

GEORGIA IMMUNIZATION STUDY

2006 Final Report



Georgia Department of Human Resources | Division of Public Health
Epidemiology Branch | Maternal and Child Health Section | Immunization Program
Eighteen Public Health Districts



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Acknowledgments

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A profound thank you and sincere appreciation is also given to the private and non-public health providers and the Vaccines for Children providers that participated in this collaborative effort. Their cooperation and assistance throughout the study is greatly appreciated.

We would also like to thank the Rollins School of Public Health at Emory University for providing us with the study materials. Their generosity allowed us to continue repeated assessments each year and compare our efforts with theirs.

A special note of thanks to Mrs. Michelle Conner, Georgia Immunization Program Director, for her support and leadership during this study.

2006 Executive Summary

The 2006 Immunization Study was conducted by the Georgia Department of Human Resources, Division of Public Health, Epidemiology Branch, Immunization Program and Public Health Districts. However, this study could not have been conducted without the assistance of the private providers, public health providers and the Vaccines for Children providers that contributed in this collaborative effort. Their cooperation and assistance throughout the study is greatly appreciated.

The Immunization Study employs a non-experimental retrospective cohort research design to ascertain the immunization coverage rate for children born in the State of Georgia. This study design allows for the calculation of immunization rates for children who turned two in January 2006. Identifying information about the children and their parents was collected from birth certificates.

The Immunization Study showed that during 2006 most childhood immunizations (80 percent) were administered in the private sector, while County Health Departments immunized 12 percent, and the sources for 8 percent are unknown. The proportion of children in Georgia who have received all of the recommended vaccinations showed a steady increase from 16 percent in 1997 to 79 percent in 2002, a slight decrease in 2003 to 74 percent, but an increase in 2004 to 81 percent. The 2005 study results showed another slight decrease in the immunization rate at 77 percent, and the 2006 study revealed that the immunization rate remained stable at 77 percent.

Acute infection with Hepatitis B causes severe disease in only a small proportion of those infected, but it can lead to chronic infection, cirrhosis, and cancer of the liver. In Georgia in 2006, 94 percent of infants had received two doses of hepatitis B vaccine by 12 months of age, and, at 24 months, 89 percent of children had received the recommended three doses.

Vaccines have largely controlled diphtheria, measles, pertussis, and other scourges of the past. In 1923, with a population of less than three million, Georgia recorded 274 deaths from diphtheria, 347 deaths from measles, and 254 deaths from pertussis, while in 2003, just 80 years later, and with a population that has almost tripled, Georgia had no reported cases of tetanus or diphtheria, and just 36 cases of pertussis. In 2006, 86 percent of children 12 months of age were appropriately immunized against diphtheria, tetanus and pertussis, and 77 percent of Georgia's two-year-olds were adequately immunized against ten vaccine-preventable childhood diseases (diphtheria, tetanus, pertussis, hepatitis B, *H. influenzae* type B, mumps, measles, rubella, polio and varicella).

There was considerable variation from district to district in the proportion of two-year-olds reported to be fully immunized, ranging from 65 percent in the Fulton district to 95 percent in the North (Dalton) district. Eight of the state's public health districts (Dalton, Gainesville, Gwinnett, Macon, Augusta, Columbus, Valdosta, and Athens) succeeded in immunizing at least 85 percent of their two-year-olds against the 10 vaccine-preventable childhood diseases. Six of the state's public health districts (Cobb, Fulton, Clayton,

DeKalb, LaGrange, and Albany) had a rate less than 75 percent. Within Metropolitan Atlanta, the immunization rates varied from 65 percent in Fulton to 93 percent in Gwinnett. In Georgia outside Metropolitan Atlanta, the immunization rates ranged from 79 percent in Rome to 95 percent in the Dalton district (see Map below).

There was minor variation in immunization status of children by the race and education of their mothers, and by whether their mothers were Medicaid recipients. Among children of white women, 83 percent were adequately immunized, while among children of black women, 78 percent were adequately immunized. Children of college-educated mothers were more likely to be adequately immunized (82 percent) than children of mothers with less than high school education (76 percent). The children of mothers who did not receive Medicaid were more likely to be adequately immunized (83 percent) than were children of mothers who did receive Medicaid (79 percent).

Georgia Vaccination Rates (4:3:1:3) by Public Health District 2006

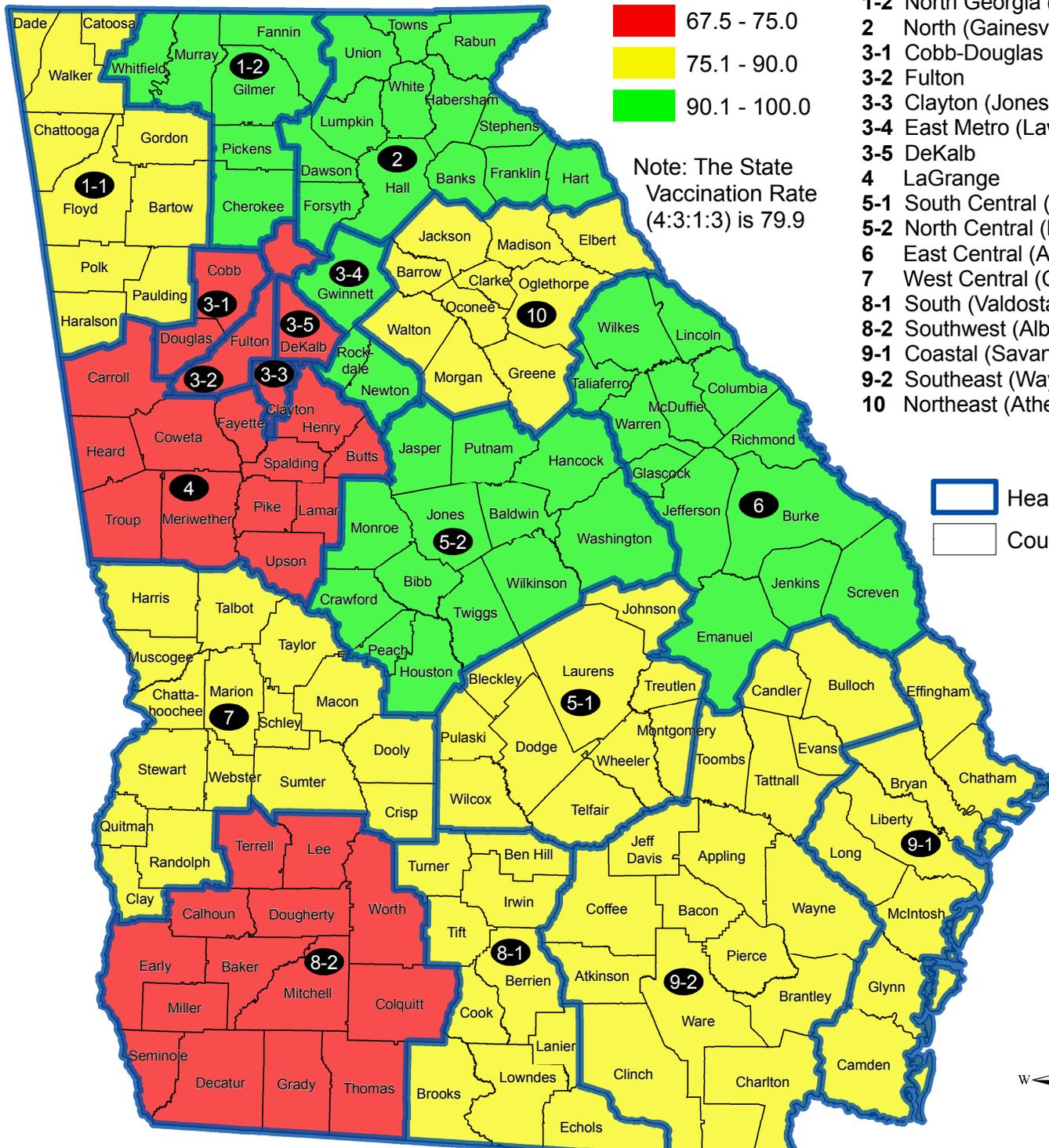
PUBLIC HEALTH DISTRICTS

Vaccination Rates



Note: The State
Vaccination Rate
(4:3:1:3) is 79.9

- 1-1 Northwest (Rome)
- 1-2 North Georgia (Dalton)
- 2 North (Gainesville)
- 3-1 Cobb-Douglas
- 3-2 Fulton
- 3-3 Clayton (Jonesboro)
- 3-4 East Metro (Lawrenceville)
- 3-5 DeKalb
- 4 LaGrange
- 5-1 South Central (Dublin)
- 5-2 North Central (Macon)
- 6 East Central (Augusta)
- 7 West Central (Columbus)
- 8-1 South (Valdosta)
- 8-2 Southwest (Albany)
- 9-1 Coastal (Savannah)
- 9-2 Southeast (Waycross)
- 10 Northeast (Athens)



- Health Districts
- Counties

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Miles

Created: February 2007
Source: Division of Public Health
Classification: Natural Breaks
Projection: Georgia Statewide
Lambert Conformal Conic
Note: Map originally printed in color



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Georgia Vaccination Rates (4:3:1:3:3:1) by Public Health District 2006

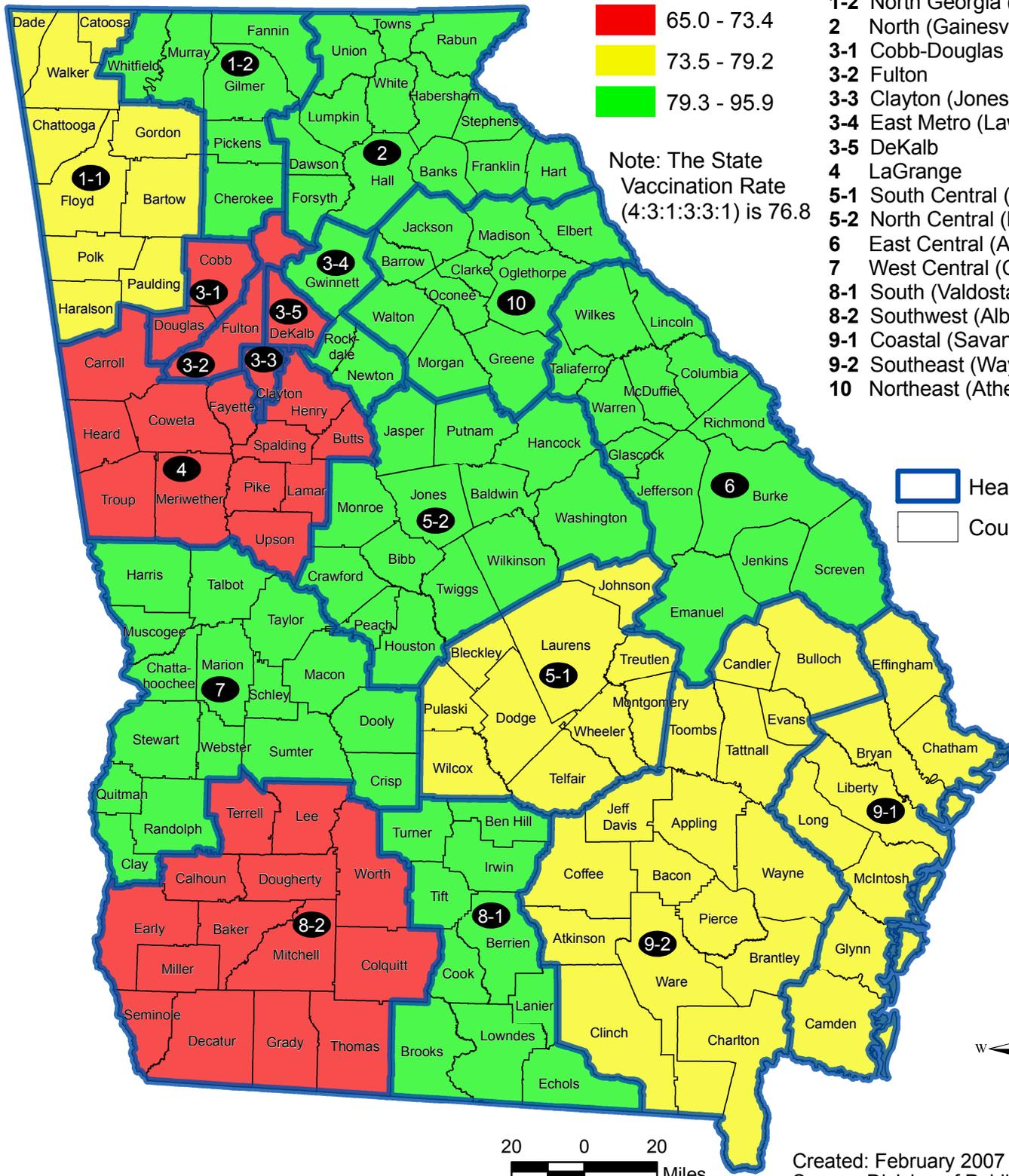
PUBLIC HEALTH DISTRICTS

Vaccination Rates

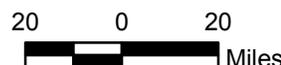
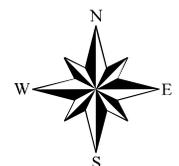


Note: The State Vaccination Rate (4:3:1:3:3:1) is 76.8

- 1-1 Northwest (Rome)
- 1-2 North Georgia (Dalton)
- 2 North (Gainesville)
- 3-1 Cobb-Douglas
- 3-2 Fulton
- 3-3 Clayton (Jonesboro)
- 3-4 East Metro (Lawrenceville)
- 3-5 DeKalb
- 4 LaGrange
- 5-1 South Central (Dublin)
- 5-2 North Central (Macon)
- 6 East Central (Augusta)
- 7 West Central (Columbus)
- 8-1 South (Valdosta)
- 8-2 Southwest (Albany)
- 9-1 Coastal (Savannah)
- 9-2 Southeast (Waycross)
- 10 Northeast (Athens)



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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 2006 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 eighteen health districts.

The Georgia Immunization Survey is now in its tenth year. The Rollins School of Public Health, Emory University did the first three years of the study and the Georgia Division of Public Health has continued on with the survey for the remaining seven years. Immunization data for each year of the study evaluate rates for children born two years before the beginning of the study. In 2006, immunization rates for children born in January 2004 were examined. 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 eighteen 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, the Assistant Project Coordinator was La Tonya Thomas, MBA-HCM, and the Project Assistant was Mrs. Katherine Kahn.

Staff at the Georgia Division of Public Health began work on the Georgia Immunization Project in November 2005. During December 2005, 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 2006.

* Throughout this report, we refer to study years one, two, three, four, and five as, 2002, 2003, 2004, 2005 and 2006 respectively. The results from these five study years refer to rates for 2000, 2001, 2002, 2003, and 2004 respectively.

During January, a training session for the public health representatives was held via conference call. Data were collected from February 2006 through September 2006. The Project Coordinator and Assistant Project Coordinator served as the contacts 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, 2005
Initial notification of public health community Immunization Coordinators Health Directors	December, 2005
Initial notification of private health community	January, 2006
Conference call training for public health representatives	January, 2006
Data collection period	February – September, 2006
Data entry period	March – November, 2006
Double data entry of 5% of data forms	December, 2006
Final data cleaning and analysis of data	January, 2007
Final Report	March, 2007

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 tenth 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 2004. 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 2006. Identifying information about the children and their parents was collected from birth certificates.

Target and Sample Populations

The target population of the tenth year of the Georgia Immunization Study included all two-year-old children born in the State of Georgia in 2004. A sample size of 2,765 children born in the month of January 2004 was selected for the study. The sample design allowed for independent estimates for each of the 18 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 2004. 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 sex

- ❖ 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 via a conference call during January 2006. 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 has been revised and updated by the staff at the Georgia Division of Public Health for use in each subsequent study year.

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, two Varicella vaccines, and four Pneumococcal Conjugate (PCV) 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.

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 United States (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 subsequent study years by Ms. Hoban.

Data Entry

The principal investigator and project assistant 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 2006. 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 98.0% 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

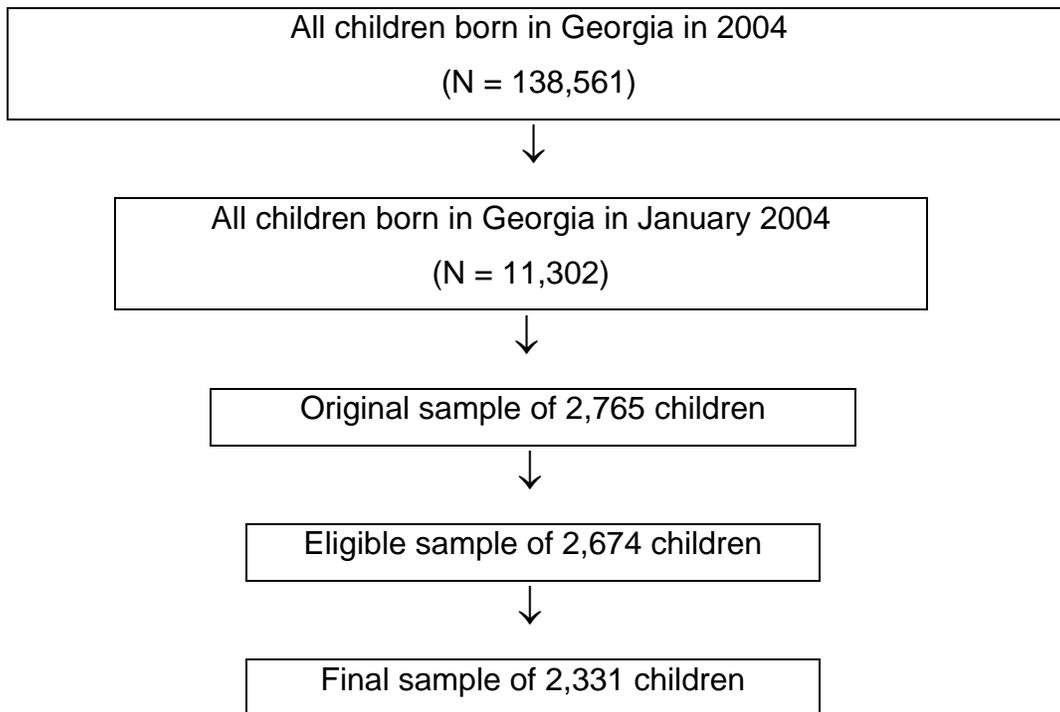
SECTION III: RESULTS OF STATEWIDE ANALYSES

Sampling

The sample of 2,765 children was drawn from 11,302 children born in Georgia in January 2004. A total of 138,561 children were born in Georgia during 2004.

Children who were ineligible for participation in the study were extracted from the original sample, leaving an eligible sample of 2,674. (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 2,674 children in the eligible sample, 2,331 children were located, 306 children never were located and 37 parental refusals were removed. The resulting final sample consisted of 2,331 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 2,331 children represented over 87 percent of the eligible sample.

Table 2:
Sample Description

Sampling Step	Number	Percent of Sample
Original Sample	2,765	100.0%
Deceased	4	0.1%
Adopted	6	0.2%
Moved out of state	72	2.6%
Military	9	0.3%
Eligible Sample	2,674	96.7%
Eligible Sample	2,674	100.0%
Records Not Located /Eligibility Unknown *	306	11.4%
Final Sample (Located Records**)	2,331	87.2%

* **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=74] 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 2006 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 77.0 percent to a high of 100.0 percent, with a statewide average response rate of 88.6 percent.

Table 3:

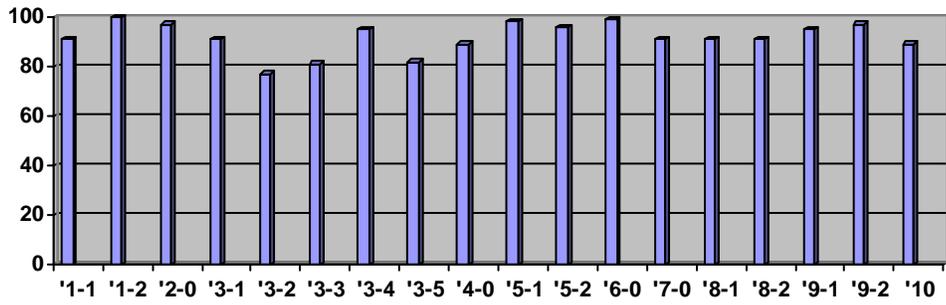
2006 Eligible Sample, Number Located and Response Rates by District

Health District	Eligible Sample (Number)	Number Located*	Response Rate ** (% of Eligible Sample located)
1-1	183	166	90.7%
1-2	39	39	100.0%
2-0	29	28	96.6%
3-1	247	224	90.7%
3-2	379	292	77.0%
3-3	202	164	81.2%
3-4	128	121	94.5%
3-5	295	243	82.4%
4-0	208	184	88.5%
5-1	50	49	98.0%
5-2	139	134	96.4%
6-0	75	74	98.7%
7-0	110	100	90.9%
8-1	64	58	90.6%
8-2	139	127	91.4%
9-1	177	168	94.9%
9-2	127	123	96.9%
10-0	83	74	89.2%
State	2,674	2,368	88.6%

*sample includes parental refusals

**number located / eligible sample

Figure 2
2006 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 2006 Study

District	Number of Records Found	Parent Refusals	
		Number	Percent
1-1	166	3	0.02
1-2	39	2	0.05
2-0	28	1	0.04
3-1	224	6	0.03
3-2	292	15	0.05
3-3	164	0	0.00
3-4	121	4	0.03
3-5	243	0	0.00
4-0	184	0	0.00
5-1	49	1	0.02
5-2	134	3	0.02
6-0	74	0	0.00
7-0	100	0	0.00
8-1	58	0	0.00
8-2	127	0	0.00
9-1	168	0	0.00
9-2	123	0	0.00
10-0	74	2	0.03
Total	2,368	37	0.02

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 2,331 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:

- ❖ "4:3:1:3:3:1" status a child has received four DTP/DaTP, three OPV/IPV, one MMR, three Hib, three Hep B, and one Varicella at anytime
- ❖ "4:3:1:3" status a child has received four DTP/DaTP, three OPV/IPV, one MMR, and three Hib vaccinations
- ❖ "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/DTaP, 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 4:3:1:3:3:1 series compared to the children in the final sample who were not adequately immunized with this series.

Of the 2,331 children who were located in 2006, 76.8 percent were adequately immunized at the 4:3:1:3:3:1 level. This percent of adequately immunized children was essentially the same as the 76.5 percent reported in 2005.

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

Status	Adequately Immunized		Inadequately Immunized	
	Number	Percent	Number	Percent
2002	2,146	78.9	575	21.1
2003	1,906	74.3	661	25.7
2004	2,150	81.3	495	18.7
2005	2,015	76.5	619	23.5
2006	1,790	76.8	541	23.2

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 4:3:1:3 series compared to the children in the final sample who were not adequately immunized with this series. This is a new assessment of immunization coverage which will be used in future study years.

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

Status	Adequately Immunized		Inadequately Immunized	
	Number	Percent	Number	Percent
2005	2,095	79.5	539	20.5
2006	1,863	79.9	468	20.1

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

Table 7 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. During the 2006 assessment, the number of adequately immunized children remained the same as 2005 with 80.8 percent of children receiving the appropriate 4:3:1 series.

