Evaluation and Recommendations for Preventing Lead Poisoning among the Internally Displaced Roma Population in Kosovo from the Centers for Disease Control and Prevention

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Summary

Mercy Corp, through its resettlement program (EU-MRSI & RESTART), has begun resettling Roma, Ashali, and Egyptian (RAE) families living in internally displaced persons (IDP) camps in North Mitrovica to the historic Roma neighborhood (Roma Mahola) that had been destroyed during the war with Serbia in 1999. The IDP camps were heavily contaminated with lead, and many of the children living in them were lead-poisoned. Mercy Corp is carrying out this task with the financial support of the European Commission Liaison Office to Kosovo (ECLO) and the US Agency for International Development (USAID). This is a report of the status of identification and clinical care of the children who are less than 6 years old and have been relocated. The report contains recommendations for next steps to be taken in addressing the needs of these children.

Status

- Staff members at the Family Medicine Center in South Mitrovica have received several rounds of training. These staff members are welcome to consult with US experts at the Centers for Disease Control and Prevention (CDC) and the Montefiore Lead Treatment Referral Center in New York City regarding difficult cases.

- There is a need for establishment of a regional referral laboratory at the Institute of Public Health (IPH) in Pristina. Such a laboratory **should be equipped with a new graphite furnace atomic absorption spectrophometer (GFAAS).** Pending the establishment of such a regional referral laboratory, the present IPH laboratory should become certified in blood lead testing by use of the existing GFAAS.

Background

Lead is a potent neurotoxicant. It can cause death at high blood lead levels, and at lower blood lead levels, it negatively affects neurodevelopment, IQ, and behavior. Children and fetuses are most sensitive to the adverse effects. No safe blood lead level for children has been identified. In addition, lead freely crosses the placenta, thus exposing the fetus to maternal blood lead levels. Maternal blood lead levels reflect both current exposure to lead and lead from previous exposure that is released from bone storage as the body mobilizes bones to meet fetal calcium demands.

In June 2005, reports of symptomatic lead poisoning among children in Mitrovica, Kosovo reached the US Centers for Disease Control and Prevention (CDC). CDC has been an active participant in efforts to resolve the continuing tragedy of child lead poisoning in Kosovo since 2005.

The Roma whose homes were destroyed during the war were relocated to camps on land contaminated with lead and other heavy metals near the Trepca smelter in Mitrovica. Adding to the lead exposure is the fact that the Roma engage in informal smelting of car batteries and computers.

Initial blood lead testing of children in the three IDP camps—Cesmin Lug, Kablar, and Zitkovac/Zhikoc—indicated that all children had blood lead levels (BLLs) $\geq$ 65 µg/dL, the highest value reported by the hand-held Lead Care analyzer. As a result of these high readings, in July 2005 the World Health Organization (WHO) and the United Nations International

Children's Emergency Fund (UNICEF) requested assistance from CDC. Specifically, CDC was asked to make recommendations for 1) a medical facility to identify and treat children with lead poisoning, 2) outreach and health education to the affected community, and 3) a strategy for primary prevention of childhood lead poisoning.

During a five-day visit in August 2005, CDC staff met with Roma community leaders, representatives from nongovernmental organizations (NGOs), and officials from Albania, Serbia, and United Nations agencies to discuss current and planned activities related to lead exposure and prevention of lead poisoning. The outcome of this meeting was production of a detailed plan for a treatment facility for those exposed to heavy metals, and the plan was provided to WHO and UNICEF. CDC continued to maintain contact with these agencies, providing technical assistance and support as needed through telephone calls and e-mail.

In January 2006, the Kosovo Office of UNICEF invited CDC to revisit the Mitrovica area. The main objectives of the two-week visit in January 2006 were to 1) review the status of progress on the CDC recommendations for BLL surveillance and medical treatment of children with lead poisoning; 2) assist in the efforts to assess and remediate lead hazards in the three Roma camps (Cesmin Lug, Kablar,and Zitkovac/Zhikoc); and 3) evaluate the lead hazards at the proposed new camp location at Osterode. The initial inspection of the Osterode camp determined that the camp was lead-safe. As a result, United Nations Mission in Kosovo (UNMK) requested and received US $1 million from the US Office in Pristina (USOP) to set up a medical treatment facility at the Osterode camp. CDC continued to provide technical assistance and support regarding treating lead poisoning among Roma children and preventing lead exposure.

