

**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:

Lead exposure is a continuing urgent health problem for Roma in Kosovo. The Centers for Disease Control and Prevention (CDC), the World Health Organization (WHO) and the United Nations International Children's Emergency Fund (UNICEF) have collaborated in blood lead surveillance of the Roma children living in displacement camps in Kosovo. In the last 3 rounds of blood lead testing, conducted between 2005 and 2007, on average, 30% of children tested had capillary blood lead levels $> 45 \mu\text{g/dL}$, the level at which CDC recommends chelation therapy. Few if any children in the camps have maintained a blood lead level $< 10 \mu\text{g/dL}$ for their entire childhood. These children are at tremendous risk for a lifetime of developmental and behavioral disabilities and other adverse health conditions.

The Cesmin Lug camp is the most highly contaminated camp and should be closed immediately. The situation in Cesmin Lug is made more critical because Roma living in Serbia and Montenegro are now moving into vacant dwellings in the camp. Dwellings that are currently vacant should be demolished immediately. These dwellings are not only contaminated by lead but a clear and present fire hazard.

In addition, uncontrolled informal smelting at the now closed Kablar camp must be stopped. These activities result in lead exposure to children in both Cesmin Lug and Osterode Camps.

Lack of data has hampered decision making and resulted in confusion on the part of Roma and others as to the seriousness of the problem and the extent of the environmental contamination. A periodic, systematic review of the data would provide important information about the quality of the children's clinical care. Reportedly 39 children have been chelated. Perhaps as many as 90 children are candidates for therapy. The actual number cannot be determined at this time.

Lead exposure should be a priority for repatriation to the Roma Mahala. Plans should be developed for continued medical surveillance of these children when they are repatriated to Roma Mahala.

Background:

Kosovo is a Province within the borders of the former Yugoslavia that is currently controlled by the United Nations (UN). This territory has experienced multiple infrastructure, economic, human rights, and public health problems as a result of the conflicts in the Balkans. International aid has been focused on maintaining peace and establishing basic services. However, economic development has recently become a priority for the UN Mission in Kosovo (UNMIK), the United States Office in Pristina (USOP) and USAID.

The Trepca mining and smelting complex, established in the 1930s, constituted the biggest mining company in Europe. The Trepca smelter in Mitrovica extracted metals including zinc, arsenic, lead, and cadmium from the products of nearby mines. Trepca

operations have been an important part of the Mitrovica economy in the past, providing employment in both the smelter and the mines to people in the region, but the UN halted operations in 2000 after UN peace keeper forces in the area were discovered to have high blood lead levels (BLLs).

Work is underway to reopen the Trepca smelter and mining compound in North Mitrovica. Currently (2007) about 3000 people are employed in the facility. The Trepca board of directors has requested funding from a donor nation to purchase a briquetting machine to increase production in the secondary smelting operation. This fall the World Bank intends to begin discussions about reopening the Treca complex, potentially enabling many people to gain employment.

Although the smelter has been closed since 2000, the environment remains heavily contaminated. Three mine tailing dams (2 unremediated and 1 remediated) are located in northern Mitrovica and the nearby town of Zvecan/ Zhikoc. Results from soil samples taken by staff of the World Health Organization (WHO) in 2004 as part of a health risk assessment for heavy metals in Mitrovica and Zvecan showed that more than 90% of the samples exceeded the UK limits for lead (450 mg/Kg), with many samples having levels more than 10 times higher than the limit; more than 40% exceeded the limit for arsenic levels; and almost 30% exceeded the limit for cadmium levels. Both the northern and southern areas of Mitrovica are contaminated by lead. However, the results of both environmental testing and blood testing indicate that Mitrovica is more contaminated north of the river where the Trepca smelter is located. The results of tests on drinking water show that generally drinking water quality appears to be acceptable.

