Childhood Blood Lead Poisoning Surveillance Report 2001-2005

Nebraska Department of Health and Human Services

Division of Public Health
December 2007

DHHS
Nebraska Department of Health and Human Services

State of Nebraska
Dave Heineman, Governor

November 20, 2007

Dear Colleagues:

I am pleased to present the **Childhood Blood Lead Poisoning Surveillance Report** 2001-2005 which describes the trends in lead testing and elevated blood lead levels (EBLLs) among Nebraska children under six years of age. This report provides information to childhood blood lead poisoning prevention programs to assist in the improvement of screening practices and enable health care providers to maximize their limited resources by directing them to the most high-risk populations. This report will be valuable in directing interventions designed to reduce blood lead levels (BLLs) and prevent future exposures and poisoning, as well as facilitating efforts to monitor the progress towards the elimination of childhood blood lead poisoning by the year 2010.

Lead is toxic to all human beings. Children under six years of age are most vulnerable to lead poisoning, due to their rapid rate of development and the frequency they put their hands and other objects into their mouths. Lead poisoning can affect a child's mental and physical growth.

We are committed to eliminating childhood blood lead poisoning by the year 2010, a goal set by the Nebraska 2010 Health Goals and Objectives. We have made progress through the Childhood Blood Lead Poisoning Prevention Program on identifying and managing individual cases of elevated blood lead levels. The number of children who received a blood lead screen has increased from 2001 to 2005. As this report indicates, the prevalence and incidence of EBLLs has consistently decreased from 2001 to 2005.

To ensure successful elimination of EBLLs among children, the Nebraska Department of Health and Human Services will continue to provide case management for children with EBLLs, as well as data management & surveillance, and education & outreach. We will continue to collaborate with other groups and agencies on implementing primary prevention strategies that work at the community level.

Please join with the Nebraska Department of Health and Human Services and other state agencies, health care providers, public programs and private businesses in working towards a lead-free environment for our children, to keep them safe and healthy.

Sincerely,

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Director, Division of Public Health
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ACKNOWLEDGEMENT

Childhood blood lead poisoning surveillance relies on data submitted by physicians through medical laboratories that conduct screening tests. We appreciate their dedication and commitment in assisting us in monitoring childhood blood lead poisoning in Nebraska. This surveillance system is a collaborative effort involving many public health professionals from the Nebraska Department of Health and Human Services, Douglas County Health Department and Lincoln Lancaster County Health Department. They deserve much appreciation for their diligent work. They are responsible for collecting, entering, compiling, and reviewing test results on a daily basis.

We thank Dr. Jackie Miller, Section Chief Administrator, Dr. Joseph M. Acierno, Deputy Chief Medical Officer, Mary Sue Semerena, Unit Administrator, and Douglas Gillespie, Health Program Manager, for reviewing this report. We would also like to extend our appreciation to Karis Bowen, GIS specialist, for producing the maps in this report. We offer special thanks to Aimee Pearce for editing this report. Finally, we thank Marla Augustine, DHHS Public Information Officer, for review this report.

EXECUTIVE SUMMARY

The Nebraska Department of Health and Human Services (DHHS) performs childhood blood lead surveillance for Nebraskan, through the Childhood Lead Poisoning Prevention Surveillance System. The Childhood Lead Poisoning Prevention Program collects data from laboratories which perform blood lead tests on children 0-6 years of age. This system generates reports, identifies children with elevated test results and provides appropriate case management. Since 1995, DHHS has released two comprehensive reports on statewide lead testing (Nebraska Health and Human Services System, 1998 and Nebraska Health and Human Services System, 2001). This report presents the childhood blood lead test results for calendar years 2001–2005.

CY 2001-2005 Surveillance Highlights

The screening rate of blood lead levels for Nebraska children less than six years of age increased steadily from 2001 (10.1 per 100 children) to 2005 (14.6 per 100 children), in almost all counties*, and age, gender, racial and ethnic groups. Douglas County accounted for nearly half or more than half of the number of children screened. Children who were one year old had the highest screening rate, as well as the largest magnitude of increase in screening rate. Male and female children had almost the same screening rate. The screening rate was highest among black children compared to other racial groups. Hispanic children had a higher screening rate than non-Hispanic children or children whose ethnicity was unknown or not reported.

The data showed a downward trend of prevalence and incidence of Elevated Blood Lead Level (EBLL) throughout the five-year period, in almost all counties*, and age, gender, racial, and ethnic groups. Prevalence of EBLL went from 3.8 per 100 children screened to 2.1 per 100 children screened. Incidence of EBLL went from 3.5 per 100 children screened to 1.7 per 100 children screened. Children with EBLL in Douglas County accounted for more than half of both newly identified and existing children with EBLL in Nebraska. The 2-year-old group had the highest incidence and prevalence of EBLL. Incidence and prevalence of EBLL were similar among male and female children. Compared to other racial groups, black children had the highest level of incidence and prevalence of EBLL throughout the five years, with the exception of 2005. Hispanic children had a higher level of incidence and prevalence of EBLL than non-Hispanic children or children whose ethnicity was unknown or not reported.

* Note: There were no lead data for six counties.

Recommendations for Data Improvement

It is a challenge to identify all children at risk of lead poisoning due to the fact that screening of childhood blood lead levels (BLL) is not universally available to all children in Nebraska. In this study, the data on BLL testing is subject to several limitations, such as incomplete and inconsistent reporting, missing values related to demographic variables, and the inability to identify the entire at-risk population. In order to improve data quality and establish and utilize reliable state-specific data to advocate for and develop prevention programs that target childhood blood lead poisoning, this report made the following recommendations:

- Improve the data reporting system;
- Form an advisory committee to establish guidelines to standardize the screening practice and data submission processes;
- Regularly assess data quality in terms of completeness and accuracy, and provide feedback to data providers for their data quality improvement ;
- Link STELLAR data with other databases, such as Medicaid, to provide a more comprehensive understanding of screening coverage among children at risk of lead poisoning;
- Educate health care providers on the importance of lead data and how the data is used;
- Reduce the incidence of missing values on race, ethnicity, and other demographic variables.

INTRODUCTION

Background

Lead is a heavy, low-melting, bluish-gray metal that occurs naturally in the earth's crust. Most of the high levels found throughout the environment come from human activities. Environmental levels of lead have increased more than 1,000-fold over the past three centuries as a direct result of human activity. In the United States, lead is no longer used in paint or gasoline. It is, however, still present in various other items, such as batteries, solder, ammunition, pipes, unglazed pottery, folk medicine, and roofing materials. (Agency for Toxic Substances and Disease Registry, 2005)

No safe BLL has been identified for children. For the adult population, higher blood lead levels (≥25ug/dl) may lead to damaged kidneys, blood, and nervous systems. For young children, at very high levels, lead poisoning can cause mental retardation, coma, convulsions, or death. Young children face the most danger from exposure to lead, due to the high rate at which their growing bodies absorb the lead. (Centers for Disease Control and Prevention, 2005)

Lead paint is the major source of lead exposure for children in the United States (American Academy of Pediatrics, 1993). Due to its small size, lead dust is not always visible to the naked eye, and it is difficult to clean up. Most commonly, lead dust gets on children's hands and toys, and then into their bodies through normal hand-to-mouth activity. When lead-based paint begins to deteriorate (chip or peel) and is disturbed during repainting or remodeling projects, the friction or impact that takes place creates lead dust (Centers for Disease Control and Prevention, 1991). Although lead was banned from residential use in 1978 (16 CFR §1303), it remains a hazard in homes built before that time. Approximately 83% of all homes built in the United States prior to 1978 have lead-based paint (Centers for Disease Control and Prevention, 1997a). The older the home, the more likely it is to contain lead-based paint and to have a higher concentration of lead in the paint. Homes built prior to 1950 pose the greatest risk of exposure to children. According to the 2000 U.S. Census, 32% of housing units in Nebraska were built prior to 1950. Since the census data cut-off time is one decade (e.g. 1970-1979), it is hard to know the actual percentage of those housing units built prior to 1978. But those built in 1979 and earlier accounted for 76% of all housing units in Nebraska in the 2000 census data.

Other than lead-based paint, sources of lead exposure in children include:

- Soil and dust: Children can be exposed to lead deposited by primary lead sources such as lead paint, leaded gasoline, and industrial or occupational sources of lead. Since lead does not dissipate, biodegrade, or decay, the lead

deposited into dust and soil becomes a long-term source of lead exposure for children.

- Drinking water: In general, lead in drinking water is not a predominant source for poisoned children. In some circumstances, however, lead exposure from water is unusually high. Overall, lead leaching from copper pipes with lead-soldered joints represents the major source of water contamination in homes and public facilities, such as schools.
- Parental occupations and hobbies: Children may be exposed to high lead levels when workers take lead home on their clothing or when they bring scrap or waste material home from work. Hobbyists-hunting, fishing, auto repair, artisans, and gardening, may also inadvertently expose their families to lead.
- Air: Although lead used in gasoline has been markedly reduced, previous use has resulted in widespread contamination of soil and dust. Except around point sources, like smelters and battery manufacturing plants, inhalation of airborne lead is now a minor exposure pathway for individual children.
- Food: The quantity of lead in the United States diet has decreased markedly in recent years. However, improperly fired ceramic ware, leaded crystal, and lead-soldered cans still result in lead leaching into foods. Food and food packaging from foreign manufacturers has been found to contain lead. Some food handling practices, such as storing food in containers that release lead for prolonged periods, can also increase the lead content of foods.
- Traditional medicines: Many “non-Western” medicines and cosmetics contain substantial quantities of lead and other metals. They have also been identified as sources of concern among lead-poisoned children. (Centers for Disease Control and Prevention, 1991)

Young children (especially those living in old houses with lead-based paint) have a higher potential for lead exposure and are especially susceptible to its toxic effects. Children from low-income families and children from racial/ethnic minority backgrounds are more likely to have elevated blood lead levels (Centers for Disease Control and Prevention, 1997). The 2000 U.S. census data estimated that 13.7% of Nebraska children who were less than 6 years old were below poverty level. It is important to note, however, that no economic or racial/ethnic subgroup of children is free from the risk of lead poisoning. Children from wealthier backgrounds and white children can also be at risk if, for example, they live in homeowner-renovated housing (Agency for Toxic Substances and Disease Registry, 2000).

