

Social Costs of Lead Poisoning



What does “social costs” mean?

- Private costs + external costs = social costs
- Private costs are those which accrue only to parties in the transaction; social costs reflect the cost to everyone in society
- Examples
 - Pollution
 - Deaths caused by drunk driving



Why consider social costs in lead poisoning?

- Effects of lead poisoning costs are borne by the society as well as the individual; therefore
 - the true cost of lead poisoning cannot be captured through only consideration of direct individual medical costs since society also bears the burden of lead poisoning

Purpose: why was this study conducted?

- Obtain better understanding of current true cost of lead poisoning by including social costs
- Encourage compliance with federal Renovation, Repair & Painting rule
- Influence legislative process



Methodology: design & population

- Retrospective cross-sectional study design
- 2009 cohort of children aged 6 and under diagnosed as lead-poisoned in Indiana (n=364)
- Data collected from Indiana Lead and Healthy Homes Program case data

Methodology: direct medical care

■ Includes

- Screening
- Monitoring
- Laboratory analysis
- Public health nurse visits
- Environmental investigation



Methodology: social costs measures

- Special education
- Juvenile justice
- ADHD treatment
- Lost lifetime earnings & lost tax revenue



Results: direct medical care (2009)

Blood lead level ($\mu\text{g/dL}$)	Per case cost	Extended cost	N
10 – 19	\$ 628	\$190,284	303
20 – 45	948	54,036	57
45 – 69	1,280	5,120	4
70 +	3,366	0	0
		\$249,440	364

Results: direct medical care, 100% testing rate

Blood lead level ($\mu\text{g}/\text{dL}$)	Per case cost	Extended cost	N
10 – 19	\$ 628	\$1,296,324	2,064
20 – 45	948	54,036	398
45 – 69	1,280	5,120	25
70 +	3,366	0	0
		\$1,705,386	2,487

Social costs: special education (2009)

Special education - annual cost

Per case cost	Extended cost	N
\$14,317	\$100,219	7

Special education - 3 year cost

Per case cost	Extended cost	N
\$14,317	\$300,657	7

Social costs: special education, 100% testing rate

Special education - annual cost

Per case cost	Extended cost	N
\$14,317	\$529,729	37

Special education - 3 year cost

Per case cost	Extended cost	N
\$14,317	\$1,589,187	37

Social costs: juvenile justice

Juvenile justice - 2007		
Per case cost	Extended cost	N
\$68,324	\$7,105,696	104
Juvenile justice - 2008		
Per case cost	Extended cost	N
\$63,152	\$6,062,592	96
Juvenile justice – 2009 (projected)		
Per case cost	Extended cost	N
\$63,152	\$5,620,528	89

Social costs: ADHD treatment (2009)

Per case cost	Extended cost	N
\$2,362	\$859,768	364



Social costs: ADHD treatment, 100% testing rate

Per case cost	Extended cost	N
\$2,362	\$5,874,294	2,487



Social costs: lost lifetime earnings (2009)

BLL	N	Avg BLL	Avg IQ point loss per $\mu\text{g}/\text{dL}$	Total IQ point loss	Lost lifetime earnings
2-9 $\mu\text{g}/\text{dL}$	39,902	3.02	0.153	18,437	\$328,457,259
10-19 $\mu\text{g}/\text{dL}$	303	12.75	0.19	734	\$13,076,522
≥ 20 $\mu\text{g}/\text{dL}$	61	31.21	0.11	209	\$3,730,801
Total					\$345,264,582

Social costs: 10% tax loss (2009)

BLL	N	Avg BLL	Avg IQ point loss per $\mu\text{g}/\text{dL}$	Total IQ point loss	10% tax loss
2-9 $\mu\text{g}/\text{dL}$	39,902	3.02	0.153	18,437	\$32,845,726
10-19 $\mu\text{g}/\text{dL}$	303	12.75	0.19	734	\$1,307,652
≥ 20 $\mu\text{g}/\text{dL}$	61	31.21	0.11	209	\$373,080
Total					\$34,526,458

Reality check

Total actual cost, 2009 cohort:

