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# United States Experiences - Lead

## IFCS Side-Event on Heavy Metals

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# Focus on Children

- Lead causes a broad range of effects in both adults and children.
- Lead is particularly harmful to the developing nervous systems of infants and young children.
- In the United States, a primary focus is on exposure of children to lead.
- The United States has set a goal for the elimination of lead poisoning in children as a public health problem by 2010



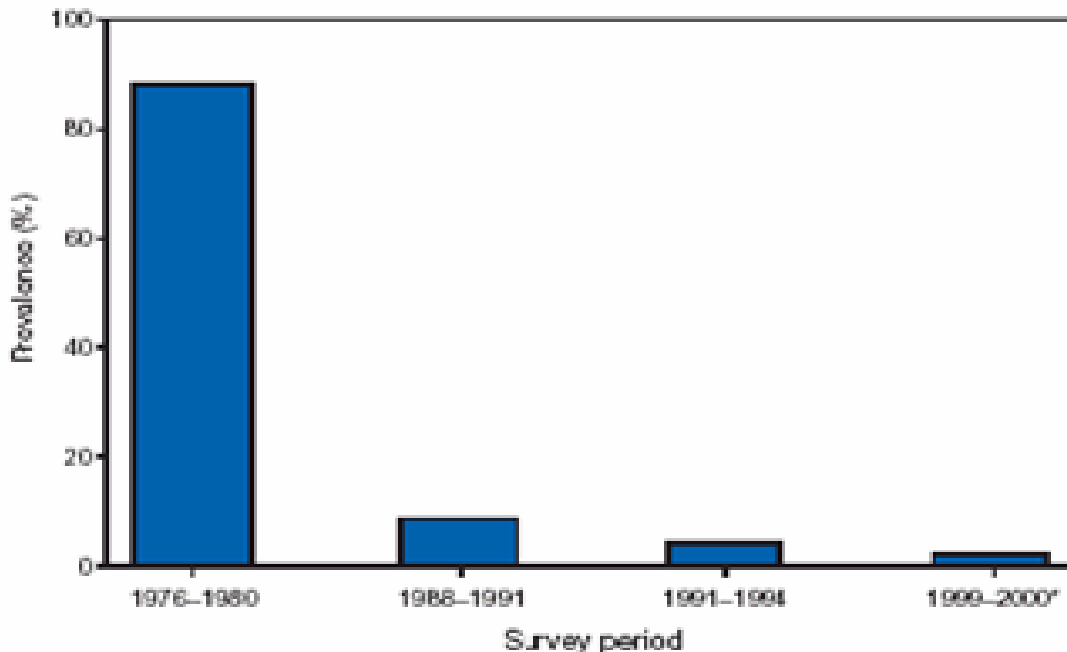
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# Sources of Lead

- In the United States, exposures to lead come from ambient air, soil, dust, drinking water, and food.
  - There has been significant progress made in lowering the incidence of lead poisoning, particularly with the phase-out of lead from gasoline.
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# Prevalence of Children with Elevated Blood Lead Levels

