

# Lead & Lead in Paint- Impact on the Environment

Workshop on Establishing Legal Limits on Lead in Paint  
New Delhi, India, 22-23 September 2014



# In this session: Aim

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The session will provide an overview of lead, with a focus on exposure from paint, and its impacts to human health and the environment, and the status of lead paint regulation worldwide. Information will include new information, the state of science and highlight the importance of prevention.

Speakers: UNEP and WHO

# Releases to the Environment

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## Natural

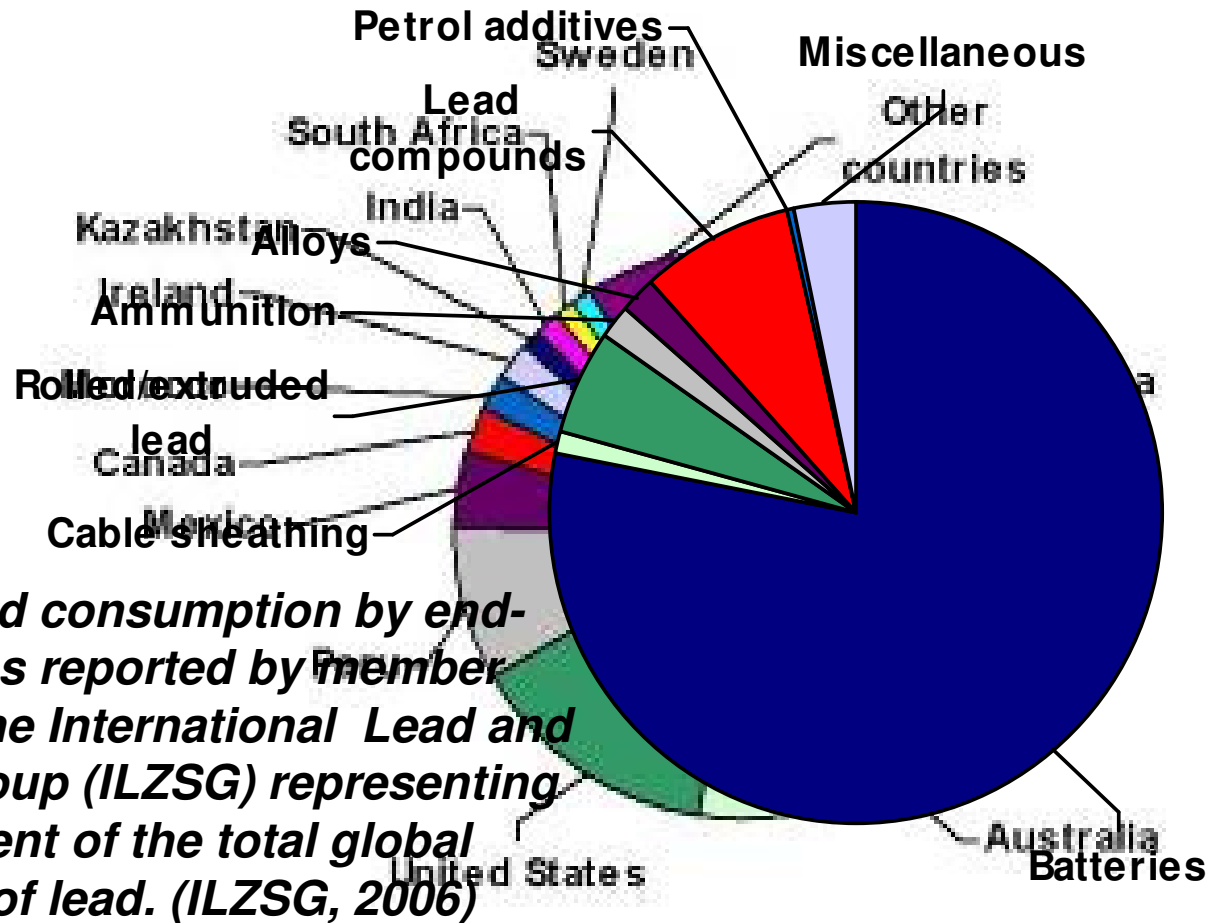
- Release of soil particles, in particular during dust storms
- Sea salt spray
- Volcanic emissions
- Natural fires
- Vegetation, pollen and spores
- Meteorite dust

## Anthropogenic

- Fossil Fuels
- Ores
- Coal
- Recycled Minerals
- Manufacturing, Use, Disposal or Incineration of products that contain lead