Between 1991 and 1997, the Centers for Disease Control and Prevention (CDC) and the American Academy of Pediatrics (AAP) recommended universal screening, that is, all children have their blood lead concentration measured, preferably when they are 1 and 2 years of age. By the late 1990s, with the steady decline in prevalence of EBLL, CDC and AAP began to recommend screening only those children at risk for having an EBLL – those in older housing, those

who had a sibling or playmate with an elevated blood lead concentration, or those who had lived in or visited a structure that might contain deteriorated, damaged, or recently remodeled lead-painted surfaces. (American Academy of Pediatrics, 2005)

The Nebraska Childhood Lead Poisoning Prevention Program (CLPPP) administered targeted screening among children who were at greater risk of lead poisoning through local health departments and Community Action Programs (CAP) until June 30, 2005. Thereafter, the targeted screening was discontinued due to the termination of federal funding. Clinics and hospitals now decide on their own whether to have a child tested for EBLL or not. There are no general guidelines for this practice, except that Medicaid-eligible children are required to be screened at 1 year and 2 years of age; and if not at 1 or 2, at some point between age 3 and 6. If a blood sample drawn from a capillary resulted in a BLL of 15µg/dL or more, a vein draw should be taken to confirm the results.

The best approach to eliminate lead poisoning is to prevent exposure in the first place (primary prevention), but it will be years before this goal is achieved. In the meantime, case-finding, case-management, and prevention of additional exposure (secondary prevention) will still be essential (American Academy of Pediatrics, 2005).

The Section of Environmental, Disease, and Vector Surveillance at Nebraska DHHS Department of Regulation and Licensure generated two surveillance reports on lead poisoning with 1997-1998 and 1999-2000 data, respectively. The first report used 1997-1998 surveillance data on lead poisoning among people over 6 years old. It was found that among 740 individuals tested for lead poisoning, 439 (59.4%) had BLL greater than 10µg/dL (Nebraska Health and Human Services System, 1998). The second report focused on childhood lead poisoning in Nebraska. It was reported that between 1995 and 2000, a total of 52,149 children were screened for EBLL. In that group, 54 children had BLL sufficiently elevated to qualify for hospitalization or chelation therapy. During the same time period, an additional 3,604 children had BLL within the range, which indicated detrimental psychological and physiological health effects. (Nebraska Health and Human Services System, 2001)

Purpose of Report

The purpose of this report is to describe the trends in lead testing and elevated blood lead levels among Nebraska children under six years old and to provide information for health care providers to improve the screening practice, in order that the limited resources could be directed to most high-risk population and utilized maximally; The purpose of this report is also to monitor the progress

towards the elimination of childhood blood lead poisoning by 2010. This report is also valuable in directing interventions designed to reduce EBLL or prevent future exposures and poisoning.

METHODS

Data Source

Nebraska lead poisoning surveillance data is entered into the Systematic Tracking of Elevated Lead Levels and Remediation (STELLAR) database that was created by the Centers for Disease Control and Prevention. The data used in this report represents all cases of Nebraska children less than six years of age who had their BLL tested and reported to Nebraska DHHS by physicians, clinics, laboratories and hospitals, as required by Nebraska law. This report is generated using the data collected in the 2001-2005 Nebraska STELLAR database, for children under 6 years of age. In this database,

- Age is based on the child's age at the time that the blood sample with the highest confirmed test result was collected, or the child's age at the time that the highest non-confirmed test result was collected, when confirmed tests were not available. One record is included in the analysis only if the child's age is less than 72 months.
- County refers to the child's county of residence at the time of screening;
- A child is counted only once in the analysis if he/she lived and/or tested in more than one county during the same year.

Analysis

All data analysis was performed with SAS 9.1. Children who had multiple tests within the same calendar year were identified. For each child, the confirmed highest test result during the year was retained. However, if a confirmed case was not available, the child's highest test result was retained.

Screening rate is defined as number of children tested among every 100 corresponding population in the State of Nebraska. Population size of specific area, age, gender, race, and ethnicity was retrieved from the 2000 national census data.

Elevated Blood Lead Level refers to one blood lead test result that is greater than or equal to 10µg/dL.

A confirmed EBLL case is defined as a venous BLL at or above 10ug/dL or capillary BLL at or above 10ug/dL confirmed by retesting with venous blood.

Incidence of EBLL is the proportion of newly detected EBLL cases during each year among children under the age of six who were screened in that year.

Prevalence of EBLL is the proportion of children who were identified to have EBLL among those under the age of six who were screened during that year.

A descriptive analysis was conducted on the lead poisoning screening rate/incidence and prevalence of EBLL per 100 children screened in each year. For each of the two sections, results were presented in the following six parts.

- Screening rate/incidence and prevalence of EBLL by major residential areas (Douglas County, Lancaster County, and other counties);
- Screening rate/incidence and prevalence of EBLL by age groups (<1 year, 1 year, 2 years, 3 years, 4 years, and 5 years);
- Screening rate/incidence and prevalence of EBLL by gender (male and female);
- Screening rate/incidence and prevalence of EBLL by race (White, Black, Asian, and Indian);
- Screening rate/incidence and prevalence of EBLL by ethnicity (Hispanic and other; note that “other” refers to all those who were not identified as Hispanic, including non-Hispanic, unknown, missing and other);
- GIS map of screening rate of EBLL by county for 2005 data (GIS map of incidence and prevalence of EBLL by county is not available, because many counties had numbers less than five, which frequently results in an unstable estimation).

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RESULTS

Sample Introduction

In the Nebraska STELLAR database, 93,694 screening tests were conducted for children under 6 years of age, from 2001-2005. After the un-duplication process based on identifications (children's last name, first name, gender, and date of birth) by each year to exclude identical records, a total of 90,535 screened records were retained. The number of children (0-6 years) screened increased from 14,292 in 2001 to 20,575 in 2005 (Table 1.1).

Table 1.1 Number of Children Screened for BLL, Nebraska, 2001-2005

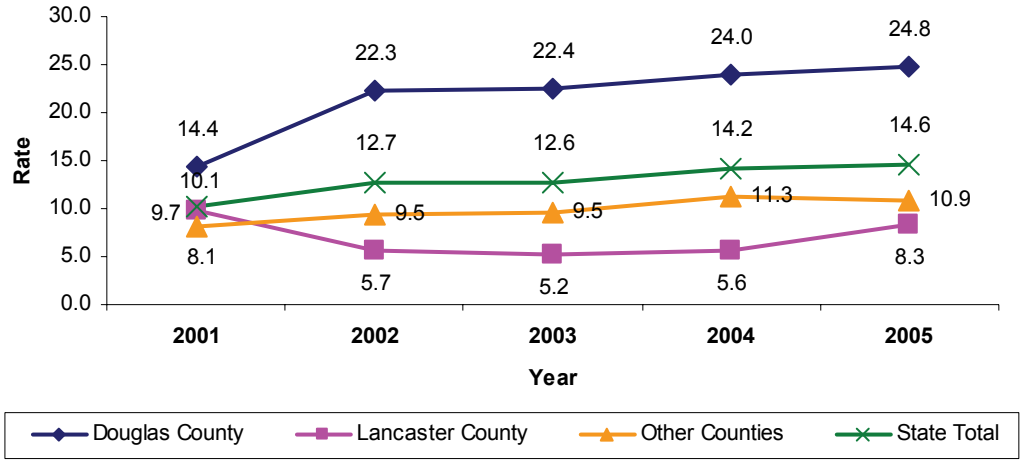
	2001	2002	2003	2004	2005	Total
Number of screening tests	**14,930**	**18,417**	**18,462**	**20,721**	**21,164**	**93,694**
Number of children screened	**14,292**	**17,848**	**17,835**	**19,985**	**20,575**	**90,535**

Children Screened for Lead Poisoning

Table 2.1 in the appendix (p.24) lists the number of children screened for lead poisoning, and the screening rate based on the population size from the 2000 census for each year by county, age group, gender, race, and ethnicity. Figures 2.1-2.5 below compare screening rate by county, age group, gender, race, and ethnicity, respectively.

- **Lead poisoning screening rate of children by county**

Fig. 2.1 Lead Poisoning Screening Rate by County

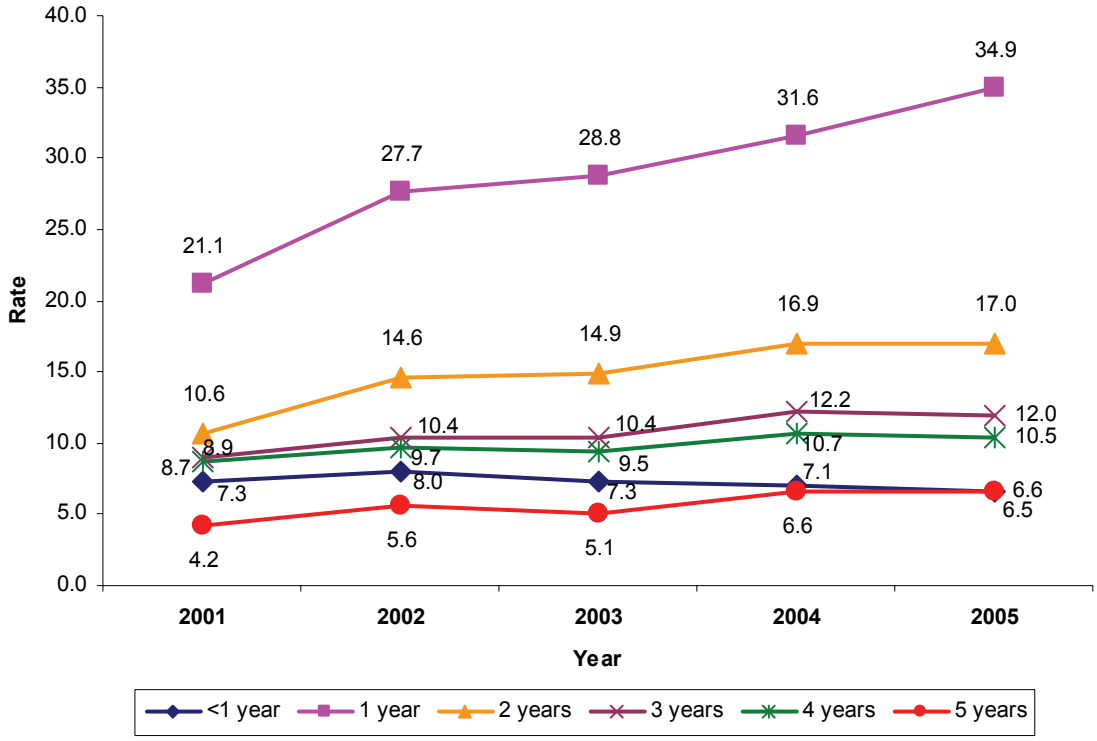


- Screening rates are per 100 children based on Population Census 2000

The state of Nebraska's overall screening rate has increased from 10.1 per 100 children in 2001 to 14.6 per 100 children in 2005. In general, the screening rates for Douglas County, other counties, and the state have exhibited upward trends, with Douglas County contributing significantly to the overall state increase in screening rate. The number of children screened in Douglas County accounted for nearly half or more than half of the number of children screened in the state over the five-year period from 2001 to 2005.

