

## **Chapter 3**

# **State Laboratory Procedures**

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## Chapter 3: State Laboratory Procedures

### Key Points

- The State Laboratory performs blood lead analysis free of charge for children under 6 years, refugee children 16 years or younger, and pregnant women receiving prenatal care at local health departments in North Carolina.
- The State Laboratory will not process blood lead specimens collected on patients who are not residents of North Carolina.
- NCSLPH provides special mailers for collection and shipment of samples and specimens. The mailers must be ordered through their Online Supply Ordering System.
- Hand-washing is an essential first-step to collection of capillary samples. Alcohol wipes alone will not remove lead residue from the child's hands, so skipping the handwashing step may yield an artificially elevated blood lead test result.
- Immediate shipping of specimens is recommended to ensure specimen integrity and suitability for analysis. If not shipped immediately, store in refrigerator. NCSLPH must receive the specimen within 28 days of collection.

### About Blood Lead

Childhood lead poisoning is a major, preventable environmental health problem. The persistence of lead poisoning, in light of present knowledge about the sources, pathways and prevention of lead exposure, continues to present a direct challenge to clinicians and public health authorities. As a result of industrialization, lead is common in the environment. Lead has no known physiological value and children are particularly susceptible to its toxic effects. Most poisoned children have no apparent symptoms, and consequently, many cases go undiagnosed and untreated. Lead poisoning is widespread and is not solely a problem of poor, inner city or minority children. No socioeconomic group, geographic area, racial or ethnic population is spared its effects.

Blood lead testing is encouraged as an important element of a comprehensive program to eliminate childhood lead poisoning. The goal of such testing is to identify children who need individual interventions to reduce their exposure.

No safe level of lead in a child's body has been identified. At higher levels ( $\geq 70$   $\mu\text{g}/\text{dL}$ ), lead exposure is an acute condition and can have devastating health consequences, including encephalopathy, seizures, coma and even death. New data indicate adverse effects of lead exposure in children at blood lead levels previously believed to be safe. As a result, in 2012, the Centers for Disease Control (CDC) intervention level of 10  $\mu\text{g}/\text{dL}$  was lowered to the reference value of 5  $\mu\text{g}/\text{dL}$ .

The North Carolina State Laboratory of Public Health (NCSLPH) performs blood lead analysis free of charge for the following groups:

- children under the age of 6 years,
- refugee children age 16 years or younger, and
- women receiving prenatal care at local health departments in North Carolina (details below).

The NCSLPH now performs prenatal lead testing in partnership with local public health departments in North Carolina. Prenatal care patients seen in clinics that meet the required criteria assessed using the **Lead and Pregnancy Risk Questionnaire** (DHHS 4116 E/S, found at [https://nchealthyhomes.com/files/2014/04/Lead-and-Pregnancy-Risk-Questionnaire\\_Updated-10\\_2015.pdf](https://nchealthyhomes.com/files/2014/04/Lead-and-Pregnancy-Risk-Questionnaire_Updated-10_2015.pdf)) will be eligible for this testing. *Please be advised that the required specimen type for adult lead testing is a venipuncture specimen (rather than fingerstick) collected in a lavender-top blood collection tube.* The specimen must be accompanied by a completed **Form DHHS 3707** (link provided below) and the “prenatal” box must be checked appropriately.

Since the Centers for Disease Control and Prevention does not recommend blood lead testing of *all* pregnant women in the United States, state or local public health departments should identify populations at increased risk for lead exposure and provide community specific risk factors to guide clinicians in determining the need for blood lead testing. **Routine blood lead testing of pregnant women is only recommended in clinical settings that serve populations with specific risk factors for lead exposure.** Health care providers serving lower risk communities should consider the possibility of lead exposure in individual pregnant women by evaluating risk factors for exposure as part of a comprehensive occupational, environmental, and lifestyle health risk assessment of the pregnant woman, and perform blood lead testing if a single risk factor is identified.

The newest methodologies to detect lead present in blood at lower levels include Inductively Coupled Plasma Mass Spectrometry (ICP/MS). In addition, a multi-tier approach to follow-up has been adopted with an overall goal of reducing blood lead levels.

**Attention:**

The North Carolina State Laboratory of Public Health will not process blood lead specimens collected on patients who are not residents of North Carolina.

If any serious elevations were detected, the North Carolina Childhood Lead Poisoning Prevention Program would not have any jurisdiction in another state.

## Ordering Supplies

The NCSLPH furnishes, at cost, mailers for collection and shipment of samples and specimens. These mailers are carefully selected by the Laboratory to meet U.S. Postal Service/DOT diagnostic specimen shipping and packaging regulations to minimize problems such as leakage or breakage, and to identify the type of specimen or sample through color coding. Color coding speeds up the process of sorting and routing thousands of specimens and samples received daily. The mailers are provided for shipping specimens or samples only to the State Lab.

The NCSLPH Online Supply Ordering System **must be used to order supplies**. You can access supplies by going to this website:

[https://slphreporting.ncpublichealth.com/labportal/\(S\(u0o4zrncgjitnvm5uil4y03fg\)\)/LoginForm.aspx](https://slphreporting.ncpublichealth.com/labportal/(S(u0o4zrncgjitnvm5uil4y03fg))/LoginForm.aspx)

You must have an account to access the system. To set up a new account please call (919)733-7656 or follow the instructions for setting up a new account on the website.