Table 7:
4:3:1 State Immunization Coverage by Study Year

Status	Adequately Immunized		Inadequately Immunized	
	Number	Percent	Number	Percent
2002	2,284	83.9	437	16.1
2003	2,075	80.8	492	19.2
2004	2,252	85.1	393	14.9
2005	2,126	80.7	508	19.3
2006	1,884	80.8	447	19.2

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

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

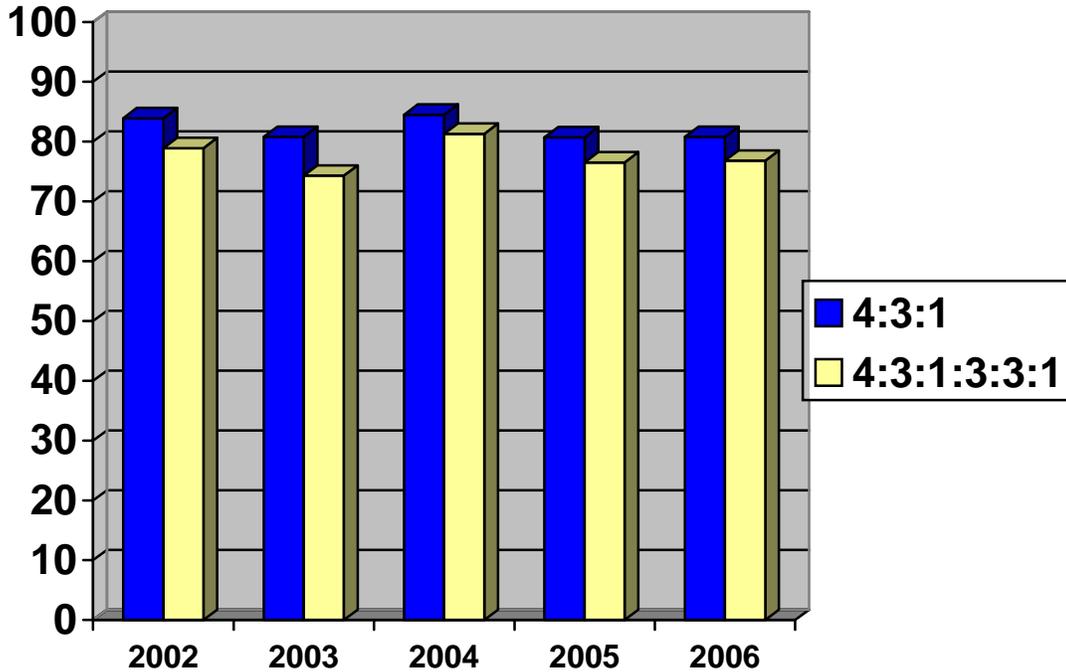


Figure 3 reveals the statewide 4:3:1 coverage rates for the 2002, 2003, 2004, 2005 and 2006 studies. The figure also shows statewide 4:3:1:3:3:1 vaccination coverage for the 2002, 2003, 2004, 2005 and 2006 studies.

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 4:3:1:3:3:1 shot series are shown here. During the 2002 assessment nearly all vaccines were at or above the state goal of 90 percent coverage. In 2003, coverage rates decreased slightly, but still showed over 90 percent coverage for 3 DTP/DtaP vaccine series. In 2004, all but one of the vaccine series met the coverage rate of 90 percent. Coverage levels for 2005 and 2006 have decreased slightly, but still show most of the vaccines are near the 90 percent coverage rate with the 3 DTP/DtaP above 90 percent. (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	2002		2003		2004		2005		2006	
	Number	Percent								
3 DTP/DTaP	2,561	94.1	2,340	91.2	2,459	93.0	2,428	92.2	2,147	92.1
4 DTP/DTaP	2,303	84.6	2,096	81.7	2,268	85.7	2,169	82.3	1,907	81.8
3 OPV/IPV	2,466	90.6	2,251	87.7	2,401	90.8	2,315	87.9	2,076	89.1
1 MMR	2,474	90.9	2,266	88.3	2,405	90.9	2,296	87.2	2,070	88.8
3 Hib	2,474	90.9	2,242	87.3	2,387	90.2	2,306	87.5	2,062	88.5
3 Hep B	2,471	90.8	2,255	87.8	2,400	90.7	2,337	88.7	2,081	89.3
1 Varicella	2,407	88.5	2,101	81.8	2,378	89.9	2,302	87.4	2,070	88.8
3 PCV	---	---	---	---	1,262	47.7	2,080	79.0	1,970	84.5
4 PCV	---	---	---	---	485	18.3	1,024	38.9	1,453	62.3

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

* PCV data not collected before 2004.

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 2002, 2003, 2004, 2005 and 2006 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 2002	Percent* 2002	Number 2003	Percent* 2003	Number 2004	Percent* 2004	Number 2005	Percent* 2005	Number 2006	Percent* 2006
DTP/DTaP1	2,667	98.0%	2,447	95.3%	2,554	96.6%	2,545	96.6%	2,269	97.3%
DTP/DTaP2	2,592	95.3%	2,367	92.2%	2,472	93.5%	2,451	93.1%	2,193	94.1%
DTP/DTaP3	2,394	88.0%	2,176	84.8%	2,255	85.3%	2,253	85.5%	1,992	85.5%
DTP/DTaP4	23	0.8%	8	0.3%	26	1.0%	25	0.9%	9	0.4%
DTP/DTaP5	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
OPV/IPV1	2,662	97.8%	2,442	95.1%	2,553	96.5%	2,541	96.5%	2,262	97.0%
OPV/IPV2	2,581	94.9%	2,350	91.5%	2,458	92.9%	2,433	92.4%	2,181	93.6%
OPV/IPV3	948	34.8%	1,004	39.1%	1,132	42.8%	1,275	48.4%	1,339	57.4%
OPV/IPV4	2	0.1%	3	0.1%	5	0.2%	9	0.3%	9	0.4%
MMR1**	34	1.2%	92	3.6%	110	4.2%	96	3.6%	24	1.0%
MMR2	1	0.0%	1	0.0%	0	0.0%	1	0.0%	0	0.0%
HIB1	2,651	97.4%	2,436	94.9%	2,541	96.1%	2,531	96.1%	2,262	97.0%
HIB2	2,569	94.4%	2,345	91.4%	2,446	92.5%	2,407	91.4%	2,156	92.5%
HIB3	1,267	46.6%	1,110	43.2%	1,063	40.2%	955	36.3%	789	33.8%
HIB4	15	0.6%	16	0.6%	25	0.9%	32	1.2%	9	0.4%
HIB5	0	0.0%	0	0.0%	0	0.0%	1	0.0%	0	0.0%
HEPB1	2,649	97.4%	2,440	95.1%	2,551	96.4%	2,549	96.8%	2,273	97.5%
HEPB2	2,542	93.4%	2,346	91.4%	2,478	93.7%	2,463	93.5%	2,199	94.3%
HEPB3	1,116	41.0%	1,264	49.2%	1,229	46.5%	1,342	50.9%	1,442	61.9%
HEPB4	17	0.6%	19	0.7%	26	1.0%	92	3.5%	193	8.3%
VAR1**	44	1.6%	125	4.9%	136	5.1%	115	4.4%	27	1.2%
VAR2	0	0.0%	1	0.0%	0	0.0%	1	0.0%	0	0.0%
PCV1	---	---	---	---	---	---	2,359	89.6%	2,167	93.0%
PCV2	---	---	---	---	---	---	2,209	83.9%	2,041	87.6%
PCV3	---	---	---	---	---	---	1,796	68.2%	1,570	67.4%
PCV4	---	---	---	---	---	---	25	2.1%	23	1.0%

*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 2002 study = 2,721; 2003 study = 2,567; 2004 study = 2, 645; 2005 study = 2,634; 2006 study = 2,331.

Table 10 shows the 2001, 2002, 2003, 2004 and 2005 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 2005 margin of error for each health district ranges from +/- 2.9 percent to +/- 9.0 percent. The District level 2005 4:3:1 immunization rates range from 53.3 percent to 97.8 percent. Of the 19 health districts, eight had an immunization coverage rate over 90 percent and seven districts had 2005 coverage rates between 80 and 90 percent. The following summary highlights the changes in 4:3:1 coverage rates between 2004 and 2005:

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

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

Dist	2002		2003		2004		2005		2006	
	%	Margin of Error								
1-1	80.6	+/-5.5	77.5	+/-6.7	82.6	+/- 5.0	79.5	+/- 5.7	81.0	+/- 5.8
1-2	79.1	+/-6.3	85.6	+/-5.6	88.2	+/- 6.3	97.0	+/- 2.9	100	+/- 0.0
2-0	93.4	+/-5.6	94.7	+/-4.5	100	+/- 0	97.8	+/- 4.2	92.6	+/- 9.9
3-1	84.5	+/-4.2	75.2	+/-7.0	73.1	+/- 6.0	75.9	+/- 6.0	74.3	+/- 5.8
3-2	82.6	+/-6.2	68.1	+/-7.8	78.3	+/- 5.4	72.6	+/- 4.9	68.6	+/- 5.5
3-3	73.9	+/-8.2	78.4	+/-4.9	65.1	+/- 10.0	53.3	+/- 6.3	76.8	+/- 6.5
3-4	94.3	+/-3.4	90.0	+/-7.6	93.5	+/- 3.3	90.2	+/- 6.1	94.9	+/- 4.0
3-5	84.6	+/-5.1	66.0	+/-7.6	82.0	+/- 4.9	72.3	+/- 5.8	73.7	+/- 5.5
4-0	87.1	+/-5.4	83.6	+/-6.9	77.5	+/- 6.0	81.6	+/- 5.1	73.9	+/- 6.3
5-1	80.8	+/-8.7	93.3	+/-5.2	85.5	+/- 9.3	94.7	+/- 5.1	89.6	+/- 8.6
5-2	84.7	+/-4.5	83.3	+/-6.5	87.1	+/- 6.0	87.8	+/- 5.4	93.1	+/- 4.3
6-0	89.2	+/-6.0	86.2	+/-6.1	90.5	+/- 5.3	93.9	+/- 4.4	98.6	+/- 2.7
7-0	82.8	+/-6.9	76.4	+/-7.0	88.4	+/- 4.4	90.3	+/- 5.4	90.0	+/- 5.9
8-1	82.2	+/-6.6	91.9	+/-4.8	89.5	+/- 6.9	94.3	+/- 4.8	89.7	+/- 7.8
8-2	83.1	+/-8.4	74.0	+/-7.0	94.9	+/- 3.3	85.5	+/- 8.8	76.4	+/- 7.4
9-1	80.9	+/-6.2	77.3	+/-6.7	97.5	+/- 3.4	87.0	+/- 9.0	84.5	+/- 5.5
9-2	85.4	+/-7.3	81.2	+/-6.5	82.2	+/- 6.5	85.4	+/- 5.4	82.9	+/- 6.7
9-3	85.6	+/-6.3	81.9	+/-7.8	83.1	+/- 8.1	82.6	+/- 7.0	---	---
10-0	80.2	+/-7.1	90.7	+/-4.5	94.3	+/- 4.8	93.5	+/- 6.1	90.3	+/- 6.8
State	83.9	+/-1.6	80.8	+/-1.6	85.1	+/-1.6	80.7	+/-1.6	80.8	+/-1.7

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

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

Tables 11-17 present the state and district rates for each individual vaccine during the 2002, 2003, 2004, 2005 and 2006 data collection periods.

As shown in Table 11, 2006 district immunization rates for the DTP/DTaP vaccines ranged from 68.6 percent to 100.0 percent, with a statewide rate of 81.8 percent receiving all four doses. The 2006 statewide DTP/DTaP rate is nearly equal to the rate from the 2005 study year.

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

District	2002 Rates 4 DTP/DTaP	2003 Rates 4 DTP/DTaP	2004 Rates 4 DTP/DTaP	2005 Rates 4 DTP/DTaP	2006 Rates 4 DTP/DTaP
1-1	81.1%	77.1%	85.3%	82.3%	82.2%
1-2	82.3%	86.3%	88.2%	97.8%	100.0%
2-0	94.7%	95.7%	100%	97.8%	92.6%
3-1	84.9%	76.6%	78.8%	79.0%	75.2%
3-2	84.0%	68.1%	78.8%	73.8%	68.6%
3-3	73.9%	79.1%	67.4%	58.6%	78.0%
3-4	94.9%	90.0%	94.1%	92.4%	94.9%
3-5	84.6%	66.0%	82.4%	74.0%	76.5%
4-0	87.8%	84.5%	79.1%	83.9%	75.0%
5-1	80.8%	93.3%	85.5%	94.7%	89.6%
5-2	85.5%	84.9%	87.1%	88.5%	94.7%
6-0	89.2%	87.8%	90.5%	94.8%	98.6%
7-0	83.6%	77.1%	88.4%	90.3%	90.0%
8-1	82.2%	91.9%	89.5%	94.3%	89.7%
8-2	85.7%	75.3%	94.9%	87.1%	77.2%
9-1	81.6%	77.3%	97.5%	87.0%	85.1%
9-2	86.5%	82.6%	83.0%	86.0%	83.7%
9-3	85.6%	83.0%	83.1%	82.6%	---
10-0	80.2%	93.2%	94.3%	93.5%	94.4%
State	84.6%	81.7%	85.7%	82.3%	81.8%

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

Table 12 shows the 2002, 2003, 2004, 2005 and 2006 state and district rates for the OPV/IPV vaccines. The 2006 district coverage rates for these vaccines varied between 80.9 percent and 100.0 percent. The 2006 statewide immunization rate for OPV/IPV was 89.1 percent, which is slightly higher than the previous year's study rate.

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

District	2002 Rates 3 OPV/IPV	2003 Rates 3 OPV/IPV	2004 Rates 3 OPV/IPV	2005 Rates 3 OPV/IPV	2006 Rates 3 OPV/IPV
1-1	90.0%	84.8%	89.9%	89.0%	91.4%
1-2	85.4%	88.9%	92.2%	98.5%	100.0%
2-0	97.4%	94.7%	100%	97.8%	96.3%
3-1	90.8%	83.4%	83.5%	86.2%	83.5%
3-2	84.7%	71.7%	85.0%	81.1%	80.9%
3-3	82.9%	85.8%	74.4%	68.4%	85.4%
3-4	96.0%	90.0%	96.1%	90.2%	97.4%
3-5	88.7%	82.0%	89.5%	83.1%	81.1%
4-0	92.5%	92.7%	85.6%	87.1%	88.6%
5-1	96.2%	97.8%	92.7%	96.0%	95.8%
5-2	94.0%	93.7%	93.2%	94.2%	96.9%
6-0	95.1%	91.9%	94.8%	97.4%	100.0%
7-0	90.5%	85.0%	93.5%	92.9%	96.0%
8-1	95.1%	96.0%	96.1%	97.7%	91.4%
8-2	90.9%	80.7%	97.7%	91.9%	85.8%
9-1	90.1%	88.7%	98.8%	94.4%	93.5%
9-2	92.1%	88.4%	90.4%	93.3%	92.7%
9-3	89.8%	89.4%	88.0%	88.7%	---
10-0	86.0%	93.2%	98.9%	98.4%	94.4%
State	90.6%	87.7%	90.8%	87.9%	89.1%

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

Table 13 shows the 2002, 2003, 2004, 2005 and 2006 state and district rates for MMR. The 2006 district rates for MMR ranged from a low of 81.6 percent to a high of 100.0 percent, with a statewide rate of 88.8 percent coverage. The 2006 statewide rate for the MMR vaccine increased slightly from the 2005 rate of 87.2 percent.

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

District	2002 Rates 1 MMR	2003 Rates 1 MMR	2004 Rates 1 MMR	2005 Rates 1 MMR	2006 Rates 1 MMR
1-1	90.5%	88.1%	91.3%	87.8%	92.0%
1-2	87.3%	90.8%	94.1%	97.8%	100.0%
2-0	96.1%	96.8%	100%	97.8%	92.6%
3-1	90.1%	80.7%	86.3%	82.1%	87.2%
3-2	84.7%	71.0%	82.7%	80.4%	81.6%
3-3	84.7%	85.1%	75.6%	65.6%	86.0%
3-4	97.1%	90.0%	96.1%	91.3%	95.7%
3-5	86.7%	80.7%	90.8%	84.8%	84.4%
4-0	93.2%	92.7%	85.0%	89.3%	83.2%
5-1	97.4%	97.8%	90.9%	96.0%	100.0%
5-2	92.3%	96.8%	93.2%	92.1%	95.4%
6-0	96.1%	91.9%	95.7%	94.8%	98.6%
7-0	92.2%	87.9%	93.0%	93.8%	95.0%
8-1	93.8%	95.2%	92.1%	97.7%	89.7%
8-2	90.9%	81.3%	97.7%	93.5%	87.4%
9-1	89.5%	90.0%	98.8%	92.6%	91.1%
9-2	94.4%	90.6%	89.6%	92.1%	86.2%
9-3	87.3%	89.4%	89.2%	87.0%	---
10-0	90.1%	93.8%	97.7%	98.4%	94.4%
State	90.9%	88.3%	90.9%	87.2%	88.8%

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

As shown in Table 14, 2006 district immunization rates for the Hib vaccine varied between 81.6 and 100.0 percent. The statewide Hib coverage rate in 2006 was 88.5 percent, a slight increase from the 2005 statewide rate of 87.5 percent.

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

District	2002 Rates 3 Hib	2003 Rates 3 Hib	2004 Rates 3 Hib	2005 Rates 3 Hib	2006 Rates 3 Hib
1-1	91.5%	84.1%	90.8%	87.2%	89.0%
1-2	86.1%	90.8%	94.1%	97.8%	100.0%
2-0	96.1%	93.6%	100%	95.7%	96.3%
3-1	91.2%	82.1%	82.1%	84.1%	87.2%
3-2	85.4%	72.5%	84.1%	81.4%	81.6%
3-3	80.2%	88.4%	76.7%	71.7%	86.0%
3-4	96.6%	90.0%	96.7%	92.4%	95.7%
3-5	86.2%	76.0%	88.3%	82.3%	84.4%
4-0	93.2%	87.3%	86.6%	88.8%	83.2%
5-1	97.4%	97.8%	87.3%	96.0%	93.8%
5-2	92.7%	91.3%	91.2%	90.6%	97.7%
6-0	97.1%	93.5%	92.2%	94.8%	98.6%
7-0	89.7%	85.7%	93.0%	91.2%	92.0%
8-1	94.6%	95.2%	94.7%	96.6%	93.1%
8-2	92.2%	81.3%	98.3%	93.5%	91.3%
9-1	90.8%	87.3%	98.8%	94.4%	93.5%
9-2	93.3%	86.2%	91.1%	91.5%	86.2%
9-3	91.5%	89.4%	84.3%	88.7%	---
10-0	86.8%	95.7%	95.5%	98.4%	97.2%
State	90.9%	87.3%	90.2%	87.5%	88.5%

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 2006, the district coverage rates varied from a low of 78.0 percent to 100.0 percent. The 2006 statewide rate of 89.3 percent for the Hepatitis B vaccine was nearly equal to the 2005 statewide rate of 88.7 percent.

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

District	2002 Rates 3 Hep B	2003 Rates 3 Hep B	2004 Rates 3 Hep B	2005 Rates 3 Hep B	2006 Rates 3 Hep B
1-1	91.0%	83.4%	90.8%	89.0%	92.0%
1-2	87.3%	90.8%	94.1%	98.5%	100.0%
2-0	97.4%	93.6%	98.5%	93.5%	96.3%
3-1	92.6%	86.2%	83.0%	83.6%	86.7%
3-2	84.7%	74.6%	85.4%	81.1%	78.0%
3-3	80.2%	88.8%	77.9%	75.0%	86.6%
3-4	94.9%	90.0%	96.7%	91.3%	95.7%
3-5	85.6%	78.0%	89.1%	82.3%	80.2%
4-0	92.5%	92.7%	86.1%	90.2%	89.7%
5-1	96.2%	96.7%	90.9%	96.0%	97.9%
5-2	93.1%	93.7%	91.8%	92.1%	96.9%
6-0	96.1%	95.1%	94.0%	95.7%	100.0%
7-0	90.5%	87.9%	93.5%	93.8%	97.0%
8-1	94.6%	96.0%	96.1%	97.7%	94.8%
8-2	92.2%	82.0%	97.7%	98.4%	89.8%
9-1	90.1%	79.3%	100%	96.3%	92.9%
9-2	92.1%	87.7%	90.4%	95.7%	90.2%
9-3	89.0%	86.2%	86.7%	90.4%	---
10-0	88.4%	95.1%	94.3%	98.4%	94.4%
State	90.8%	87.8%	90.7%	88.7%	89.3%

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

Table 16 reports Varicella coverage rates among the 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 81.2 percent to 100.0 percent, with a statewide coverage rate of 88.8 percent for the Varicella vaccine. This is a slight increase from the 2005 Varicella rate of 87.4 percent.

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

District	2002 Rates 1 Varicella	2003 Rates 1 Varicella	2004 Rates 1 Varicella	2005 Rates 1 Varicella	2006 Rates 1 Varicella
1-1	89.1%	86.8%	89.0%	87.2%	92.0%
1-2	86.1%	90.2%	95.1%	97.8%	100.0%
2-0	96.1%	96.8%	98.5%	97.8%	92.6%
3-1	88.4%	80.7%	83.5%	82.6%	84.9%
3-2	81.9%	71.7%	81.4%	78.5%	81.2%
3-3	82.9%	84.7%	74.4%	67.2%	86.0%
3-4	96.0%	90.0%	94.1%	92.4%	95.7%
3-5	83.6%	74.0%	89.5%	85.7%	84.8%
4-0	92.5%	92.7%	85.0%	89.7%	83.7%
5-1	84.6%	95.6%	90.9%	97.3%	97.9%
5-2	90.3%	92.9%	91.2%	92.8%	96.9%
6-0	97.1%	90.2%	94.8%	93.9%	98.6%
7-0	88.8%	85.7%	93.5%	93.8%	96.0%
8-1	93.0%	94.4%	92.1%	96.6%	91.4%
8-2	90.9%	78.0%	97.7%	93.5%	85.0%
9-1	83.6%	83.3%	98.8%	94.4%	92.9%
9-2	87.6%	91.3%	90.4%	93.3%	87.8%
9-3	83.9%	86.2%	88.0%	87.8%	---
10-0	86.8%	95.7%	94.3%	98.4%	93.1%
State	88.5%	86.7%	89.9%	87.4%	88.8%

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

Table 17 reports the statewide and district immunization coverage rates for the PCV vaccine. In 2006, the district coverage rates varied from a low of 77.8 percent to 100.0 percent.

Table 17:
State and District Immunization
Rates for PCV by Study Year

District	2005 Rates 3 PCV	2006 Rates 3 PCV
1-1	81.1%	82.2%
1-2	95.5%	100.0%
2-0	95.7%	96.3%
3-1	82.1%	87.6%
3-2	79.8%	79.4%
3-3	62.7%	78.7%
3-4	90.2%	95.7%
3-5	73.2%	77.8%
4-0	78.1%	81.5%
5-1	82.7%	87.5%
5-2	69.1%	90.1%
6-0	90.4%	97.3%
7-0	67.3%	82.0%
8-1	88.6%	87.9%
8-2	85.5%	81.1%
9-1	75.9%	82.7%
9-2	79.3%	89.4%
9-3	73.9%	---
10-0	91.9%	90.3%
State	79.0%	84.5%

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 18-20 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 18 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 the 2002 study year the immunization rates of children born to black and white mothers were virtually the same. However, in the 2003, 2004, 2005 and 2006 study years maternal race was a significant factor in the immunization status of two-year-old children in Georgia.

Table 18:
Statewide Cross tabulations of
Maternal Race and Child Immunization Status by Study Year

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	1410/1664 (84.7)	1221/1560 (78.3)	1377/1587 (86.8)	1296/1529 (84.8)	1152/1388 (83.0)
Black	806/978 (82.4)	661/940 (70.3)	800/977 (81.9)	703/949 (74.1)	668/855 (78.1)
Other	64/79 (81.0)	53/67 (79.1)	75/81 (92.6)	69/91 (75.8)	64/88 (72.7)
4:3:1 Total	83.9%	80.8%	85.1%	80.7%	80.8%

Notes: Total rates based on data weighted by health district.
2002 Chi-square=3.81, p=0.28; 2003 Chi-square=20.49, p<0.05; 2004 Chi-square=15.07, p<0.05; 2005 Chi-square=43.88, p<0.05, 2006 Chi-square=11.96, p<0.003.

Table 19 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 and 2003 maternal educational attainment was associated with child immunization status. As the mother's education level increased, the child's immunization rate increased as well. During the other study years shown in Table 19, childhood immunization status varied with maternal educational attainment.

Table 19:
**Statewide Cross tabulations of Maternal Educational Attainment
and Child Immunization Status by Study Year**

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Education	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	124/157 (79.0)	25/33 (75.8)	28/32 (87.5)	131/151 (86.8)	45/59 (76.3)
Some high school	455/561 (81.1)	297/408 (72.8)	360/428 (84.1)	276/355 (77.7)	243/311 (78.1)
High school	752/914 (82.3)	619/856 (72.1)	687/816 (84.2)	621/771 (80.5)	539/671 (80.3)
Some college	415/498 (83.3)	380/495 (76.8)	438/523 (83.7)	418/539 (77.6)	363/442 (82.1)
College or higher	538/591 (91.0)	614/775 (79.2)	739/846 (87.4)	680/818 (83.1)	694/848 (81.8)
4:3:1 Total	83.9%	80.8%	85.1%	80.7%	80.8%

Notes: Total rates based on data weighted by health district.
2002 Chi-square=31.97, p<0.05; 2003 Chi-square=12.50, p<0.05; 2004 Chi-square=5.15, p=0.27; 2005 Chi-square=12.09, p<0.05, 2006 Chi-square=3.39, p=0.49.

Table 20 shows the statewide cross-tabulation of maternal Medicaid status and 4:3:1 immunization status for 2002, 2003, 2004, 2005, and 2006 study years. The 4:3:1 rates are shown for Medicaid recipients and non-Medicaid recipients. During all of the study years with the exception of 2005, statewide immunization rates were significantly higher for Non-Medicaid recipients.

