

GEORGIA IMMUNIZATION STUDY 2002 Final Report

A collaboration between:
Georgia Department of
Human Resources
Division of Public Health,
Epidemiology Branch
and Immunization Program,
Georgia Public Health Districts,
and Private Medical Providers
throughout Georgia.

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Acknowledgments

The Division of Public Health, Georgia Department of Human Resources thanks the public health representatives that participated in this study for all of their hard work, support and dedication.

We are grateful to the private providers in Georgia for their support and cooperation throughout this study. Over seventy percent of all immunizations in this year's study were received at a physician's office. This study would not have been possible without their cooperation and support.

We appreciate the Rollins School of Public Health at Emory University for providing us with the study materials. Their generosity allowed us to repeat the assessment for a sixth year and compare our efforts with theirs.

We acknowledge the support of the Georgia Chapter of the American Academy of Pediatrics, the Georgia Academy of Family Physicians and the Medical Association of Georgia for their support with this and many other public health activities.

A special note of thanks to Mr. Mike Chaney, Georgia Immunization Program Manager, for his support and leadership during this study.

Executive Summary

- The private sector administered 72 percent of all childhood immunizations, the County Health Departments administered 20 percent, and unknown sources provided the remaining 8 percent.
- The rate of fully vaccinated children in Georgia has increased steadily since 1997.
- Immunization against varicella (chicken pox) showed the greatest increase in the past two years from 64 to 89 percent.
- By twelve months of age 93 percent of Georgia infants had received two doses for hepatitis B immunization. At twenty-four months, 91 percent of children had been given the recommended three doses.
- Ninety percent of Georgia's two-year-olds were immunized against *H. influenzae*, hepatitis B, mumps, measles, rubella and polio.
- In Georgia, 88 percent of children twelve months of age were appropriately immunized against diphtheria, tetanus and pertussis.
- Seventy-nine percent of Georgia's two-year-olds were adequately immunized against ten vaccine-preventable childhood diseases, namely diphtheria, tetanus, pertussis, hepatitis B, *H. influenzae* type B, mumps, measles, rubella, polio and varicella.
- A disparity of fully immunized two-year-olds was seen among the 19 health districts, ranging from 69 to 93 percent.
- Four of the state's public health districts had a rate of 85 percent or greater for immunization against the ten vaccine-preventable childhood diseases.
- Six of the public health districts had a rate less than 75 percent.
- Maternal race was not a significant factor in the immunization status of the children studied.
- The children of college-educated mothers were shown to have the highest immunization rates.
- The children of mothers who were Medicaid recipients were slightly less likely to be adequately immunized.

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SECTION I:

PROJECT OVERVIEW

SECTION I: PROJECT OVERVIEW AND INTRODUCTION

The Division of Public Health, Epidemiology Branch, Immunization Program and Health Districts collaborated on the 2002 Georgia Immunization Study. The purpose of the study was to assess the immunization coverage rates of two-year-old children in Georgia statewide and for each of the nineteen health districts.

The Rollins School of Public Health, Emory University did the first three years of the study. Immunization rates for the first year of the study evaluated rates for children born in 1994. The second year of the study estimated rates for children born in 1995. The third year examined rates for children born in 1996. The fourth year, 1999-00 looked at immunization rates for infants born in 1997. The fifth year, 2001 examined immunization rates for children born in 1999. This year, immunization rates for children born in January 2000 were assessed. The current rates are compared throughout this report with data from the previous four years of the study. *

Public health representatives in each of the nineteen health districts collected immunization data from both public and private health care providers.

The Principal Investigator and Project Coordinator was Carol A. Hoban, MS, MPH. Ms. Hoban performed data entry and analysis.

Staff at the Georgia Division of Public Health began work on the Georgia Immunization Project in November 2001. During December 2001, the sampling procedure was completed, and revisions were made to the data collection form and training manual. Letters were sent to each district health director informing them about the study. Each Vaccines For Children provider in Georgia (approximately 700) received a letter and supporting information about the study during the month of January 2002.

* Throughout this report, we refer to study years one, two, three, four, and five as 1997-98, 1998-99, 1999-00, 2001, and 2002 respectively. The results from these five study years refer to rates for 1995, 1996, 1997, 1999, and 2000 respectively.

During January, a training session for the public health representatives was held in Forsyth, Georgia. Data were collected from February 2002 through August 2002. (Data collection continued on some difficult to obtain records through the end of September 2002). The Project Coordinator served as the contact person for the public health representatives during the data collection period. Conference calls were held monthly with the public health representatives to answer questions and address concerns regarding data collection.

Table 1 describes project activities that took place throughout the project timeline.

Table 1:
Project Activity Timeline

Project Activity	Date
Original, stratified sample drawn	December, 2001
Initial notification of public health community Immunization Coordinators Health Directors	December, 2001
Initial notification of private health community	January, 2002
One day training for public health representatives	January, 2002
Data collection period	February – August, 2002
Data entry period	February – November, 2002
Double data entry of 5% of data forms	November, 2002
Final data cleaning and analysis of data	December, 2002
Final Report	January, 2003

Data collection was extended beyond August 2002 in to allow for follow-up of records for which the public health representatives had some information but needed more time to complete.

This Final Report includes both statewide and health district level immunization analyses. It contains an overview of data collection, sampling methodology, and a discussion of the study findings. Additional reports on related topics are discussed in Appendices D, E, and F. Findings specific to Varicella are discussed in Appendix D. A report on the immunization site (public or private provider) is included in Appendix E. Margins of error for immunization coverage rates are included in Appendix F.

SECTION II:
METHODOLOGY

SECTION II: METHODOLOGY

Research Design

The sixth year of the Georgia Immunization Study employed a non-experimental retrospective cohort research design in order to ascertain the immunization coverage rate for children born in the State of Georgia in January 2000. In this retrospective study, all of the immunizations should have occurred prior to the initiation of the project. However, during the data collection time period children that were not up-to-date on all immunizations were allowed to receive their shots. The study design allowed for the calculation of immunization rates for children who turned two in January 2002. Identifying information about the children and their parents was collected from birth certificates.

Target and Sample Populations

The target population of the sixth year of the Georgia Immunization Study included all two-year-old children born in the State of Georgia in 2000. A sample size of 4,387 children born in the month of January 2000 was selected for the study. The sample design allowed for independent estimates for each of the 19 health districts in the state. (See Appendix A for a description of the sampling plan.) The final estimate for the state is based on weighted data to account for differential probabilities of selection for each health district.

Dr. John Carter, Epidemiologist and Assistant Professor at the Rollins School of Public Health, drew a stratified random sample (by health district) from the total births in the state for January 2000. Information for each child, including all birth certificate variables available, was downloaded into an ASCII file. Examples of the type of birth certificate information obtained for each child include:

- ❖ Health district of birth
- ❖ County of birth
- ❖ Infant's first, middle, and last name
- ❖ Infant's gender

- ❖ Infant's date of birth
- ❖ Infant's address
- ❖ Medicaid status of mother at birth of child
- ❖ Mother's first, middle, and last name
- ❖ Father's first, middle, and last name (if available)
- ❖ Mother's race
- ❖ Mother's level of education

Preparation for Data Collection

Public health representatives in each health district completed the data collection procedures. Division of Public Health staff trained the representatives in Forsyth, Georgia on January 16th, 2002. During this training, the public health representatives:

- ❖ received an overview of childhood immunizations
- ❖ learned the data collection process and locating methods
- ❖ were taught information on recording data on the data collection form
- ❖ were instructed in confidentiality and professional etiquette

This information as well as other pertinent details were defined in the Public Health Representative Training Manual presented to each representative at the training. This manual was developed by the staff at the Rollins School of Public Health in 1996-97, and was revised by the staff at the Georgia Division of Public Health for use in year five.

Data Form Development

The Georgia Division of Public Health, Epidemiology Branch, revised the standardized data collection form developed by the staff at the Rollins School of Public Health. (See Appendix C for a copy of the data collection form.) The form followed the recommended schedule of childhood immunizations jointly approved by the Advisory Committee on Immunization Practices (ACIP), the American

Academy of Pediatrics (AAP), and the American Academy of Family Physicians (AAFP).

The data collection form contained four distinct sections to be completed by the public health representatives, and included identifying information from the child's birth certificate.

The section titled "Part A: Identifying Information" included the identifying information for each child as well as a code number to further identify each record. This section also included an area for the representatives to record any changes to identifying information (i.e., change of address).

The immunization dates for each particular vaccination were recorded in the section labeled "Part B: Immunization History." There were spaces available for five Diphtheria, Tetanus, Pertussis (DTP/DTaP) vaccines, four Polio (OPV/IPV) vaccines, two Measles, Mumps, Rubella (MMR) vaccines, five *Haemophilus Influenza* type B (Hib) vaccines, four Hepatitis B (Hep B) vaccines, and two Varicella vaccines. The data collection form provided one extra space for each vaccine to accommodate instances where a child was over-immunized. In this section the representative also noted the location where each individual vaccine was given (Health Department, Private Physician, or Unknown). See Appendix E for a report of the "Provider of Immunizations" information.

The next section, "Part C: Tracking Log", provided space for representatives to chronicle all activities performed for each record. This section aided the representatives in their work by documenting where they were in the abstraction process at any point in time. The section also enabled the State staff to understand the steps necessary to find each child's immunization history and to clarify notations made by the representative in Part D of the form.

"Part D: Data Collection" is designed to track where the data were collected and the reason data abstraction ended for each individual record. This information was used to understand why the representative returned the record to the State and to determine if any evidence of the child was found.

Data Collection Protocol

Step #1: Search for immunization records at local health departments.

In this step, representatives reviewed computerized files or immunization cards for shot dates. Representatives also used these files to find updated contact information for families. Representatives were instructed to check with Women, Infants, and Children (WIC) offices, for updated contact information as well.

Step #2: Search for immunization records through the parent(s).

In this step, representatives used the contact information from the birth certificate or any updated contact information found at the health department to contact the parent. Representatives also used sources such as city phone directories, directory assistance, and the Internet to find current contact information for parents. Parents were then contacted by phone and letter and asked to provide an immunization history or the location of immunization information (i.e., the name of the doctor or clinic office). Representatives also sent consent forms to parents. Although immunization data are in the public domain, and law does not require consent forms, many private physicians refused to provide information without a signed consent from the parent.

Note about Field Visits: In some cases, representatives made home visits to collect data. This practice was encouraged if the representative was comfortable with it.

Step #3: Search for immunization records through private physician(s).

In this step, representatives contacted private physicians and requested the child's immunization history. Most physicians provided the information by phone or fax, once a copy of the

parent's consent form was received. Some provided the information with a verbal parental consent. Others cooperated by checking a list of children from the sample against their patient list. Some physicians preferred that representatives visit their offices in person to collect the data. Representatives were instructed to collect the information by the method (e.g., phone, fax, personal visit) most convenient to the doctor's office. In most cases, nurses, office managers, and records clerks were the main contacts for representatives collecting data in private physician offices.

Representatives returned completed data collection forms to the Georgia Immunization Program on a weekly basis via U.S. mail. The returned forms were reviewed by staff for correctness and completeness. ("Completeness" here refers not to immunization status, but to *completion of the abstraction process*, i.e., that a representative did all he or she could do to document a child's entire immunization record.) If a form was incorrectly filled out or incomplete, the public health representative was contacted for clarification.

The immunization dates and location for each record were then entered into an Epi Info Version 6.04 data file. This program was developed specifically for this study in Year Two, revised in Year Three by Ms. Alperin, Co-Principal Investigator and again in year six by Ms. Hoban.

Data Entry

The principal investigator reviewed each record prior to entry into the Epi Info database. Attempts were made to resolve any unclear information with the public health representative before data entry.

Data cleaning and double data entry were done in the month of December 2002. Five percent of the data were re-entered and correlated with the original forms to look for data entry errors and estimate the error rate for the final sample. A data reliability rate of approximately 99.0% was found.

Analysis Plan

The plan for the analysis was very similar to that used in the previous years. Additionally, trends from the previous five years of the study are shown in this Final Report. Epi Info was the main software program used to assess immunization coverage rates, and provide a measure of where the immunizations were given. The analyses include univariate, bivariate, and multivariate analyses to produce a clear description of the immunization status of two-year-old children in the State of Georgia.

SECTION III:

RESULTS OF STATEWIDE ANALYSES

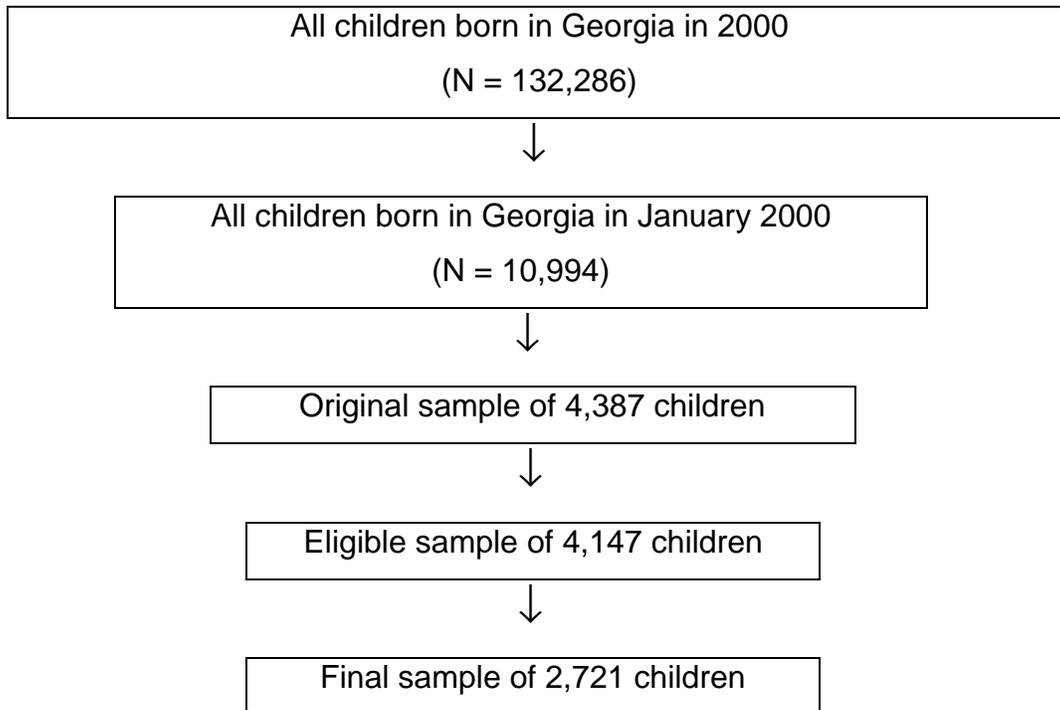
SECTION III: RESULTS OF STATEWIDE ANALYSES

Sampling

The sample of 4,387 children was drawn from 10,994 children born in Georgia in January 2000. A total of 132,286 children were born in Georgia during 2000.

Children who were ineligible for participation in the study were extracted from the original sample, leaving an eligible sample of 4,147. (Ineligible children were those who were deceased, adopted, moved out of state, or were known to be part of a military family.) Figure 1 below depicts the stages of the sampling procedure.

Figure 1: Sampling Procedure



Of the 4,147 children in the eligible sample, 2,721 children were located, 1,426 children never were located and 125 parental refusals were removed. The resulting final sample consisted of 2,721 children. The final sample represents the children for whom parental consent was given to have their child's

immunization record included in this study. The children who were never located were those for whom no evidence beyond the birth certificate could be found to confirm that the child existed. The final sample of 2,721 children represented 65.6 percent of the eligible sample.

Table 2:
Sample Description

Sampling Step	Number	Percent of Sample
Original Sample	4,387	100.0%
Deceased	4	0.1%
Adopted	12	0.3%
Moved out of state	167	3.8%
Military	57	1.3%
Eligible Sample	4,147	94.5%
Eligible Sample	4,147	100.0%
Records Not Located /Eligibility Unknown *	1,426	34.4%
Final Sample (Located Records**)	2,721	65.6%

* **Records Not Located / Eligibility Unknown** - This category refers to records where no evidence of a child's existence was found beyond birth certificate data (including those records where only one Hepatitis B shot was given at birth [n=8] or if a parent refused to participate in the study).

** **Located Records** – This category refers to all records where *evidence of a child's existence* was found, regardless of the child's immunization status. The supposition here, is that, if evidence of a child's existence was found, it is possible to also find documentation of that child's immunization status. This category includes records where:

- a) a provider refused to participate in the study;
- b) no immunization record was available due to documented religious objection;
- c) a provider could not be found (this implies contact with a parent, who would have provided evidence of the child's existence);
- d) no immunization record was available due to documented medical exemption;
- e) a parent could not be found, but shot dates were found elsewhere

Response Rates

Table 3 and Figure 2 depict the district and state response rates for the 2002 study. The response rates are the number of records located divided by the total number of records in the sample. Response rates provide some indication of the ease or difficulty of accessing records of the children in the study as well as the quality of data collection. As noted in the last column of Table 3, response rates are reported - using the eligible sample as the total. In reviewing the response rates based on the eligible sample, the district response rates range from a low of 30.7 percent to a high of 98.8 percent, with a statewide average response rate of 68.6 percent.

Table 3:

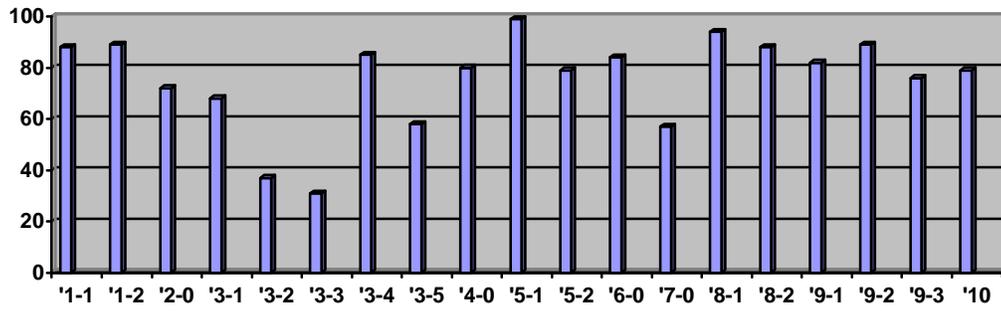
2002 Eligible Sample, Number Located and Response Rates by District

Health District	Eligible Sample (Number)	Number Located*	Response Rate ** (% of Eligible Sample located)
1-1	237	209	88.2%
1-2	187	167	89.3%
2-0	105	76	72.4%
3-1	434	293	67.5%
3-2	469	172	36.7%
3-3	361	111	30.7%
3-4	250	212	84.8%
3-5	347	201	57.9%
4-0	206	164	79.6%
5-1	80	79	98.8%
5-2	319	252	79.0%
6-0	121	102	84.3%
7-0	205	117	57.1%
8-1	137	129	94.2%
8-2	88	77	87.5%
9-1	186	152	81.7%
9-2	101	90	89.1%
9-3	157	119	75.8%
10-0	157	124	79.0%
State	4,147	2,846	68.6 %

*sample includes parental refusals

**number located / eligible sample

Figure 2
2002 Response Rates by District



Georgia Health Districts

Parent Refusals by District:

Table 4 shows the number of parents who refused to participate in the study.

Table 4:
Parent Refusals by Health District for the 2002 Study

District	Number of Records Found	Parent Refusals	
		Number	Percent
1-1	209	8	3.8
1-2	167	9	5.4
2-0	76	0	0.0
3-1	293	9	3.1
3-2	172	28	16.3
3-3	111	0	0.0
3-4	212	37	17.5
3-5	201	6	3.0
4-0	164	17	10.4
5-1	79	1	1.3
5-2	252	4	1.6
6-0	102	0	0.0
7-0	117	1	0.9
8-1	129	0	0.0
8-2	77	0	0.0
9-1	152	0	0.0
9-2	90	1	1.1
9-3	119	1	0.8
10-0	124	3	2.4
Total	2,846	125	4.4

Parent refusals are defined as situations where the parent told the public health representative that he/she did not want to participate in the study.

Statewide Immunization Results

The immunization rates that were calculated for this report involved only the final sample of 2,721 children (children located). All reported immunization rates include information from both public and private providers. Since "adequate immunization status" is defined differently by different authorities, the Georgia Immunization Study has evaluated immunization status in several different ways:

- ❖ "4:3:1+3" status a child has received four DTP/DaTP, three OPV/IPV, one MMR, three Hib, three Hep B and one Varicella at anytime

- ❖ "4:3:1" status: used most frequently throughout the study, referring to the more traditional standard of immunization status -- a child who has received four DTP/DaTP, three OPV/IPV, and one MMR vaccination

- ❖ "3:3:1" status: used infrequently in this study - refers to a child who has received three DTP/DaTP, three OPV/IPV, and one MMR vaccination

Table 5 illustrates the percent of the children in the final samples in the last four years of this study who were adequately immunized with the 4:3:1+3 series compared to the children in the final sample who were not adequately immunized with this series.

Of the 2,721 children who were located in 2002, 78.9 percent were adequately immunized at the 4:3:1+3 level. This percent of adequately immunized children increased from 66.7 percent in 2001.

Table 5:
4:3:1+3 State Immunization Coverage by Study Year

Status	Adequately Immunized		Inadequately Immunized	
	Number	Percent	Number	Percent
1997-98	474	16.0	2,078	84.0
1998-99	1,360	41.9	2,100	58.1
1999-00	1,573	56.3	1,220	43.7
2001	1,837	66.7	918	33.3
2002	2,146	78.9	575	21.1

Note: State rates based on data weighted by health district.

Table 6 illustrates the percent of the children in the final sample who were adequately immunized with the 4:3:1 series compared to the children in the final sample who were not adequately immunized with this series. The number of adequately immunized children increased from 71.3 percent in 1997-98 to 73.3 percent in 1998-99 and to 78.8 percent in the 1999-00 study, but decreased slightly to 75.1 percent in the 2001 assessment. During the 2002 assessment, the number of adequately immunized children increased to 83.9 percent which is the highest percentage recorded since this study began.

Table 6:
4:3:1 State Immunization Coverage by Study Year

Status	Adequately Immunized		Inadequately Immunized	
	Number	Percent	Number	Percent
1997-98	1,821	71.3	731	28.7
1998-99	2,511	73.3	949	26.7
1999-00	2,202	78.8	591	21.2
2001	2,068	75.1	687	24.9
2002	2,284	83.9	437	16.1

Note: State rates based on data weighted by health district.

Figure 3: Statewide Coverage
4:3:1 and 4:3:1+3

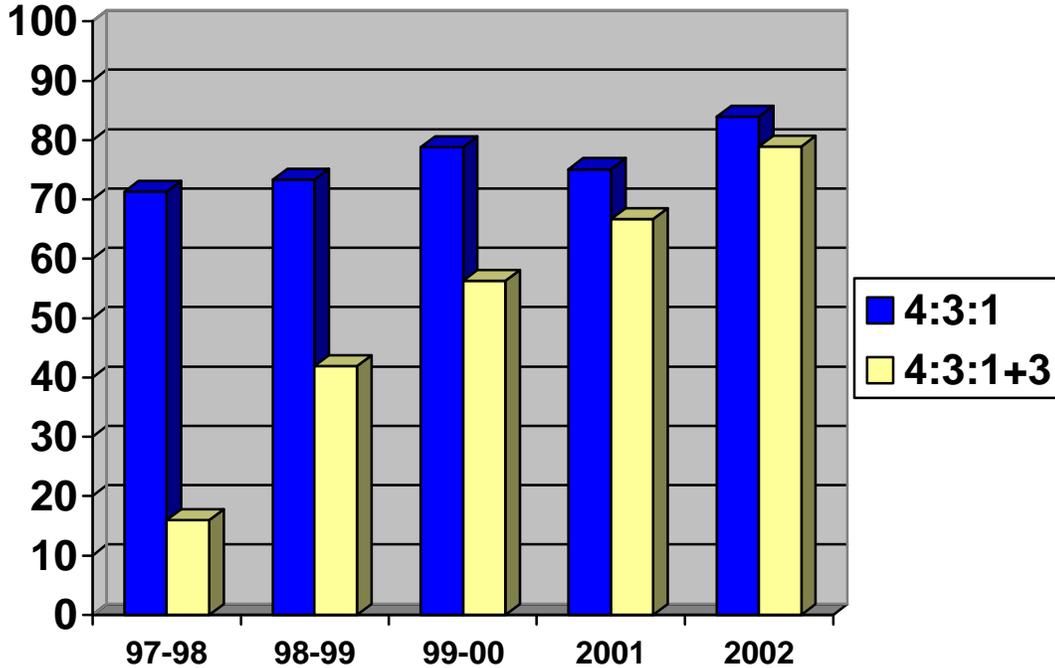


Figure 3 reveals the statewide 4:3:1 coverage rates for the 1997-98, 1998-99, 1999-00, 2001 and 2002 studies. The figure also shows statewide 4:3:1+3 vaccination coverage for the 1997-98, 1998-99, 1999-00, 2001 and 2002 studies.

The 3:3:1 immunization coverage rates allow for three DTP/DTaP instead of four DTP/DTaP. The number of OPV/IPV and MMR vaccinations remain the same. Table 7 indicates the 3:3:1 immunization coverage rate for the state remained consistent during the 1997-98 and 1998-99 studies (78.1 and 78.4 respectively) while increasing in the 1999-00 study to 82.0 percent. In the 2001 study the 3:3:1 rate decreased to 78.9 percent, but increased to 88.8 percent during the 2002 assessment.

**Table 7:
3:3:1 State Immunization Coverage by Study Year**

Status	Adequately Immunized		Inadequately Immunized	
	Number	Percent	Number	Percent
1997-98	2,005	78.1	547	21.9
1998-99	2,685	78.4	775	21.6
1999-00	2,290	82.0	503	18.0
2001	2,175	78.9	580	21.1
2002	2,417	88.8	304	11.2

Note: State rates based on data weighted by health district.

The statewide immunization status for each individual vaccine series is located in Table 8. This table illustrates the number and percent of children who were adequately immunized with each of the recommended vaccines. Vaccines which are part of the 4:3:1+3 shot series are shown here. In 1997-98, 1998-99, 1999-00, and 2001 none of the immunization rates met the state goal of 90 percent coverage; however, during the 2002 assessment nearly all vaccines were at or above the state goal of 90 percent coverage. The coverage rate for the Varicella vaccine dramatically increased from 19.0 percent in 1997-98 to 47.1 percent in 1998-99, to 64.3 percent in 1999-00, to 77.9 percent in 2001 and to 88.5 percent in 2002. (Note: The Hib vaccine status can be considered adequate with three or four shots, depending on the manufacturer of the vaccine. For this study, adequate immunization status for the Hib vaccines was calculated considering three Hib shots as "adequate").

Table 8:
State Immunization Status by Vaccine Series by Study Year

Vaccine	1997-98		1998-99		1999-00		2001		2002	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
3 DTP/DTaP	2,227	87.3	2,912	84.9	2,491	89.2	2,392	86.8	2,561	94.1
4 DTP/DTaP	1,861	72.9	2,545	74.2	2,233	79.9	2,093	76.0	2,303	84.6
3 OPV/IPV	2,186	85.4	2,864	83.6	2,358	84.4	2,226	80.8	2,466	90.6
1 MMR	2,063	80.8	2,752	80.2	2,363	84.6	2,258	82.0	2,474	90.9
3 Hib	2,141	83.6	2,866	83.6	2,441	87.4	2,322	84.3	2,474	90.9
3 Hep B	2,133	83.2	2,839	82.9	2,422	86.7	2,308	83.8	2,471	90.8
1 Varicella	555	19.0	1,620	47.1	1,795	64.3	2,147	77.9	2,407	88.5

Note: State rates based on data weighted by health district.