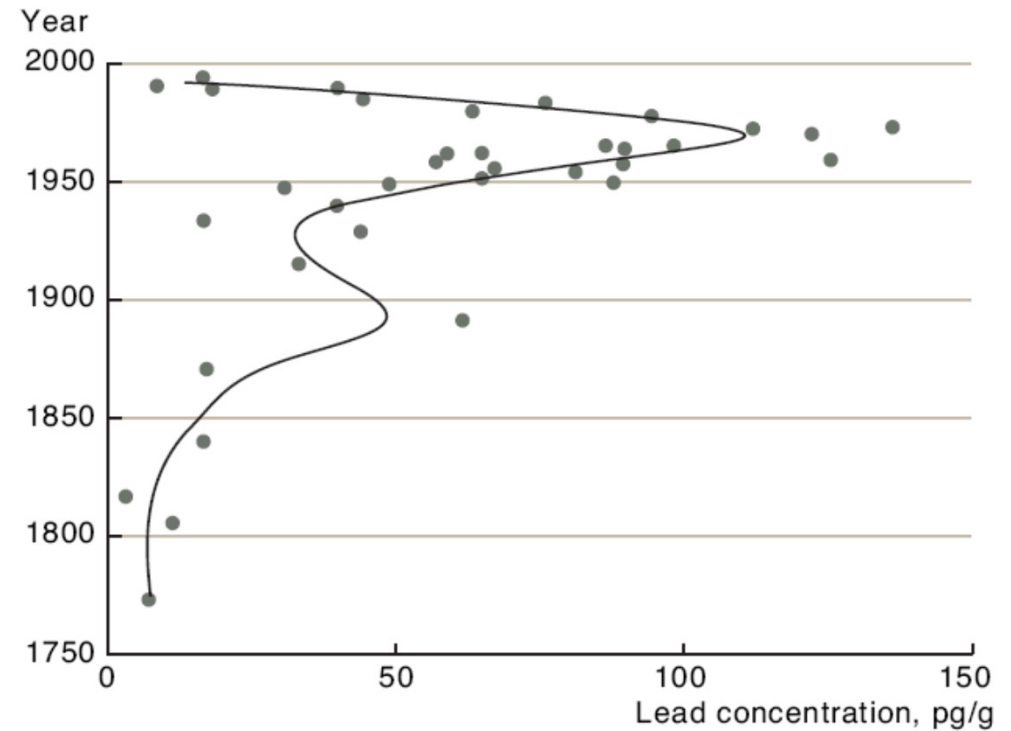
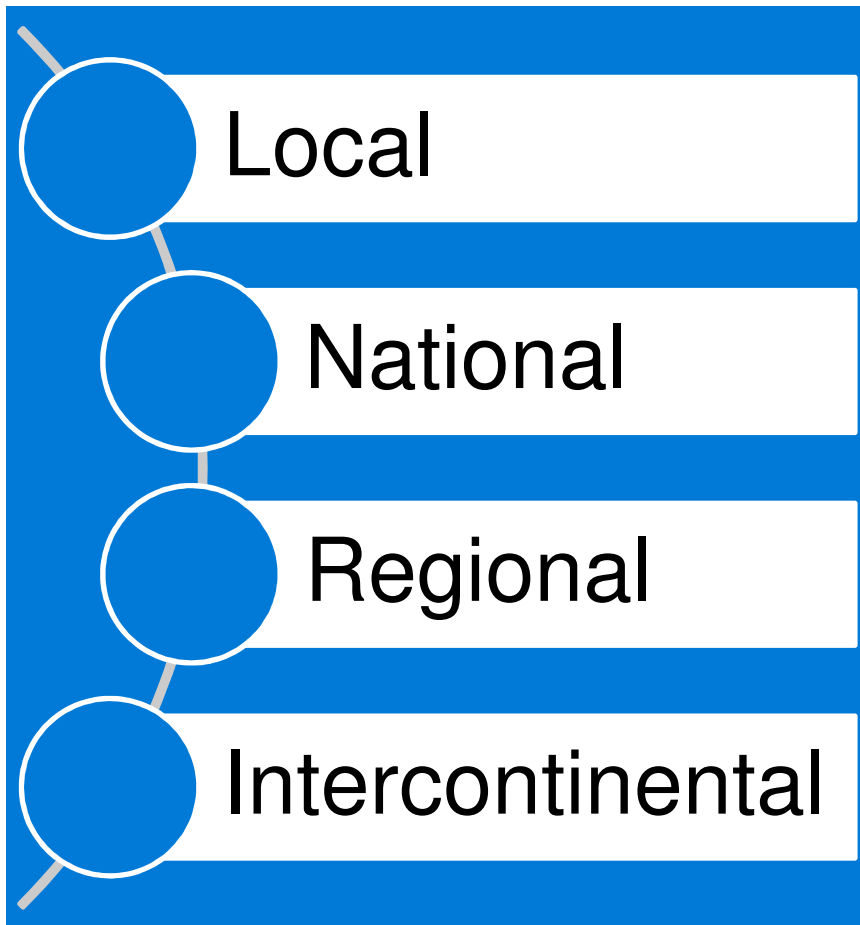
# Sources of Lead Emissions

