

# Blood Lead Level of Chinese Children (0-6 years old)

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# Background

- In recent years, lead poisoning of children has been receiving attention from researchers in China.
- Many studies showed a high prevalence of lead poisoning among children and aroused widespread public concern. However,
  - Most studies performed to date focused only on children living in highly polluted areas.
  - Sample sizes were generally small.
- To estimate the extent of lead exposure for children aged 0 to 6 years, we conducted blood lead level surveillance in 14 cities in 2004, 2005 and 2006 respectively.



# Surveillance spots



# The surveillance was conducted only in 2004 and Changsha dropped out in the next two years

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# *Subjects*

- Children under 6 years old were sampled from each city.
  - Children aged 3 to 6 years were sampled from kindergartens during the regular physical examination.
  - children aged 0 to 2 years were sampled in child health clinics of communities during their mandatory, periodic, well-child visits.



# Distribution of the surveillance spots and sample sizes

Location	City	2004	2005	2006	total
North	Beijing	1114	1208	960	<b>3282</b>
	Shijiazhuang	1170	1296	1212	<b>3678</b>
	Huhehaote	1192	746	1028	<b>2966</b>
Northeast	Haerbin	1276	1255	542	<b>3073</b>
	Dalian	1223	1503	543	<b>3269</b>
East	Hefei	1013	941	1006	<b>2960</b>
	Qingdao	1189	834	1537	<b>3560</b>
South	Guangzhou	1234	845	947	<b>3026</b>
	Haikou	858	940	492	<b>2290</b>
Southwest	Chengdu	1394	727	901	<b>3022</b>
Northwest	Xian	864	657	1167	<b>2688</b>
	Yinchuan	1156	1414	1165	<b>3735</b>
Middle	Wuhan	1242	1281	1163	<b>3686</b>
	Zhengzhou	1044	1090	921	<b>3055</b>
	Changsha	1172			<b>1172</b>
<b>total</b>		<b>17141</b>	<b>14737</b>	<b>13584</b>	<b>45462</b>

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# *Laboratory methods*

- 40 $\mu$ l finger blood was obtained.
- Blood specimens were frozen and shipped to the local maternal and child health care hospital for analysis.
- All the specimens were stored at 4°C and analyzed within one week after being obtained.
- Blood lead was measured by Tungsten atomizer absorption spectrophotometer.
- Analysis of each specimen was performed in duplicate, and the mean of the duplicate measurements was reported.



# Statistical analyses

- Statistical analyses were conducted with Stata8.0.
- Geometric mean of blood lead levels and the percentage of children with blood lead levels  $\geq 100\mu\text{g/L}$  were calculated.
- Differences between age groups and sex were evaluated



# Quality Control

- QC materials were measured to ensure that all equipments were properly calibrated.
- Avoiding lead contamination of samples
  - clean subjects' hands before drawing blood
  - training on methods of sample collection, storage, transportation, determination
  - same operating procedures
  - lead-free materials



# Results

- GM (geometric means) of blood lead levels:

For all three years: 46.89 $\mu$ g/L (10-790 $\mu$ g/L )

– 2004: 47.42 $\mu$ g/L

– 2005: 46.17 $\mu$ g/L

– 2006: 47.03 $\mu$ g/L

The differences were not statistically significant.



- The prevalence of elevated blood lead levels (blood lead levels  $\geq 100\mu\text{g/L}$ ):