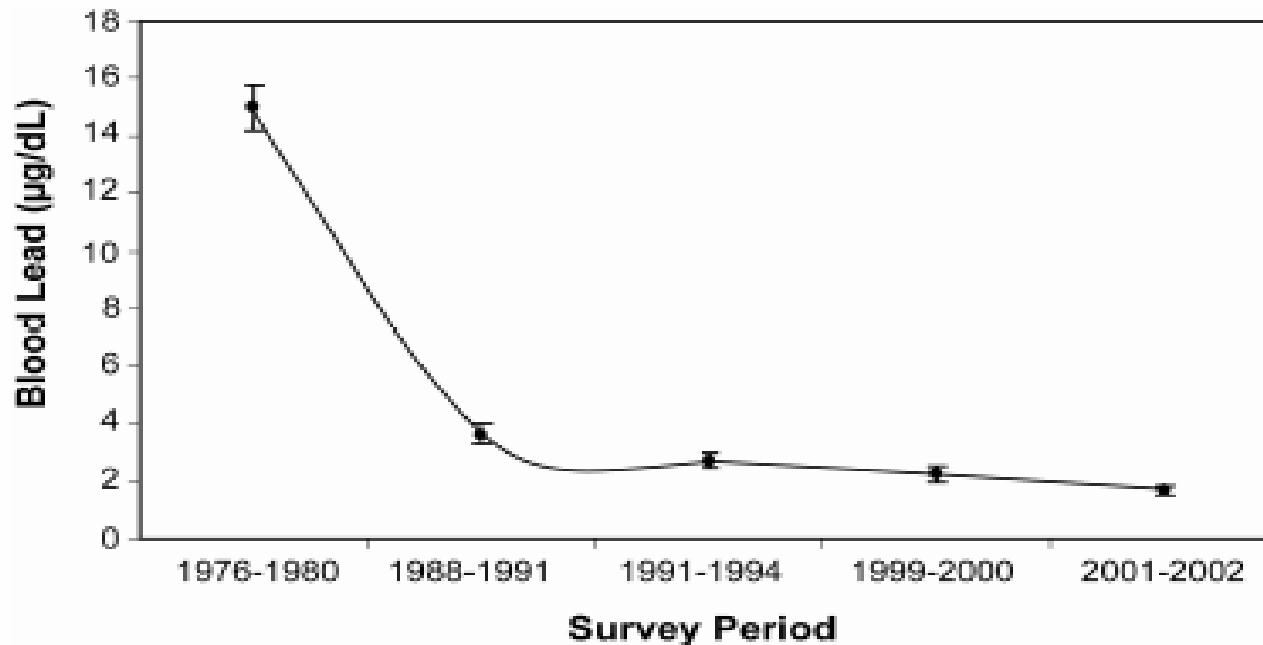
FIGURE 1. Blood lead levels  $\geq 10$   $\mu\text{g}/\text{dL}$  among children aged 1–5 years — United States, 1976–1980, 1988–1991, 1991–1994, and 1999–2000\*



Source: National Health and Nutrition Examination Surveys (NHANES).  
Note: In 1991, NHANES III Phase 1 was completed and Phase 2 was begun.  
\*Data for 1999–2000 are highly variable (relative standard error  $>30\%$ ).