- **Lead poisoning screening rate of children by age group**

Fig. 2.2 Lead Poisoning Screening Rate by Age Group

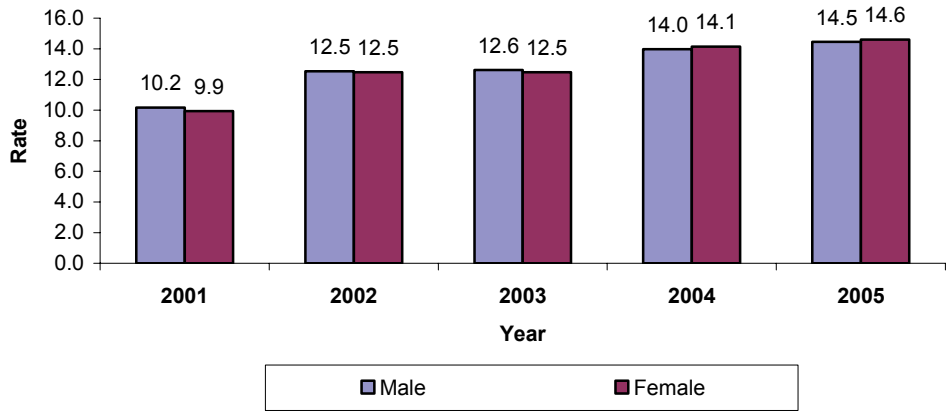


- Screening rates are per 100 children based on Population Census 2000

Over the 5-year time period, the screening rate has increased for all age groups except children under 1 year of age. The highest screening rate was among one-year-old children, with a decline in the screening rate as the children's age increased, excluding children less than 1 year old. Children who were 1 year old also had the largest magnitude of increase in screening rate over this 5-year period (from 21.1 in 2001 to 34.9 in 2005). The screening rate among 2-year-old children increased from 10.6 in 2001 to 17.0 in 2005.

- **Lead poisoning screening rate of children by gender**

Fig. 2.3 Lead Poisoning Screening Rate by Gender

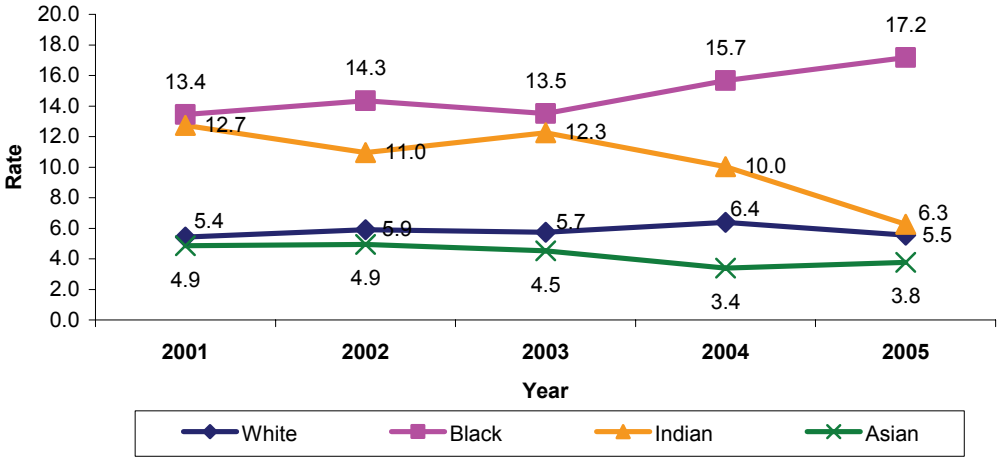


- Screening rates are per 100 children based on Population Census 2000

A steady increase of screening was found among both male and female children. For males, the screening rate was 10.2 per 100 children in 2001, which rose to 14.5 per 100 children in 2005. For females, the rate went from 9.9 per 100 children in 2001 to 14.6 per 100 children in 2005. The screening rates were nearly the same between males and females.

- **Lead poisoning screening rate of children by race**

Fig. 2.4 Lead Poisoning Screening Rate by Race

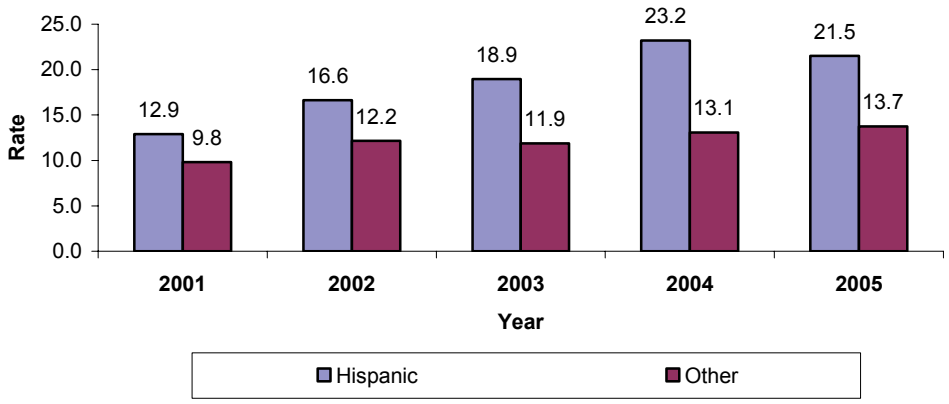


- Screening rates are per 100 children based on Population Census 2000
- Asian represents Asian/Pacific Islander; Indian represents Native American/Alaskan Native.

Over the 5-year period from 2001 to 2005, blacks had the highest screening rate, and the rate showed an upward trend; whites had a relatively steady screening rate; Indians and Asians demonstrated downward trends.

- **Lead poisoning screening rate of children by ethnicity**

Fig. 2.5 Lead Poisoning Screening Rate by Ethnicity



- Screening rates are per 100 children based on Population Census 2000
- "Other" refers to all those who were not identified as Hispanic, including non-Hispanic, unknown, missing and other

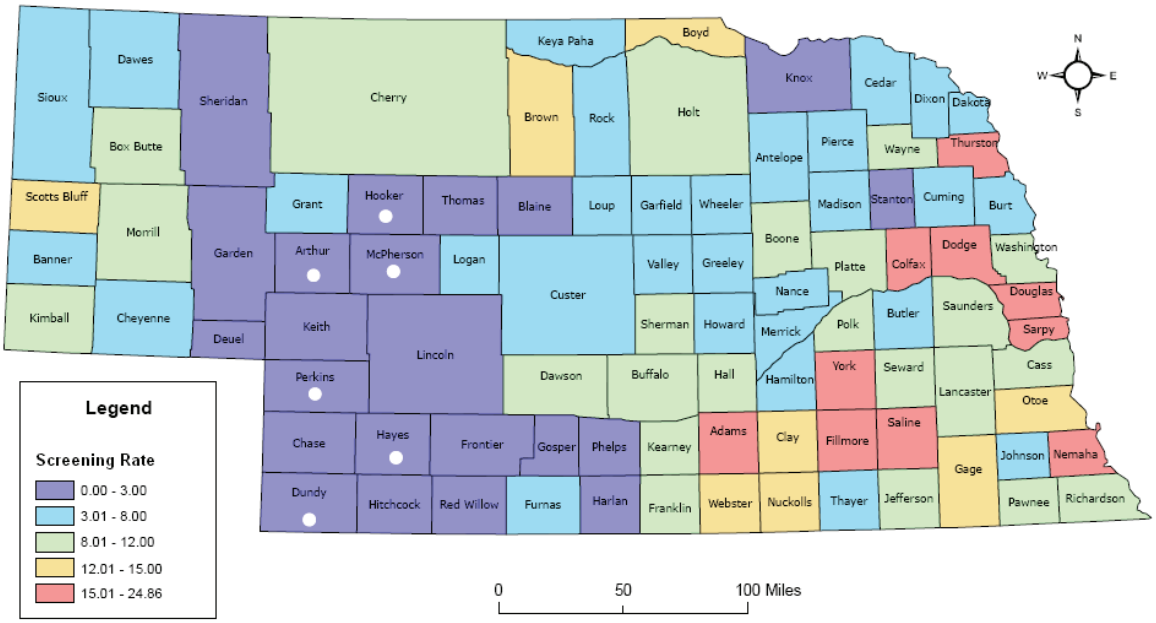
Over the 5 years from 2001 to 2005, Hispanic children had higher blood lead screening rates than "other" children. Blood lead screening rates among Hispanic children increased from 12.9 in 2001 to 21.5 in 2005; whereas screening rates among "other" children increased from 9.8 in 2001 to 13.7 in 2005.

- **GIS – lead poisoning screening rate by county in 2005**

Table 2.2 in Appendix A lists the number of children screened and the screening rate in each county in 2005. A GIS map was generated to visually display the screening rate by county (figure 2.6).

Counties located in southwest Nebraska had lower screening rates than the rest of the area. Douglas County ranked the highest (24.8 per 100 children) in screening rate among all counties in 2005. Ten counties had screening rates greater than 15 per 100 children. Data was not available for six counties: Arthur, Dundy, Hayes, Hooker, McPherson and Perkins.

Fig. 2.6 Lead Poisoning Screening Rate by County



- Map created by NDHHS GIS Program
- Screening rates are per 100 children based on Population Census 2000
- Those counties with white circles had no children tested for lead poisoning

Incidence and Prevalence of Elevated Blood Lead Level

Incidence and prevalence of EBLL in each year during 2001-2005 are listed in Table 3.1. Both incidence and prevalence are based on number of children screened in each year. From 2001 to 2005, the number of newly identified children with EBLL dropped from 501 to 340. The number of existing cases of EBLL dropped from 546 to 434.

In appendix B, Table 3.2 lists the incidence of EBLL by county, age group, gender, race, and ethnicity. Tables 3.3-3.7 illustrate the prevalence of EBLL in the sets specified in Table 3.1, by county, age group, gender, race, and ethnicity.