- 2004: 9.91%

- 2005: 7.78%

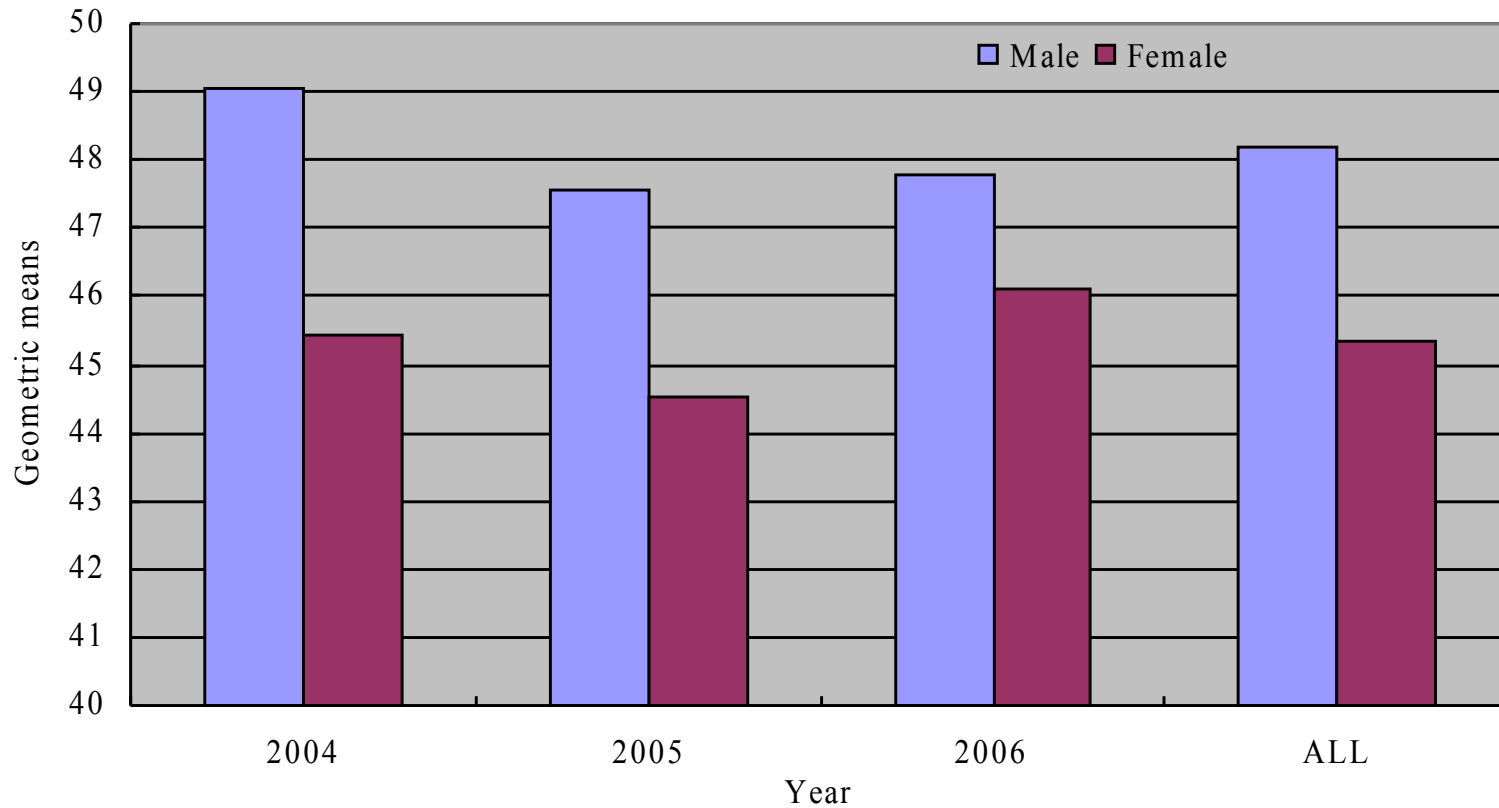
- 2006: 7.35%

The differences were statistically significant ( $P < 0.05$ ).

