A Tribal – University Partnership to Reduce Lead Exposure among Native American Children

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Tribal Efforts Against Lead

NIEHS-funded intervention research project to assess the effectiveness of a lay health advisor intervention in:

- Decreasing the prevalence of elevated blood lead levels in Native American children.
- Increasing preventive behaviors and associated beliefs in Native American children and/or their caregivers.
- Increasing the capacity of area Tribes to respond to a severe environmental lead problem.

Used principles of community-based participatory research

Environmental Health Problem

- Once one of the largest lead & zinc mining regions in the world; focus on northeastern Oklahoma (Ottawa County)
- Mine tailings (chat) contain lead & other heavy metals
- Hundreds of acres covered in chat (millions of tons)
- Quapaw Nation owns 75% of affected land
- Currently a Superfund site
- Multiple sources of lead (dust, soil, chat, paint)

Mine Tailings or “Chat” Pile

Chat Piles

Residential Exposures

Public Health Problem

- Prevalence of lead poisoning in children as high as 26% in some towns
- Lead poisoning causes:
  - decreased IQ
  - learning difficulties & behavioral problems
  - slowed growth
  - impaired hearing
- 33% of white and 40% of American Indian children live below federal poverty level

Community Advisory Board

- Quapaw Nation
- Miami Nation
- Eastern Shawnee Nation
- Peoria Nation
- Wyandotte Nation
- Seneca-Cayuga Nation
- Ottawa Nation
- Modoc Nation
- Shawnee Nation
- Ottawa County Health Department
- Oklahoma Department of Environmental Quality
- Indian Health Service
- LEAD Agency
- College of Public Health, University of Oklahoma
- Rollins School of Public Health, Emory University
- University of New Mexico

Rationale for a Lay Health Advisor Intervention

- Lay health advisors are identified and recruited from individuals who serve natural helping roles in their social networks
- These natural helpers are lay people whom others naturally turn to for advice, emotional support and tangible assistance
- Each of the tribes was asked to recruit lay health advisors--for a total of 40 in the first phase and 24 in the second phase; lay health advisors attended training event and monthly dinner meetings to plan educational activities

Society of Clan Mothers & Fathers

TEAL Project Action Plan

Behavior-Related Objectives

- Hand washing
- Playing on safe surfaces
- Annual blood lead tests
- Good nutrition, including sufficient calcium intake
- Housecleaning, including damp cloth when dusting.

Also had policy-related objectives.

Society of Clan Mothers and Clan Fathers

- Educate one-on-one through social networks
- Sponsor interactive booths at Pow-Wows & fairs
- Develop educational materials, including calendars with tribal languages, coloring and activity books, and brochures
- Give presentations to community groups
- Pilot tested and implement culturally-tailored lead poisoning prevention curriculum in tribal day cares
- Educate decision-makers about various policy issues related to Tar Creek and prevention of lead poisoning
- Encourage tribal resolutions supporting policy change

