual.

Lead Case Management may be continued beyond the minimum of three encounters until two acceptable blood lead levels (per guidelines and/or by the attending physician) are documented

- The encounters must be at two to three month intervals, all being face-to-face
- Documentation must include validation of the blood lead level and be attached to the claim.

A minimum of 3 client/family encounters, all to be face-to-face shall be mandatory. These encounters must be at 2-3 month intervals.

- Initial visit (encounter) for admission within 2 weeks of receiving confirmatory blood lead level. (Note: The higher the blood lead level the more timely the initial visit should occur.) This visit must include client/family assessment, lead poisoning education/prevention aspects inclusive of verbal and reference materials. Client is provided the care coordinator's name and telephone number.
- Follow-up visit at 3 months following initial encounter (OR sooner if case status indicates) to assess progress of affected child/family. Review and reinforce client education and medical regime.
- Exit encounter at 6 - 7 months from initial encounter to include discharge counseling (if applicable to the case) regarding lead poisoning status, ongoing nutrition efforts and environmental maintenance.

Client record - Documentation of Service

- Admission note to include blood lead level, assessment of client/family, plan of care, and any interventions, along with short/long term goals set by the case manager, family and other team disciplines.
- Follow-up visit (2nd visit) to include lab results, client status, any interventions by care coordinator.
- Exit or discharge contact documentation to include lab results, client status, exit counseling (to include telephone number for questions and assistance).

If a lead case manager cannot be located for the child, contact the area Bureau of Special Health Care Needs (BSHCN) office closest to the child's residence.

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Delivery of Care Coordination Services

Traditionally local health departments have been the entity that provided case management services to children with elevated blood lead levels. With the initial and ongoing evolution of managed care systems, either the local health agency or the managed care entity provides case management services. Because of this factor it becomes imperative that it be clearly understood WHICH entity will be delivering case management services to the child, per contract requirements, policy etc. Good communication between the local health department and the managed care plan is key to ensuring that case management services occur in a timely manner and children do not fall between the cracks.

Reporting of Lead Case Management Activities

Systematic reporting of lead case management activities for all children with elevated blood lead levels is necessary in order to validate appropriate EBL follow up and to document ongoing lead case management efforts. This lead case management activity reporting is part of the DHSS Stellar Database designed for tracking follow up of children with elevated blood lead levels. For ease of this systematic reporting DHSS [Lead Poisoning Case Management Report](#) (E 10-12 Form) has been included in this manual for use by lead case managers. The E 10-12 form presents an opportunity for the lead case manager to document activities of lead case management in a more standardized format and maintain compliance with the 2003 case management reporting requirement noted below. Also included within this manual is an optional [Lead Case Management Self Assessment Tool](#), for use as a mechanism to help the lead case manager track the quality/completeness of lead case management services.

Lead Case Management Report E 10-12

19 CSR 20-8.030 requires the reporting of lead case management activities for children under the age of 72 months. The regulation notes that individuals providing EBL case management for a child shall provide information regarding each case to the Department of Health and Senior Services using forms (Lead Poisoning Case Management Report E 10-12).

The current language specifies that when a child becomes eligible for the initiation of case management activities according to the Childhood Blood Lead Testing and Follow Up Guidelines in the current DHSS Lead Manual, information regarding all case management events shall be reported. Per the current guidelines, lead case management is identified by the language “assure coordination of care (case management)” in part four of the Follow Up section. This terminology applies to the following blood lead levels:

Two venous tests taken at least three months apart resulting in elevations of 15 µg/dL or greater OR
A single venous blood lead level 20 µg/dL or greater.

WHO should report—Physicians, Physician Assistants, Nurses, Clinics or other Private or Public Institutions providing EBL case management.

WHAT to report—Report items on the current Lead Poisoning Case Management Report E 10-12 (dated 6/02). Please discard any forms dated prior to 6/02. Follow the instructions on the reverse of the form.

WHERE to report—DHSS or the Local Public Health Agency. The Local Public Health Agency is to forward case management information to DHSS using the DHSS forms.

WHEN to report—Case management information is to be sent to DHSS Childhood Lead Program on the final day of each month in which a lead case management activity occurred or should have occurred. Examples of activities are: initiation of lead case management services inclusive of home visits, subsequent visits, or face-to-face office visits, refusal of lead case management services, initiation and completion of chelation therapy, retest interval completion, non-completion of the retest and the outreach

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(contacts with the parents/guardian, child’s physician, follow-up home visits, etc.) or circumstances related to the non-completion, case closure, and/or significant problem-related events that may occur outside these times.

REPORT DISTRIBUTION—The white copy of the form is to be sent to DHSS, yellow is retained in the child’s lead case management file, and pink should be forwarded to the child’s physician for reference regarding lead case management activities. Record retention policies should follow current industry guidelines.

Case Management Guidance Standards

To assist with the delivery of case management services the following recommended standards will provide guidance for the case manager specific to the care of children with elevated blood lead levels.

Standard I

Children with confirmed blood lead levels 10µg/dL to 19µg/dL should receive care coordination/case management services through the Local Health Agency, HMO, or the child’s physician. The child’s primary care physician assures medical management. Parents/caregivers of EBL children with this level should receive instructions and lead poisoning educational reference materials inclusive of nutritional counseling and hygiene to improve their knowledge and care of the child within 5-7 days of receipt of the child’s laboratory results. The lead case management nurse should ensure that the instruction and educational materials provided are language, comprehension, and reading level appropriate for the parent/caregiver and document understanding/application of the instruction. Instructions should also include the following precautions:

- Wash the child’s hands frequently, especially before eating and sleeping, after playing outside or after handling possible lead contaminated objects.
- Wash objects that children put in their mouths (toys, pacifiers etc.)
- Encourage child to keep hands and objects out of his/her mouth.
- Do not use standard vacuum if you have known lead dust—it can scatter dust in the air. Instead use a vacuum that has a HEPA Filter.
- Wet mop floors using a detergent twice a week.
- Wet wash furniture and windowsills to remove lead dust.

Home visits enhance case management efforts and provide the opportunity to assess the EBL child/family within their environment. The lead case manager should take the opportunity to make a brief visual assessment of the home for possible lead hazards and instruct the parent/caregiver accordingly. Some examples of lead hazards include:

- Pre- 1978 homes may contain lead-based paint that is peeling, chipping, flaking—these are highly suspect.
- Bare yards or vacant lots without grass increase access to lead in soil.
- Renovation of property increases lead dust possibility.
- Vacant buildings, bridges, and other play areas may be sources of lead exposure.
- Upholstered furniture may hide lead dust.
- Pets that play in dirt and dust can be a lead source.
- Habit of eating things that fall on the floor can increase lead intake.
- Family practice of burning old, painted wood for heat can increase lead in the environment.

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- Calcium supplement in the form of dolomite, bone meal, and oyster shell may contain lead.
- Pipes soldered with lead are suspect.

Assessment of the EBL child/family should include the child’s birth history, current health history, family health history, developmental status, nutritional assessment, social history, and child’s habits and results documented. Post-assessment concerns should be discussed with the child’s physician and parent/caregiver. The [Nurses Lead Case Management Questionnaire](#) can assist in completing the assessments.

