

ELEVATED BLOOD LEAD LEVELS AMONG BURMESE CHILDREN IN FORT WAYNE, IN: ENVIRONMENTAL RISK FACTORS

***A COMPARISON OF DATA ANALYSES TO
SUPPORT THE INDIANA STATE DEPARTMENT
OF HEALTH LEAD MONITORING INITIATIVES**

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Lead as a Concern for Children

- Physiological characteristics that increase vulnerability
- Lead has no function in the body thus a zero concentration is ideal

Modern Standards

- From a policy perspective, bans over the years have drastically reduced the amount of lead in the environment
 - average blood level of children under 5:
 - 15.1 mcg/dL in 1980
 - 1.51 mcg/dL in 2008

International Lead Poisoning

- low-level environmental exposures are still common in developing or impoverished areas of the world
- High-risk factors for children
 - Medicaid recipients
 - Refugees
 - Users of alternative medicine/cosmetics
 - Minority status

Background

- A 2009 study
 - CDC discovered elevated blood lead levels among Burmese children in Fort Wayne, Indiana (Allen County), which was linked to dermal applications of "Thanaka," a face cream commonly used among this culture.

Allen County Demographics

- Fort Wayne, Indiana
 - ▣ large proportion of Burmese refugees, with around 5,000 in 2008
- Allen County has an Asian resident rate almost twice as high Indiana as a whole, which is 1.58% as of 2010

Cultural Risk Factors

- Leaded gasoline still used in Myanmar
- Malnutrition among refugees
- Traditional medicine
- “Synergistic” effect of lead poisoning must be considered

Fish Consumption

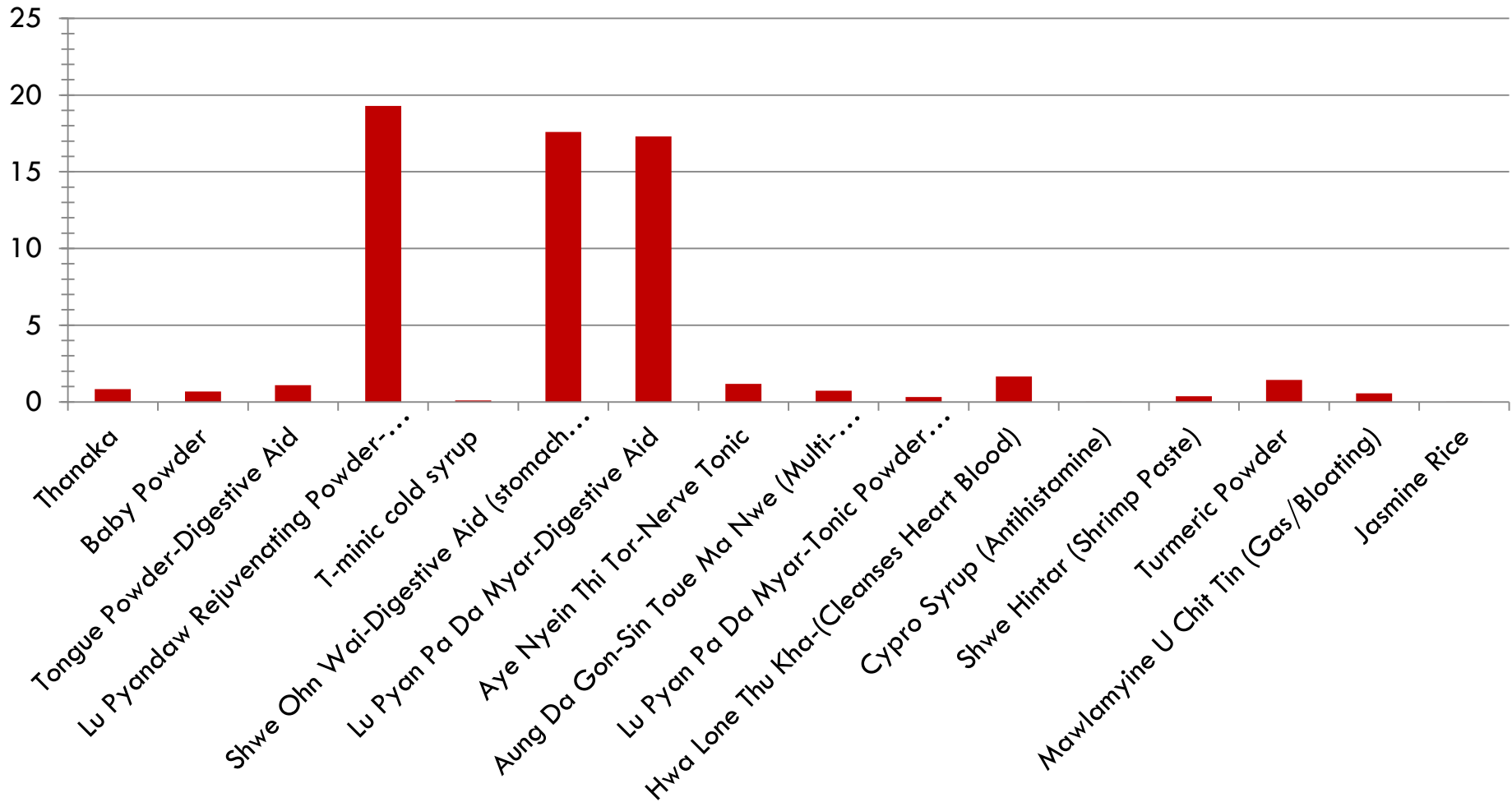
- US Department of Agriculture Survey
 - ▣ general adult population = average of 17.5g fish/day
 - ▣ subsistence groups (i.e. Native Americans) = 142-170g
- King County, Washington study among Asian Pacific Islanders (APIs)