Testing conducted by WHO in the general Mitrovica area in 2004 found that BLLs in the general population had fallen; however, BLLs remained dangerously high in the Roma, Ashkali, and Egyptian (RAE) communities. The RAE, also referred to collectively as "Roma," have lived in Mitrovica for many years. Before the Balkan conflict (1990-1999) they lived in a southern Mitrovica neighborhood known as Roma Mahala. In the immediate period following the 1999 Kosovo conflict, Roma Mahala was destroyed. The Office of the United Nations High Commissioner for Refugees (UNHCR) constructed two internal displacement (IDP) camps as a temporary housing solution for the Roma who were left homeless. A third unofficial camp, Kablar, was developed after the occupation of French KFOR barracks in 2001. Unfortunately, the camps were established in highly lead-contaminated areas in northern Mitrovica and Zvecan/ Zhikoc. The camps are located within 3 kilometers of the Trepca smelter and within 300 meters of two mine tailing sites.

In June 2005, reports of symptomatic lead poisoning among children in Mitrovica, Kosovo, reached the Centers for Disease Control and Prevention (CDC). The children most affected by the lead contamination in Mitrovica are the Roma whose homes were destroyed during the war and who have been relocated to camps on land contaminated with lead and other heavy metals near the Trepca smelter in Mitrovica. In addition, the Roma engage in informal smelting of car batteries and computers. Initial blood lead testing of children in the 3 IDP camps Cesmin Lug, Kablar and Zitkovac/Zhikoc

indicated that all children had blood lead levels (BLLs) ≥ 65 $\mu\text{g/dL}$, the highest value reported out using the hand held LeadCare analyzer. As a result, 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 requested 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 5-day visit in August 2005, CDC staff met with Roma community leaders, representatives from nongovernmental organizations (NGOs), and officials from United Nations agencies to discuss current and planned activities related to lead exposure and prevention of lead poisoning. A detailed plan for a heavy metals treatment facility 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 email.

In January 2006, the Kosovo Office of UNICEF invited CDC to revisit the Mitrovica area. The main objectives of the 2-week visit in January 2006 were 1) to 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 inspection of Osterode camp determined that the camp was lead safe. As a result, UNMK requested and received \$US 1 million from USOP to set up a medical treatment facility at Osterode camp. CDC continued to provide technical assistance and support regarding treating lead poisoning among Roma children and prevention of lead exposure.

In August 2006, 2 laboratorians from the WHO-sponsored Public Health Institute in Pristina came to the environmental laboratory at CDC to be trained in the use of graphite furnace atomic absorption spectrophotometry for blood lead analysis. Since their visit the laboratory in Pristina has participated in a quality assurance and control program at CDC. The results of the proficiency 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. What follows are the assessment of the IDP camps, the lead treatment center and ancillary services as well as recommendations for future activities to prevent childhood lead poisoning among the Roma. The visit was conducted by Dr. Mary Jean Brown Chief, Lead Poisoning Prevention Branch CDC and Mr. Barry Brooks Acting Team Lead, Lead Poisoning Prevention Branch CDC.

2007 Assessment:

Lead Contamination of the Sites:

Cesmin Lug: This camp has at least 4 sources of lead exposure for children.

1) The camp is downwind of lead mine tailings, raising ambient soil and air lead levels.

2) There is evidence of informal lead smelting activity in the camp. Informal smelting is a cottage industry for the Roma. Ingots are collected by a local businessman in a building within easy walking distance of the camp. Currently Roma receive 30-40 cents per kilo of lead. Collection and distribution of the product is sophisticated and involves large corporations. According to the Trepca mine directors, the lead produced by the Roma finds its way to the world market. Burn areas in the camp adjacent to the houses are undoubtedly heavily contaminated. Children play in these areas, and the dust is walked into the house by children and adults, particularly those who don't wear shoes.

3) Many of the doors and window frames are painted with lead paint, and they are peeling profusely.

4) There is evidence of recent informal lead smelting in the old Kablar camp which is adjacent to Cesmin Lug. The education activities conducted by trained health education workers (facilitators) in the camps are undoubtedly responsible for moving the informal smelting activity from Cesmin Lug to Kablar. Nonetheless, the smoke and dust from lead smelting can be carried home by the individuals who are engaging in it and contaminate the home environment.