In addition to looking at the immunization status of the children in the sample at two years of age, the study also reviewed data on the immunization status of the children at one year of age. Table 9 provides an overview of the immunization status of the children in the final sample of the 1997-98, 1998-99, 1999-00, 2001, and 2002 studies at one year of age, looking at coverage status by individual doses of vaccine.

**Table 9:
Statewide Immunization Status by
Individual Vaccines at 12 Months of Age**

Vaccine	Number 97-98	Percent* 97-98	Number 98-99	Percent* 98-99	Number 99-00	Percent* 99-00	Number 2001	Percent* 2001	Number 2002	Percent* 2002
DTP/DTaP1	2,404	94.2%	3,071	88.8%	2,588	92.7%	2,507	91.0%	2,667	98.0%
DTP/DTaP2	2,282	89.4%	2,976	86.0%	2,507	89.8%	2,426	88.1%	2,592	95.3%
DTP/DTaP3	2,049	80.3%	2,712	78.4%	2,327	83.3%	2,214	80.4%	2,394	88.0%
DTP/DTaP4	61	2.4%	81	2.3%	25	0.9%	12	0.4%	23	0.8%
DTP/DTaP5	0	0.0%	0	0.0%	1	0.0%	0	0.0%	0	0.0%
OPV/IPV1	2,389	93.6%	3,063	88.5%	2,586	92.6%	2,504	90.9%	2,662	97.8%
OPV/IPV2	2,268	88.9%	2,965	85.7%	2,493	89.3%	2,412	87.5%	2,581	94.9%
OPV/IPV3	1,850	72.5%	2,411	69.7%	742	26.6%	601	21.8%	948	34.8%
OPV/IPV4	9	0.4%	8	0.2%	7	0.3%	1	0.0%	2	0.1%
MMR1**	83	3.3%	206	6.0%	117	4.2%	87	3.2%	34	1.2%
MMR2	4	0.2%	1	0.0%	1	0.0%	0	0.0%	1	0.0%
HIB1	2,324	91.1%	3,024	87.4%	2,569	92.0%	2,492	90.5%	2,651	97.4%
HIB2	2,190	85.8%	2,925	84.5%	2,482	88.9%	2,398	87.0%	2,569	94.4%
HIB3	1,935	75.8%	2,612	75.5%	2,220	79.5%	1,720	62.4%	1,267	46.6%
HIB4	48	1.9%	99	2.9%	61	2.2%	27	1.0%	15	0.6%
HIB5	0	0.0%	0	0.0%	1	0.0%	1	0.0%	0	0.0%
HEPB1	2,404	94.2%	3,068	88.7%	2,616	93.7%	2,508	91.0%	2,649	97.4%
HEPB2	2,283	89.5%	2,961	85.7%	2,527	90.5%	2,449	88.9%	2,542	93.4%
HEPB3	1,825	71.5%	2,419	69.9%	2,087	74.7%	1,803	65.4%	1,116	41.0%
HEPB4	21	0.8%	15	0.4%	23	0.8%	14	0.5%	17	0.6%
VAR1**	37	1.5%	160	4.6%	150	5.4%	118	4.3%	44	1.6%
VAR2	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

*Percents are calculated as (number immunized/sample size).

**The Advisory Committee on Immunization Practices (ACIP) does not recommend the initiation of the MMR and Varicella vaccine series until after the first birthday.

Sample Size for 1997-98 study = 2,552; 1998-99 study = 3,460; 1999-00 study = 2,793; 2001 study = 2,755, 2002 study = 2,721.

Table 10 shows the 1997-98, 1998-99, 1999-00, 2001, and 2002 4:3:1 immunization coverage rates and percents for each of the 19 health districts in the state. *(For more detailed information on immunization rates specific to health districts, see Section IV: Results of District Level Analyses)* The margin of error indicates the confidence limits surrounding the immunization rates. The 2002 margin of error for each health district ranges from +/- 3.4 percent to +/- 8.7 percent. The District level 2002 4:3:1 immunization rates range from 73.9 percent to 94.3 percent. Of the 19 health districts, two had an immunization coverage rate over 90 percent and fifteen districts had 2002 coverage rates between 80 and 90 percent. The following summary highlights the changes in 4:3:1 coverage rates between 2001 and 2002:

- ❖ Coverage increased between 0 and 5 percent in four districts (District 1-1, 1-2, 4-0 and 6-0)
- ❖ Coverage increased between 5 and 20 percent in nine districts (Districts 3-1, 3-3, 3-4, 3-5, 5-2, 7-0, 8-1, 9-1 and 9-3)
- ❖ Coverage increased 40.2 percent in District 3-2
- ❖ Coverage fell between 0 and 5 percent in three districts (Districts 2-0, 5-1 and 10-0)
- ❖ Coverage fell between 5 and 15 percent in two districts (Districts 8-2 and 9-2)

**Table 10:
4:3:1 District and State Coverage Rates by Study Year**

Dist	1997-98		1998-99		1999-00		2001		2002	
	%	Margin of Error	%	Margin of Error	%	Margin of Error	%	Margin of Error	%	Margin of Error
1-1	81.5	+/- 6.6	78.2	+/- 6.8	67.5	+/- 7.1	78.9	+/-6.2	80.6	+/-5.5
1-2	71.7	+/- 8.3	74.9	+/- 6.4	75.3	+/-7.0	78.1	+/-6.7	79.1	+/-6.3
2-0	78.9	+/- 9.2	66.7	+/- 6.8	88.5	+/-5.5	94.8	+/-3.7	93.4	+/-5.6
3-1	75.3	+/- 5.6	58.1	+/- 6.5	75.6	+/-6.1	70.7	+/-6.8	84.5	+/-4.2
3-2	49.7	+/- 7.1	53.8	+/- 5.4	69.6	+/-6.5	42.4	+/-5.6	82.6	+/-6.2
3-3	85.5	+/- 5.4	76.3	+/- 7.1	60.7	+/-10.4	57.6	+/-8.9	73.9	+/-8.2
3-4	57.4	+/- 9.6	65.0	+/- 5.6	94.5	+/-2.3	75.9	+/-9.4	94.3	+/-3.4
3-5	58.3	+/- 7.6	63.0	+/- 5.5	64.9	+/-6.3	75.5	+/-6.0	84.6	+/-5.1
4-0	58.7	+/- 9.5	67.5	+/- 5.6	79.7	+/-5.7	83.5	+/-5.1	87.1	+/-5.4
5-1	78.3	+/- 7.8	87.1	+/- 7.1	91.3	+/-6.2	85.0	+/-9.0	80.8	+/-8.7
5-2	71.8	+/- 7.2	94.5	+/- 2.8	83.6	+/-9.8	69.1	+/-8.6	84.7	+/-4.5
6-0	76.6	+/- 7.1	96.1	+/- 2.8	72.3	+/-12.8	88.9	+/-4.8	89.2	+/-6.0
7-0	71.8	+/- 5.8	67.9	+/- 7.8	77.1	+/-6.3	73.1	+/-6.7	82.8	+/-6.9
8-1	88.4	+/- 6.8	80.4	+/- 8.1	86.0	+/-6.6	76.7	+/-8.2	82.2	+/-6.6
8-2	81.4	+/- 9.1	83.8	+/- 6.1	83.7	+/-5.9	93.2	+/-4.3	83.1	+/-8.4
9-1	66.4	+/- 7.8	80.4	+/- 6.5	78.5	+/-7.1	69.1	+/-8.2	80.9	+/-6.2
9-2	80.5	+/- 8.6	83.5	+/- 6.6	85.0	+/-6.1	90.8	+/-4.9	85.4	+/-7.3
9-3	68.6	+/- 7.7	60.6	+/- 9.2	82.2	+/-8.8	71.6	+/-9.1	85.6	+/-6.3
10-0	73.6	+/- 7.6	78.9	+/- 6.1	73.4	+/-7.0	84.4	+/-5.7	80.2	+/-7.1
State	71.3	+/- 1.8	73.3	+/- 1.5	78.8	+/-1.5	75.1	+/-1.5	83.9	+/-1.6

Note: State rates based on data weighted by health district.

Additional information regarding 3:3:1 and 4:3:1+3 coverage rates and margins of error by district can be found in Appendix F: Margins of Error for Immunization Coverage Rates.

Tables 11-16 present the state and district rates for each individual vaccine during the 1997-98, 1998-99, 1999-00, 2001, and 2002 data collection periods.

As shown in Table 11, 2002 district immunization rates for the DTP/DTaP vaccines ranged from 73.9 percent to 94.9 percent, with a statewide rate of 84.6 percent receiving all four doses. The 2002 statewide DTP/DTaP rate increased from the 1997-98, 1998-999, 1999-00, and 2001 study years.

Table 11:
State and District Immunization Rates
for DTP/DTaP by Study Year

District	1997-98 Rates 4 DTP/DTaP	1998-99 Rates 4 DTP/DTaP	1999-00 Rates 4 DTP/DTaP	2001 Rates 4 DTP/DTaP	2002 Rates 4 DTP/DTaP
1-1	83.0%	78.2%	67.5%	79.5%	81.1%
1-2	72.6%	75.4%	77.4%	79.5%	82.3%
2-0	80.3%	67.7%	89.3%	94.8%	94.7%
3-1	77.9%	59.0%	77.7%	70.7%	84.9%
3-2	51.8%	55.1%	71.1%	42.4%	84.0%
3-3	86.1%	76.3%	63.1%	61.0%	73.9%
3-4	59.4%	66.4%	94.8%	75.9%	94.9%
3-5	61.3%	64.4%	66.2%	77.0%	84.6%
4-0	61.5%	69.0%	79.7%	83.5%	87.8%
5-1	79.2%	87.1%	91.3%	86.7%	80.8%
5-2	72.5%	96.5%	83.6%	72.7%	85.5%
6-0	76.6%	96.1%	74.5%	89.5%	89.2%
7-0	73.1%	69.3%	77.1%	74.3%	83.6%
8-1	88.4%	81.5%	86.9%	77.7%	82.2%
8-2	81.4%	84.5%	85.6%	94.7%	85.7%
9-1	67.1%	80.4%	80.8%	69.9%	81.6%
9-2	84.1%	83.5%	88.0%	92.4%	86.5%
9-3	72.1%	64.2%	82.2%	71.6%	85.6%
10-0	74.4%	78.9%	74.7%	85.1%	80.2%
State	72.9%	74.2%	79.9%	76.0%	84.6%

Note: State rates based on data weighted by health district.

Table 12 shows the 1997-98, 1998-99, 1999-00, 2001, and 2002 state and district rates for the OPV/IPV vaccines. The 2002 district coverage rates for these vaccines varied between 82.9 percent and 97.4 percent. The 2002 statewide immunization rate for OPV/IPV was 90.6 percent, which is higher than the previous year's study rates.

Table 12:
State and District Immunization Rates
for OPV/IPV by Study Year

District	1997-98 Rates 3 OPV/IPV	1998-99 Rates 3 OPV/IPV	1999-00 Rates 3 OPV/IPV	2001 Rates 3 OPV/IPV	2002 Rates 3 OPV/IPV
1-1	88.1%	90.8%	72.3%	88.6%	90.0%
1-2	88.5%	86.9%	82.2%	86.3%	85.4%
2-0	93.4%	73.7%	88.5%	97.0%	97.4%
3-1	84.4%	72.5%	79.3%	75.3%	90.8%
3-2	75.4%	64.9%	76.8%	45.5%	84.7%
3-3	88.5%	93.5%	71.4%	69.5%	82.9%
3-4	64.4%	72.9%	96.4%	77.2%	96.0%
3-5	77.9%	76.4%	75.7%	83.7%	88.7%
4-0	83.7%	80.2%	85.9%	86.4%	92.5%
5-1	90.6%	92.9%	93.8%	93.3%	96.2%
5-2	85.9%	98.0%	87.3%	81.8%	94.0%
6-0	91.2%	98.3%	85.1%	93.2%	95.1%
7-0	93.2%	83.2%	85.9%	78.4%	90.5%
8-1	94.2%	94.6%	87.9%	84.5%	91.5%
8-2	88.6%	90.1%	90.8%	96.2%	90.9%
9-1	80.7%	87.4%	88.5%	79.7%	90.1%
9-2	92.7%	93.4%	90.2%	92.4%	92.1%
9-3	84.3%	77.1%	86.3%	76.8%	89.8%
10-0	89.1%	86.5%	76.0%	88.3%	86.0%
State	85.4%	83.6%	84.4%	80.8%	90.6%

Note: State rates based on data weighted by health district.

Table 13 shows the 1997-98, 1998-99, 1999-00, 2001, and 2002 state and district rates for MMR. The 2002 district rates for MMR ranged from a low of 84.7 percent to a high of 97.4 percent, with a statewide rate of 90.9 percent coverage. This statewide rate for the MMR vaccine increased from the 2001 rate of 82.0 percent.

Table 13:
State and District Immunization
Rates for MMR by Study Year

District	1997-98 Rates 1 MMR	1998-99 Rates 1 MMR	1999-00 Rates 1 MMR	2001 Rates 1 MMR	2002 Rates 1 MMR
1-1	90.4%	86.6%	73.5%	89.2%	90.5%
1-2	85.8%	84.6%	83.6%	85.6%	87.3%
2-0	85.5%	72.0%	90.1%	97.0%	96.1%
3-1	78.4%	64.0%	81.9%	77.0%	90.1%
3-2	71.2%	65.8%	77.8%	45.1%	84.7%
3-3	88.5%	84.9%	70.2%	74.6%	84.7%
3-4	63.4%	69.7%	96.4%	83.5%	97.1%
3-5	68.1%	73.3%	71.6%	87.8%	86.7%
4-0	69.2%	73.1%	84.9%	86.4%	93.2%
5-1	84.0%	91.8%	96.3%	91.7%	97.4%
5-2	80.5%	95.7%	90.9%	82.7%	92.3%
6-0	84.7%	98.3%	87.2%	95.1%	96.1%
7-0	92.3%	83.2%	85.3%	80.2%	92.2%
8-1	95.3%	89.1%	90.7%	82.5%	93.8%
8-2	85.7%	91.5%	88.9%	97.0%	90.9%
9-1	72.1%	86.7%	85.4%	79.7%	89.5%
9-2	87.8%	85.1%	91.0%	93.1%	94.4%
9-3	76.4%	67.9%	87.7%	80.0%	87.3%
10-0	82.2%	84.8%	77.3%	89.6%	90.1%
State	80.4%	80.2%	84.6%	82.0%	90.9%

Note: State rates based on data weighted by health district.

As shown in Table 14, 2002 district immunization rates for the Hib vaccine varied between 80.2 and 97.4 percent. The statewide Hib coverage rate in 2002 was 90.9 percent, an increase from the 2001 statewide rate of 84.3 percent.

Table 14:
State and District Immunization
Rates for Hib by Study Year

District	1997-98 Rates 3 Hib	1998-99 Rates 3 Hib	1999-00 Rates 3 Hib	2001 Rates 3 Hib	2002 Rates 3 Hib
1-1	88.9%	90.8%	76.5%	89.2%	91.5%
1-2	89.4%	88.0%	86.3%	95.2%	86.1%
2-0	88.2%	73.1%	88.5%	96.3%	96.1%
3-1	83.5%	71.6%	85.0%	83.9%	91.2%
3-2	69.1%	65.2%	79.9%	45.5%	85.4%
3-3	87.9%	93.5%	79.8%	81.4%	80.2%
3-4	59.4%	70.4%	97.5%	92.4%	96.6%
3-5	74.8%	76.7%	77.0%	89.3%	86.2%
4-0	79.8%	81.0%	88.5%	88.3%	93.2%
5-1	89.6%	94.1%	96.3%	91.7%	97.4%
5-2	81.2%	98.0%	96.4%	84.5%	92.7%
6-0	92.0%	98.3%	87.2%	97.5%	97.1%
7-0	88.5%	85.4%	85.3%	82.6%	89.7%
8-1	96.5%	94.6%	92.5%	81.6%	94.6%
8-2	87.1%	90.8%	92.8%	92.5%	92.2%
9-1	81.4%	86.0%	91.5%	81.3%	90.8%
9-2	93.9%	93.4%	95.5%	95.4%	93.3%
9-3	85.7%	78.0%	89.0%	81.1%	91.5%
10-0	88.4%	87.7%	79.9%	94.2%	86.8%
State	83.6%	83.6%	87.4%	84.3%	90.9%

Note: State rates based on data weighted by health district.

Table 15 reports the statewide and district immunization coverage rates for the Hepatitis B vaccine. In 2002, the district coverage rates varied from a low of 80.2 percent to 97.4 percent. The 2002 statewide rate of 90.8 percent for the Hepatitis B vaccine was higher than the 2001 statewide rate of 83.8 percent.

Table 15:
State and District Immunization Rates
for Hep B by Study Year

District	1997-98 Rates 3 Hep B	1998-99 Rates 3 Hep B	1999-00 Rates 3 Hep B	2001 Rates 3 Hep B	2002 Rates 3 Hep B
1-1	92.6%	88.0%	76.5%	92.8%	91.0%
1-2	85.8%	86.3%	86.3%	93.2%	87.3%
2-0	88.2%	73.1%	89.3%	95.6%	97.4%
3-1	82.3%	72.1%	85.5%	82.8%	92.6%
3-2	74.3%	62.8%	79.4%	44.4%	84.7%
3-3	84.8%	92.8%	76.2%	81.4%	80.2%
3-4	62.4%	72.2%	97.5%	86.1%	94.9%
3-5	75.5%	73.6%	77.9%	88.8%	85.6%
4-0	78.8%	81.0%	85.9%	88.8%	92.5%
5-1	88.7%	89.4%	96.3%	93.3%	96.2%
5-2	78.5%	97.7%	89.1%	83.6%	93.1%
6-0	82.5%	98.9%	85.1%	93.2%	96.1%
7-0	93.6%	84.7%	87.6%	85.0%	90.5%
8-1	89.5%	91.3%	92.5%	84.5%	94.6%
8-2	85.7%	90.8%	90.2%	95.5%	92.2%
9-1	82.1%	84.6%	89.2%	76.4%	90.1%
9-2	95.1%	91.7%	91.7%	95.4%	92.1%
9-3	85.7%	81.7%	87.7%	81.1%	89.0%
10-0	86.0%	87.7%	79.9%	91.6%	88.4%
State	83.2%	82.9%	86.7%	83.8%	90.8%

Note: State rates based on data weighted by health district.

Table 16 reports Varicella coverage rates among the 19 health districts and statewide by study year. Children reported to have had Varicella disease are not considered in the results below. For a more detailed description of Varicella rates including prior history of disease, see Appendix D. The district coverage rates ranged from 81.9 percent to 97.1 percent, with a statewide coverage rate of 88.5 percent for the Varicella vaccine. This is an increase from the 2001 Varicella rate of 77.9 percent.

Table 16:
State and District Immunization
Rates for Varicella by Study Year

District	1997-98 Rates 1 Varicella	1998-99 Rates 1 Varicella	1999-00 Rates 1 Varicella	2001 Rates 1 Varicella	2002 Rates 1 Varicella
1-1	5.2%	41.5%	45.2%	83.7%	89.1%
1-2	14.2%	48.0%	58.2%	82.9%	86.1%
2-0	21.1%	48.4%	81.7%	94.8%	96.1%
3-1	50.2%	43.2%	66.3%	72.4%	88.4%
3-2	17.3%	43.1%	67.5%	44.4%	81.9%
3-3	71.5%	80.6%	52.4%	69.5%	82.9%
3-4	9.9%	54.2%	89.5%	86.1%	96.0%
3-5	29.4%	51.0%	57.2%	81.1%	83.6%
4-0	6.7%	31.7%	65.6%	83.0%	92.5%
5-1	12.3%	21.2%	61.3%	86.7%	84.6%
5-2	15.4%	63.7%	61.8%	80.0%	90.3%
6-0	19.0%	75.3%	61.7%	88.3%	97.1%
7-0	21.4%	24.1%	53.5%	74.9%	88.8%
8-1	16.3%	30.4%	61.7%	78.6%	93.0%
8-2	18.6%	71.8%	66.0%	96.2%	90.9%
9-1	14.3%	18.9%	51.5%	71.5%	83.6%
9-2	3.7%	27.3%	58.6%	88.5%	87.6%
9-3	5.0%	25.7%	57.5%	69.5%	83.9%
10-0	11.6%	52.0%	58.4%	87.0%	86.8%
State	19.0%	47.1%	64.3%	77.9%	88.5%

Notes: State rates based on data weighted by health district.

Statewide Comparisons of Maternal Demographics of Adequately Immunized Children

Cross-tabulations were performed at the state level in order to describe the relationship between maternal characteristics and the immunization status of two-year-old children. Tables 17-19 provide some of the characteristics of mothers of children who were up-to-date on their 4:3:1 series. Analyses include cross-tabulations of 4:3:1 complete children and total children in each group with the following three variables: maternal race, maternal education, and maternal Medicaid status. Differences between groups are significant if the p-value is less than 0.05.

Table 17 contains statewide cross-tabulations of maternal race and children’s immunization status. The numbers in the top row of each cell represent the total number of individuals who fall into each category by race and adequacy of immunization. The bottom row represents the percent of each race that falls into that specific category. The table shows that, for all years, the immunization rates of children born to black and white mothers were virtually the same. Maternal race was not a significant factor in the immunization status of two-year-old children in Georgia.

Table 17:
Statewide Cross tabulations of
Maternal Race and Child Immunization Status by Study Year

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	1,134/1,572 (72.1)	1654/2265 (73.0)	1265/1661 (76.2)	1410/1664 (84.7)
Black	658/936 (70.3)	806/1122 (71.8)	765/1045 (73.2)	806/978 (82.4)
Other	29/44 (65.9)	51/73 (69.9)	38/49 (77.6)	64/79 (81.0)
4:3:1 Total	71.3%	73.3%	75.1%	83.9%

Notes: Total rates based on data weighted by health district.
 1998-99 Chi-square=2.61, p=0.45; 1997-98 Chi-square =1.95, p=0.58; 1999-00 Analysis not done; 2001 Chi-square=3.15, p=0.21; 2002 Chi-square=3.81, p=0.28.

Table 18 shows the statewide cross-tabulation of maternal educational attainment and 4:3:1 immunization status. The top row in each cell shows the number of mothers in each group according to the immunization status of their children. The bottom row represents the percent of the total number in that category. In 2002, maternal educational attainment was associated with child immunization status (Chi-square=31.97, p=0.000006). As the mother's education level increased, the child's immunization rate increased as well.

Table 18:
**Statewide Cross tabulations of Maternal Educational Attainment
and Child Immunization Status by Study Year**

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Education	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	93/123 (75.6)	135/176 (76.7)	161/221 (72.9)	124/157 (79.0)
Some high school	401/569 (70.5)	472/662 (71.3)	456/595 (76.6)	455/561 (81.1)
High school	643/916 (70.2)	866/1,189 (72.8)	724/960 (75.4)	752/914 (82.3)
Some college	326/465 (70.1)	493/679 (72.6)	364/485 (75.1)	415/498 (83.3)
College or higher	358/479 (74.7)	545/754 (72.3)	363/494 (73.5)	538/591 (91.0)
4:3:1 Total	71.3%	73.3%	75.1%	83.9%

Notes: Total rates based on data weighted by health district. In 1996-97, 28 records did not include information on educational attainment on the birth certificate. 1997-98 Chi-square = 4.94, p = 0.29; 1998-99 Chi-square=2.12, p=0.71; 1999-00 Analysis not done; 2001 Chi-square=2.09, p=0.7; 2002 Chi-square=31.97, p<0.05.

Table 19 shows the statewide cross-tabulation of maternal Medicaid status and 4:3:1 immunization status for 2001 and 2002 study years. The 4:3:1 rates are shown for Medicaid recipients and non-Medicaid recipients. In 2002, statewide immunization rates are higher for Non-Medicaid recipients (Chi-square=15.34, p=0.00009).

Table 19:
2002 Statewide Cross tabulations
of Maternal Medicaid Status and Child Immunization Status

	2001 4:3:1 Adequate	2001 4:3:1 Inadequate	2002 4:3:1 Adequate	2002 4:3:1 Inadequate
Medicaid Status	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Medicaid	1,024/1,357 (75.5)	333/1,357 (24.5)	1,054/1,300 (81.1)	246/1,300 (18.9)
Non-Medicaid	1,044/1,398 (74.7)	354/1,398 (25.3)	1,230/1,421 (86.6)	191/1,421 (13.4)
4:3:1 Total	75.1%	24.9%	83.9%	16.1%

Notes: 4:3:1 total rates based on data weighted by health district.
 2001 Chi-square = 0.23, p = 0.64; 2002 Chi-square = 15.13, p<0.05.

Summary of Statewide Analyses

The statewide analyses reviewed both the study's process of measuring immunization rates and the rates themselves. In measuring immunization rates, the study assessed rates at three levels: 4:3:1+3 coverage, 4:3:1 coverage, and 3:3:1 coverage.

In reviewing rates at the most commonly used level of coverage, 4:3:1 coverage, immunization rates increased in 2002 statewide compared to the same rates as measured by this study in 2001.

SECTION IV:
RESULTS OF DISTRICT LEVEL
ANALYSES

Section IV: Results of District Level Analyses

Overview of District Rates

The immunization rates for this sixth year report were calculated based on final samples. The final sample sizes in each health district varied by district. The number of children in the final sample in each district is reported in each Individual Health District Report in this section, as well as in Table 3: Response Rates for the 2002 Georgia Immunization Study. The rates reported are based on information collected from both public and private providers. Summaries of all district rates are included in Section III: Statewide Rates, specifically Tables 10-16. The Individual District Reports include immunization rates for each recommended vaccine and 4:3:1 rates. Although statistical analyses would be informative for each of the districts, sub-category sample sizes in the cross tabulation tables were too small for such analyses to be interpreted and generalized to the target population.