Materials

- blood lead level samples from children under 6 living in Allen County (2010-2013)
- 119 fish tissue samples taken out of Allen County (1990-2010)
- 23 cosmetic/alternative medicines (2014)

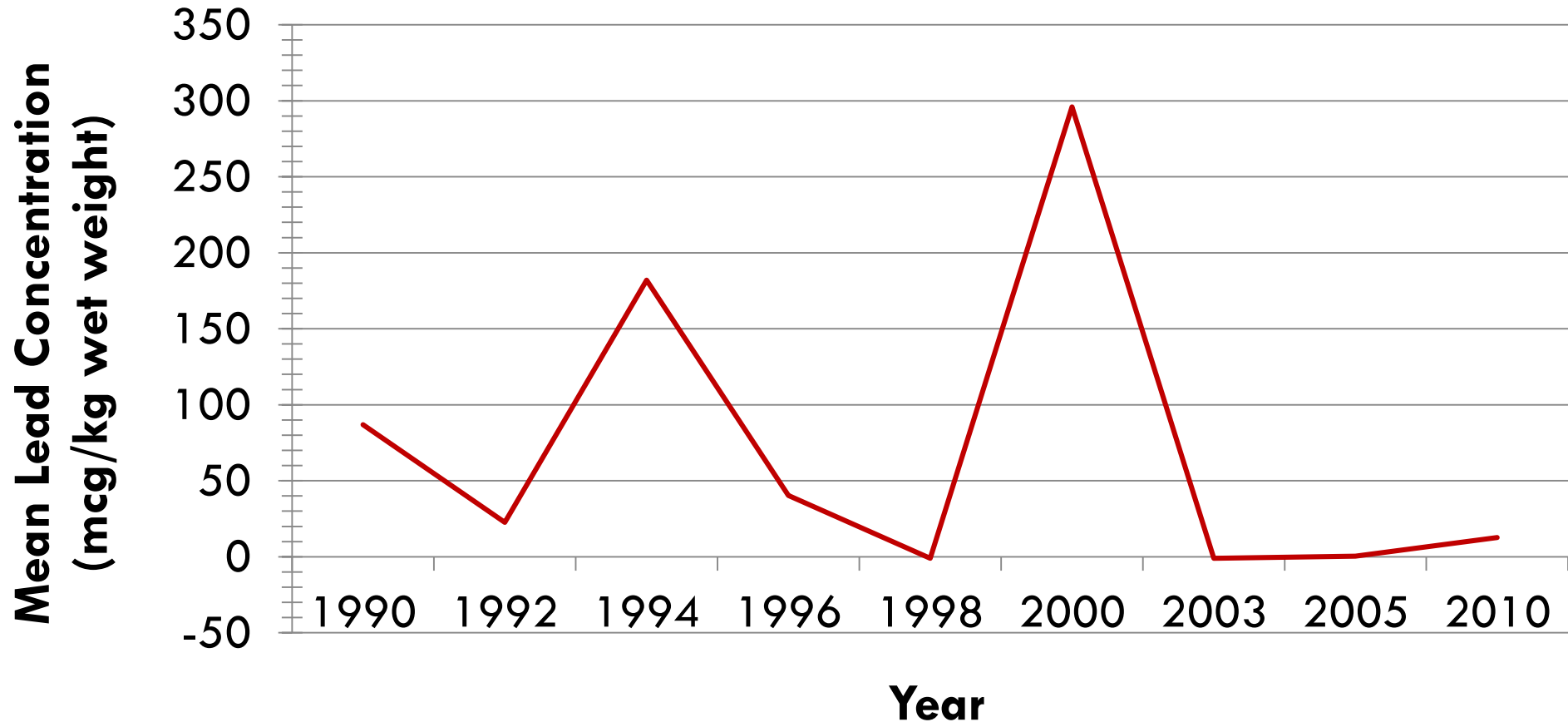
Results-ISDH Surveillance

Surveillance Samples-Mean Lead Concentration (ppm)