The following **assessment components** are recommended:

Birth History

- Mother’s health during pregnancy
- Length of pregnancy
- Type of delivery and delivery complications
- Medication taken during pregnancy
- Delivery in hospital or home
- Birth weight, post birth complications

Child’s Health History

Has the child ever had the following:

- | | | |
|---|---|--|
| • Measles | • Intestinal parasites | • German measles |
| • Urinary problems | • Whooping cough | • GI problems |
| • Allergies | • HIV | • Mumps |
| • Scarlet fever | • Seizure | • Joint or muscle pain |
| • Rheumatic fever | • Heart disease | • Tuberculosis |
| • Anemia | • Jaundice | • EENT problems |
| • Immunization status: DTaP, IPV, Hib, Hepatitis B, MMR, Varicella, Pneumococcal, (Hepatitis A and Influenza in selected populations)*per recommended schedule. | • Has the child had any other health problems within the last year? | • Has the child had any hospitalizations, accidents, or injuries? (include date and description) |

Family Health History

Has any family member ever had the following:

- | | |
|------------------------|----------------------|
| • allergies | • cardiac disease |
| • diabetes | • seizures |
| • birth defects | • mental retardation |
| • psychiatric problems | • rheumatic fever |
| • kidney disorders | • hypertension |
| • genetic disorders | • lead poisoning |

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Social History

- Number of adults in the home
- Employment of caregiver(s)
- Housekeeping related to lead exposure
- Year house was built. Indicate if own or renting. Type of plumbing.
- General condition of house (stable, deterioration, undergoing repair, good condition etc.)
- Primary caregiver of the child
- Where does child spend most of his/her time (parents or grandparents, aunts etc.)?
- Ask primary caregiver if the child is extremely active, or different in any way from other children his/her age. Does the child get along with others?

Child's Habits

- Hand-to-mouth activity
- Chews on toys, crayons, newspapers, magazines, plaster, etc.
- Chews on furniture, crib, window- sills, etc.
- Chews on shirt, or security blanket
- Plays alone or with other children
- Puts fingers in mouth
- Plays near areas of chipping, flaking, or peeling paint
- Picks at paint chips, eats paint chips
- Eats dirt, grass
- Sleep habits – where does child sleep?

Nutritional Evaluation (See [Nutritional questionnaire](#))

- Number of times per day child eats
- Foods eaten
- Where foods eaten (inside, outside, table, floor, etc.)

Venous re-test intervals per DHSS/DMS guidelines should be followed. The nurse case manager should provide assistance when indicated, in coordinating necessary referrals and follow up along with documenting results of these referrals. Assess community resources available and assist the parent/caregiver in securing use of resources based upon identified needs and availability. Ongoing collaboration with the child’s parent/caregiver, primary care physician, social worker, WIC staff, and other members of the health care team /referral agencies is recommended. Include when possible, the age appropriate child, parents/caregiver, health care individuals in the decision making process and the creation of the care plan. It is important for the lead case manager to ensure that all individuals involved in the care of the EBL child clearly understand the identified needs, interventions, and goals of the care plan. Maintaining consistent documentation of lead case management activities can be accomplished through use of the E 10-12 Lead Case Management Report.

Standard II

Children with confirmed blood lead levels 20 µg/dL or greater OR two levels 15 µg/dL or greater taken at least 3 months apart should receive case management services through the Local Health Agency, HMO, the child’s physician. Parents/caregivers of EBL children should receive instructions and lead poisoning educational reference materials inclusive of nutritional counseling and hygiene to improve their knowledge and care of the child within 5-7 days of receipt of the child’s laboratory results. The lead case management nurse should ensure that the instruction and educational materials provided are language, comprehension, and reading level appropriate and should document understanding/application of the instruction. Instructions should also include the following precautions:

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- Wash the child’s hands frequently especially before eating and sleeping, after playing outside or after handling possible lead contaminated objects.
- Wash objects that children put in their mouths (toys, pacifiers, etc.)
- Encourage the child to keep hands and objects out of his/her mouth.
- Do not use standard vacuum if you have known lead dust-it can scatter the dust in the air. Use a vacuum that has a HEPA Filter
- Wet mop floors using a detergent twice a week
- Wet wash furniture and window- sills to remove lead dust

The child’s primary care physician assures medical management. Children in this range should receive a home visit from the nurse case manager. The initial nursing visit should occur within 2 weeks of receipt of the confirmatory blood lead level. **HOWEVER** as always the higher the confirmatory level the **earlier** the initial visit should occur within the two-week period. The nurse case manager should assure that referral for environmental assessment by a licensed lead risk assessor occurs to facilitate lead hazard identification and control. The nurse case manager should use all opportunities to schedule the nursing case management home visit at the same time as the licensed lead risk assessor's visit. This facilitates collaboration and demonstrates the partnership of these disciplines in management of the EBL child along with making the visits more convenient for the parent/caregiver. Should the nursing visit occur **PRIOR** to the licensed lead risk assessor’s scheduled visit, the nurse can take the opportunity to make a brief “visual assessment” of the child’s home for possible lead hazards and initiate instruction/education. Some examples of lead hazards include:

- Pre-1978 homes may contain lead-based paint that is peeling, chipping, flaking-- these are highly suspect.
- Bare yards or vacant lots without grass increase access to lead in soil.
- Renovation of property increases lead dust possibility.
- Vacant buildings, bridges, and other play areas may be sources of lead exposure.
- Upholstered furniture may hide lead dust.
- Pets that play in dirt and dust can be a lead source.
- Habit of eating things that fall on the floor can increase lead intake.
- Family practice of burning old, painted wood for heat can increase lead in the environment.
- Calcium supplement in the form of dolomite, bone meal, and oyster shell may contain lead.
- Pipes soldered with lead are suspect.

Assessment of the EBL child/family should include the child’s birth history, current health history, family health history, developmental status, nutritional assessment, social history, and child’s habits and results documented. Post- assessment concerns should be discussed with the child’s physician and parent/caregiver. The [Nurses Lead Case Management Questionnaire](#) can assist in completing the assessment.

Please refer to the assessment components listed in Standard I.

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Standard III

Children with confirmed blood lead levels 45 µg/dL or greater should receive case management services through the Local Health Agency, HMO, or the child’s Physician, Parents/caregivers of EBL children with this level should receive instructions and lead poisoning educational reference materials inclusive of nutritional counseling and hygiene to improve their knowledge and care of the child within 48 hours of receipt of the child’s laboratory results. *Contact with the child’s primary care provider should happen immediately to determine whether the child is being chelated at home or in the hospital. It is critical that a lead hazard assessment be completed in the child’s home as quickly as possible.

The lead case management nurse should ensure that the instruction and educational materials provided are language, comprehension, and reading level appropriate and should document understanding/application of the instruction. Instruction should also include the following precautions:

- Wash the child’s hands frequently especially before eating and sleeping, after playing outside or after handling possible lead contaminated objects.
- Wash objects that children put in their mouths (toys, pacifiers, etc.)
- Encourage the child to keep hands and objects out of his/her mouth.
- Do not use standard vacuum if you have known lead dust-it can scatter the dust in the air. Instead use a vacuum that has a HEPA Filter
- Wet mop floors using a detergent twice a week
- Wet wash furniture and window- sills to remove lead dust

The child’s primary care physician assures medical management. The physician must assess the EBL child before beginning chelation therapy. Chelation therapy is medication that is capable of binding or chelating lead so as to deplete the soft and hard skeletal tissues of lead, excrete the ions of lead through the kidneys, and reduce acute toxicity. Chelation therapy is recommended for children with confirmed blood lead levels of 45 µg/dL or greater. While chelation therapy is considered a mainstay in the medical management of children with BLLs > 45 µg/dL, it should be used with caution. Primary care providers should consult with an expert in the management of lead chemotherapy prior to using chelation agents. If unaware of a center with such expertise, PCPs should contact their local or state lead poisoning prevention program, local poison control center, or the Lead Poisoning Prevention Branch at CDC (404-498-1420) for the names of accessible experts. A child with an EBL and signs or symptoms consistent with encephalopathy should be chelated in a center capable of providing appropriate intensive services!