\$6,829,995

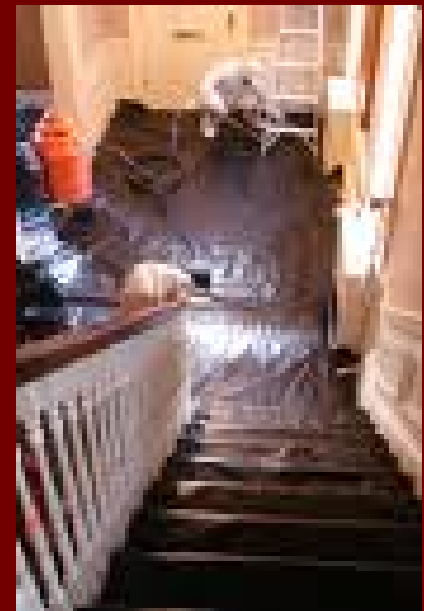
\$379,791,040

\$386,620,995



Reality check

- Based upon estimates by the President's Task Force, remediation costs = \$733 - \$10,333 per unit
- The true cost is likely closer to the median, \$5,533 per unit
- 21% (n=379,865) of housing units in Indiana estimated to be home to children aged 6 and under



Reality check

- At the cost of \$733/unit, total remediation cost = **\$278,441,045**
- At the cost of \$10,333/unit, total remediation cost = **\$3,925,145,045**
- At the median cost of \$5,533/unit, total remediation cost = **\$2,101,793,045**

Reality Check

- Remediation is a cost incurred only once
- Costs of childhood lead poisoning ongoing
- Aggregate savings realized in homes where more than 1 child resides



Reality check

A remediation project completed at the maximum projected cost (\$10,333/unit) would cover direct medical care costs for 16+ children at the 10 $\mu\text{g}/\text{dL}$ level



Reality check

If all 379,865 lead hazard homes in Indiana were remediated at the median cost the total cost (\$2,101,793,045) would cover direct medical care costs for

3,346,804 children at the 10 - 19 $\mu\text{g}/\text{dL}$ level

OR

2,217,081 children at the 20 - 45 $\mu\text{g}/\text{dL}$ level

OR

1,642,206 children at the 46 - 69 $\mu\text{g}/\text{dL}$ level

OR

624,419 children at the 70+ $\mu\text{g}/\text{dL}$ level

Reality check

Assuming static costs and lead poisoned population, Indiana will have incurred direct medical care and social costs that will more than cover the cost of remediation of

ALL

lead hazard homes at the maximum projected cost (\$10,333/unit) within
10 years, 2 months

Reality check

Negative effects of
childhood poisoning are
lifelong in comparison
with one-time only
remediation costs