Table 3.1 Incidence and Prevalence of Elevated Blood Lead Levels, Nebraska, 2001-2005

year	no. of newly identified children with elevated BLL	no. of children with elevated BLL	no. of children screened	incidence per 100 children screened	prevalence per 100 children screened
2001	501	546	14,292	3.5	3.8
2002	407	491	17,848	2.3	2.8
2003	452	545	17,835	2.5	3.1
2004	423	517	19,985	2.1	2.6
2005	340	434	20,575	1.7	2.1

Fig. 3.1 Incidence and Prevalence of EBLL

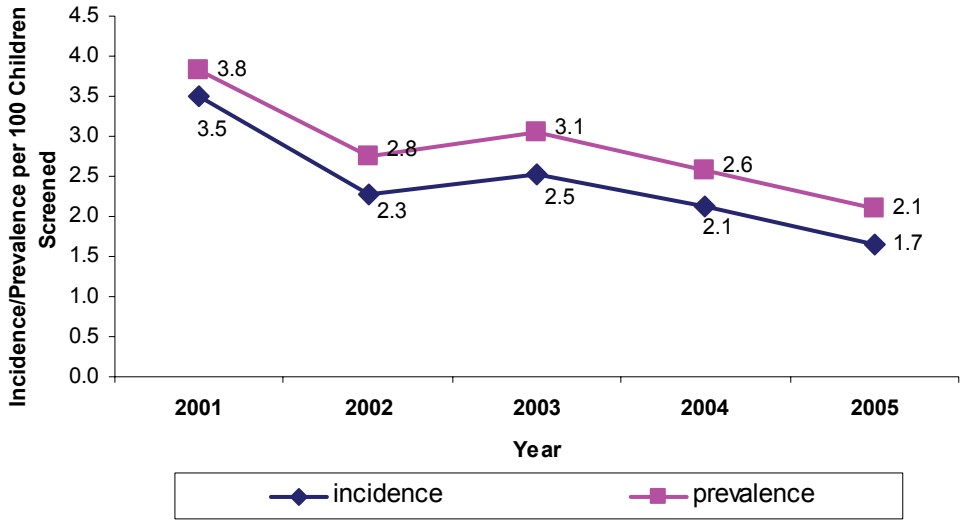


Figure 3.1 shows a parallel downward trend of prevalence and incidence of EBLL throughout the five years, with the exception of a slight rally in 2003. Prevalence of EBLL went from 3.8 per 100 children screened to 2.1 per 100 children screened. Incidence of EBLL went from 3.5 per 100 children screened to 1.7 per 100 children screened.

- **Incidence and prevalence of EBLL by county**

Fig. 3.21 Incidence of EBLL by County

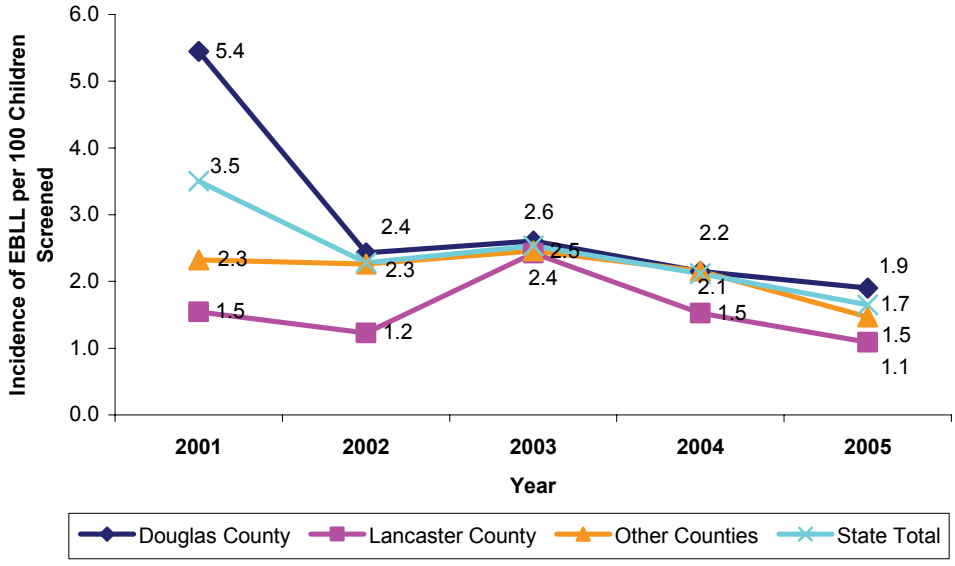
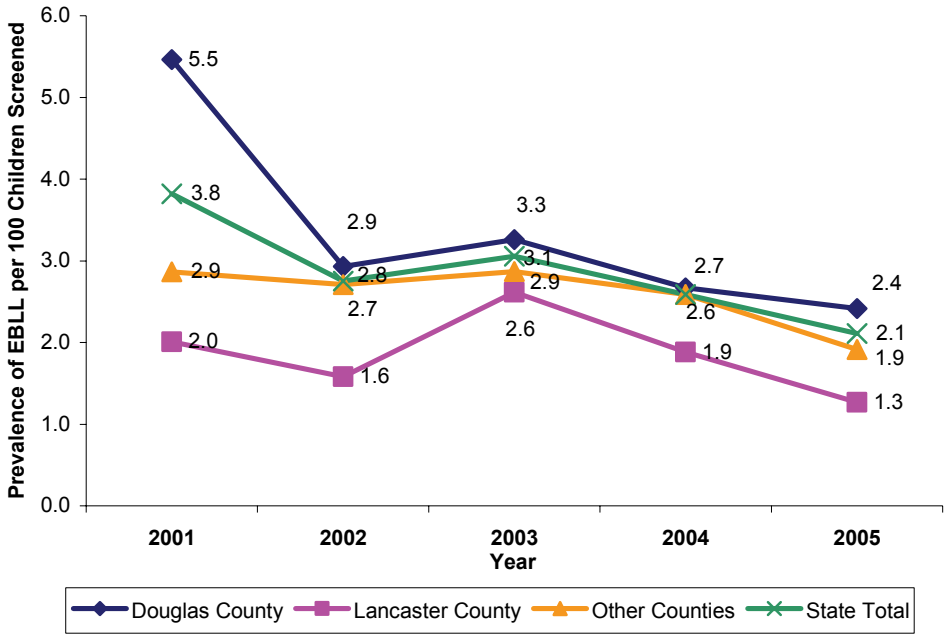


Fig. 3.22 Prevalence of EBLL by County



Both incidence and prevalence of EBLL were observed to have declining trends in Douglas County, Lancaster County and other counties. Children with EBLL in Douglas County accounted for more than half of both newly identified and existing children with EBLL in the state. Lancaster County had the fewest tested children in 2003 (1,032), but had the second most children with newly identified (25) and existing (27) EBLL throughout the five years. This constituted the largest percentage of children with EBLL (2.6) over the five-year time period.

- **Incidence and prevalence of EBLL by age group**

Over the five-year period, from 2001 to 2005, new and existing cases of EBLL were observed for all age groups among children under 6. The two-year-old group had the highest incidence and prevalence of EBLL. Overall, the incidence and prevalence of EBLL demonstrated decreasing trends in all age groups.

Fig. 3.31 Incidence of EBLL by Age Group

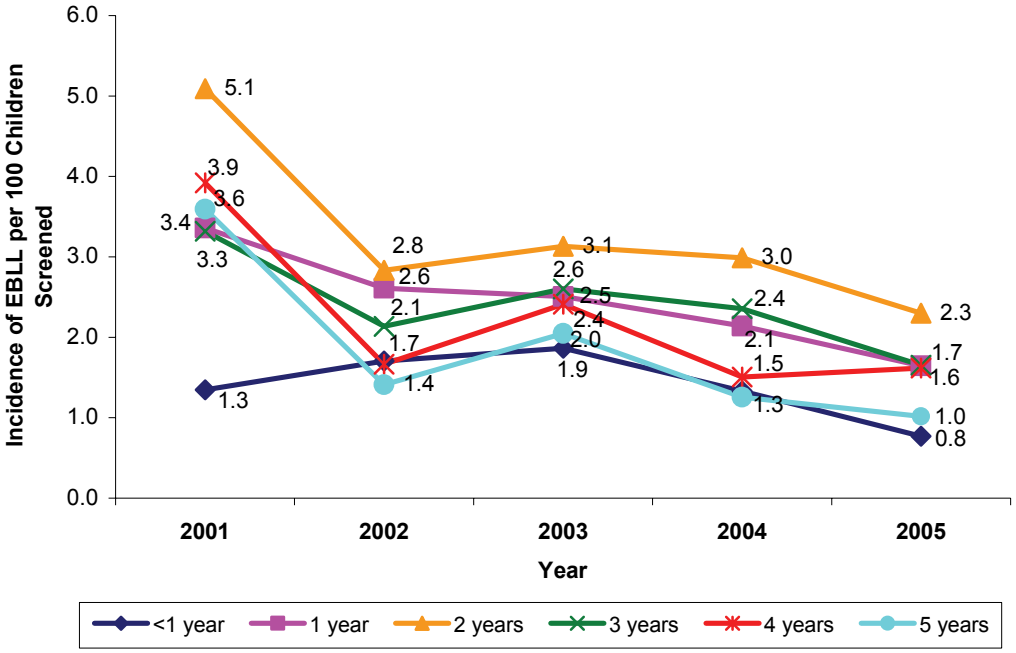
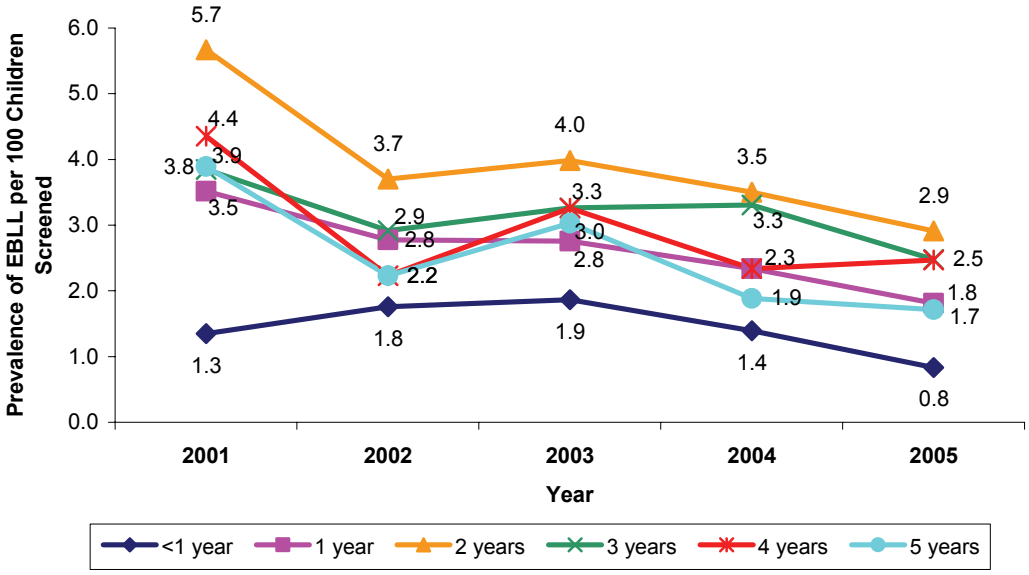