Table 20:
2006 Statewide Cross tabulations
of Maternal Medicaid Status and Child Immunization Status

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Medicaid Status	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Medicaid	1,054/1,300 (81.1)	991/1,375 (72.1)	1,203/1,440 (83.5)	1,070/1,348 (79.4)	1,012/1,285 (78.8)
Non-Medicaid	1,230/1,421 (86.6)	944/1,192 (79.2)	1,049/1,205 (87.1)	1,056/1,286 (82.1)	872/1,046 (83.4)
4:3:1 Total	83.9%	80.8%	85.1%	80.7%	80.8%

Notes: 4:3:1 total rates based on data weighted by health district.
2002 Chi-square = 15.13, p<0.05; 2003 Chi-square = 17.45, p<0.05; 2004 Chi-square = 6.40, p<0.05; 2005 Chi-square = 3.17, p=0.08; 2006 Chi-square = 7.91, p<0.005

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: 4:3:1:3:3:1 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 during the 2006 study year were comparable to the rates measured by this study during 2005.

SECTION IV:
RESULTS OF DISTRICT LEVEL
ANALYSES

Section IV: Results of District Level Analyses

Overview of District Rates

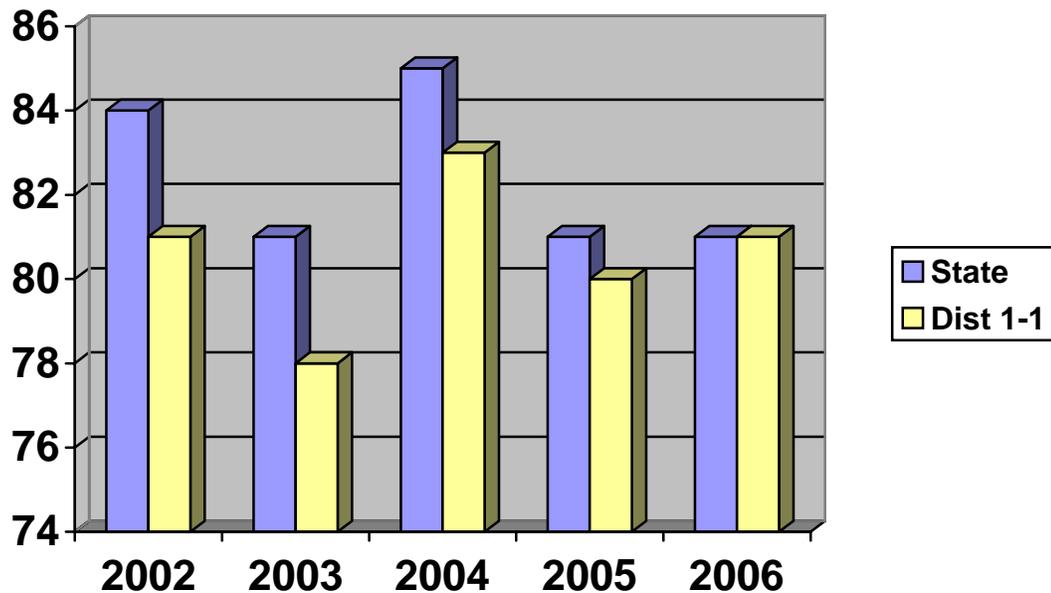
The immunization rates for this seventh year report were calculated based on final samples. The final sample sizes in each health district varied by district. The number of children in the final sample in each district is reported in each Individual Health District Report in this section, as well as in Table 3: Response Rates for the 2006 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 10-17. 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 183 children born in January 2004. From the 183 children, 166 records were located (Response Rate=90.7%). Of the 166 located records, there were 3 parental refusals leaving a final sample of 163 records.

- ❖ **The 4:3:1 immunization coverage estimate is 81.0 percent (132/163).**
This rate is nearly equal to the statewide 4:3:1 immunization rate of 80.8 percent.

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



- ❖ **The 4:3:1:3 immunization coverage estimate is 80.4 percent (131/163).**
This rate is equal to the statewide 4:3:1:3 immunization rate of 79.9 percent.
- ❖ **The 4:3:1:3:3:1 immunization coverage estimate is 78.5 percent (128/163).**
This rate is slightly higher than the statewide 4:3:1:3:3:1 immunization rate of 76.8 percent.

Table 21:
District Immunization Rates for
Health District 1-1 by Study Year*

Vaccine	2002 Adequate Rates	2003 Adequate Rates	2004 Adequate Rates	2005 Adequate Rates	2006 Adequate Rates
4 DTP/DTaP	81.1%	77.5%	85.3%	79.5%	82.2%
3 OPV/IPV	90.0%	84.8%	89.9%	88.8%	91.4%
1 MMR	90.5%	88.1%	91.3%	87.6%	92.0%
3 Hib	91.5%	84.1%	90.8%	87.0%	89.0%
3 HepB	91.0%	83.4%	90.8%	88.8%	92.0%
1 Varicella	89.1%	86.8%	89.0%	87.0%	92.0%
3 PCV	---	---	51.4%	82.0%	82.2%
4 PCV	---	---	15.6%	44.1%	69.9%

*PCV data not collected before 2004.

Table 21 reveals the coverage rates of each vaccine series. Coverage rates ranged from 69.1 to 92.0 percent for the 2006 study data.

Table 22 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 22:
2006 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 1-1

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	158	96.9%
DTP2/DTaP2	153	93.9%
DTP3/DTaP3	142	87.1%
DTP4/DTaP4	2	1.2%
DTP5/DTaP5	0	0.0%
OPV/IPV1	157	96.3%
OPV/IPV2	152	93.3%
OPV/IPV3	124	76.1%
OPV/IPV4	1	0.6%
MMR1	2	1.2%
MMR2	0	0.0%
HIB1	157	96.3%
HIB2	150	92.0%
HIB3	60	36.8%
HIB4	2	1.2%
HIB5	0	0.0%
HEPB1	158	96.9%
HEPB2	155	95.1%
HEPB3	128	78.5%
HEPB4	29	17.8%
VAR1	3	1.8%
VAR2	0	0.0%
PCV1	149	91.4%
PCV2	136	83.4%
PCV3	111	68.1%
PCV4	4	2.5%
PCV5	0	0.0%

*Percent = number immunized / sample size
sample size = 163

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

	2002	2003	2004	2005	2006
	4:3:1	4:3:1	4:3:1	4:3:1	4:3:1
	Adequate	Adequate	Adequate	Adequate	Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	140/174 (80.5)	96/135 (71.1)	154/185 (83.2)	119/149 (79.9)	117/143 (81.8)
Black	19/23 (82.6)	9/16 (56.3)	21/27 (77.8)	10/13 (76.9)	13/16 (81.3)
Other	3/3 (100.0)	---	5/6 (83.3)	1/1 (100.0)	2/4 (50.0)
Unknown	---	---	---	1/1 (100.0)	---
Total	162/200 (81.0)	105/151 (69.5)	180/218 (82.6)	131/164 (79.9)	132/163 (81.0)

Table 23 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 23 shows that in 2006 the 4:3:1 immunization rate of children born to black mothers was nearly the same of children born to white mothers in the district.

Table 24:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 1-1 by Study Year

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	9/14 (64.3)	2/2 (100.0)	3/3 (100.0)	9/9 (100.0)	17/22 (77.3)
Some high school	36/50 (72.0)	18/25 (72.0)	22/26 (84.6)	9/16 (56.3)	26/30 (86.7)
High school graduate	66/79 (83.5)	25/43 (58.1)	73/89 (82.0)	57/70 (81.4)	34/46 (73.9)
Some college	29/35 (82.9)	24/31 (77.4)	35/46 (76.1)	22/26 (84.6)	22/25 (88.0)
College or more	19/20 (95.0)	36/50 (72.0)	47/54 (87.0)	34/43 (79.1)	33/40 (82.5)
Unknown	3/3 (100.0)	---	---	---	---
Total	162/200 (81.0)	105/151 (69.5)	180/218 (82.6)	131/164 (79.9)	132/163 (81.0)

Table 24 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 2006 study, immunization rates varied with educational attainment.

Table 25:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 1-1

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Medicaid Status	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Medicaid	79/99 (79.8)	49/78 (62.8)	84/103 (81.6)	62/77 (80.5)	75/94 (79.8)
Non-Medicaid	83/102 (81.4)	56/73 (76.7)	96/115 (83.5)	69/87 (79.3)	57/69 (82.6)
Total	162/200 (81.0)	105/151 (69.5)	180/218 (82.6)	131/164 (79.9)	132/163 (81.0)

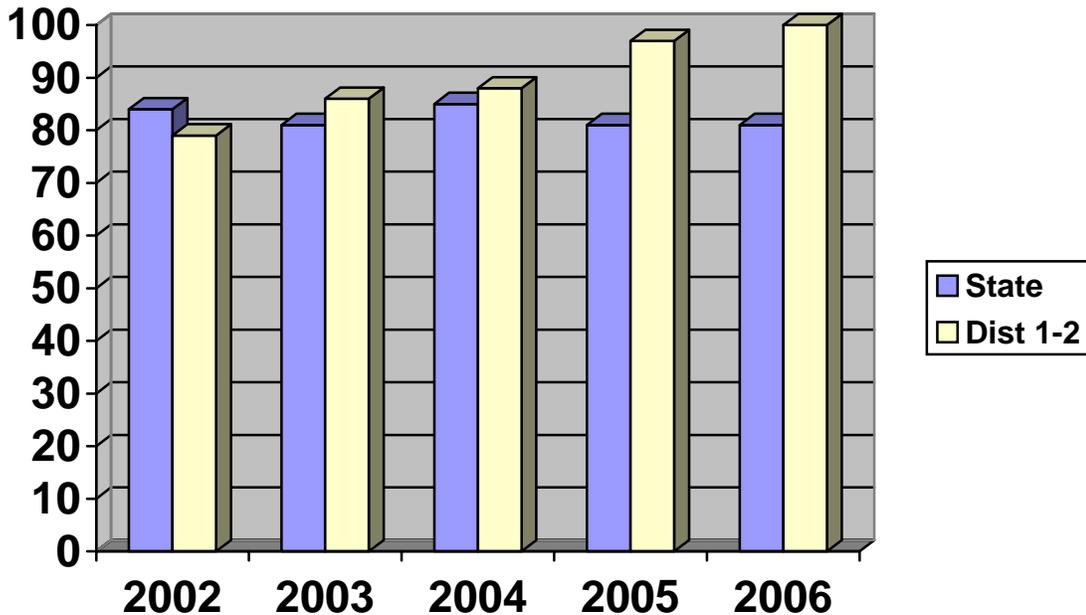
Table 25 shows immunization status of children born to women stratified by Medicaid status for the 2002, 2003, 2004, 2005 and 2006 study years. For the 2006 study, children born to non-Medicaid women had a slightly higher immunization rate than children born to women using Medicaid.

Individual Health District Report: District 1-2

The eligible sample from this district included 39 children born in January 2004. From these children, 39 records were located (Response Rate=100.0%). Of the 39 located records, there were 2 parental refusals leaving a final sample of 37 records.

- ❖ **4:3:1 immunization coverage estimate is 100.0 percent (37/37).** This rate is much higher than the statewide 4:3:1 immunization rate of 80.8 percent.

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



- ❖ **4:3:1:3 immunization coverage estimate 100.0 percent (37/37).** This rate is much higher than the statewide 4:3:1:3 immunization rate of 79.9 percent.
- ❖ **4:3:1:3:3:1 immunization coverage estimate 94.6 percent (35/37).** This rate is also much higher than the statewide 4:3:1:3:3:1 immunization rate of 76.8 percent.

Table 26:
District Immunization Rates for
Health District 1-2 by Study Year*

Vaccine	2002 Adequate Rates	2003 Adequate Rates	2004 Adequate Rates	2005 Adequate Rates	2006 Adequate Rates
4 DTP/DTaP	82.3%	86.3%	88.2%	97.8%	100.0%
3 OPV/IPV	85.4%	88.9%	92.2%	98.5%	100.0%
1 MMR	87.3%	90.8%	94.1%	97.8%	100.0%
3 Hib	86.1%	90.8%	94.1%	97.8%	100.0%
3 HepB	87.3%	90.8%	94.1%	98.5%	100.0%
1 Varicella	86.1%	90.2%	95.1%	97.8%	100.0%
3 PCV	---	---	56.9%	95.5%	100.0%
4 PCV	---	---	14.7%	52.2%	81.1%

*PCV data not collected before 2004.

Table 26 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 81.1 to 100.0 percent for the 2006 study data.

Table 27 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 27:
2006 District Immunization Rates by Individual Vaccine at
12 months of age for Health District 1-2**

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	37	100.0%
DTP2/DTaP2	36	97.3%
DTP3/DTaP3	33	89.2%
DTP4/DTaP4	0	0.0%
DTP5/DTaP5	0	0.0%
OPV/IPV1	37	100.0%
OPV/IPV2	36	97.3%
OPV/IPV3	24	64.9%
OPV/IPV4	0	0.0%
MMR1	1	2.7%
MMR2	0	0.0%
HIB1	37	100.0%
HIB2	36	97.3%
HIB3	12	32.4%
HIB4	0	0.0%
HIB5	0	0.0%
HEPB1	37	100.0%
HEPB2	36	97.3%
HEPB3	22	59.5%
HEPB4	3	8.1%
VAR1	1	2.7%
VAR2	0	0.0%
PCV1	36	97.3%
PCV2	34	91.9%
PCV3	30	81.1%
PCV4	0	0.0%
PCV5	0	0.0%

*Percent = number immunized / sample size
Sample size = 37

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

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	118/149 (79.2)	118/145 (81.4)	86/98 (87.8)	112/115 (97.4)	36/36 (100.0)
Black	2/3 (66.7)	1/2 (50.0)	3/3 (100.0)	2/2 (100.0)	1/1 (100.0)
Other	2/2 (100.0)	4/6 (66.7)	1/1 (100.0)	3/3 (100.0)	--- (---)
Unknown	3/4 (75.0)	--- (---)	--- (---)	13/14 (92.9)	--- (---)
Total	125/158 (79.1)	123/153 (80.4)	90/102 (88.2)	130/134 (97.0)	37/37 (100.0)

Table 28 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 29:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 1-2 by Study Year

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	10/10 (100.0)	3/3 (100.0)	1/1 (100.0)	16/17 (94.1)	2/2 (100.0)
Some high school	28/37 (75.7)	16/22 (72.7)	15/19 (79.0)	16/16 (100.0)	4/4 (100.0)
High school graduate	25/36 (69.4)	36/44 (81.8)	28/30 (93.3)	28/28 (100.0)	8/8 (100.0)
Some college	31/37 (83.8)	24/30 (80.0)	8/10 (80.0)	30/31 (96.8)	5/5 (100.0)
College or more	29/34 (85.3)	44/54 (81.5)	38/42 (90.5)	40/42 (95.2)	18/18 (100.0)
Unknown	2/4 (50.0)	----	---	---	---
Total	125/158 (79.1)	123/153 (80.4)	90/102 (88.2)	130/134 (97.0)	37/37 (100.0)

Table 29 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 30:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 1-2

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Medicaid	44/60 (73.3)	43/62 (69.4)	43/52 (82.7)	61/64 (95.3)	15/15 (100.0)
Non-Medicaid	81/98 (82.7)	80/91 (87.9)	47/50 (94.0)	69/70 (98.6)	22/22 (100.0)
Total	125/158 (79.1)	123/153 (80.4)	90/102 (88.2)	130/134 (97.0)	37/37 (100.0)

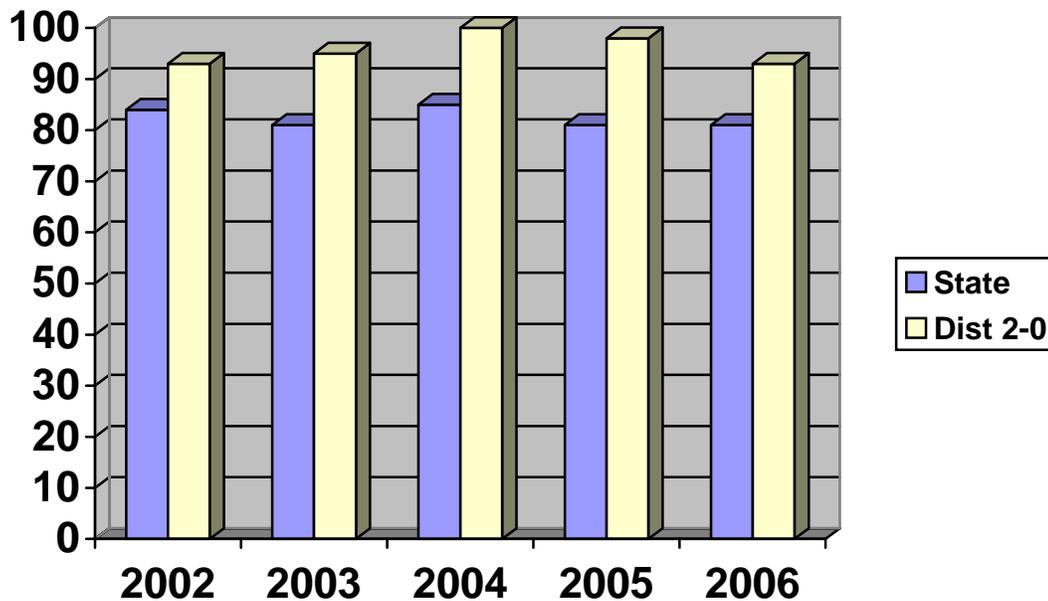
Table 30 shows immunization status of children born to women stratified by Medicaid status for the 2002, 2003, 2004, 2005 and 2006 study years. For Health District 1-2, children born to non-Medicaid women had the same immunization rate than children born to women using Medicaid.

Individual Health District Report: District 2-0

The eligible sample from this district included 29 children born in January 2004. From the 29 children, 28 records were located (Response rate = 96.6%). Of the 28 located records, there was 1 parental refusal leaving a final sample of 27 records.

- ❖ **4:3:1 immunization coverage estimate is 92.6% percent (25/27).** This rate is much higher than the statewide 4:3:1 immunization rate of 80.8 percent.

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



- ❖ **4:3:1:3 immunization coverage estimate is 92.6 percent (25/27).** This rate is much higher than the statewide 4:3:1:3 immunization rate of 79.9 percent.
- ❖ **4:3:1:3:3:1 immunization coverage estimate is 88.9 percent (24/27).** This rate is also much higher than the statewide 4:3:1:3:3:1 immunization rate of 76.8 percent.

**Table 31:
District Immunization Rates for
Health District 2-0 by Study Year***

Vaccine	2002 Adequate Rates	2003 Adequate Rates	2004 Adequate Rates	2005 Adequate Rates	2006 Adequate Rates
4 DTP/DTaP	94.7%	95.7%	100%	97.8%	92.6%
3 OPV/IPV	97.4%	94.7%	100%	97.8%	96.3%
1 MMR	96.1%	96.8%	100%	97.8%	92.6%
3 Hib	96.1%	93.6%	100%	95.7%	96.3%
3 HepB	97.4%	93.6%	100%	93.5%	96.3%
1 Varicella	96.1%	96.8%	98.5%	97.8%	92.6%
3 PCV	---	---	77.6%	95.7%	96.3%
4 PCV	---	---	28.4%	65.2%	74.1%

*PCV data not collected before 2004.

Table 31 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 74.1 to 96.3 percent for the 2006 study data.

Table 32 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 32:
2006 District Immunization Rates by Individual Vaccine at
12 months of age for Health District 2-0**

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	27	100.0%
DTP2/DTaP2	26	96.3%
DTP3/DTaP3	26	96.3%
DTP4/DTaP4	0	0.0%
DTP5/DTaP5	0	0.0%
OPV/IPV1	27	100.0%
OPV/IPV2	26	96.3%
OPV/IPV3	5	18.5%
OPV/IPV4	0	0.0%
MMR1	0	0.0%
MMR2	0	0.0%
HIB1	26	96.3%
HIB2	26	96.3%
HIB3	5	18.5%
HIB4	0	0.0%
HIB5	0	0.0%
HEPB1	27	100.0%
HEPB2	27	100.0%
HEPB3	8	29.6%
HEPB4	0	0.0%
VAR1	0	0.0%
VAR2	0	0.0%
PCV1	27	100.0%
PCV2	26	96.3%
PCV3	24	88.9%
PCV4	0	0.0%
PCV5	0	0.0%

*Percent = number immunized / sample size
Sample size = 27

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

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	65/70 (92.9)	82/91 (90.1)	65/65 (100.0)	43/44 (97.7)	25/27 (92.3)
Black	4/4 (100.0)	3/3 (100.0)	2/2 (100.0)	1/1 (100.0)	---
Other	2/2 (100.0)	---	---	1/1 (100.0)	---
Total	71/76 (93.4)	85/94 (90.4)	67/67 (100.0)	45/46 (97.8)	25/27 (92.6)

Table 33 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 33 shows that the number of white mothers was over 10 times the number of black mothers during the 2002-2005 study years for District 2-0, with 2006 having only white mothers sampled. The sample size of black mothers is therefore too small to make definitive generalizations on racial differences in immunization rates.

Table 34:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 2-0 by Study Year

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	9/9 (100.0)	1/1 (100.0)	---	4/4 (100.0)	---
Some high school	15/18 (83.3)	11/12 (91.7)	11/11 (100.0)	7/7 (100.0)	---
High school graduate	20/21 (95.2)	38/41 (92.7)	16/16 (100.0)	10/11 (91.0)	8/9 (88.9)
Some college	7/8 (87.5)	5/7 (71.4)	9/9 (100.0)	4/4 (100.0)	7/8 (87.5)
College or more	17/17 (100.0)	30/33 (90.9)	31/31 (100.0)	20/20 (100.0)	10/10 (100.0)
Unknown	3/3 (100.0)	---	---	---	---
Total	71/76 (93.4)	85/94 (90.4)	67/67 (100.0)	45/46 (97.8)	25/27 (92.6)

Table 34 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 for each level of educational attainment.

Table 35:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 2-0

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Medicaid	24/28 (85.7)	49/52 (94.2)	29/29 (100.0)	19/19 (100.0)	12/14 (85.7)
Non-Medicaid	47/48 (97.9)	36/42 (85.7)	38/38 (100.0)	26/27 (96.3)	13/13 (100.0)
Total	71/76 (93.4)	85/94 (90.4)	67/67 (100.0)	45/46 (97.8)	25/27 (92.6)

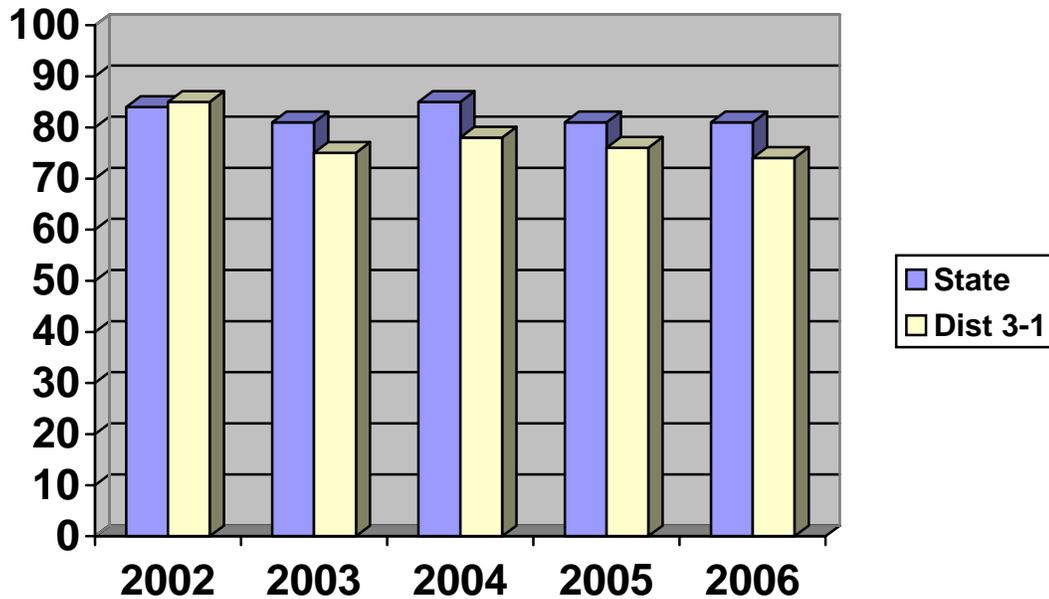
Table 35 shows immunization status of children born to women stratified by Medicaid status for the 2002, 2003, 2004, 2005 and 2006 study years. During the 2006 study, children born to non-Medicaid women had a higher immunization rate than children born to Medicaid women.