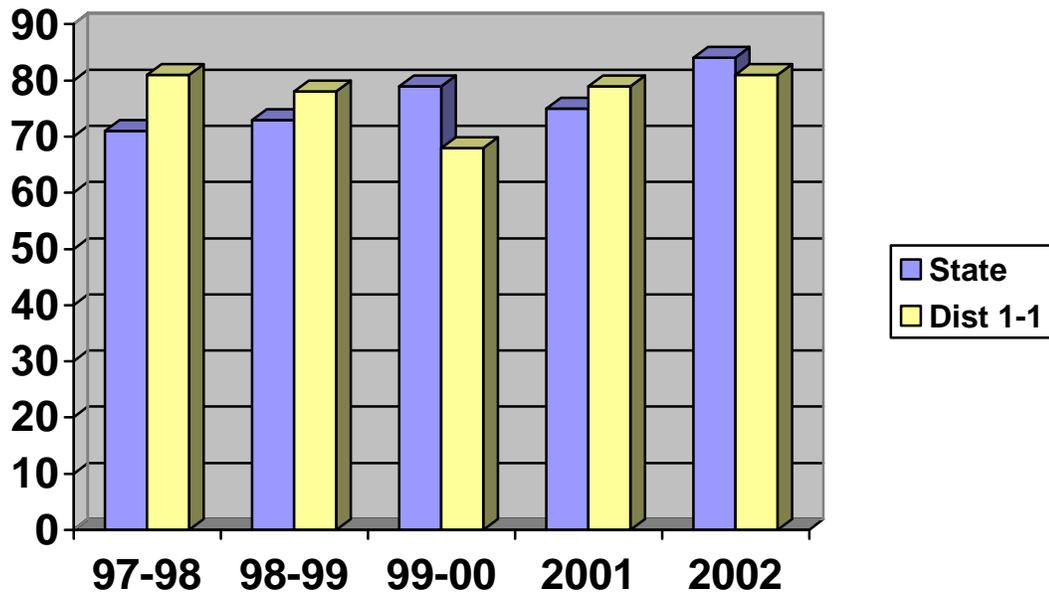
Individual Health District Report: District 1-1

The eligible sample from this district included 237 children born in January 2000. From the 237 children, 209 records were located (Response Rate=88.2%). Of the 209 located records, there were 8 parental refusals leaving a final sample of 201 records.

- ❖ **The 4:3:1 immunization coverage estimate is 80.6 percent (162/201).**

This rate is lower than the statewide 4:3:1 immunization rate of 83.9 percent.

Figure 4: 4:3:1 Coverage for State and District 1-1



- ❖ **The 4:3:1+3 immunization coverage estimate is 75.1 percent (151/201).**

This rate is lower than the statewide 4:3:1+3 immunization rate of 78.9 percent.

Table 20:
District Immunization Rates for
Health District 1-1 by Study Year

Vaccine	1997-98 Adequate Rates	1998-99 Adequate Rates	1999-00 Adequate Rates	2001 Adequate Rates	2002 Adequate Rates
4 DTP/DTaP	83.0%	78.2%	67.5%	79.5%	81.1%
3 OPV/IPV	88.1%	90.8%	82.2%	88.6%	90.0%
1 MMR	90.4%	86.6%	73.5%	89.2%	90.5%
3 Hib	88.9%	90.8%	76.5%	89.2%	91.5%
3 HepB	92.6%	88.0%	76.5%	92.8%	91.0%
1 Varicella	5.2%	41.5%	45.2%	83.7%	89.1%

Table 20 reveals the coverage rates of each vaccine series. Coverage rates ranged from 81.1 to 91.5 percent for the 2002 study data.

Table 21 shows the immunization rates for each individual vaccine at twelve months of age. Not all shots are recommended prior to the first birthday; therefore, certain immunization rates within each series are expected to be low. For example, the DTP/DTaP vaccine series includes 4 doses before the second birthday; however, only three of the four shots are recommended within the first year of life. As shown in the following table, the percentage of children vaccinated for DTP/DTaP decreases by dose. Similarly, the Advisory Committee on Immunization Practices (ACIP) does not recommend the initiation of the MMR and Varicella vaccine series until after the first birthday, so these rates should be close to 0% at 12 months.

Table 21:
2002 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 1-1

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	201	100.0%
DTP2/DTaP2	189	94.0%
DTP3/DTaP3	168	83.6%
DTP4/DTaP4	5	2.5%
DTP5/DTaP5	0	0.0%
OPV/IPV1	201	100.0%
OPV/IPV2	188	93.5%
OPV/IPV3	67	33.3%
OPV/IPV4	0	0.0%
MMR1	5	2.5%
MMR2	0	0.0%
HIB1	201	100.0%
HIB2	188	93.5%
HIB3	64	31.8%
HIB4	1	0.5%
HIB5	0	0.0%
HEPB1	200	99.5%
HEPB2	184	91.5%
HEPB3	49	24.4%
HEPB4	1	0.5%
VAR1	5	2.5%
VAR2	0	0.0%

*Percent = number immunized / sample size
sample size = 201

Table 22:
Cross tabulations of Maternal Race and
Child Immunization Status for Health District 1-1 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1: Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	96/120 (80.0)	99/129 (76.7)	123/154 (79.9)	140/174 (80.5)
Black	11/12 (91.7)	11/12 (91.7)	8/12 (66.7)	19/23 (82.6)
Other	3/3 (100.0)	1/1 (100.0)	----	3/3 (100.0)
Total	110/135 (81.5)	111/142 (78.2)	131/166 (78.9)	162/200 (81.0)

* Excludes 1999-00 study year.

Table 22 contains a cross tabulation of maternal race and children's immunization status. The numbers in the top row of each cell represent the total number of individuals in each category. The bottom row in each cell represents the percent in that immunization status category.

- ❖ Table 22 shows that in 1997-98, 1998-99, and 2002 the 4:3:1 immunization rate of children born to black mothers was higher than that of children born to white mothers in the district. However, in 2001 the immunization rate of children born to white mothers was higher than that of black mothers.

Table 23:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 1-1 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	8/11 (72.7)	9/13 (69.2)	14/15 (93.3)	9/14 (64.3)
Some high school	25/31 (80.6)	23/34 (67.6)	29/41 (70.7)	36/50 (72.0)
High school graduate	42/54 (77.8)	43/52 (82.7)	41/52 (78.8)	66/79 (83.5)
Some college	22/25 (88.0)	23/28 (82.1)	27/35 (77.1)	29/35 (82.9)
College or more	13/14 (92.9)	13/15 (86.7)	20/23 (87.0)	19/20 (95.0)
Unknown	---	---	---	3/3 (100.0)
Total	110/135 (81.5)	111/142 (78.2)	131/166 (78.9)	162/200 (81.0)

*Excludes 1999-00 study year.

Table 23 shows the cross tabulation of maternal educational attainment and 4:3:1 immunization status in District 1-1. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ For the 2002 study, immunization rates increased with educational attainment.

Table 24:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 1-1

	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Medicaid Status	#/Total (percent)	#/Total (percent)
Medicaid	62/80 (77.5)	79/99 (79.8)
Non-Medicaid	69/86 (80.2)	83/102 (81.4)
Total	131/166 (78.9)	162/200 (81.0)

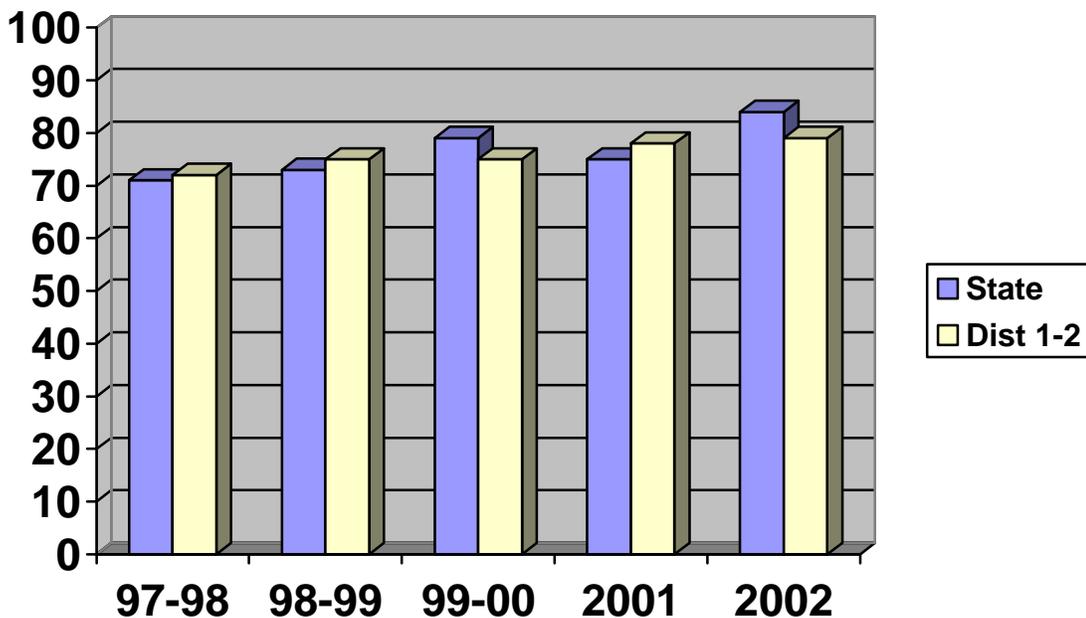
Table 24 shows immunization status of children born to women stratified by Medicaid status for the 2001 and 2002 study years. For Health District 1-1, children born to non-Medicaid women had a slightly higher immunization rate than children born to women using Medicaid.

Individual Health District Report: District 1-2

The eligible sample from this district included 187 children born in January 2000. From these children, 167 records were located (Response Rate=89.3%). Of the 167 located records, there were 9 parental refusals leaving a final sample of 158 records.

- ❖ **4:3:1 immunization coverage estimate is 79.1 percent (125/158).** This rate is lower than the statewide 4:3:1 immunization rate of 83.9 percent.

Figure 5: 4:3:1 Coverage for State and District 1-2



- ❖ **4:3:1+3 immunization coverage estimate 72.8 percent (115/158).** This rate is lower than the statewide 4:3:1+3 immunization rate of 78.9 percent.

Table 25:
District Immunization Rates for
Health District 1-2 by Study Year

Vaccine	1997-98 Adequate Rates	1998-99 Adequate Rates	1999-00 Adequate Rates	2001 Adequate Rates	2002 Adequate Rates
4 DTP/DTaP	72.6%	75.4%	77.4%	79.5%	82.3%
3 OPV/IPV	88.5%	86.9%	82.2%	86.3%	85.4%
1 MMR	85.8%	84.6%	83.6%	85.6%	87.3%
3 Hib	89.4%	88.0%	86.3%	95.2%	86.1%
3 HepB	85.8%	86.3%	86.3%	93.2%	87.3%
1 Varicella	14.2%	48.0%	58.2%	82.9%	86.1%

Table 25 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 82.3 to 87.3 percent for the 2002 study data.

Table 26 shows the immunization rates for each individual vaccine at twelve months of age. Not all shots are recommended prior to the first birthday; therefore, certain immunization rates within each series are expected to be low. For example, the DTP/DTaP vaccine series includes 4 doses before the second birthday; however, only three of the four shots are recommended within the first year of life. As shown in the following table, the percentage of children vaccinated for DTP/DTaP decreases by dose. Similarly, the Advisory Committee on Immunization Practices (ACIP) does not recommend the initiation of the MMR and Varicella vaccine series until after the first birthday, so these rates should be close to 0% at 12 months.

Table 26:
2002 District Immunization Rates by Individual Vaccine at
12 months of age for Health District 1-2

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	155	98.1%
DTP2/DTaP2	150	94.9%
DTP3/DTaP3	141	89.2%
DTP4/DTaP4	2	1.3%
DTP5/DTaP5	0	0.0%
OPV/IPV1	155	98.1%
OPV/IPV2	148	93.7%
OPV/IPV3	62	39.2%
OPV/IPV4	0	0.0%
MMR1	2	1.3%
MMR2	0	0.0%
HIB1	153	96.8%
HIB2	148	93.7%
HIB3	72	45.6%
HIB4	1	0.6%
HIB5	0	0.0%
HEPB1	154	97.5%
HEPB2	147	93.0%
HEPB3	54	34.2%
HEPB4	0	0.0%
VAR1	2	1.3%
VAR2	0	0.0%

*Percent = number immunized / sample size
Sample size = 158

Table 27:
Cross tabulations of Maternal Race and
Child Immunization Status for Health District 1-2 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	79/110 (71.8)	125/167 (74.9)	112/142 (78.9)	118/149 (79.2)
Black	1/2 (50.0)	4/6 (66.7)	2/4 (50.0)	2/3 (66.7)
Other	1/1 (100.0)	2/2 (100.0)	---	2/2 (100.0)
Unknown	---	---	---	3/4 (75.0)
Total	81/113 (71.7)	131/175 (74.9)	114/146 (78.1)	125/158 (79.1)

*Excludes 1999-00 study year.

Table 27 contains a cross tabulation of maternal race and children's immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ The sample of non-white mothers in the district was too small to make generalizations from these numbers.

Table 28:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 1-2 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	8/10 (80.0)	12/14 (85.7)	14/20 (70.0)	10/10 (100.0)
Some high school	20/27 (74.1)	29/39 (74.4)	32/37 (86.5)	28/37 (75.7)
High school graduate	31/46 (67.4)	49/65 (75.4)	30/45 (66.7)	25/36 (69.4)
Some college	14/20 (70.0)	18/25 (72.0)	21/23 (91.3)	31/37 (83.8)
College or more	8/10 (80.0)	23/32 (71.9)	17/21 (81.0)	29/34 (85.3)
Unknown	---	----	---	2/4 (50.0)
Total	81/113 (71.7)	131/175 (74.9)	114/146 (78.1)	125/158 (79.1)

*Excludes 1999-00 study year.

Table 28 shows the cross tabulation of maternal educational attainment and 4:3:1 immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ Immunization rates varied from year to year in relation to education of the mother.

Table 29:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 1-2

	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)
Medicaid	52/62 (83.9)	44/60 (73.3)
Non-Medicaid	62/84 (73.8)	81/98 (82.7)
Total	114/146 (78.1)	125/158 (79.1)

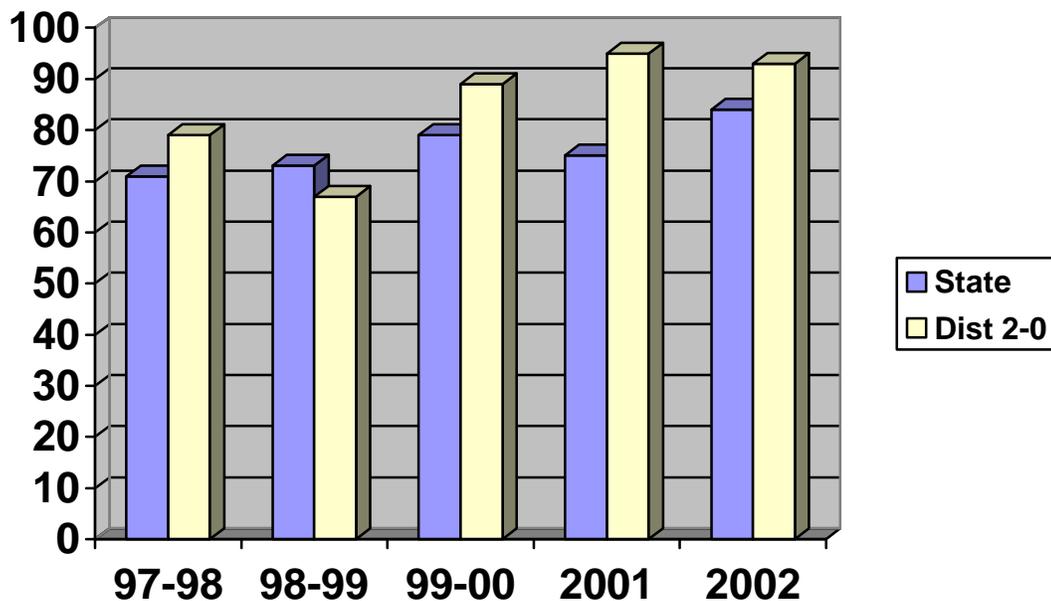
Table 29 shows immunization status of children born to women stratified by Medicaid status for the 2001 and 2002 study years. For Health District 1-2, children born to non-Medicaid women had a higher immunization rate than children born to women not using Medicaid.

Individual Health District Report: District 2-0

The eligible sample from this district included 105 children born in January 2000. From the 105 children, 76 records were located (Response rate = 72.4%). Of the 76 located records, there were no parental refusals leaving a final sample of 76 records.

- ❖ **4:3:1 immunization coverage estimate is 93.4 percent (71/76).** This rate is much higher than the statewide 4:3:1 immunization rate of 83.9 percent.

Figure 6: 4:3:1 Coverage for State and District 2-0



- ❖ **4:3:1+3 immunization coverage estimate is 93.4 percent (71/76).** This rate is also much higher than the statewide 4:3:1+3 immunization rate of 78.9 percent.

Table 30:
District Immunization Rates for
Health District 2-0 by Study Year

Vaccine	1997-98 Adequate Rates	1998-99 Adequate Rates	1999-00 Adequate Rates	2001 Adequate Rates	2002 Adequate Rates
4 DTP/DTaP	80.3%	67.7%	89.3%	94.8%	94.7%
3 OPV/IPV	93.4%	73.7%	88.5%	97.0%	97.4%
1 MMR	85.5%	72.0%	90.1%	97.0%	96.1%
3 Hib	88.2%	73.1%	88.5%	96.3%	96.1%
3 HepB	88.2%	73.1%	89.3%	95.6%	97.4%
1 Varicella	21.1%	48.4%	81.7%	94.8%	96.1%

Table 30 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 94.7 to 97.4 percent for the 2002 study data.

Table 31 shows the immunization rates for each individual vaccine at twelve months of age. Not all shots are recommended prior to the first birthday; therefore, certain immunization rates within each series are expected to be low. For example, the DTP/DTaP vaccine series includes 4 doses before the second birthday; however, only three of the four shots are recommended within the first year of life. As shown in the following table, the percentage of children vaccinated for DTP/DTaP decreases by dose. Similarly, the Advisory Committee on Immunization Practices (ACIP) does not recommend the initiation of the MMR and Varicella vaccine series until after the first birthday, so these rates should be close to 0% at 12 months.

**Table 31:
2002 District Immunization Rates by Individual Vaccine at
12 months of age for Health District 2-0**

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	76	100.0%
DTP2/DTaP2	76	100.0%
DTP3/DTaP3	71	93.4%
DTP4/DTaP4	0	0.0%
DTP5/DTaP5	0	0.0%
OPV/IPV1	76	100.0%
OPV/IPV2	76	100.0%
OPV/IPV3	51	67.1%
OPV/IPV4	0	0.0%
MMR1	0	0.0%
MMR2	0	0.0%
HIB1	75	98.7%
HIB2	75	98.7%
HIB3	49	64.5%
HIB4	0	0.0%
HIB5	0	0.0%
HEPB1	76	100.0%
HEPB2	76	100.0%
HEPB3	42	55.3%
HEPB4	0	0.0%
VAR1	9	6.7%
VAR2	0	0.0%

*Percent = number immunized / sample size
Sample size = 76

Table 32:
Cross tabulations of Maternal Race and
Child Immunization Status for Health District 2-0 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	53/69 (76.8)	114/169 (67.5)	121/127 (95.3)	65/70 (92.9)
Black	6/6 (100.0)	9/13 (69.2)	5/6 (83.3)	4/4 (100.0)
Other	1/1 (100.0)	1/4 (25.0)	2/2 (100.0)	2/2 (100.0)
Total	60/76 (78.9)	124/186 (66.7)	128/135 (94.8)	71/76 (93.4)

*Excludes 1999-00 study year.

Table 32 contains a cross tabulation of maternal race and children's immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ Table 32 shows that the number of white mothers was over 10 times the number of black mothers in each year of the study for District 2-0. The sample size of black mothers was too small to make definitive generalizations on racial differences in immunization rates.

Table 33:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 2-0 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	5/5 (100.0)	17/22 (77.3)	23/25 (92.0)	9/9 (100.0)
Some high school	12/17 (70.6)	24/41 (58.5)	24/24 (100.0)	15/18 (83.3)
High school graduate	25/32 (78.1)	38/58 (65.5)	38/42 (90.5)	20/21 (95.2)
Some college	10/11 (90.9)	21/30 (70.0)	15/16 (93.8)	7/8 (87.5)
College or more	8/11 (72.7)	24/35 (68.6)	28/28 (100.0)	17/17 (100.0)
Unknown	---	---	---	3/3 (100.0)
Total	60/76 (78.9)	124/186 (66.7)	128/135 (94.8)	71/76 (93.4)

*Excludes 1999-00 study year.

Table 33 shows the cross tabulation of maternal educational attainment and 4:3:1 immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ The immunization status of the children in District 2-0 varied with maternal educational attainment, with no clear trend or correlation emerging.

Table 34:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 2-0

	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)
Medicaid	48/51 (94.1)	24/28 (85.7)
Non-Medicaid	80/84 (95.2)	47/48 (97.9)
Total	128/135 (94.8)	71/76 (93.4)

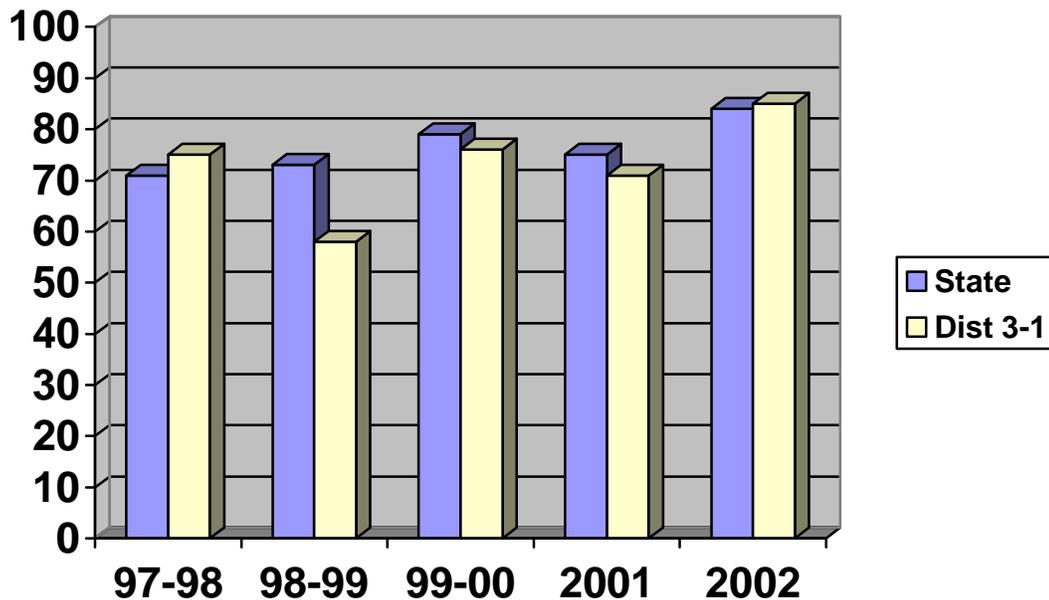
Table 34 shows immunization status of children born to women stratified by Medicaid status for the 2001 and 2002 study years. For Health District 2-0, children born to non-Medicaid women had a higher immunization rate than children born to women using Medicaid.

Individual Health District Report: District 3-1

The eligible sample from this district included 434 children born in January 2000. From the 434 children, 293 records were located (Response Rate=67.5%). Of the 293 located records, there were 9 parental refusals leaving a final sample of 284 records.

- ❖ **The 4:3:1 immunization coverage estimate is 84.5 percent (240/284).**
This rate is higher than the statewide 4:3:1 immunization rate of 83.9 percent.

Figure 7: 4:3:1 Coverage for State and District 3-1



- ❖ **The 4:3:1+3 immunization coverage estimate is 81.3 percent (231/284).**
This rate is higher than the statewide 4:3:1+3 immunization rate of 78.9 percent.

Table 35:
District Immunization Rates for
Health District 3-1 by Study Year

Vaccine	1997-98 Adequate Rates	1998-99 Adequate Rates	1999-00 Adequate Rates	2001 Adequate Rates	2002 Adequate Rates
4 DTP/DTaP	77.9%	59.0%	77.7%	70.7%	84.9%
3 OPV/IPV	84.4%	72.5%	79.3%	75.3%	90.8%
1 MMR	78.4%	64.0%	81.9%	77.0%	90.1%
3 Hib	83.5%	71.6%	85.0%	83.9%	91.2%
3 HepB	82.3%	72.1%	85.5%	82.8%	92.6%
1 Varicella	50.2%	43.2%	66.3%	72.4%	88.4%

Table 35 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 84.9 to 92.6 percent for the 2002 study data.

Table 36 shows the immunization rates for each individual vaccine at twelve months of age. Not all shots are recommended prior to the first birthday; therefore, certain immunization rates within each series are expected to be low. For example, the DTP/DTaP vaccine series includes 4 doses before the second birthday; however, only three of the four shots are recommended within the first year of life. As shown in the following table, the percentage of children vaccinated for DTP/DTaP decreases by dose. Similarly, the Advisory Committee on Immunization Practices (ACIP) does not recommend the initiation of the MMR and Varicella vaccine series until after the first birthday, so these rates should be close to 0% at 12 months.

Table 36:
2002 District Immunization Rates by Individual Vaccine at
12 months of age for Health District 3-1

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	278	97.9%
DTP2/DTaP2	270	95.1%
DTP3/DTaP3	257	90.5%
DTP4/DTaP4	1	0.4%
DTP5/DTaP5	0	0.0%
OPV/IPV1	277	97.5%
OPV/IPV2	271	95.4%
OPV/IPV3	66	23.2%
OPV/IPV4	0	0.0%
MMR1	0	0.0%
MMR2	0	0.0%
HIB1	275	96.8%
HIB2	269	94.7%
HIB3	123	43.3%
HIB4	0	0.0%
HIB5	0	0.0%
HEPB1	276	97.2%
HEPB2	269	94.7%
HEPB3	111	39.1%
HEPB4	5	1.8%
VAR1	4	1.4%
VAR2	0	0.0%

*Percent = number immunized / sample size
Sample size = 284

Table 37:
Cross tabulations of Maternal Race and
Child Immunization Status for Health District 3-1 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	135/183 (73.8)	101/172 (58.7)	95/128 (74.2)	179/207 (86.5)
Black	36/45 (80.0)	25/45 (55.6)	22/40 (55.0)	51/66 (77.3)
Other	2/2 (100.0)	3/5 (60.0)	6/6 (100.0)	8/9 (88.9)
Unknown	---	---	---	2/2 (100.0)
Total	174/231 (75.3)	129/222 (58.1)	123/174 (70.7)	240/284 (84.5)

*Excludes 1999-00 study year.

Table 37 contains a cross tabulation of maternal race and children's immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ Table 37 shows that the number of white mothers in the District 3-1 sample was substantially higher than the number of black mothers in each year of the study. The table also shows no clear relationship between race and immunization status in this district.

Table 38:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 3-1 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	6/9 (66.7)	7/10 (70.0)	7/16 (43.8)	17/26 (65.4)
Some high school	12/18 (66.7)	10/22 (45.5)	17/23 (73.9)	21/28 (75.0)
High school graduate	46/64 (71.9)	32/68 (47.1)	41/53 (77.4)	60/74 (81.1)
Some college	38/51 (74.5)	26/47 (55.3)	22/34 (64.7)	38/46 (82.6)
College or more	72/89 (80.9)	54/75 (72.0)	36/48 (75.0)	99/105 (94.3)
Unknown	---	---	---	5/5 (100.0)
Total	174/231 (75.3)	129/222 (58.1)	123/174 (70.7)	240/284 (84.5)

*Excludes 1999-00 study year.

Table 38 shows the cross tabulation of maternal educational attainment and 4:3:1 immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers.

- ❖ In the 2002 study year, immunization status of children in District 3-1 varied significantly (p-value = 0.002) with maternal educational attainment. Immunization status increased as maternal education increased.