Osterode: This camp has at least 2 sources of lead exposure for children.

1) The camp is downwind of lead mine tailings, raising ambient soil and air lead levels.

2) Individuals in Osterode may also be engaged in the informal lead smelting in the old Kablar camp. The smoke and dust from these activities can be carried home by the individuals who are engaging in them and contaminate the home environment. However, in 2006 the site was inspected by Mr. Brooks, a licensed lead inspector from CDC. The site was found to be lead-safe. Recommendations for maintaining lead safety— including washing down paved surfaces every day—are in place and were visible during the visit in June 2007. In addition, families in Osterode are visited by health educators (facilitators) who reinforce the need for families to implement measures to decrease lead contamination including removal of shoes when entering the house and good hygiene. These activities were also in evidence during the June 2007 site visit.

Roma Mahala: There is no obvious source of lead exposure in the Mahala. The Trepca directors informed CDC that in the past the Mahala was perhaps the least contaminated area in Mitrovica. Although in the past there were reports that informal smelting was also occurring in the Mahala near the river, the onsite police and the headman deny this. The policeman could describe what to look for to identify a smelting site, i.e. burn areas and discarded battery casings.

Population:

Most Roma camp residents are younger than 30 years of age. They appear in general good health, although oral health is quite a problem. The average age of first birth is about 15 years old for girls. The infants are well nourished and active. However, several toddlers appeared pale and listless. There was one report of a child with a seizure

disorder and several complaints of back aches and shortness of breath among the few elderly people we talked to.

A total of about 395 people live in Osterode and 134 in Cesman Lug (NCA census 4/3/07). At least at this time, 30 percent of the total number of residents of Osterode and Cesmin Lug camp do not have a right to return to the Mahala, because they did not live there in 1999. A total of 80 people are considered 'illegal' because they are not former residents of the lead-contaminated camps (Kablar, Cesmin Lug or Zitkovack Camps). Of these 80, 5 families (24 people) that cannot return to the Mahala live in Cesmin Lug. These include Roma families from Serbia and Montenegro that are reportedly moving into Cesmin Lug. It seems likely that at least 2 families have recently moved into Cesmin Lug from outside Kosovo, but this needs to be verified.

Blood Lead Surveillance Program:

There are 300 children younger than 14 years old living in both camps; approximately 70 in Cesmin Lug (NCA census 4/3/07) and 230 in Osterode (214 by latest NCA census of 4/3/07). Both WHO and the clinic medical director estimated that 95% of these children have had at least one BLL test. The BLL data have been reported to parents but have not been formally released by WHO because interpretation of these data is difficult due to non-standardized collection, relocation of families among the camps and to the Mahala and selection bias.

The clinic medical director, WHO, and a cursory review of the clinic records by CDC's Dr. Brown, showed that 3 rounds of blood lead surveillance of about 100 children each were conducted recently: in Fall 2005, January 15-26, 2007, and June 4-8, 2007. Approximately 39 children in the first round, 32 children in the second round, and 29 children in the third round had capillary BLLs > 45 µg/dL. Attempts are made to collect venous BLLs during the surveillance screening; however, not all children will submit to the test. These children are recalled if necessary. All blood lead analysis is done at the Institute of Public Health in North Mitrovica, where capillary samples are analyzed using the hand held Lead Care analyzer. It is not clear what method is used for the venous confirmation. However, the Institute plans to purchase a graphite furnace atomic absorption spectrophotometer.

Lead Clinic:

The clinic medical director in Osterode is following CDC recommendations for treatment; treating children with venous blood lead levels (BLLs) >45µg/dL with DMSA 200 mg/twice a day. He has modified the protocol slightly and is also treating children with first capillary BLLs >45µg/dL and follow up venous BLLs >35 µg/dL and ZPP > 40 µg/dL, because he has found that venous samples from the Public Health Institute in North Mitrovicia tend to be lower than those from the CDC quality assurance program or the capillary samples. The causes of this bias are unclear but may relate both to the instrumentation used in the laboratory at the Public Health Institute and the expected difference between venous and capillary BLL.