# Decreases in Blood Lead Levels

Blood lead concentrations in U.S. children, 1-5 years of age



Source: National Health and Nutrition Examination Surveys

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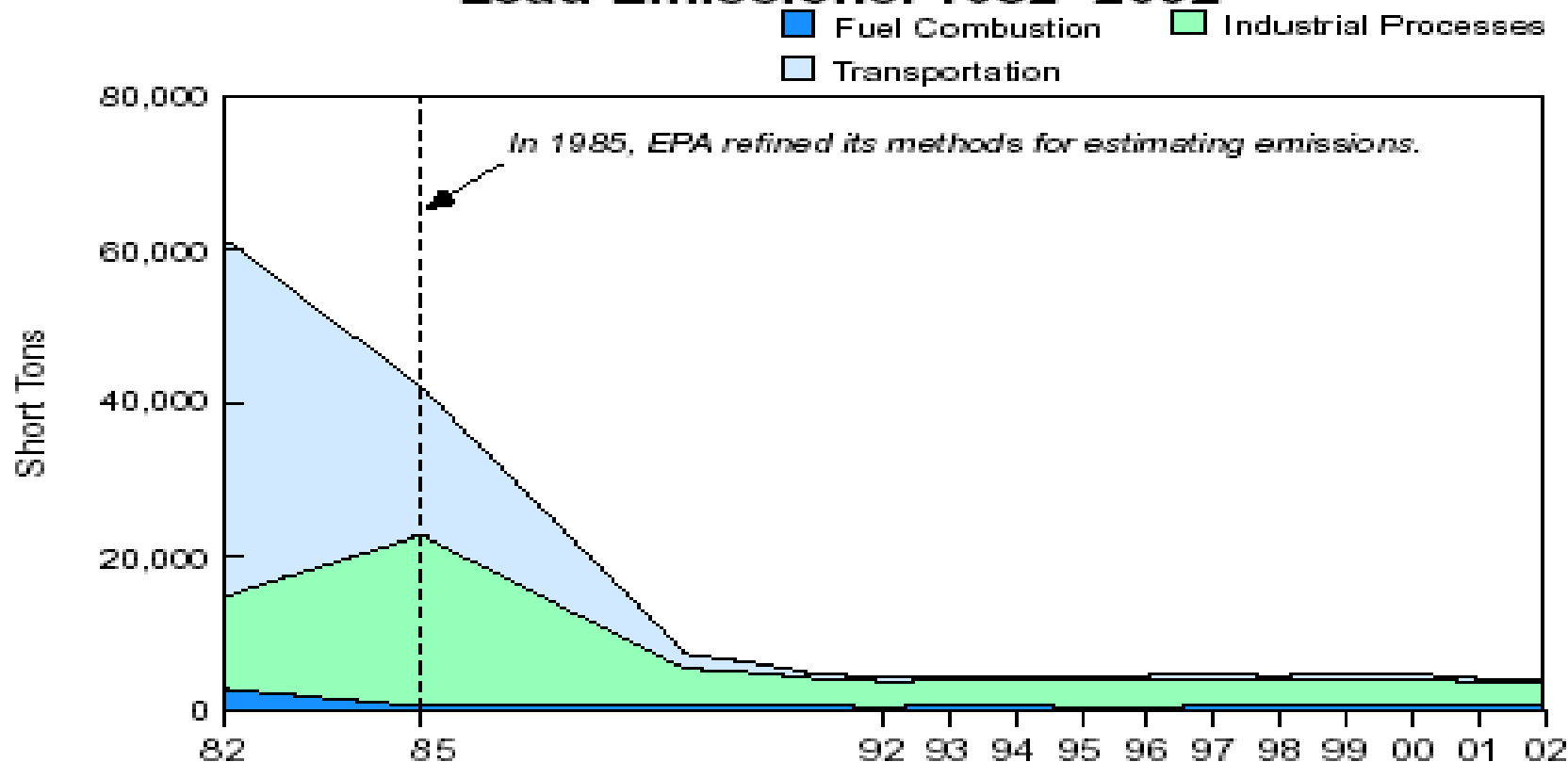
# Changes in Regulations and Laws

*Changes in regulations and laws implemented since the 1970s have limited the use of lead*

- 1973 - Phaseout of lead in gasoline
    - Primary phaseout of leaded gas in US completed by 1986
    - US blood-lead levels decline by 78% from 1978 to 1991
  - 1978 - Ban on use of lead in paint
    - Millions of homes continue to have lead paint
  - 1980s – 2000s – Decreases in industrial releases
  - 1988 - Ban on use of leaded-solder in household plumbing in new buildings
    - Most buildings will continue to have leaded solder for decades
  - 1992 - Laws on addressing lead in existing household paint
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# Trends in U.S. Air Lead Emissions