If oral outpatient chelation therapy is undertaken, the case manager should ensure that caregivers adhere to the prescribed dosing schedule and should serve as the liaison between the medical community and the child's caregiver. Treatment should occur in a lead-safe environment (CDC Managing Elevated Blood Lead Levels Among Young Children, march 2002).

Children should be treated with the appropriate chelating agents and not returned to an environment where lead hazard exposure may continue until the hazard(s) are controlled.

Children in this range should receive lead case management, medical management and, environmental risk assessment, within 48 hours of receipt of the child’s laboratory results. Lead hazard control should occur in a very timely manner. The nurse case manager should use all opportunities to schedule the nursing case management home visit at the same time as the licensed lead risk assessor’s visit. This facilitates collaboration and demonstrates the partnership of these disciplines in management of the EBL child along with making the visits more convenient for the parent/caregiver. Should the nursing visit occur PRIOR to the

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licensed lead risk assessors scheduled visit, the nurse can take an opportunity to make a brief “visual assessment” of the child’s home for possible lead hazards and initiate instruction/education. Some examples of lead hazards include:

- Pre-1978 homes may contain lead-based paint that is peeling, chipping, flaking.
- Bare yards or vacant lots without grass increase access to lead in soil.
- Renovation of property increases lead dust possibility.
- Vacant buildings, bridges, and other play areas may be sources of lead exposure.
- Upholstered furniture may hide lead dust.
- Pets that play in dirt and dust can be a lead source.
- Habit of eating things that fall on the floor can increase lead intake.
- Family practice of burning old, painted wood for heat can increase lead in the environment.
- Calcium supplement in the form of dolomite, bone meal, and oyster shell may contain lead.
- Pipes soldered with lead are suspect.

Assessment of the EBL child/family should include the child’s birth history, current health history, family health history, developmental status, nutritional status, social history, child’s habits, and blood lead test results. Post assessment concerns should be discussed with the child’s physician and parent/caregiver. The [Nurse Lead Case Management Questionnaire](#) can assist in completing the assessment.

Please refer to the assessment components listed in Standard I.

Ongoing collaboration with the child’s parent/caregiver, primary care physician, hospital in-patient and out-patient staff, licensed lead risk assessor, social worker, WIC staff, and other members of the health care team or referral agencies is critical both during and after chelation therapy. Discharge planning remains a significant component of care coordination at this level.

Standard IV

According to CDC recommendations Chelation therapy should be initiated immediately for all children with an initial screening test result that is greater than or equal to 70 µg/dL. The EBL child must be hospitalized and medical treatment initiated. If such an elevated BLL is obtained on a fingerstick sample, the health care provider should order an immediate diagnostic test (venous blood sample) and consider initiating chelation while that test is being performed **if there is reason to believe that the results of the screening test are accurate. (e.g., if it was obtained by a skilled phlebotomist under controlled conditions- CDC November 1997-Screening Young Children for Lead Poisoning)*

Case management, medical management, licensed lead risk assessment and lead hazard control should occur as a “team” effort through the Hospital, Local Health Agency, HMO, and Primary Care Physician. For the nurse lead case manager, completion of parent/caregiver instruction/education, and necessary health assessments related to lead poisoning may depend upon the timing/urgency of admission to the hospital. As indicated parent/caregiver instruction and educational reference materials related to lead poisoning inclusive of ongoing nutritional counseling and hygiene should be provided as a collaborative effort with hospital staff during the child’s hospitalization. Assess remaining knowledge deficits and assessment needs post hospital stay and instruct and complete remaining assessments accordingly. Education and reference materials provided should be language, comprehension and reading level appropriate for the parent/caregiver and documentation of understanding/application of education should occur. Instruction should also include the following precautions:

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- Wash the child’s hands frequently especially before eating and sleeping, after playing outside or after handling possible lead contaminated objects.
- Wash objects that children put in their mouths (toys, pacifiers, etc.)
- Encourage the child to keep hands and objects out of his/her mouth.
- Do not use standard vacuum if you have known lead dust, it can scatter the dust in the air. Instead use a vacuum that has a HEPA Filter
- Wet mop floors using a detergent twice a week
- Wet wash furniture and window sills to remove lead dust
- Assessment of the EBL child/family should include the child’s birth history, current health history, family health history, developmental status, nutritional status, social history, child’s habits, and results documented. Post assessment concerns should be discussed with the child’s physician and parent/caregiver. The Nurse Lead Case Management Questionnaire can assist in completing the assessment. The following assessment components are recommended:

Assessment of the EBL child/family should include the child’s birth history, current health history, family health history, developmental status, nutritional assessment, social history, and child’s habits and results documented. Post- assessment concerns should be discussed with the child’s physician and parent/caregiver. The [Nurses Lead Case Management Questionnaire](#) can assist in completing the assessment.

Please refer to the assessment components listed in Standard I.

The nurse case manager should maintain close collaboration with hospital staff, parents/caregiver, age-appropriate child, licensed lead risk assessor, social worker, community resources, etc. both during and after hospitalization for chelation therapy. To provide assistance with completion of assessments and supportive care regarding care of the EBL child/family. When the home visit occurs, the nurse case manager should collaborate closely with the licensed lead risk assessor to become aware of identified lead hazards and recommendations to eliminate known hazards. The nurse case manager should utilize opportunities to re-enforce the lead hazard control recommendations of the licensed lead risk assessor. Should additional parent/caregiver lead hazard instruction/education be needed during nurse case manager visits, the following are examples of possible lead hazards:

- Pre-1978 homes may contain lead-based paint that is peeling, chipping, flaking-- these are highly suspect.
- Bare yards or vacant lots without grass increase access to lead in soil.
- Renovation of property increases lead dust possibility.
- Vacant buildings, bridges, and other play areas may be sources of lead exposure.
- Upholstered furniture may hide lead dust.
- Pets that play in dirt and dust can be a lead source.
- Habit of eating things that fall on the floor can increase lead intake.
- Family practice of burning old, painted wood for heat can increase lead in the environment.
- Calcium supplement in the form of dolomite, bone meal, and oyster shell may contain lead.
- Pipes soldered with lead are suspect.

Discharge planning remains a significant component of care coordination in this phase along with assisting the child/family to secure alternative housing (if indicated) and other needed community resources. It is important that all individuals involved in the care of the child clearly understand the identified needs, interventions, and goals of both the hospitalization and post-hospitalization care plans.

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Maintaining consistent documentation of lead case management activities can be accomplished through use of the E 10-12 Lead Case Management Report.

Standard V

For lead case management cases the lead case manager will provide the child's primary care physician with both verbal and written information which includes details of the child's current status, case management activities such as results of assessments, planned interventions, progress towards goals and non-compliance issues. A written summary report should be provided to the physician on a monthly or quarterly basis (more frequently if the child's status warrants or the child's physician requests, OR at an alternate frequency agreed upon by both the physician and lead case manager.