Follow up of children was hampered by a 2-month-long job action by the physicians. This also hampered repeat testing of those children from the second round of surveillance testing. Children with elevated capillary tests in January, 2007 had repeat BLLs the first week of June according to the medical director. Of the 31/2 who required testing 15 have been repeated, 7 have moved to the Mahala and 9) have refused the test. Discrepancies in record keeping and movement within and into the camps makes a full accounting difficult, thus the reported number of individuals does not sum to the total. We were unable to determine the status of confirmatory testing for the 29 children tested during the third round of surveillance testing,. The medical director seemed unaware of this last round of surveillance testing; however, the records are in the clinic.

Ancillary Services:

An early childhood education center provides PATCH education support to 10 children less than 6 years old whose BLLs are currently elevated, although if other children stop by they are not turned away. One child receives in-home education under this program.

A nutritional survey on the Roma children less than 6 years old was conducted by WHO and identified malnutrition. Food packages are delivered to each family in both camps. Distribution occurs at Osterode camp. Families at Cesmin Lug come to Osterode to pick up the food. There are reports that families who live in the Mahala but who maintain a residence at one of the camps also may be receiving the supplemental food packages. The purpose of the food distribution is to reduce lead absorption among children by ensuring adequate iron, calcium and zinc intake. Although prevention of micro-nutrient deficiencies is essential for growth and overall good health, few data exist to support a supplemental food program to treat or prevent lead poisoning.

Many Roma told us how important the food supplements were to them, and in the Mahala, families that no longer received the food supplements complained bitterly. However, the amount of snack food wrappers and other food-related litter in the camps indicate the families may have other sources of food available. Camp administrators feel that food distribution has lead to a 'culture of dependency' with the result that the Roma are not employed, have not been integrated in to the wider Mitrovica society and are reluctant to relocate to the Roma Mahala where food packages are available only for the first month of residence.

Recommendations:

- 1. Close Cesmin Lug and relocate families to Osterode.** In 2005 and again in 2006, CDC recommended that the 3 Roma IDP camps be closed as soon as possible. This has happened in 2 camps. The Osterode site was inspected by CDC's Mr. Brooks in 2006 and found to be lead-safe. Osterode contains sufficient space for all families living in Cesmin Lug. Reports that new families are moving into Cesmin Lug make its closure more critical.
 - 1.1. There is a consensus among the agencies involved with the camps that sequential removal of services is warranted if families are not willing to relocate

voluntarily. **Agencies Responsible:** Norwegian Church Agency (NCA), UNMIK

- 1.2. Residence at Osterode should be a requirement for moving into the Mahala. **Agencies Responsible:** Organization for Security and Cooperation in Europe (OSCE), UNMIK
 - 1.3. All agencies should provide the same information regarding moving to Osterode, timetable for sequential removal of services, and details of relocation to the Mahala. **Agencies Responsible:** NCA, WHO, UNMIK, USOP, UNICEF
 - 1.4. Currently vacated residences should be torn down immediately to prevent new families from moving in. These residences are not only lead-contaminated but are a clear and present fire hazard. **Agencies Responsible:** NCA, UNMIK
 - 1.5. As additional residences are vacated, these must also be torn down immediately to prevent new families from moving in. **Agencies Responsible:** NCA, UNMIK
 - 1.6. Osterode camp should be used as a staging area for the Roma Mahala.
 - 1.7. Funding should be continued in order to provide security, educational services, and water to the camp residents. **Agencies Responsible:** NCA, UNMIK, Donor Nations
 - 1.8. Status of Roma who are not eligible for repatriation needs to be determined. **Agencies Responsible:** UNMIK
- 2. Identify a donor to fund construction of 1 apartment building in Roma Mahala.** Currently lead poisoning/exposure is not among the priorities for families on the waiting list for relocation to Roma Mahala.
- 2.1. One 12-unit building costs approximately \$US 500,000. The entire relocation package including food and income generation is about \$US 2 million. The building could be erected in 4-6 months. **Agencies Responsible:** UNMIK, OSCE, Donor Nations
- 3. Institute battery recycling program.** Consider a 'buy back' program for batteries/computers that will prevent future smelting either in Kablar camp prior to relocation or in the Roma Mahala after families are relocated.
- 3.1. While this is complicated and requires thought, Trepchia mine directors were confident that they could recycle as many batteries as they receive and that there was a market for the lead. **Agencies Responsible:** UNMIK, UNEP, CDC.

