



National Center for Environmental Health Division of Laboratory Sciences

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Environmental Health

LAMP: CDC's Lead and Multi-Element Proficiency Program

The Centers for Disease Control and Prevention (CDC) has been involved in preventing human exposure to lead and lead poisoning for a number of years. Over time, as an understanding of the adverse health effects of lead poisoning has grown, public health officials have recognized the need for accurate and precise blood lead measurements.

CDC began the Blood-Lead Laboratory Reference System (BLLRS) in 1990 to help laboratories ensure consistent, high-quality blood-lead measurements. Because of the success of the program, CDC expanded BLLRS in 2006 to include more elements and gave it a new name: the Lead and Multi-Element Proficiency Program, or LAMP.

LAMP is a voluntary program that focuses on assuring the quality of multi-element analyses in whole blood. At least 100 laboratories, including 30 international labs, participate in LAMP. Each quarter, these laboratories are required to analyze a set of blood samples provided by CDC and return the analyses results to CDC. CDC provides detailed reports to participating laboratories about how well they performed these analyses. LAMP results are not used for accreditation or certification; however, the program does improve the precision and accuracy of blood lead, cadmium, and mercury measurements. In the future, other inorganic toxicants, such as arsenic, selenium, and uranium, will be added to the program.

Program Details

Four times a year, CDC sends participating laboratories bovine (cow) blood samples containing known values of environmental contaminants. Laboratories use their routine analytical procedures and run the samples in duplicate on two days or two different runs and then report the results to CDC. Labs are also asked to report the limit of detection for their analytical method. Besides quality-control materials, CDC provides each laboratory with analytical guidelines, technical training, and consultation to ensure that its measurements of blood lead, cadmium, and mercury levels are both accurate and precise. CDC sends each laboratory a report of its results, and the laboratories will use the reports to

- Verify calibrations.
- Troubleshoot analytical problems.
- Set up quality-assurance or quality-control programs.
- Compare various laboratory methods.
- Conduct research and development.

CDC calculates Z-scores, which enable a laboratory to compare its results with those of other laboratories. Data are provided for all participating laboratories but laboratories are not identified by name in the report to maintain confidentiality. The samples that CDC prepares for the laboratories are prepared using Inductively Coupled Plasma–Mass Spectrometry (ICP-MS).

At the end of each year, laboratories receive a certificate with tabulated progress scores for that year.

Frequently Asked Questions

Q: Is enrolling in LAMP a long process?

A: No. When the program receives your application by e-mail or fax, your laboratory will be enrolled immediately.

Q: How much does it cost to enroll in the program?

A: There is no charge. Providing quality-assurance materials is a service that CDC provides free of charge. CDC views the program as its part in the effort to help eliminate exposure and poisoning from inorganic toxicants around the world.

Q: The fact sheet mentions a certificate. Does that mean our laboratory receives certification by participating in the program?

A: No. The certificate is merely a way for laboratories to verify their participation in the program and to track their progress made over the course of the year. Participation in this program cannot provide or authorize certification or accreditation.

Q: If you calculate progress scores, does this mean our laboratory can fail?

A: No. This is not a pass or fail program. A passing score means that a round of samples falls within two z-scores of the target values that CDC assigns. A score is calculated simply to measure a laboratory's progress. The emphasis of LAMP is not on passing or failing but on measurable and sustained progress.

Q: My laboratory was opened recently and still has many improvements to make. Can we still enroll?

A: Yes. Any laboratory can enroll. CDC supports good laboratory practice and would like to help laboratories increase the reliability of whole-blood analysis around the world. As such, we encourage all laboratories performing whole-blood analysis to enroll.

How to Enroll

1. Go to http://www.cdc.gov/labstandards/lamp_enrollment.html and complete the application form.
2. E-mail the completed form to LAMP@cdc.gov or fax it to (770) 488-4097. A confirmation e-mail will be sent within 72 hours.
3. Enrollment occurs immediately upon receipt of your form and your laboratory will receive a set of samples each February, May, August, and November.

For more information, contact

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