Global mine production by country (based on USGS, 2006)






*Intentional lead consumption by end-uses in 2003 as reported by member countries of the International Lead and Zinc Study group (ILZSG) representing about 86 percent of the total global consumption of lead. (ILZSG, 2006)*

# Scope of Lead Emissions



**Lead Concentrations in a Greenland ice core**

# Impacts on the Ecosystem

Species	Impact of Lead
	<p>Highly Toxic</p> <p>Toxicosis, Neurological and Behavioural Changes, and Eventual Death</p>
	<p>Impaired Reproduction</p>
	<p>Adverse effects in several organs and organ systems, including the blood system, central nervous system, the kidney and the reproductive and immune systems</p>

# Impacts on the Ecosystem

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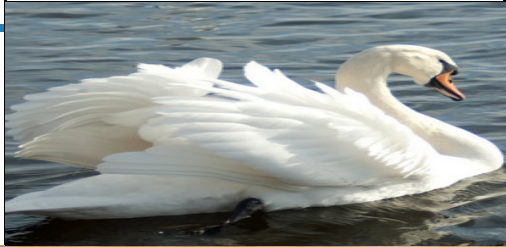
Spinal Deformity And Blackening of The Caudal Region

Can survive in a mixture of heavy metal concentrations of up to 3 mg/L and in a solution of lead of 100 mg/L.



Hinder chemical breakdown of inorganic soil fragments, thus being more readily available to be taken up by plants.

# Birds



**0.5 ppm** level of Lead in blood- Toxic

**5 ppm** level of Lead in blood or more- Lethal



Approx. 200000-360000 mortality due to lead shot gun pellets

Several Million sub lethal lead poisoning



Eating lead shot-contaminated prey animals accounts for an estimated 10–15 percent of the recorded post-fledging mortality in these species.



(Avian Species, such as Common Loons, Trumpeter, Mute, Tundra Swans, Sandhill Cranes)

Ingestion of lead fishing sinkers- toxic and fatal effects



# Lead Bioaccumulation / biomagnification

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- Lead is known to bioaccumulate in organisms, in particular in biota feeding primarily on particulate matter.
- Biomagnification of inorganic lead in the aquatic food chain is not apparent, as the levels of lead, as well as the bioaccumulation factors, decrease as the trophic level rises. This is partly explained by the fact that in vertebrates, lead is mainly stored in bone, which reduces the risk of lead transmission to other organisms in the food chain.