3.2. Monitor and control informal smelting in Kablar, Cesmin Lug, Osterode and Roma Mahala. **Agencies Responsible:** UNMIK, NCA, OSCE, Mitrovica municipal government

4. Publish blood lead surveillance and treatment data and environmental lead data.

The lack of data has hampered decision making and resulted in confusion on the part of Roma and others as to the seriousness of the problem and the extent of the environmental contamination.

4.1. We have been given assurances that blood lead levels are decreasing, and the data received at CDC support that. Nonetheless,, complete data need to be made available as soon as possible. **Agencies Responsible:** WHO

4.2. CDC will provide epidemiologic and statistical support for publication as soon as it is requested. Given that lead data are inherently difficult, this support is necessary to allow an accurate interpretation of the data. **Agencies Responsible:** CDC

5. Ensure adequate medical treatment and case management of children with elevated blood lead levels. A well-developed plan is needed to transfer medical records and management of children from Osterode to Roma Mahala.

5.1 A primary care medical clinic (Ambulata) in Roma Mahala is not staffed to provide case management services. Case management and follow-up will be provided by the South Mitrovica Health and Heavy Metal Unit. ‘Patronage sisters’ are available from the Ministry of Health to provide outreach, health education and case management within the Mahala. The goal should be to integrate children’s primary health care and lead poisoning prevention and follow-up services. The Ambulata is the most likely setting for this but medical and nursing staff will require education about lead poisoning prevention and follow-up protocols. **Agencies Responsible:** WHO, Kosovo Ministry of Health, South Mitrovica Health and Heavy Metal Unit

5.2 The PATCH education program currently conducted at Osterode Camp should be continued/expanded at Roma Mahalla. The program provides educational services for children 0-6 years of age. All children should be eligible for services. **Agencies Responsible:** NCA, Donor Nations