Standard VI

The nurse case manager will assess the child's home for other hazards and discuss concerns with the parents/caregiver. Include the child's primary care physician in discussions as indicated.

Standard VII

The lead case manager will assess lead case management cases for possible closure depending upon the status of the case. (See Case Closure Reasons)

*For lead case managers it remains important to remember that there are differences between closing a case in the Stellar Database OR closing a case under Medicaid or DHSS guidelines where the child continues to have an elevated blood lead level (i.e.: 10 µg/dL or greater). The lead case manager should clearly understand that **WHATEVER THE REASON, THE EBL CHILD MUST BE REFERRED OR TRANSFERRED to the care of the primary care physician, Managed Care HMO, etc. for all remaining follow up until the child's blood lead level falls below 10 µg/dL. Such referral should occur by both phone contact and letter. The child's parent/caregiver should also receive notification that the case is being referred to the child's physician for all remaining follow up. This notification process will assist in promoting continuity of follow-up of the child's elevated lead level through a clinical entity. Documentation of all referrals and notification letters becomes a part of the child's lead case management record.***

CHILD CASE REFERRAL TRANSFER AND CLOSURE REASONS

Purpose

- To facilitate and assure timely tracking, follow-up, and referral occurs for children with elevated blood lead levels (BLLs).
- To maintain an accurate, up-to-date listing of open cases of children with elevated blood lead levels that are actively receiving follow-up.
- To accurately evaluate caseloads and their activity.
- To assure that those children's cases that are being closed for any reason whereby the child continues to have an elevated blood lead level receive timely referral to the child's primary care physician for all remaining follow-up until the child's lead level falls below 10µg/dL.

The nurse case manager should review cases for possible closure from a point of view of services provided and consider closing the child's case according to the occurrences in the following table. The nurse case manager may consider closing the child's case when the following occurs:

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REASONS FOR CASE CLOSURE	
Current blood lead level (BLL) less than 10 µg/dl	
Blood lead level remains less than 15 µg/dl for at least 6 months.	<ul style="list-style-type: none"> • The blood lead level remains less than 15 µg/dl for at least six (6) months. • Lead hazards have been removed. • There are no new exposures. <p><i>Note: If utilizing this reason for case closure and child still has BLL 10 µg/dl or greater the case manager <u>must</u> refer the child to the primary care physician for all remaining follow-up until BLL falls below 10 µg/dl.</i></p>
Refusal of service	<p>Case Management is offered to the child’s family but is refused.</p> <p><i>Note: Case manager should document refusal of services in the case management record and validate by letter to the child's physician and parent that services were declined. The physician should be requested to provide case management for the EBL child. This notification should be retained in the child's case management record.</i></p>
Older than 72 months	<p>The child’s age is greater than 72 months of age.</p> <p><i>*See note at end of table regarding handling notification to medical provider.</i></p>
Moved out of area/state	<p>If the family provides advance notification that they are moving out of the area, the agency should:</p> <ul style="list-style-type: none"> • Provide the family with referral information from the case file to take with them to the new state for follow-up as needed. • Send referral information from the case file to the new state or local CLPPP, upon written consent of the parent/guardian. <p><i>Note: If the family does not provide notification regarding the move, CHECK WITH OTHER PROVIDERS (Physicians, WIC, DFS, or other provider types) for possible information regarding the new location the family has moved to.</i></p> <p><i>Phone contact with the child’s new state should occur and referral information forwarded to the child’s new State’s Department of Health Childhood Lead Program. If a blood lead lab result is reported to the child’s new state it may then be possible to determine the child’s new address, county of residence, and local health agency for ongoing follow-up.</i></p>

Note: Keep in mind, that all opportunities (* *Especially when an elevated blood lead level (10mcg/dL or Greater is present) where case closure is occurring, the nurse case manager should provide verbal and written notification of closure to the child’s physician, parent/caregiver and other disciplines involved in the care of the child to assure that all understand the nurse will no longer be following the child.

Anticipatory Guidance

Anticipatory guidance should be provided to all families regardless of blood lead levels. Anticipatory guidance helps prevent lead poisoning by educating families on ways to prevent lead exposure. This includes information to promote safe environmental and occupational practices, address the health effects of childhood lead poisoning, the risk of normal childhood hand-to-hand activity, likely sources of lead, and instruction in general measures of nutrition and hygiene for preventing lead exposure. Anticipatory guidance should be tailored to important sources and pathways of lead exposure. The following are suggested topics for anticipatory guidance. Remember, children are more at risk than adults.

What does lead do to children?

- Lead affects all body systems, but especially the brain and nervous system of fetuses and children.
- Lower IQ's and decreased cognition with low blood lead levels.
- Reading disability, along with deficits in vocabulary.
- Short attention spans.
- Disturbed fine motor coordination.

Where is lead? Lead is everywhere, but particularly in:

- Lead-based paint
- Soil and dust
- Drinking water (if lead plumbing, or kept in lead containers)
- Air
- Some occupations and hobbies
- Food
- Some folk medicines such as **Azarcon, Greta, Liga, Maria Luisa, Pay-loo-ah, Alkohl, Chuifong tokuwan etc.
- Some cosmetics such as Surma and Kohl used around the eye for either decorative or medicinal purposes

Home Visits

Home visits help to provide a method by which the nurse case manager can assess the child, and the child's all important environment. The nurse can use this opportunity to further educational efforts, interface directly with the parent/caregiver/child and other family members and to help promote the concept of prevention and family health in general.

Precautions to take:

- Wash child's hands frequently, but especially before eating, after playing outside or after handling possible lead contaminated objects, and before sleeping.
- Wash objects that children put in their mouths (toys, pacifiers etc.)
- Encourage child to keep hands and objects out of his/her mouth.
- Do not use a standard vacuum if you have known lead dust - it can scatter dust in the air. Instead use a vacuum that has a HEPA Filter.
- Wet mop floors using a detergent twice a week.
- Wet wash furniture and windowsills to remove lead dust.

Nutrition and Hygiene Measures for Preventing Lead Exposure and Absorption

The following information will assist the health care provider in providing nutritional guidance to parents/caregiver.

The child's risk to lead exposure can be reduced by:

- preparing foods safely.
- making good food choices. (i.e. high iron, calcium, vitamin C and foods low in fat.)
- adequate frequency of food intake.

Good nutrition can have a preventative effect in helping to reduce the possibility of lead poisoning. The food that the child eats, including the overall patterns of food consumption and frequency of food intake, can influence the absorption of lead from the gastrointestinal tract. Preventive measures should be consistent with the general recommendations for nutrition in health promotion. The dietary intake should be adequate in iron and calcium, as they are the two main minerals identified to reduce the absorption of lead. Children can avoid lead poisoning to a degree if they eat a diet high in iron and calcium.

The Special Supplemental Nutrition Program for Women, Infants and Children (WIC) located in the DHSS Division of Nutritional Health Services (DNHS), focuses on nutrition related issues for eligible clients. The WIC Program has the same standards for participation regardless of race, national origin, sex, age or disability. Information about the WIC Program can be accessed from the DNHS web page or call 1-800-392-8209 or by writing to the Missouri Department of Health and Senior Services, P.O. Box 570, Jefferson City MO 65102.