Fig. 3.32 Prevalence of EBLL by Age Group



- **Incidence and prevalence of EBLL by gender**

Fig. 3.41 Incidence of EBLL by Gender

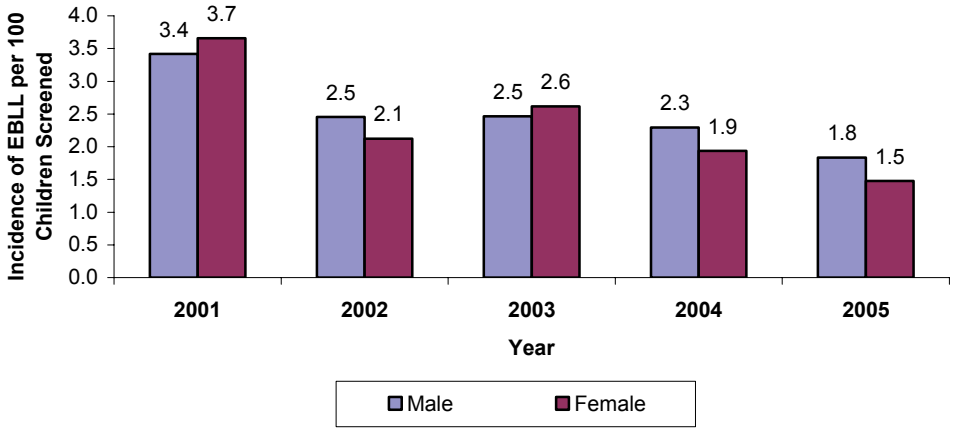
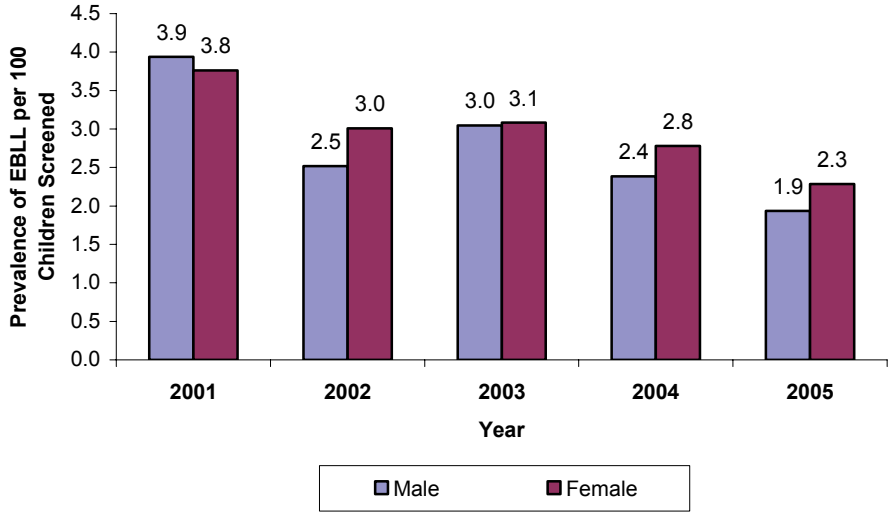


Fig. 3.42 Prevalence of EBLL by Gender



Both male and female children less than six years old experienced a decrease in incidence and prevalence of EBLL through the five years, with the exception of a slight increase in 2003. The incidence of EBLL decreased from 3.4 to 1.8 per 100 male children screened and from 3.7 to 1.5 per 100 female children screened. Prevalence of EBLL decreased from 3.9 to 1.9 per 100 male children screened and from 3.8 to 2.3 per 100 female children screened.

- **Incidence and prevalence of EBLL by race**

Fig. 3.51 Incidence of EBLL by Race

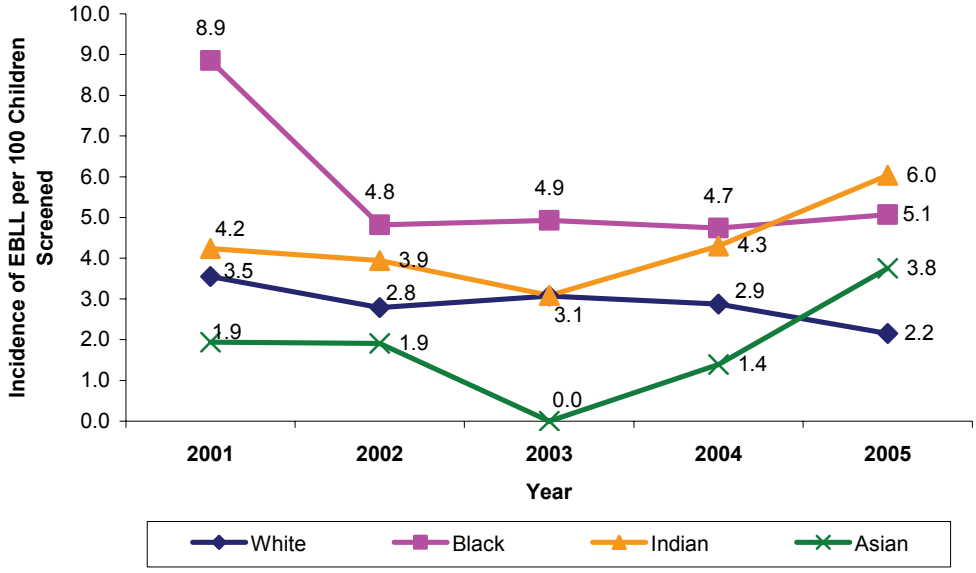
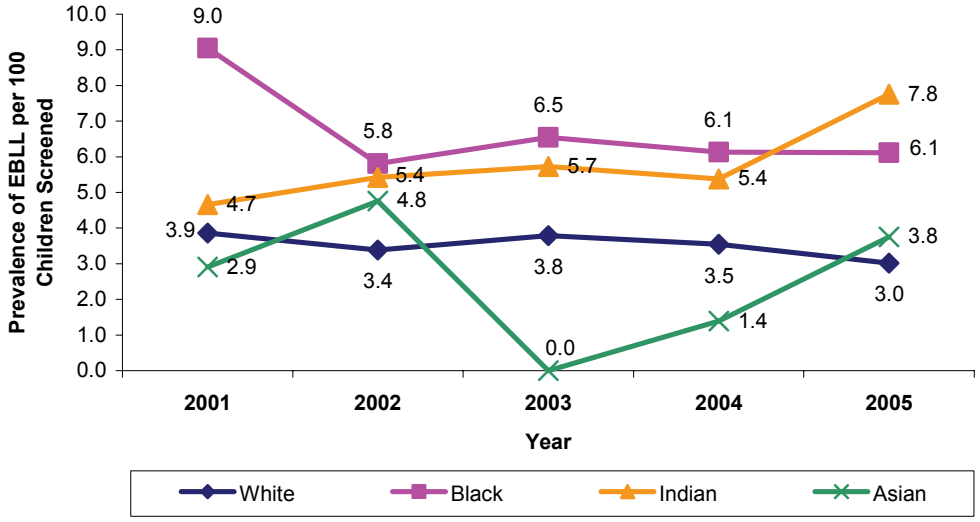


Fig. 3.52 Prevalence of EBLL by Race



- Asian represents Asian/Pacific Islander; Indian represents Native American/Alaskan Native.

From 2001 to 2005, the incidence of EBLL has decreased from 3.5 to 2.2 per 100 white children screened, and from 8.9 to 5.1 per 100 black children screened. Prevalence of EBLL has decreased from 3.9 to 3.0 per 100 white children screened, and from 9.0 to 6.1 per 100 Black children screened. The

interpretation of the trend among American Indian and Asian children should be viewed with caution, as only a few children were identified with EBLL for these two racial groups (fewer than 15 American Indians and fewer than 6 Asians).

- **Incidence and prevalence of EBLL by ethnicity**

Fig. 3.61 Incidence of EBLL by Ethnicity

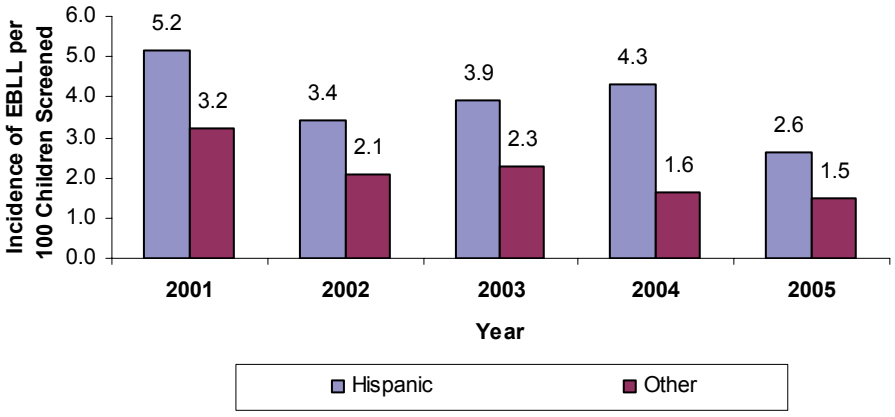
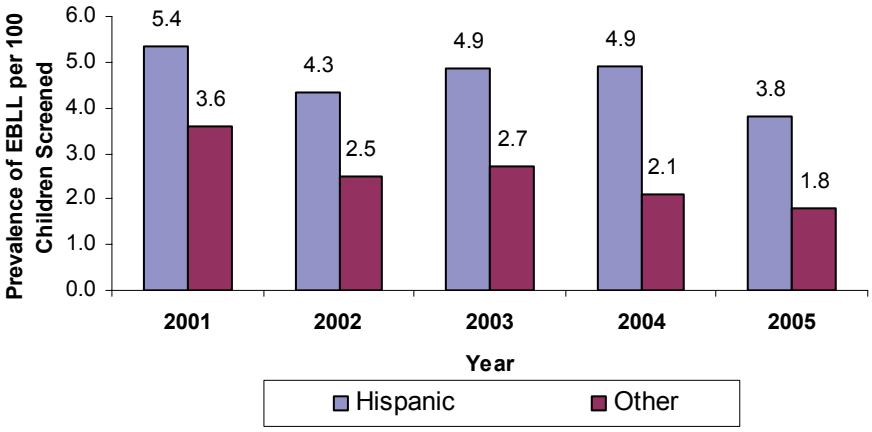


Fig. 3.62 Prevalence of EBLL by Ethnicity



- "Other" refers to all those who were not identified as Hispanic, including non-Hispanic, unknown, missing and other

Hispanic children had higher rate of incidence and prevalence of EBLL than "other" children, although incidence and prevalence of EBLL generally declined among both Hispanic and "other" children over the five-year time period. Incidence of EBLL among Hispanic children declined from 5.2 to 2.6 per 100 children screened. Prevalence of EBLL among Hispanic children declined from 5.4 to 3.8 per 100 children screened.

DISCUSSION

Significance

The Childhood Lead Poisoning Prevention Program is of critical importance to achieve the national and state goal of eliminating BLL≥10μg/dL among children 1-6 years of age by 2010 (U.S. Department of Health and Human Services, 2000; Nebraska Department of Health and Human Services, 2002). Childhood lead poisoning surveillance is responsible for identifying, monitoring and tracking Nebraska children that are at risk or who suffer from EBLL. It is also to inform health professionals and policy makers about developing policies and procedures concerning proper care of children with EBLL and eliminating or reducing environmental lead hazards.

