Description of the Outpatient Partially Observed DMSA (OPOD) chelation therapy programme to treat lead toxicity in children under-5 in Zamfara, northern Nigeria.

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Background
In March 2010, MSF surveillance in northern Nigeria noted a substantial number of deaths in children under-5 following afebrile convulsions in a village with recently increased small-scale gold extraction. Severe lead toxicity was confirmed by blood lead levels from eight children and two adults. Epidemiological and environmental investigations initially identified seven villages as grossly lead contaminated, with around 3000 children 5 years or younger potentially suffering acute lead poisoning.

Methods
MSF responded with medical treatment, and an environmental organisation was responsible for remediation (removal of top soil). Initially, only supportive care could be provided to critically encephalopathic children until an oral chelating agent (DMSA) was imported. The initial chelation protocol, based on WHO's 2006 lead poisoning crisis response in Kosovo, was inpatient twice-daily DMSA for 28 days. Revisions based on scientific evidence available, data collected in Zamfara, and input from internationally renowned toxicologists and MSF medical experts, produced the current protocol. Depending on initial blood lead level, one of three regimens is currently used: DMSA 19 days three times daily; 5 days three times daily, then 14 days twice-daily; or 5 days three times daily. Encephalopathic patients receive intravenous chelation as inpatients, but most treatments are outpatient partially observed DMSA (OPOD). Outreach clinics are on alternate days, making one dose of six (if three times daily) or one dose of four (if twice daily) directly observed. A project-specific database supports day-to-day protocol implementation.

Results
MSF currently provides OPOD in seven affected villages. More than 1100 children have commenced over 4000 courses of DMSA, with some on course 13. At start of initial treatment in June, 2010, 82% of patients (5 years and younger) had blood lead levels higher than 100 µg/dL. Average blood lead level was 166 µg/dL in children starting in June, 2010, but decreased to 58–69 µg/dL for children starting a first course from October, 2010, to May, 2011. Average decrease in blood lead levels is 15% (31 µg/dL) from start of treatment until the most recent test (early May, 2011), with 7% reduced more than 65 µg/dL. Most children are still on treatment or follow-up. Mortality since start of OPOD is 1%. Although treatment protocol adjustments have reduced the burden on patients, adherence is a challenge and community education is ongoing to deter defaulting.

Conclusion
After routine surveillance activities uncovered lead toxicity of an unprecedented scale, MSF has successfully implemented community-based chelation therapy.