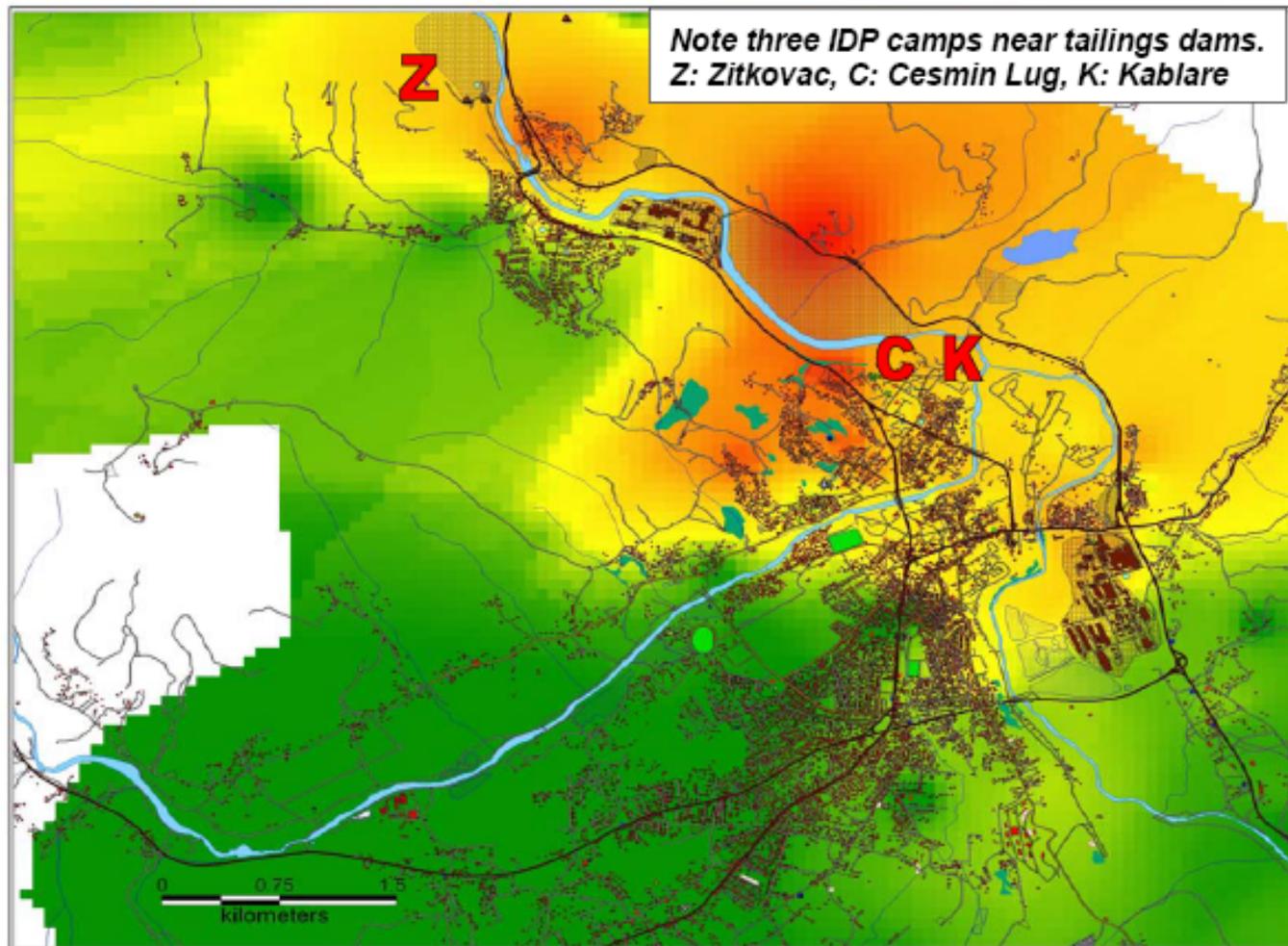
5.3 DMSA should not be diverted to the Occupational Health Clinic in Belgrade because of the danger of misuse. WHO has arranged for transfer of a supply of DMSA to the heavy metals unit in south Mitrovica. It should be available for treatment of children in Roma Mahalla and other areas of Mitrovica if warranted. **Agencies Responsible:** WHO

5.4 7-day-a-week staffing of the Lead Clinic in Osterode is not warranted given the current patient load. In addition, the nurses should be provided standing orders to

allow them to draw the confirmatory and surveillance blood lead samples in the absence of the physician. **Agencies Responsible:** WHO, NCA, local health authorities

- 5.5 When the GFAAS instrument is delivered to the Public Health Institute in North Mitrovica, arrangements should be made for the laboratorians to come to CDC for training and they should be included in the CDC QA/QC program. In addition, training should be made available to provide back-up for the laboratorian in Pristina. **Agencies Responsible:** CDC
- 5.6 The distribution of supplemental food packages has caused undue problems for camp administrators and donors. The funds currently used to purchase the food would be much better used to build permanent residences in the Roma Mahala. **Agencies Responsible:** NCA, WHO, Donor Nations, OSCE

Annex 5. Map of Mitrovica/ë Region, Kosovo



WHO ECEH. 'Mission Report Lead Crisis in United Nations Administered Province of Kosovo'. Bonn. May 2005.