Individual Health District Report: District 3-1

The eligible sample from this district included 247 children born in January 2004. From the 247 children, 224 records were located (Response Rate=90.7%). Of the 224 located records, there were 6 parental refusals leaving a final sample of 218 records.

- ❖ **The 4:3:1 immunization coverage estimate is 74.3 percent (162/218).**
This rate is lower than the statewide 4:3:1 immunization rate of 80.8 percent.

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



- ❖ **The 4:3:1:3 immunization coverage estimate is 74.3 percent (162/218).**
This rate is lower than the statewide 4:3:1:3 immunization rate of 79.9 percent.
- ❖ **The 4:3:1:3:3:1 immunization coverage estimate is 73.4 percent (160/218).** This rate is also lower than the statewide 4:3:1:3:3:1 immunization rate of 76.8 percent.

**Table 36:
District Immunization Rates for
Health District 3-1 by Study Year***

Vaccine	2002 Adequate Rates	2003 Adequate Rates	2004 Adequate Rates	2005 Adequate Rates	2006 Adequate Rates
4 DTP/DTaP	84.9%	76.6%	78.8%	79.0%	75.2%
3 OPV/IPV	90.8%	83.4%	83.5%	86.2%	83.5%
1 MMR	90.1%	80.7%	86.3%	82.1%	87.2%
3 Hib	91.2%	82.1%	82.1%	84.1%	86.2%
3 HepB	92.6%	86.2%	83.0%	83.6%	86.7%
1 Varicella	88.4%	80.7%	83.5%	82.6%	84.9%
3 PCV	---	---	46.7%	82.1%	87.6%
4 PCV	---	---	23.1%	45.6%	68.8%

*PCV data not collected before 2004.

Table 36 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 68.8 to 87.6 percent for the 2006 study data.

Table 37 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 37:
2006 District Immunization Rates by Individual Vaccine at
12 months of age for Health District 3-1**

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	211	96.8%
DTP2/DTaP2	203	93.1%
DTP3/DTaP3	188	86.2%
DTP4/DTaP4	1	0.5%
DTP5/DTaP5	0	0.0%
OPV/IPV1	209	95.9%
OPV/IPV2	203	93.1%
OPV/IPV3	128	58.7%
OPV/IPV4	1	0.5%
MMR1	2	0.9%
MMR2	0	0.0%
HIB1	211	96.8%
HIB2	197	90.4%
HIB3	87	39.9%
HIB4	2	0.9%
HIB5	0	0.0%
HEPB1	210	96.3%
HEPB2	202	92.7%
HEPB3	134	61.5%
HEPB4	29	13.3%
VAR1	3	1.4%
VAR2	0	0.0%
PCV1	208	95.4%
PCV2	199	91.3%
PCV3	162	74.3%
PCV4	6	2.8%
PCV5	0	0.0%

*Percent = number immunized / sample size
Sample size = 218

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

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	179/207 (86.5)	84/108 (77.8)	118/142 (83.1)	119/146 (81.5)	121/156 (77.6)
Black	51/66 (77.3)	21/35 (60.0)	40/60 (66.7)	28/44 (63.6)	34/52 (65.4)
Other	8/9 (88.9)	1/2 (50.0)	8/10 (80.0)	1/5 (20.0)	7/10 (70.0)
Unknown	2/2 (100.0)	---	---	---	---
Total	240/284 (84.5)	106/145 (73.1)	166/212 (78.3)	148/195 (75.9)	162/218 (74.3)

Table 38 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 38 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 39:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 3-1 by Study Year

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	17/26 (65.4)	3/3 (100.0)	5/8 (62.5)	15/17 (88.2)	6/9 (66.7)
Some high school	21/28 (75.0)	7/10 (70.0)	9/11 (81.8)	8/13 (61.5)	12/19 (63.2)
High school graduate	60/74 (81.1)	25/38 (65.8)	37/52 (71.2)	45/57 (78.9)	39/54 (72.2)
Some college	38/46 (82.6)	14/23 (60.9)	33/46 (71.2)	16/28 (57.1)	25/34 (73.5)
College or more	99/105 (94.3)	57/71 (80.3)	82/95 (86.3)	64/80 (80.0)	80/102 (78.4)
Unknown	5/5 (100.0)	---	---	---	---
Total	240/284 (84.5)	106/145 (73.1)	166/212 (78.3)	148/195 (75.9)	162/218 (74.3)

Table 39 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. The other study years showed no correlation between educational attainment and immunization rate.

Table 40:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 3-1

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Medicaid	58/79 (73.4)	21/35 (60.0)	53/71 (74.6)	60/78 (76.9)	56/84 (66.7)
Non-Medicaid	182/205 (88.8)	85/110 (77.3)	113/141 (80.1)	88/117 (75.2)	106/134 (79.1)
Total	240/284 (84.5)	106/145 (73.1)	166/212 (78.3)	148/195 (75.9)	162/218 (74.3)

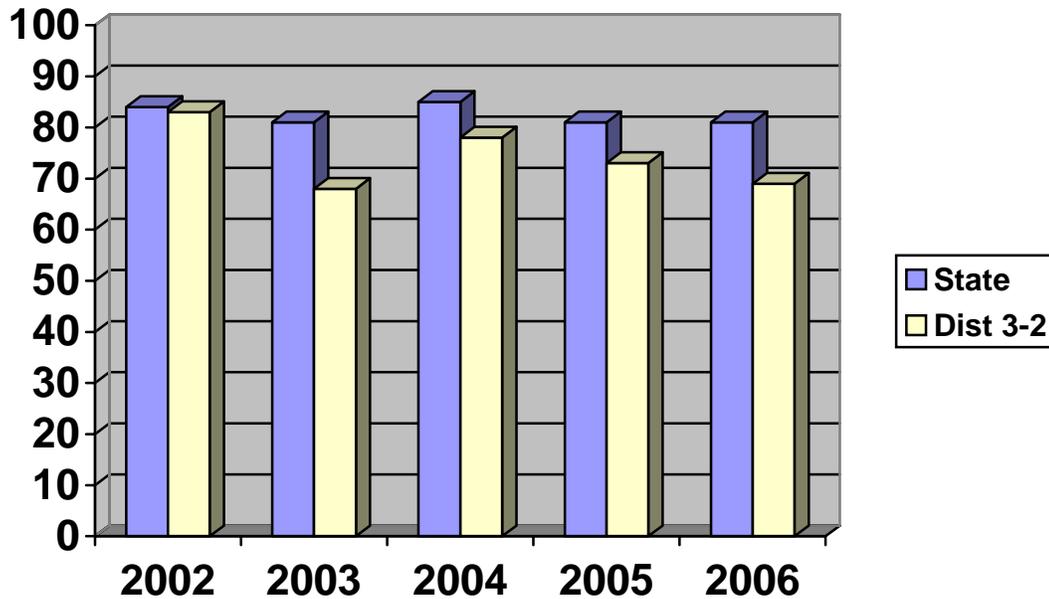
Table 40 shows immunization status of children born to women stratified by Medicaid status for the 2002, 2003, 2004, 2005 and 2006 study years. For the 2006 study, children born to non-Medicaid women had a higher immunization rate than children born to women using Medicaid.

Individual Health District Report: District 3-2

The eligible sample from this district included 379 children born in January 2004. From the 379 children, 292 records were located (Response Rate=77.0%). Of the 292 located records, there were 15 parental refusals leaving a final sample of 277 records.

- ❖ **The 4:3:1 immunization coverage estimate is 68.6 percent (190/277).**
This rate is lower than the statewide 4:3:1 immunization rate of 80.8 percent.

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



- ❖ **The 4:3:1:3 immunization coverage estimate is 67.5 percent (187/277).**
This rate is lower than the statewide 4:3:1:3 immunization rate of 79.9 percent.
- ❖ **The 4:3:1:3:3:1 immunization coverage estimate is 65.0 percent (180/277).** This rate is also lower than the statewide 4:3:1:3:3:1 immunization rate of 76.8 percent.

**Table 41:
District Immunization Rates for
Health District 3-2 by Study Year***

Vaccine	2002 Adequate Rates	2003 Adequate Rates	2004 Adequate Rates	2005 Adequate Rates	2006 Adequate Rates
4 DTP/DTaP	84.0%	68.1%	78.8%	73.8%	68.6%
3 OPV/IPV	84.7%	71.7%	85.0%	81.1%	80.9%
1 MMR	84.7%	71.0%	82.7%	80.4%	81.6%
3 Hib	85.4%	72.5%	84.1%	81.4%	80.9%
3 HepB	84.7%	74.6%	85.4%	81.1%	78.0%
1 Varicella	81.9%	71.7%	81.4%	78.5%	81.2%
3 PCV	---	---	66.8%	79.8%	79.4%
4 PCV	---	---	35.8%	47.6%	58.8%

*PCV data not collected before 2004.

Table 41 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 58.8 to 81.6 percent for the 2006 study data.

Table 42 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 42:
2006 District Immunization Rates by Individual Vaccine at
12 months of age for Health District 3-2

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	259	93.5%
DTP2/DTaP2	241	87.0%
DTP3/DTaP3	210	75.8%
DTP4/DTaP4	0	0.0%
DTP5/DTaP5	0	0.0%
OPV/IPV1	259	93.5%
OPV/IPV2	242	87.4%
OPV/IPV3	137	49.5%
OPV/IPV4	1	0.4%
MMR1	4	1.4%
MMR2	0	0.0%
HIB1	258	93.1%
HIB2	240	86.6%
HIB3	90	32.5%
HIB4	1	0.4%
HIB5	0	0.0%
HEPB1	258	93.1%
HEPB2	238	85.9%
HEPB3	127	45.8%
HEPB4	10	3.6%
VAR1	2	0.7%
VAR2	0	0.0%
PCV1	252	91.0%
PCV2	229	82.7%
PCV3	179	64.6%
PCV4	0	0.0%
PCV5	0	0.0%

*Percent = number immunized / sample size
Sample size = 277

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

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	69/79 (87.3)	50/76 (65.8)	95/113 (84.1)	127/159 (79.9)	115/151 (76.2)
Black	48/61 (78.7)	31/59 (52.5)	69/99 (69.7)	89/142 (62.7)	67/112 (59.8)
Other	2/3 (66.7)	3/3 (100.0)	13/14 (92.9)	12/14 (85.7)	8/14 (57.1)
Unknown	---	---	---	2/2 (100.0)	---
Total	119/144 (82.6)	84/138 (60.9)	177/226 (78.3)	230/317 (72.6)	190/277 (68.6)

Table 43 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 44:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 3-2 by Study Year

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	7/9 (77.8)	3/3 (100.0)	3/3 (100.0)	11/17 (64.7)	2/6 (33.3)
Some high school	15/20 (75.0)	7/14 (50.0)	25/34 (73.5)	28/44 (63.6)	16/30 (53.3)
High school graduate	20/26 (76.9)	16/27 (59.3)	36/47 (76.6)	41/63 (65.1)	35/55 (63.6)
Some college	22/28 (78.6)	7/21 (33.3)	17/24 (70.8)	28/39 (71.8)	26/39 (66.7)
College or more	50/55 (90.9)	51/73 (69.9)	96/118 (81.3)	122/154 (79.2)	111/147 (75.5)
Unknown	5/6 (83.3)	---	---	---	---
Total	119/144 (82.6)	84/138 (60.9)	177/226 (78.3)	230/317 (72.6)	190/277 (68.6)

Table 44 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).

- ❖ For the 2006 study, the immunization status of the children in the sample in District 3-2 varied significantly with maternal educational attainment (p-value=0.03).

Table 45:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 3-2

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Medicaid	37/48 (77.1)	32/67 (47.8)	74/103 (71.8)	77/124 (62.1)	81/135 (60.0)
Non-Medicaid	82/96 (85.4)	52/71 (73.2)	103/123 (83.7)	153/193 (79.3)	109/142 (76.8)
Total	119/144 (82.6)	84/138 (60.9)	177/226 (78.3)	230/317 (72.6)	190/277 (68.6)

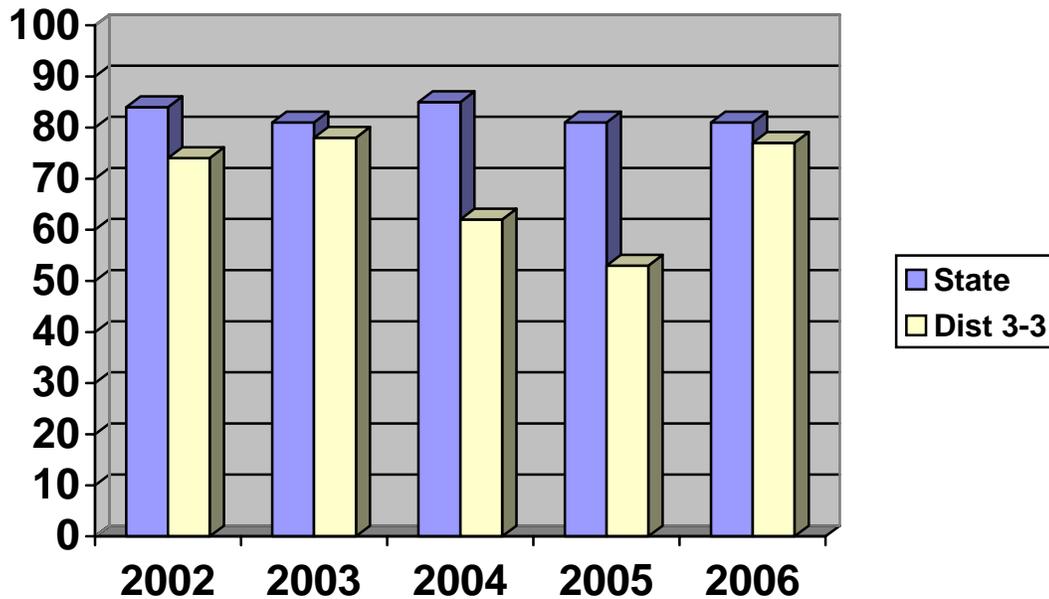
Table 45 shows immunization status of children born to women stratified by Medicaid status for the 2002, 2003, 2004, 2005 and 2006 study years. For Health District 3-2, children born to non-Medicaid women had a higher immunization rate than children born to women using Medicaid.

Individual Health District Report: District 3-3

The eligible sample from this district included 202 children born in January 2004. From the 202 children, 164 records were located (Response Rate=81.2%). Of the 164 located records, there were 0 parental refusals leaving a final sample of 164 records.

- ❖ **The 4:3:1 immunization coverage estimate is 76.8 percent (126/164).**
This rate is lower than the statewide 4:3:1 immunization rate of 80.8 percent.

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



- ❖ **The 4:3:1:3 immunization coverage estimate is 75.0 percent (123/164).**
This rate is lower than the statewide 4:3:1:3 immunization rate of 79.9 percent.
- ❖ **The 4:3:1:3:3:1 immunization coverage estimate is 70.7 percent (116/164).** This rate is also much lower than the statewide 4:3:1:3:3:1 immunization rate of 76.8 percent.

**Table 46:
District Immunization Rates for
Health District 3-3 by Study Year***

Vaccine	2002 Adequate Rates	2003 Adequate Rates	2004 Adequate Rates	2005 Adequate Rates	2006 Adequate Rates
4 DTP/DTaP	73.9%	79.1%	67.4%	58.6%	78.0%
3 OPV/IPV	82.9%	85.8%	74.4%	68.4%	85.4%
1 MMR	84.7%	85.1%	75.6%	65.6%	86.0%
3 Hib	80.2%	88.4%	76.7%	71.7%	84.8%
3 HepB	80.2%	88.8%	77.9%	75.0%	86.6%
1 Varicella	82.9%	84.7%	74.4%	67.2%	86.0%
3 PCV	---	---	30.2%	62.7%	78.7%
4 PCV	---	---	11.6%	22.5%	52.4%

*PCV data not collected before 2004.

Table 46 reveals the coverage rates of each vaccine series. Coverage rates ranged from 52.4 to 86.6 percent for the 2006 study data.

Table 47 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 47:
2006 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 3-3**

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	159	97.0%
DTP2/DTaP2	153	93.3%
DTP3/DTaP3	135	82.3%
DTP4/DTaP4	0	0.0%
DTP5/DTaP5	0	0.0%
OPV/IPV1	158	96.3%
OPV/IPV2	150	91.5%
OPV/IPV3	96	58.5%
OPV/IPV4	0	0.0%
MMR1	4	2.4%
MMR2	0	0.0%
HIB1	159	97.0%
HIB2	148	90.2%
HIB3	74	45.1%
HIB4	1	0.6%
HIB5	0	0.0%
HEPB1	160	97.6%
HEPB2	153	93.3%
HEPB3	113	68.9%
HEPB4	8	4.9%
VAR1	4	2.4%
VAR2	0	0.0%
PCV1	148	90.2%
PCV2	137	83.5%
PCV3	110	67.1%
PCV4	1	0.6%
PCV5	0	0.0%

*Percent = number immunized / sample size
Sample size = 164

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

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	40/52 (76.9)	75/104 (72.1)	22/35 (62.9)	60/84 (71.4)	37/55 (67.3)
Black	38/54 (70.4)	103/142 (72.5)	31/47 (66.0)	63/137 (46.0)	84/102 (82.4)
Other	3/4 (75.0)	20/23 (87.0)	3/4 (75.0)	7/23 (30.4)	5/7 (71.4)
Unknown	1/1 (100.0)	---	---	---	---
Total	82/111 (73.9)	198/269 (73.6)	56/86 (65.1)	130/244 (53.3)	126/164 (76.8)

Table 48 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 born to black mothers was higher than the children born to white mothers.

Table 49:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 3-3 by Study Year

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	12/13 (92.3)	4/6 (66.7)	---	3/4 (75.0)	3/4 (75.0)
Some high school	10/18 (55.6)	28/40 (70.0)	4/6 (66.7)	16/31 (51.6)	16/21 (76.2)
High school graduate	25/36 (69.4)	57/85 (67.1)	18/30 (60.0)	31/69 (44.9)	36/44 (81.8)
Some college	17/21 (81.0)	52/62 (83.9)	13/23 (56.5)	24/57 (42.1)	30/36 (83.3)
College or more	16/20 (80.0)	57/76 (75.0)	21/27 (77.8)	56/83 (67.5)	41/59 (69.5)
Unknown	2/3 (66.7)	---	---	---	---
Total	82/111 (73.8)	198/269 (73.6)	56/86 (65.1)	130/244 (53.3)	126/164 (76.8)

Table 49 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 50:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 3-3

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Medicaid	41/58 (70.7)	92/127 (72.4)	31/54 (57.4)	69/134 (51.5)	76/98 (77.6)
Non- Medicaid	41/53 (77.4)	106/142 (74.6)	25/32 (78.1)	61/110 (55.5)	50/66 (75.8)
Total	82/111 (73.9)	198/269 (73.6)	56/86 (65.1)	130/244 (53.3)	126/164 (76.8)

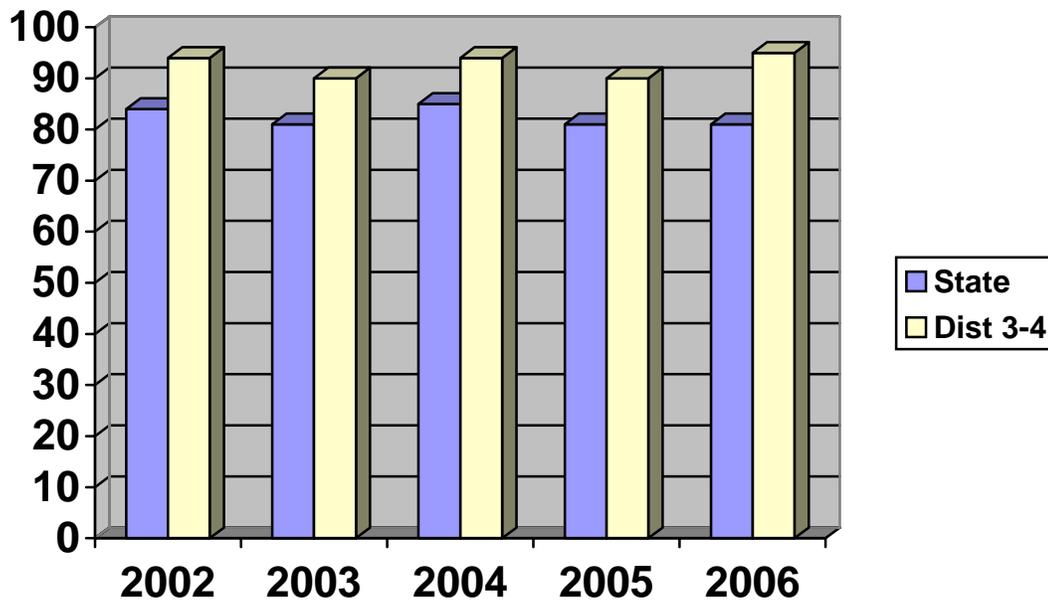
Table 50 shows immunization status of children born to women stratified by Medicaid status for the 2002, 2003, 2004, 2005 and 2006 study years. For Health District 3-3, children born to Medicaid women had a higher immunization rate than children born to women using non-Medicaid.

Individual Health District Report: District 3-4

The eligible sample from this district included 128 children born in January 2004. From the 128 children, 121 records were located (Response Rate=94.5%). Of the 121 located records, there were 4 parental refusals leaving a final sample of 117 records.

- ❖ **The 4:3:1 immunization coverage estimate is 94.9 percent (111/117).**
This rate is much higher than the statewide 4:3:1 immunization rate of 80.8 percent.

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



- ❖ **The 4:3:1:3 immunization coverage estimate is 94.0 percent (110/117).**
This rate is much higher than the statewide 4:3:1:3 immunization rate of 79.9 percent.
- ❖ **The 4:3:1:3:3:1 immunization coverage estimate is 93.2 percent (109/117).** This rate is also much higher than the statewide 4:3:1:3:3:1 immunization rate of 76.8 percent.

**Table 51:
District Immunization Rates for
Health District 3-4 by Study Year***

Vaccine	2002 Adequate Rates	2003 Adequate Rates	2004 Adequate Rates	2005 Adequate Rates	2006 Adequate Rates
4 DTP/DTaP	94.9%	90.0%	94.1%	92.4%	94.9%
3 OPV/IPV	96.0%	90.0%	96.1%	90.2%	97.4%
1 MMR	97.1%	90.0%	96.1%	91.3%	95.7%
3 Hib	96.6%	90.0%	96.7%	92.4%	96.6%
3 HepB	94.9%	90.0%	96.7%	91.3%	95.7%
1 Varicella	96.0%	90.0%	94.1%	92.4%	95.7%
3 PCV	---	---	76.5%	90.2%	95.7%
4 PCV	---	---	40.5%	53.3%	81.2%

*PCV data not collected before 2004.

Table 51 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 81.2 to 97.4 percent for the 2006 study data.

Table 52 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 52:
2006 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 3-4**

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	116	99.1%
DTP2/DTaP2	114	97.4%
DTP3/DTaP3	107	91.5%
DTP4/DTaP4	0	0.0%
DTP5/DTaP5	0	0.0%
OPV/IPV1	116	99.1%
OPV/IPV2	114	97.4%
OPV/IPV3	60	51.3%
OPV/IPV4	0	0.0%
MMR1	0	0.0%
MMR2	0	0.0%
HIB1	116	99.1%
HIB2	114	97.4%
HIB3	54	46.2%
HIB4	1	0.9%
HIB5	0	0.0%
HEPB1	116	99.1%
HEPB2	112	95.7%
HEPB3	67	57.3%
HEPB4	3	2.6%
VAR1	1	0.9%
VAR2	0	0.0%
PCV1	114	97.4%
PCV2	111	94.9%
PCV3	88	75.2%
PCV4	1	0.9%
PCV5	0	0.0%

*Percent = number immunized / sample size
Sample size = 117

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

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	122/127 (96.1)	37/42 (88.1)	106/115 (92.2)	59/62 (95.2)	67/71 (94.4)
Black	30/35 (85.7)	10/12 (83.3)	26/27 (96.3)	16/21 (76.2)	28/29 (96.6)
Other	11/11 (100.0)	5/6 (83.3)	11/11 (100.0)	8/8 (100.0)	16/17 (94.1)
Unknown	2/2 (100.0)	---	---	0/1 (0.0)	---
Total	165/175 (94.3)	52/60 (86.7)	143/153 (93.5)	83/92 (90.2)	111/117 (94.9)

Table 53 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).

- ❖ For the 2006 study year, the immunization rates varied among race with no clear correlation.

