2004

Annual Report

Adult Blood Lead Levels in North Carolina

North Carolina Department of Health and Human Services
Division of Public Health
Occupational and Environmental Epidemiology Branch
Occupational Health Surveillance Unit

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State of North Carolina • Michael F. Easley, Governor
Department of Health and Human Services • Carmen Hooker Odom, Secretary
Division of Public Health • Leah Devlin, State Health Director
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Overview and Summary

This is the first annual report on surveillance of blood lead levels in North Carolina citizens. It is based on reporting regulations that went into effect in 1994. The mandatory reporting statute in North Carolina requires physicians and laboratories to report any blood lead level (BLL) 40 ug/dL and above for individuals 18 years and older. In an effort to meet public health goals, North Carolina has elected to try to collect data on all blood lead levels (>0 ug/dL) for individuals 16 years and older. Most data collected is occupation-related. Currently, North Carolina has at least 60 industry groups subject to lead exposure. Exposure can also occur in the home or during recreation. Data currently collected indicates that over-exposure to lead is primarily occurring in workers. The public health objective that most states strive to meet is set by the Healthy People 2010 initiative: Reduce the rate of adults age 16 years or older who have blood lead concentrations of 25 micrograms per deciliter (ug/dL) or greater.

In 2004, 6,869 blood lead reports were received for 6,337 individuals over 16 years of age (Table 1). Of those, 6133 (97.10%) individuals had blood lead levels under 25 ug/dL and183 had blood lead levels greater than or equal to 25 ug/dL. Twenty-four of those 183 blood lead levels were greater than or equal to 50 ug/dL. The number of blood lead tests reported to us was consistently low until 2002, when they started to rise. At that time, CDC recommended we encourage reporting sources to report all levels above 0 ug/dL (Figure 1). Elevated blood lead levels overall have decreased in our state for the reports we do receive. Based on reports in the database, the rate per 100,000 employed workers in North Carolina with a blood lead level of 25ug/dL or higher decreased from 5.37 in 1997 to 2.98 in 2004 (Figure 2).

Individuals with blood lead levels greater than or equal to 25 ug/dL were likely to be men (93.44%), as shown in Table 2, and to be black (54.2%) for those whose race was known (Table 4). Hispanics accounted for 14.9% of all blood lead levels received (Table 5). The largest percentage of individuals with blood lead levels greater than or equal to 25 ug/dL was for ages 35 – 44 (Table 3). For those whose work county was known (Table 6), the counties with the greatest percentage of BLL greater than or equal to 25 ug/dL were Forsyth (72.4%), Rutherford (11.9%), and Mecklenburg (4.00%).

Occupational settings remain the predominant source of lead exposure in North Carolina. Industries with the greatest number of individuals reported with blood lead levels greater than or equal to 25ug/dL in 2004 were: battery manufacturing, copper foundries, industrial valve manufacturing, and iron and steel mills (Table 7). For the small number of cases coded as nonoccupational, sources of exposure included consumption of liquids containing lead (moonshine), target shooting, and casting of bullets. Aside from these, other potential sources of non-occupational exposure include: remodeling or renovation activities, hobbies such as ceramics and stained glass, retained bullets, pica ingestion, and ingestion of nontraditional remedies.

Surveillance data is compiled in an aggregate format, without identifiers, and transmitted by the North Carolina ABLES program to the ABLES Coordinator at NIOSH and to the North Carolina Occupational Safety and Health Administration (OSHA) on a quarterly basis. Each year, NC OSHA utilizes data from the ABLES program to help plan inspections for its Lead Emphasis Program. The top 5 industry groups in which the standard 1910.1025 (General Industry; Lead Standard) was cited by NC OSHA between October 2004 and September 2005 were: internal

combustion engines, automotive repair shops, printed circuit boards, metal processing, and electronic components. The industry groups in which the standard 1926.0062 (Construction Standard; Lead) was cited by NC OSHA during the same period were: general contractors - non-residential, wrecking and demolition work, printing and paper hanging, hotel and motels, electronic services, and air and water resources/solid waste management.