Table 39:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 3-1

	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)
Medicaid	39/61 (63.9)	58/79 (73.4)
Non-Medicaid	84/113 (74.3)	182/205 (88.8)
Total	123/174 (70.7)	240/284 (84.5)

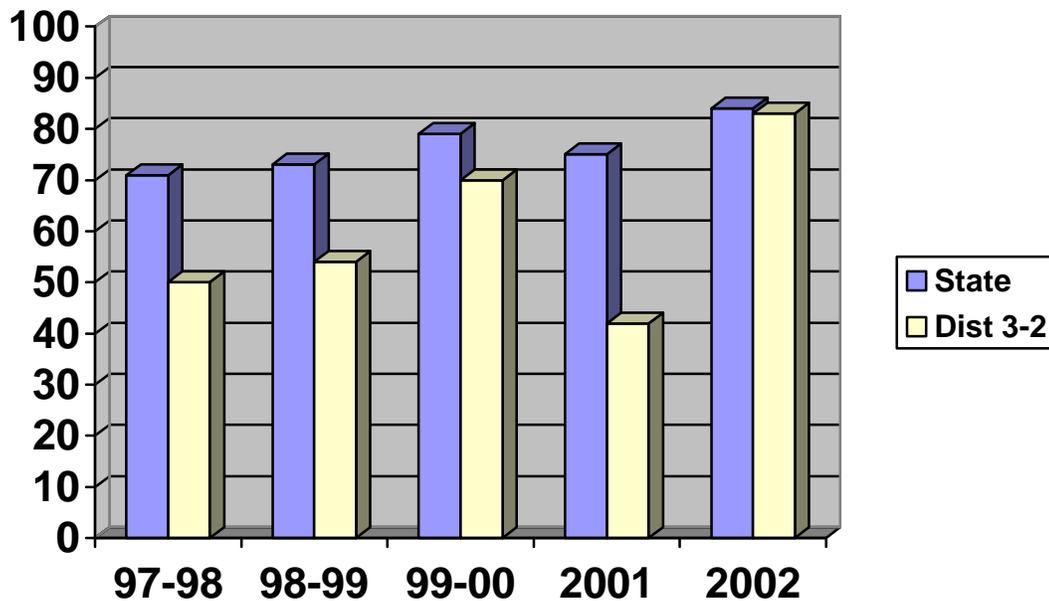
Table 39 shows immunization status of children born to women stratified by Medicaid status for the 2001 and 2002 study years. For Health District 3-1, children born to non-Medicaid women had a higher immunization rate than children born to women using Medicaid.

Individual Health District Report: District 3-2

The eligible sample from this district included 469 children born in January 2000. From the 469 children, 172 records were located (Response Rate=36.7%). Of the 172 located records, there were 28 parental refusals leaving a final sample of 144 records.

- ❖ **The 4:3:1 immunization coverage estimate is 82.6 percent (119/144).**
This rate is lower than the statewide 4:3:1 immunization rate of 83.9 percent.

Figure 8: 4:3:1 Coverage for State and District 3-2



- ❖ **The 4:3:1+3 immunization coverage estimate is 77.8 percent (112/144).**
This rate is lower than the statewide 4:3:1+3 immunization rate of 78.9 percent.

Table 40:
District Immunization Rates for
Health District 3-2 by Study Year

Vaccine	1997-98 Adequate Rates	1998-99 Adequate Rates	1999-00 Adequate Rates	2001 Adequate Rates	2002 Adequate Rates
4 DTP/DTaP	51.8%	55.1%	71.1%	42.4%	84.0%
3 OPV/IPV	75.4%	64.9%	76.8%	45.5%	84.7%
1 MMR	71.2%	65.8%	77.8%	45.1%	84.7%
3 Hib	69.1%	65.2%	79.9%	45.5%	85.4%
3 HepB	74.3%	62.8%	79.4%	44.4%	84.7%
1 Varicella	17.3%	43.1%	67.5%	44.4%	81.9%

Table 40 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 81.9 to 85.4 percent for the 2002 study data.

Table 41 shows the immunization rates for each individual vaccine at twelve months of age. Not all shots are recommended prior to the first birthday; therefore, certain immunization rates within each series are expected to be low. For example, the DTP/DTaP vaccine series includes 4 doses before the second birthday; however, only three of the four shots are recommended within the first year of life. As shown in the following table, the percentage of children vaccinated for DTP/DTaP decreases by dose. Similarly, the Advisory Committee on Immunization Practices (ACIP) does not recommend the initiation of the MMR and Varicella vaccine series until after the first birthday, so these rates should be close to 0% at 12 months.

Table 41:
2002 District Immunization Rates by Individual Vaccine at
12 months of age for Health District 3-2

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	134	93.1%
DTP2/DTaP2	130	90.3%
DTP3/DTaP3	123	85.4%
DTP4/DTaP4	1	0.7%
DTP5/DTaP5	0	0.0%
OPV/IPV1	133	92.4%
OPV/IPV2	128	88.9%
OPV/IPV3	59	41.0%
OPV/IPV4	0	0.0%
MMR1	3	2.1%
MMR2	0	0.0%
HIB1	132	91.7%
HIB2	127	88.2%
HIB3	96	66.7%
HIB4	4	2.8%
HIB5	0	0.0%
HEPB1	135	93.8%
HEPB2	127	88.2%
HEPB3	66	45.8%
HEPB4	2	1.4%
VAR1	6	4.2%
VAR2	0	0.0%

*Percent = number immunized / sample size
Sample size = 144

Table 42:
Cross tabulations of Maternal Race and
Child Immunization Status for Health District 3-2 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	50/78 (64.1)	95/153 (62.1)	66/148 (44.6)	69/79 (87.3)
Black	44/111 (39.6)	77/161 (47.8)	58/143 (40.6)	48/61 (78.7)
Other	1/2 (50.0)	3/11 (27.3)	2/6 (33.3)	2/3 (66.7)
Total	95/191 (49.7)	175/325 (53.8)	126/297 (42.4)	119/144 (82.6)

*Excludes 1999-00 study year.

Table 42 contains a cross tabulation of maternal race and children's immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ In all years of the study, the immunization rate of children born to white mothers was higher than that of black mothers.

Table 43:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 3-2 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	4/14 (28.6)	10/22 (45.5)	16/30 (53.3)	7/9 (77.8)
Some high school	19/45 (42.2)	23/53 (43.4)	24/47 (51.1)	15/20 (75.0)
High school graduate	28/64 (43.8)	41/77 (53.2)	25/69 (36.2)	20/26 (76.9)
Some college	11/22 (50.0)	32/51 (62.7)	15/37 (40.5)	22/28 (78.6)
College or more	33/46 (71.7)	69/122 (56.6)	46/114 (40.4)	50/55 (90.9)
Unknown	---	---	---	5/6 (83.3)
Total	95/191 (49.7)	175/325 (53.8)	126/297 (42.4)	119/144 (82.6)

*Excludes 1999-00 study year.

Table 43 shows the cross tabulation of maternal educational attainment and 4:3:1 immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ The immunization status of the children in the sample in District 3-2 varied with maternal educational attainment.

Table 44:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 3-2

	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)
Medicaid	41/93 (44.1)	37/48 (77.1)
Non-Medicaid	85/204 (41.7)	82/96 (85.4)
Total	126/297 (42.4)	119/144 (82.6)

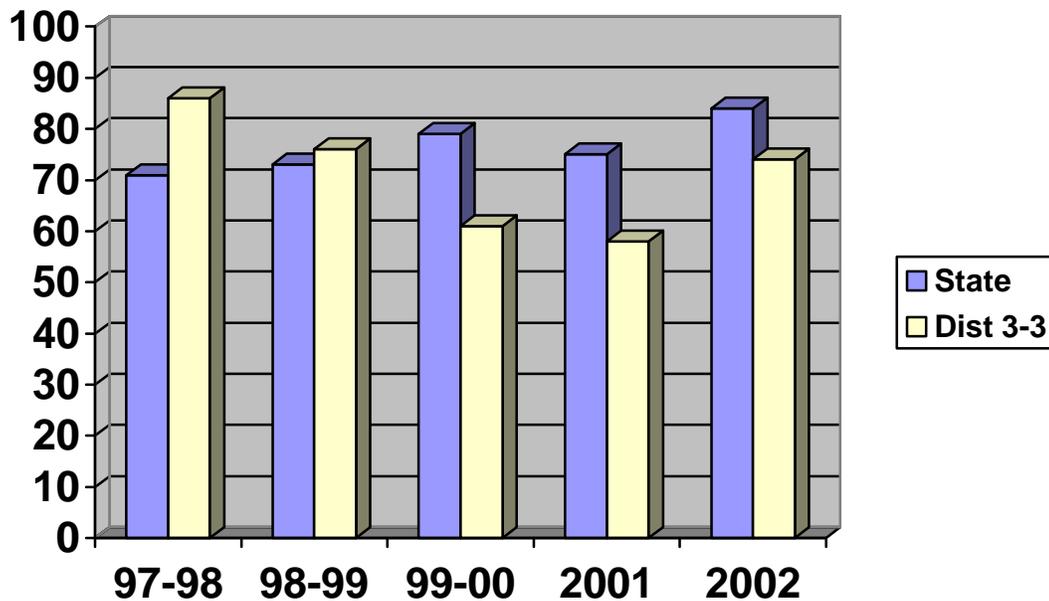
Table 44 shows immunization status of children born to women stratified by Medicaid status for the 2001 and 2002 study years. For Health District 3-2, children born to Medicaid women had a slightly higher immunization rate than children born to women not using Medicaid in the 2001 study, but were lower than non-Medicaid women in the 2002 study.

Individual Health District Report: District 3-3

The eligible sample from this district included 361 children born in January 2000. From the 361 children, 111 records were located (Response Rate=30.7%). Of the 111 located records, there were no parental refusals leaving a final sample of 111 records.

- ❖ **The 4:3:1 immunization coverage estimate is 73.9 percent (82/111).**
This rate is lower than the statewide 4:3:1 immunization rate of 83.9 percent.

Figure 9: 4:3:1 Coverage for State and District 3-3



- ❖ **The 4:3:1+3 immunization coverage estimate is 69.4 percent (77/111).**
This rate is lower than the statewide 4:3:1+3 immunization rate of 78.9 percent.

Table 45:
District Immunization Rates for
Health District 3-3 by Study Year

Vaccine	1997-98 Adequate Rates	1998-99 Adequate Rates	1999-00 Adequate Rates	2001 Adequate Rates	2002 Adequate Rates
4 DTP/DTaP	86.1%	76.3%	63.1%	61.0%	73.9%
3 OPV/IPV	88.5%	93.5%	71.4%	69.5%	82.9%
1 MMR	88.5%	84.9%	70.2%	74.6%	84.7%
3 Hib	87.9%	93.5%	79.8%	81.4%	80.2%
3 HepB	84.8%	92.8%	76.2%	81.4%	80.2%
1 Varicella	71.5%	80.6%	52.4%	69.5%	82.9%

Table 45 reveals the coverage rates of each vaccine series. Coverage rates ranged from 73.9 to 84.7 percent.

Table 46 shows the immunization rates for each individual vaccine at twelve months of age. Not all shots are recommended prior to the first birthday; therefore, certain immunization rates within each series are expected to be low. For example, the DTP/DTaP vaccine series includes 4 doses before the second birthday; however, only three of the four shots are recommended within the first year of life. As shown in the following table, the percentage of children vaccinated for DTP/DTaP decreases by dose. Similarly, the Advisory Committee on Immunization Practices (ACIP) does not recommend the initiation of the MMR and Varicella vaccine series until after the first birthday, so these rates should be close to 0% at 12 months.

Table 46:
2002 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 3-3

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	106	95.5%
DTP2/DTaP2	98	88.3%
DTP3/DTaP3	88	79.3%
DTP4/DTaP4	4	3.6%
DTP5/DTaP5	0	0.0%
OPV/IPV1	106	95.5%
OPV/IPV2	98	88.3%
OPV/IPV3	44	39.6%
OPV/IPV4	0	0.0%
MMR1	1	0.9%
MMR2	0	0.0%
HIB1	106	95.5%
HIB2	97	87.4%
HIB3	51	45.9%
HIB4	2	1.8%
HIB5	0	0.0%
HEPB1	103	92.8%
HEPB2	95	85.6%
HEPB3	37	33.3%
HEPB4	0	0.0%
VAR1	2	1.8%
VAR2	0	0.0%

*Percent = number immunized / sample size
Sample size = 111

Table 47:
Cross tabulations of Maternal Race and
Child Immunization Status for Health District 3-3 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	70/81 (86.4)	52/71 (73.2)	27/49 (55.1)	40/52 (76.9)
Black	64/77 (83.1)	49/62 (79.0)	39/67 (58.2)	38/54 (70.4)
Other	7/7 (100.0)	5/6 (83.3)	2/2 (100.0)	3/4 (75.0)
Unknown	---	---	---	1/1 (100.0)
Total	141/165 (85.5)	106/139 (76.3)	68/118 (57.6)	82/111 (73.9)

*Excludes 1999-00 study year.

Table 47 contains a cross tabulation of maternal race and children's immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ The immunization status of the children in the sample in District 3-3 varied with maternal race.

Table 48:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 3-3 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	4/5 (80.0)	4/4 (100.0)	1/4 (25.0)	12/13 (92.3)
Some high school	22/30 (73.3)	21/27 (77.8)	17/31 (54.8)	10/18 (55.6)
High school graduate	53/61 (86.9)	36/51 (70.6)	31/48 (64.6)	25/36 (69.4)
Some college	36/41 (87.8)	27/35 (77.1)	15/26 (57.7)	17/21 (81.0)
College or more	26/28 (92.9)	18/22 (81.8)	4/9 (44.4)	16/20 (80.0)
Unknown	---	---	---	2/3 (66.7)
Total	141/165 (85.5)	106/139 (76.3)	68/118 (57.6)	82/111 (73.8)

*Excludes 1999-00 study year.

Table 48 shows the cross tabulation of maternal educational attainment and 4:3:1 immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ The immunization status of the children in the sample in District 3-3 does not appear to change with educational attainment.

Table 49:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 3-3

	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)
Medicaid	42/71 (59.2)	41/58 (70.7)
Non-Medicaid	26/47 (55.3)	41/53 (77.4)
Total	68/118 (57.6)	82/111 (73.9)

Table 49 shows immunization status of children born to women stratified by Medicaid status for the 2001 and 2002 study years. For Health District 3-3, children born to Medicaid women had a slightly higher immunization rate than children born to women not using Medicaid for the 2001 study. However, in the 2002 study children born to non-Medicaid women had a higher immunization rate than children born to women not using Medicaid.

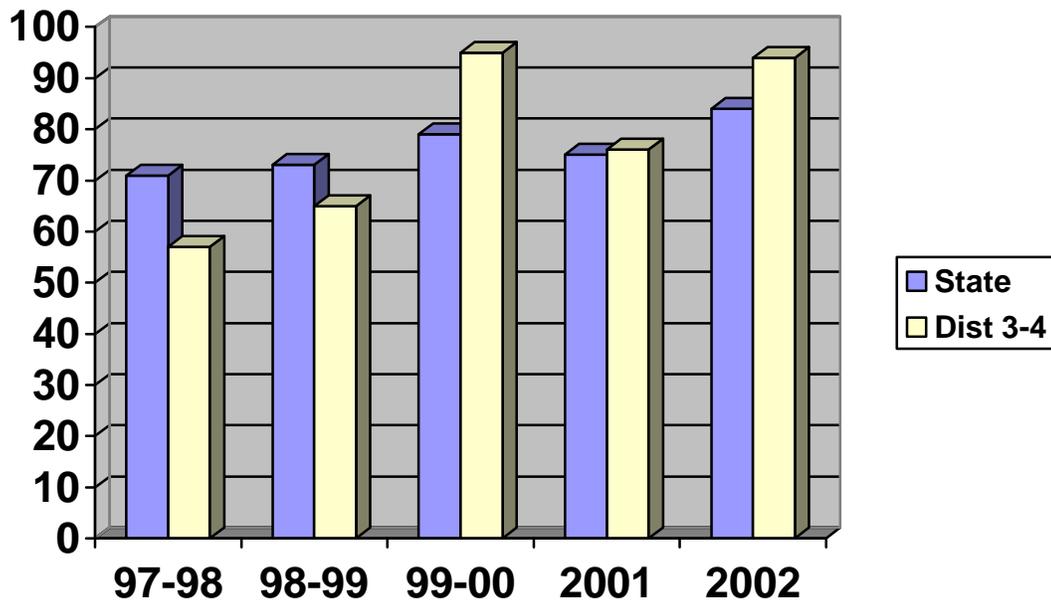
Individual Health District Report: District 3-4

The eligible sample from this district included 250 children born in January 2000. From the 250 children, 212 records were located (Response Rate=84.8%). Of the 212 located records, there were 37 parental refusals leaving a final sample of 175 records.

- ❖ **The 4:3:1 immunization coverage estimate is 94.3 percent (165/175).**

This rate is higher than the statewide 4:3:1 immunization rate of 83.9 percent.

Figure 10: 4:3:1 Coverage for State and District 3-4



- ❖ **The 4:3:1+3 immunization coverage estimate is 86.9 percent (152/175).**

This rate is higher than the statewide 4:3:1+3 immunization rate of 78.9 percent.

Table 50:
District Immunization Rates for
Health District 3-4 by Study Year

Vaccine	1997-98 Adequate Rates	1998-99 Adequate Rates	1999-00 Adequate Rates	2001 Adequate Rates	2002 Adequate Rates
4 DTP/DTaP	59.4%	66.4%	94.8%	75.9%	94.9%
3 OPV/IPV	64.4%	72.9%	96.4%	77.2%	96.0%
1 MMR	63.4%	69.7%	96.4%	83.5%	97.1%
3 Hib	59.4%	70.4%	97.5%	92.4%	96.6%
3 HepB	62.4%	72.2%	97.5%	86.1%	94.9%
1 Varicella	9.9%	54.2%	89.5%	86.1%	96.0%

Table 50 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 94.9 to 97.1 percent for the 2002 study data.

Table 51 shows the immunization rates for each individual vaccine at twelve months of age. Not all shots are recommended prior to the first birthday; therefore, certain immunization rates within each series are expected to be low. For example, the DTP/DTaP vaccine series includes 4 doses before the second birthday; however, only three of the four shots are recommended within the first year of life. As shown in the following table, the percentage of children vaccinated for DTP/DTaP decreases by dose. Similarly, the Advisory Committee on Immunization Practices (ACIP) does not recommend the initiation of the MMR and Varicella vaccine series until after the first birthday, so these rates should be close to 0% at 12 months.

Table 51:
2002 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 3-4

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	172	98.3%
DTP2/DTaP2	169	96.6%
DTP3/DTaP3	160	91.4%
DTP4/DTaP4	2	1.1%
DTP5/DTaP5	0	0.0%
OPV/IPV1	171	97.7%
OPV/IPV2	169	96.6%
OPV/IPV3	59	33.7%
OPV/IPV4	1	0.6%
MMR1	0	0.0%
MMR2	0	0.0%
HIB1	172	98.3%
HIB2	169	96.6%
HIB3	89	50.9%
HIB4	2	1.1%
HIB5	0	0.0%
HEPB1	168	96.0%
HEPB2	166	94.9%
HEPB3	77	44.0%
HEPB4	1	0.6%
VAR1	1	0.6%
VAR2	0	0.0%

*Percent = number immunized / sample size
Sample size = 175

Table 52:
Cross tabulations of Maternal Race and
Child Immunization Status for Health District 3-4 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	45/81 (55.6)	155/241 (64.3)	43/56 (76.8)	122/127 (96.1)
Black	11/16 (68.8)	14/24 (58.3)	12/17 (70.6)	30/35 (85.7)
Other	2/4 (50.0)	11/12 (91.7)	5/6 (83.3)	11/11 (100.0)
Unknown	---	---	---	2/2 (100.0)
Total	58/101 (57.4)	180/277 (65.0)	60/79 (75.9)	165/175 (94.3)

*Excludes 1999-00 study year.

Table 52 contains a cross tabulation of maternal race and children's immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ Table 52 shows that in the 1997-98 study year, the immunization rates of children born to white mothers was less than that of black mothers, but in the 1998-99, 2001, and 2002 study years data this trend was reversed.

Table 53:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 3-4 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Educational Level	#/Total (Percent)	#/Total (Percent)	#/Total (Percent)	#/Total (Percent)
Less than high school	2/3 (66.7)	5/6 (83.3)	2/3 (66.7)	4/5 (80.0)
Some high school	7/12 (58.3)	16/22 (72.7)	7/11 (63.6)	15/18 (83.3)
High school graduate	20/34 (58.8)	47/71 (66.2)	16/25 (64.0)	58/61 (95.1)
Some college	13/18 (72.2)	45/74 (60.8)	8/10 (80.0)	27/29 (93.1)
College or more	16/34 (47.1)	67/104 (64.4)	27/30 (90.0)	55/56 (98.2)
Unknown	---	---	---	6/6 (100.0)
Total	58/101 (57.4)	180/277 (65.0)	60/79 (75.9)	165/175 (94.3)

*Excludes 1999-00 study year.

Table 53 shows the cross tabulation of maternal educational attainment and 4:3:1 immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ In the 2001 and 2002 studies, the immunization status of the children in the sample in District 3-4 appears to increase with educational attainment of the mother.

Table 54:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 3-4

	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)
Medicaid	13/24 (54.2)	41/46 (89.1)
Non-Medicaid	47/55 (85.5)	124/129 (96.1)
Total	60/79 (75.9)	165/175 (94.3)

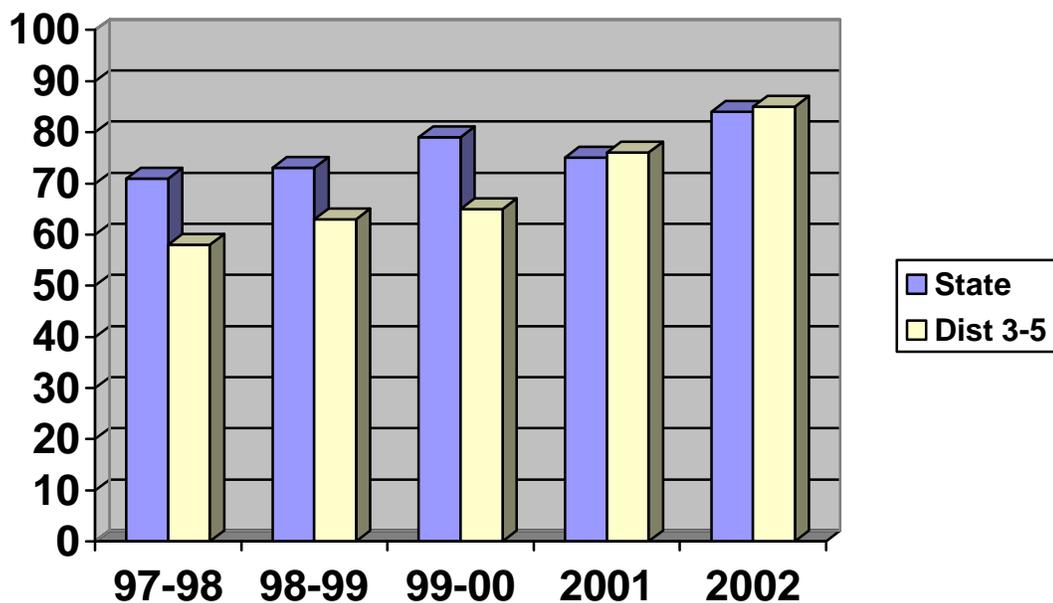
Table 54 shows immunization status of children born to women stratified by Medicaid status for the 2001 and 2002 study years. For Health District 3-4, children born to non-Medicaid women had a higher immunization rate than children born to women using Medicaid.

Individual Health District Report: District 3-5

The eligible sample from this district included 347 children born in January 2000. From the 347 children, 201 records were located (Response Rate=57.9%). Of the 201 located records, there were 6 parental refusals leaving a final sample of 195 records.

- ❖ **The 4:3:1 immunization coverage estimate is 84.6 percent (165/195).**
This rate is slightly higher than the statewide 4:3:1 immunization rate of 83.9 percent.

Figure 11: 4:3:1 Coverage for State and District 3-5



- ❖ **The 4:3:1+3 immunization coverage estimate is 77.9 percent (152/195).**
This rate is slightly lower than the statewide 4:3:1+3 immunization rate of 78.9 percent.

Table 55:
District Immunization Rates for
Health District 3-5 by Study Year

Vaccine	1997-98 Adequate Rates	1998-99 Adequate Rates	1999-00 Adequate Rates	2001 Adequate Rates	2002 Adequate Rates
4 DTP/DTaP	61.3%	64.4%	66.2%	77.0%	84.6%
3 OPV/IPV	77.9%	76.4%	75.7%	83.7%	88.7%
1 MMR	68.1%	73.3%	71.6%	87.8%	86.7%
3 Hib	74.8%	76.7%	77.0%	89.3%	86.2%
3 HepB	75.5%	73.6%	77.9%	88.8%	85.6%
1 Varicella	29.4%	51.0%	57.2%	81.1%	83.6%

Table 55 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 83.6 to 88.7 percent for the 2002 study data.

Table 56 shows the immunization rates for each individual vaccine at twelve months of age. Not all shots are recommended prior to the first birthday; therefore, certain immunization rates within each series are expected to be low. For example, the DTP/DTaP vaccine series includes 4 doses before the second birthday; however, only three of the four shots are recommended within the first year of life. As shown in the following table, the percentage of children vaccinated for DTP/DTaP decreases by dose. Similarly, the Advisory Committee on Immunization Practices (ACIP) does not recommend the initiation of the MMR and Varicella vaccine series until after the first birthday, so these rates should be close to 0% at 12 months.

Table 56:
2002 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 3-5

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	186	95.4%
DTP2/DTaP2	182	93.3%
DTP3DTaP3	173	88.7%
DTP4/DTaP4	1	0.5%
DTP5/DTaP5	0	0.0%
OPV/IPV1	186	95.4%
OPV/IPV2	182	93.3%
OPV/IPV3	60	30.8%
OPV/IPV4	0	0.0%
MMR1	4	2.1%
MMR2	1	0.5%
HIB1	182	93.3%
HIB2	177	90.8%
HIB3	75	38.5%
HIB4	0	0.0%
HIB5	0	0.0%
HEPB1	181	92.8%
HEPB2	175	89.7%
HEPB3	67	34.4%
HEPB4	0	0.0%
VAR1	10	5.1%
VAR2	0	0.0%

*Percent = number immunized / sample size
Sample size = 195

Table 57:
Cross tabulations of Maternal Race and
Child Immunization Status for Health District 3-5 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Race	#/Total (Percent)	#/Total (Percent)	#/Total (Percent)	#/Total (Percent)
White	42/54 (77.8)	78/111 (70.3)	38/52 (73.1)	51/63 (81.0)
Black	51/101 (50.5)	94/166 (56.6)	100/130 (76.9)	101/117 (86.3)
Other	0/4 (0.0)	12/15 (80.0)	10/14 (71.4)	9/10 (90.0)
Unknown	---	---	---	4/5 (80.0)
Total	93/159 (58.5)	184/292 (63.0)	148/196 (75.5)	165/195 (84.6)

*Excludes 1999-00 study year.