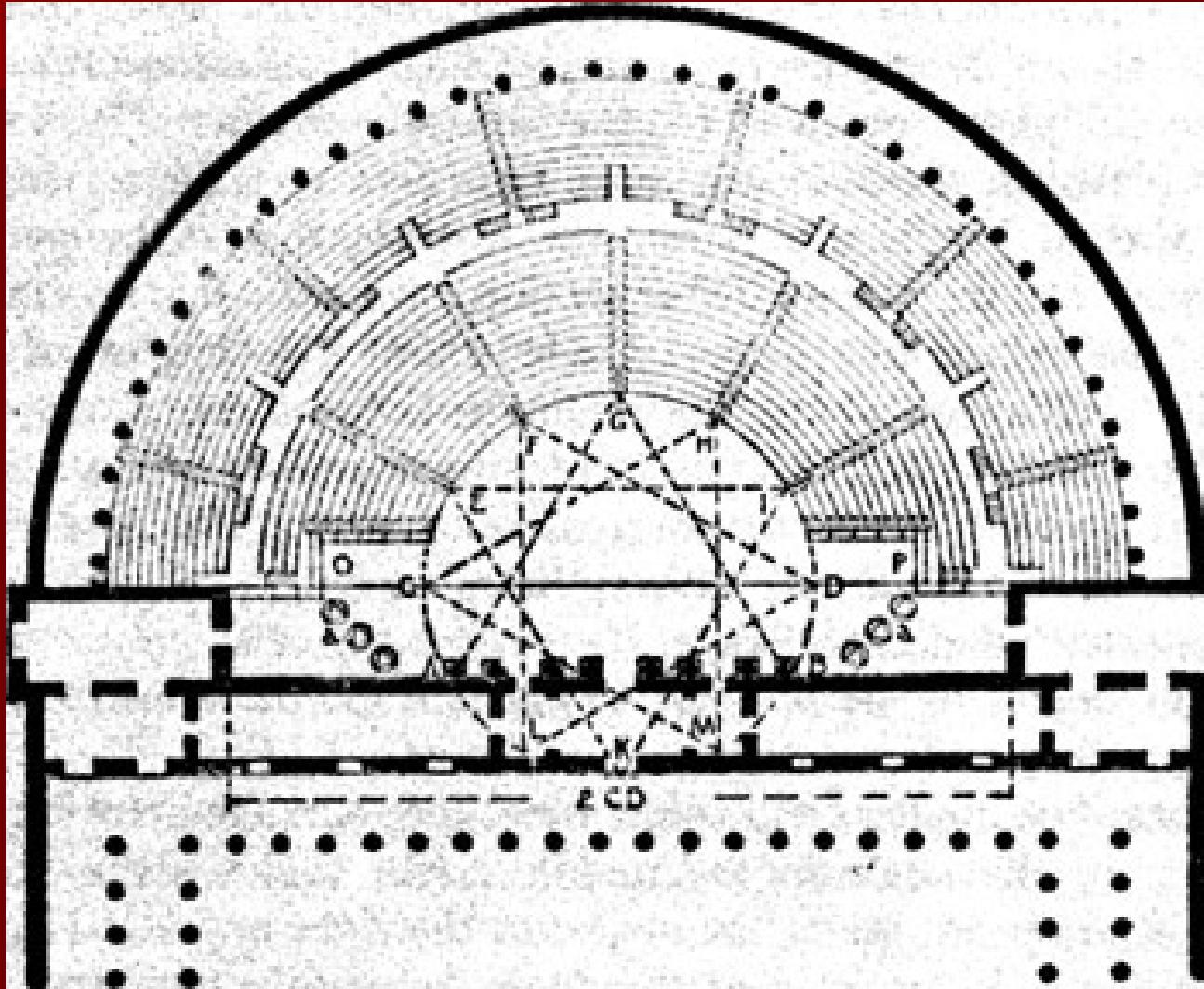




Historical effects of lead poisoning



Historical effects of lead poisoning

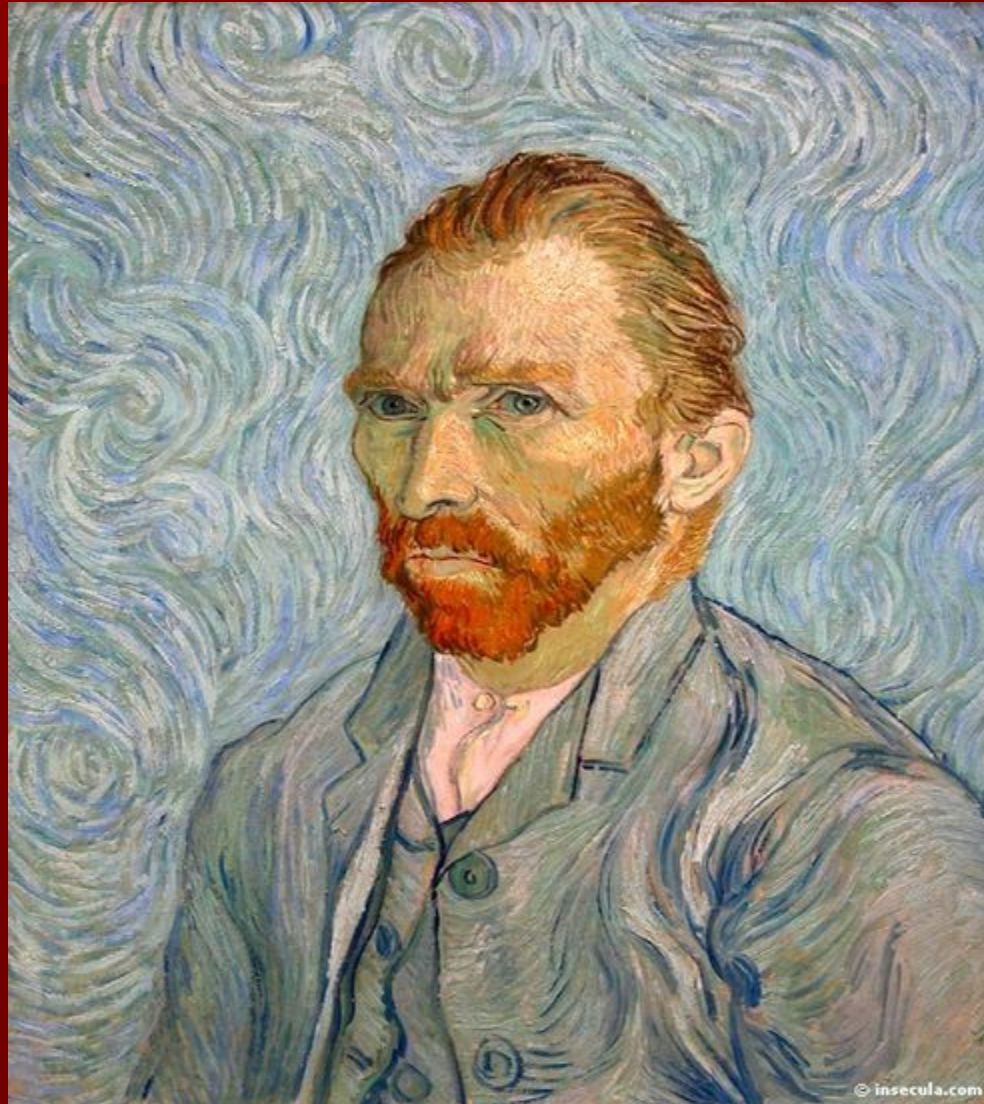