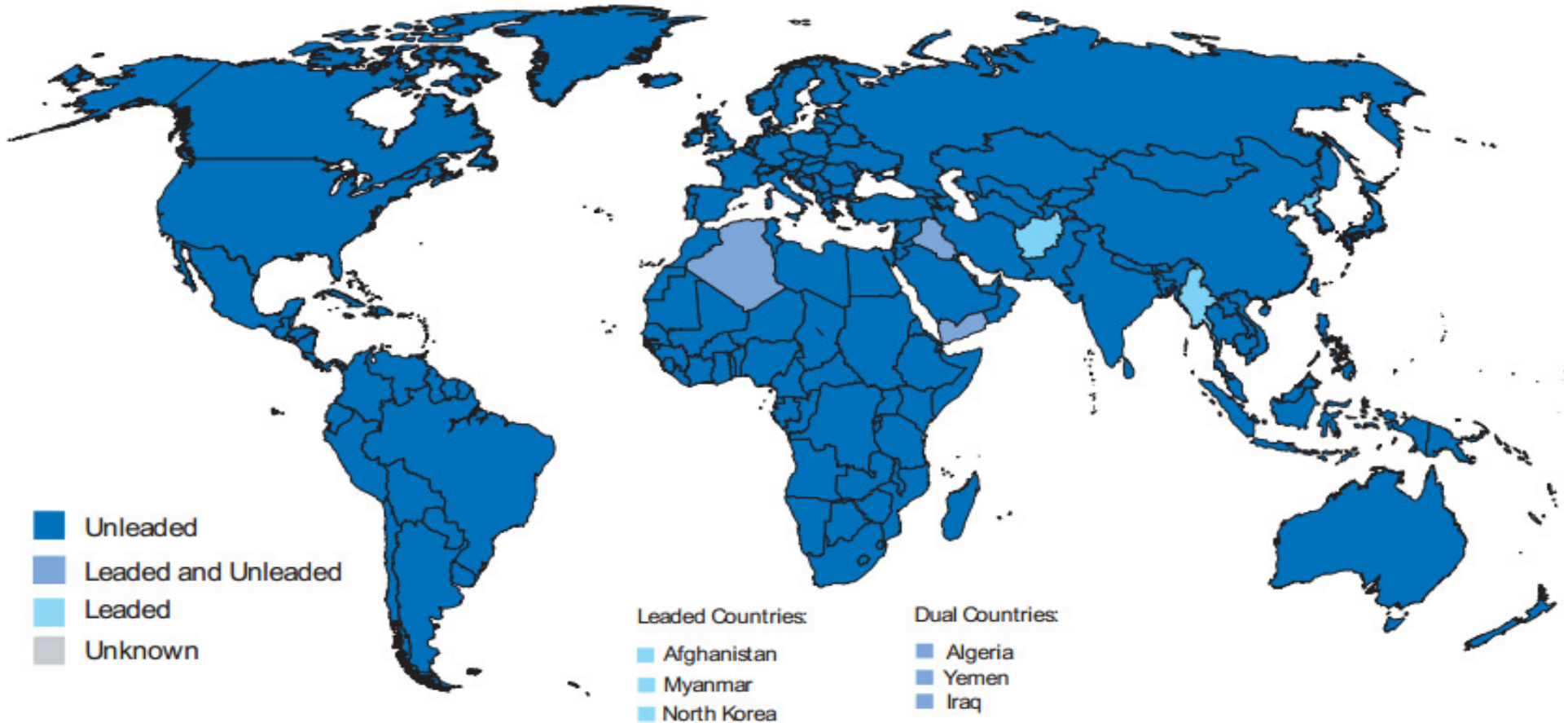
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# Lessons learnt from leaded-gasoline....to lead paint....

# Efforts of PCFV



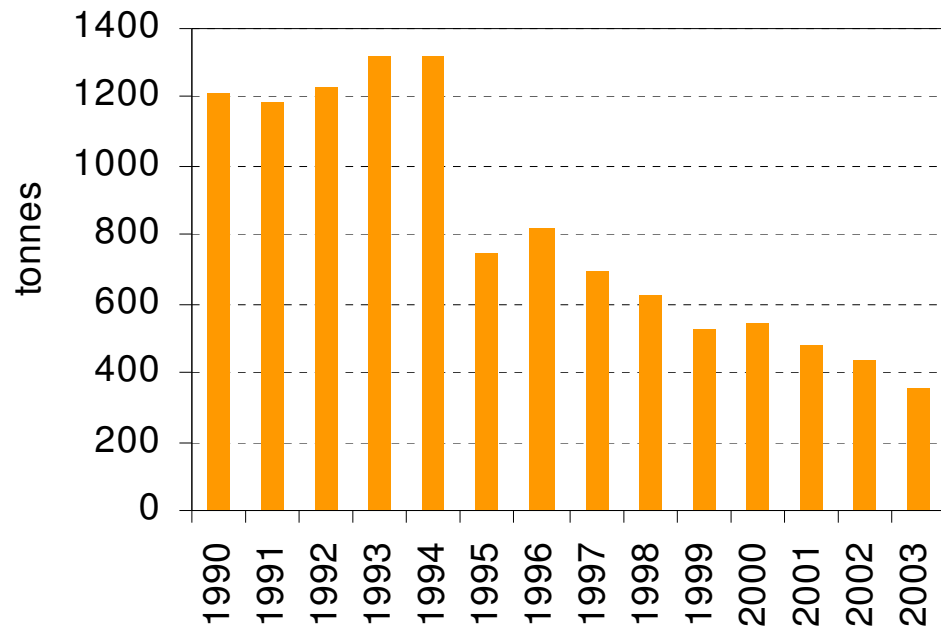
## Leaded Petrol Phase-out: Global Status April 2014