Table 54:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 3-4 by Study Year

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Educational Level	#/Total (Percent)	#/Total (Percent)	#/Total (Percent)	#/Total (Percent)	#/Total (Percent)
Less than high school	4/5 (80.0)	1/1 (100.0)	2/2 (100.0)	5/6 (83.3)	2/2 (100.0)
Some high school	15/18 (83.3)	3/3 (100.0)	12/14 (85.7)	6/9 (66.7)	12/13 (92.3)
High school graduate	58/61 (95.1)	17/21 (81.0)	35/35 (100.0)	22/23 (95.7)	19/21 (90.5)
Some college	27/29 (93.1)	9/10 (90.0)	29/33 (87.9)	13/15 (86.7)	23/24 (95.8)
College or more	55/56 (98.2)	22/25 (88.0)	65/69 (94.2)	37/39 94.9	55/57 96.5
Unknown	6/6 (100.0)	---	---	---	---
Total	165/175 (94.3)	52/60 (86.7)	143/153 (93.5)	83/92 (90.2)	111/117 (94.9)

Table 54 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 3-4 appears to vary with educational attainment of the mother.

Table 55:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 3-4

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Medicaid	41/46 (89.1)	17/19 (89.5)	59/65 (90.8)	26/33 (78.8)	49/53 (92.5)
Non-Medicaid	124/129 (96.1)	35/41 (85.4)	84/88 (95.5)	57/59 (96.6)	62/64 (96.9)
Total	165/175 (94.3)	52/60 (86.7)	143/153 (93.5)	83/92 (90.2)	111/117 (94.9)

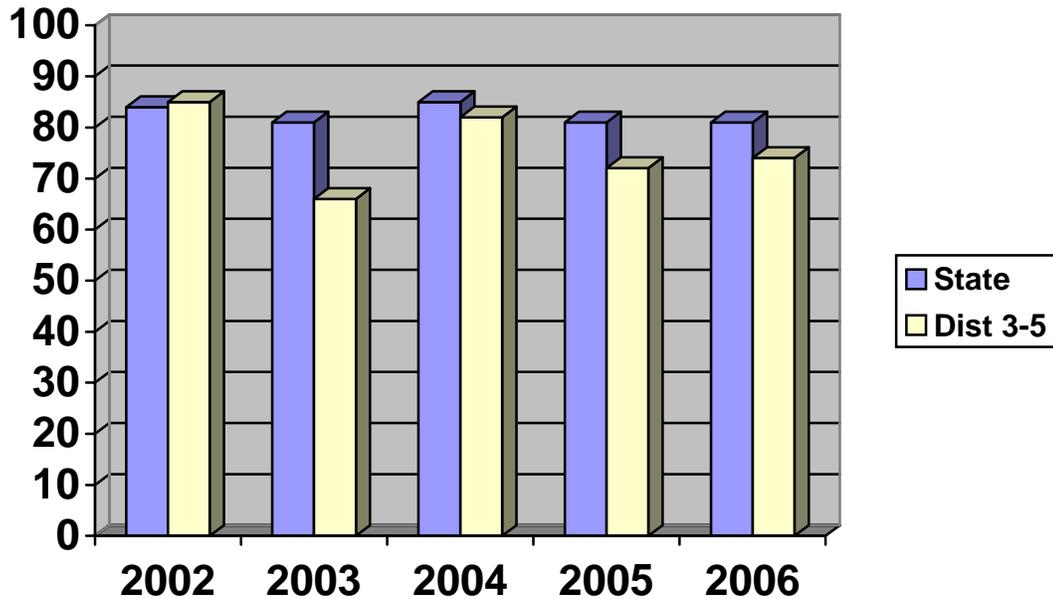
Table 55 shows immunization status of children born to women stratified by Medicaid status for the 2002, 2003, 2004, 2005 and 2006 study years. In the 2006 study, children born to non-Medicaid women had a higher immunization rate than children born to women using Medicaid.

Individual Health District Report: District 3-5

The eligible sample from this district included 295 children born in January 2004. From the 295 children, 243 records were located (Response Rate=82.4%). Of the 243 located records, there were no parental refusals leaving a final sample of 243 records.

- ❖ **The 4:3:1 immunization coverage estimate is 73.7 percent (179/243).**
This rate is lower than the statewide 4:3:1 immunization rate of 80.8 percent.

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



- ❖ **The 4:3:1:3 immunization coverage estimate is 72.0 percent (175/243).**
This rate is lower than the statewide 4:3:1:3 immunization rate of 79.9 percent.
- ❖ **The 4:3:1:3:3:1 immunization coverage estimate is 67.5 percent (164/243).** This rate is also lower than the statewide 4:3:1:3:3:1 immunization rate of 76.8 percent.

Table 56:
District Immunization Rates for
Health District 3-5 by Study Year*

Vaccine	2002 Adequate Rates	2003 Adequate Rates	2004 Adequate Rates	2005 Adequate Rates	2006 Adequate Rates
4 DTP/DTaP	84.6%	66.0%	82.4%	74.0%	76.5%
3 OPV/IPV	88.7%	82.0%	89.5%	83.1%	81.1%
1 MMR	86.7%	80.7%	90.8%	84.8%	84.4%
3 Hib	86.2%	76.0%	88.3%	82.3%	79.4%
3 HepB	85.6%	78.0%	89.1%	82.3%	80.2%
1 Varicella	83.6%	74.0%	89.5%	85.7%	84.8%
3 PCV	---	---	43.5%	73.2%	77.8%
4 PCV	---	---	19.7%	38.5%	51.4%

*PCV data not collected before 2004.

Table 56 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 51.4 to 84.8 percent for the 2006 study data.

Table 57 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 57:
2006 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 3-5

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	235	96.7%
DTP2/DTaP2	219	90.1%
DTP3DTaP3	189	77.8%
DTP4/DTaP4	0	0.0%
DTP5/DTaP5	0	0.0%
OPV/IPV1	235	96.7%
OPV/IPV2	216	88.9%
OPV/IPV3	102	42.0%
OPV/IPV4	2	0.8%
MMR1	0	0.0%
MMR2	0	0.0%
HIB1	233	95.9%
HIB2	213	87.7%
HIB3	72	29.6%
HIB4	0	0.0%
HIB5	0	0.0%
HEPB1	235	96.7%
HEPB2	221	90.9%
HEPB3	122	50.2%
HEPB4	6	2.5%
VAR1	2	0.8%
VAR2	0	0.0%
PCV1	221	90.9%
PCV2	201	82.7%
PCV3	141	58.0%
PCV4	1	0.4%
PCV5	0	0.0%

*Percent = number immunized / sample size
Sample size = 243

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

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Race	#/Total (Percent)	#/Total (Percent)	#/Total (Percent)	#/Total (Percent)	#/Total (Percent)
White	51/63 (81.0)	36/45 (80.0)	62/74 (83.8)	67/90 (74.4)	79/105 (75.2)
Black	101/117 (86.3)	53/100 (53.0)	123/154 (80.0)	87/127 (68.5)	91/123 (74.0)
Other	9/10 (90.0)	2/5 (40.0)	11/11 (100.0)	13/13 (100.0)	9/15 (60.0)
Unknown	4/5 (80.0)	---	---	0/1 (0.0)	---
Total	165/195 (84.6)	91/150 (60.7)	196/239 (82.0)	167/231 (72.3)	179/243 (73.7)

Table 58 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 rates of children in District 3-5 varied with maternal race with no clear trend emerging.

Table 59:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 3-5 by Study Year

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	11/15 (73.3)	2/5 (40.0)	5/6 (83.3)	13/18 (72.2)	3/4 (75.0)
Some high school	19/22 (86.4)	9/13 (69.2)	27/37 (73.0)	20/26 (76.9)	7/10 (70.0)
High school graduate	40/48 (83.3)	22/42 (52.4)	49/59 (83.1)	42/57 (73.7)	40/60 (66.7)
Some college	38/49 (77.6)	21/39 (53.8)	43/49 (87.8)	29/45 (64.4)	35/51 (68.6)
College or more	51/54 (94.4)	37/51 (72.5)	72/88 (81.8)	63/85 (74.1)	94/118 (80.0)
Unknown	6/7 (85.7)	---	---	---	---
Total	165/195 (84.6)	91/150 (60.7)	196/239 (82.0)	167/231 (72.3)	179/243 (73.7)

Table 59 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 all study years, the immunization status of the children in District 3-5 varied with level of maternal educational attainment.

Table 60:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 3-5

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Medicaid	66/82 (80.5)	36/72 (50.0)	95/117 (81.2)	78/106 (73.6)	91/122 (74.6)
Non-Medicaid	99/113 (87.6)	55/78 (70.5)	101/122 (82.8)	89/125 (71.2)	88/121 (72.7)
Total	165/195 (84.6)	91/150 (60.7)	196/239 (82.0)	167/231 (72.3)	179/243 (73.7)

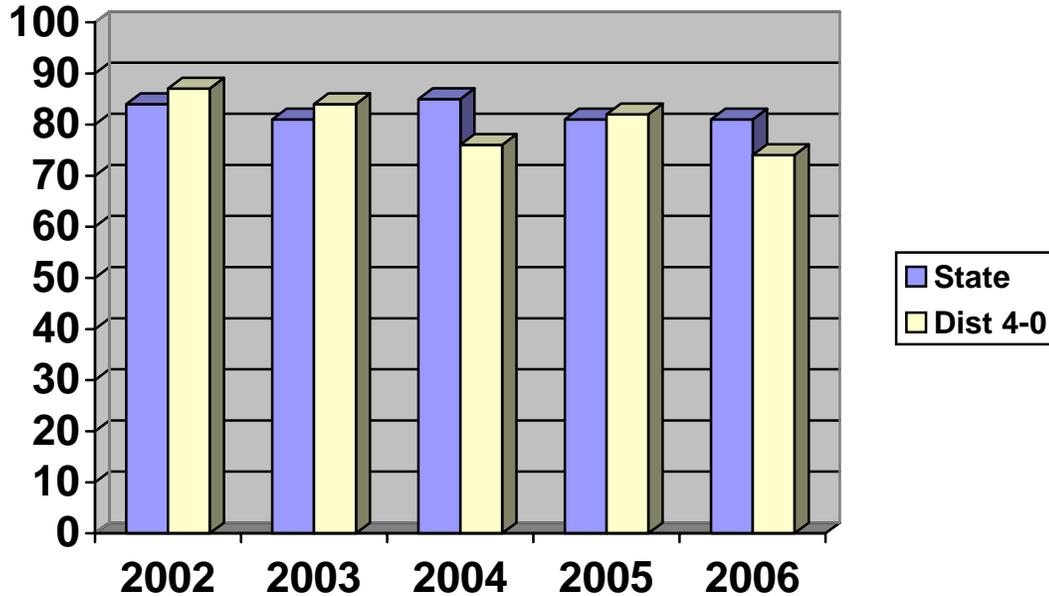
Table 60 shows immunization status of children born to women stratified by Medicaid status for the 2002, 2003, 2004, 2005 and 2006 study years. For the 2006 study, children born to Medicaid women had a slightly higher immunization rate than children born to women using non-Medicaid.

Individual Health District Report: District 4-0

The eligible sample from this district included 208 children born in January 2004. From the 208 children, 184 records were located (Response Rate=88.5%). Of the 184 located records, there were no parental refusals leaving a final sample of 184 records.

- ❖ **The 4:3:1 immunization coverage estimate is 73.9 percent (136/184).**
This rate is lower than the statewide 4:3:1 immunization rate of 80.8 percent.

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



- ❖ **The 4:3:1:3 immunization coverage estimate is 73.9 percent (136/184).**
This rate is lower than the statewide 4:3:1:3 immunization rate of 79.9 percent.
- ❖ **The 4:3:1:3:3:1 immunization coverage estimate is 70.7 percent (130/184).** This rate is also lower than the statewide 4:3:1:3:3:1 immunization rate of 76.8 percent

**Table 61:
District Immunization Rates for
Health District 4-0 by Study Year**

Vaccine	2002 Adequate Rates	2003 Adequate Rates	2004 Adequate Rates	2005 Adequate Rates	2006 Adequate Rates
4 DTP/DTaP	87.8%	84.5%	79.1%	83.9%	75.0%
3 OPV/IPV	92.5%	92.7%	85.6%	87.0%	88.6%
1 MMR	93.2%	92.7%	85.0%	89.2%	83.2%
3 Hib	93.2%	87.3%	86.6%	88.8%	84.8%
3 HepB	92.5%	92.7%	86.1%	90.1%	89.7%
1 Varicella	92.5%	92.7%	85.0%	89.7%	83.7%
3 PCV	---	---	32.1%	78.0%	81.5%
4 PCV	---	---	9.1%	26.9%	58.2%

*PCV data not collected before 2004.

Table 61 reveals the coverage rates of each vaccine series. Coverage rates ranged from 58.2 to 89.7 percent for the 2006 study data.

Table 62 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 62:
2006 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 4-0

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	176	95.7%
DTP2/DTaP2	172	93.5%
DTP3/DTaP3	156	84.8%
DTP4/DTaP4	0	0.0%
DTP5/DTaP5	0	0.0%
OPV/IPV1	175	95.1%
OPV/IPV2	170	92.4%
OPV/IPV3	120	65.2%
OPV/IPV4	1	0.5%
MMR1	3	1.6%
MMR2	0	0.0%
HIB1	175	95.1%
HIB2	166	90.2%
HIB3	61	33.2%
HIB4	0	0.0%
HIB5	0	0.0%
HEPB1	178	96.7%
HEPB2	173	94.0%
HEPB3	129	70.1%
HEPB4	18	9.8%
VAR1	2	1.1%
VAR2	0	0.0%
PCV1	172	93.5%
PCV2	164	89.1%
PCV3	128	69.6%
PCV4	1	0.5%
PCV5	0	0.0%

*Percent = number immunized / sample size
Sample size = 184

Table 63:
Cross tabulations of Maternal Race and
Child Immunization Status for Health District 4-0 by Study Year

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	89/99 (89.9)	57/68 (83.8)	108/141 (76.6)	116/143 (81.1)	89/122 (73.0)
Black	39/47 (83.0)	29/42 (69.0)	34/43 (79.1)	58/72 (80.6)	45/57 (78.9)
Other	0/1 (0.0)	---	3/3 (100.0)	6/6 (100.0)	2/5 (40.0)
Unknown	---	---	---	3/3 (100.0)	---
Total	128/147 (87.1)	86/110 (78.2)	145/187 (77.5)	183/224 (81.7)	136/184 (73.9)

Table 63 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 District 4-0 varies with maternal race.

Table 64:

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

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	2/2 (100.0)	4/4 (100.0)	1/1 (100.0)	5/5 (100.0)	1/1 (100.0)
Some high school	37/44 (84.1)	21/29 (72.4)	21/28 (75.0)	21/28 (75.0)	16/22 (72.7)
High school graduate	44/52 (84.6)	28/33 (84.8)	57/71 (80.3)	55/67 (82.1)	53/73 (72.6)
Some college	24/26 (92.3)	15/20 (75.0)	23/32 (71.9)	50/61 (82.0)	27/35 (77.1)
College or more	21/23 (91.3)	18/24 (75.0)	43/55 (78.2)	52/63 (82.5)	39/53 (73.6)
Unknown	---	---	---	---	---
Total	128/147 (87.1)	86/110 (78.2)	145/187 (77.5)	183/224 (81.7)	136/184 (73.9)

Table 64 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 65:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 4-0

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Medicaid	62/71 (87.3)	53/69 (76.8)	76/95 (80.0)	84/106 (79.2)	70/96 (72.9)
Non-Medicaid	66/76 (86.8)	33/41 (80.5)	69/92 (75.0)	99/118 (83.9)	66/88 (75.0)
Total	128/147 (87.1)	86/110 (78.2)	145/187 (77.5)	183/224 (81.7)	136/184 (73.9)

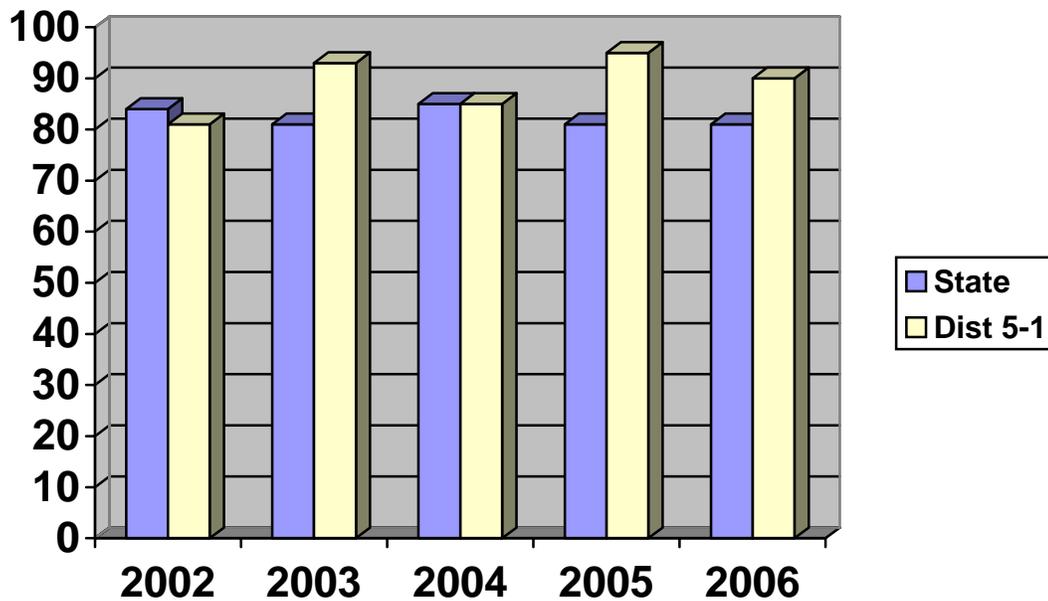
Table 65 shows immunization status of children born to women stratified by Medicaid status for the 2002, 2003, 2004, 2005 and 2006 study years. For the 2006 study, the immunization rate of children born to non-Medicaid women was slightly higher than the immunization rate of children born to women using Medicaid.

Individual Health District Report: District 5-1

The eligible sample from this district included 50 children born in January 2004. From the 50 children, 49 records were located (Response Rate=98.0%). Of the 49 located records, there was 1 parental refusal leaving a final sample of 48 records.

- ❖ **The 4:3:1 immunization coverage estimate is 89.6 percent (43/48).** This rate is much higher than the statewide 4:3:1 immunization rate of 80.8 percent.

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



- ❖ **The 4:3:1:3 immunization coverage estimate 89.6 percent (43/48).** This rate is much higher than the statewide 4:3:1:3 immunization rate of 79.9 percent.
- ❖ **The 4:3:1:3:3:1 immunization coverage estimate 79.2 percent (38/48).** This rate is also higher than the statewide 4:3:1:3:3:1 immunization rate of 76.8 percent.

Table 66:
District Immunization Rates for
Health District 5-1 by Study Year*

Vaccine	2002 Adequate Rates	2003 Adequate Rates	2004 Adequate Rates	2005 Adequate Rates	2006 Adequate Rates
4 DTP/DTaP	80.8%	93.3%	85.5%	94.7%	89.6%
3 OPV/IPV	96.2%	97.8%	92.7%	96.0%	95.8%
1 MMR	97.4%	97.8%	90.9%	96.0%	100.0%
3 Hib	97.4%	97.8%	87.3%	96.0%	93.8%
3 HepB	96.2%	96.7%	90.9%	96.0%	97.8%
1 Varicella	84.6%	95.6%	90.9%	97.3%	97.9%
3 PCV	---	---	23.6%	82.7%	87.5%
4 PCV	---	---	3.6%	32.0%	72.9%

*PCV data not collected before 2004.

Table 66 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 72.9 to 100.0 percent for the 2006 study data.

Table 67 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 67:
2006 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 5-1

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	48	100.0%
DTP2/DTaP2	47	97.9%
DTP3/DTaP3	45	93.8%
DTP4/DTaP4	0	0.0%
DTP5/DTaP5	0	0.0%
OPV/IPV1	48	100.0%
OPV/IPV2	47	97.9%
OPV/IPV3	34	70.8%
OPV/IPV4	0	0.0%
MMR1	0	0.0%
MMR2	0	0.0%
HIB1	48	100.0%
HIB2	47	97.9%
HIB3	3	6.3%
HIB4	0	0.0%
HIB5	0	0.0%
HEPB1	48	100.0%
HEPB2	47	97.9%
HEPB3	36	75.0%
HEPB4	1	2.1%
VAR1	0	0.0%
VAR2	0	0.0%
PCV1	46	95.8%
PCV2	41	85.4%
PCV3	32	66.7%
PCV4	0	0.0%
PCV5	0	0.0%

*Percent = number immunized / sample size
Sample size = 48

Table 68:
Cross tabulations of Maternal Race and
Child Immunization Status for Health District 5-1 by Study Year

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	34/44 (77.3)	56/64 (87.5)	27/32 (84.4)	39/41 (95.1)	29/32 (90.6)
Black	29/34 (85.3)	19/25 (76.0)	20/23 (87.0)	30/32 (93.8)	14/16 (87.5)
Other	---	1/1 (100.0)	---	2/2 (100.0)	---
Total	63/78 (80.8)	76/90 (84.4)	47/55 (85.5)	71/75 (94.7)	43/48 (89.6)

Table 68 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 rates for District 5-1 vary with maternal race with no clear trend emerging.

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

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	1/2 (50.0)	---	---	1/1 (100.0)	---
Some high school	23/26 (88.5)	13/16 (81.3)	9/10 (90.0)	12/14 (85.7)	7/8 (87.5)
High school graduate	28/36 (77.8)	30/36 (83.3)	18/23 (78.3)	36/38 (94.7)	14/15 (93.3)
Some college	3/3 (100.0)	10/12 (83.3)	8/9 (88.9)	5/5 (100.0)	10/11 (90.9)
College or more	8/11 (72.7)	23/26 (88.5)	12/13 (92.3)	17/17 (100.0)	5/5 (100.0)
Unknown	---	---	---	---	12/14 (85.7)
Total	63/78 (80.8)	76/90 (84.4)	47/55 (85.5)	71/75 (94.7)	43/48 (89.6)

Table 69 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 70:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 5-1

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Medicaid	35/43 (81.4)	37/48 (77.1)	34/40 (80.0)	43/46 (93.5)	32/36 (88.9)
Non-Medicaid	28/35 (80.0)	39/42 (92.9)	13/15 (86.7)	28/29 (96.6)	11/12 (91.7)
Total	63/78 (80.8)	76/90 (84.4)	47/55 (85.5)	71/75 (94.7)	43/48 (89.6)

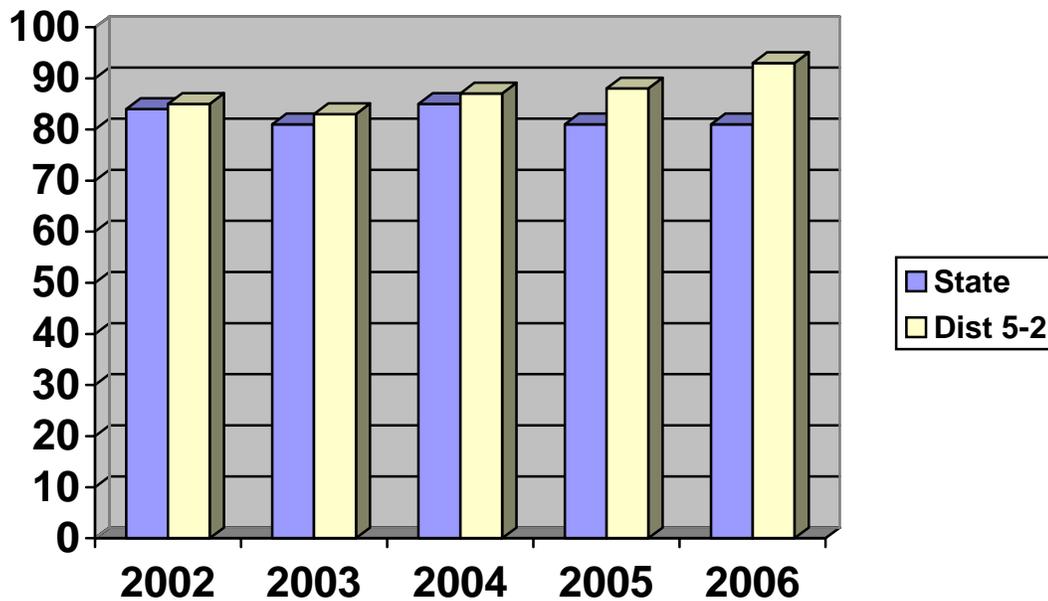
Table 70 shows immunization status of children born to women stratified by Medicaid status for the 2002, 2003, 2004, 2005 and 2006 study years. The immunization rates for District 5-1 vary with maternal Medicaid status.