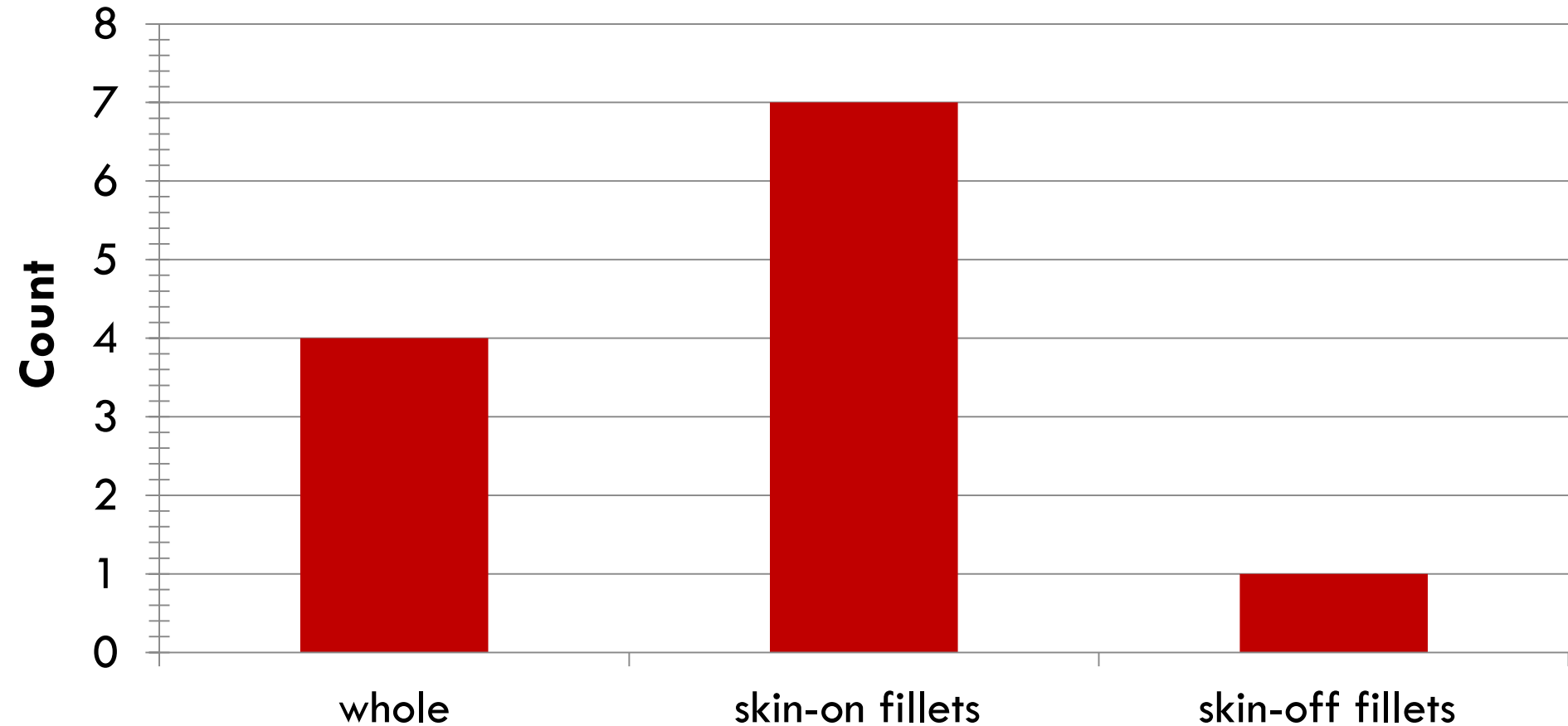
Results-Fish Tissue Sampling

Average Lead Concentration of All Combined Fish Species by Year



Results-Fish Tissue Sampling

Fish Sample Preparations Higher than WHO Standard of 300mcg/kg



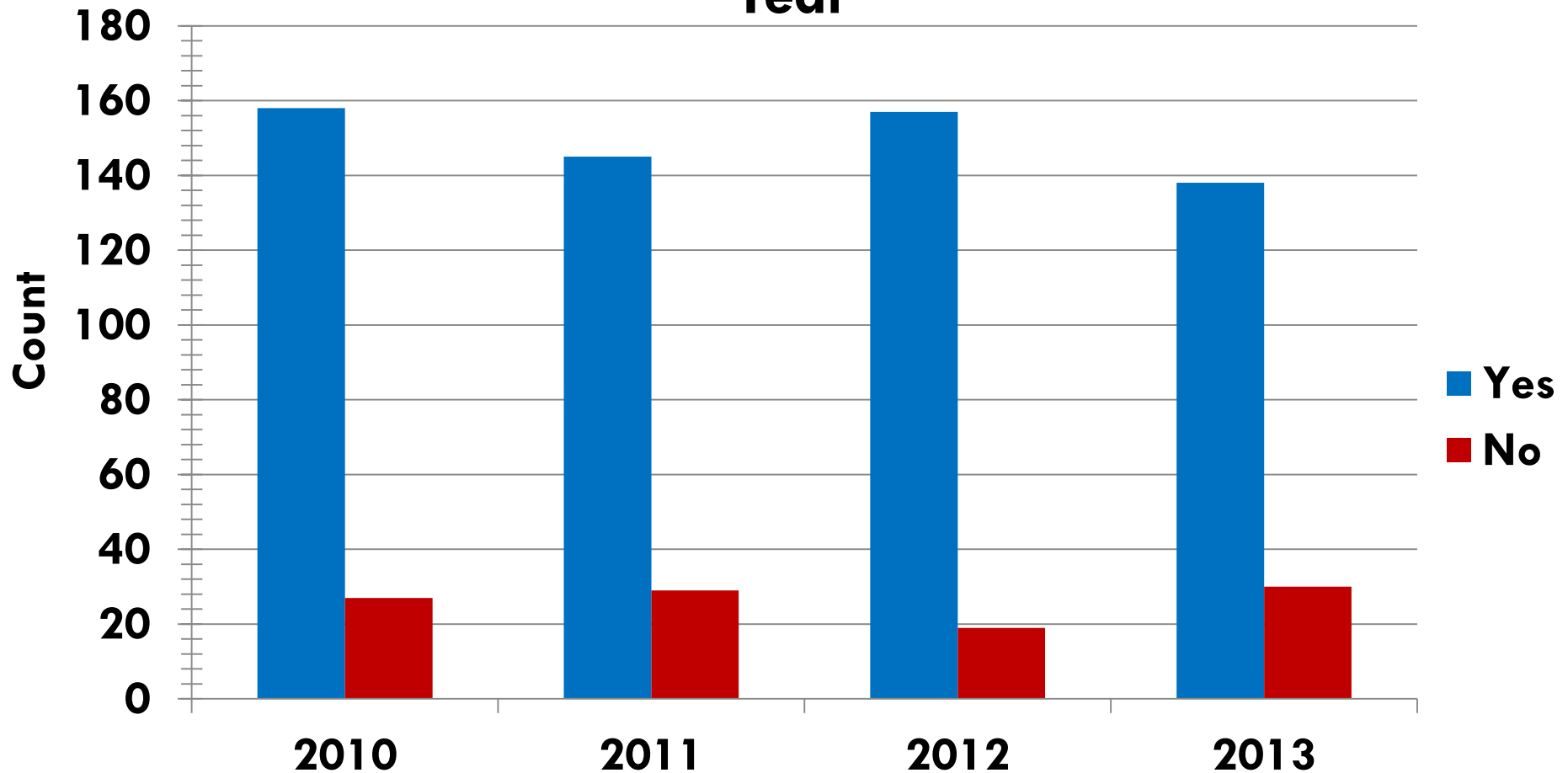
Results-Blood Lead Data

□ Descriptive: sample sizes

	2010	2011	2012	2013	Total
Asian/Pacific Islander	185 (8.2%)	175 (8.3%)	180 (9%)	180 (9.2%)	720
Black	620 (27.6%)	506 (24%)	505 (25.1%)	467 (23.9%)	2098
Hispanic	230 (10.2%)	221 (10.4%)	211 (10.5%)	204 (10.5%)	866
White	1215 (54%)	1210 (57.3%)	1114 (55.4%)	1099 (56.4%)	4638
Total	2250	2112	2010	1950	8322