## Specimen Identification, Collection and Shipment

### A. DHHS form #3707

Blood Lead Analysis Form and specimen collection device kit are available from The NCSLPH website at: <https://slph.ncpublichealth.com/Forms/3707-BloodLead-201609.pdf>

It is imperative that **all** of the following information be given:

- Patient information: Last name, first name, physical address, city, state, county code and zip code
- Patient number or social security number
- Date of birth
- Medicaid number, if applicable
- Race, ethnicity and sex
- Patient status: child, refugee, prenatal and/or WIC
- Specimen Data: collection date, initial or follow-up test, microtainer or venous
- Submitter name and/or tax identification number (EIN)
- NPI number and Provider name

*Blood Lead CPT Code: 83655*  
*ICD-10 Code: Z 13.88 [Encounter screen for disorder due to exposure to contaminants]*

### **Tips on filling out Form 3707 Completely**

1. Use Social Security and Medicaid numbers.
2. County should be coded as child's county of residence, not the county in which the specimen was obtained.
3. Print or type information clearly.
4. Place labeled microtainer in a plastic bag, keeping **Form 3707** separate from specimen. Place sample and **Form 3707** into approved mailing container. Do not mail in envelopes or other mailing devices.
5. Send specimen to NCSLPH as soon as possible. If transport is delayed, refrigerate specimen. Specimen **MUST BE RECEIVED** by the NCSLPH within four weeks (28 calendar days) from date of collection.

### **B. Preparation for Collection of Finger Stick Blood Sample**

1. To remove lead residue from the skin, wash child's hands thoroughly with soap and water. Rinse well. Dry.
2. Grasp the child's hand so that the thumb of the blood drawer is across the top of the child's fingers.
3. Hold the child's hand so that the palm faces up.
4. Use child's middle or ring finger for sample collection.
5. Using an alcohol wipe, briskly scrub the child's fingertip for 20 seconds.



**\*Note that alcohol wipes alone will not remove lead residue from the child's hands, so skipping the handwashing step (#1) may yield an artificially elevated blood lead test result.\***

6. Using dry gauze, wipe scrubbed area once.
7. Use lancet to stick finger slightly left of center.
8. Use dry gauze to wipe off the first drop of blood.
9. After specimen collection, care of puncture site should be consistent with your institution's procedures.

### **C. Collection of Blood Sample**

1. Continuing to grasp the finger, touch the tip of the capillary of collection device to the beaded drop of blood. Capillary must be held continuously in a horizontal position during specimen collection to prevent air bubbles from forming in the capillary tube.
2. After 3-4 drops of blood fall from the full capillary into the microtainer, you should have enough blood (150-250µg/L).
3. Turn capillary/tube unit immediately to a vertical position to allow the blood in the capillary to flow into the tube.
4. Remove capillary with holder at the same time. Close microtainer with attached cap.
5. Agitate the specimen to mix the anticoagulant through the blood.
6. Properly label with patient's first and last name. Place in a refrigerator until specimen is shipped.

### **D. Shipment**

The NCSLPH must receive the specimen within 28 days of collection; however, immediate shipping is recommended to ensure specimen integrity and suitability for analysis. If not shipped immediately, store in refrigerator.

Place the specimen in a plastic bag with separate pouch for requisition. Place return address label on outside of container. Packaging and shipping instructions are available from the NCSLPH website at:

<https://slph.ncpublichealth.com/Forms/InstructionsforBloodLeadShipment-050317.pdf>

## **Receiving Results of Blood Lead Tests**

Specimens are usually analyzed and reported on the day received by the NCSLPH.

Online results are available from the NCSLPH website at:

[https://celr.ncpublichealth.com/index;jsessionid=uK-lab\\_hz6UgPvWJizFqVy5L33tKsVRELf7ReXUn.localhost](https://celr.ncpublichealth.com/index;jsessionid=uK-lab_hz6UgPvWJizFqVy5L33tKsVRELf7ReXUn.localhost)

Patient results for Blood Lead Testing will be accompanied by Reference Value Ranges provided by the CDC. Please note that the Provider of record and the North Carolina Childhood Lead Poisoning Prevention Program (NCCLPPP) or Adult Blood Lead Epidemiology and Surveillance (ABLES) program will be immediately notified (i.e., via telephone) of abnormally high results ( $\geq 25\mu\text{g/dL}$ ) and a hardcopy final report will be issued; all other results will be reported via hardcopy to the Provider of record.

Results are reported in micrograms per deciliter ( $\mu\text{g}/\text{dL}$ ) of whole blood. The range of results reported is  $<1\mu\text{g}/\text{dL}$  to  $>100\mu\text{g}/\text{dL}$ . Requisition forms are retained by the NCSLPH for two years plus the current year and are filed according to laboratory accession number. Occasionally, results are given as one of several "Unsatisfactory Specimen Codes." These require submission of another specimen for analysis.

For more information, about the North Carolina State Laboratory of Public Health, download *SCOPE: A Guide to Laboratory Services* at:

<https://slph.ncpublichealth.com/doc/SCOPE-090618-v2.pdf>

**Please call for any questions or concerns:**

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