Individual Health District Report: District 5-2

The eligible sample from this district included 139 children born in January 2004. From the 139 children, 134 records were located (Response Rate=96.4%). Of the 134 located records, there were 3 parental refusals leaving a final sample of 131 records.

- ❖ **The 4:3:1 immunization coverage estimate is 93.1 percent (122/131).**
This rate is much higher than the statewide 4:3:1 immunization rate of 80.8 percent.

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



- ❖ **The 4:3:1:3 immunization coverage estimate is 93.1 percent (122/131).**
This rate is much higher to the statewide 4:3:1:3 immunization rate of 79.9 percent.
- ❖ **The 4:3:1:3:3:1 immunization coverage estimate is 89.3 percent (117/131).** This rate is also higher to the statewide 4:3:1:3:3:1 immunization rate of 76.8 percent.

Table 71:
District Immunization Rates for
Health District 5-2 by Study Year*

Vaccine	2002 Adequate Rates	2003 Adequate Rates	2004 Adequate Rates	2005 Adequate Rates	2006 Adequate Rates
4 DTP/DTaP	85.5%	84.9%	87.1%	88.5%	94.7%
3 OPV/IPV	94.0%	93.7%	93.2%	94.2%	96.9%
1 MMR	92.3%	96.8%	93.2%	92.1%	95.4%
3 Hib	92.7%	91.3%	91.2%	90.6%	97.7%
3 HepB	93.1%	93.7%	91.8%	92.1%	96.9%
1 Varicella	90.3%	92.9%	91.2%	92.8%	96.9%
3 PCV	---	---	39.5%	69.1%	90.1%
4 PCV	---	---	15.0%	36.0%	68.7%

*PCV data not collected before 2004.

Table 71 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 68.7.0 to 97.7 percent for the 2006 study data.

Table 72 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 72:
2006 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 5-2**

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	131	100.0%
DTP2/DTaP2	128	97.7%
DTP3/DTaP3	122	93.1%
DTP4/DTaP4	1	0.8%
DTP5/DTaP5	0	0.0%
OPV/IPV1	130	99.2%
OPV/IPV2	128	97.7%
OPV/IPV3	91	69.5%
OPV/IPV4	0	0.0%
MMR1	2	1.5%
MMR2	0	0.0%
HIB1	131	100.0%
HIB2	127	96.9%
HIB3	33	25.2%
HIB4	1	0.8%
HIB5	0	0.0%
HEPB1	131	100.0%
HEPB2	130	99.2%
HEPB3	81	61.8%
HEPB4	8	6.1%
VAR1	1	0.8%
VAR2	0	0.0%
PCV1	122	93.1%
PCV2	120	91.6%
PCV3	96	73.3%
PCV4	2	1.5%
PCV5	0	0.0%

*Percent = number immunized / sample size
Sample size = 131

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

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	109/123 (88.6)	55/68 (80.9)	63/71 (88.8)	54/61 (88.5)	72/76 (94.7)
Black	96/120 (80.0)	41/56 (73.2)	62/73 (85.0)	49/58 (84.5)	48/53 (90.6)
Other	4/4 (100.0)	2/2 (100.0)	3/3 (100.0)	2/2 (100.0)	2/2 (100.0)
Unknown	1/1 (100.0)	---	---	17/18 (94.4)	---
Total	210/248 (84.7)	98/126 (77.8)	128/147 (87.1)	122/139 (87.8)	122/131 (93.1)

Table 73 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 rates for District 5-2 vary with maternal race with no clear trend emerging.

Table 74:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 5-2 by Study Year

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	1/4 (25.0)	---	1/1 (100.0)	22/23 (95.7)	2/2 (100.0)
Some high school	13/17 (76.5)	18/23 (78.3)	22/23 (95.7)	13/16 (81.3)	24/24 (100.0)
High school graduate	41/53 (77.4)	30/42 (71.4)	47/53 (88.7)	42/49 (85.7)	40/45 (88.9)
Some college	12/23 (52.2)	26/33 (78.8)	31/40 (78.0)	24/28 (85.7)	22/24 (91.7)
College or more	9/13 (69.2)	24/28 (85.7)	27/30 (90.0)	21/23 (91.3)	34/36 (94.4)
Total	76/110 (69.1)	98/126 (77.8)	128/147 (87.1)	122/139 (87.8)	122/131 (93.1)

Table 74 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 75:
**Cross tabulations of Maternal Medicaid Status and
 Child Immunization Status for Health District 5-2**

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Medicaid	103/131 (78.6)	48/70 (68.6)	79/91 (86.8)	72/86 (83.7)	75/82 (91.5)
Non- Medicaid	107/117 (91.5)	50/56 (89.3)	49/56 (88.0)	50/53 (94.3)	47/49 (95.9)
Total	210/248 (84.7)	98/126 (77.8)	128/147 (87.1)	122/139 (87.8)	122/131 (93.1)

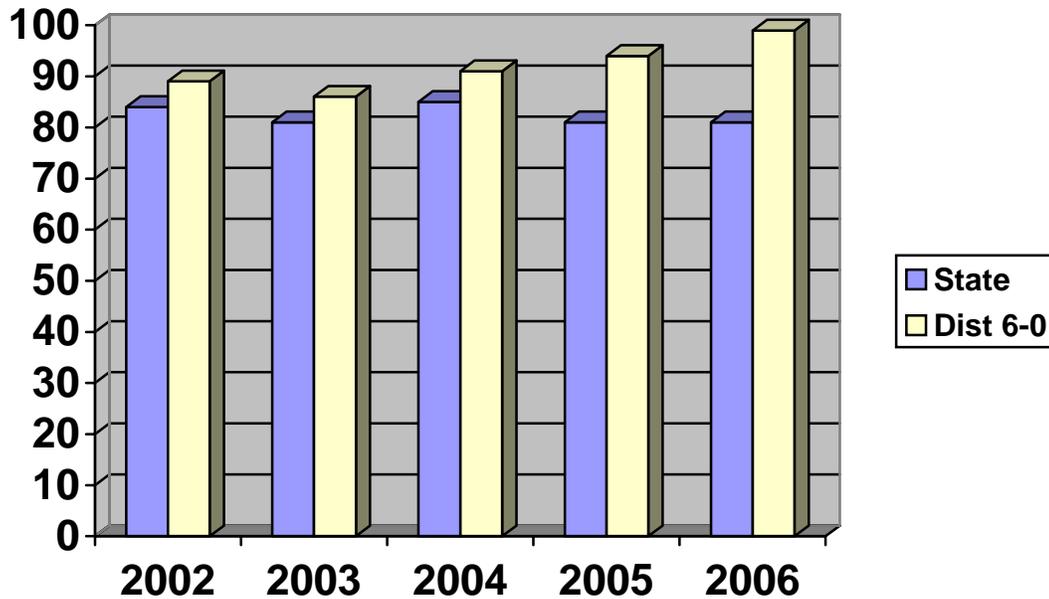
Table 75 shows immunization status of children born to women stratified by Medicaid status for the 2002, 2003, 2004, 2005 and 2006 study years. In all study years, children born to women not using Medicaid had a higher immunization rate than children born to Medicaid women.

Individual Health District Report: District 6-0

The eligible sample from this district included 75 children born in January 2004. From the 75 children, 74 records were located (Response Rate=98.7%). Of the 74 located records, there were no parental refusals leaving a final sample of 74 records.

- ❖ **The 4:3:1 immunization coverage estimate is 98.6 percent (73/74).** This rate is much higher than the statewide 4:3:1 immunization rate of 80.8 percent.

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



- ❖ **The 4:3:1:3 immunization coverage estimate is 98.6 percent (73/74).** This rate is much higher than the statewide 4:3:1:3 immunization rate of 79.9 percent.
- ❖ **The 4:3:1:3:3:1 immunization coverage estimate is 95.9 percent (71/74).** This rate is also much higher than the statewide 4:3:1:3:3:1 immunization rate of 76.8 percent.

**Table 76:
District Immunization Rates for
Health District 6-0 by Study Year***

Vaccine	2002 Adequate Rates	2003 Adequate Rates	2004 Adequate Rates	2005 Adequate Rates	2006 Adequate Rates
4 DTP/DTaP	89.2%	87.8%	90.5%	94.8%	98.6%
3 OPV/IPV	95.1%	91.9%	94.8%	97.4%	100.0%
1 MMR	96.1%	91.9%	95.7%	94.8%	98.6%
3 Hib	97.1%	93.5%	92.2%	94.8%	98.6%
3 HepB	96.1%	95.1%	94.0%	95.7%	100.0%
1 Varicella	97.1%	90.2%	94.8%	93.9%	98.6%
3 PCV	---	---	54.3%	90.4%	97.3%
4 PCV	---	---	23.3%	52.2%	82.4%

*PCV data not collected before 2004.

Table 76 reveals the coverage rates of each vaccine series. Coverage rates ranged from 82.4 to 100.0 percent for the 2006 study data.

Table 77 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 77:
2006 District Immunization Rates by Individual Vaccine at
12 months of age for Health District 6-0**

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	74	100.0%
DTP2/DTaP2	74	100.0%
DTP3/DTaP3	69	93.2%
DTP4/DTaP4	1	1.4%
DTP5/DTaP5	0	0.0%
OPV/IPV1	74	100.0%
OPV/IPV2	74	100.0%
OPV/IPV3	54	73.0%
OPV/IPV4	2	2.7%
MMR1	0	0.0%
MMR2	0	0.0%
HIB1	74	100.0%
HIB2	74	100.0%
HIB3	32	43.2%
HIB4	1	1.4%
HIB5	0	0.0%
HEPB1	74	100.0%
HEPB2	74	100.0%
HEPB3	58	78.4%
HEPB4	25	33.8%
VAR1	1	1.4%
VAR2	0	0.0%
PCV1	72	97.3%
PCV2	70	94.6%
PCV3	54	73.0%
PCV4	1	1.4%
PCV5	0	0.0%

*Percent = number immunized / sample size
Sample size = 74

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

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	39/42 (92.9)	51/61 (83.6)	53/56 (94.6)	47/50 (94.0)	35/35 (100.0)
Black	52/60 (86.7)	48/59 (81.4)	49/57 (86.0)	44/46 (95.7)	36/37 (97.3)
Other	---	3/3 (100.0)	3/3 (100.0)	3/3 (100.0)	2/2 (100.0)
Unknown	---	---	---	14/16 (87.5)	---
Total	91/102 (89.2)	102/123 (82.9)	105/116 (90.5)	108/115 (93.9)	73/74 (98.6)

Table 78 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 78 shows that the immunization rates of children in District 6-0 varied with maternal race.

Table 79:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 6-0 by Study Year

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	3/3 (100.0)	0/1 (0.0)	---	15/17 (88.2)	---
Some high school	18/21 (85.7)	18/21 (81.8)	23/24 (95.8)	17/19 (89.5)	18/18 (100.0)
High school graduate	37/42 (88.1)	35/44 (79.5)	32/37 (86.5)	23/26 (88.5)	24/25 (96.0)
Some college	18/19 (94.7)	23/26 (88.5)	19/20 (95.0)	26/26 (100.0)	12/12 (100.0)
College or more	15/17 (88.2)	26/30 (86.7)	31/35 (88.6)	27/27 (100.0)	19/19 (100.0)
Total	91/102 (89.2)	102/123 (82.9)	105/116 (90.5)	108/115 (93.9)	73/74 (98.6)

Table 79 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 80:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 6-0

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Medicaid	53/61 (86.9)	69/83 (83.1)	60/68 (88.2)	61/67 (91.0)	41/41 (100.0)
Non-Medicaid	38/41 (92.7)	33/40 (82.5)	45/48 (93.8)	47/48 (97.9)	32/33 (97.0)
Total	91/102 (89.2)	102/123 (82.9)	105/116 (90.5)	108/115 (93.9)	73/74 (98.6)

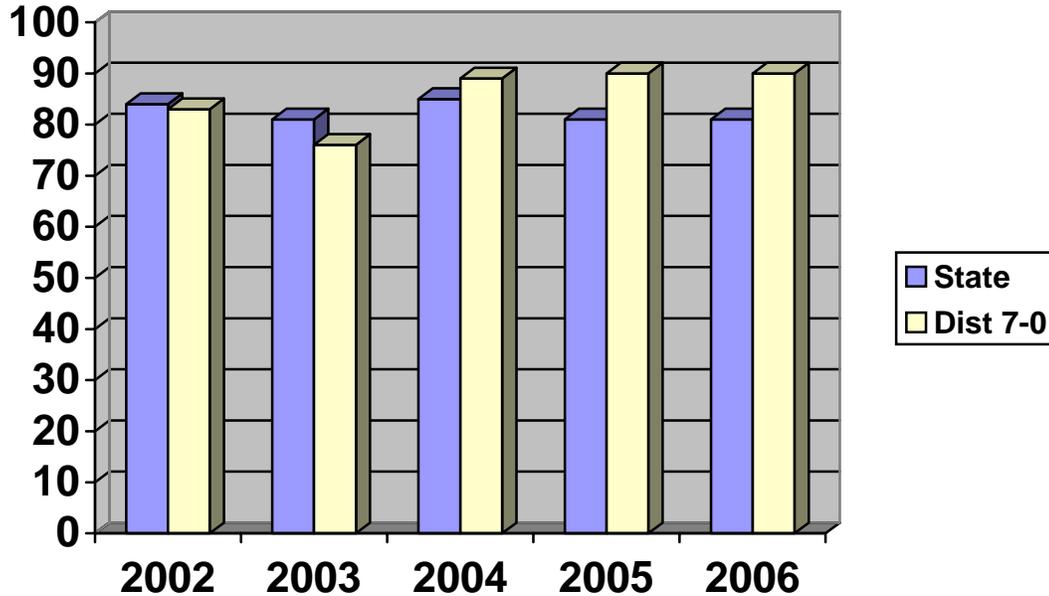
Table 80 shows immunization status of children born to women stratified by Medicaid status for the 2002, 2003, 2004, 2005 and 2006 study years. Table 81 shows that the immunization rates of children in District 6-0 vary with maternal Medicaid status.

Individual Health District Report: District 7-0

The eligible sample from this district included 110 children born in January 2004. From the 110 children, 100 records were located (Response Rate=90.9%). Of the 100 located records, there were 0 parental refusals leaving a final sample of 100 records.

- ❖ **The 4:3:1 immunization coverage estimate is 90.0 percent (90/100).** This rate is higher than the statewide 4:3:1 immunization rate of 80.8 percent.

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



- ❖ **The 4:3:1:3 immunization coverage estimate is 90.0 percent (90/100).** This rate is much higher than the statewide 4:3:1:3 immunization rate of 79.9 percent.
- ❖ **The 4:3:1:3:3:1 immunization coverage estimate is 85.0 percent (85/100).** This rate is also higher than the statewide 4:3:1:3:3:1 immunization rate of 76.8 percent.

**Table 81:
District Immunization Rates for
Health District 7-0 by Study Year***

Vaccine	2002 Adequate Rates	2003 Adequate Rates	2004 Adequate Rates	2005 Adequate Rates	2006 Adequate Rates
4 DTP/DTaP	83.6%	77.1%	88.4%	90.3%	90.0%
3 OPV/IPV	90.5%	85.0%	93.5%	92.9%	96.0%
1 MMR	92.2%	87.9%	93.0%	93.8%	95.0%
3 Hib	89.7%	85.7%	93.0%	91.2%	92.0%
3 HepB	90.5%	87.9%	93.5%	93.8%	97.0%
1 Varicella	88.8%	85.7%	93.5%	93.8%	96.0%
3 PCV	---	---	34.2%	67.3%	82.0%
4 PCV	---	---	10.1%	35.4%	52.0%

*PCV data not collected before 2004.

Table 81 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 52.0 to 97.0 percent for the 2006 study data.

Table 82 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 82:
2006 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 7-0**

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	97	97.0%
DTP2/DTaP2	96	96.0%
DTP3/DTaP3	86	86.0%
DTP4/DTaP4	1	1.0%
DTP5/DTaP5	0	0.0%
OPV/IPV1	96	96.0%
OPV/IPV2	94	94.0%
OPV/IPV3	42	42.0%
OPV/IPV4	0	0.0%
MMR1	0	0.0%
MMR2	0	0.0%
HIB1	96	96.0%
HIB2	93	93.0%
HIB3	48	48.0%
HIB4	0	0.0%
HIB5	0	0.0%
HEPB1	98	98.0%
HEPB2	96	96.0%
HEPB3	69	69.0%
HEPB4	1	1.0%
VAR1	0	0.0%
VAR2	0	0.0%
PCV1	86	86.0%
PCV2	83	83.0%
PCV3	57	57.0%
PCV4	0	0.0%
PCV5	0	0.0%

*Percent = number immunized / sample size
Sample size = 100

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

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	36/44 (81.8)	26/38 (68.4)	79/86 (91.9)	38/43 (88.4)	43/47 (91.5)
Black	60/72 (83.3)	74/102 (72.5)	94/110 (85.5)	60/65 (92.3)	44/50 (88.0)
Other	---	---	3/3 (100.0)	3/3 (100.0)	3/3 (100.0)
Unknown	---	---	---	1/2 (50.0)	---
Total	96/116 (82.8)	100/140 (71.4)	176/199 (88.4)	102/113 (90.3)	90/100 (90.0)

Table 83 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 83 shows that the immunization rates of children in District 7-0 varied with maternal race.

Table 84:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 7-0 by Study Year

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	3/3 (100.0)	1/1 (100.0)	2/2 (100.0)	2/3 (66.7)	---
Some high school	34/40 (85.0)	23/38 (60.5)	44/52 (84.6)	16/18 (88.9)	14/16 (87.5)
High school graduate	35/42 (83.3)	36/51 (70.6)	56/62 (90.3)	40/40 (100.0)	28/33 (84.8)
Some college	18/23 (78.3)	21/24 (87.5)	41/46 (89.1)	25/30 (83.3)	20/21 (95.2)
College or more	6/7 (85.7)	19/26 (73.1)	33/37 (89.2)	19/22 (86.4)	28/30 (93.3)
Unknown	0/1 (0.0)	---	---	---	---
Total	96/116 (82.8)	100/140 (71.4)	176/199 (88.4)	102/113 (90.3)	90/100 (90.0)

Table 84 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 7-0 varies with maternal educational attainment.

Table 85:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 7-0

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Medicaid	70/83 (84.3)	75/101 (74.3)	127/147 (86.4)	68/74 (91.9)	52/60 (86.7)
Non-Medicaid	26/33 (78.8)	25/39 (64.1)	49/52 (94.2)	34/39 (87.2)	38/40 (95.0)
Total	96/116 (82.8)	100/140 (71.4)	176/199 (88.4)	102/113 (90.3)	90/100 (90.0)

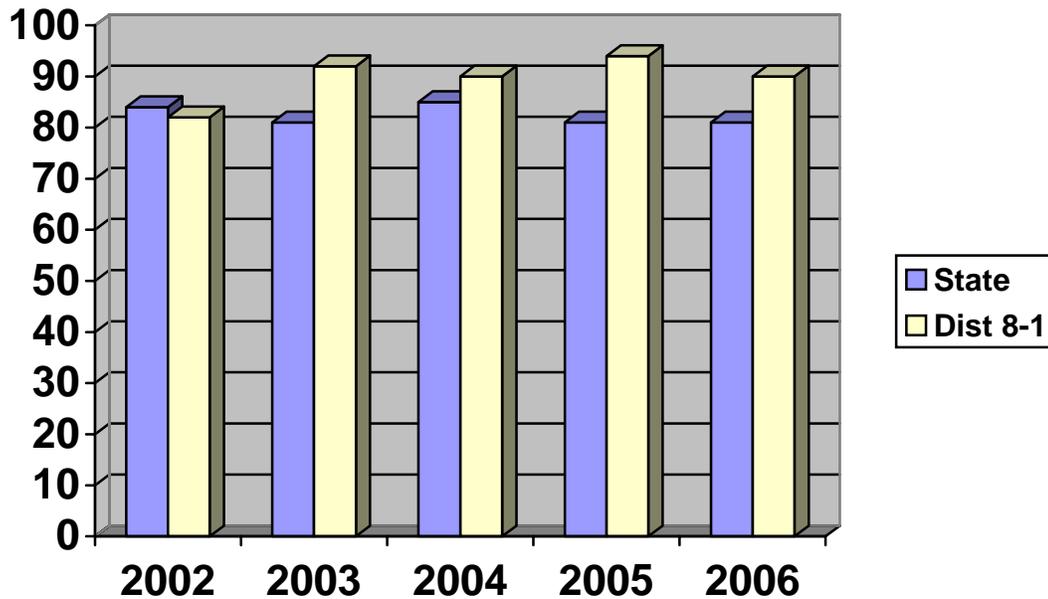
Table 85 shows immunization status of children born to women stratified by Medicaid status for the 2002, 2003, 2004, 2005 and 2006 study years. For Health District 7-0, immunization rates of children vary with maternal Medicaid status.

Individual Health District Report: District 8-1

The eligible sample from this district included 64 children born in January 2004. From the 64 children, 58 records were located (Response Rate=90.6%). Of the 58 located records, there were no parental refusals leaving a final sample of 58 records.

- ❖ **The 4:3:1 immunization coverage estimate is 89.7 percent (52/58).** This rate is higher than the statewide 4:3:1 immunization rate of 80.8 percent.

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



- ❖ **The 4:3:1:3 immunization coverage estimate is 89.7 percent (52/58).** This rate is much higher than the statewide 4:3:1:3 immunization rate of percent 79.9.
- ❖ **The 4:3:1:3:3:1 immunization coverage estimate is 86.2 percent (50/58).** This rate is also much higher than the statewide 4:3:1:3:3:1 immunization rate of percent 76.8.

**Table 86:
District Immunization Rates for
Health District 8-1 by Study Year***

Vaccine	2002 Adequate Rates	2003 Adequate Rates	2004 Adequate Rates	2005 Adequate Rates	2006 Adequate Rates
4 DTP/DTaP	82.2%	91.9%	89.5%	94.3%	89.7%
3 OPV/IPV	91.5%	96.0%	96.1%	97.7%	91.4%
1 MMR	93.8%	95.2%	92.1%	97.7%	89.7%
3 Hib	94.6%	95.2%	94.7%	96.6%	93.1%
3 HepB	94.6%	96.0%	96.1%	97.7%	94.8%
1 Varicella	93.0%	94.4%	92.1%	96.6%	91.4%
3 PCV	---	---	39.5%	88.6%	87.9%
4 PCV	---	---	13.2%	31.8%	53.4%

*PCV data not collected before 2004.

Table 86 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 53.4 to 94.8 percent for the 2006 study data.

Table 87 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 87:
2006 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 8-1**

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	56	96.6%
DTP2/DTaP2	55	94.8%
DTP3/DTaP3	50	86.2%
DTP4/DTaP4	0	0.0%
DTP5/DTaP5	0	0.0%
OPV/IPV1	56	96.6%
OPV/IPV2	55	94.8%
OPV/IPV3	39	67.2%
OPV/IPV4	0	0.0%
MMR1	1	1.7%
MMR2	0	0.0%
HIB1	56	96.6%
HIB2	54	93.1%
HIB3	16	27.6%
HIB4	0	0.0%
HIB5	0	0.0%
HEPB1	56	96.6%
HEPB2	56	96.6%
HEPB3	42	72.4%
HEPB4	10	17.2%
VAR1	2	3.4%
VAR2	0	0.0%
PCV1	56	96.6%
PCV2	53	91.4%
PCV3	33	56.9%
PCV4	0	0.0%
PCV5	0	0.0%

*Percent = number immunized / sample size
Sample size = 58

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

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	67/80 (83.8)	59/69 (85.5)	48/51 (94.1)	58/62 (93.5)	34/37 (91.9)
Black	38/48 (79.2)	45/53 (84.9)	19/24 (79.2)	20/21 (95.2)	18/21 (85.7)
Other	1/1 (100.0)	2/2 (100.0)	1/1 (100.0)	2/2 (100.0)	--- ---
Unknown	--- ---	--- ---	--- ---	3/3 (100.0)	--- ---
Total	106/129 (82.2)	106/124 (85.5)	68/76 (89.5)	83/88 (94.3)	52/58 (89.7)

Table 88 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 88 shows that the immunization rate of children varies with maternal race in District 8-1.