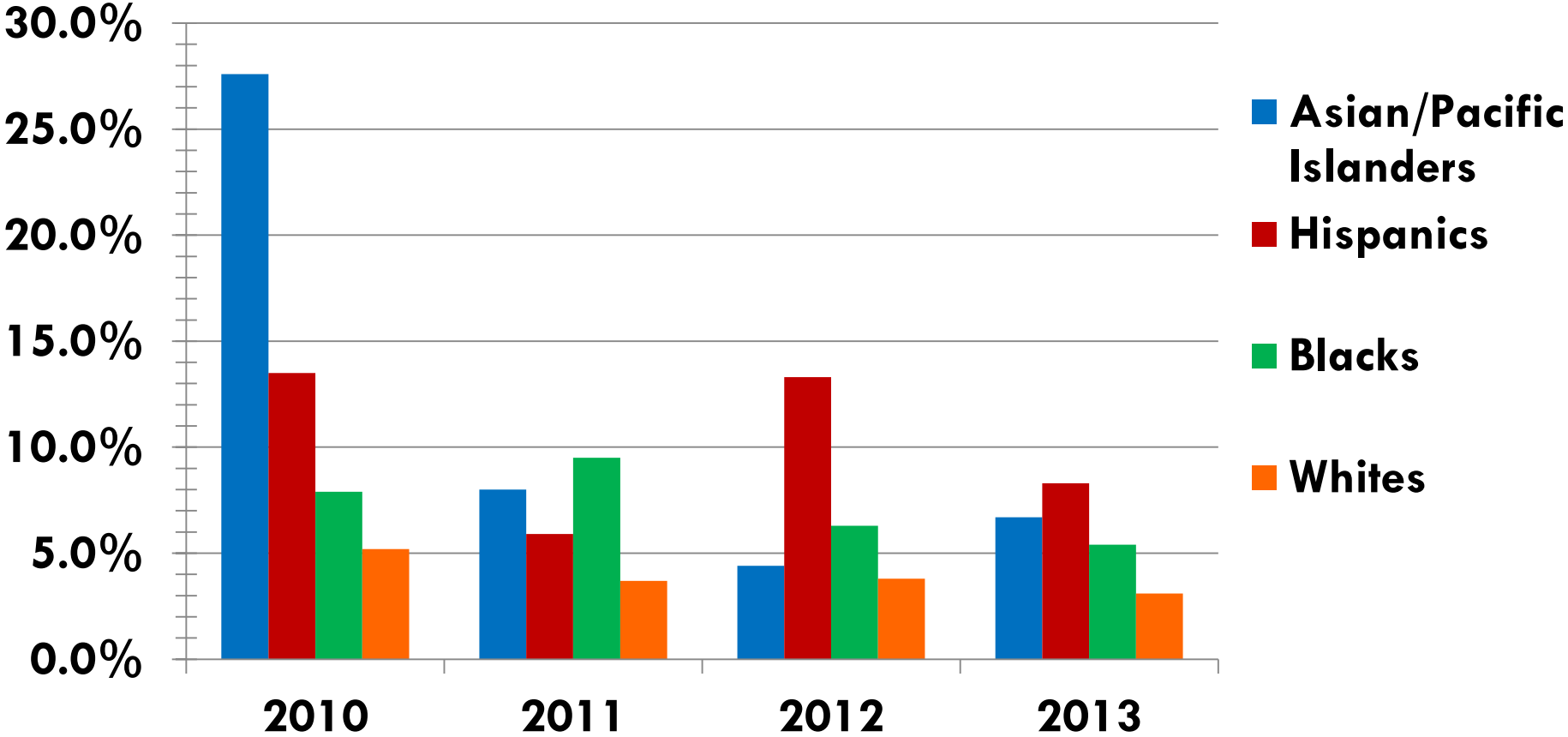
Results-Blood Lead Data

Figure 6: Proportion of APIs on Medicaid by Year



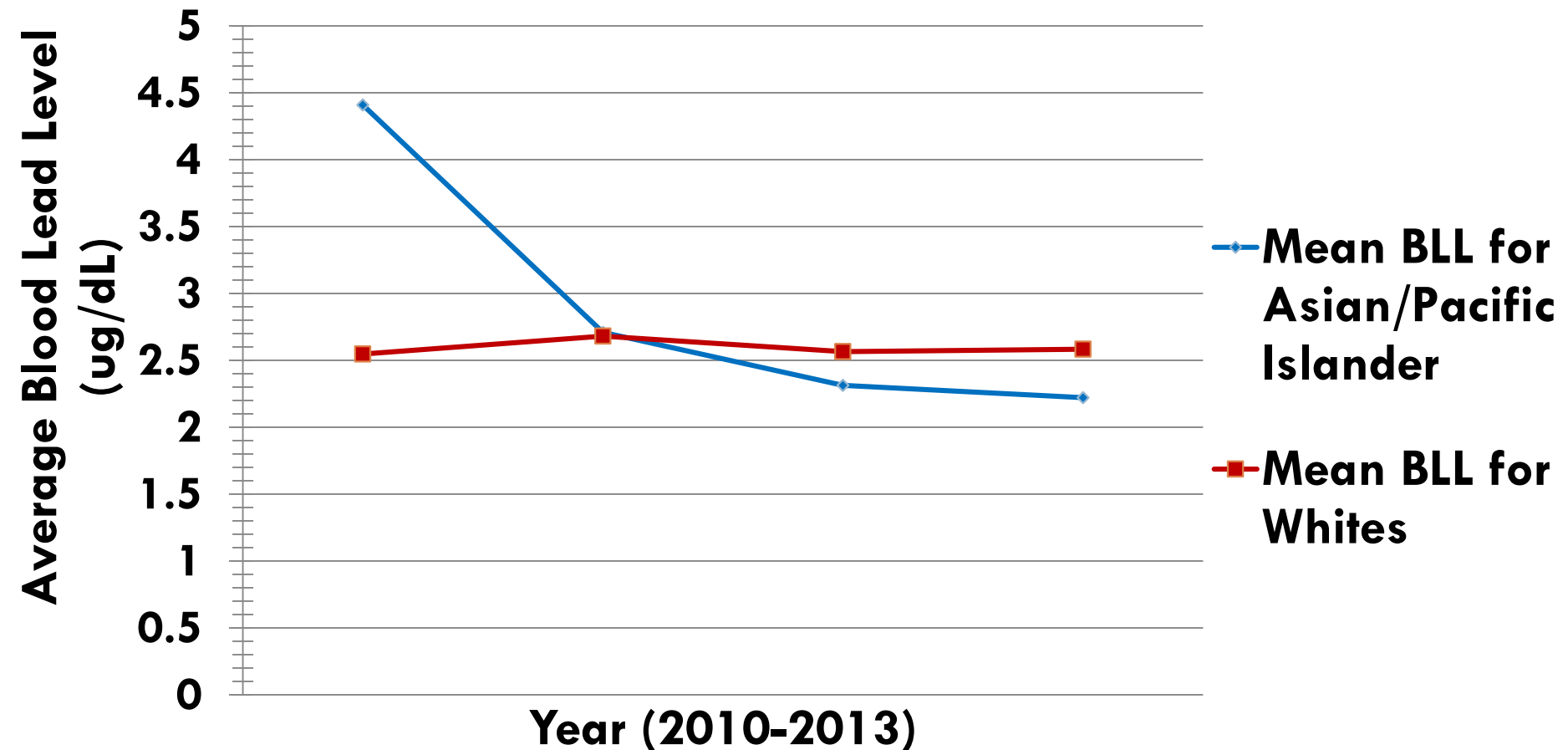
Results-Blood Lead Data

Figure 5: Percent of Children with Blood Lead Levels above 5ug/dL by Race or Ethnic Group



Results-Blood Lead Data

Figure 4: Mean Blood Lead Level for Whites versus Asian Pacific Islanders from 2010-2013



Discussion

- The surveillance investigation into ayurvedic treatments among Burmese residents allows ISDH to better understand cultural practices that may play an important role for perceived vigor or vitality
- Regular monitoring in the future can help keep contaminated products off the shelves

Discussion

- Fish sampling patterns and trends
- More direct correlation between Burmese subsistence fishermen and the rivers depicted in this study is needed
 - ▣ Environmental sampling of smaller water bodies

Discussion

- Theoretical Exposure Assessment
- Synergistic effect of lead exposure must be considered

Discussion

- Trends among Asian Pacific Islander Children
 - Medicaid as a risk factor
 - Positive change in mean blood lead levels, but less so with incidence when compared to whites only, in recent years

Policy Recommendations

- Increased lead education geared towards Burmese residents is needed to better establish boundaries in regards to exposure
- Screening for this culture should be placed on an extremely high priority list to avoid discovering blood lead levels as high as the 2009 investigation

Study Limitations

- WHO dietary standard of 300mcg/kg for lead in fish and seafood
- Only 14 of 119 fish tissue samples were from the whole animal while the rest were either a skin-on or skin-off fillet
- Blood lead level data used in this study was obtained from a de-identified ISDH dataset for each year.

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