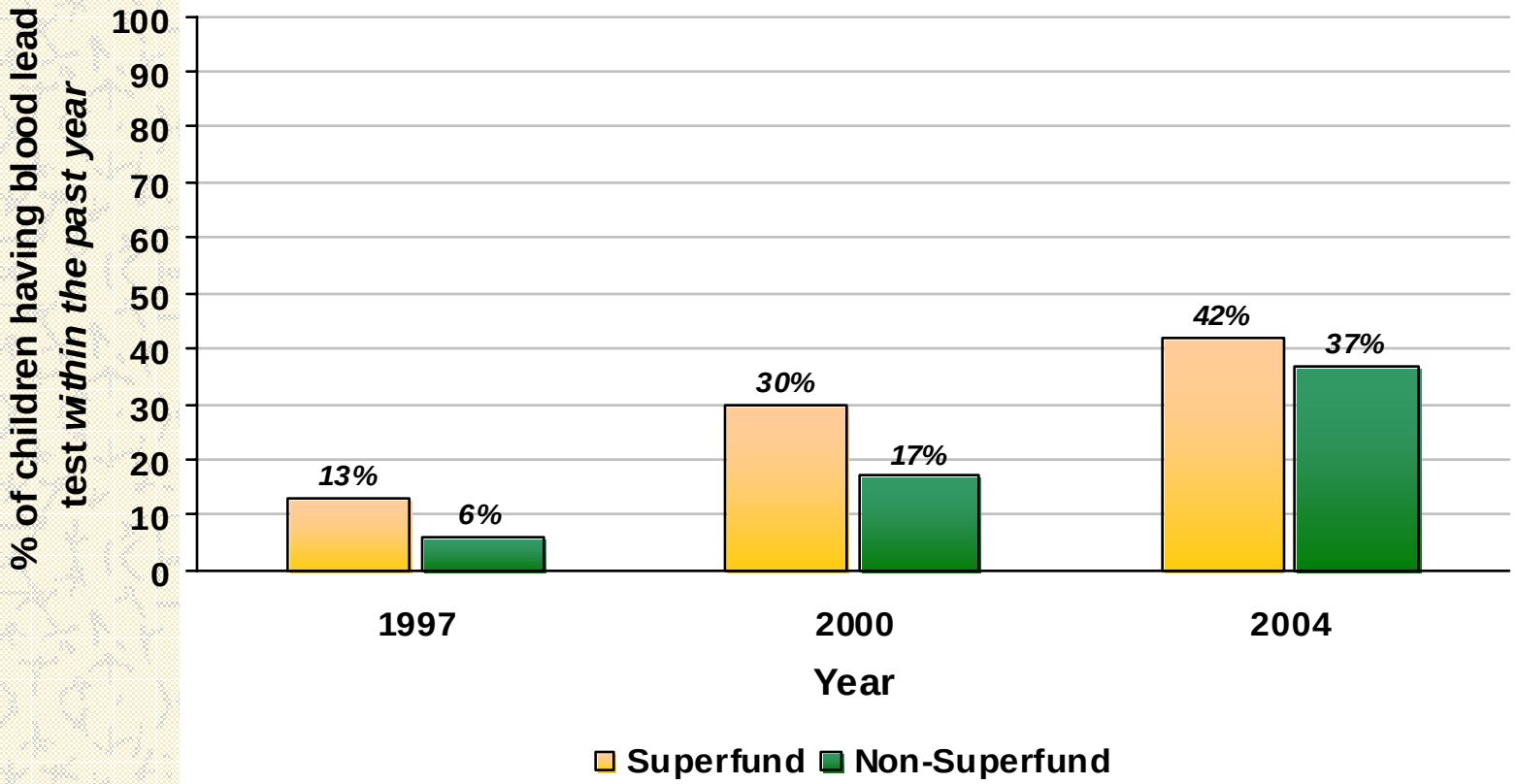
Evaluation Design Components

- Population-based blood lead screening & caregiver interviews in 1997 & 2000 & 2004
- American Indians comprise intervention group, with whites as reference
- Community leader surveys in 1997 & 2000 & 2005
- Organizational network interviews in 1997 & 2000 & 2005
- Process measures (activity tracking forms, attendance, minutes, agendas, materials)