Table 57 contains a cross tabulation of maternal race and children's immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ Table 57 shows that the number of white mothers was less than that of black mothers in each year. The immunization rates of children born to white mothers was greater than that of black mothers for the 1997-98 and 1998-99 study years, but in the 2001 and 2002 studies, the immunization rates of children born to black mothers was higher than that of children born to white mothers.

Table 58:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 3-5 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	6/7 (85.7)	8/11 (72.7)	12/17 (70.6)	11/15 (73.3)
Some high school	15/26 (57.7)	19/36 (52.8)	17/25 (68.0)	19/22 (86.4)
High school graduate	26/50 (52.0)	47/84 (56.0)	43/59 (72.9)	40/48 (83.3)
Some college	16/37 (43.2)	30/56 (53.6)	33/46 (71.7)	38/49 (77.6)
College or more	32/43 (74.4)	80/105 (76.2)	43/49 (87.8)	51/54 (94.4)
Unknown	---	---	---	6/7 (85.7)
Total	95/163 (58.3)	184/292 (63.0)	148/196 (75.5)	165/195 (84.6)

*Excludes 1999-00 study year.

Table 58 shows the cross tabulation of maternal educational attainment and 4:3:1 immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ In the 1998-99, 2001, and 2002 study years, the immunization status of the children in District 3-5 was greatest with the highest level of maternal educational attainment.

Table 59:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 3-5

	2001 4:3:1 Adequate	2001 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)
Medicaid	69/98 (70.4)	66/82 (80.5)
Non-Medicaid	79/98 (80.6)	99/113 (87.6)
Total	148/196 (75.5)	165/195 (84.6)

Table 59 shows immunization status of children born to women stratified by Medicaid status for the 2001 and 2002 study years. For Health District 3-5, children born to non-Medicaid women had a higher immunization rate than children born to women using Medicaid.

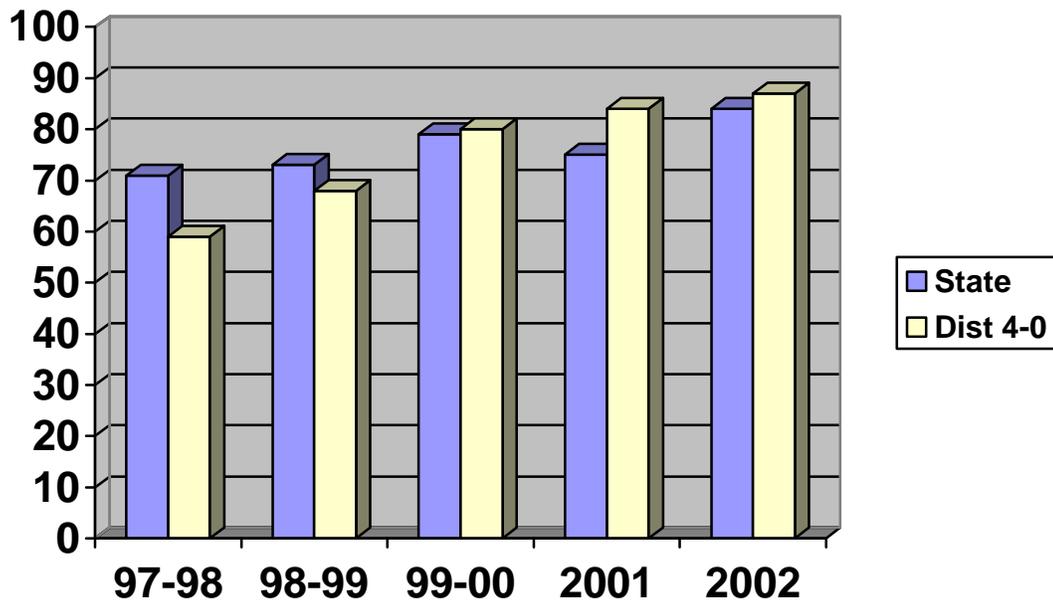
Individual Health District Report: District 4-0

The eligible sample from this district included 206 children born in January 2000. From the 206 children, 164 records were located (Response Rate=79.6%). Of the 164 located records, there were 17 parental refusals leaving a final sample of 147 records.

- ❖ **The 4:3:1 immunization coverage estimate is 87.1 percent (128/147).**

This rate is higher than the statewide 4:3:1 immunization rate of 83.9 percent.

Figure 12: 4:3:1 Coverage for State and District 4-0



- ❖ **The 4:3:1+3 immunization coverage estimate is 85.0 percent (125/147).**

This rate is higher than the statewide 4:3:1+3 immunization rate of 78.9 percent.

Table 60:
District Immunization Rates for
Health District 4-0 by Study Year

Vaccine	1997-98 Adequate Rates	1998-99 Adequate Rates	1999-00 Adequate Rates	2001 Adequate Rates	2002 Adequate Rates
4 DTP/DTaP	61.5%	69.0%	79.7%	83.5%	87.8%
3 OPV/IPV	83.7%	80.2%	85.9%	86.4%	92.5%
1 MMR	69.2%	73.1%	84.9%	86.4%	93.2%
3 Hib	79.8%	81.0%	88.5%	88.3%	93.2%
3 HepB	78.8%	81.0%	85.9%	88.8%	92.5%
1 Varicella	6.7%	31.7%	65.6%	83.0%	92.5%

Table 60 reveals the coverage rates of each vaccine series. Coverage rates ranged from 87.8 to 93.2 percent for the 2002 study data.

Table 61 shows the immunization rates for each individual vaccine at twelve months of age. Not all shots are recommended prior to the first birthday; therefore, certain immunization rates within each series are expected to be low. For example, the DTP/DTaP vaccine series includes 4 doses before the second birthday; however, only three of the four shots are recommended within the first year of life. As shown in the following table, the percentage of children vaccinated for DTP/DTaP decreases by dose. Similarly, the Advisory Committee on Immunization Practices (ACIP) does not recommend the initiation of the MMR and Varicella vaccine series until after the first birthday, so these rates should be close to 0% at 12 months.

Table 61:
2002 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 4-0

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	144	98.0%
DTP2/DTaP2	143	97.3%
DTP3/DTaP3	127	86.4%
DTP4/DTaP4	1	0.7%
DTP5/DTaP5	0	0.0%
OPV/IPV1	144	98.0%
OPV/IPV2	142	96.6%
OPV/IPV3	51	34.7%
OPV/IPV4	0	0.0%
MMR1	0	0.0%
MMR2	0	0.0%
HIB1	143	97.3%
HIB2	141	95.9%
HIB3	73	49.7%
HIB4	0	0.0%
HIB5	0	0.0%
HEPB1	144	98.0%
HEPB2	142	96.6%
HEPB3	65	44.2%
HEPB4	0	0.0%
VAR1	0	0.0%
VAR2	0	0.0%

*Percent = number immunized / sample size
Sample size = 147

Table 62:
Cross tabulations of Maternal Race and
Child Immunization Status for Health District 4-0 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	36/70 (51.4)	132/203 (65.0)	115/138 (83.3)	89/99 (89.9)
Black	24/33 (72.7)	47/63 (74.6)	54/65 (83.1)	39/47 (83.0)
Other	1/1 (100.0)	2/2 (100)	3/3 (100.0)	0/1 (0.0)
Total	61/104 (58.7)	181/268 (67.5)	172/206 (83.5)	128/147 (87.1)

*Excludes 1999-00 study year.

Table 62 contains a cross tabulation of maternal race and children's immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ Table 62 shows that in 2002, the immunization rate of children born to white mothers was higher than that of children born to black mothers.

Table 63:

**Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 4-0 by Study Year***

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	5/5 (100.0)	5/8 (62.5)	4/5 (80.0)	2/2 (100.0)
Some high school	13/25 (52.0)	37/52 (71.2)	43/49 (87.8)	37/44 (84.1)
High school graduate	23/42 (54.8)	75/108 (69.4)	69/84 (82.1)	44/52 (84.6)
Some college	8/14 (57.1)	43/62 (69.4)	32/41 (78.0)	24/26 (92.3)
College or more	12/18 (66.7)	21/38 (55.2)	24/27 (88.9)	21/23 (91.3)
Unknown	---	---	---	---
Total	61/104 (58.7)	181/268 (67.5)	172/206 (83.5)	128/147 (87.1)

*Excludes 1999-00 study year.

Table 63 shows the cross tabulation of maternal educational attainment and 4:3:1 immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ The immunization status of the children in the sample in District 4-0 appears to vary with educational attainment.

Table 64:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 4-0

	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)
Medicaid	85/102 (83.3)	62/71 (87.3)
Non-Medicaid	87/104 (83.7)	66/76 (86.8)
Total	172/206 (83.5)	128/147 (87.1)

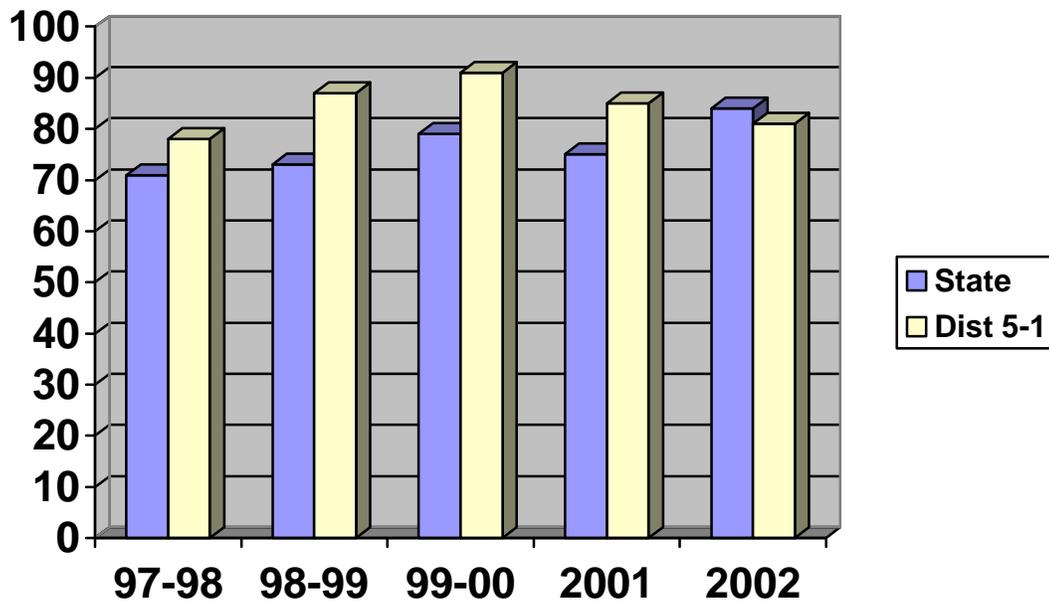
Table 64 shows immunization status of children born to women stratified by Medicaid status for the 2001 and 2002 study years. For the 2001 study, the immunization rate of children born to non-Medicaid women was essentially the same as children born to women using Medicaid. However, in the 2002 study children born to women using Medicaid had a slightly higher immunization rate than children born to women not using Medicaid.

Individual Health District Report: District 5-1

The eligible sample from this district included 80 children born in January 2000. From the 80 children, 79 records were located (Response Rate=98.8%). Of the 79 located records, there was 1 parental refusal leaving a final sample of 78 records.

- ❖ **The 4:3:1 immunization coverage estimate is 80.8 percent (63/78).** This rate is lower than the statewide 4:3:1 immunization rate of 83.9 percent.

Figure 13: 4:3:1 Coverage for State and District 5-1



- ❖ **The 4:3:1+3 immunization coverage estimate 70.5 percent (55/78).** This rate is lower than the statewide 4:3:1+3 immunization rate of 78.9 percent.

**Table 65:
District Immunization Rates for
Health District 5-1 by Study Year**

Vaccine	1996-97 Adequate Rates	1997-98 Adequate Rates	1998-99 Adequate Rates	1999-00 Adequate Rates	2001 Adequate Rates
4 DTP/DTaP	79.2%	87.1%	91.3%	86.7%	80.8%
3 OPV/IPV	90.6%	92.9%	93.8%	93.3%	96.2%
1 MMR	84.0%	91.8%	96.3%	91.7%	97.4%
3 Hib	89.6%	94.1%	96.3%	91.7%	97.4%
3 HepB	88.7%	89.4%	96.3%	93.3%	96.2%
1 Varicella	12.3%	21.2%	61.3%	86.7%	84.6%

Table 65 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 80.8 to 97.4 percent for the 2002 study data.

Table 66 shows the immunization rates for each individual vaccine at twelve months of age. Not all shots are recommended prior to the first birthday; therefore, certain immunization rates within each series are expected to be low. For example, the DTP/DTaP vaccine series includes 4 doses before the second birthday; however, only three of the four shots are recommended within the first year of life. As shown in the following table, the percentage of children vaccinated for DTP/DTaP decreases by dose. Similarly, the Advisory Committee on Immunization Practices (ACIP) does not recommend the initiation of the MMR and Varicella vaccine series until after the first birthday, so these rates should be close to 0% at 12 months.

Table 66:
2002 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 5-1

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	76	97.4%
DTP2/DTaP2	76	97.4%
DTP3/DTaP3	71	91.0%
DTP4/DTaP4	3	3.8%
DTP5/DTaP5	0	0.0%
OPV/IPV1	76	97.4%
OPV/IPV2	76	97.4%
OPV/IPV3	32	41.0%
OPV/IPV4	1	1.3%
MMR1	3	3.8%
MMR2	0	0.0%
HIB1	76	97.4%
HIB2	76	97.4%
HIB3	43	55.1%
HIB4	1	1.3%
HIB5	0	0.0%
HEPB1	77	98.7%
HEPB2	76	97.4%
HEPB3	41	52.6%
HEPB4	1	1.3%
VAR1	2	2.6%
VAR2	0	0.0%

*Percent = number immunized / sample size
Sample size = 78

Table 67:
Cross tabulations of Maternal Race and
Child Immunization Status for Health District 5-1 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	55/67 (82.1)	39/45 (86.7)	32/36 (88.9)	34/44 (77.3)
Black	28/39 (71.8)	34/39 (87.2)	19/24 (79.2)	29/34 (85.3)
Other	---	1/1 (100)	---	---
Total	83/106 (78.3)	74/85 (87.1)	51/60 (85.0)	63/78 (80.8)

*Excludes 1999-00 study year.

Table 67 contains a cross tabulation of maternal race and children's immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ Table 67 shows that the number of white mothers was greater than that of black mothers. The table also shows that the immunization rates for the 2002 study are higher for black mothers than for white mothers.

Table 68:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 5-1*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	5/6 (83.3)	2/2 (100.0)	2/2 (100.0)	1/2 (50.0)
Some high school	23/29 (79.3)	19/22 (86.4)	13/19 (68.4)	23/26 (88.5)
High school graduate	33/44 (75.0)	36/42 (85.7)	19/21 (90.5)	28/36 (77.8)
Some college	12/16 (75.0)	8/9 (88.9)	11/12 (91.7)	3/3 (100.0)
College or more	10/11 (90.9)	9/10 (90.0)	6/6 (100.0)	8/11 (72.7)
Unknown	---	---	---	---
Total	83/106 (78.3)	74/85 (87.1)	51/60 (85.0)	63/78 (80.8)

*Excludes 1999-00 study year.

Table 68 shows the cross tabulation of maternal educational attainment and 4:3:1 immunization status. The educational categories were based on those used in previous years of the study, to allow comparisons between the three years. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ The immunization status of the children in the sample in District 5-1 varies with educational attainment.

Table 69:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 5-1

	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)
Medicaid	29/35 (82.9)	35/43 (81.4)
Non-Medicaid	22/25 (88.0)	28/35 (80.0)
Total	51/60 (85.0)	63/78 (80.8)

Table 69 shows immunization status of children born to women stratified by Medicaid status for the 2001 and 2002 study years. For the 2001 study, children born to non-Medicaid women had a higher immunization rate than children born to women using Medicaid, but in the 2002 study children born to women using Medicaid had a slightly higher immunization rate than children born to non-Medicaid women.

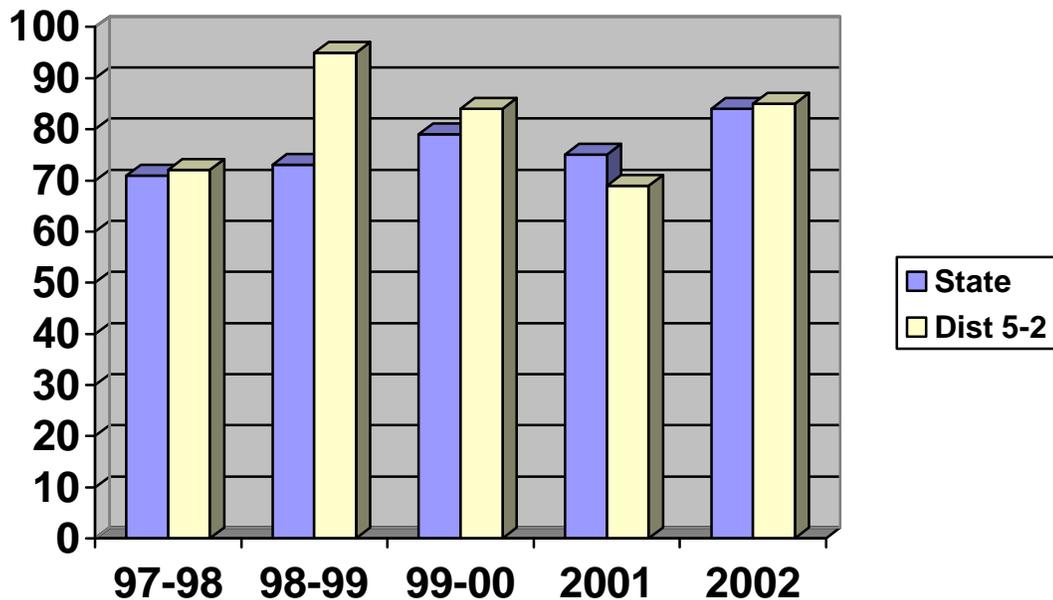
Individual Health District Report: District 5-2

The eligible sample from this district included 319 children born in January 2000. From the 319 children, 252 records were located (Response Rate=79.0%). Of the 252 located records, there were 4 parental refusals leaving a final sample of 248 records.

- ❖ **The 4:3:1 immunization coverage estimate is 84.7 percent (210/248).**

This rate is higher than the statewide 4:3:1 immunization rate of 83.9 percent.

Figure 14: 4:3:1 Coverage for State and District 5-2



- ❖ **The 4:3:1+3 immunization coverage estimate is 80.2 percent (199/248).**

This rate is higher than the statewide 4:3:1+3 immunization rate of 78.9 percent.

**Table 70:
District Immunization Rates for
Health District 5-2 by Study Year**

Vaccine	1997-98 Adequate Rates	1998-99 Adequate Rates	1999-00 Adequate Rates	2001 Adequate Rates	2002 Adequate Rates
4 DTP/DTaP	72.5%	96.5%	83.6%	72.7%	85.5%
3 OPV/IPV	85.9%	98.0%	87.3%	81.8%	94.0%
1 MMR	80.5%	95.7%	90.9%	82.7%	92.3%
3 Hib	81.2%	98.0%	96.4%	84.5%	92.7%
3 HepB	78.5%	97.7%	89.1%	83.6%	93.1%
1 Varicella	15.4%	63.7%	61.8%	80.0%	90.3%

Table 70 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 85.5 to 94.0 percent for the 2002 study data.

Table 71 shows the immunization rates for each individual vaccine at twelve months of age. Not all shots are recommended prior to the first birthday; therefore, certain immunization rates within each series are expected to be low. For example, the DTP/DTaP vaccine series includes 4 doses before the second birthday; however, only three of the four shots are recommended within the first year of life. The Advisory Committee on Immunization Practices (ACIP) does not recommend the initiation of the MMR and Varicella vaccine series until after the first birthday, so these rates should be close to 0% at 12 months.

Table 71:
2002 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 5-2

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	246	99.2%
DTP2/DTaP2	240	96.8%
DTP3/DTaP3	217	87.5%
DTP4/DTaP4	0	0.0%
DTP5/DTaP5	0	0.0%
OPV/IPV1	244	98.4%
OPV/IPV2	238	96.0%
OPV/IPV3	94	37.9%
OPV/IPV4	0	0.0%
MMR1	2	0.8%
MMR2	0	0.0%
HIB1	245	98.8%
HIB2	238	96.0%
HIB3	109	44.0%
HIB4	0	0.0%
HIB5	0	0.0%
HEPB1	244	98.4%
HEPB2	238	96.0%
HEPB3	127	51.2%
HEPB4	1	0.4%
VAR1	1	0.4%
VAR2	0	0.0%

*Percent = number immunized / sample size
Sample size = 248

Table 72:
Cross tabulations of Maternal Race and
Child Immunization Status for Health District 5-2 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	45/69 (65.2)	143/151 (94.7)	33/52 (63.5)	109/123 (88.6)
Black	61/78 (78.2)	97/103 (94.2)	43/58 (74.1)	96/120 (80.0)
Other	1/2 (50.0)	2/2 (100.0)	---	4/4 (100.0)
Unknown	---	---	----	1/1 (100.0)
Total	107/149 (71.8)	242/256 (94.5)	76/110 (69.1)	210/248 (84.7)

*Excludes 1999-00 study year.

Table 72 contains a cross tabulation of maternal race and children's immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ The table shows that the immunization rate of children born to white mothers was less than that of black mothers in the 1997-98 and 2001 study data, but not in the 1998-99 and 2002 study years.

Table 73:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 5-2 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	6/6 (100.0)	9/10 (90.0)	1/4 (25.0)	6/6 (100.0)
Some high school	31/48 (64.6)	48/51 (94.1)	13/17 (76.5)	45/54 (83.3)
High school graduate	38/50 (76.0)	93/99 (93.9)	41/53 (77.4)	85/104 (81.7)
Some college	16/22 (72.7)	47/50 (94.0)	12/23 (52.2)	44/52 (84.6)
College or more	16/23 (69.6)	45/46 (97.8)	9/13 (69.2)	30/32 (93.8)
Total	107/149 (71.8)	242/256 (94.5)	76/110 (69.1)	210/248 (84.7)

*Excludes 1999-00 study year.

Table 73 shows the cross tabulation of maternal educational attainment and 4:3:1 immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ The immunization status of the children in District 5-2 varied with maternal educational attainment.

Table 74:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 5-2

	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)
Medicaid	44/63 (69.8)	103/131 (78.6)
Non-Medicaid	32/47 (68.1)	107/117 (91.5)
Total	76/110 (69.1)	210/248 (84.7)

Table 74 shows immunization status of children born to women stratified by Medicaid status for the 2001 and 2002 study years. For the 2001 study, children born to Medicaid women had a slightly higher immunization rate than children born to women not using Medicaid. In the 2002 study, children born to women not using Medicaid had a higher immunization rate than children born to Medicaid women.

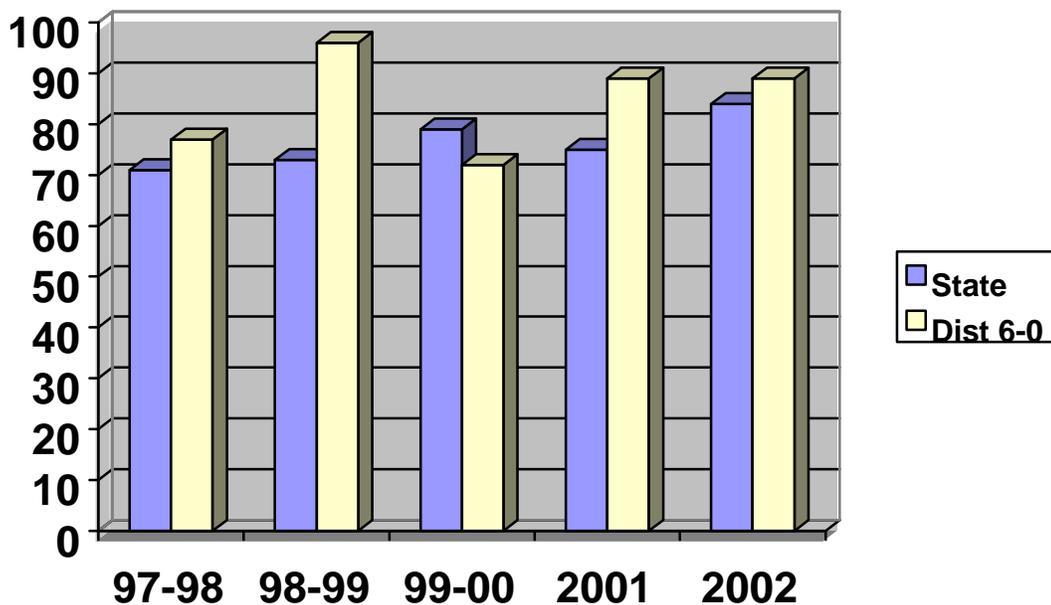
Individual Health District Report: District 6-0

The eligible sample from this district included 121 children born in January 2000. From the 121 children, 102 records were located (Response Rate=84.3%). Of the 102 located records, there were no parental refusals leaving a final sample of 102 records.

- ❖ **The 4:3:1 immunization coverage estimate is 89.2 percent (91/102).**

This rate is higher than the statewide 4:3:1 immunization rate of 83.9 percent.

Figure 15: 4:3:1 Coverage for State and District 6-0



- ❖ **The 4:3:1+3 immunization coverage estimate is 86.3 percent (88/102).**

This rate is higher than the statewide 4:3:1+3 immunization rate of 78.9 percent.

Table 75:
District Immunization Rates for
Health District 6-0 by Study Year

Vaccine	1997-98 Adequate Rates	1998-99 Adequate Rates	1999-00 Adequate Rates	2001 Adequate Rates	2002 Adequate Rates
4 DTP/DTaP	76.6%	96.1%	74.5%	89.5%	89.2%
3 OPV/IPV	91.2%	98.3%	85.1%	93.2%	95.1%
1 MMR	84.7%	98.3%	87.2%	95.1%	96.1%
3 Hib	92.0%	98.3%	87.2%	97.5%	97.1%
3 HepB	82.5%	98.9%	85.1%	93.2%	96.1%
1 Varicella	19.0%	75.3%	61.7%	88.3%	97.1%

Table 75 reveals the coverage rates of each vaccine series. Coverage rates ranged from 89.2 to 97.1 percent for the 2002 study data.

Table 76 shows the immunization rates for each individual vaccine at twelve months of age. Not all shots are recommended prior to the first birthday; therefore, certain immunization rates within each series are expected to be low. For example, the DTP/DTaP vaccine series includes 4 doses before the second birthday; however, only three of the four shots are recommended within the first year of life. As shown in the following table, the percentage of children vaccinated for DTP/DTaP decreases by dose. Similarly, the Advisory Committee on Immunization Practices (ACIP) does not recommend the initiation of the MMR and Varicella vaccine series until after the first birthday, so these rates should be close to 0% at 12 months.