The 2001-2005 surveillance data indicates that Nebraska children's BLL screening rate continues to increase from 2001 to 2005; in contrast, incidence and prevalence of EBLL continue to decline throughout the state. This is consistent with the national trend, which could be partially attributed to national policies and laws implemented since the 1970s which have limited the use of lead (Meyer, Pivetz, Dignam, Homa, Schoonover, et al., 2003).

It is unrealistic to identify all children at risk of lead poisoning due to the fact that screening of childhood BLL is not universally available to all children in Nebraska. Screening rates in this study are not calculated based on at-risk population, but on the population of children under 6 years as a whole. Incidence and prevalence of EBLL are based on neither at-risk nor the entire population, but on the number of children screened. Since some children at risk may be left out of the screening process, the number of at-risk children and incidence and prevalence of EBLL may be underestimated.

One-year-old children had the highest screening rate, followed by two-year-old children; however, the latter group had the highest incidence and prevalence of EBLL. Special efforts should be directed to increase screening for children 2 and 3 years old. Although children should be tested at least once before they are 2 years of age, health-care providers should be aware that measuring blood lead concentration only at 2 years of age, when blood lead concentration peaks, may be too late to prevent peak exposure (American Academy of Pediatrics, 2005). Therefore, earlier screening should be considered when exposure is likely.

Results from this study are consistent with previous findings that minority children, such as blacks, Indians, or Hispanics are more likely to have EBLL than those who are non-Hispanic whites (Centers for Disease Control and Prevention, 1997). On the other hand, some of these minority groups, such as Asian, were not adequately screened, thus their risk of lead poisoning may not be fully revealed in this study.

Limitations

Accurately assessing the number of children at risk of EBLL and children with EBLL, and monitoring the trend of incidence and prevalence is critical to achieve the 2010 goal of eliminating EBLL (BLL≥10μg/dL) among children. However, the data on BLL tests are subject to several limitations.

First, the screening of young children for EBLL is voluntary. The data collected contains only results from children who present themselves for screening and whose results are subsequently reported. In addition, not all blood lead tests were reported to DHHS. Some physicians and clinics may fail to report their results to the state, although reporting all blood lead tests is required in Nebraska. Six counties did not report tests, suggesting that some Nebraska children with lead poisoning were not identified. Additionally, some Nebraska children were screened in-state, their blood samples were analyzed in another state, and the results were therefore not reported back to Nebraska. It is important to track all blood lead test results to estimate the proportion of Nebraska children affected by EBLL.

Second, screening criteria varied by health care providers and over the years. Before June 30, 2005, there were several targeted screening sites that were sponsored by the State of Nebraska. Children who were at high risk of lead poisoning were routinely screened at these sites. After July 1, 2005, the targeted screening sites no longer existed due to funding termination. Whether a child should be screened or not was then decided by clinics and hospitals, without uniform guidelines. The inconsistent screening practices result in challenges in comparing rates of children at risk and incidence and prevalence of EBLL across communities and over time.

Third, information in terms of ethnicity, gender, and race were not completely recorded, and the missing data may create challenges to define the risk for certain racial or ethnic groups.

Fourth, rates of children tested from 2001 to 2005 were based on population per the 2000 U.S. Census. Changes in population size and demography in recent years may cast doubt on the explanation of blood lead tests, though this change has been very small in recent years.

The American Academy of Pediatrics (2005) recommended changing policy to shift away from case identification and management (secondary) to primary prevention with a goal of safe housing for all children. Primary prevention activities are exclusive to the City of Omaha, which currently receives federal funding focused on the correction of lead-based paint hazards in child-occupied homes. Recognizing the shift in focus to primary prevention, the current Nebraska Childhood Lead Poisoning Prevention Program (CLPPP) focuses on

secondary prevention efforts of monitoring children's blood lead levels, conducting environmental investigations, performing follow-ups with children who have EBLLs, and providing education & outreach. The Department will introduce primary prevention activities as funding becomes available.

Recommendations

In keeping with nationwide health care trends, the Nebraska CLPPP makes the following recommendations:

A child should have BLL testing at both 12 and 24 months at a minimum, even if the first test at 12 months is normal. Based on the results of this report, 2-year-old children had the highest incidence and prevalence of EBLL among all age groups, but a lower screening rate than 1-year-olds. It is recommended that health care providers conduct more BLL tests for 2-year-old children, including follow-ups for children already screened at one year, since a child whose BLL is normal at one year of age could still be lead-poisoned later in his/her life.

To obtain more complete data, it is recommended that all counties, physicians and clinics utilize screening criteria to identify children at risk before they are two years old, have eligible children tested, and report the results to DHHS. Educating and encouraging parents to have their children tested for BLL is an important way to improve the screening rate. At the same time, it is necessary to identify reasons of screening rate drop among specific racial groups, such as Asian and Native American. In addition to parents, intervention and education should also focus on raising awareness among other family members, daycare, and clinics. Messages on the importance of screening, consequences of lead poisoning, and how to avoid it should be included in the intervention and education programs.

An advisory committee should be created for Nebraska CLPPP. A guideline should be developed to direct screening practices and standardize the data submission process.

At the same time, quality checks should be performed regularly on the database, and feedback given to health-care providers to ensure the records are accurate and updated.

Since most children with EBLL are eligible for Medicaid, it is recommended to continue screening all Medicaid-eligible children. Future work should link STELLAR data with Medicaid data based on Medicaid identification numbers to determine the number of children at high risk for lead exposure who were actually tested for lead poisoning.

Collecting race and ethnicity data is challenging. In this study, over half of the ethnicity data was missing. A study conducted by Rhode Island CLPPP showed that laboratory professionals were uncomfortable asking clients about their race and ethnicity, even though the clients did not indicate discomfort filling out the information themselves (Rhode Island Childhood Lead Poisoning Prevention Program, 2005). Hence one way to gather more complete information on race or ethnicity would be to have clients complete the race and ethnicity questions themselves.

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Appendix A: Children Screened for Lead Poisoning

Table 2.1 Children Screened for Lead Poisoning, Nebraska, 2001-2005

	2001		2002		2003		2004		2005		Population Size (2000)
	no. of children screened	rate per 100 population	no. of children screened	rate per 100 population	no. of children screened	rate per 100 population	no. of children screened	rate per 100 population	no. of children screened	rate per 100 population	
Resident Area											
Douglas County	5,894	14.4	9,139	22.3	9,200	22.4	9,859	24.0	10,195	24.8	41,067
Lancaster County	1,941	9.7	1,138	5.7	1,032	5.2	1,115	5.6	1,655	8.3	19,993
Other Counties	6,457	8.1	7,571	9.5	7,603	9.5	9,011	11.3	8,725	10.9	80,021
Age Group											
<1 year	1,706	7.3	1,876	8.0	1,717	7.3	1,654	7.1	1,557	6.6	23,459
1 year	5,003	21.1	6,557	27.7	6,821	28.8	7,485	31.6	8,274	34.9	23,684
2 years	2,435	10.6	3,352	14.6	3,415	14.9	3,884	16.9	3,914	17.0	22,963
3 years	2,079	8.9	2,433	10.4	2,422	10.4	2,844	12.2	2,784	12.0	23,294
4 years	2,067	8.7	2,284	9.7	2,239	9.5	2,525	10.7	2,472	10.5	23,648
5 years	1,002	4.2	1,346	5.6	1,221	5.1	1,593	6.6	1,574	6.5	24,033
Gender											
Male	7,313	10.2	9,038	12.5	9,084	12.6	10,075	14.0	10,417	14.5	72,036
Female	6,858	9.9	8,620	12.5	8,608	12.5	9,765	14.1	10,080	14.6	69,045
Race											
White	6,314	5.4	6,893	5.9	6,680	5.7	7,440	6.4	6,457	5.5	116,545
Black	1,050	13.4	1,120	14.3	1,055	13.5	1,224	15.7	1,341	17.2	7,812
Indian	236	12.7	203	11.0	227	12.3	186	10.0	116	6.3	1,853
Asian	103	4.9	105	4.9	96	4.5	72	3.4	80	3.8	2,122
Ethnicity											
Hispanic	1,959	12.9	2,524	16.6	2,877	18.9	3,525	23.2	3,268	21.5	15,191
Other	12,333	9.8	15,324	12.2	14,958	11.9	16,460	13.1	17,307	13.7	125,890
State Total	14,292	10.1	17,848	12.7	17,835	12.6	19,985	14.2	20,575	14.6	141,081

Table 2.2 Lead poisoning Screening Rate by County, Nebraska, 2005

County	Population Size (2000)	no. of children screened	rate per 100 population	County	Population Size (2000)	no. of children screened	rate per 100 population
ADAMS	2423	441	18.2	JEFFERSON	541	51	9.4
ANTELOPE	533	25	4.7	JOHNSON	290	23	7.9
ARTHUR	27			KEARNEY	524	43	8.2
BANNER	50	2	4	KEITH	610	12	2
BLAINE	39	1	2.6	KEYA PAHA	73	3	4.1
BOONE	451	46	10.2	KIMBALL	274	24	8.8
BOX BUTTE	957	80	8.4	KNOX	663	17	2.6
BOYD	149	20	13.4	LANCASTER	19993	1655	8.3
BROWN	223	27	12.1	LINCOLN	2769	4	0.1
BUFFALO	3380	314	9.3	LOGAN	50	2	4
BURT	534	39	7.3	LOUP	52	2	3.8
BUTLER	715	41	5.7	MADISON	2943	213	7.2
CASS	2066	202	9.8	MCPHERSON	45		
CEDAR	734	40	5.4	MERRICK	651	30	4.6
CHASE	268	1	0.4	MORRILL	386	38	9.8
CHERRY	462	37	8	NANCE	300	12	4
CHEYENNE	737	32	4.3	NEMAHA	440	78	17.7
CLAY	498	66	13.3	NUCKOLLS	295	41	13.9
COLFAX	901	177	19.6	OTOE	1210	165	13.6
CUMING	784	61	7.8	PAWNEE	178	20	11.2
CUSTER	833	40	4.8	PERKINS	211		
DAKOTA	2119	130	6.1	PHELPS	748	21	2.8
DAWES	545	30	5.5	PIERCE	575	31	5.4
DAWSON	2431	207	8.5	PLATTE	2747	288	10.5
DEUEL	110	3	2.7	POLK	399	47	11.8
DIXON	504	21	4.2	RED WILLOW	855	17	2
DODGE	2719	453	16.7	RICHARDSON	626	53	8.5
DOUGLAS	41067	10195	24.8	ROCK	107	8	7.5
DUNDY	151			SALINE	1048	206	19.7
FILLMORE	468	81	17.3	SARPY	12159	2311	19
FRANKLIN	234	27	11.5	SAUNDERS	1547	169	10.9
FRONTIER	204	2	1	SCOTTS BLUFF	2904	355	12.2
FURNAS	368	20	5.4	SEWARD	1147	136	11.9
GAGE	1643	225	13.7	SHERIDAN	431	6	1.4
GARDEN	110	3	2.7	SHERMAN	210	22	10.5
GARFIELD	110	8	7.3	SIOUX	95	4	4.2
GOSPER	140	4	2.9	STANTON	541	12	2.2
GRANT	45	2	4.4	THAYER	399	18	4.5
GREELEY	199	12	6	THOMAS	52	1	1.9
HALL	4887	581	11.9	THURSTON	828	127	15.3
HAMILTON	772	41	5.3	VALLEY	318	20	6.3
HARLAN	219	6	2.7	WASHINGTON	1502	140	9.3
HAYES	58			WAYNE	631	66	10.5
HITCHCOCK	169	1	0.6	WEBSTER	248	35	14.1
HOLT	825	95	11.5	WHEELER	83	6	7.2
HOOKER	46			YORK	993	165	16.6
HOWARD	483	34	7				