Study Participants

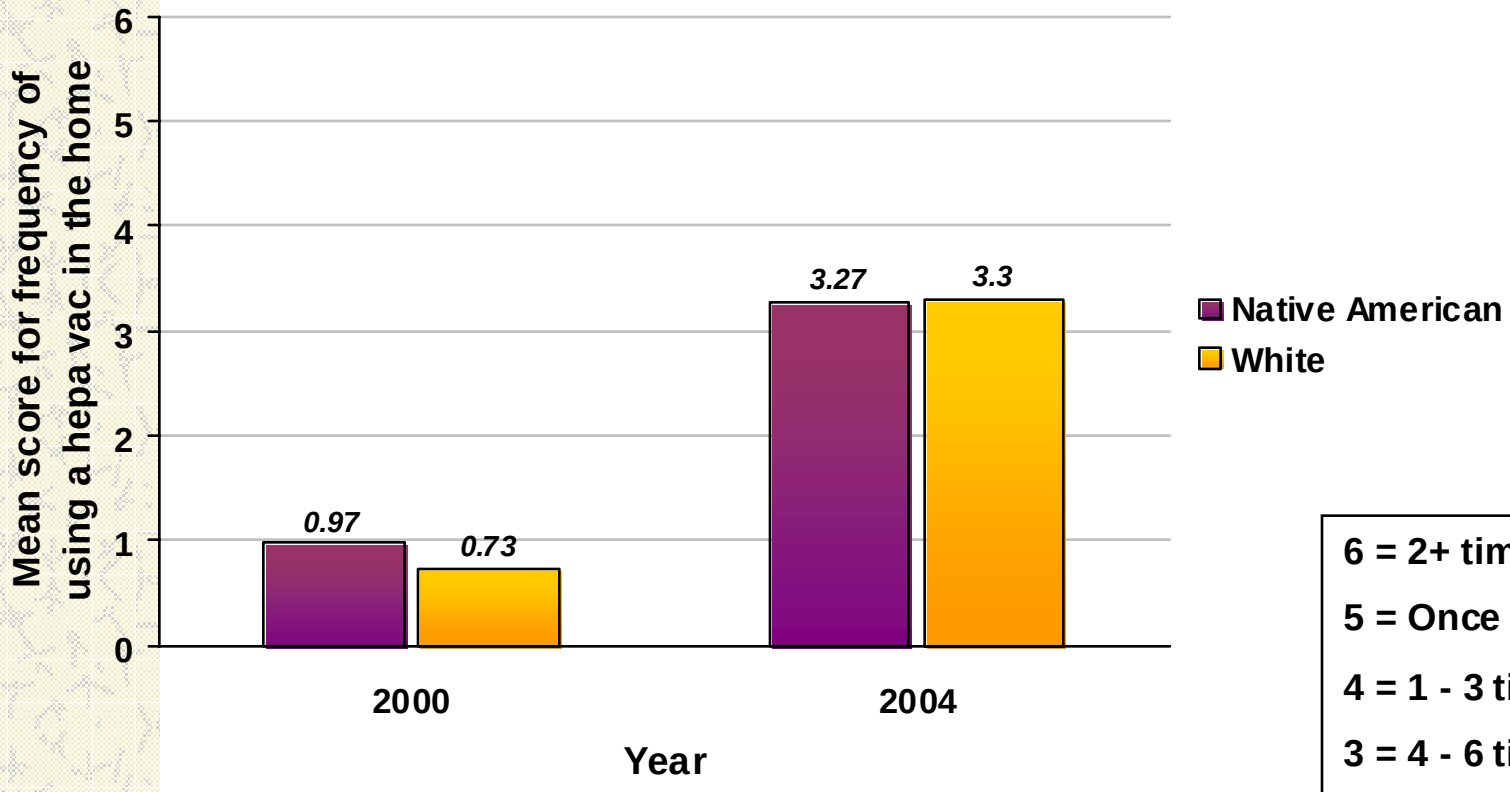
Characteristic	1997	2000	2004
Number of participants	331	387	345
% Native American (children)	43.4	54.3	51.9
% HS education or higher	77.1	73.6	74.8
% Mothers	90.4	84.5	88.2

Child had blood tested for lead ***within the past year***



Cuzick's Trend Test: Superfund ($p < 0.0001$) Non-Superfund ($p < 0.0001$)

Frequency of using a HEPA VAC – Superfund Communities



Change over time: Native American ($p < 0.0001$) White ($p < 0.0001$)

6 = 2+ times / wk

5 = Once / wk

4 = 1 - 3 times / mo

3 = 4 - 6 times / yr

2 = 2 - 3 times / yr

1 = Once / yr

0 = Never

Policy-Related Outcomes

- EPA purchased two HEPA-vacs for each of the 8 tribes
- ODEQ issued regulations for the safe use of chat, including strict penalties for violations*
- Convinced County Commissioner to stop spreading chat on rural roads
- State provided matching funds for Tar Creek Superfund site*
- Got permission from Picher City Council to hang banners warning people about the dangers of chat piles
- Seven tribes passed resolutions supporting mandatory blood lead screening for young children
- Implemented day care curriculum in tribal day cares; trained HEAD START teachers

*TEAL one of many players involved

Community-Based Participatory Research (CBPR) Principles

- Facilitates collaborative, equitable partnership in all phases of the research
  - problem definition (e.g., prevalence by SES, geography; routes of exposure), data collection, interpretation & application of results (Clan Mothers action strategies); resource sharing (e.g., stipends, subcontract to tribe)
- Promotes co-learning and capacity building among all partners
  - research skills, Native American community & culture, local knowledge of environmental problem, major players & local politics
  - policy advocacy & effective strategies for addressing environmental health problems in rural communities

(Israel et al., 2003)

CBPR Principles (cont.)

- Integrates and achieves a balance between research and action to mutual benefit of all partners
  - intervention focused on local action/policy goals
  - policy change & increased community capacity were explicitly desired outcomes
- Involves a long-term process and commitment
  - Over 10 years of collaboration

(Israel et al., 2003)