

# LEAD AND ENVIRONMENTAL HEALTH IN BROKEN HILL

Bill Balding

Project Manager, Broken Hill Environmental Lead Centre  
(now at the NSW Environment Protection Authority)

Sean Reddan

Senior Scientific Officer, Broken Hill Environmental Lead Centre

The mining city of Broken Hill is in the far west of NSW. Since the early 1880s silver, lead and zinc have been extracted from what was one of the world's richest ore bodies of its type. Broken Hill has had a major role in developing the nation's prosperity.

However, development at Broken Hill was not always easy. Broken Hill was isolated. Water, building supplies and fuel to feed the developing industry were difficult to obtain. The demand for resources led to widespread environmental degradation, resulting in erosion and periodic dust storms that would darken a clear sky. Boom-time mentality and the lack of planning and environmental laws decades ago have left an environmental legacy that is still being dealt with.

Mining also took its toll on the residents of Broken Hill. Lead poisoning among the early miners and their families was common. This presented as clinical plumbism with anaemia, nephropathy and encephalopathy, and sometimes resulted in death. The incidence of lead poisoning was estimated to be as high as 2 per 100 miners in 1895. The effects of lead on health were not limited to the workforce. A committee convened by the NSW Government in 1892 heard that the high infant mortality rate in Broken Hill might have been attributable to lead poisoning.

Although lead exposure among miners is no longer a major health issue, lead toxicity in children has emerged as a major public health issue over the past decade. In 1991 the first comprehensive testing undertaken on children under five years of age revealed that more than 80 per cent had blood lead levels over the current guideline level of 10 µg/dL.

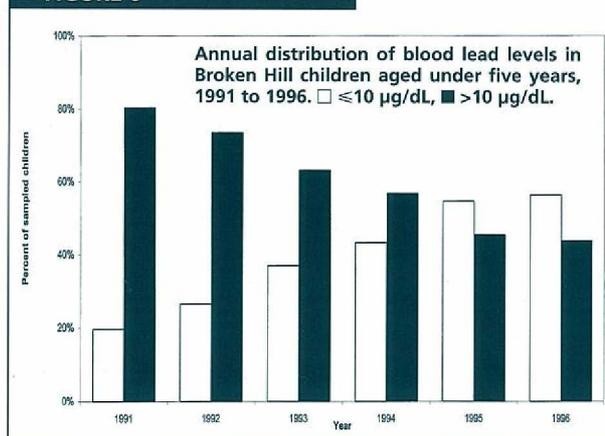
Current environmental exposure to lead appears to be related more to historical mining and mine management practice than current activities. Lead contamination of the broader community arises from sources including:

- naturally occurring surface ores;
- past smelting and mine waste management practices;
- entrapment of dust in linings of domestic buildings and the re-entrainment over time of this dust back into the living spaces;
- open-cut mining activities (undertaken in the centre of the city until the early 1990s);
- the handling and transportation of ore concentrates;
- dust from tailings dams and the contamination of open spaces;
- off-site use of mining by-products for private use, such as landfill and driveways; and
- carry-home occupational health problems, such as contaminated dust in clothing and in vehicles.

However, environmental health investigations and programs managed jointly by the NSW Health Department and the NSW Environment Protection Authority in consultation with Broken Hill Council, industry and the community have been very successful in reducing the impact of environmental lead contamination in Broken Hill.

In 1994 the NSW Government established the Broken Hill Environmental Lead Centre. The centre, which has brought

FIGURE 6



together a team of nurses, technicians, educators and scientists, is implementing a comprehensive and integrated strategy aimed at reducing lead exposure to children and the whole community. The centre has developed a strategy with five elements:

- education and awareness-raising;
- clinical monitoring;
- environmental testing of children's home environments (lead in paint, dust and soil);
- remediation of children's home environments (where appropriate); and
- the remediation of contaminated public land.

As part of this strategy, the centre has implemented a number of projects, including:

- monitoring of blood lead in newborn infants to help identify children at risk as early as possible;
- interactive preschool and school education programs;
- programs aimed at the Aboriginal community;
- early intervention programs, in which infants enter remediation programs before critical blood lead levels are attained;
- programs to support community groups to undertake lead-risk reduction "greening" programs (a greening program may include planting trees or lawn, removing contaminated soil from playgrounds, extracting contaminated dust from child-care centres, fencing off sensitive areas and controlling stormwater damage to rehabilitated areas); and
- monitoring and evaluation programs.

The centre's programs, with extensive site works undertaken by mining companies to control fugitive emissions, have been a major cause of the decline in average of the blood lead level in the population aged under five years in Broken Hill. The average blood lead level dropped from 18.4 µg/dL (0.88 µmol/L) in 1991 to 10.8 µg/dL (0.52 µmol/L) in 1996. At this time, the number of children exceeding the 10 µg/dL guideline for blood lead in Australians determined by the National Health and Medical Research Council was 44 per cent (Figure 6).

## ACKNOWLEDGMENT

Staff of the Environmental Lead Centre, for their continued dedication in implementing this strategy.