Appendix B: Incidence and Prevalence of EBLL

Table 3.2 Incidence of EBLL by County, Age Group, Gender, Race, and Ethnicity, Nebraska, 2001-2005

	2001			2002			2003			2004			2005		
	no. of newly identified children with EBLL	no. of children screened	incidence rate per 100 population	no. of newly identified children with EBLL	no. of children screened	incidence rate per 100 population	no. of newly identified children with EBLL	no. of children screened	incidence rate per 100 population	no. of newly identified children with EBLL	no. of children screened	incidence rate per 100 population	no. of newly identified children with EBLL	no. of children screened	incidence rate per 100 population
County															
Douglas County	321	5,894	5.4	222	9,139	2.4	240	9,200	2.6	212	9,859	2.2	194	10,195	1.9
Lancaster County	30	1,941	1.5	14	1,138	1.2	25	1,032	2.4	17	1,115	1.5	18	1,655	1.1
Other Counties	150	6,457	2.3	171	7,571	2.3	187	7,603	2.5	194	9,011	2.2	128	8,725	1.5
Age Group															
<1 year	23	1,706	1.3	32	1,876	1.7	32	1,717	1.9	22	1,654	1.3	12	1,557	0.8
1 year	168	5,003	3.4	171	6,557	2.6	171	6,821	2.5	160	7,485	2.1	136	8,274	1.6
2 years	124	2,435	5.1	95	3,352	2.8	107	3,415	3.1	116	3,884	3.0	90	3,914	2.3
3 years	69	2,079	3.3	52	2,433	2.1	63	2,422	2.6	67	2,844	2.4	46	2,784	1.7
4 years	81	2,067	3.9	38	2,284	1.7	54	2,239	2.4	38	2,525	1.5	40	2,472	1.6
5 years	36	1,002	3.6	19	1,346	1.4	25	1,221	2.0	20	1,593	1.3	16	1,574	1.0
Gender															
Male	250	7,313	3.4	222	9,038	2.5	224	9,084	2.5	231	10,075	2.3	191	10,417	1.8
Female	251	6,858	3.7	183	8,620	2.1	225	8,608	2.6	189	9,765	1.9	149	10,080	1.5
Race															
White	224	6,314	3.5	192	6,893	2.8	205	6,680	3.1	214	7,440	2.9	139	6,457	2.2
Black	93	1,050	8.9	54	1,120	4.8	52	1,055	4.9	58	1,224	4.7	68	1,341	5.1
Indian	10	236	4.2	8	203	3.9	7	227	3.1	8	186	4.3	7	116	6.0
Asian	2	103	1.9	2	105	1.9	0	96	0.0	1	72	1.4	3	80	3.8
Ethnicity															
Hispanic	101	1,959	5.2	86	2,524	3.4	113	2,877	3.9	152	3,525	4.3	86	3,268	2.6
Other	400	12,333	3.2	321	15,324	2.1	339	14,958	2.3	271	16,460	1.6	254	17,307	1.5
State Total	501	14,292	3.5	407	17,848	2.3	452	17,835	2.5	423	19,985	2.1	340	20,575	1.7

Table 3.3 Prevalence of BLL by County, Nebraska, 2001-2005

	no. of children screened	BLL (µg/dL)															
		0-4	%	5-9	%	10-14	%	15-19	%	20-44	%	45-69	%	≥70	%	≥10 (EBLL)	%
year 2001																	
Douglas County	5,894	2,911	49.4	2,661	45.1	229	3.9	50	0.8	40	0.7	3	0.1	0	0.0	322	5.5
Lancaster County	1,941	1,476	76.0	426	21.9	25	1.3	7	0.4	5	0.3	2	0.1	0	0.0	39	2.0
Other Counties	6,457	4,766	73.8	1,506	23.3	118	1.8	39	0.6	27	0.4	1	0.0	0	0.0	185	2.9
State Total	14,292	9,153	64.0	4,593	32.1	372	2.6	96	0.7	72	0.5	6	0.0	0	0.0	546	3.8
year 2002																	
Douglas County	9,139	3,975	43.5	4,896	53.6	200	2.2	36	0.4	31	0.3	1	0.0	0	0.0	268	2.9
Lancaster County	1,138	962	84.5	158	13.9	12	1.1	3	0.3	2	0.2	1	0.1	0	0.0	18	1.6
Other Counties	7,571	5,325	70.3	2,041	27.0	134	1.8	36	0.5	28	0.4	7	0.1	0	0.0	205	2.7
State Total	17,848	10,262	57.5	7,095	39.8	346	1.9	75	0.4	61	0.3	9	0.1	0	0.0	491	2.8
year 2003																	
Douglas County	9,200	6,459	70.2	2,441	26.5	211	2.3	49	0.5	38	0.4	2	0.0	0	0.0	300	3.3
Lancaster County	1,032	910	88.2	95	9.2	18	1.7	5	0.5	4	0.4	0	0.0	0	0.0	27	2.6
Other Counties	7,603	5,847	76.9	1,538	20.2	128	1.7	39	0.5	48	0.6	3	0.0	0	0.0	218	2.9
State Total	17,835	13,216	74.1	4,074	22.8	357	2.0	93	0.5	90	0.5	5	0.0	0	0.0	545	3.1
year 2004																	
Douglas County	9,859	7,821	79.3	1,775	18.0	166	1.7	51	0.5	40	0.4	3	0.0	3	0.0	263	2.7
Lancaster County	1,115	852	76.4	242	21.7	15	1.3	3	0.3	3	0.3	0	0.0	0	0.0	21	1.9
Other Counties	9,011	7,004	77.7	1,774	19.7	155	1.7	43	0.5	29	0.3	5	0.1	1	0.0	233	2.6
State Total	19,985	15,677	78.4	3,791	19.0	336	1.7	97	0.5	72	0.4	8	0.0	4	0.0	517	2.6
year 2005																	
Douglas County	10,195	8,265	81.1	1,684	16.5	149	1.5	50	0.5	41	0.4	6	0.1	0	0.0	246	2.4
Lancaster County	1,655	1,258	76.0	376	22.7	14	0.8	5	0.3	2	0.1	0	0.0	0	0.0	21	1.3
Other Counties	8,725	7,151	82.0	1,407	16.1	103	1.2	44	0.5	19	0.2	1	0.0	0	0.0	167	1.9
State Total	20,575	16,674	81.0	3,467	16.9	266	1.3	99	0.5	62	0.3	7	0.0	0	0.0	434	2.1

Table 3.4 Prevalence of BLL by Age Group, Nebraska, 2001-2005

	no. of children screened	BLL (µg/dL)															
		0-4	%	5-9	%	10-14	%	15-19	%	20-44	%	45-69	%	≥70	%	≥10 (EBLL)	%
year 2001																	
<1 year	1,706	1,176	68.9	507	29.7	14	0.8	6	0.4	3	0.2	0	0.0	0	0.0	23	1.3
1 year	5,003	3,276	65.5	1,551	31.0	128	2.6	27	0.5	21	0.4	0	0.0	0	0.0	176	3.5
2 years	2,435	1,457	59.8	840	34.5	77	3.2	24	1.0	36	1.5	1	0.0	0	0.0	138	5.7
3 years	2,079	1,340	64.5	659	31.7	58	2.8	13	0.6	5	0.2	4	0.2	0	0.0	80	3.8
4 years	2,067	1,367	66.1	610	29.5	62	3.0	21	1.0	6	0.3	1	0.0	0	0.0	90	4.4
5 years	1,002	537	53.6	426	42.5	33	3.3	5	0.5	1	0.1	0	0.0	0	0.0	39	3.9
State Total	14,292	9,153	64.0	4,593	32.1	372	2.6	96	0.7	72	0.5	6	0.0	0	0.0	546	3.8
year 2002																	
<1 year	1,876	1,293	68.9	550	29.3	23	1.2	4	0.2	6	0.3	0	0.0	0	0.0	33	1.8
1 year	6,557	3,879	59.2	2,496	38.1	129	2.0	27	0.4	23	0.4	3	0.0	0	0.0	182	2.8
2 years	3,352	1,745	52.1	1,483	44.2	85	2.5	19	0.6	16	0.5	4	0.1	0	0.0	124	3.7
3 years	2,433	1,436	59.0	926	38.1	51	2.1	12	0.5	7	0.3	1	0.0	0	0.0	71	2.9
4 years	2,284	1,301	57.0	932	40.8	38	1.7	7	0.3	5	0.2	1	0.0	0	0.0	51	2.2
5 years	1,346	608	45.2	708	52.6	20	1.5	6	0.4	4	0.3	0	0.0	0	0.0	30	2.2
State Total	17,848	10,262	57.5	7,095	39.8	346	1.9	75	0.4	61	0.3	9	0.1	0	0.0	491	2.8
year 2003																	
<1 year	1,717	1,343	78.2	342	19.9	22	1.3	3	0.2	7	0.4	0	0.0	0	0.0	32	1.9
1 year	6,821	5,144	75.4	1,489	21.8	117	1.7	34	0.5	36	0.5	1	0.0	0	0.0	188	2.8
2 years	3,415	2,420	70.9	859	25.2	89	2.6	19	0.6	27	0.8	1	0.0	0	0.0	136	4.0
3 years	2,422	1,773	73.2	570	23.5	51	2.1	16	0.7	10	0.4	2	0.1	0	0.0	79	3.3
4 years	2,239	1,628	72.7	538	24.0	52	2.3	13	0.6	7	0.3	1	0.0	0	0.0	73	3.3
5 years	1,221	908	74.4	276	22.6	26	2.1	8	0.7	3	0.2	0	0.0	0	0.0	37	3.0
State Total	17,835	13,216	74.1	4,074	22.8	357	2.0	93	0.5	90	0.5	5	0.0	0	0.0	545	3.1
year 2004																	
<1 year	1,654	1,360	82.2	271	16.4	15	0.9	6	0.4	1	0.1	1	0.1	0	0.0	23	1.4
1 year	7,485	5,941	79.4	1,369	18.3	119	1.6	26	0.3	26	0.3	2	0.0	2	0.0	175	2.3
2 years	3,884	2,957	76.1	791	20.4	76	2.0	36	0.9	20	0.5	2	0.1	2	0.1	136	3.5
3 years	2,844	2,200	77.4	550	19.3	59	2.1	16	0.6	18	0.6	1	0.0	0	0.0	94	3.3
4 years	2,525	1,955	77.4	511	20.2	46	1.8	6	0.2	6	0.2	1	0.0	0	0.0	59	2.3
5 years	1,593	1,264	79.3	299	18.8	21	1.3	7	0.4	1	0.1	1	0.1	0	0.0	30	1.9
State Total	19,985	15,677	78.4	3,791	19.0	336	1.7	97	0.5	72	0.4	8	0.0	4	0.0	517	2.6
year 2005																	
<1 year	1,557	1,319	84.7	225	14.5	9	0.6	3	0.2	1	0.1	0	0.0	0	0.0	13	0.8
1 year	8,274	6,790	82.1	1,334	16.1	95	1.1	34	0.4	20	0.2	1	0.0	0	0.0	150	1.8
2 years	3,914	3,094	79.0	706	18.0	61	1.6	30	0.8	20	0.5	3	0.1	0	0.0	114	2.9
3 years	2,784	2,196	78.9	519	18.6	41	1.5	15	0.5	11	0.4	2	0.1	0	0.0	69	2.5
4 years	2,472	1,974	79.9	437	17.7	42	1.7	13	0.5	5	0.2	1	0.0	0	0.0	61	2.5
5 years	1,574	1,301	82.7	246	15.6	18	1.1	4	0.3	5	0.3	0	0.0	0	0.0	27	1.7
State Total	20,575	16,674	81.0	3,467	16.9	266	1.3	99	0.5	62	0.3	7	0.0	0	0.0	434	2.1