**Table 76:
2002 District Immunization Rates by Individual Vaccine at
12 months of age for Health District 6-0**

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	100	98.0%
DTP2/DTaP2	98	96.1%
DTP3/DTaP3	88	86.3%
DTP4/DTaP4	0	0.0%
DTP5/DTaP5	0	0.0%
OPV/IPV1	100	98.0%
OPV/IPV2	98	96.1%
OPV/IPV3	35	34.3%
OPV/IPV4	0	0.0%
MMR1	2	2.0%
MMR2	0	0.0%
HIB1	100	98.0%
HIB2	98	96.1%
HIB3	65	63.7%
HIB4	0	0.0%
HIB5	0	0.0%
HEPB1	100	98.0%
HEPB2	96	94.1%
HEPB3	51	50.0%
HEPB4	1	1.0%
VAR1	1	1.0%
VAR2	0	0.0%

*Percent = number immunized / sample size
Sample size = 102

Table 77:
Cross tabulations of Maternal Race and
Child Immunization Status for Health District 6-0 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	53/70 (75.7)	98/102 (96.0)	57/65 (87.7)	39/42 (92.9)
Black	51/66 (77.3)	71/74 (95.9)	86/96 (89.6)	52/60 (86.7)
Other	1/1 (100.0)	2/2 (100.0)	1/1 (100.0)	---
Total	105/137 (76.6)	171/178 (96.1)	144/162 (88.9)	91/102 (89.2)

*Excludes 1999-00 study year.

Table 77 contains a cross tabulation of maternal race and children's immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ Table 77 shows that the immunization rates of children born to white mothers were similar to that of black mothers in the 1997-98, 1998-99 and 2001 study years, but higher for white mothers in the 2002 study.

Table 78:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 6-0 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	4/4 (100.0)	4/4 (100.0)	10/12 (83.3)	3/3 (100.0)
Some high school	28/38 (73.7)	36/37 (97.3)	32/38 (84.2)	18/21 (85.7)
High school graduate	37/43 (86.0)	65/69 (94.2)	47/52 (90.4)	37/42 (88.1)
Some college	19/30 (63.3)	43/44 (97.7)	34/35 (97.1)	18/19 (94.7)
College or more	17/22 (77.3)	23/24 (95.8)	21/25 (84.0)	15/17 (88.2)
Total	105/137 (76.6)	171/178 (96.1)	144/162 (88.9)	91/102 (89.2)

*Excludes 1999-00 study years.

Table 78 shows the cross tabulation of maternal educational attainment and 4:3:1 immunization status. The educational categories were based on those used in previous years, to allow comparisons between the three years. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ The immunization status of the children in District 6-0 varies with educational attainment.

Table 79:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 6-0

	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)
Medicaid	83/93 (89.2)	53/61 (86.9)
Non-Medicaid	61/69 (88.4)	38/41 (92.7)
Total	144/162 (88.9)	91/102 (89.2)

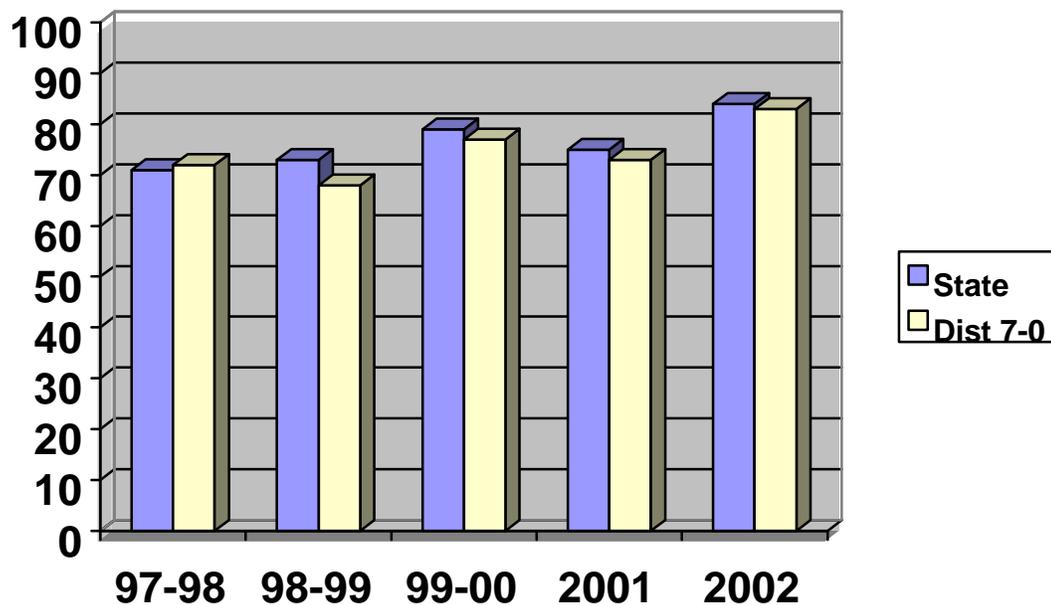
Table 79 shows immunization status of children born to women stratified by Medicaid status for the 2001 and 2002 study years. For the 2001 study, children born to Medicaid women had a slightly higher immunization rate than children born to women not using Medicaid. In the 2002 study, children born to women not using Medicaid had a higher immunization rate than children born to Medicaid women.

Individual Health District Report: District 7-0

The eligible sample from this district included 205 children born in January 2000. From the 205 children, 117 records were located (Response Rate=57.1%). Of the 117 located records, there was 1 parental refusal leaving a final sample of 116 records.

- ❖ **The 4:3:1 immunization coverage estimate is 82.8 percent (96/116).** This rate is slightly lower than the statewide 4:3:1 immunization rate of 83.9 percent.

Figure 16: 4:3:1 Coverage for State and District 7-0



- ❖ **The 4:3:1+3 immunization coverage estimate is 74.1 percent (86/116).** This rate is lower than the statewide 4:3:1+3 immunization rate of 78.9 percent.

Table 80:
District Immunization Rates for
Health District 7-0 by Study Year

Vaccine	1997-98 Adequate Rates	1998-99 Adequate Rates	1999-00 Adequate Rates	2001 Adequate Rates	2002 Adequate Rates
4 DTP/DTaP	73.1%	69.3%	77.1%	74.3%	83.6%
3 OPV/IPV	93.2%	83.2%	85.9%	78.4%	90.5%
1 MMR	92.3%	83.2%	85.3%	80.2%	92.2%
3 Hib	88.5%	85.4%	85.3%	82.6%	89.7%
3 HepB	93.6%	84.7%	87.6%	85.0%	90.5%
1 Varicella	21.4%	24.1%	53.5%	74.9%	88.8%

Table 80 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 83.6 to 92.2 percent for the 2002 study data.

Table 81 shows the immunization rates for each individual vaccine at twelve months of age. Not all shots are recommended prior to the first birthday; therefore, certain immunization rates within each series are expected to be low. For example, the DTP/DTaP vaccine series includes 4 doses before the second birthday; however, only three of the four shots are recommended within the first year of life. As shown in the following table, the percentage of children vaccinated for DTP/DTaP decreases by dose. Similarly, the Advisory Committee on Immunization Practices (ACIP) does not recommend the initiation of the MMR and Varicella vaccine series until after the first birthday, so these rates should be close to 0% at 12 months.

**Table 81:
2002 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 7-0**

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	116	100.0%
DTP2/DTaP2	114	98.3%
DTP3/DTaP3	107	92.2%
DTP4/DTaP4	0	0.0%
DTP5/DTaP5	0	0.0%
OPV/IPV1	116	100.0%
OPV/IPV2	113	97.4%
OPV/IPV3	33	28.4%
OPV/IPV4	0	0.0%
MMR1	2	1.7%
MMR2	0	0.0%
HIB1	115	99.1%
HIB2	112	96.6%
HIB3	62	53.4%
HIB4	0	0.0%
HIB5	0	0.0%
HEPB1	115	99.1%
HEPB2	110	94.8%
HEPB3	57	49.1%
HEPB4	1	0.9%
VAR1	1	0.9%
VAR2	0	0.0%

*Percent = number immunized / sample size
Sample size = 116

Table 82:
Cross tabulations of Maternal Race and
Child Immunization Status for Health District 7-0 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	81/109 (74.3)	46/61 (75.4)	43/64 (67.2)	36/44 (81.8)
Black	85/120 (70.8)	45/73 (61.6)	78/101 (77.2)	60/72 (83.3)
Other	2/5 (40.0)	2/3 (66.7)	1/2 (50.0)	---
Total	168/234 (71.8)	93/137 (67.9)	122/167 (73.1)	96/116 (82.8)

*Excludes 1999-00 study year.

Table 82 contains a cross tabulation of maternal race and children's immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ Table 82 shows that the immunization rate of children born to black mothers was greater than white mothers in the 2001 and 2002 study years.

Table 83:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 7-0 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	5/7 (71.4)	8/10 (80.0)	4/6 (66.7)	3/3 (100.0)
Some high school	39/56 (69.6)	14/24 (58.3)	41/53 (77.4)	34/40 (85.0)
High school graduate	69/90 (76.7)	36/58 (62.1)	55/72 (76.4)	35/42 (83.3)
Some college	25/43 (58.1)	21/29 (72.4)	10/13 (76.9)	18/23 (78.3)
College or more	30/38 (78.9)	14/16 (87.5)	12/23 (52.2)	6/7 (85.7)
Unknown	---	---	---	0/1 (0.0)
Total	168/234 (71.8)	93/137 (67.9)	122/167 (73.1)	96/116 (82.8)

*Excludes 1999-00 study data.

Table 83 shows the cross tabulation of maternal educational attainment and 4:3:1 immunization status. The educational categories were based on those used in previous years, to allow comparisons between the three years. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ In the 2002 study year, the immunization status of the children in District 7-0 varies with maternal educational attainment.

Table 84:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 7-0

	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)
Medicaid	79/104 (76.0)	70/83 (84.3)
Non-Medicaid	43/63 (68.3)	26/33 (78.8)
Total	122/167 (73.1)	96/116 (82.8)

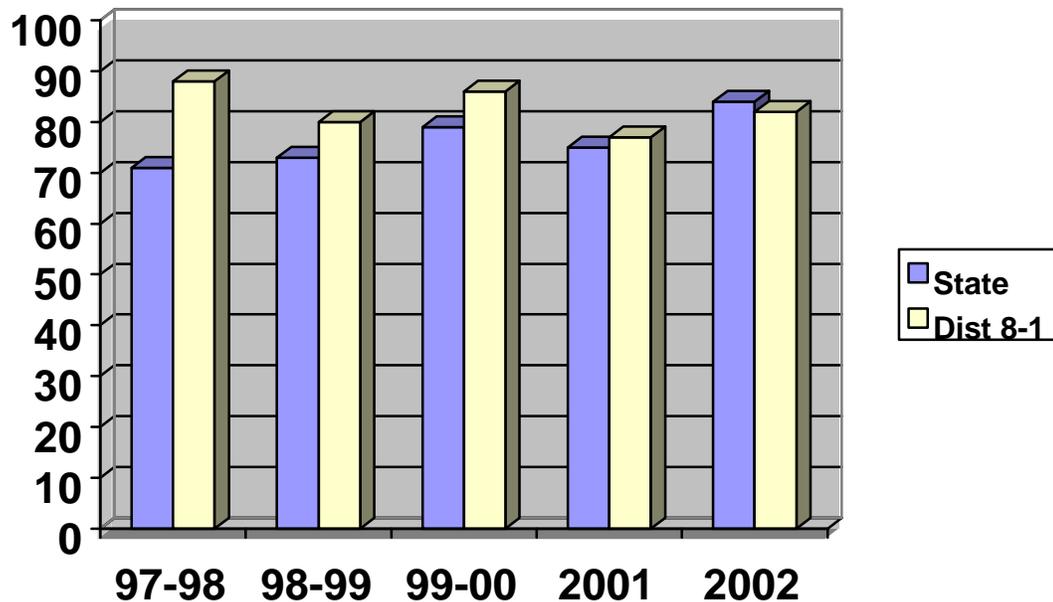
Table 84 shows immunization status of children born to women stratified by Medicaid status for the 2001 and the 2002 study years. For Health District 7-0, children born to Medicaid women had a higher immunization rate than children born to women not using Medicaid for both study years.

Individual Health District Report: District 8-1

The eligible sample from this district included 137 children born in January 2000. From the 137 children, 129 records were located (Response Rate=94.2%). Of the 129 located records, there were no parental refusals leaving a final sample of 129 records.

- ❖ **The 4:3:1 immunization coverage estimate is 82.2 percent (106/129).**
This rate is slightly lower than the statewide 4:3:1 immunization rate of 83.9 percent.

Figure 17: 4:3:1 Coverage for State and District 8-1



- ❖ **The 4:3:1+3 immunization coverage estimate is 77.5 percent (100/129).**
This rate is lower than the statewide 4:3:1+3 immunization rate of 78.9 percent.

**Table 85:
District Immunization Rates for
Health District 8-1 by Study Year**

Vaccine	1997-98 Adequate Rates	1998-99 Adequate Rates	1999-00 Adequate Rates	2001 Adequate Rates	2002 Adequate Rates
4 DTP/DTaP	88.4%	81.5%	86.9%	77.7%	82.2%
3 OPV/IPV	94.2%	94.6%	87.9%	84.5%	91.5%
1 MMR	95.3%	89.1%	90.7%	82.5%	93.8%
3 Hib	96.5%	94.6%	92.5%	81.6%	94.6%
3 HepB	89.5%	91.3%	92.5%	84.5%	94.6%
1 Varicella	16.3%	30.4%	61.7%	78.6%	93.0%

Table 85 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 82.2 to 94.6 percent for the 2002 study data.

Table 86 shows the immunization rates for each individual vaccine at twelve months of age. Not all shots are recommended prior to the first birthday; therefore, certain immunization rates within each series are expected to be low. For example, the DTP/DTaP vaccine series includes 4 doses before the second birthday; however, only three of the four shots are recommended within the first year of life. As shown in the following table, the percentage of children vaccinated for DTP/DTaP decreases by dose. Similarly, the Advisory Committee on Immunization Practices (ACIP) does not recommend the initiation of the MMR and Varicella vaccine series until after the first birthday, so these rates should be close to 0% at 12 months.

Table 86:
2002 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 8-1

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	129	100.0%
DTP2/DTaP2	125	96.9%
DTP3/DTaP3	116	89.9%
DTP4/DTaP4	1	0.8%
DTP5/DTaP5	0	0.0%
OPV/IPV1	129	100.0%
OPV/IPV2	125	96.9%
OPV/IPV3	33	25.6%
OPV/IPV4	0	0.0%
MMR1	2	1.6%
MMR2	0	0.0%
HIB1	129	100.0%
HIB2	125	96.9%
HIB3	63	48.8%
HIB4	1	0.8%
HIB5	0	0.0%
HEPB1	128	99.2%
HEPB2	120	93.0%
HEPB3	48	37.2%
HEPB4	1	0.8%
VAR1	0	0.0%
VAR2	0	0.0%

*Percent = number immunized / sample size
Sample size = 129

Table 87:
Cross tabulations of Maternal Race and
Child Immunization Status for Health District 8-1 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	41/49 (83.7)	46/56 (82.1)	42/60 (70.0)	67/80 (83.8)
Black	34/36 (94.4)	28/35 (80.0)	36/42 (85.7)	38/48 (79.2)
Other	1/1 (100.0)	0/1 (0.0)	1/1 (100.0)	1/1 (100.0)
Total	76/86 (88.4)	74/92 (80.4)	79/103 (76.7)	106/129 (82.2)

*Excludes 1999-00 study year.

Table 87 contains a cross tabulation of maternal race and children's immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ Table 87 shows that the number of white mothers was more than that of black mothers. The table also shows that the immunization rate of children born to white mothers was less than that of children born to black mothers in the 2001 and 2002 study years.

Table 88:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 8-1 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	2/2 (100.0)	7/8 (87.5)	9/13 (69.2)	6/9 (66.7)
Some high school	23/27 (85.2)	21/31 (67.7)	19/26 (73.1)	29/35 (82.9)
High school graduate	26/28 (92.9)	24/27 (88.9)	27/34 (79.4)	34/40 (85.0)
Some college	13/16 (81.3)	12/15 (80.0)	17/22 (77.3)	22/27 (81.5)
College or more	12/13 (92.3)	10/11 (90.9)	7/8 (87.5)	15/18 (83.3)
Total	76/86 (88.4)	74/92 (80.4)	79/103 (76.7)	106/129 (82.2)

*Excludes 1999-00 study year.

Table 88 shows the cross tabulation of maternal educational attainment and 4:3:1 immunization status. The educational categories were based on those used in previous years, to allow comparisons between the three years. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ The immunization status of the children in the sample in District 8-1 varies with educational attainment.

Table 89:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 8-1

	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)
Medicaid	50/68 (73.5)	64/74 (86.5)
Non-Medicaid	29/35 (82.9)	42/55 (76.4)
Total	79/103 (76.7)	106/129 (82.2)

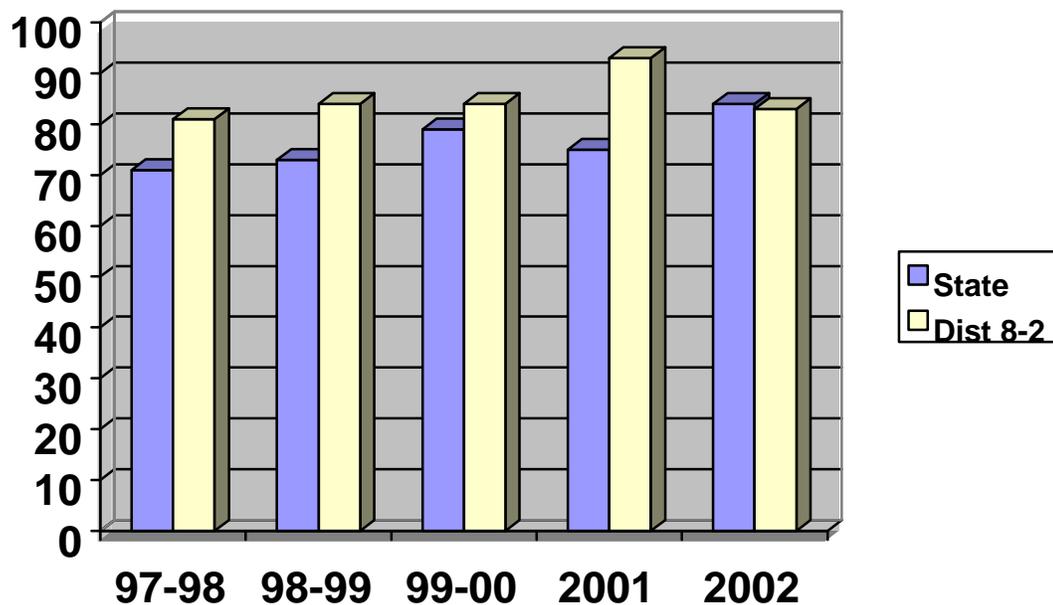
Table 89 shows immunization status of children born to women stratified by Medicaid status for the 2001 and 2002 study years. For the 2001 study, children born to non-Medicaid women had a higher immunization rate than children born to women using Medicaid. In the 2002 study, children born to women using Medicaid had a higher immunization rate than children born to non-Medicaid women.

Individual Health District Report: District 8-2

The eligible sample from this district included 88 children born in January 2000. From the 88 children, 77 records were located (Response Rate=87.5%). Of the 77 located records, there were no parental refusals leaving a final sample of 77 records.

- ❖ **The 4:3:1 immunization coverage estimate is 83.1 percent (64/77).** This rate is essentially the same as the statewide 4:3:1 immunization rate of 83.9 percent.

Figure 18: 4:3:1 Coverage for State and District 8-2



- ❖ **The 4:3:1+3 immunization coverage estimate rate is 81.8 percent (63/77).** This rate is higher than the statewide 4:3:1+3 immunization rate of 78.9 percent.

Table 90:
District Immunization Rates for
Health District 8-2 by Study Year

Vaccine	1997-98 Adequate Rates	1998-99 Adequate Rates	1999-00 Adequate Rates	2001 Adequate Rates	2002 Adequate Rates
4 DTP/DTaP	81.4%	84.5%	85.6%	94.7%	85.7%
3 OPV/IPV	88.6%	90.1%	90.8%	96.2%	90.9%
1 MMR	85.7%	91.5%	88.9%	97.0%	92.2%
3 Hib	87.1%	90.8%	92.8%	92.5%	92.2%
3 HepB	85.7%	90.8%	90.2%	95.5%	92.2%
1 Varicella	18.6%	71.8%	66.0%	96.2%	90.9%

Table 90 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 85.7 to 92.2 percent for the 2002 study data.

Table 91 shows the immunization rates for each individual vaccine at twelve months of age. Not all shots are recommended prior to the first birthday; therefore, certain immunization rates within each series are expected to be low. For example, the DTP/DTaP vaccine series includes 4 doses before the second birthday; however, only three of the four shots are recommended within the first year of life. As shown in the following table, the percentage of children vaccinated for DTP/DTaP decreases by dose. Similarly, the Advisory Committee on Immunization Practices (ACIP) does not recommend the initiation of the MMR and Varicella vaccine series until after the first birthday, so these rates should be close to 0% at 12 months.

**Table 91:
2002 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 8-2**

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	77	100.0%
DTP2/DTaP2	75	97.4%
DTP3/DTaP3	71	92.2%
DTP4/DTaP4	1	1.3%
DTP5/DTaP5	0	0.0%
OPV/IPV1	77	100.0%
OPV/IPV2	75	97.4%
OPV/IPV3	25	32.5%
OPV/IPV4	0	0.0%
MMR1	0	0.0%
MMR2	0	0.0%
HIB1	77	100.0%
HIB2	74	96.1%
HIB3	32	41.6%
HIB4	1	1.3%
HIB5	0	0.0%
HEPB1	77	100.0%
HEPB2	72	93.5%
HEPB3	28	36.4%
HEPB4	0	0.0%
VAR1	0	0.0%
VAR2	0	0.0%

*Percent = number immunized / sample size
Sample size = 77

**Table 92:
Cross tabulations of Maternal Race and
Child Immunization Status for Health District 8-2 by Study Year***

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	31/40 (77.5)	56/71 (78.9)	55/58 (94.8)	21/28 (75.0)
Black	26/30 (86.7)	62/70 (88.6)	67/73 (91.8)	40/46 (87.0)
Other	---	1/1 (100.0)	2/2 (100.0)	1/1 (100.0)
Unknown	---	---	---	2/2 (100.0)
Total	57/70 (81.4)	119/142 (83.8)	124/133 (93.2)	64/77 (83.1)

*Excludes 1999-00 study year.

Table 92 contains a cross tabulation of maternal race and children's immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ Table 92 shows that the immunization rates of children in District 8-2 varies with maternal race.

**Table 93:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 8-2 by Study Year***

	1996-97 4:3:1 Adequate	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	7/9 (77.8)	9/11 (81.8)	9/9 (100.0)	7/10 (70.0)
Some high school	17/19 (89.5)	41/48 (85.4)	39/44 (88.6)	21/24 (87.5)
High school graduate	18/25 (72.0)	41/47 (87.2)	44/48 (91.7)	19/25 (76.0)
Some college	10/10 (100.0)	18/23 (78.2)	22/22 (100.0)	11/12 (91.7)
College or more	5/7 (71.4)	10/13 (76.9)	10/10 (100.0)	6/6 (100.0)
Total	57/70 (81.4)	119/142 (83.8)	124/133 (93.2)	64/77 (83.1)

*Excludes 1999-00 study year.

Table 93 shows the cross tabulation of maternal educational attainment and 4:3:1 immunization status. The educational categories were based on those used in previous years, to allow comparisons between the three years. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ The immunization status of the children in District 8-2 varies with educational attainment.

Table 94:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 8-2

	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)
Medicaid	82/90 (91.1)	43/54 (79.6)
Non-Medicaid	42/43 (97.7)	21/23 (91.3)
Total	124/133 (93.2)	64/77 (83.1)

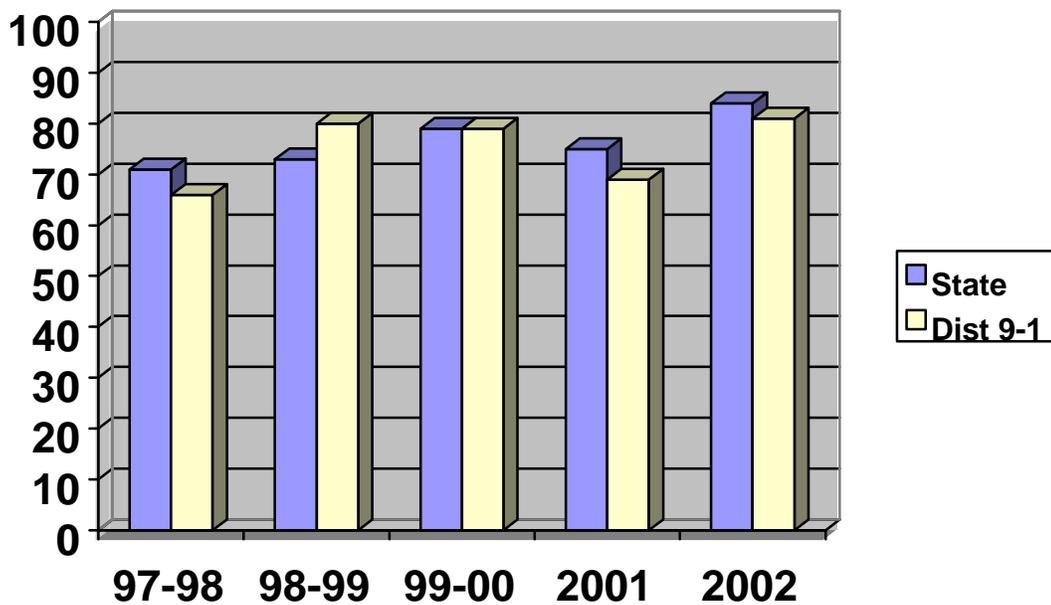
Table 94 shows immunization status of children born to women stratified by Medicaid status for the 2001 and the 2002 study years. For Health District 8-2, children born to non-Medicaid women had a higher immunization rate than children born to women using Medicaid for both study years.

Individual Health District Report: District 9-1

The eligible sample from this district included 186 children born in January 2000. From the 186 children, 152 records were located (Response Rate=81.7%). Of the 152 located records, there were no parental refusals leaving a final sample of 152 records.

- ❖ **The 4:3:1 immunization coverage estimate is 80.9 percent (123/152).**
This rate is lower to the statewide 4:3:1 immunization rate of 83.9 percent.

Figure 19: 4:3:1 Coverage for State and District 9-1



- ❖ **The 4:3:1+3 immunization coverage estimate is 74.3 percent (113/152).**
This rate is lower than the statewide 4:3:1+3 immunization rate of 78.9 percent.

Table 95:
District Immunization Rates for
Health District 9-1 by Study Year

Vaccine	1997-98 Adequate Rates	1998-99 Adequate Rates	1999-00 Adequate Rates	2001 Adequate Rates	2002 Adequate Rates
4 DTP/DTaP	67.1%	80.4%	80.8%	69.9%	81.6%
3 OPV/IPV	80.7%	87.4%	88.5%	79.7%	90.1%
1 MMR	72.1%	86.7%	85.4%	79.7%	89.5%
3 Hib	81.4%	86.0%	91.5%	81.3%	90.8%
3 HepB	82.1%	84.6%	89.2%	76.4%	90.1%
1 Varicella	14.3%	18.8%	51.5%	71.5%	83.6%

Table 95 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 81.6 to 90.8 percent for the 2002 study data.