In August 2006, two laboratorians from the WHO-sponsored Institute of Public Health (IPH) in Pristina came to the Environmental Health Laboratory at CDC's National Center for Environmental Health to be trained in the use of graphite furnace atomic absorption spectrophotometery for blood lead analysis. Since the visit of these two laboratorians, the laboratory in Pristina has participated in a quality assurance and control program at CDC. The results of CDC's Laboratory Quality Assurance testing indicate that the laboratory in Pristina meets standards for blood lead testing laboratories established in Europe and the United States.

In May 2007, as a result of continued concern about the clinical services provided by the treatment unit in Osterode camp, the US State Department, USOP, and USAID requested that CDC inspect the facility and make recommendations about future activities. Later in 2007, CDC travelled to Montenegro to work with WHO on the preparation of a manuscript describing the results of lead poisoning prevention interventions undertaken in the IDP camps (Brown et al. 2009). In 2009, CDC conducted training of medical and community health staff in Macedonia. Later that year, CDC also undertook training of outreach, nursing, and medical staff at the Family Medical Unit in South Mitrovicia and at the Osterode camp. In 2010, CDC sponsored a week-long, hands-on training session for the laboratory and clinical staff members. The training occurred in New York City at the CDC lead poisoning prevention program and the Montefiore Lead Poisoning Referral Center.

In December 2010, CDC provided support and technical assistance to clinical staff at Mercy Corp and the health center (Ambulanta) in South Mitrovicia. What follows is a description of the status of the clinical services now available and recommendations for next steps.

Relocation Efforts

In 2005 and 2006, the Danish Refugee Council and others participated in resettling over 80 families from the IDP camps in North Mitrovicia and other locations to the Roma Mahola in South Mitrovicia.

In 2010, the European Community Liaison Office (ECLO) and the US Agency for International Development (USAID) provided funding to relocate another 140 Roma families from the IDP camps Cesmin Lug and Osterode in North Mitrovica to the Roma Mahola in South Mitrovicia. In September 2010, 50 families were relocated from the Cesmin Lug/Osterode camps. At the end of September, the remaining families from Cesmin Lug were temporarily moved to Osterode, and the camp at Cesmin Lug was destroyed. Osterode was safer than than Cesmin Lug, but far from lead-free. Another 78 families with 71 children 6 years old and younger remained in the Osterode camp. A total of 38 Osterode families with 38 children 6 years old and younger were due to move to Roma Mahola on 20/12/2010. The remaining 40 Osterode families are expected to be relocated in 2011. When all families have been relocated, the Osterode facility can be destroyed (estimated July 2011).

Blood Lead Laboratory Analysis

Making the clinical diagnosis of lead poisoning can be difficult when there is no clear history of exposure. Poisoned children may be asymptomatic, and signs and symptoms, when they are present, are relatively non-specific. Blood lead level (BLL) tests are the only reliable way to diagnose lead-exposed individuals. Such tests are essential to the identification and management of lead poisoning.

Several methods are available to determine BLLs. The most common ones are graphite furnace atomic absorption spectrometry (GFAAS), anodic stripping voltametry (ASV), and inductively coupled plasma mass spectrometry (ICP-MS). In addition, a simple-to-use, portable device using ASV technology is available for performing blood lead measurements at point-of-care (Lead Care 1 and Lead Care 2). These methods differ significantly in their analytical capacities (e.g., in limits of detection, accuracy), costs (e.g., purchase and maintenance costs, infrastructure required, reagents, and laboratory supplies), and technical requirements (e.g., sample preparation, calibration, need for skilled personnel).

Currently, Lead Care 1 is used in the Roma Mahalla Ambulanta to test BLLs. However, the instrument is not working well, and the staff are awaiting receipt of Lead Care 2 technology. Such point-of-care instruments are useful for screening and follow-up of individual children. However, there is a need for more precise instrumentation like GFAAS to ensure that the two types of Lead Care instruments are reliable.