Table 3.5 Prevalence of BLL by Gender, Nebraska, 2001-2005

	no. of children screened	BLL (µg/dL)															
		0-4	%	5-9	%	10-14	%	15-19	%	20-44	%	45-69	%	≥70	%	≥10 (EBLL)	%
year 2001																	
Male	7,313	4,680	64.0	2,358	32.2	183	2.5	50	0.7	38	0.5	4	0.1	0	0.0	275	3.8
Female	6,858	4,425	64.5	2,163	31.5	188	2.7	46	0.7	34	0.5	2	0.0	0	0.0	270	3.9
State Total	14,292	9,153	64.0	4,593	32.1	372	2.6	96	0.7	72	0.5	6	0.0	0	0.0	546	3.8
year 2002																	
Male	9,038	5,175	57.3	3,591	39.7	192	2.1	42	0.5	34	0.4	4	0.0	0	0.0	272	3.0
Female	8,620	5,025	58.3	3,378	39.2	153	1.8	32	0.4	27	0.3	5	0.1	0	0.0	217	2.5
State Total	17,848	10,262	57.5	7,095	39.8	346	1.9	75	0.4	61	0.3	9	0.1	0	0.0	491	2.8
year 2003																	
Male	9,084	6,651	73.2	2,153	23.7	190	2.1	41	0.5	46	0.5	3	0.0	0	0.0	280	3.1
Female	8,608	6,485	75.3	1,861	21.6	166	1.9	52	0.6	42	0.5	2	0.0	0	0.0	262	3.0
State Total	17,835	13,216	74.1	4,074	22.8	357	2.0	93	0.5	90	0.5	5	0.0	0	0.0	545	3.1
year 2004																	
Male	10,075	7,817	77.6	1,978	19.6	197	2.0	45	0.4	32	0.3	4	0.0	2	0.0	280	2.8
Female	9,765	7,768	79.5	1,764	18.1	136	1.4	51	0.5	40	0.4	4	0.0	2	0.0	233	2.4
State Total	19,985	15,677	78.4	3,791	19.0	336	1.7	97	0.5	72	0.4	8	0.0	4	0.0	517	2.6
year 2005																	
Male	10,417	8,330	80.0	1,849	17.7	150	1.4	45	0.4	39	0.4	4	0.0	0	0.0	238	2.3
Female	10,080	8,284	82.2	1,601	15.9	115	1.1	54	0.5	23	0.2	3	0.0	0	0.0	195	1.9
State Total	20,575	16,674	81.0	3,467	16.9	266	1.3	99	0.5	62	0.3	7	0.0	0	0.0	434	2.1

Table 3.6 Prevalence of BLL by Race, Nebraska, 2001-2005

	no. of children screened	BLL (µg/dL)															
		0-4	%	5-9	%	10-14	%	15-19	%	20-44	%	45-69	%	≥70	%	≥10 (EBLL)	%
year 2001																	
White	6,314	5,112	81.0	958	15.2	160	2.5	40	0.6	42	0.7	2	0.0	0	0.0	244	3.9
Black	1,050	674	64.2	281	26.8	63	6.0	19	1.8	11	1.0	2	0.2	0	0.0	95	9.0
Indian	236	188	79.7	37	15.7	6	2.5	4	1.7	1	0.4	0	0.0	0	0.0	11	4.7
Asian	103	84	81.6	16	15.5	0	0.0	0	0.0	3	2.9	0	0.0	0	0.0	3	2.9
State Total	14,292	9,153	64.0	4,593	32.1	372	2.6	96	0.7	72	0.5	6	0.0	0	0.0	546	3.8
year 2002																	
White	6,893	5,181	75.2	1,479	21.5	156	2.3	39	0.6	33	0.5	5	0.1	0	0.0	233	3.4
Black	1,120	708	63.2	347	31.0	46	4.1	12	1.1	7	0.6	0	0.0	0	0.0	65	5.8
Indian	203	144	70.9	48	23.6	7	3.4	2	1.0	1	0.5	1	0.5	0	0.0	11	5.4
Asian	105	83	79.0	17	16.2	4	3.8	1	1.0	0	0.0	0	0.0	0	0.0	5	4.8
State Total	17,848	10,262	57.5	7,095	39.8	346	1.9	75	0.4	61	0.3	9	0.1	0	0.0	491	2.8
year 2003																	
White	6,680	5,267	78.8	1,160	17.4	159	2.4	42	0.6	50	0.7	2	0.0	0	0.0	253	3.8
Black	1,055	757	71.8	229	21.7	47	4.5	14	1.3	8	0.8	0	0.0	0	0.0	69	6.5
Indian	227	156	68.7	58	25.6	8	3.5	2	0.9	2	0.9	1	0.4	0	0.0	13	5.7
Asian	96	86	89.6	10	10.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
State Total	17,835	13,216	74.1	4,074	22.8	357	2.0	93	0.5	90	0.5	5	0.0	0	0.0	545	3.1
year 2004																	
White	7,440	5,549	74.6	1,627	21.9	159	2.1	51	0.7	45	0.6	6	0.1	3	0.0	264	3.5
Black	1,224	812	66.3	337	27.5	55	4.5	15	1.2	4	0.3	1	0.1	0	0.0	75	6.1
Indian	186	128	68.8	48	25.8	6	3.2	2	1.1	2	1.1	0	0.0	0	0.0	10	5.4
Asian	72	58	80.6	13	18.1	1	1.4	0	0.0	0	0.0	0	0.0	0	0.0	1	1.4
State Total	19,985	15,677	78.4	3,791	19.0	336	1.7	97	0.5	72	0.4	8	0.0	4	0.0	517	2.6
year 2005																	
White	6,457	5,209	80.7	1,053	16.3	114	1.8	51	0.8	28	0.4	2	0.0	0	0.0	195	3.0
Black	1,341	1,016	75.8	243	18.1	48	3.6	20	1.5	12	0.9	2	0.1	0	0.0	82	6.1
Indian	116	77	66.4	30	25.9	5	4.3	1	0.9	3	2.6	0	0.0	0	0.0	9	7.8
Asian	80	71	88.8	6	7.5	1	1.3	2	2.5	0	0.0	0	0.0	0	0.0	3	3.8
State Total	20,575	16,674	81.0	3,467	16.9	266	1.3	99	0.5	62	0.3	7	0.0	0	0.0	434	2.1

Table 3.7 Prevalence of BLL by Ethnicity, Nebraska, 2001-2005

	no. of children screened	BLL (µg/dL)															
		0-4	%	5-9	%	10-14	%	15-19	%	20-44	%	45-69	%	≥70	%	≥10 (EBLL)	%
year 2001																	
Hispanic	1,959	1,505	76.8	349	17.8	74	3.8	13	0.7	18	0.9	0	0.0	0	0.0	105	5.4
Other	12,333	7,648	62.0	4,244	34.4	298	2.4	83	0.7	54	0.4	6	0.0	0	0.0	441	3.6
State Total	14,292	9,153	64.0	4,593	32.1	372	2.6	96	0.7	72	0.5	6	0.0	0	0.0	546	3.8
year 2002																	
Hispanic	2,524	1,831	72.5	584	23.1	75	3.0	15	0.6	19	0.8	0	0.0	0	0.0	109	4.3
Other	15,324	8,431	55.0	6,511	42.5	271	1.8	60	0.4	42	0.3	9	0.1	0	0.0	382	2.5
State Total	17,848	10,262	57.5	7,095	39.8	346	1.9	75	0.4	61	0.3	9	0.1	0	0.0	491	2.8
year 2003																	
Hispanic	2,877	2,200	76.5	537	18.7	90	3.1	23	0.8	27	0.9	0	0.0	0	0.0	140	4.9
Other	14,958	11,016	73.6	3,537	23.6	267	1.8	70	0.5	63	0.4	5	0.0	0	0.0	405	2.7
State Total	17,835	13,216	74.1	4,074	22.8	357	2.0	93	0.5	90	0.5	5	0.0	0	0.0	545	3.1
year 2004																	
Hispanic	3,525	2,490	70.6	862	24.5	104	3.0	31	0.9	34	1.0	3	0.1	1	0.0	173	4.9
Other	16,460	13,187	80.1	2,929	17.8	232	1.4	66	0.4	38	0.2	5	0.0	3	0.0	344	2.1
State Total	19,985	15,677	78.4	3,791	19.0	336	1.7	97	0.5	72	0.4	8	0.0	4	0.0	517	2.6
year 2005																	
Hispanic	3,268	2,591	79.3	553	16.9	72	2.2	30	0.9	20	0.6	2	0.1	0	0.0	124	3.8
Other	17,307	14,083	81.4	2,914	16.8	194	1.1	69	0.4	42	0.2	5	0.0	0	0.0	310	1.8
State Total	20,575	16,674	81.0	3,467	16.9	266	1.3	99	0.5	62	0.3	7	0.0	0	0.0	434	2.1