# Trends in Atmospheric Emission of Lead

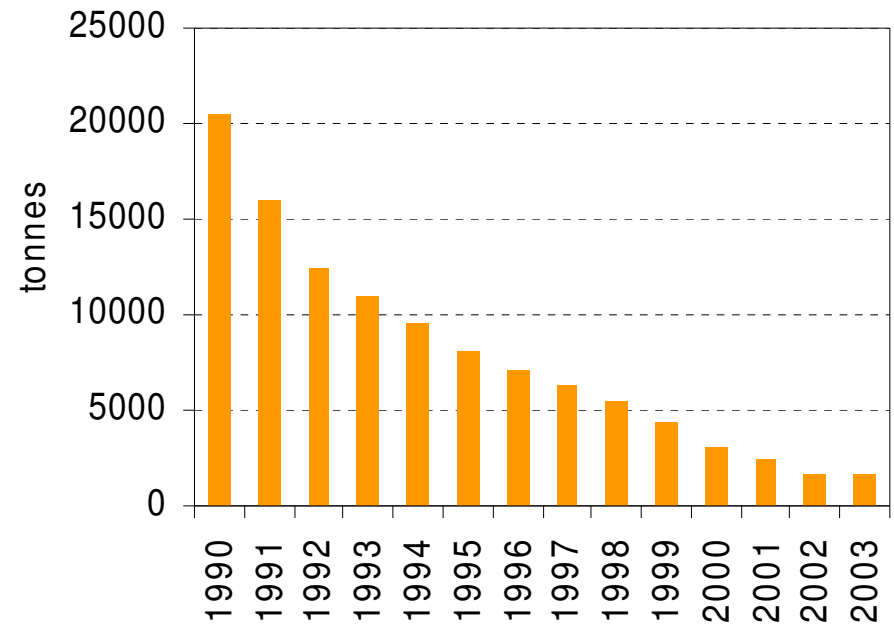
## Canada

Pb emissions, t/y

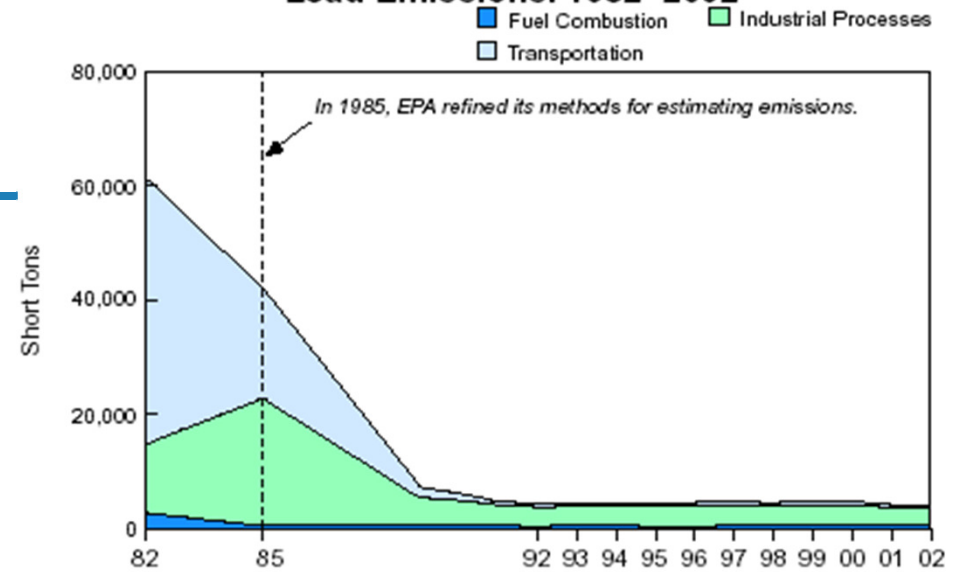


## EMEP area

Pb emissions, t/y



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

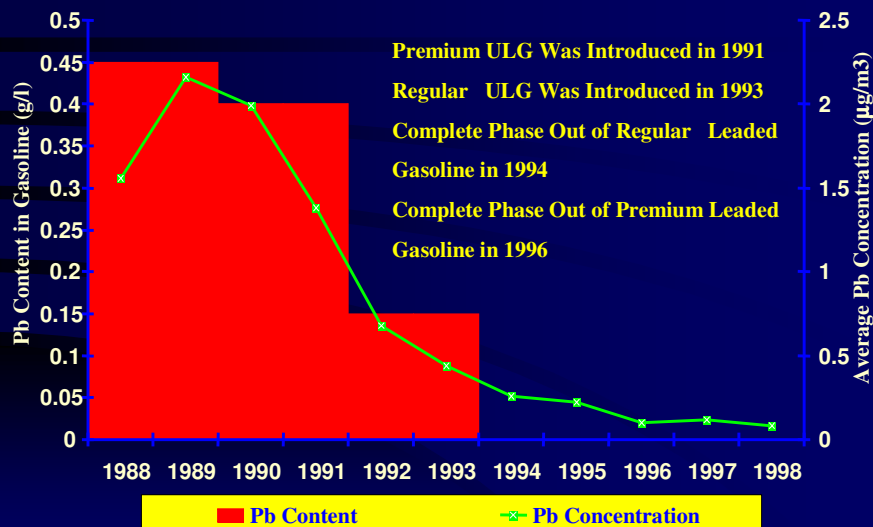


1982–02: 93% decrease

1993–02: 5% decrease

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

### PHASE-OUT OF LEADED GASOLINE IN THAILAND



UNEP

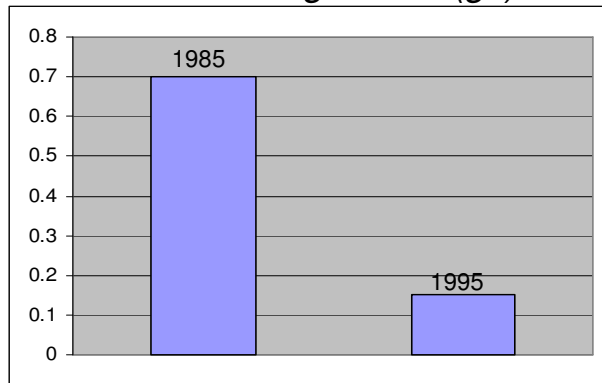
**Lead levels in petrol in Hungary:**

**1985: 0.7 grams/ liter**

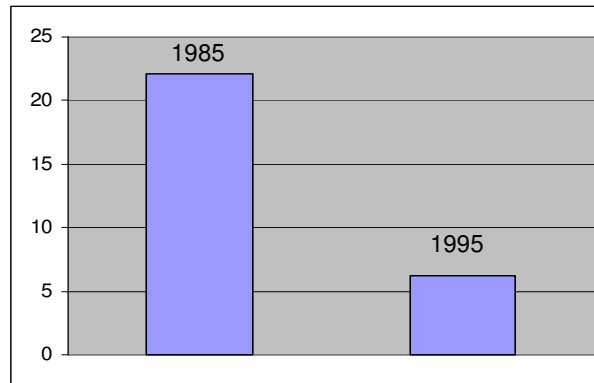
**1995: 0.15 grams per liter**



*Lead contents in gasoline (g/l)*