Table 96 shows the immunization rates for each individual vaccine at twelve months of age. Not all shots are recommended prior to the first birthday; therefore, certain immunization rates within each series are expected to be low. For example, the DTP/DTaP vaccine series includes 4 doses before the second birthday; however, only three of the four shots are recommended within the first year of life. As shown in the following table, the percentage of children vaccinated for DTP/DTaP decreases by dose. Similarly, the Advisory Committee on Immunization Practices (ACIP) does not recommend the initiation of the MMR and Varicella vaccine series until after the first birthday, so these rates should be close to 0% at 12 months.

Table 96:
2002 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 9-1

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	150	98.7%
DTP2/DTaP2	145	95.4%
DTP3/DTaP3	126	82.9%
DTP4/DTaP4	1	0.7%
DTP5/DTaP5	0	0.0%
OPV/IPV1	150	98.7%
OPV/IPV2	143	94.1%
OPV/IPV3	71	46.7%
OPV/IPV4	0	0.0%
MMR1	0	0.0%
MMR2	0	0.0%
HIB1	149	98.0%
HIB2	144	94.7%
HIB3	81	53.3%
HIB4	2	1.3%
HIB5	0	0.0%
HEPB1	150	98.7%
HEPB2	143	94.1%
HEPB3	91	59.9%
HEPB4	2	1.3%
VAR1	1	0.7%
VAR2	0	0.0%

*Percent = number immunized / sample size
Sample size = 152

Table 97:
Cross tabulations of Maternal Race and
Child Immunization Status for Health District 9-1 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	38/70 (54.3)	47/66 (71.2)	36/55 (65.5)	51/65 (78.5)
Black	53/66 (80.3)	68/77 (88.3)	47/66 (71.2)	70/83 (84.3)
Other	2/4 (50.0)	---	2/2 (100.0)	0/1 (0.0)
Unknown	---	---	---	2/3 (66.7)
Total	93/140 (66.4)	115/143 (80.4)	85/123 (69.1)	123/152 (80.9)

*Excludes 1999-00 study year.

Table 97 contains a cross tabulation of maternal race and children's immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ Table 97 shows that the immunization rate of children born to white mothers was less than that of black mothers in each of the years of the study.

Table 98:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 9-1 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	4/5 (80.0)	8/8 (100.0)	0/2 (0.0)	2/2 (100.0)
Some high school	28/37 (75.7)	31/37 (83.8)	18/22 (81.8)	21/29 (72.4)
High school graduate	28/45 (62.2)	40/49 (81.6)	38/58 (65.5)	50/60 (83.3)
Some college	22/30 (73.3)	19/26 (73.1)	11/22 (50.0)	19/27 (70.4)
College or more	11/23 (47.8)	17/23 (73.9)	18/19 (94.7)	30/33 (90.9)
Unknown	---	---	---	1/1 (100.0)
Total	93/140 (66.4)	115/143 (80.4)	85/123 (69.1)	123/152 (80.9)

*Excludes 1999-00 study year.

Table 98 shows the cross tabulation of maternal educational attainment and 4:3:1 immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ The immunization status of the children in the sample in District 9-1 seems to vary with educational attainment.

Table 99:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 9-1

	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)
Medicaid	43/64 (67.2)	69/89 (77.5)
Non-Medicaid	42/59 (71.2)	54/63 (85.7)
Total	85/123 (69.1)	123/152 (80.9)

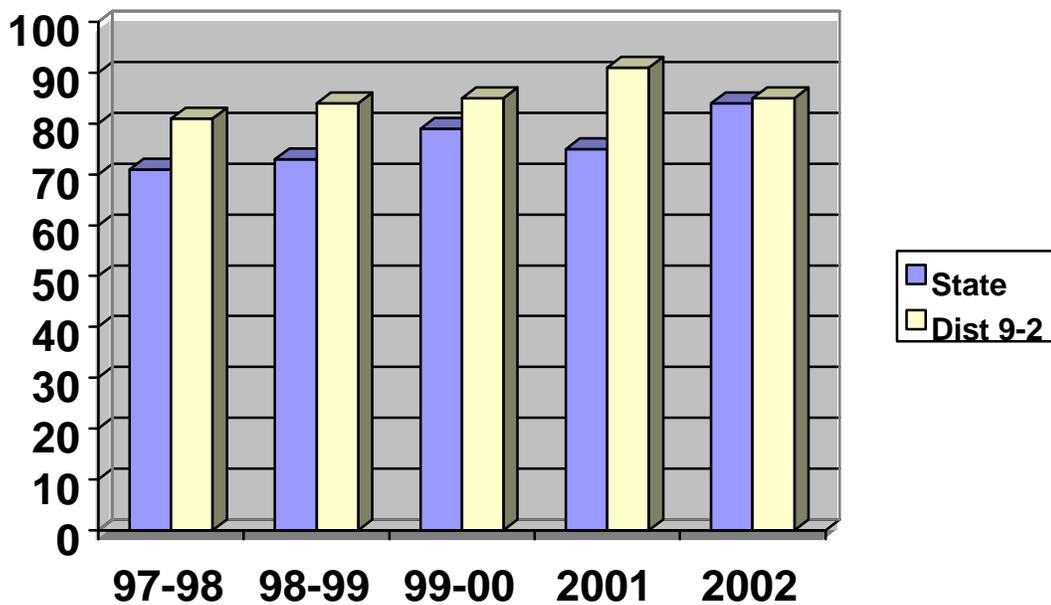
Table 99 shows immunization status of children born to women stratified by Medicaid status for the 2001 and the 2002 study years. For Health District 9-1, children born to non-Medicaid women had a higher immunization rate than children born to women using Medicaid for both study years.

Individual Health District Report: District 9-2

The eligible sample from this district included 101 children born in January 2000. From the 101 children, 90 records were located (Response Rate=89.1%). Of the 90 located records, there was 1 parental refusal leaving a final sample of 89 records.

- ❖ **The 4:3:1 immunization coverage estimate is 85.4 percent (76/89).** This rate is higher than the statewide 4:3:1 immunization rate of 83.9 percent.

Figure 20: 4:3:1 Coverage for State and District 9-2



- ❖ **The 4:3:1+3 immunization coverage estimate is 79.8 percent (71/89).** This rate is higher than the statewide 4:3:1+3 immunization rate of 78.9 percent.

**Table 100:
District Immunization Rates for
Health District 9-2 by Study Year**

Vaccine	1997-98 Adequate Rates	1998-99 Adequate Rates	1999-00 Adequate Rates	2001 Adequate Rates	2002 Adequate Rates
4 DTP/DTaP	84.1%	83.5%	88.0%	92.4%	86.5%
3 OPV/IPV	92.7%	93.4%	90.2%	92.4%	92.1%
1 MMR	87.8%	85.1%	91.0%	93.1%	94.4%
3 Hib	93.9%	93.4%	95.5%	95.4%	93.3%
3 HepB	95.1%	91.7%	91.7%	95.4%	92.1%
1 Varicella	3.7%	27.3%	58.6%	88.5%	87.6%

Table 100 reveals the coverage rates of each vaccine series. Coverage rates ranged from 86.5 to 94.4 percent for the 2002 study data.

Table 101 shows the immunization rates for each individual vaccine at twelve months of age. Not all shots are recommended prior to the first birthday; therefore, certain immunization rates within each series are expected to be low. For example, the DTP/DTaP vaccine series includes 4 doses before the second birthday; however, only three of the four shots are recommended within the first year of life. As shown in the following table, the percentage of children vaccinated for DTP/DTaP decreases by dose. Similarly, the Advisory Committee on Immunization Practices (ACIP) does not recommend the initiation of the MMR and Varicella vaccine series until after the first birthday, so these rates should be close to 0% at 12 months.

**Table 101:
2002 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 9-2**

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	89	100.0%
DTP2/DTaP2	86	96.6%
DTP3/DTaP3	82	92.1%
DTP4/DTaP4	0	0.0%
DTP5/DTaP5	0	0.0%
OPV/IPV1	89	100.0%
OPV/IPV2	86	96.6%
OPV/IPV3	9	10.1%
OPV/IPV4	0	0.0%
MMR1	0	0.0%
MMR2	0	0.0%
HIB1	89	100.0%
HIB2	86	96.6%
HIB3	12	13.5%
HIB4	0	0.0%
HIB5	0	0.0%
HEPB1	89	100.0%
HEPB2	85	95.5%
HEPB3	15	16.9%
HEPB4	0	0.0%
VAR1	0	0.0%
VAR2	0	0.0%

*Percent = number immunized / sample size
Sample size = 89

Table 102:
Cross tabulations of Maternal Race and
Child Immunization Status for Health District 9-2 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	53/65 (81.5)	81/96 (84.4)	82/92 (89.1)	50/59 (84.7)
Black	13/17 (76.5)	20/25 (80.0)	36/38 (94.7)	24/28 (85.7)
Other	---	---	1/1 (100.0)	---
Unknown	---	---	---	2/2 (100.0)
Total	66/82 (80.5)	101/121 (83.5)	119/131 (90.8)	76/89 (85.4)

*Excludes 1999-00 study year.

Table 102 contains a cross tabulation of maternal race and children's immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ Table 102 shows that the number of white mothers was more than the number of black mothers. The table also shows that the immunization rate of children born to white mothers was similar to that of black mothers.

Table 103:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 9-2 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	4/5 (80.0)	7/8 (87.5)	12/12 (100.0)	7/9 (77.8)
Some high school	15/19 (78.9)	18/23 (78.3)	28/33 (84.8)	17/19 (89.5)
High school graduate	32/37 (86.5)	44/51 (86.3)	48/55 (87.3)	33/37 (89.2)
Some college	8/14 (57.1)	15/17 (88.2)	21/21 (100.0)	13/18 (72.2)
College or more	7/7 (100.0)	17/22 (77.3)	10/10 (100.0)	5/5 (100.0)
Unknown	---	---	---	1/1 (100.0)
Total	66/82 (80.5)	101/121 (83.5)	119/131 (90.8)	76/89 (85.4)

*Excludes 1999-00 study year.

Table 103 shows the cross tabulation of maternal educational attainment and 4:3:1 immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ The immunization status of the children in District 9-2 varied with educational attainment.

Table 104:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 9-2

	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)
Medicaid	68/76 (89.5)	54/62 (87.1)
Non-Medicaid	51/55 (92.7)	22/27 (81.5)
Total	119/131 (90.8)	76/89 (85.4)

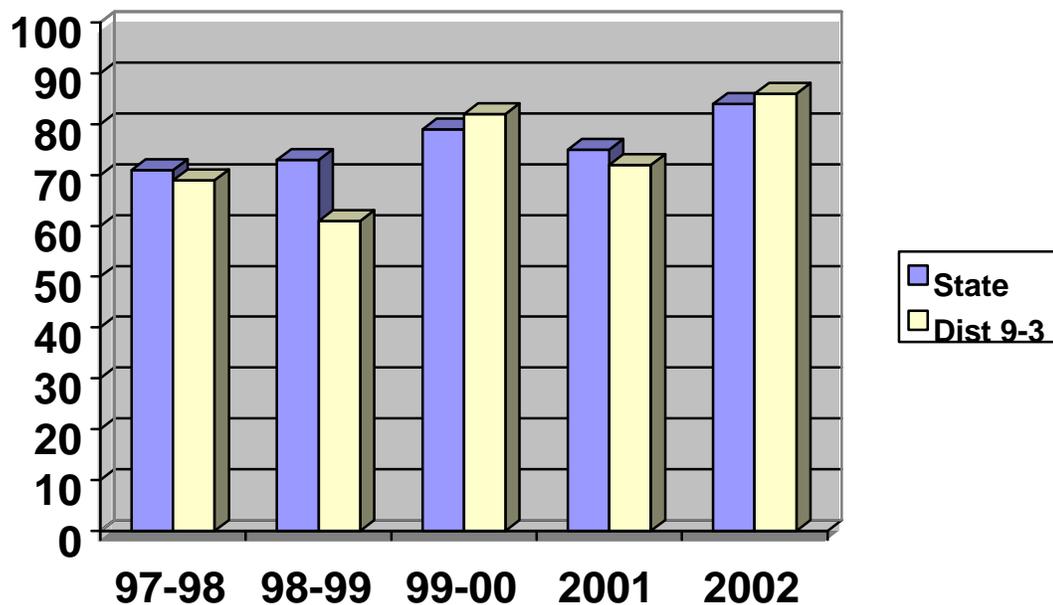
Table 104 shows immunization status of children born to women stratified by Medicaid status for the 2001 and 2002 study years. For the 2001 study, children born to non-Medicaid women had a slightly higher immunization rate than children born to women using Medicaid. In the 2002 study, children born to women using Medicaid had a higher immunization rate than children born to non-Medicaid women.

Individual Health District Report: District 9-3

The eligible sample from this district included 157 children born in January 2000. From the 157 children, 119 records were located (Response Rate=75.8%). Of the 119 located records, there was 1 parental refusal leaving a final sample of 118 records.

- ❖ **The 4:3:1 immunization coverage estimate is 85.6 percent (101/118).**
This rate is higher than the statewide 4:3:1 immunization rate of 83.9 percent.

Figure 21: 4:3:1 Coverage for State and District 9-3



- ❖ **The 4:3:1+3 immunization coverage estimate is 80.5 percent (95/118).**
This rate is higher than the statewide 4:3:1+3 immunization rate of 78.9 percent.

Table 105:
District Immunization Rates for
Health District 9-3 by Study Year

Vaccine	1997-98 Adequate Rates	1998-99 Adequate Rates	1999-00 Adequate Rates	2001 Adequate Rates	2002 Adequate Rates
4 DTP/DTaP	72.1%	64.2%	82.2%	71.6%	85.6%
3 OPV/IPV	94.3%	77.1%	86.3%	76.8%	89.8%
1 MMR	76.4%	67.9%	87.7%	80.0%	87.3%
3 Hib	85.7%	78.0%	89.0%	81.1%	91.5%
3 HepB	85.7%	81.7%	87.7%	81.1%	89.0%
1 Varicella	5.0%	25.7%	57.5%	69.5%	83.9%

Table 105 reveals the coverage rates of each vaccine series. Coverage rates ranged from 83.9 to 91.5 percent for the 2002 study data.

Table 106 shows the immunization rates for each individual vaccine at twelve months of age. Not all shots are recommended prior to the first birthday; therefore, certain immunization rates within each series are expected to be low. For example, the DTP/DTaP vaccine series includes 4 doses before the second birthday; however, only three of the four shots are recommended within the first year of life. As shown in the following table, the percentage of children vaccinated for DTP/DTaP decreases by dose. Similarly, the Advisory Committee on Immunization Practices (ACIP) does not recommend the initiation of the MMR and Varicella vaccine series until after the first birthday, so these rates should be close to 0% at 12 months.

Table 106:
2002 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 9-3

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	113	95.8%
DTP2/DTaP2	110	93.2%
DTP3/DTaP3	103	87.3%
DTP4/DTaP4	0	0.0%
DTP5/DTaP5	0	0.0%
OPV/IPV1	113	95.8%
OPV/IPV2	110	93.2%
OPV/IPV3	68	57.6%
OPV/IPV4	0	0.0%
MMR1	7	5.9%
MMR2	0	0.0%
HIB1	113	95.8%
HIB2	110	93.2%
HIB3	79	66.9%
HIB4	0	0.0%
HIB5	0	0.0%
HEPB1	113	95.8%
HEPB2	108	91.5%
HEPB3	61	51.7%
HEPB4	1	0.8%
VAR1	7	5.9%
VAR2	0	0.0%

*Percent = number immunized / sample size
Sample size = 118

Table 107:
Cross tabulations of Maternal Race and
Child Immunization Status for Health District 9-3 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	58/89 (65.2)	38/60 (63.3)	47/67 (70.1)	61/70 (87.1)
Black	38/51 (74.5)	26/46 (56.5)	21/28 (75.0)	39/46 (84.8)
Other	---	2/3 (66.7)	---	1/1 (100.0)
Unknown	---	---	---	0/1 (0.0)
Total	96/140 (68.6)	66/109 (60.6)	68/95 (71.6)	101/118 (85.6)

*Excludes 1999-00 study year.

Table 107 contains a cross tabulation of maternal race and children's immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ Table 107 shows that the number of white mothers was more than the number of black mothers. The table also shows that the immunization rate of children born to white mothers was higher than that of black mothers for the 1998-99 and 2002 study years.

Table 108:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 9-3 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	1/2 (50.0)	2/2 (100.0)	7/8 (87.5)	3/3 (100.0)
Some high school	26/32 (81.3)	17/30 (56.7)	15/23 (65.2)	26/29 (89.7)
High school graduate	34/58 (58.6)	29/47 (61.7)	23/31 (74.2)	38/48 (79.2)
Some college	20/26 (76.9)	12/19 (63.1)	15/21 (71.4)	22/24 (91.7)
College or more	15/22 (68.2)	6/11 (54.5)	8/12 (66.7)	9/11 (81.8)
Unknown	---	---	---	3/3 (100.0)
Total	96/140 (68.6)	66/109 (60.6)	68/95 (71.6)	101/118 (85.6)

*Excludes 1999-00 study year.

Table 108 shows the cross tabulation of maternal educational attainment and 4:3:1 immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ The immunization status of the children in the sample in District 9-3 varies with educational attainment.

Table 109:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 9-3

	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)
Medicaid	38/53 (71.7)	64/73 (87.7)
Non-Medicaid	30/42 (71.4)	37/45 (82.2)
Total	68/95 (71.6)	101/118 (85.6)

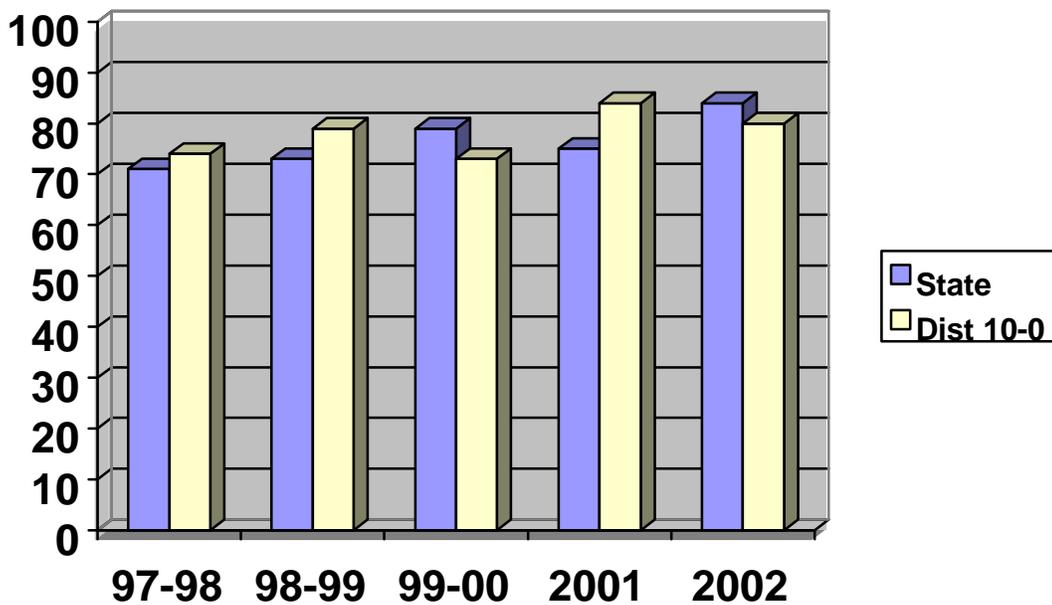
Table 109 shows immunization status of children born to women stratified by Medicaid status for the 2001 and 2002 study years. For the 2001 study, children born to non-Medicaid women had essentially the same immunization rate as children born to women using Medicaid. In the 2002 study, children born to women using Medicaid had a higher immunization rate than children born to non-Medicaid women.

Individual Health District Report: District 10-0

The eligible sample from this district included 157 children born in January 2000. From the 157 children, 124 records were located (Response Rate=79.0%). Of the 124 located records, there were 3 parental refusals leaving a final sample of 121 records.

- ❖ **The 4:3:1 immunization coverage estimate is 80.2 percent (97/121).** This rate is lower than the statewide 4:3:1 immunization rate of 83.9 percent.

Figure 22: 4:3:1 Coverage for State and District 10-0



- ❖ **The 4:3:1+3 immunization coverage estimate is 74.4 percent (90/121).** This rate is lower than the statewide 4:3:1+3 immunization rate of 78.9 percent.

Table 110:
District Immunization Rates for
Health District 10-0 by Study Year

Vaccine	1997-98 Adequate Rates	1998-99 Adequate Rates	1999-00 Adequate Rates	2001 Adequate Rates	2002 Adequate Rates
4 DTP/DTaP	74.4%	78.9%	74.7%	85.1%	80.2%
3 OPV/IPV	89.1%	86.5%	76.0%	88.3%	86.0%
1 MMR	82.2%	84.8%	77.3%	89.6%	90.1%
3 Hib	88.4%	87.7%	79.9%	94.2%	86.8%
3 HepB	86.0%	87.7%	79.9%	91.6%	88.4%
1 Varicella	11.6%	52.0%	55.8%	87.0%	86.8%

Table 110 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 80.2 to 90.1 percent for the 2002 study data.

Table 111 shows the immunization rates for each individual vaccine at twelve months of age. Not all shots are recommended prior to the first birthday; therefore, certain immunization rates within each series are expected to be low. For example, the DTP/DTaP vaccine series includes 4 doses before the second birthday; however, only three of the four shots are recommended within the first year of life. The Advisory Committee on Immunization Practices (ACIP) does not recommend the initiation of the MMR and Varicella vaccine series until after the first birthday, so these rates should be close to 0% at 12 months.

**Table 111:
2002 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 10-0**

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	119	98.3%
DTP2/DTaP2	116	95.9%
DTP3/DTaP3	105	86.8%
DTP4/DTaP4	0	0.0%
DTP5/DTaP5	0	0.0%
OPV/IPV1	119	98.3%
OPV/IPV2	115	95.0%
OPV/IPV3	29	24.0%
OPV/IPV4	0	0.0%
MMR1	1	0.8%
MMR2	0	0.0%
HIB1	119	98.3%
HIB2	115	95.0%
HIB3	29	24.0%
HIB4	0	0.0%
HIB5	0	0.0%
HEPB1	119	98.3%
HEPB2	113	93.4%
HEPB3	29	24.0%
HEPB4	0	0.0%
VAR1	1	0.8%
VAR2	0	0.0%

*Percent = number immunized / sample size
Sample size = 121

Table 112:
Cross tabulations of Maternal Race and
Child Immunization Status for Health District 10-0 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	73/98 (74.5)	109/141 (77.3)	98/118 (83.1)	69/88 (78.4)
Black	21/30 (70.0)	25/28 (89.2)	32/35 (91.4)	26/31 (83.9)
Other	1/1 (100.0)	1 / 2 (50.0)	0/1 (0.0)	1/1 (100.0)
Unknown	---	---	---	1/1 (100.0)
Total	95/129 (73.6)	135/171 (78.9)	130/154 (84.4)	97/121 (80.2)

*Excludes 1999-00 study year.

Table 112 contains a cross tabulation of maternal race and children's immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ Table 112 shows that the number of white mothers was more than the number of black mothers. The table also shows that the immunization rates of children born to white mothers were lower than that of black mothers in the 1998-99, 2001, and 2002 study years.

Table 113:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 10-0 by Study Year*

	1997-98 4:3:1 Adequate	1998-99 4:3:1 Adequate	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	7/8 (87.5)	2/3 (66.7)	14/18 (77.8)	5/7 (71.4)
Some high school	26/33 (78.8)	25/33 (75.8)	28/32 (87.5)	25/29 (86.2)
High school graduate	34/49 (69.4)	50/66 (75.8)	48/59 (81.4)	35/47 (74.5)
Some college	13/19 (68.4)	33/39 (84.6)	23/26 (88.5)	12/14 (85.7)
College or more	15/20 (75.0)	25/30 (83.3)	17/19 (89.5)	20/23 (87.0)
Unknown	---	---	---	0/1 (0.0)
Total	95/129 (73.6)	135/171 (78.9)	130/154 (84.4)	97/121 (80.2)

*Excludes 1999-00 study year.

Table 113 shows the cross tabulation of maternal educational attainment and 4:3:1 immunization status. The top row in each cell shows the number of mothers in each group whose children were adequately immunized and the total number of mothers in that group. The bottom row represents the percent that corresponds to those numbers (percent of each group that was adequately immunized).

- ❖ The immunization status of the children in District 10-0 varies with educational attainment.

Table 114:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 10-0

	2001 4:3:1 Adequate	2002 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)
Medicaid	57/69 (82.6)	47/59 (79.7)
Non-Medicaid	73/85 (85.9)	50/62 (80.6)
Total	130/154 (84.4)	97/121 (80.2)

Table 114 shows immunization status of children born to women stratified by Medicaid status for the 2001 and 2002 study years. For Health District 10-0, children born to non-Medicaid women had a slightly higher immunization rate than children born to women using Medicaid.

**Section V:
Discussion of Results**

Section V: Discussion

Summary

The purpose of the sixth year of the Georgia Immunization Study (GIS) was to assess the statewide and district-specific immunization coverage rates of two-year-old children who received immunizations from both public and private providers in Georgia in 2001-02. To assess these rates, the study drew an original sample of 4,387 children born in January 2000. The final sample of returned immunization records totaled 4,387. After removal of ineligible children (those deceased, adopted, moved out of state, born in military hospitals) the eligible sample was 4,147. Of these, 2,721 were located and make up the final sample.

The sixth year of the GIS, 2002, measured immunization coverage for children born in 1999 at three levels:*

- 4:3:1+3 coverage, defined as 4 DTP, 3 OPV/IPV, 1 MMR, 3 Hib, 3 Hep B, and 1 Varicella
- 4:3:1 coverage, defined as 4 DTP, 3 OPV/IPV, and 1 MMR
- 3:3:1 coverage, defined as 3 DTP, 3 OPV/IPV, and 1 MMR

Of these three coverage levels, 4:3:1+3 coverage rates were lowest and 3:3:1 rates the highest. The 4:3:1 measure was used most frequently throughout the study. Although complete 4:3:1 coverage is not considered adequate by the childhood immunization schedule currently recommended, coverage rates have traditionally been calculated using the 4:3:1 measure. Continuing to use this measure for most of the analyses allowed for comparison of data collected in 1997-98, 1998-99, 1999-00, 2001, and 2002. The newer 4:3:1+3 measure of

*It must be remembered that the 2002 study is estimating 2000 rates. The 2001 study is estimating 1999 rates, 1999-00 study estimated 1997 rates, 1998-99 study estimated 1996 rates, and the 1997-98 study estimated rates for 1995.

coverage was added in 1997-98. Therefore, 4:3:1+3 rates can be compared using study data from 1997-98, 1998-99, 1999-00, 2001 and 2002.

The 2002 results reflect immunization rates for children born in 2000. The results of the study indicate that, of the 2,721 children whose immunization records were located during 2002 data collection:

- 78.9 percent of children born in January of 2000 in Georgia were adequately immunized with the 4:3:1+3 vaccine series, compared to 66.7 percent in those who were born in January of 1999.
- 83.9 percent of children born in January of 2000 in Georgia were adequately immunized with the 4:3:1 vaccine series, compared to 75.1 percent of children born in January of 1999, 78.8 percent of children born in November of 1997, 73.3 percent of children born in April of 1996, and 71.3 percent of those born in April of 1995.