Food Safety

- Caregivers should wash their hands before fixing foods, pumping breast milk, or preparing formula. Children should wash their hands before eating.
- Wash all fruits and vegetables.
- If there is known lead or suspicion of lead in water or piping, run cold tap water 30 seconds before using it for washing, cooking or drinking.
- Store left over food or juices in lead-free glass, plastic, stoneware without decal-type decorations, porcelain, or stainless steel--do not store in cans or poorly glazed ceramic ware.
- Check antique dishes or family heirlooms to see if they leach lead; if in doubt, use only for decorative purposes. These can be checked with a lead check swab.
- Avoid imported canned foods.
- Do not use dishes or pottery from other countries unless you know it is lead free. Check with a lead check swab.
- Use lead-free or certified low-lead china.
- Do not use lead soldered pots, pans, or cooking utensils.
- Do not eat garden foods planted in an area of heavy air pollution.
- Teach your child to keep all non-food items out of their mouth.
- Wash off all bottles, pacifiers, toys, and food that drop on the floor before giving them back to your infant.
- Do not use supplements that contain animal bone or dolomite.

Making Good Food Choices

The food that the child eats—the overall patterns of food consumption and frequency of food intake—can influence the absorption of lead since the gastrointestinal tract is a primary absorption site. Preventive measures should be consistent with the general recommendations for nutrition in health promotion. ([See Food Pyramid.](#)) The dietary intake should be adequate in iron and calcium, as they are the two main minerals identified to reduce the absorption of lead. A child who is diagnosed with iron deficiency anemia will absorb more lead than a child with adequate iron storage. An empty stomach absorbs more lead; therefore, it is imperative that the child eats 5-6 times a day. It is better to offer the child three moderate meals with snacks in between than three large meals.

The [Food Guide Pyramid for Young Children](#) is an adaptation of the original Food Guide Pyramid designed to simplify educational messages and focus on young children's food preferences and nutritional requirements. The pyramid is a guide for two to six year olds. The [attached pyramid design](#) is credited to the U.S. Department of Agriculture.

The healthcare professional may wish to use the [Nutritional Questionnaire and Food Frequency Form](#) to evaluate the child's intake.

Foods that are high in iron or are a good source of iron:

- liver, beef, chicken, turkey, fish or pork
- chili with or without beans
- braunschweiger
- egg yolks
- main dishes made with lean red meats
- lentils, chickpeas, pinto beans, navy beans, cowpeas, black-eyed peas, great northern beans, black beans, baked beans, soybeans, kidney beans, red beans, lima beans
- cooked cereals such as: Cream of Wheat®, Malt-O-Meal®, Maypo®, oatmeal
- any iron-fortified ready-to-eat cereals such as: Raisin Bran®, Shredded Wheat®, Corn Flakes®, Cheerios®, Total®, etc.
- enriched breads and grain products, bagels, bran muffins, cooked white or brown rice
- dried fruits (raisins, dates, figs, prunes)
- spinach, greens, Swiss chard, broccoli, peas, baked potato w/skin

Tea or tannin-containing beverages interfere with the absorption of iron. Excess consumption of soda beverages interferes with iron absorption. Limit soda consumption. Do not drink tea with meals or snacks. Iron from animal sources (heme iron) is absorbed best. To enhance the absorption of non-heme iron (iron from plant foods), a good source of vitamin C in combination with that food is needed.

Foods that are a good source of vitamin C:

- oranges, grapefruit, tangerines, strawberries, cantaloupe
- orange, grapefruit, pineapple, or other vitamin C enriched juices
- tomatoes, bell peppers, greens, kale, broccoli

Foods high in calcium or are a good source of calcium:

- low fat milk and yogurt
- low fat cheese, cottage cheese, and cream cheese

Subsection 4.5 Nutrition and Hygiene Measures for Preventing Lead Exposure and Absorption

- ice milk or frozen yogurt
- foods made with low fat milk such as pudding, custard, cream soup
- greens, rhubarb
- navy beans, great northern, and baked beans
- calcium fortified orange juice

Limit Fats and Oils

Foods high in fats and oils make it easier for the body to absorb lead. Removing skins from chicken and trimming fat from meats will also help. Dietary fat should NOT be restricted in children under 2 years of age. Try to limit these foods in your child's diet:

- Butter
- Oil
- Lard
- Bacon
- Sausage
- French Fries
- Potato Chips
- Fried Foods

Ideas for snacks

- Dry Cereals
- Juice
- Cereal With Milk
- Finger Sandwiches Made With Lean Meats
- Serve Snacks With Milk
- Yogurt (low or non-fat)
- Cheese and Crackers
- Sherbert
- Whole Wheat Toast
- Bread Sticks
- Fresh or Canned Fruit
- Low Fat Cottage Cheese
- Graham Crackers

Snacks for children over two

- Peanut Butter
- Raw Vegetables
- Raisins
- String Cheese

Nutrition References and Sources

Nutritional Referral:

Local Public Health Agencies

Local WIC agencies

Local hospital dietitian

Dietitians in private practice - Check yellow pages for listing in your area or call American Dietetic Association at 1-800-877-1600 for registry of dietitians in private practice in your area. (Non-reimbursable Medicaid expense)

DHSS/DNHS web page

American Dietetic Association <http://www.eatright.org/> (Dietetic locator)

Community food sources

Food Stamps

Child and adult care food program (daycare)

Community food banks

Commodity supplemental food program

School lunch

School breakfast.

Summer food service program

Nutrition-related lead materials:

Preventing Lead Poisoning: Food Safety & Good Nutrition, DHSS

Babies Need Iron, DHSS

Anemic? DHSS

Nutrition Resources

Key Nutrients and the Basic Food Groups, DHSS

Feeding Your Baby: Birth to 4 Months, DHSS

Building Good Food Habits for Kids 1-6, DHSS

Preventing Lead Poisoning – Food Safety and Good Nutrition, DHSS

Lead In Pregnancy

Introduction:

Clinical

All women contemplating pregnancy and who are concerned about lead poisoning (past or present exposures) should inquire with either their physician or nurse midwife about being tested for lead. In the ideal situation this testing should be done before becoming pregnant, especially if the woman may have an occupation or hobby related exposure source or if a significant other's occupation or hobby may present a possible source of exposure. If the prospective mother feels there is a chance that she may have been exposed to lead then a blood test to check for lead can be performed. As is well known, lead in a pregnant woman's body does cross the placenta and enters the body of the fetus. This crossing over is thought to occur at all levels including less than 10 micrograms per deciliter.

Placental transfer of lead can begin within the first trimester of gestation and can continue throughout fetal development. Changes that occur during pregnancy can call upon the body to release stored minerals. Because the body is unable to distinguish between calcium and lead stores, lead is often released along with other minerals. Lead stored in the pregnant woman's bones can be released into the fetus' brain, bones and other organs. Unborn babies that are exposed to lead may be more likely to be born prematurely and can be of smaller birth weight. There are studies that suggest that lead exposure may be a contributing factor to miscarriage, fetuses exposed to lead can have both learning and behavior problems.

The level of concern in pregnant women has not been clearly identified. At present there is insufficient clinical knowledge or experience with any chelating regimen(s) to recommend treating pregnant women who have elevated blood lead levels. Until clinical research is conducted and results evaluated, no recommendations can be made. Regardless, it still remains important to educate the pregnant woman regarding lead poisoning inclusive of prevention strategies.