Table 89:
**Cross tabulations of Maternal Educational Level and
 Child Immunization Status for Health District 8-1 by Study Year**

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	6/9 (66.7)	---	1/1 (100.0)	4/4 (100.0)	1/1 (100.0)
Some high school	29/35 (82.9)	19/23 (82.6)	17/19 (89.5)	18/19 (94.7)	11/13 (84.6)
High school graduate	34/40 (85.0)	41/47 (87.2)	15/18 (83.3)	21/23 (91.3)	18/18 (100.0)
Some college	22/27 (81.5)	17/19 (89.5)	19/20 (95.0)	22/22 (100.0)	9/10 (90.0)
College or more	15/18 (83.3)	29/35 (82.9)	16/18 (88.9)	18/20 (90.0)	13/16 (81.3)
Total	106/129 (82.2)	106/124 (85.5)	68/76 (89.5)	83/88 (94.3)	52/58 (89.7)

Table 89 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 90:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 8-1

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Medicaid	64/74 (86.5)	80/92 (87.0)	42/48 (87.5)	55/59 (93.2)	38/43 (88.4)
Non-Medicaid	42/55 (76.4)	26/32 (81.3)	26/28 (92.9)	28/29 (96.6)	14/15 (93.3)
Total	106/129 (82.2)	106/124 (85.5)	68/76 (89.5)	83/88 (94.3)	52/58 (89.7)

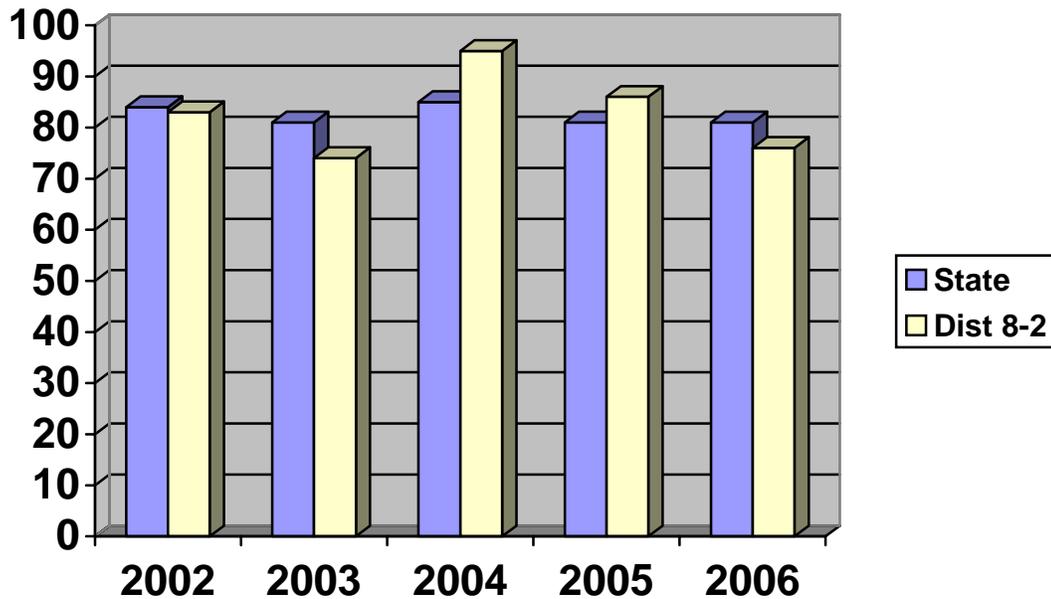
Table 90 shows immunization status of children born to women stratified by Medicaid status for the 2002, 2003, 2004, 2005 and 2006 study years. Table 91 shows that the immunization rates of children in District 8-1 vary with maternal Medicaid status.

Individual Health District Report: District 8-2

The eligible sample from this district included 139 children born in January 2004. From the 139 children, 127 records were located (Response Rate=91.4%). Of the 127 located records, there were no parental refusals leaving a final sample of 127 records.

- ❖ **The 4:3:1 immunization coverage estimate is 76.4 percent (97/127).** This rate is lower than the statewide 4:3:1 immunization rate of 80.8 percent.

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



- ❖ **The 4:3:1:3 immunization coverage estimate rate is 74.8 percent (95/127).** This rate is lower than the statewide 4:3:1:3 immunization rate of 79.9 percent.
- ❖ **The 4:3:1:3:3:1 immunization coverage estimate rate is 73.2 percent (93/127).** This rate is also lower than the statewide 4:3:1:3:3:1 immunization rate of 76.8 percent.

**Table 91:
District Immunization Rates for
Health District 8-2 by Study Year***

Vaccine	2002 Adequate Rates	2003 Adequate Rates	2004 Adequate Rates	2005 Adequate Rates	2006 Adequate Rates
4 DTP/DTaP	85.7%	75.3%	94.9%	87.1%	77.2%
3 OPV/IPV	90.9%	80.7%	97.7%	91.9%	85.8%
1 MMR	92.2%	81.3%	97.7%	93.5%	87.4%
3 Hib	92.2%	81.3%	98.3%	93.5%	91.3%
3 HepB	92.2%	82.0%	97.7%	98.4%	89.8%
1 Varicella	90.9%	78.0%	97.7%	93.5%	85.0%
3 PCV	---	---	38.9%	85.5%	81.1%
4 PCV	---	---	8.0%	27.4%	62.2%

*PCV data not collected before 2004.

Table 91 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 62.2 to 91.3 percent for the 2006 study data.

Table 92 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 92:
2006 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 8-2**

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	125	98.4%
DTP2/DTaP2	122	96.1%
DTP3/DTaP3	108	85.0%
DTP4/DTaP4	1	0.8%
DTP5/DTaP5	0	0.0%
OPV/IPV1	125	98.4%
OPV/IPV2	122	96.1%
OPV/IPV3	67	52.8%
OPV/IPV4	0	0.0%
MMR1	1	0.8%
MMR2	0	0.0%
HIB1	125	98.4%
HIB2	121	95.3%
HIB3	44	34.6%
HIB4	0	0.0%
HIB5	0	0.0%
HEPB1	127	100.0%
HEPB2	124	97.6%
HEPB3	87	68.5%
HEPB4	1	0.8%
VAR1	1	0.8%
VAR2	0	0.0%
PCV1	116	91.3%
PCV2	110	86.6%
PCV3	86	67.7%
PCV4	1	0.8%
PCV5	0	0.0%

*Percent = number immunized / sample size
Sample size = 127

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

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	21/28 (75.0)	47/78 (60.3)	83/88 (94.3)	24/30 (80.0)	48/59 (81.4)
Black	40/46 (87.0)	50/71 (70.4)	83/87 (95.4)	27/30 (90.0)	48/67 (71.6)
Other	1/1 (100.0)	0/1 (0.0)	---	---	1/1 (100.0)
Unknown	2/2 (100.0)	---	---	2/2 (100.0)	---
Total	64/77 (83.1)	97/150 (64.7)	166/175 (94.9)	53/62 (85.5)	97/127 (76.4)

Table 93 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 93 shows that the immunization rates of children in District 8-2 vary with maternal race.

Table 94:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 8-2 by Study Year

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	7/10 (70.0)	0/2 (0.0)	2/2 (100.0)	4/4 (100.0)	2/2 (100.0)
Some high school	21/24 (87.5)	25/37 (67.6)	41/42 (97.6)	8/10 (80.0)	15/26 (57.7)
High school graduate	19/25 (76.0)	30/49 (61.2)	52/56 (92.9)	19/23 (82.6)	31/36 (86.1)
Some college	11/12 (91.7)	21/29 (72.4)	39/40 (97.5)	14/15 (93.3)	23/29 (79.3)
College or more	6/6 (100.0)	21/33 (63.6)	32/35 (91.4)	8/10 (80.0)	26/34 (76.5)
Total	64/77 (83.1)	97/150 (64.7)	166/175 (94.9)	53/62 (85.5)	97/127 (76.4)

Table 94 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 95:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 8-2

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Medicaid	43/54 (79.6)	60/87 (70.0)	105/110 (95.5)	34/41 (82.9)	63/84 (75.0)
Non-Medicaid	21/23 (91.3)	37/63 (58.7)	61/65 (93.8)	19/21 (90.5)	34/43 (79.1)
Total	64/77 (83.1)	97/150 (64.7)	166/175 (94.9)	53/62 (85.5)	97/127 (76.4)

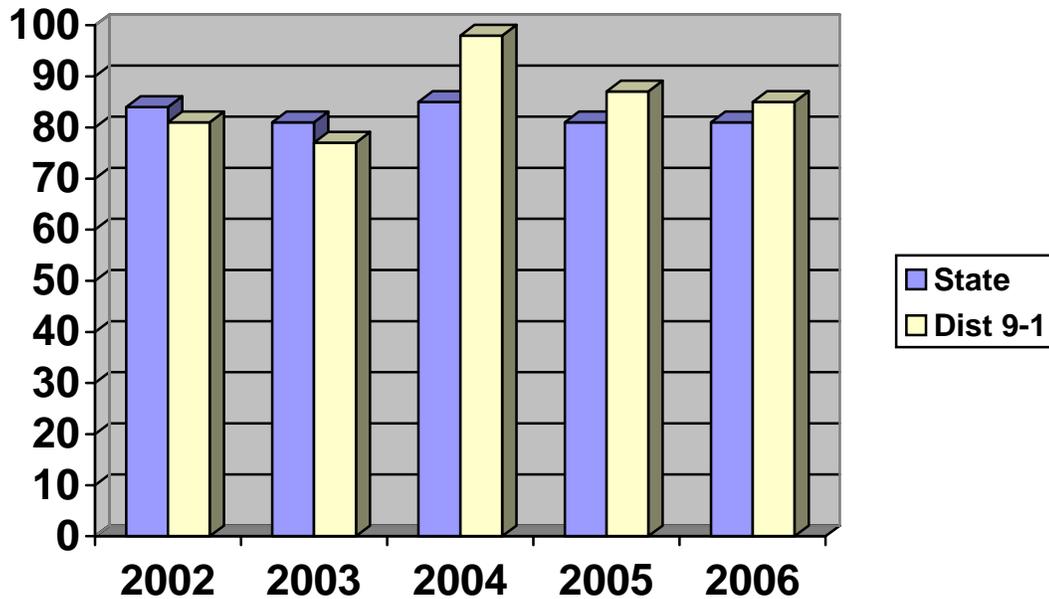
Table 95 shows immunization status of children born to women stratified by Medicaid status for the 2002, 2003, 2004, 2005 and 2006 study years. In the 2006 study year, children born to non-Medicaid women had a higher immunization rate than children born to women using Medicaid.

Individual Health District Report: District 9-1

The eligible sample from this district included 177 children born in January 2004. From the 177 children, 168 records were located (Response Rate=94.9%). Of the 168 located records, there were no parental refusals leaving a final sample of 168 records.

- ❖ **The 4:3:1 immunization coverage estimate is 84.5 percent (142/168).** This rate is higher than the statewide 4:3:1 immunization rate of 80.8 percent.

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



- ❖ **The 4:3:1:3 immunization coverage estimate is 82.7 percent (139/168).** This rate is higher than the statewide 4:3:1:3 immunization rate of 79.9 percent.
- ❖ **The 4:3:1:3:3:1 immunization coverage estimate is 78.6 percent (132/168).** This rate is also higher than the statewide 4:3:1:3:3:1 immunization rate of 76.8 percent.

**Table 96:
District Immunization Rates for
Health District 9-1 by Study Year***

Vaccine	2002 Adequate Rates	2003 Adequate Rates	2004 Adequate Rates	2005 Adequate Rates	2006 Adequate Rates
4 DTP/DTaP	81.6%	77.3%	97.5%	87.0%	85.1%
3 OPV/IPV	90.1%	88.7%	98.8%	94.4%	93.5%
1 MMR	89.5%	90.0%	98.8%	92.6%	91.1%
3 Hib	90.8%	87.3%	98.8%	94.4%	93.5%
3 HepB	90.1%	79.3%	100%	96.3%	92.9%
1 Varicella	83.6%	83.3%	98.8%	94.4%	92.9%
3 PCV	---	---	53.1%	75.9%	82.7%
4 PCV	---	---	17.3%	33.3%	61.9%

*PCV data not collected before 2004.

Table 96 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 61.9 to 93.5 percent for the 2006 study data.

Table 97 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 97:
2006 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 9-1

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	166	98.8%
DTP2/DTaP2	164	97.6%
DTP3/DTaP3	151	89.9%
DTP4/DTaP4	0	0.0%
DTP5/DTaP5	0	0.0%
OPV/IPV1	166	98.8%
OPV/IPV2	163	97.0%
OPV/IPV3	108	64.3%
OPV/IPV4	1	0.6%
MMR1	2	1.2%
MMR2	0	0.0%
HIB1	166	98.8%
HIB2	162	96.4%
HIB3	54	32.1%
HIB4	0	0.0%
HIB5	0	0.0%
HEPB1	166	98.8%
HEPB2	165	98.2%
HEPB3	97	57.7%
HEPB4	9	5.4%
VAR1	1	0.6%
VAR2	0	0.0%
PCV1	151	89.9%
PCV2	144	85.7%
PCV3	115	68.5%
PCV4	3	1.8%
PCV5	0	0.0%

*Percent = number immunized / sample size
Sample size = 168

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

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	51/65 (78.5)	53/74 (71.6)	23/24 (96.3)	18/22 (81.8)	81/95 (85.3)
Black	70/83 (84.3)	55/73 (75.3)	51/52 (98.1)	26/29 (89.7)	57/69 (82.6)
Other	0/1 (0.0)	2/3 (66.7)	5/5 (100.0)	3/3 (100.0)	4/4 (100.0)
Unknown	2/3 (66.7)	---	---	---	---
Total	123/152 (80.9)	110/150 (73.3)	79/81 (98.3)	47/54 (87.0)	142/168 (84.5)

Table 98 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 98 shows that the immunization rate of children born to white mothers was greater than that of black mothers during the 2006 study.

Table 99:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 9-1 by Study Year

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	2/2 (100.0)	---	---	---	3/3 (100.0)
Some high school	21/29 (72.4)	10/15 (66.7)	10/10 (100.0)	7/7 (100.0)	20/25 (80.0)
High school graduate	50/60 (83.3)	44/61 (72.1)	24/26 (92.3)	18/21 (85.7)	42/51 (82.4)
Some college	19/27 (70.4)	22/30 (73.3)	20/20 (100.0)	13/16 (81.3)	44/51 (86.3)
College or more	30/33 (90.9)	34/44 (77.3)	25/25 (100.0)	9/10 (90.0)	33/38 (86.8)
Unknown	1/1 (100.0)	---	---	---	---
Total	123/152 (80.9)	110/150 (73.3)	79/81 (97.5)	47/54 (87.0)	142/168 (84.5)

Table 99 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 100:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 9-1

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Medicaid	69/89 (77.5)	60/86 (69.8)	49/50 (98.0)	33/38 (86.8)	84/103 (81.6)
Non-Medicaid	54/63 (85.7)	50/64 (78.1)	30/31 (96.8)	14/16 (87.5)	58/65 (89.2)
Total	123/152 (80.9)	110/150 (73.3)	79/81 (97.5)	47/54 (87.0)	142/168 (84.5)

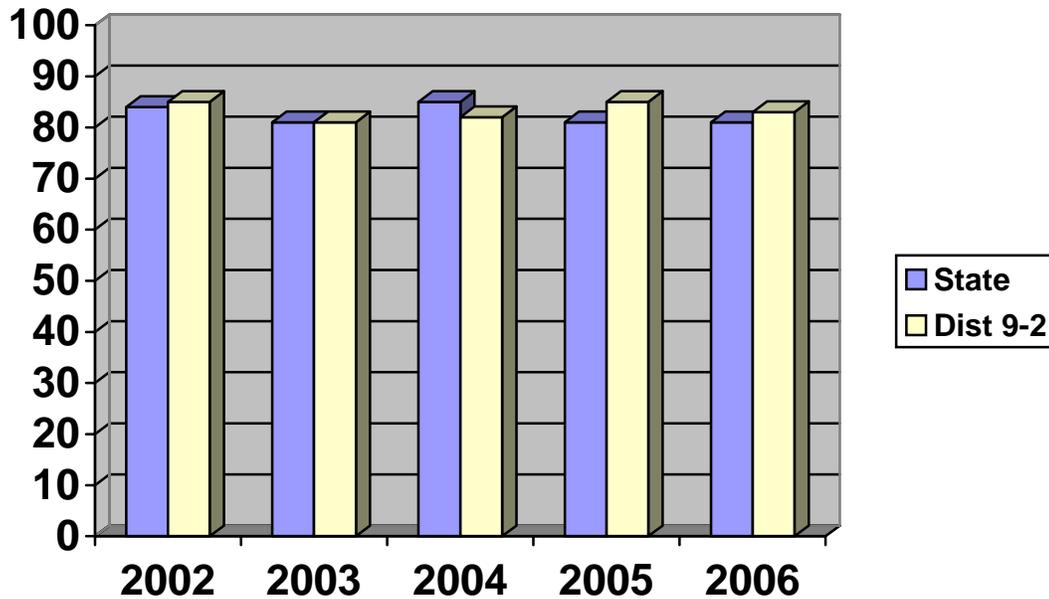
Table 100 shows immunization status of children born to women stratified by Medicaid status for the 2002, 2003, 2004, 2005 and 2006 study years. For the 2006 study, children born to non-Medicaid women had a higher immunization rate than children born to women using Medicaid.

Individual Health District Report: District 9-2

The eligible sample from this district included 127 children born in January 2004. From the 127 children, 123 records were located (Response Rate=96.9%). Of the 123 located records, there were no parental refusals leaving a final sample of 123 records.

- ❖ **The 4:3:1 immunization coverage estimate is 82.9 percent (102/123).**
This rate is slightly higher than the statewide 4:3:1 immunization rate of 80.8 percent.

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



- ❖ **The 4:3:1:3 immunization coverage estimate is 80.5 percent (99/123).**
This rate is nearly equal to the statewide 4:3:1:3 immunization rate of 79.9 percent.
- ❖ **The 4:3:1:3:3:1 immunization coverage estimate is 77.2 percent (95/123).** This rate is slightly higher than the statewide 4:3:1:3:3:1 immunization rate of 76.8 percent.

**Table 101:
District Immunization Rates for
Health District 9-2 by Study Year***

Vaccine	2002 Adequate Rates	2003 Adequate Rates	2004 Adequate Rates	2005 Adequate Rates	2006 Adequate Rates
4 DTP/DTaP	86.5%	82.6%	83.0%	86.0%	83.7%
3 OPV/IPV	92.1%	88.4%	90.4%	93.3%	92.7%
1 MMR	94.4%	90.6%	89.6%	92.1%	86.2%
3 Hib	93.3%	86.2%	91.1%	91.5%	86.2%
3 HepB	92.1%	87.7%	90.4%	95.7%	90.2%
1 Varicella	87.6%	91.3%	90.4%	93.3%	87.8%
3 PCV	---	---	39.3%	79.3%	89.4%
4 PCV	---	---	5.2%	28.7%	54.5%

*PCV data not collected before 2004.

Table 101 reveals the coverage rates of each vaccine series. Coverage rates ranged from 54.5 to 92.7 percent for the 2006 study data.

Table 102 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 102:
2006 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 9-2

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	122	99.2%
DTP2/DTaP2	118	95.9%
DTP3/DTaP3	106	86.2%
DTP4/DTaP4	1	0.8%
DTP5/DTaP5	0	0.0%
OPV/IPV1	122	99.2%
OPV/IPV2	118	95.9%
OPV/IPV3	70	56.9%
OPV/IPV4	0	0.0%
MMR1	2	1.6%
MMR2	0	0.0%
HIB1	122	99.2%
HIB2	116	94.3%
HIB3	27	22.0%
HIB4	0	0.0%
HIB5	0	0.0%
HEPB1	122	99.2%
HEPB2	118	95.9%
HEPB3	95	77.2%
HEPB4	31	25.2%
VAR1	2	1.6%
VAR2	0	0.0%
PCV1	121	98.4%
PCV2	116	94.3%
PCV3	74	60.2%
PCV4	1	0.8%
PCV5	0	0.0%

*Percent = number immunized / sample size
Sample size = 123

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

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	50/59 (84.7)	76/104 (73.1)	81/97 (83.5)	98/116 (84.5)	70/81 (86.4)
Black	24/28 (85.7)	25/32 (78.1)	29/37 (78.4)	40/46 (87.0)	31/41 (75.6)
Other	---	1/2 (50.0)	1/1 (100.0)	1/1 (100.0)	1/1 (100.0)
Unknown	2/2 (100.0)	---	---	1/1 (100.0)	---
Total	76/89 (85.4)	102/138 (73.9)	111/135 (82.2)	140/164 (85.4)	102/123 (82.9)

Table 103 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 103 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 did not vary significantly to that of black mothers.

Table 104:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 9-2 by Study Year

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	7/9 (77.8)	1/1 (100.0)	1/1 (100.0)	1/1 (100.0)	---
Some high school	17/19 (89.5)	10/17 (58.8)	27/35 (77.1)	36/41 (87.8)	18/24 (75.0)
High school graduate	33/37 (89.2)	39/59 (66.1)	31/39 (79.5)	43/48 (89.6)	47/52 (90.4)
Some college	13/18 (72.2)	26/31 (83.9)	25/29 (86.2)	30/38 (78.9)	15/18 (83.3)
College or more	5/5 (100.0)	26/30 (86.7)	27/31 (87.1)	30/36 (83.3)	22/29 (75.9)
Unknown	1/1 (100.0)	---	---	---	---
Total	76/89 (85.4)	102/138 (73.9)	111/135 (82.2)	140/164 (85.4)	102/123 (82.9)

Table 104 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 varies with level of maternal educational attainment.

Table 105:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 9-2

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Medicaid	54/62 (87.1)	56/81 (69.1)	82/103 (79.6)	101/116 (87.1)	74/91 (81.3)
Non-Medicaid	22/27 (81.5)	46/57 (80.7)	29/32 (90.6)	39/48 (81.3)	28/32 (87.5)
Total	76/89 (85.4)	102/138 (73.9)	111/135 (82.2)	140/164 (85.4)	102/123 (82.9)

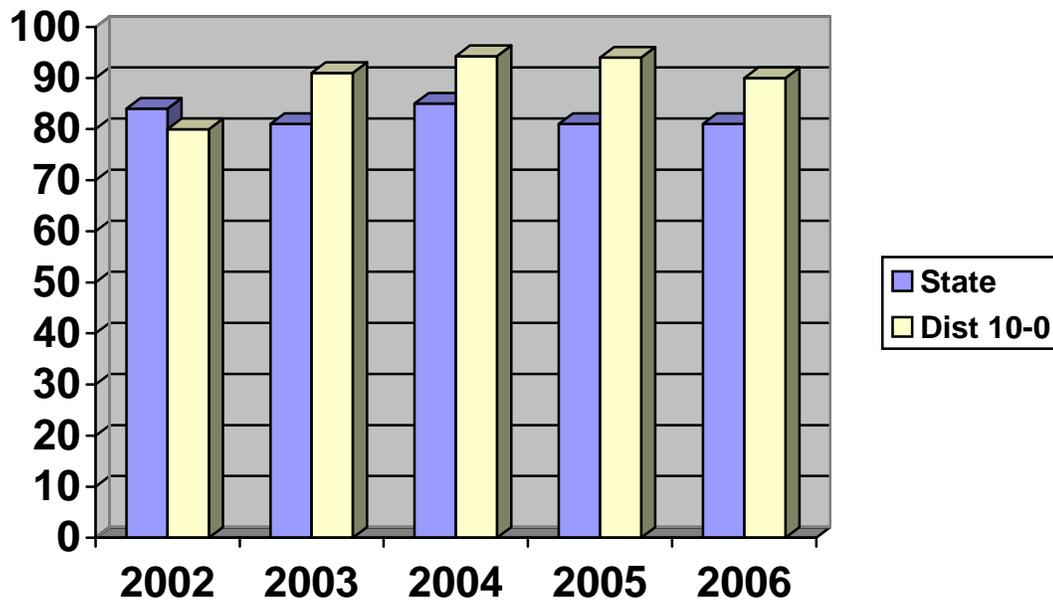
Table 105 shows immunization status of children born to women stratified by Medicaid status for the 2002, 2003, 2004, 2005 and 2006 study years. For the 2006 study, children born to non-Medicaid women had a higher immunization rate than children born to women using Medicaid.

Individual Health District Report: District 10-0

The eligible sample from this district included 83 children born in January 2004. From the 83 children, 74 records were located (Response Rate=89.2%). Of the 74 located records, there were 2 parental refusals leaving a final sample of 72 records.

- ❖ **The 4:3:1 immunization coverage estimate is 90.3 percent (65/72).** This rate is much higher than the statewide 4:3:1 immunization rate of 80.8 percent.

Figure 21: 4:3:1 Coverage for State and District 10-0



- ❖ **The 4:3:1:3 immunization coverage estimate is 88.9 percent (64/72).** This rate is much higher than the statewide 4:3:1:3 immunization rate of 79.9 percent.
- ❖ **The 4:3:1:3:3:1 immunization coverage estimate is 87.5 percent (63/72).** This rate is also much higher than the statewide 4:3:1:3:3:1 immunization rate of 76.8 percent.