4:3:1 immunization rates in the individual health districts ranged from

- 73.9 percent to 94.3 percent in the 2002 study
- 42.4 percent to 94.8 percent in the 2001 study
- 60.7 percent to 94.5 percent in the 1999-00 study
- 53.8 percent to 96.1 percent in the 1998-99 study
- 49.7 percent to 88.4 percent in the 1997-98 study

The study investigated where the immunizations are being administered in Georgia (See Appendix E). In the sixth study year, 71.9 percent of the shots found were given by private providers.

Furthermore, the findings may serve to guide future immunization assessments, as well as to highlight areas for additional research.

Conclusions

The greatest increase in rates from the 2001 study to the 2002 study was observed in the 4:3:1+3 vaccine series (66.7% to 78.9%). These rates are lower, because they represent an immunization schedule that was introduced in the last few years. In fact, the most recent addition to the series, the Varicella vaccine, was only recommended for use in 1995 and was first available statewide in January 1997. The 2002 Georgia Immunization Study (GIS) measured Varicella rates for the fifth year. From one perspective, the rates represent a success for the Georgia Immunization Program and the health districts. Measurement of rates for a new vaccine series has to begin at some time. The collection of data on 4:3:1+3 rates from the first point at which these rates became available (i.e. the 1997-98 Georgia Immunization Study) will allow public health staff to survey trends and monitor rates.

In reviewing the 4:3:1 vaccine series, rates increased statewide from the 2001 study (75.1 percent) to 83.9 percent in 2002.

The results of the previous four years of the GIS study (1997-98, 1998-99, 1999-00, and 2001) show that immunization-specific coverage rates for the state remained relatively similar during the years when all shots were given, 1997-1998, 1996-97 and 1995-96, respectively.

Strengths

1. This study represents Georgia's sixth successful statewide, population-based assessment of immunization coverage rates. The sampling methodology for the study, was originally developed by Dr. Joan Herold, Demographer/Survey Specialist at Emory University. The sample sizes fulfill the power and accuracy requirements for the data analyses.
2. The stratification of the sample by health district, allows for the calculation of district level immunization rates.
3. In the absence of a statewide registry, the study represents the current "state of the art" in this research area. The methodology allowed for analysis of these useful data:

- Determination of where the shots are given, either public or private provider. (See Appendix E: Provider of Immunizations). Former immunization audits in Georgia have looked at rates of public providers alone.
 - Assessment of immunization status based on the most recent recommended 4:3:1+3 vaccine series.
 - Comparison of rates for children born in 1995, 1996, 1997, 1999, and 2000 in Georgia.
4. As a measure of reliability for the data entry process, double data entry was conducted on 5 percent of all records entered. The data entry error rate is approximately 1 percent for the 2002 study.

Limitations

The following sections describe important limitations of the study that should be considered when interpreting study results.

1. There were three limitations related to sampling. First, although the study included a random sample of children born in January 2000 and, thus, represented a generalizable estimate of coverage rates for all two-year-olds born in 2000, it could not account for variations that may routinely occur in other months of the year. Second, limiting the sample to children born in one month does not form the basis of a surveillance system capable of detecting changes in the health care system. Third, there may be children in the eligible sample who were erroneously included in the eligible sample and listed as not located. Examples of this type of error would be cases where a child died, was adopted, or was part of a military family, but the child's ineligibility related to these circumstances never became known to the study participants because the child could not be found. Although public health representatives were trained to follow the same protocol, each worked independently with limited supervision and may have deviated from the stated protocol in order to obtain all of the information.

2. Each year of the study fewer records were found in the public health system and consequently more parents had to be located. Parents in the Metro Atlanta area more often refused to participate (District 3-2, 3-4, and 3-5). Response rates tended to be lower in the Metro area (District 3-1, 3-2, 3-3, and 3-5).

APPENDIX A:

**DESCRIPTION OF SAMPLING PLAN
AND STATISTICAL NOTE**

APPENDIX A: DESCRIPTION OF SAMPLING PLAN AND STATISTICAL NOTE

The target population for this study was children born in the state of Georgia in 2000 who were residing in the state in 2002. Children who were born in Georgia to mothers who were not Georgia residents were excluded, since Georgia was not responsible for the health care of these children. Children born on military bases were excluded because they fall under their own health care system and their immunization records were not obtainable. Those who died or moved out of state before their second birthday were also excluded because Georgia was no longer responsible for their immunization status. Adopted children were excluded because they were untraceable.

The sampling frame for the study was all infants born in January 2000 in the state of Georgia who were born to Georgia residents, not in military hospitals, and who survived until their first birthday. This choice of sampling frame assumes no seasonality in birth coverage or exposure to immunizations in the state in 2000. From this sampling frame, independent random samples of birth certificate data were drawn for each health district in Georgia, in accordance with the required sample sizes. At the time of sample selection, children born in military hospitals and children known to have died within the first year of life were eliminated from the sampling frame. However, it was impossible to eliminate from the sampling frame children born to military families who were not born in a military hospital, children who were adopted, and children who died after the first year of life or who moved out of state during 2002. Thus, these exclusions were made after sample selection. It can be assumed that the elimination of these records after sample selection did not have a significant effect on the random nature of the sampling because of the very small percentage they represented of the total population.

For a description of sample sizes, see Table 115: Data Used for Sample Size Estimates for the 2002 Study. Response rates and immunization coverage levels from the 2001 study were used in the sample size calculation for the 2002

study. The sample sizes were adjusted for small population size. The desired sample size was then increased by a factor equivalent to the non-response rate (non-locatable immunization records) for each district from the 2001 study. The final calculated sample size is shown in the last column (Column H) of Table 115. This is the number of birth records statewide and per health district used as a result of this calculation for the study.

At the end of the study, response rates (located immunization records) varied from a low of 30.7 percent to a high of 98.9 percent, with the average response rate for the state at 68.6 percent. The state level data are based on a sample stratified by health district, with differing probabilities of selection. Therefore, the district data were weighted in order to provide more accurate, weighted estimates for the state level coverage rates.

Table 115:
Data Used for Sample Size Estimates
for the 2002 Study

A	B	C	D	E	F	G	H
Health District	Jan 2000 Total Births	Jan 2000 Eligible Births	2001 4:3:1 Immunization Rates	2002 First Sample Estimate	2002 Second Sample Estimate	Return Rate based on 2001 Eligible Sample	2002 Adjusted Sample Size
1-1	653	603	0.789	255.818	179.617	0.734	245
1-2	448	437	0.781	262.825	164.119	0.767	214
2-0	654	609	0.948	75.750	67.370	0.683	99
3-1	936	912	0.707	318.317	235.959	0.456	517
3-2	1,234	1,193	0.424	375.284	285.480	0.607	470
3-3	374	365	0.576	375.284	185.035	0.418	365
3-4	978	961	0.759	281.081	217.473	0.810	268
3-5	905	881	0.755	284.240	214.905	0.597	360
4-0	729	695	0.835	211.711	162.278	0.786	206
5-1	139	135	0.85	195.922	79.927	0.896	89
5-2	536	522	0.691	328.102	201.469	0.590	341
6-0	551	530	0.889	151.634	117.902	0.900	131
7-0	477	387	0.731	302.163	169.680	0.810	209
8-1	310	297	0.767	274.614	142.684	0.912	156
8-2	467	431	0.932	97.386	79.437	0.893	89
9-1	349	324	0.691	328.102	163.019	0.855	191
9-2	456	380	0.908	128.365	95.952	0.970	99
9-3	338	238	0.716	312.467	135.098	0.744	182
10-0	447	439	0.844	202.320	138.493	0.887	156
State	10,981	10,339	0.751			0.698	4,387

Figure 23:
Explanations of Table 115
Data Used for Sample Size Estimates
For the 2002 Study

<u>Column A:</u>	Health District	District number.
<u>Column B:</u>	January 2000 Total Births	Given. Source: DHR Vital Statistics Office.
<u>Column C:</u>	January 2000 Eligible Births	
<u>Column D:</u>	2001 4:3:1 Immunization Rates	Given. Source: Georgia Birth Cohort Follow-up Study (1999-00).
<u>Column E:</u>	First Sample Estimate - 2002 Study	Formula Used: $3.8416 \times (D) (1 - D) / .0025$
<u>Column F:</u>	Second Sample Estimate - 2002 Study	Adjustment for small size district populations. Formula Used: $E / (1 + E/C)$.
<u>Column G:</u>	Estimated Return Rate (Based on 2001 Study)	Given. Source: Georgia Birth Cohort Follow-up Study (1999-00).
<u>Column H:</u>	Adjusted Sample Size - 2002 Study	Formula Used: (Column F) / (Column G)

APPENDIX B:

**LIST OF 2002 PUBLIC HEALTH REPRESENTATIVES
FOR THE
GEORGIA IMMUNIZATION STUDY**

APPENDIX B: LIST OF 2002 PUBLIC HEALTH REPRESENTATIVES FOR THE GEORGIA IMMUNIZATION STUDY

<u>Health District</u>	<u>Public Health Representative</u>
1-1	Rosemarie Newman
1-2	Ann Vossen, R.N.
2-0	Annette Harkins, R.N.
3-1	Joy Stymest
3-2	Georgia Goseer, R.N. Likesar McCray
3-3	Lisa Germany Freda Sheppard
3-4	Kathy Heidish, R.N. Gloria Melvin Eunice Rose
3-5	Stuart Brown, MD Mike Bynum
4-0	Michelle Heard, R.N., B.S.N. Amy Fenn, RN
5-1	Susan Beckham, R.N.
5-2	Debbie Adams, R.N. Shelly Tye, R.N.
6-0	Melba McNorril, R.N. Darlene Morris, R.N.
7-0	Beverly Roberson, R.N., B.S.N.
8-1	Kirsten Wright, M.P.H Yugonda Thomas Dorene Wilson
8-2	Rhonda L. Schell
9-1	Susan Malone, R.N.
9-2	Lisa Boyett Hollard Phillips, M.S. Doris Wilbon, B.S. Stacy Giles, R.N. JoAnn Deas, R.N. Pat Thomas, R.N. Linda Sornson, R.N.
9-3	Robert Hamilton
10-0	Noelle Broadnax Barbie Bushey, R.N., C.P.N., M.P.H.

APPENDIX C:
DATA COLLECTION FORM

APPENDIX D:
VARICELLA VACCINE AND
CHICKEN POX DATA

APPENDIX D: Varicella Vaccine and Chicken Pox Data

Table 116 elaborates on the information found on the Varicella vaccine as well as information with regard to chicken pox. The results of this study have considered a child immunized for Varicella if the vaccine was administered anytime before or during the data collection period.

The table below demonstrates the utilization of the Varicella vaccine results in two ways. The first column describes the Varicella results had the two-year cut off been applicable. The second column depicts the Varicella results without the two-year restriction. The Varicella vaccination rates that report vaccination within the first two years of a child's life are lower than the Varicella vaccination rates that report vaccination at any point in time during the data collection period. These rates have not been adjusted for children who had natural Varicella immunity due to the chicken pox.

The final column describes the frequency of cases of chicken pox by district. A child's chicken pox status was provided by health department records, parents, or physicians. The percent column is equal to the number of children who had chicken pox divided by the district's final sample size.

**Table 116:
2002 Varicella Rates and
Cases of Chicken Pox by District**

Health District	Varicella shot by age 2		Varicella shot anytime (by end of data collection)		Had chicken pox at anytime (by end of data collection)	
	Number	Percent	Number	Percent	Number	Percent
1-1	168	83.6	179	89.1	3	1.5
1-2	130	82.3	136	86.1	2	1.3
2-0	73	96.1	73	96.1	0	0.0
3-1	248	87.3	251	88.4	2	0.7
3-2	118	81.9	118	81.9	2	1.4
3-3	89	80.2	92	82.9	0	0.0
3-4	159	90.9	168	96.0	2	1.1
3-5	160	82.1	163	83.6	1	0.5
4-0	134	91.2	136	92.5	1	0.7
5-1	61	78.2	66	84.6	3	3.8
5-2	214	86.3	224	90.3	1	0.4
6-0	95	93.1	99	97.1	1	1.0
7-0	96	82.8	103	88.8	2	1.7
8-1	115	89.1	120	93.0	1	0.8
8-2	70	90.9	70	90.9	0	0.0
9-1	121	79.6	127	83.6	5	0.7
9-2	74	83.1	78	87.6	2	2.2
9-3	96	81.4	99	83.9	1	0.8
10-0	101	83.5	105	86.8	0	0.0
Statewide	2,322	85.3	2,407	88.5	29	1.1

Figure 24: 2002 State Varicella Coverage Rates and Percentage of Sample with Chicken Pox Disease

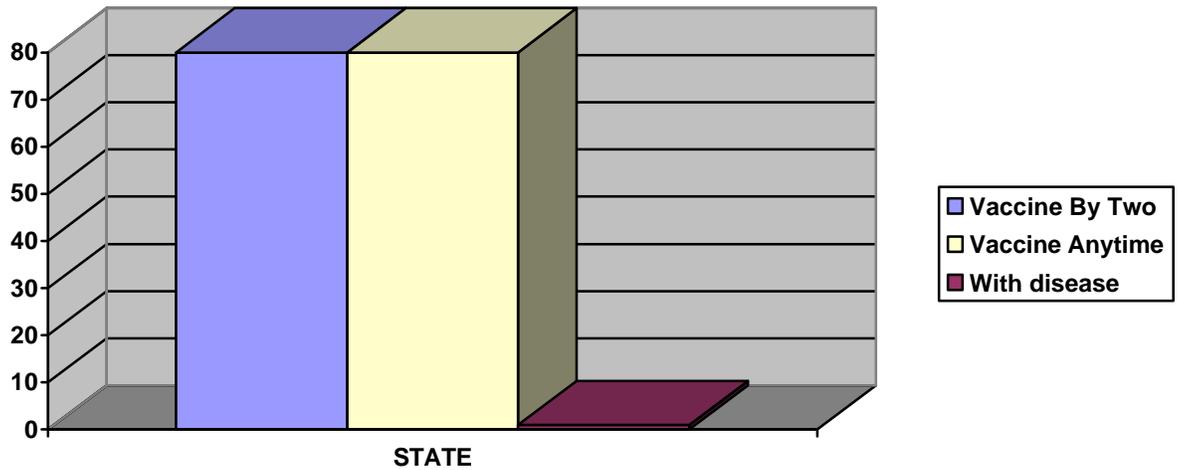


Figure 24 depicts the Varicella rate by the age of two years and the Varicella rate without the two year cut-off (received Varicella shot at any time during the data collection period). The last bar indicates the percentage of children with documented chicken pox disease at any point in time.

Appendix E:
Provider of Immunizations

Appendix E: Provider of Immunizations

Information about the provider of the immunizations was collected by noting where the shots were given (Public Health, Private Health, or Both) and who provided the information (Health Department, Private Provider, or Parent). If there was no indication of who gave the individual shot, the location for that shot was classified as unknown. The total number and percentage of shots given at each of the provider categories is shown in Table 117.

Table 117:
Statewide Percentage of Shots by Provider: 1998-99, 1999-00, 2001, and 2002

Provider	1998-99		1999-00		2001		2002	
	Total #	Percent						
Public Health Dept	20,222	45.1%	11,248	29.1%	9,472	25.5%	8,085	20.3%
Private Physician	22,686	50.6%	23,984	61.9%	25,797	69.5%	28,667	71.9%
Unknown	1,934	4.3%	3,503	9.0%	1,866	5.0%	3,112	7.8%
Total	44,842	100.0%	38,735	100.0%	37,135	100.0%	39,864	100.0%

As shown in Table 117, in 2002, over 70% of the shots recorded for the sampled children were given by a private provider.

Location of Immunizations by District

Table 118 illustrates the distribution of immunizations among public and private providers for each health district. These data were generated by counting the total number of shots given in each health district by provider location.

Table 118:
District Specific Percentage of Shots by Provider 2002

District	Public Health Department		Private Physician		Unknown		Total Shots Given
	# Shots Given	Percent	# Shots Given	Percent	# Shots Given	Percent	
1-1	591	20.3	2,129	73.2	189	6.5	2,909
1-2	308	13.7	1,505	66.9	437	19.4	2,250
2-0	284	24.3	875	75.0	8	0.7	1,167
3-1	791	19.1	2,253	54.4	1,097	26.5	4,141
3-2	480	24.0	1,130	56.5	389	19.5	1,999
3-3	402	26.6	892	59.1	216	14.3	1,510
3-4	195	7.4	2,322	87.9	124	4.7	2,641
3-5	318	11.7	2,337	86.4	51	1.9	2,706
4-0	437	19.9	1,678	76.5	79	3.6	2,194
5-1	349	29.9	806	69.0	13	1.1	1,168
5-2	979	26.7	2,426	66.2	260	7.1	3,665
6-0	378	24.1	1,171	74.6	20	1.3	1,569
7-0	390	22.8	1,321	77.1	2	0.1	1,713
8-1	390	20.5	1,501	78.7	15	0.8	1,906
8-2	259	22.8	841	73.9	38	3.3	1,138
9-1	440	17.5	1,974	78.2	109	4.3	2,523
9-2	474	36.4	777	59.7	51	3.9	1,302
9-3	280	16.9	1,362	82.2	14	0.9	1,656
10-0	340	19.9	1,367	80.1	0	0.0	1,707
State	8,085	20.3	28,667	71.9	3,112	7.8	39,864

In Year Six:

- ❖ In all nineteen health districts, more than 50% of the shots were given in the **Private sector.**

Results by region:

- ❖ **North (Districts 1-1, 1-2, 2-0, and 10-0)**

In all of these districts private physicians gave the majority of the immunizations.

- ❖ **Metro Atlanta (Districts 3-1, 3-2, 3-3, 3-4, and 3-5)**

In the metro-Atlanta area more of the immunizations were administered in the private sector than in the public sector. District 3-1, Cobb County had the highest number of unknown shot locations (26.5 percent).

- ❖ **Central (Districts 4-0, 5-1, 5-2, 6-0, 7-0)**

Children in all of the central districts received the majority of their shots at a private provider.

- ❖ **South (Districts 8-1, 8-2, 9-1, 9-2, 9-3)**

Private providers provided the majority of vaccinations in all health districts.

Four Year Comparison of Provider Information

The following table shows a comparison of results from the current year and the three previous years of the study. The comparisons reflect a movement of immunization services into the private sector in Georgia.

Table 119:
Location of Immunizations by District
Four Year Comparison
1998-99, 1999-00, 2001, 2002

District	Public Health Department				Private Physician			
	98-99	99-00	2001	2002	98-99	99-00	2001	2002
1-1	55.9	51.7	26.5	20.3	44.1	44.2	65.7	73.2
1-2	34.5	24.9	16.0	13.7	63.6	72.6	81.3	66.9
2-0	60.5	35.5	20.3	24.3	39.3	48.3	75.9	75.0
3-1	41.9	18.8	18.9	19.1	56.0	57.5	55.3	54.4
3-2	24.9	30.6	28.7	24.0	59.3	60.2	48.9	56.5
3-3	34.8	19.1	20.2	26.6	39.6	53.4	66.2	59.1
3-4	17.5	8.9	3.1	7.4	80.2	77.1	96.9	87.9
3-5	24.4	25.9	22.0	11.7	65.7	65.9	75.7	86.4
4-0	62.4	35.8	25.4	19.9	36.3	61.0	74.2	76.5
5-1	44.5	51.8	43.7	29.9	55.3	43.2	52.5	69.0
5-2	60.1	46.3	44.9	26.7	38.8	53.6	51.4	66.2
6-0	30.0	34.9	14.5	24.1	70.0	59.8	84.9	74.6
7-0	60.5	36.1	36.1	22.8	37.1	55.6	63.8	77.1
8-1	60.9	23.1	30.6	20.5	35.1	76.3	69.3	78.7
8-2	70.3	26.5	29.6	22.8	29.7	59.8	70.4	73.9
9-1	41.9	14.4	16.7	17.5	52.8	81.7	81.1	78.2
9-2	81.3	57.9	53.9	36.4	17.1	39.7	45.5	59.7
9-3	52.0	31.0	23.6	16.9	47.4	61.2	75.7	82.2
10-0	40.7	34.1	19.7	19.9	57.9	65.8	80.1	80.1
State Totals	45.1	29.0	25.5	20.3	50.6	61.9	69.5	71.9

Four-Year Comparison: Summary of Table 119

In 1998-99	45.1% of the shots were given in the public health department 50.6% of the shots were given in the private sector 4.3% of the shot locations were unknown
In 1999-00	29.0% of the shots were received at the public health department 61.9% of the shots were given in the private sector 9.0% of the shot locations were unknown
In 2001	25.5% of the shots were received at the public health department 69.5% of the shots were given in the private sector 5.0% of the shot locations were unknown
In 2002	20.3% of the shots were received at the public health department 71.9% of the shots were given in the private sector 7.8% of the shot locations were unknown

APPENDIX F:

**MARGINS OF ERROR FOR
IMMUNIZATION COVERAGE RATES**

APPENDIX I: MARGINS OF ERROR FOR IMMUNIZATION COVERAGE RATES

Margins of error were calculated for all statewide and district immunization coverage rates, including 4:3:1+3 rates, 4:3:1 rates, and 3:3:1 rates. These margins of error can be found in Tables 120-122. The formula used to calculate the margins of error in these tables was:

$$\text{Margin of error} = \text{square root of: } \frac{(3.8416)(\text{imm rate})(1 - \text{imm rate})}{\text{Final sample size}}$$

Confidence intervals can be calculated using the margins of error. The constant 3.8416 is the chi-square value representing an error probability of less than 5%. Using the above formula for margin of error yields a 95% confidence interval for immunization rates. The interpretation of the 95% confidence interval for the state 4:3:1 immunization rate is as follows:

- ❖ With 95% confidence, the true statewide 4:3:1 immunization rate for infants born in 2000 is between 82.3 and 85.5 percent.

Due to the extensive analyses conducted for this report and the large number of rates reported, margins of error for specific rates were only calculated for the following:

- ❖ Statewide 4:3:1+3 immunization coverage rates
- ❖ Statewide 4:3:1 immunization coverage rates
- ❖ Statewide 3:3:1 immunization coverage rates
- ❖ District 4:3:1+3 immunization coverage rates
- ❖ District 4:3:1 immunization coverage rates
- ❖ District 3:3:1 immunization coverage rates

These margins of error and confidence intervals are noted in this appendix.

**Table 120:
Margins of Error for 2002
Statewide and District 4:3:1+3 Rates**

Health District	Sizes of Final Sample (Records Located)	4:3:1+3 Immunization Coverage Rates (percent)	Margins of Error (percent)	95% Confidence Intervals (percent)
1-1	201	75.1	+/- 6.0	69.1 – 81.1
1-2	158	72.8	+/- 6.9	65.9 – 79.7
2-0	76	93.4	+/- 5.6	87.8 – 99.0
3-1	284	81.3	+/- 4.5	76.8 – 85.8
3-2	144	77.8	+/- 6.8	71.0 – 84.6
3-3	111	69.4	+/- 8.6	60.8 – 78.0
3-4	175	86.9	+/- 5.0	81.9 – 91.9
3-5	195	77.9	+/- 5.8	72.1 – 83.7
4-0	147	85.0	+/- 5.8	79.2 – 90.8
5-1	78	70.5	+/- 10.1	60.4 – 80.6
5-2	248	80.2	+/- 5.0	75.2 – 85.2
6-0	102	86.3	+/- 6.7	79.6 – 93.0
7-0	116	74.1	+/- 8.0	66.1 – 82.1
8-1	129	77.5	+/- 7.2	70.3 – 84.7
8-2	77	81.8	+/- 8.6	73.2 – 90.4
9-1	152	74.3	+/- 6.9	67.4 – 81.2
9-2	89	79.8	+/- 8.3	71.5 – 88.1
9-3	118	80.5	+/- 7.1	73.4 – 87.6
10-0	121	74.4	+/- 7.8	66.6 – 82.2
Statewide Rate (weighted)	2,721	78.9	+/- 1.5	77.4 – 80.4

Table 121:
Margins of Error for 2002
Statewide and District 4:3:1 Rates

Health District	Sizes of Final Sample (Records Located)	4:3:1 Immunization Coverage Rates (percent)	Margins of Error (percent)	95% Confidence Intervals (percent)
1-1	201	80.6	+/- 5.5	75.1 – 86.1
1-2	158	79.1	+/- 6.3	72.8 – 85.4
2-0	76	93.4	+/- 5.6	87.8 – 99.0
3-1	284	84.5	+/- 4.2	80.3 – 88.7
3-2	144	82.6	+/- 6.2	76.4 – 88.8
3-3	111	73.9	+/- 8.2	65.7 – 82.1
3-4	175	94.3	+/- 3.4	90.9 – 97.7
3-5	195	84.6	+/- 5.1	79.5 – 89.7
4-0	147	87.1	+/- 5.4	81.7 – 92.5
5-1	78	80.8	+/- 8.7	72.1 – 89.5
5-2	248	84.7	+/- 4.5	80.2 – 89.2
6-0	102	89.2	+/- 6.0	83.2 – 95.2
7-0	116	82.8	+/- 6.9	75.9 – 89.7
8-1	129	82.2	+/- 6.6	75.6 – 88.8
8-2	77	83.1	+/- 8.4	74.7 – 91.5
9-1	152	80.9	+/- 6.2	74.7 – 87.1
9-2	89	85.4	+/- 7.3	78.1 – 92.7
9-3	118	85.6	+/- 6.3	79.3 – 91.9
10-0	121	80.2	+/- 7.1	73.1 – 87.3
Statewide Rate (weighted)	2,721	83.9	+/- 1.6	82.3 – 85.5

Table 122:
Margins of Error for 2002
Statewide and District 3:3:1 Rates

Health District	Sizes of Final Sample (Records Located)	3:3:1 Immunization Coverage Rates (percent)	Margins of Error (percent)	95% Confidence Intervals (percent)
1-1	201	87.6	+/- 4.6	83.0 – 92.2
1-2	158	82.9	+/- 5.9	77.0 – 88.8
2-0	76	96.1	+/- 4.4	91.7 – 100.5
3-1	284	89.1	+/- 3.6	85.5 – 92.7
3-2	144	83.3	+/- 6.1	77.2 – 89.4
3-3	111	81.1	+/- 7.3	73.8 – 88.4
3-4	175	96.0	+/- 2.9	93.1 – 98.9
3-5	195	86.2	+/- 4.8	81.4 – 91.0
4-0	147	91.8	+/- 4.4	87.4 – 96.2
5-1	78	96.2	+/- 4.2	92.0 – 100.4
5-2	248	90.7	+/- 3.6	87.1 – 94.3
6-0	102	94.1	+/- 4.6	89.5 – 98.7
7-0	116	88.8	+/- 5.7	83.1 – 94.5
8-1	129	89.9	+/- 5.2	84.7 – 95.1
8-2	77	88.3	+/- 7.2	81.1 – 95.5
9-1	152	86.8	+/- 5.4	81.4 – 92.2
9-2	89	91.0	+/- 5.9	85.1 – 96.9
9-3	118	87.3	+/- 6.0	81.3 – 93.3
10-0	121	86.0	+/- 6.2	79.8 – 92.2
Statewide Rate (weighted)	2,721	88.8	+/- 1.2	87.6 – 90.0