Present Exposure

A pregnant women who breathes in or swallows lead, gets it into her blood stream and passes it though the placenta (the organ that supplies oxygen and nutrients to the baby). The lead gets into the unborn baby's bones and organs including the brain.

Past Exposure

Lead enters the mothers' blood stream and some gets stored in her bones where it can remain for many years. During pregnancy, the body needs minerals stored in the bones. Lead may be released along with other minerals, and pass through the placenta into the baby's bones, organs and brain. Past exposure to lead should be a consideration in terms of a possible risk factor. This information should be communicated to the pregnant woman's physician/specialist along with discussion regarding blood lead testing.

Assessment for Lead Poisoning in Pregnant Women

Health Care providers/physicians/health care facilities, including but not limited to health departments, hospitals, clinics and health maintenance organizations that serve pregnant women, should perform a lead risk assessment of pregnant woman as part of the first prenatal visit. A questionnaire for assessing risk of lead poisoning in pregnant women has been developed by the DHSS. See [Pregnancy Questionnaire](#). The questionnaire is designed to be self administered, with the responses being reviewed by the health care provider to clarify any unknown or incomplete responses. Any positive response to the questionnaire should be considered an indication of lead poisoning risk to both the unborn child and pregnant woman. The pregnant woman should ask her physician about a blood lead test. The completed questionnaire should become a part of the woman's medical record; additionally, health care providers/facilities, health maintenance organizations, etc. identifying a pregnant woman with risk factor(s) should take the

appropriate steps to refer the pregnant woman to a licensed physician or health care provider for blood lead testing.

Pregnant women at risk should be venous blood lead tested using a lead free tan top tube. Testing can be done at the physician's office or at the local health agency. Should they object to being tested then a written statement that identifies the reason for refusing the testing should be obtained. The refusal statement should include the woman's name, date of birth, reason for refusal, date of refusal and that a copy of the written refusal will be provided to the woman's physician. The written refusal becomes a part of the woman's medical record.

Referral of Pregnant Women with EBL Levels

All health care facilities serving pregnant women, should take the appropriate steps to refer pregnant women with EBL levels (referred to in 19 CSR 20-8.110.7) for follow-up to a health care provider or physician practicing medicine in any of its branches and licensed pursuant to chapter 194 RSMo.

Follow-up of EBL Pregnant Women

For follow-up guidelines regarding pregnant women less than age 18 yrs. with elevated lead levels, it is recommended that the current DHSS/DSS Childhood Blood Lead Testing and Follow-up Guidelines be utilized to determine re-test interval frequency. For those women greater than 18 years of age, it is recommended that the Agency for Toxic Substance and Disease Registry (ATSDR) Adult Guidelines be referenced or a clinical Toxicologist be consulted regarding follow-up activities.

Blood Testing at Childbirth

Upon birth of the child, depending on the mother's blood lead elevation, the child's or placental blood may be tested for lead at birth to alert the physician to future care needs of the child.

Care of the Mother Following Childbirth

Blood testing and treatment regarding lead poisoning of the mother following birth of the child should be determined by the woman's physician utilizing current follow up guidelines.

Sources of Lead Exposure

- Paint-lead dust can be formed when lead based painted surfaces/objects rub together or are dry scraped, sanded or heated. This dust can get on things that we touch. Lead based paint may be a hazard on surfaces that get a lot of use/work such as doors, windows and sills, railing, porches, stairs, fences, etc. Lead dust from lead based paint can get into the air and settle on objects in our environment. This dust can re-enter the air when we sweep, vacuum, or walk through it.
- Water-sources such as pipes and faucets either made with lead or joined together with lead can contaminate the water we use.
- Food-food that is grown in soil that contains lead is a source of lead exposure. Lead can get into food or liquids when they are stored in stored in lead crystal, ceramic ware, or in cans with lead seams.
- Soil- sources of soil exposures include previous highway pollution from back when gasoline contained lead and the fumes settled on the nearby soil areas. Also lead from lead painted buildings that are peeling/flaking fall into the soil.
- Other sources- sources of lead exposure can include making stained glass or refinishing of furniture, pottery making, folk remedies that contain lead such as "Azarcon", "Greta", Pay-loo-ah", "Marie Luisa", "bali-goli". Mini-blinds and some cosmetics can be sources of lead exposure.

Symptoms

Many times there are NO symptoms of lead exposure, especially at low exposure levels. When symptoms are present they can include:

- Headaches
- Abdominal pain
- Changes in mood
- Anemia (low iron in the blood)
- Muscle or joint pain
- Tiredness

Ways to reduce Exposure

- Consider getting tested for lead. A physician or local health department can do testing. Blood tests can measure the amount of lead in the blood. If there is lead in the blood, steps can be taken by you to limit the exposure, help lower the amount of lead in the system, and reduce the family's exposure. Regular prenatal check ups are important to both the pregnant woman and the unborn child.
- Clean floors, window sills/frames and other suspect areas by mopping or sponge cleaning with warm water and a general all-purpose cleaner weekly. Rinse sponges and mops well after cleaning any dusty/dirty areas.
- Use a vacuum with a HEPA filter. This type of vacuum will trap lead particles, carefully empty the contents collected. Use water to moisten contents and limit the spread of dust particles.
- Eat nutritious meals that are high in folic acid, calcium and iron. Eat a good variety of foods from the five (5) food groups whenever possible.
- Hot water directly from the faucet is more likely to contain higher levels of lead if there is lead in the water or piping. Avoid making coffee, cocoa, soups or other drinks using hot tap water. Once the baby is born **AVOID USING HOT TAP WATER TO MAKE FORMULA, CEREALS, OR OTHER FOODS/DRINKS FOR THE BABY/CHILD**. Have your water tested; contact your Local Health Department for information, if you suspect a problem. Let the cold water run for at least 30 seconds before drinking it or using it in cooking.
- Foods and liquids should not be served or left in open cans with lead seams, in lead crystal or ceramic ware/pottery that could be lead glazed. Avoid drinking hot liquids out of ceramic type containers if you are not sure about the type of glazing it may have had.
- Wash hands especially after cleaning and before meals/snacks. Remove shoes before entering your home to reduce bringing lead from soil into your home.
- Be choosy about the types of hobbies you do that could expose you to lead, for example: Refinishing furniture, making leaded stained glass.
- Avoid using products that contain lead such as cosmetics and folk remedies that are not made here in the United States.
- Mini blinds that are made outside the United States may contain Lead. If you are unsure where yours were made replace them with blinds that are "Lead-Free or made without lead additives".
- Don't remove lead paint; let trained professionals remove it. If remodeling is necessary, find a temporary place to stay, until the remodeling is finished and the work area is cleaned properly.
- If you do not own your home or are renting, be sure to let your landlord know if you have painted surfaces that are chipping, peeling or worn.
- If your job has lead hazards, talk with your doctor or supervisor right away if you are pregnant or may be planning a future pregnancy. If a household member works with lead on their job, make sure the person showers and changes clothes **BEFORE** coming home. Wash work clothes separately from all other laundry. Be aware that household members can also have hobbies that involve exposure to lead.

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Subsection 4.6 Lead In Pregnancy	

Breastfeeding

The distribution of Lead in breast milk and possible health effects continues to be studied. It is not clear at present the specific health effect low-level exposure via breast milk may have on an infant. More research is required to better understand the impact on health. All breast-feeding concerns should be openly discussed with the pregnant woman’s physician (OB, or Family Practice). Prevention strategies may include behavior modification, improving nutrition; improving general knowledge regarding lead poisoning, storage of lead etc. and these strategies should be communicated to women at possible risk. At present, the general feeling is that breast-feeding should be encouraged under most circumstances. Remember to discuss breastfeeding concerns related to past or current lead exposures with the physician as part of comprehensive pre-natal care.