Table 106:
District Immunization Rates for
Health District 10-0 by Study Year*

Vaccine	2002 Adequate Rates	2003 Adequate Rates	2004 Adequate Rates	2005 Adequate Rates	2006 Adequate Rates
4 DTP/DTaP	80.2%	93.2%	94.3%	93.5%	94.4%
3 OPV/IPV	86.0%	93.2%	98.9%	98.4%	94.4%
1 MMR	90.1%	93.8%	97.7%	98.4%	94.4%
3 Hib	86.8%	95.7%	95.5%	98.4%	97.2%
3 HepB	88.4%	95.1%	94.3%	98.4%	94.4%
1 Varicella	86.8%	95.7%	94.3%	98.4%	93.1%
3 PCV	---	---	60.2%	91.9%	90.3%
4 PCV	---	---	25.0%	35.5%	61.1%

*PCV data not collected before 2004.

Table 106 reveals the coverage rates of each vaccine series. Vaccine coverage rates ranged from 61.1 to 97.2 percent for the 2006 study data.

Table 107 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 107:
2006 District Immunization Rates by Individual Vaccine at
12 Months of Age for Health District 10-0**

Vaccine Dose	Number Immunized	Percent*
DTP1/DTaP1	72	100.0%
DTP2/DTaP2	72	100.0%
DTP3/DTaP3	69	95.8%
DTP4/DTaP4	1	1.4%
DTP5/DTaP5	0	0.0%
OPV/IPV1	72	100.0%
OPV/IPV2	71	98.6%
OPV/IPV3	38	52.8%
OPV/IPV4	0	0.0%
MMR1	0	0.0%
MMR2	0	0.0%
HIB1	72	100.0%
HIB2	72	100.0%
HIB3	17	23.6%
HIB4	0	0.0%
HIB5	0	0.0%
HEPB1	72	100.0%
HEPB2	72	100.0%
HEPB3	27	37.5%
HEPB4	1	1.4%
VAR1	1	1.4%
VAR2	0	0.0%
PCV1	70	97.2%
PCV2	67	93.1%
PCV3	50	69.4%
PCV4	1	1.4%
PCV5	0	0.0%

*Percent = number immunized / sample size
Sample size = 72

Table 108:
Cross tabulations of Maternal Race and
Child Immunization Status for Health District 10-0 by Study Year

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Race	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
White	69/88 (78.4)	111/127 (87.4)	63/65 (96.9)	42/45 (93.3)	54/60 (90.0)
Black	26/31 (83.9)	23/30 (76.7)	18/21 (85.7)	15/16 (93.8)	9/9 (100.0)
Other	1/1 (100.0)	4/5 (80.0)	2/2 (100.0)	1/1 (100.0)	2/3 (66.7)
Unknown	1/1 (100.0)	---	---	---	---
Total	97/121 (80.2)	138/162 (85.2)	83/88 (94.3)	58/62 (93.5)	65/72 (90.3)

Table 108 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 108 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 vary with maternal race.

Table 109:
Cross tabulations of Maternal Educational Level and
Child Immunization Status for Health District 10-0 by Study Year

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Educational Level	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Less than high school	5/7 (71.4)	---	---	---	1/1 (100.0)
Some high school	25/29 (86.2)	26/32 (81.3)	12/14 (85.7)	8/9 (88.9)	7/8 (87.5)
High school graduate	35/47 (74.5)	45/59 (76.3)	29/32 (90.6)	15/16 (93.8)	23/26 (88.5)
Some college	12/14 (85.7)	28/31 (90.3)	18/18 (100.0)	13/15 (86.7)	8/9 (88.9)
College or more	20/23 (87.0)	39/40 (97.5)	24/24 (100.0)	22/22 (100.0)	26/28 (92.9)
Unknown	0/1 (0.0)	---	---	---	---
Total	97/121 (80.2)	138/162 (85.2)	83/88 (94.3)	58/62 (93.5)	65/72 (90.3)

Table 109 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 seems to vary with maternal educational attainment.

Table 110:
Cross tabulations of Maternal Medicaid Status and
Child Immunization Status for Health District 10-0

	2002 4:3:1 Adequate	2003 4:3:1 Adequate	2004 4:3:1 Adequate	2005 4:3:1 Adequate	2006 4:3:1 Adequate
Maternal Medicaid Status	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)	#/Total (percent)
Medicaid	47/59 (79.7)	71/86 (82.6)	39/43 (90.7)	26/29 (89.7)	28/34 (82.4)
Non-Medicaid	50/62 (80.6)	67/76 (88.2)	44/45 (97.8)	32/33 (97.0)	37/38 (97.4)
Total	97/121 (80.2)	138/162 (85.2)	83/88 (94.3)	58/62 (93.5)	65/72 (90.3)

Table 110 shows immunization status of children born to women stratified by Medicaid status for the 2002, 2003, 2004, 2005 and 2006 study years. For Health District 10-0, children born to non-Medicaid women had a higher immunization rate than children born to women using Medicaid.

**Section V:
Discussion of Results**

Section V: Discussion

Summary

The purpose of the tenth 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 2006. To assess these rates, the study drew an original sample of 2,765 children born in January 2004. The final sample of returned immunization records totaled 2,765. After removal of ineligible children (those deceased, adopted, moved out of state, born in military hospitals) the eligible sample was 2,674. Of these, 2,331 were located and make up the final sample.

The tenth year of the GIS, 2006, measured immunization coverage for children born in 2004 at four levels:*

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

Of these four coverage levels, 4:3:1:3:3:1 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 2002, 2003, 2004, 2005 and 2006. The newer 4:3:1:3:3:1 measure of coverage

*It must be remembered that the 2006 study is estimating 2004 rates. The 2005 study is estimating 2003 rates, 2004 study estimated 2002 rates, 2003 study estimated 2001 rates, and the 2002 study estimated rates for 2000.

was added in 1997-98. Therefore, 4:3:1:3:3:1 rates can be compared using study data from the 1997-98 on.

The 2006 results reflect immunization rates for children born in 2004. The results of the study indicate that, of the 2,331 children whose immunization records were located during data collection:

- 76.8 percent of children born in January of 2004 in Georgia were adequately immunized with the 4:3:1:3:3:1 vaccine series.
- 80.8 percent of children born in January of 2004 in Georgia were adequately immunized with the 4:3:1 vaccine series.

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

- 68.6 percent to 100.0 percent in the 2006 study
- 53.3 percent to 97.8 percent in the 2005 study
- 65.1 percent to 100 percent in the 2004 study
- 66.0 percent to 94.7 percent in the 2003 study
- 73.9 percent to 94.3 percent in the 2002 study
- 42.4 percent to 94.8 percent in the 2001 study

The study investigated where the immunizations are being administered in Georgia (See Appendix E). In the tenth study year, 80.5 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

Immunization rates for the 4:3:1:3:3:1 vaccine series remained the same from the 2005 study (76.5 to 76.8). The 2006 Georgia Immunization Study (GIS) measured Varicella rates for the ninth 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 4:3:1:3:3:1 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 stabilized statewide from the 2005 study of 80.7 percent to 80.8 percent in 2006.

The results of the previous four years of the GIS study (2002, 2003, 2004 and 2005) show that immunization-specific coverage rates for the state remained relatively similar during the years when all shots were given, 2000, 2001, 2002 and 2003, respectively.

Strengths

1. This study represents Georgia's tenth successful statewide, population-based assessment of immunization coverage rates. Dr. Joan Herold, Demographer/Survey Specialist at Emory University, originally developed the sampling methodology for the study. 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. 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 4:3:1:3:3:1 vaccine series.
 - Comparison of rates for children born in 2000, 2001, 2002, 2003 and 2004 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 4 percent for the 2006 study.

5. The implementation of the Georgia Registry of Immunizations and Transaction Services (GRITS) has assisted with locating immunization records. The response rate for 2006 was 88.6 percent, which is 4% increase over the 2005 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 2004 and, thus, represented a generalizable estimate of coverage rates for all two-year-olds born in 2004, 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 parents in the Metro Atlanta District more often refused to participate (District 3-1 and 3-2). Response rates also tend to be lower in the Metro area (Districts 3-2 and 3-3).

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 2004 who were residing in the state in 2006. 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 2004 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 2004. 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 2006. 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 111: Data Used for Sample Size Estimates for the 2006 Study. Response rates and immunization coverage levels from the 2005 study were used in the sample size calculation for the 2006 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 2005 study. The final calculated sample size is shown in the last column (Column H) of Table 111. 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 77.0 percent to a high of 100.0 percent, with the average response rate for the state at 88.6 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 111:
Data Used for Sample Size Estimates
for the 2006 Study**

A	B	C	D	E	F	G	H
Health District	Jan 2004 Total Births	Jan 2004 Eligible Births	2005 4:3:1 Immunization Rates	2006 First Sample Estimate	2006 Second Sample Estimate	Return Rate based on 2005 Eligible Sample	2006 Adjusted Sample Size
1-1	740	725	0.795	250	186	0.965	193
1-2	467	459	0.970	45	41	0.993	41
2-0	649	640	0.978	33	31	0.94	33
3-1	1,010	986	0.759	281	219	0.828	264
3-2	1,076	1,040	0.726	306	236	0.652	362
3-3	403	395	0.533	382	194	0.811	240
3-4	1,234	1,200	0.902	136	122	0.913	134
3-5	944	915	0.723	308	230	0.746	309
4-0	775	756	0.816	231	177	0.915	193
5-1	158	156	0.947	77	52	0.974	53
5-2	598	585	0.878	165	128	0.913	141
6-0	555	537	0.939	88	76	0.975	78
7-0	434	368	0.903	135	99	0.876	113
8-1	307	302	0.943	83	65	0.938	69
8-2	418	414	0.855	191	130	0.939	139
9-1	663	591	0.840	207	153	0.828	185
9-2	395	385	0.854	192	128	0.976	131
10-0	476	466	0.935	93	78	0.892	87
State	11,302	10,920					2,765

Figure 22:
Explanations of Table 111
Data Used for Sample Size Estimates
For the 2006 Study

<u>Column A:</u>	Health District	District number.
<u>Column B:</u>	January 2004 Total Births	Given. Source: DHR Vital Statistics Office.
<u>Column C:</u>	January 2004 Eligible Births	
<u>Column D:</u>	2005 4:3:1 Immunization Rates	Given. Source: Georgia Birth Cohort Follow-up Study (2005).
<u>Column E:</u>	First Sample Estimate - 2006 Study	Formula Used: $3.8416 \times (D) (1 - D) / .0025$
<u>Column F:</u>	Second Sample Estimate - 2006 Study	Adjustment for small size district populations. Formula Used: $E / (1 + E/C)$.
<u>Column G:</u>	Estimated Return Rate (Based on 2005 Study)	Given. Source: Georgia Birth Cohort Follow-up Study (2005).
<u>Column H:</u>	Adjusted Sample Size - 2006 Study	Formula Used: $(\text{Column F}) / (\text{Column G})$

APPENDIX B:

**LIST OF 2006 PUBLIC HEALTH REPRESENTATIVES
FOR THE
GEORGIA IMMUNIZATION STUDY**

APPENDIX B: LIST OF 2006 PUBLIC HEALTH REPRESENTATIVES FOR THE GEORGIA IMMUNIZATION STUDY

<u>Health District</u>	<u>Public Health Representative</u>
1-1	Gayle Brannon, R.N., B.S.N.
1-2	Marian Babb, R.N. Ann Vossen, R.N.
2-0	Sandy Moore, LPN Janie Dalton, R.N.
3-1	Joy Stymest Karen Dibling, R.N., B.S.N.
3-2	Georgia Goseer, R.N. Jessica Harris
3-3	Freda Sheppard, L.P.N.
3-4	Brenda Crowe Gloria Melvin
3-5	Delicia Colbert Joyce Hess, R.N.
4-0	Tina Dempsey, L.P.N. Deborah Cox, L.P.N. Amy Fenn, RN
5-1	Donna Forth, R.N. Kelly Knight
5-2	Debbie Liby, R.N.
6-0	Melba McNorrill, R.N. Clois Witt, R.N., B.S.N.
7-0	Beverly Roberson, R.N., B.S.N.
8-1	Yugonda Thomas Courtney D. Sheeley, M.P.A. D. Geneine Godfrey, M.P.H.
8-2	Edward W. Sullivan
9-1	Marianne Pappas, R.N. Cathy Schmidt, R.N. Joanne Burnsed Nan Swindell, B.S.N. Katie Golden, B.S.N. Barbara Scott, R.N.
9-2	Betty Miller Jessie Jones Doris Wilbon, B.S. Virginia Bellamy, B.S.N. Kimberly Brown, B.S.N. Pat Thomas, R.N. Hollard Phillips, M.S.
10-0	Dionne Hansey 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 112 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 112:
2006 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	144	88.3	150	92.0	0	0.0
1-2	35	94.6	37	100.0	0	0.0
2-0	24	88.9	25	92.6	0	0.0
3-1	181	83.0	185	84.9	0	0.0
3-2	219	79.1	225	81.2	0	0.0
3-3	135	82.3	141	86.0	1	0.6
3-4	110	94.0	112	95.7	0	0.0
3-5	199	81.9	206	84.8	0	0.0
4-0	150	81.5	154	83.7	1	0.5
5-1	43	89.6	47	97.9	1	2.1
5-2	122	93.1	127	96.9	1	0.8
6-0	71	95.9	73	98.6	0	0.0
7-0	93	93.0	96	96.0	0	0.0
8-1	51	87.9	53	91.4	0	0.0
8-2	107	84.3	108	85.0	0	0.0
9-1	149	88.7	156	92.9	0	0.0
9-2	106	86.2	108	87.8	0	0.0
10-0	66	91.7	67	93.1	0	0.0
Statewide	2,005	86.0	2,070	88.8	4	0.02

Figure 23: 2006 State Varicella Coverage Rates and Percentage of Sample with Chicken Pox Disease

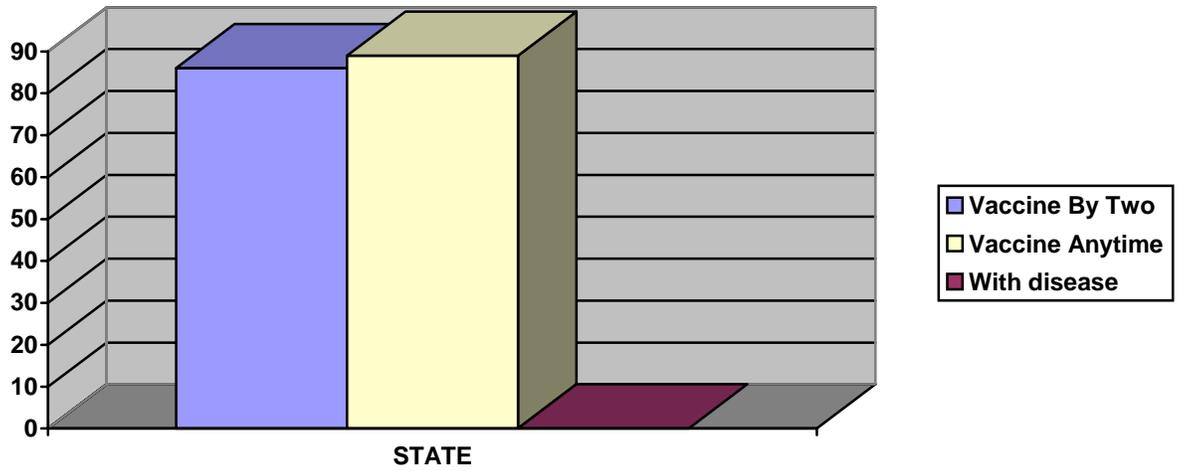


Figure 23 depicts the Varicella rate by the age of two years and the Varicella rate without the two-year cut-off (received Varicella shot at any time during the data collection period). The last bar indicates the percentage of children with documented chicken pox disease at any point in time.

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 113.

Table 113:
Statewide Percentage of Shots by Provider: 2002, 2003, 2004, 2005 and 2006

Provider	2002		2003		2004		2005		2006	
	Total #	%								
Public Health Dept	8,085	20.3	5,873	16.3	5,449	14.3	6,013	13.2	4,793	11.6
Private Physician	28,667	71.9	26,956	74.8	26,734	70.1	35,065	77.1	33,268	80.5
Unknown	3,112	7.8	3,205	8.9	5,966	15.6	4,407	9.7	3,256	7.9
Total	39,864	100.0	36,034	100.0	38,149	100.0	45,485	100.0	41,317	100.0

As shown in Table 113, in 2006, over 80% of the shots recorded for the sampled children were given by a private provider.

Location of Immunizations by District

Table 114 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 114:
District Specific Percentage of Shots by Provider 2006

District	Public Health Department		Private Physician		Unknown		Total Shots Given
	# Shots Given	Percent	# Shots Given	Percent	# Shots Given	Percent	
1-1	184	6.3	2,492	84.9	258	8.8	2,934
1-2	40	5.6	659	92.8	11	1.6	710
2-0	75	15.2	419	84.8	0	0.0	494
3-1	229	5.9	1,788	46.4	1,835	47.7	3,852
3-2	308	6.8	3,977	87.2	277	6.0	4,562
3-3	307	10.9	2,199	78.2	307	10.9	2,813
3-4	49	2.2	2,169	97.8	0	0.0	2,218
3-5	431	10.5	3,562	87.2	93	2.3	4,086
4-0	590	18.5	2,561	80.5	33	1.0	3,184
5-1	151	16.9	743	83.1	0	0.0	894
5-2	383	15.7	1,861	76.3	195	8.0	2,439
6-0	161	11.0	1,277	87.2	27	1.8	1,465
7-0	98	5.4	1,713	94.6	0	0.0	1,811
8-1	83	7.9	967	92.1	0	0.0	1,050
8-2	73	3.2	2,182	96.8	0	0.0	2,255
9-1	445	14.7	2,418	80.1	155	5.2	3,018
9-2	1,093	49.2	1,064	47.9	65	2.9	2,222
10-0	93	7.1	1,217	92.9	0	0.0	1,310
State	4,793	11.6	33,268	80.5	3,256	7.9	41,317

In Year Ten:

- ❖ Sixteen health districts gave more than 50% of the shots 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 a high number of unknown shot locations (47.7 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 except District 9-2 which had the majority of their shots given in the public sector (49.2 percent).

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 115:
Location of Immunizations by District
Four Year Comparison
2003, 2004, 2005, and 2006

District	Public Health Department				Private Physician			
	2003	2004	2005	2006	2003	2004	2005	2006
1-1	16.4	8.0	9.8	6.3	66.9	73.9	82.3	84.9
1-2	16.2	14.4	4.1	5.6	81.0	76.2	92.7	92.8
2-0	25.2	15.2	6.5	15.2	73.0	85.4	82.8	84.8
3-1	18.4	16.0	13.1	5.9	42.2	42.6	22.5	46.4
3-2	32.1	24.8	8.3	6.8	48.2	69.4	87.3	87.2
3-3	5.4	12.8	8.7	10.9	90.7	69.4	75.9	78.2
3-4	2.1	0.6	4.4	2.2	97.9	95.5	94.2	97.8
3-5	11.6	8.9	21.4	10.5	73.5	45.7	75.1	87.2
4-0	19.7	10.6	15.0	18.5	64.0	50.9	80.2	80.5
5-1	23.1	13.2	13.8	16.9	74.1	76.1	79.1	83.1
5-2	22.2	20.1	15.4	15.7	73.9	61.8	70.2	76.3
6-0	6.4	14.8	8.2	11.0	89.7	85.0	89.0	87.2
7-0	21.7	25.9	11.7	5.4	76.8	71.5	86.7	94.6
8-1	22.4	22.1	13.7	7.9	77.6	77.6	86.3	92.1
8-2	11.7	11.9	26.4	3.2	62.2	86.0	73.6	96.8
9-1	9.2	11.3	14.6	14.7	86.0	87.4	85.4	80.1
9-2	32.6	38.3	30.2	49.2	66.4	60.6	65.9	47.9
9-3	6.2	7.2	8.7	---	93.8	88.8	89.3	---
10-0	14.7	9.4	20.7	7.1	79.6	88.6	78.0	92.9
State Totals	16.3	14.3	13.2	11.6	74.8	70.1	77.1	80.5

Four-Year Comparison: Summary of Table 115:

In 2003	16.3% of the shots were received at the public health department 74.8% of the shots were given in the private sector 8.9% of the shot locations were unknown
In 2004	14.3% of the shots were received at the public health department 70.1% of the shots were given in the private sector 15.6% of the shot locations were unknown
In 2005	13.2% of the shots were received at the public health department 77.1% of the shots were given in the private sector 9.7% of the shot locations were unknown
In 2006	11.6% of the shots were received at the public health department 80.5% of the shots were given in the private sector 7.9% of the shot locations were unknown

APPENDIX F:

**MARGINS OF ERROR FOR
IMMUNIZATION COVERAGE RATES**

APPENDIX F: MARGINS OF ERROR FOR IMMUNIZATION COVERAGE RATES

Margins of error were calculated for all statewide and district immunization coverage rates, including 4:3:1:3:3:1 rates and 4:3:1 rates. These margins of error can be found in Tables 117-118. 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 4:3:1:3:3:1 immunization rate is as follows:

- ❖ With 95% confidence, the true statewide 4:3:1:3:3:1 immunization rate for infants born in 2006 is between 75.1 and 78.5 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 4:3:1:3:3:1 immunization coverage rates
- ❖ Statewide 4:3:1 immunization coverage rates
- ❖ District 4:3:1:3:3:1 immunization coverage rates
- ❖ District 4:3:1 immunization coverage rates

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

**Table 116:
Margins of Error for 2006
Statewide and District 4:3:1:3:3:1 Rates**

Health District	Sizes of Final Sample (Records Located)	4:3:1:3:3:1 Immunization Coverage Rates (percent)	Margins of Error (percent)	95% Confidence Intervals (percent)
1-1	163	78.5	+/- 6.3	72.2 – 84.8
1-2	37	94.6	+/- 7.3	87.3 – 101.9
2-0	27	88.9	+/- 11.8	77.1 – 100.7
3-1	218	73.4	+/- 5.9	67.5 – 79.3
3-2	277	65.0	+/- 5.6	59.4 – 70.6
3-3	164	70.7	+/- 7.0	63.7 – 77.7
3-4	117	93.2	+/- 4.6	88.6 – 97.8
3-5	243	67.5	+/- 5.9	61.6 – 73.4
4-0	184	70.7	+/- 6.6	64.1 – 77.3
5-1	48	79.2	+/- 11.5	67.7 – 90.7
5-2	131	89.3	+/- 5.3	84.0 – 94.6
6-0	74	95.9	+/- 4.5	91.4 – 100.4
7-0	100	85.0	+/- 7.0	78.0 – 92.0
8-1	58	86.2	+/- 8.9	77.3 – 95.1
8-2	127	73.2	+/- 7.7	65.5 – 80.9
9-1	168	78.6	+/- 6.2	72.4 – 84.8
9-2	123	77.2	+/- 7.4	69.8 – 84.6
10-0	72	87.5	+/- 7.6	79.9 – 95.1
Statewide Rate (weighted)	2,331	76.8	+/- 1.7	75.1 – 78.5

**Table 117:
Margins of Error for 2006
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	163	81.0	+/- 5.7	75.3– 86.7
1-2	37	100.0	+/- 0.0	100.0
2-0	27	92.6	+/- 9.9	82.7 – 102.5
3-1	218	74.3	+/- 5.8	68.5 – 80.1
3-2	277	68.6	+/- 5.5	63.1 – 74.1
3-3	164	76.8	+/- 6.5	70.3 – 83.3
3-4	117	94.9	+/- 4.0	90.9 – 98.9
3-5	243	73.7	+/- 5.5	68.2 – 79.2
4-0	184	73.9	+/- 6.3	67.6 – 80.2
5-1	48	89.6	+/- 8.6	81.6 – 98.2
5-2	131	93.1	+/- 4.3	88.8 – 97.4
6-0	74	98.6	+/- 2.7	95.9 – 101.3
7-0	100	90.0	+/- 5.9	84.1 – 95.9
8-1	58	89.7	+/- 7.8	81.9 – 97.5
8-2	127	76.4	+/- 7.4	69.0 – 83.8
9-1	168	84.5	+/- 5.5	79.0 – 90.0
9-2	123	82.9	+/- 6.7	76.2 – 89.6
10-0	72	90.3	+/- 6.8	83.5 – 97.1
Statewide Rate (weighted)	2,331	80.8	+/- 1.7	79.1 – 82.5