Follow-up is performed for elevated blood lead levels over 25/ug/dL. Individuals are contacted primarily by mail, and sometimes by phone, to report elevated blood level results and discuss ways to prevent over-exposure. Data is also reviewed by the ABLES program manager on a periodic basis to identify industries and occupations where over-exposure may be occurring. NC ABLES partners with the Health Hazard Control Unit within the Occupational and Environmental Epidemiology Branch to plan site visits to advise industries on how to lower exposures. We have noted that industries using lead in their workplaces may be currently underrepresented in our database. We plan on working more closely with OSHA inspection data, OSHA citation data, and Employment Securities Commission data to identify the major industry groups that are using lead and not reporting results. A survey is planned to query certain industry sectors on their awareness of applicable OSHA lead standards, compliance with biological monitoring requirements, and need for information on standard requirements.

ABLES partners with the North Carolina Childhood Lead Poisoning and Prevention Program on common issues, most recently including informing all OSHA-approved laboratories of the North Carolina reporting statutes for child and adult blood lead levels and ensuring that information on take-home lead from the workplace is shared with workers. Initiatives to be conducted in 2006 are: surveying industries likely to be involved in lead-related activities to determine who is unaware of medical surveillance requirements; submitting an article to a medical journal or newsletter to announce the recent publication of medical guidelines to manage adult lead exposure; presenting a program to at least one trade organization about the prevalence of elevated blood lead and ways to impact this; and developing relationships with advocacy groups to help reach special populations regarding how to prevent over-exposure to lead. Questions about our program should be directed to the Occupational Health Surveillance Unit, Occupational and Environmental Epidemiology, Division of Public Health, N.C. DHHS at 919-707-5900.

Table 1. Distribution of Blood Lead Levels (BLLs) Among Adults * in North Carolina: 2004

BLLs(ug/dL)	Number	Percent
<=24	6133	97.10
25-39	100	1.58
40-49	59	0.93
50-59	14	0.22
>=60	10	0.16
Total	****6316**	**100.00**

* For this report, adult is defined as an individual age 16 or older.
** In 2004, 6869 BLL reports were received for 6337 individuals. The BLL level is missing for 21 individuals.

Table 2. Distribution of Gender among Adults Tested for Blood Lead in North Carolina: 2004

	All Blood Lead Levels		Blood Lead Levels >= 25		Blood Lead Levels >= 40	
Gender	Number	Percent	Number	Percent	Number	Percent
Male	3760	59.33	171	93.44	80	96.39
Female	2553	40.29	12	6.56	3	3.61
Unknown	24	0.38	-	-	-	-
Total	**6337**	**100.00**	**183**	**100.00**	**83**	**100.00**

Table 3. Distribution of Age among Adults Tested for Blood Lead in North Carolina: 2004

	All Blood Lead Levels		Blood Lead Levels >= 25		Blood Lead Levels >= 40	
Age Range	Number	Percent	Number	Percent	Number	Percent
16 to 17 *	145	2.29				
18 to 24	1030	16.26	15	8.20	7	8.43
25 to 34	1576	24.87	34	18.58	16	19.28
35 to 44	1264	19.95	76	41.53	34	40.96
45 to 54	1091	17.22	35	19.13	18	22.89
55 to 64	667	10.53	19	10.38	7	8.43
65 or older	563	8.89	4	2.19		
Total	**6336****	**100.00**	**183**	**100.00**	**83**	**100.00**

* Ages 16 - 17 are separate to allow for evaluation of adult group not covered by the N.C. statute.
** Age is unknown for 1 additional individual.

Table 4. Distribution of Race among Adults Tested for Blood Lead in North Carolina: 2004

	All Blood Lead Levels		Blood Lead Levels >= 25		Blood Lead Levels >= 40	
Race	Number	Percent	Number	Percent	Number	Percent
Native Amer.	4	0.06	0	0	0	0
Asian/Pacific Isl.	11	0.17	1	0.55	1	1.20
Black	52	0.82	45	24.59	36	43.37
White	54	0.85	37	20.22	26	31.33
Not available	6216	98.09	100	54.64	20	24.10
Total	**6337**	**100.00**	**183**	**100.00**	**83**	**100.00**

Table 5. Distribution of Ethnicity among Adults Tested for Blood Lead in North Carolina: 2004

	All Blood Lead Levels		Blood Lead Levels >= 25		Blood Lead Levels >= 40	
Ethnicity	Number	Percent	Number	Percent	Number	Percent
Hispanic	946	14.93	14	7.65	3	3.61
Not Hispanic	5383	84.95	169	92.35	80	96.39
Not available	8	0.13				
Total	6337	100.00	183	100.00	83	100.00

Table 6. Distribution of County of Exposure for Adults Tested for Blood Lead in North Carolina: 2004