Testing

Women of childbearing age and pregnant women who are found to be at risk for Lead Poisoning can receive lead testing from either their doctor or local health department. All women of childbearing age and pregnant women should receive information regarding lead hazards. Nutritional counseling should also be provided. Clients can be referred to WIC if eligible. The local health department will work closely with the parent/family for blood levels taken from the vein that are 20µg/dL or greater. This also includes blood levels 15-19µg/dL that are taken at least 3 months apart.

Parental Occupational Lead Hazards

Parental Occupational Lead Hazards and How They Provide an Exposure Source for Children

Lead is a metal that is used to make ceramics, batteries, paint, plastics, some rubber products, etc. Lead gets into the body in different ways. It can enter through the lungs when inhaled or through the mouth when swallowed. Lead can be in the form of:

- Dust- sanding or removing lead based paint, cutting of lead pipes
- Fumes or Vapor- lead that is melted is usually exposed to high temperatures. During this process “fumes” are created and can be breathed in or swallowed. When steel that contains lead is welded (for example: bridge construction workers that cut/weld steel, construction workers, ship builders etc.) lead fumes can be also taken in by the body

Fine Particles- These moist particles are produced when paints containing lead are used in sprayers to paint ships, bridges, buildings, etc. It’s important to be aware of lead poisoning because lead can accumulate in your body without you ever knowing.

Parents’ jobs can expose both them and other members of the family to LEAD. Many parents are not aware of lead in the work place and can unknowingly expose children.

Occupational Sources

Some of the job related sources of lead are:

- Plumbers, pipe fitters
- Lead miners
- Auto repairer
- Radiator repair
- Printers
- Plastics manufactures
- Demolition workers
- Construction workers
- Gas station attendants
- Battery manufacturers
- Industrial machinery and equipment operators
- Brass/copper foundry
- Lead smelters and refiners
- Glass manufactures
- Shipbuilders
- Firing range instructors
- Policemen
- Steel welders and cutters
- Bridge construction workers
- Solid waste production
- Chemical and chemical preparation manufactures

Symptoms of Lead Poisoning

Some symptoms of lead poisoning can be the same symptoms as other medical illnesses or problems. It is important to see your doctor if you notice these symptoms. Know the possible warning signs.

- headache
- muscle pain
- tremors (trembling, shaking, or shivering)
- lack of appetite
- abdominal pain
- nervousness
- tiredness
- joint pain
- insomnia (unable to sleep)
- weakness
- dizziness
- metallic taste

Let your doctor and your employer know how long and to what degree your symptoms have been present. A simple blood test can let you know if your blood lead level is too high. Treating lead poisoning could mean the use of “chelating medications” that help remove/reduce the amount of lead in your blood, if your blood lead level indicates and your physician determines this is necessary.

Level of Concern

Lead in blood is measured in micrograms per deciliter. The CDC level of concern for adults is twenty-five (25) micrograms per deciliter and above.

What You Can Do To Reduce Occupational Lead Exposure

- When removing work coveralls/outer protective clothing, remove these first completely before removing your respirator.
- Avoid wiping the sleeve of your work coveralls against your face. Don't bring contaminated clothing and protective work equipment into washing or eating areas.
- Limit lead fumes by routing fumes to containment/collection systems in your work section.
- Use HEPA (high efficiency particulate air) vacuums to clean up surfaces that are exposed to lead dust.
- When you are not at work, store your protective work equipment in an area that is clean and limits contamination.
- Keep your foods/liquids out of the work area and away from contaminated clothing, other equipment etc.
- If showering/clothes changing facilities are not available at work, shower and wash your hair immediately upon arriving at home.
- Wear your protective equipment such as face protectors, respirators (must be equipped with a hepa filter), safety glasses, coveralls, helmets, gloves, shoes/shoe covers, etc. Use the right kind of equipment for the type of exposure.
- Be aware of lead hazards. Tell your supervisor if your protective equipment is in need of repair or replacement. Know how to properly use your equipment and be sure it fits correctly. Keep it clean and check filter regularly.
- Use good personal habits. Remember to try and keep hands and objects away from your mouth. Avoid touching face areas such as nose and mouth.
- Wash your face and hands with soap and water often
- Follow company rules, re: showering at work and changing clothes.
- Always use clean towels to dry your hands/body areas.
- Avoid drinking or eating while performing your work duties.
- Keep work clothes separate from your other clothing, launder clothes separately from all other family clothing.
- Have all required medical exams and lab tests. Keep all follow-up appointments and follow your doctor's treatment recommendations.
- Follow your employers company policies created to help protect your health in the work place.
- Be aware of the OSHA (Occupational Safety and Health Administration) lead standard. Know what it requires and recommends, if you are covered under this standard.

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Subsection 4.7 Parental Occupational Lead Hazards	

Prevention

Prevention is the key as a first defense against job related exposure. Employer and employee education about job related lead exposure and ways to reduce/eliminate exposure can play an important role in reducing exposure to children. Occupational/family physicians, nurses, and the licensed risk assessor along with other health care personnel, play a significant role in prevention efforts and can be excellent resources. They can assist the parent in understanding and limiting work place lead exposure, and ultimately benefit the child and the family.

Nursing Care Plans

The case manager is responsible for developing and implementing a written case management plan based on needs assessment done at visits in the child's home and other sites where the child spends significant amounts of time. The caregiver also should be involved in developing the care plan to ensure that it is realistic and meets their perceived needs. (CDC- Managing Elevated Blood Lead Levels Among Young Children- March 2002.)

The purpose of care plans is to establish a plan involving the parent/caregiver/age appropriate child/physician/ risk assessor/social worker/ etc. that will bring the child's blood lead level down to below 10 micrograms per deciliter. The care plan should be based on individualized child/family assessments. The care plan can also serve to help meet other identified needs. Results of assessments may be utilized to identify problems, interventions, outcomes and goals. Both short and long term goals should be established and measurable. Goals can be revised or extended depending on progress. Collaboration involving these individuals in the creation of the care plan and the decision making process helps to encourage ownership/participation and can be critical to the success of the plan and overall outcomes.

Refer the family to appropriate resources such as:

- Primary care provider
- Health plan
- Local health department
- Nutritionist/dietician
- Women, infant, and children's program (WIC)
- Local human services agencies
- Local education agency
- Well child clinics
- Housing agencies, i.e., HUD, homeless shelter, etc.
- Environmental agencies
- Division of Family Services

Client Outcomes

Outcomes that can be measured would include but not be limited to the following:

- The family will successfully participate in the overall process to reduce the child's elevated lead level.
- The family will be able to demonstrate improved knowledge regarding childhood lead poisoning, (pathways of ingestion, exposure sources, and health effects).
- The family will be able to describe measures to control or eliminate the lead hazard;
- The family will describe changes in their lifestyle to avoid the lead hazard.

As a result, the family will assist in maintaining a safe environment; will carry out practices that minimize the lead hazard(s). The child will have decreasing blood lead levels to WNL. The family will be able to assist in preventing future elevated blood lead levels.