*Blood Lead Level (µg/dl)*



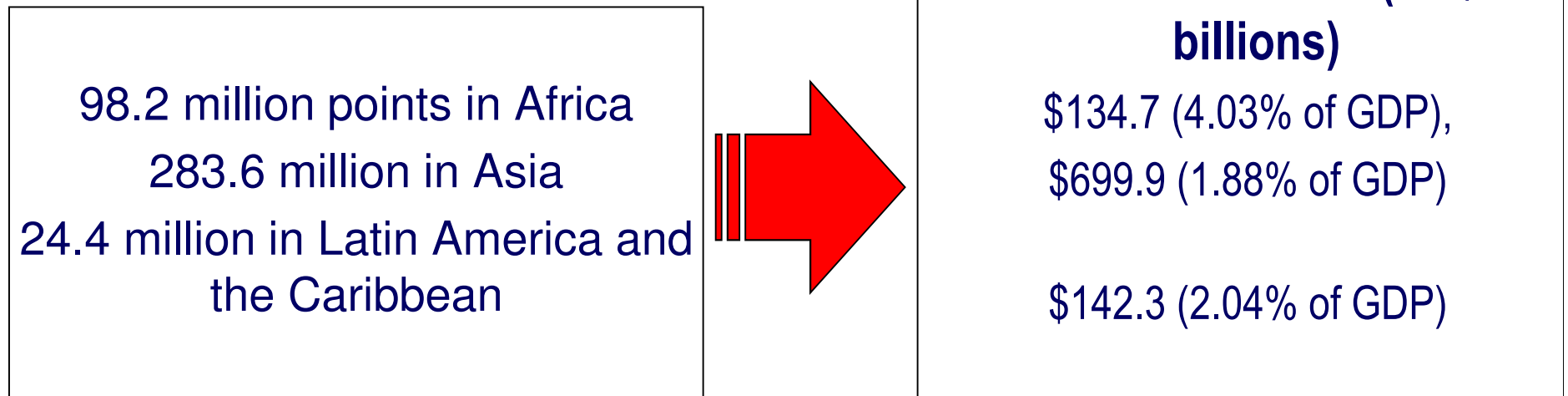
# Global Benefits & Economic Loss

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- Global benefits (PCFV):
  - 2.44 trillion/ yr/ 4% global GDP
  - Developing Nations = \$702 billion / year
  - Developed Nations = \$1.74 trillion / year
  - ~1.1 million premature deaths/ yr
  - ~320 million IQ points/yr

Ref. First draft study Thomas H. Hatfield, prof. occupational and environmental health, California State University

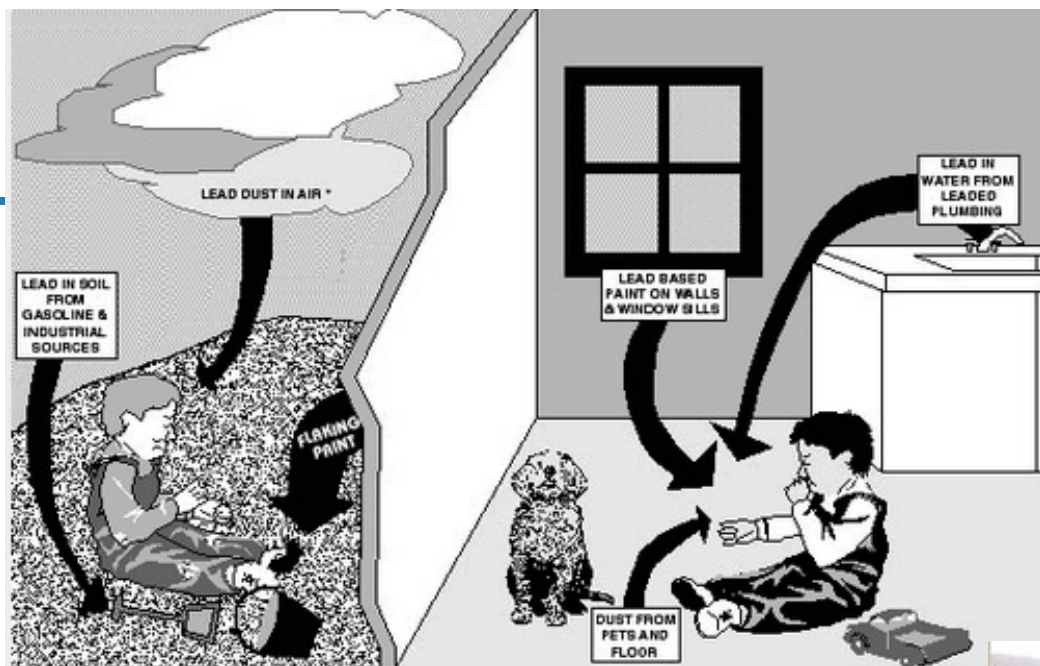
## Low- and middle-income countries\*: Estimated reduced cognitive potentials (loss of IQ points) due to preventable childhood lead exposure:



The UNEP Cost of Inaction Report (2012): Lead exposure from all sources costs Pakistan USD 775 million in terms of IQ losses and adverse health effects.

\* Ref: <http://ehp.niehs.nih.gov/wp-content/uploads/121/9/ehp.1206424.pdf>





In Senegal, lead pollution was caused by the improper recycling of used car batteries. In Nigeria, it was the result of small-scale gold processing.



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# THANK YOU VERY MUCH

*Further information at:*  
[www.unep.org/noleadpaint](http://www.unep.org/noleadpaint)

*Further contact at:*  
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