Historical effects of lead poisoning

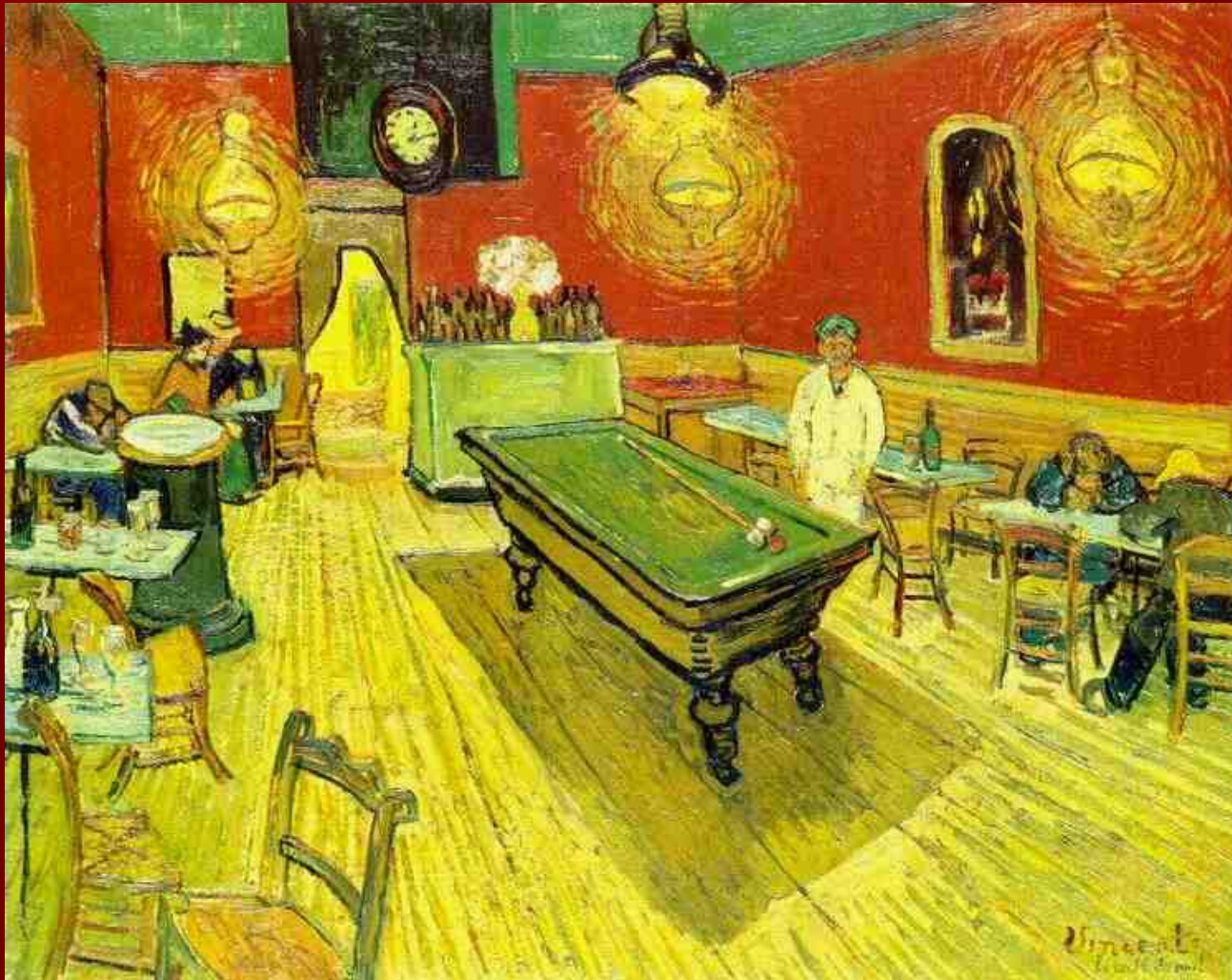


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