The IPH has a GFAAS, but it is old, and the company that produced it will no longer provide replacement parts or service. Moreover, in many cases, trying to maintain obsolete instruments is more expensive in the long run than purchasing new equipment. Therefore, CDC recommends

the purchase of a new GFAAS under the EU-MRSI project. A new GFAAS also would allow the IPH to become a reference laboratory for Kosovo and perhaps the region. In the meantime, the laboratory should continue with proficiency testing and become certified to conduct BLL testing by use of the existing equipment as quickly as possible.

Blood Lead Screening

By December 2010, 45 children had participated in capillary blood lead testing for lead poisoning conducted at the Ambulanta in Roma Mahola. The parents of another 12 children from 8 families have declined testing. The BLLs were analyzed by use of the point-of-care instrument Lead Care 1.

Of the 45 children tested by the use of Lead Care 1, 7 (16%) have BLLs ≥ 45 µg/dL, the level at which CDC recommends chelation therapy; another 22 (49%) have BLLs 20–44 µg/dL; 11 (24%) have BLLs 10–19 µg/dL; and 5(11%) children have BLLs < 10 µg/dL.

Three of the 7 children who are potential candidates for chelation therapy had venous BLLs drawn in December by a nurse with special training and experience in pediatric phlebotomy. This nurse will remain on-call to Ambulanta staff as children who need venous testing present themselves for care.

However, the blood of the 3 children has not been analyzed because the Lead Care 1 instrument in the Ambulanta stopped working in December and the purchased Lead Care II instrument has not been received. If venous BLLs confirm the capillary test, the children will be treated in the Ambulanta. Follow-up efforts for the other 4 children have been unsuccessful; the families of 3 of these 4 children were not home when Mercy Corp and CDC staff conducted home visits, and the other child's parents declined venous testing but will return to the Ambulanta for a capillary test.

The 22 children with BLLs 20–44 µg/dL should be retested in 1 month, and if their blood lead levels are confirmed by venous testing, the children should be given a multi-vitamin every day. We have tentatively scheduled the testing for 10/1/2011 to allow for family notification and to accommodate the holiday schedule. A follow-up date of 17/1/2011 has been scheduled for children who fail to present on 10/1.

The 11 children with BLLs 10–19 µg/dL should be re-tested in 3 months. If these levels are confirmed by venous testing, the children should be given a multi-vitamin every day. We have tentatively scheduled the testing for 7/3/2010, with a follow-up date of 14/3/2010 tentatively scheduled for children who fail to present on 7/3.

All children whose BLLs are increasing, as determined by the re-testing, should receive home visits to evaluate whether lead sources remain in their current environment. Such a review of the children's environment should include consideration of parental occupation and the possible role of consumer products—for example, parental metal working and recycling and use of traditional remedies or teas and other consumer products.

Treatment

The medical and nursing staff at the Main Family Medicine Center Mitrovicia, Kosovo and the Amulanta in Roma Mahalla have received extensive training in the use of the oral chelation agent Succimer, following the WHO protocol of two doses a day for 28 days. This protocol has also been reviewed and approved in November 2010 by the Kosovo Ministry of Health.

Chelation should begin for the 7 potential candidates as soon as their blood lead levels are confirmed by venous blood lead testing. We agreed that the Ambulanta nurses could provide the first dose of Succimer in the morning, and if necessary, distribute the multi-vitamin in the afternoon. Using the health facilitators who live in Roma Mahalla to distribute the evening dose of Succimer is under consideration. However, in most cases, parents could probably administer the dose.

Children who are being chelated should have BLLs, urinalysis, and kidney and liver function tests on Days 7 and 28 of treatment. They should have blood lead testing 2 weeks and 1 month after discontinuation of chelation therapy. These tests could be scheduled when other BLL testing is being conducted.

It is very important that the lead poisoning treatment team, the Mercy Corp medical and nursing staff, the Family Medicine medical and nursing staff, and the health facilitators meet at least every two weeks to review the status of all the cases under care and to plan future screening outreach and health education activities.