County	All Blood Lead Levels		Blood Lead Levels >= 25		Blood Lead Levels >= 40	
Or State	Number	Percent	Number	Percent	Number	Percent
Buncombe	3	.05	2	1.09	1	1.20
Craven	1	.02	1	.55		
Cumberland	1	.02	1	.55		
Forsyth	100	1.58	91	49.73	68	81.93
Gaston	1	.02	1	.55		
Guilford	2	.03	2	1.09	2	2.41
Harnett	1	.02	1	.55		
Lee	1	.02	1	.55	1	1.20
Mecklenburg	9	.14	5	2.73	1	1.20
New Hanover	2	.03	2	1.09		
Randolph	1	.02	1	.55		
Rockingham	1	.02	1	.55	1	1.20
Rutherford	20	.32	15	8.20	2	2.40
Sampson	4	.06	2	1.10		
Wake	1	.02	1	.55		
Wayne	3	.05	1	.55		
Unknown	6186	97.61	55	31.32	7	8.43
Total	**6337**	**100.00**	**183**	**100.00**	**83**	**100.00**

Table 7. Industries with Greatest Number of Individuals Reported with BLLs >= 25 ug/dl in 2004

Industry	Rank
Primary Battery Mfg	1
All Other Basic Inorganic Chemical Mfg	2
Copper Foundries (except Die-Casting)	3
Industrial Valve Mfg	4
Iron & Steel Mills	5

Figure 1. Number of Adults Tested for Blood Lead, North Carolina: 1994 - 2004

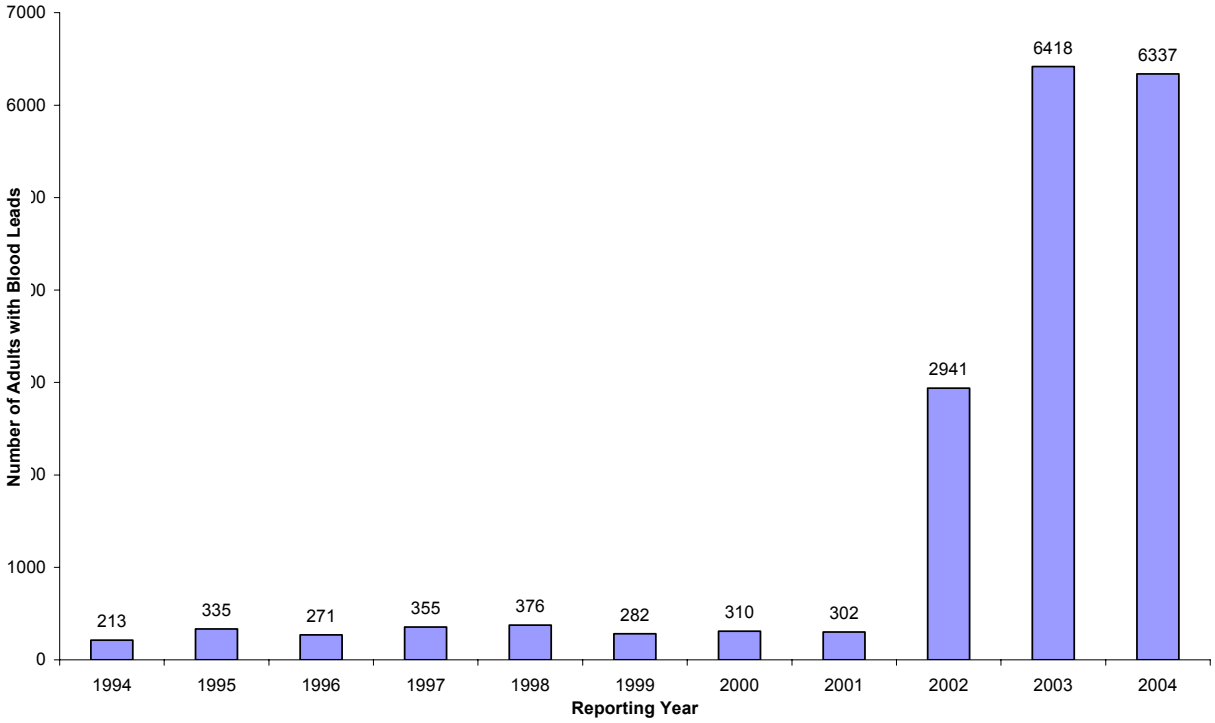

Figure 2: Incident Cases of Elevated Blood Lead Levels (BLL ≥ 25 μg/dl) Among Adults in North Carolina: 1997 - 2004