## Lead Emissions. 1982–2002<sup>a</sup>



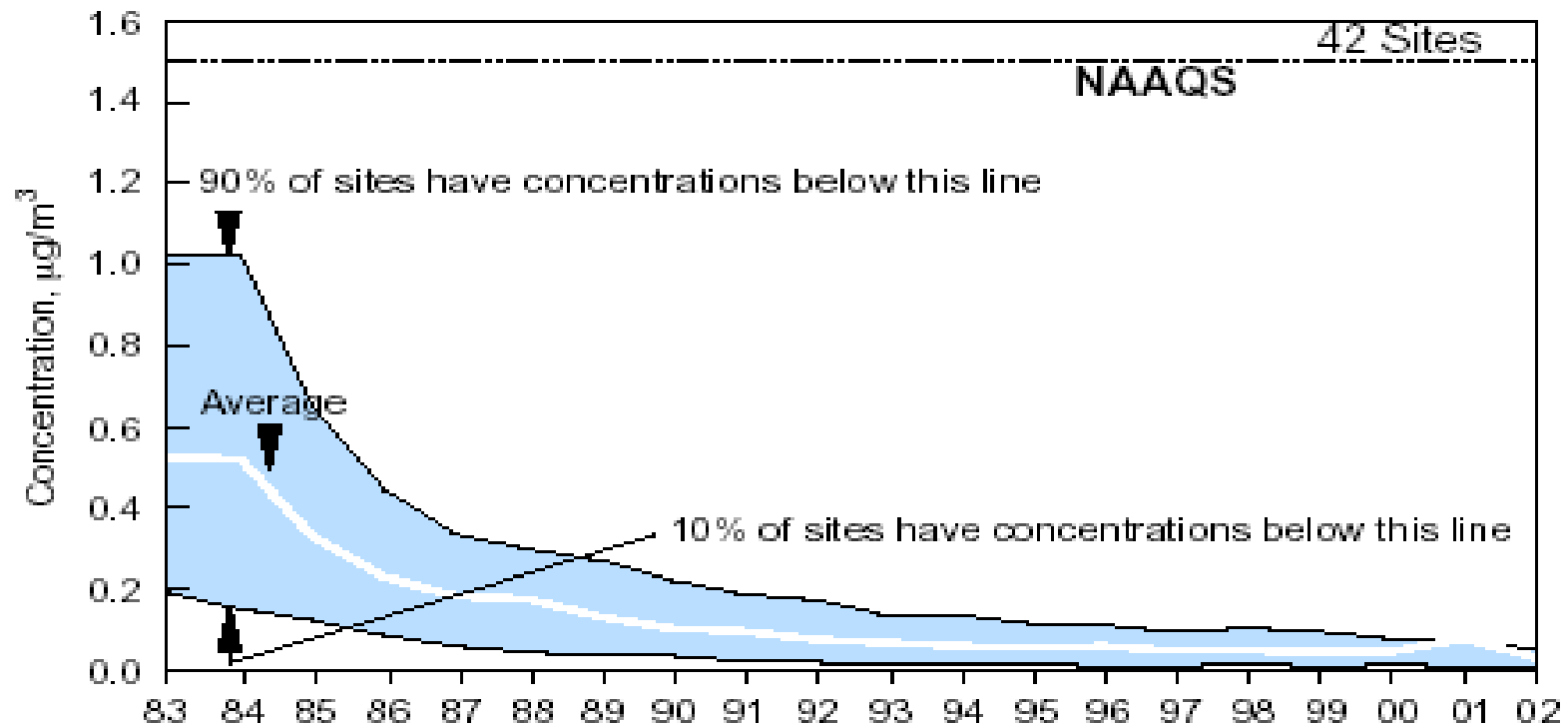
**1982–02: 93% decrease**

**1993–02: 5% decrease**

<sup>a</sup> As of 2002, lead emissions are included in the Toxic National Emissions Inventory.