Outreach and Public Education

There have been many complaints that families 1) did not receive the results of the blood lead tests of their children and 2) do not know what to expect if their child requires chelation therapy. In order to address these issues, we agreed that staff of Mercy Corp and the Ministry of Health will schedule meeting invitations for families whose children have BLLs 10–44 µg/dL. At such meetings, staff will explain a child's test result and the need for re-testing on the dates tentatively scheduled. In addition, the health educator will develop an education module that explains the treatment protocol in general terms and incorporate it in his education program.

It is also very important that Rome Mahalla health facilitators and the Mercy Corp staff conduct home visits to encourage families to have their children tested. Such visits are particularly important in the cases of children who fail to present for screening or follow-up tests. The visits will help to identify barriers to testing.

Surveillance

Three separate line lists currently exist of children less than 6 years old and living in Roma Mahalla. The first, DRC/NCA children, consists of those children who were resettled in 2005 and 2006. The second, RESTART, consists of those children who are being resettled under the Mercy Corp RESTART program. The third list, EU-MRSI, contains the names of those children who will be resettled under the EU project in 2010 and 2011. It is very important that these lists be integrated so that there can be a full accounting of all children relocated to Roma Mahalla. Integration of the three lists can help ensure that all these children have been tested for lead and

that all their BLLs are recorded. This line listing can serve as the basis of future analyses of the children's lead levels over time.

CDC provided a database program. With Shqipe Agushi's (Mercy Corps) assistance, CDC will provide another version of the database, with data fields and a help file, in Albanian. All children and their test results should be entered into this second database to help the staff better keep track of the children and their test results and to allow for analyses. The database is also designed to collect data about chelation therapy and other treatments for children for whom such treatments are necessary.

Reports/Data Management

The database program can provide reports of blood lead levels by age, gender, and date of test. In addition, the data file can easily be uploaded into SAS or another commercial statistical program. In the future, Mercy Corps and others may wish to run reports that compare the BLLs of children one year after resettlement with their previous BLLs at the time of resettlement, or Mercy Corps can compare the BLLs of children born in Roma Mahalla with those of children who were relocated. The program can also accommodate description of the BLLs of children who received chelation therapy.

Medical records for those children who were treated while living in the IDP camps are now in the possession of Mercy Corp. These records should also be entered into the database at some point.

Osterode

Perhaps the most important step to take now to break the cycle of lead poisoning is to make Osterode eventually uninhabitable. Osterode, though safer than any of the other camps, still was found to have soil that contained unacceptable levels of lead. As families are relocated, the containers in which many of them are now living should be moved off the facility. Unfortunately, merely sealing these containers may not make them inaccessible. They could be inhabited again if many Roma are repatriated from the countries where they fled during the war and become homeless in the process. It is also important that Mercy Corps receive back-up in the form of security to ensure that new families do not take the place of those relocated and thereby continue this terrible tragedy of lead poisoning among the children.

Roma Housing in Roma Mahalla

The housing in Roma Mahalla is new, and multiple soil testing projects have demonstrated that soil lead levels are below UN and US Environmental Protection Agency standards for the safe maximum of lead in soil. Unless lead is introduced from outside Roma Mahalla, it is very unlikely that the children living there will continue to experience high BLLs.

Most the housing in Roma Mahalla is in excellent condition. However, some houses built under RESTART have mold. Mold exposure has been demonstrated by numerous studies to trigger asthma attacks in individuals who are sensitive to mold. Therefore, the existing mold needs to be cleaned up by use of a mixture of bleach and water, with necessary repairs made so that the affected houses will not be vulnerable to mold growth.

Continued Support

CDC will continue to support Mercy Corps and others as needed to address the lead poisoning issue. However, at this point the work is well under way, and I am confident that it will be successful, given the commitment, energy, and knowledge demonstrated by the Mercy Corp and Family Medicine center staff.

References

1. Brown MJ, McWeeney G, Kim R, Tahirukaj A, Bulat P, Syla S, et al. Lead Poisoning Among Internally Displaced Roma, Ashkali, and Egyptian Children in the United Nations-Administered Province of Kosovo. European Journal of Public Health 2010;20:288–292.