Regardless of risk, all families must be given detailed lead poisoning prevention counseling as part of as part of the anticipatory guidance. Refer to subsection 4.4 for information on anticipatory guidance.

Examples of Nursing Diagnosis

For those agencies using nursing diagnosis, the following are some examples for care plans.

- Potential for lead poisoning related to (R/T) continued exposure to lead environment.
- Fear R/T knowledge deficit of the effects of lead on children.
- Optimal Nutritional status R/T age requirements and nutritional needs to prevent increased absorption of lead.
- The parent/caregiver may feel powerless to a perceived lack of control over current situation R/T health and environmental hazards.
- Potential for alteration in nutrition associated with lead poisoning by interfering with iron and calcium absorption.
- Home maintenance/management impaired R/T insufficient finances and inadequate support systems.
- Altered growth and development R/T lead in the environment.
- At risk for lead poisoning R/T knowledge deficit of sources of lead poisoning.
- Anxiety R/T knowledge deficit of prevention of childhood lead poisoning.
- Altered cognitive development R/T the effects of lead poisoning on children.
- Altered parenting R/T lack of appropriate responses to client's needs.
- Alteration in nutrition of less than body requirements for growth R/T lack of interest in food.
- Possible high risk environmental hazards R/T lack of coordinated community activities and resources.

NOTE: This list is not all-inclusive. Other nursing diagnoses may be needed or utilized to meet the demands of individual cases. The nursing care plan should flow from the diagnosis and lead to the desired outcome, or identified goals.

MISSOURI DEPARTMENT OF HEALTH AND SENIOR SERVICES CARE PLAN

CLIENT NAME (LAST, FIRST, MIDDLE)		COUNTY OF RESIDENCE	CLIENT NUMBER
DATE	DIAGNOSIS	INTERVENTIONS	OUTCOMES
mm/dd/yy	Knowledge deficits related to diagnosis of elevated blood lead level/lead poisoning	Provide parent/caregiver education regarding lead poisoning. Assist and support family in understanding instruction given.	Parent/caregiver will be knowledgeable Re: lead poisoning and assist in identifying interventions to resolve the problem within one month
mm/dd/yy	Potential for lead poisoning R/T continued exposure to lead contaminated environment and risk producing behaviors.	Perform home visits to assess behaviors. Continue instruction Re: preventive actions, and support parent/caregiver in positive actions. Collaborate with Licensed Lead Risk assessor if level indicates regarding environmental lead hazards and interventions.	Family will decrease or eliminate exposures to lead hazards in the environment within recommended time frames. Family will attempt to correct child's risk producing behaviors based upon recommendations of the case manager and licensed lead risk assessor within 1-2 months. Child will wash or have hands washed before meals, after play, before naps/bedtime etc. within 1 week.
mm/dd/yy	Knowledge deficit relates to nutrition requirements for age and for recommended nutrition needs to assist in reducing gastrointestinal absorption of lead	Assess growth and development per AAP guidelines or Periodicity Schedule. Instruct parent/caregiver Re: Nutrition related to age requirements and nutritional needs specific to the reduction/prevention of lead poisoning. Refer to WIC if indicated. Refer for nutritionist counseling if indicated.	Parent/caregiver will be knowledgeable regarding child's nutritional needs. Child will maintain adequate growth and development levels and decrease lead absorption through gastrointestinal system. Blood lead level will be <10 micrograms/deciliter.

CHELATION THERAPY

The following portions of information should be used only as preliminary information. Clinicians should NOT view this information as treatment guidance. The treating health care provider should ALWAYS reference sources such as Clinical Toxicologist experienced in chelation therapy of lead poisoned children, Physicians Desk Reference (PDR), CDC, AAP, Medical Reference Libraries etc. for recommended treatment methods, dosage, duration, precautions, and contraindications relative to use of chelating agents for childhood lead poisoning.

Chelation medications are capable of binding or chelating lead, which depletes the soft and hard (skeletal) tissues of lead thus reducing its toxicity. It should be remembered that all drugs have potential side-effects. The length of chelation is determined by the specific agent being used.

Assessment

A complete physical to evaluate all medical parameters, especially behavioral, neurological, and developmental areas of the child should occur along with identification of immunization status. Order specialty consultation as needed. Assess nutrition to validate an adequate diet inclusive of calcium, iron, Vitamin C and low fat content. Assessment of parent/caregiver knowledge regarding lead poisoning, parental/caregiver lead education and assessment of understanding of lead education should be an important part of overall management.

Range of Toxicity

Clinical effects can range from no obvious or subtle symptoms to death. Toxicity depends on the nature and duration of exposure. Lead entering the body from different sources and through different pathways presents a combined toxicological threat. Multiple low-level inputs can result in a significant aggregate exposure. Low-level exposure during early development has been linked to deficits in neurobehavioral-cognitive performance later in childhood and adolescence. These effects can be seen even in the absence of other systemic symptoms such as those listed previously.

Clinical Effects

Most lead poisoning is slow in onset and results from gradual accumulation of lead overtime however acute exposure can occur.

- Neurologic - Encephalopathy (due to an increase of intracranial pressure) is an ominous sign. Blood lead levels of ≥ 70 $\mu\text{g/dL}$ can cause coma, altered mental status, convulsions, or even death. Encephalopathy is usually associated with levels ≥ 120 $\mu\text{g/dL}$. Lower levels may be associated with developmental and behavioral neurotoxicity. Other neurological findings may include clumsiness, frank ataxia, weakness, and peripheral neuropathy (i.e. foot drop, decreased hearing acuity). Nonspecific symptoms may include fatigue, malaise, anorexia, unexplained hyperirritability, sleep disturbances, and hyperactivity.
- Gastrointestinal - Vomiting, constipation, recurrent or persistent abdominal pain (colic), or loss of appetite.
- Renal - Nephropathy, proteinuria, renal insufficiency, renal hypertension.
- Hepatic - Lead salts may cause liver injury. Rarely is liver damage seen with chronic inorganic lead exposure.

Subsection 4.9 Chelation Therapy

- Cardiovascular - Chronic exposure in an adult leads to renal hypertension and secondary cardiac effects.
- Metabolic - Vitamin D deficiency (decrease synthesis of the active metabolite 1, 25 Dihydroxy, Vitamin D3). Decreased stature or growth may be seen.
- Musculoskeletal - Lead may be deposited in bone or teeth. Lead deposition in bones interferes with normal bone metabolism of calcium resulting in opacity in the metaphyseal plate. Also, lead sulfide precipitates in the margin of the gums causing a blue-black line; this is most often present in older children and adults. This line is characteristic in that it can be rubbed off the gum to differentiate from the normal hyper pigmented lines seen in dark skinned individuals.
- Reproductive - Associated with sterility, congenital anomalies, abortion, still births and neonatal deaths in humans. A decrease in the number of sperm, abnormal sperm, or decreased mobility of sperm has also been noted.

Chelation agents

BAL (British AntiLewisite, Dimercaprol, 2,3-dimercaptopropanol)

CaNa₂EDTA (Calcium disodium edetate, Calcium disodium versenate, or CaEDTA)

α -Penicillamine (Cuprimine®, Depen-titratabs®, 3-Mercapto-D-valine)

Administration note:

Further consultation with the Regional Poison Center/toxicologist is advised. Administer with extreme caution.

Succimer (Chemet®, meso 2,3-dimercaptosuccinic acid), DMSA. Oral chelating agent.

Increasing use is noted for out-patient treatment.