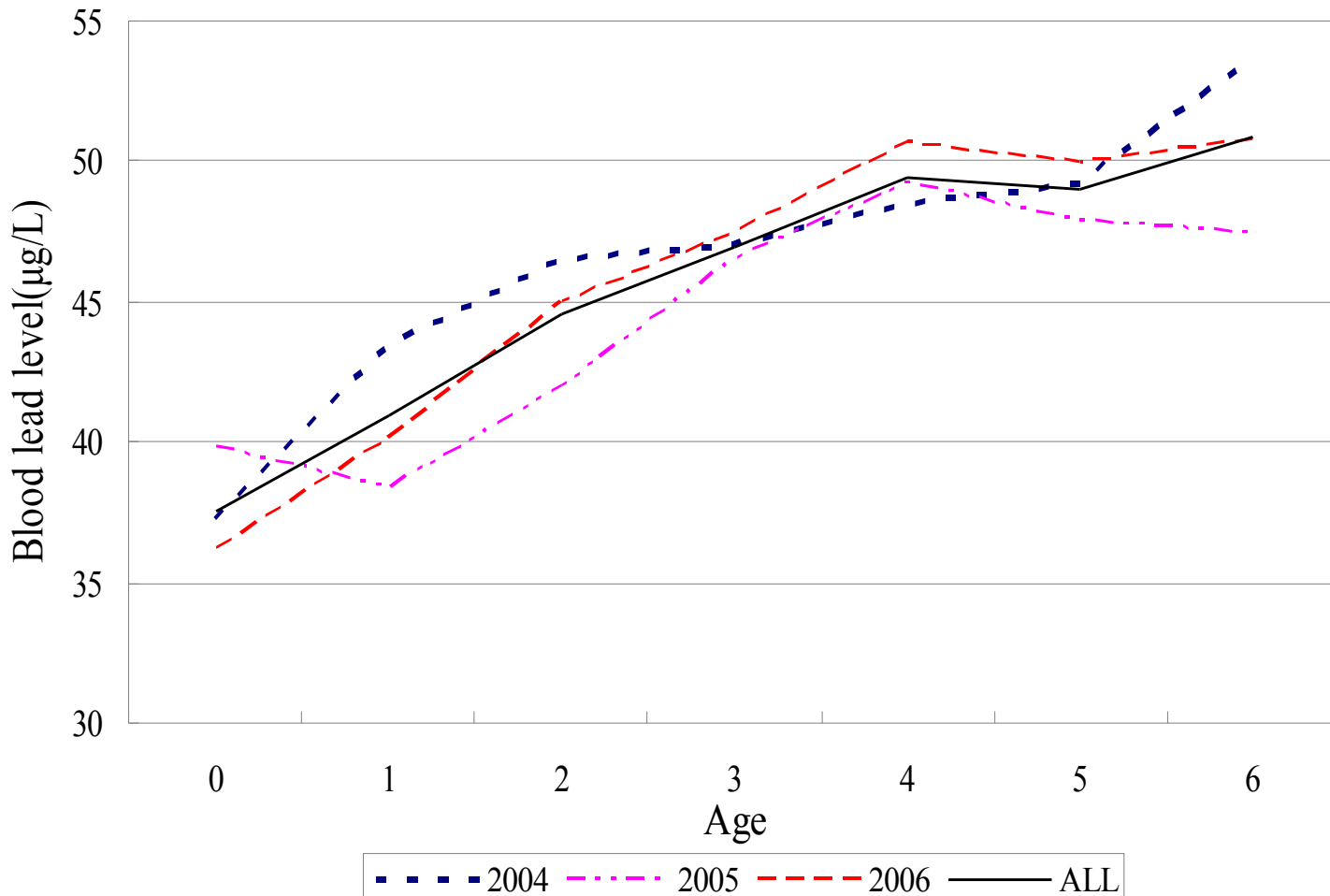
- 88 (0.19%) cases needed chelation therapy ( $\geq 450\mu\text{g/L}$ )



# Geometric mean of blood lead levels by sex



# Blood lead level by age



# Suggestions

- If possible, conduct a nationwide population-based survey to assess blood lead levels for all children.
- Develop and apply the national standards for blood lead measurement methods and quality control.
- Develop a practical national guideline for prevention and treatment of childhood lead poisoning.