# Trends in U.S. Lead Air Quality

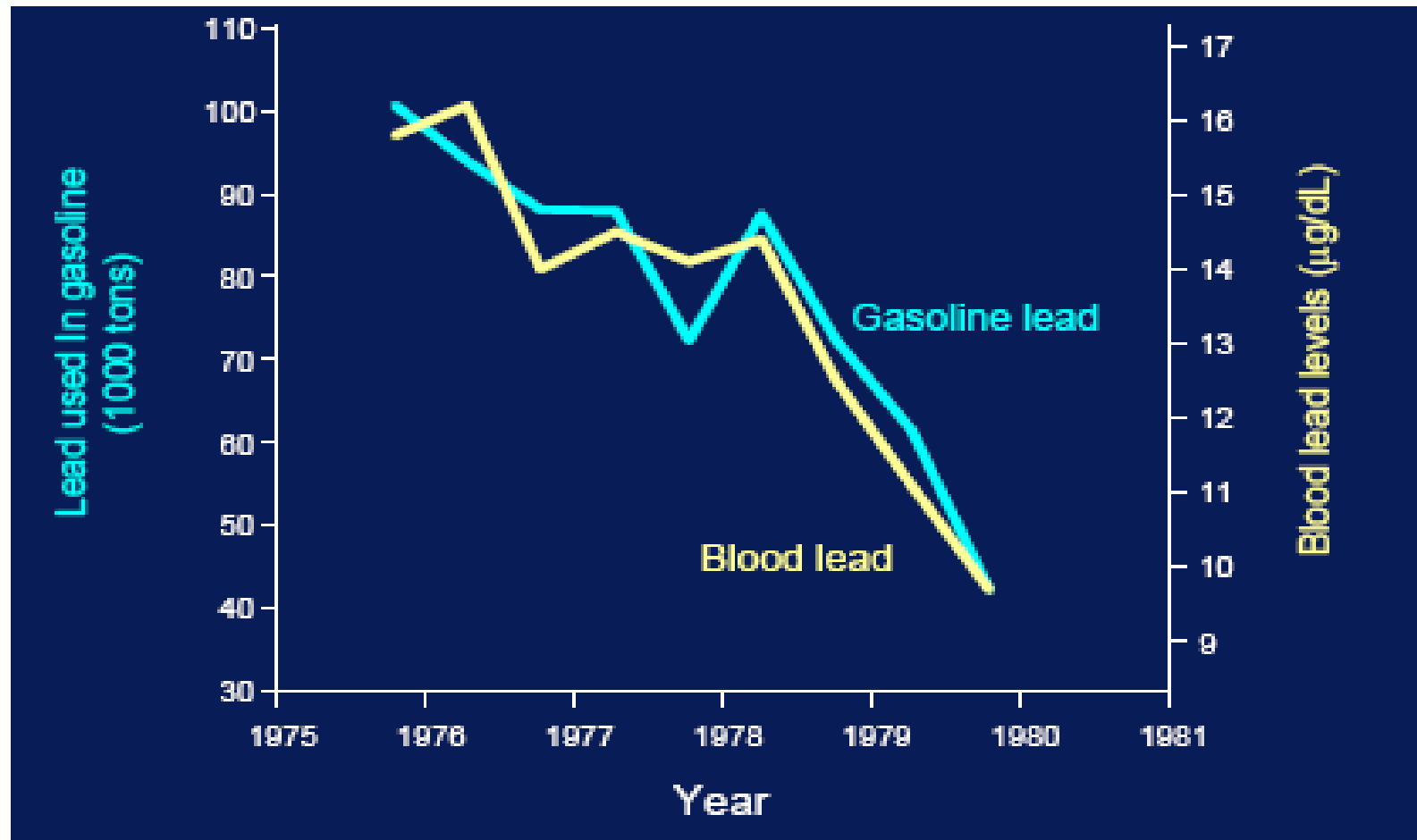
**Lead Air Quality, 1983–2002**  
Based on Annual Maximum Quarterly Average



**1983–02: 94% decrease**

**1993–02: 57% decrease**

# Lead in Gasoline & Lead in Blood



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# Current Sources of Lead Exposure

- In the United States, the vast majority of exposure to lead is due to local and regional sources, both industrial and non-industrial
  - Industrial sources include
    - Lead smelters
    - Battery recyclers
    - Lead and other metal (e.g., zinc) mines
  - Non-industrial sources include
    - Paint
    - Drinking water
    - Food
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# Current Sources of Lead Exposure

- Major contributors to elevated blood lead levels in children
    - Lead paint
      - The United States Centers for Disease Control and Prevention state that exposure to lead paint causes the majority of cases of elevated blood lead levels in children
    - Contaminated sites – air deposition and land releases
      - Around mining sites, smelters, battery sites
      - In some areas, these are the primary contributors to elevated blood lead levels in that locality or region
    - Imported foods and ceramics
  - Other lesser sources
    - Drinking water
      - May be a contributor but is not typically the major source of exposure
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# Management Strategies

- Major focus on lead paint in housing
    - Primary prevention
      - Eliminate or at least minimize exposure to lead paint
      - Use of lead safe work practices in housing
  - Clean-ups of contaminated sites
    - Particularly where children spend a lot of time, e.g., pre-schools
  - Reducing air emissions from industrial sites
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# Management Strategies

- Environmental and human health monitoring
  - Outreach and education
  - Cooperation and collaboration
    - Across the national government
    - Local governments
    - Non-governmental organizations
    - Private sector
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# Success of Hazard Reduction Efforts

- In the period 1999 to 2002, the prevalence of blood lead levels  $\geq 10$   $\mu\text{g}/\text{dL}$  in children aged 1 to 5 years was estimated to be 1.6%.
  - This represents a continual decline from an estimated 78% in the period 1976 to 1980.
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