Biennial Report of

IMMUNIZATION COMPLETION RATES BY 24 MONTHS OF AGE

to the Governor, the President of the Senate and the Speaker of the House

Measurement Period Ending Sept. 30, 2005

Arizona Health Care Cost Containment System
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TABLE OF CONTENTS

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EXECUTIVE SUMMARY

Background

Routine immunization of children and adults is a safe and cost-effective method of preventing serious, often life-threatening diseases.[1-3] Many of these diseases, such as measles and varicella (chicken pox) may be thought of as mild illnesses that are part of childhood. But measles is a highly infectious disease that can cause severe pneumonia, diarrhea, encephalitis (inflammation of the brain) and even death. Before widespread use of the varicella vaccine, chicken pox was responsible for 11,000 hospitalizations and 100 deaths per year.[4] To prevent unnecessary illness, hospitalizations and deaths, high rates of vaccination are necessary – generally 90 percent or greater, according to the Centers for Disease Control and Prevention (CDC).

Since 1993, the Arizona Health Care Cost Containment System (AHCCCS) has regularly measured the immunization status of children at 24 months of age. This report includes results of the most recent measurement of immunization for 10 childhood diseases, generally using the following vaccines (or antigens): diphtheria, tetanus, and acellular pertussis (DTaP); inactivated poliovirus (IPV); measles, mumps and rubella (MMR); Haemophilus influenza type b (Hib); hepatitis B virus (HBV), and varicella zoster virus (VZV). This measurement included children who turned 2 years old during the contract year ending (CYE) Sept. 30, 2005, and who were enrolled in AHCCCS under Medicaid (Title XIX of the Social Security Act) and KidsCare (Title XXI, the State Child Health Insurance Program).

AHCCCS-contracted health plans (Contractors) have been working to improve rates of immunization among children and adolescents for several years, and their efforts have shown steady increases. However, immunization levels for individual vaccines have not reached the 90-percent goal established by "Healthy People 2010." Unprecedented shortages of several childhood vaccines in 2001 and 2002 further limited the ability of health care providers and health plans to achieve this goal. The most recent rates reported by the National Committee for Quality Assurance, which has developed a standardized methodology for managed care organizations to measure specific services, show that both commercial and Medicaid health plans overall have not met the 90-percent goal for most vaccines, or the goal of 80 percent for the five-antigen vaccine series.[4] For example, NCQA reported a national average (mean) of 76.4 percent in 2004 for commercial health plans for the immunization series that includes all of the above-named vaccines except varicella. The national Medicaid average for this vaccine series was 65.4 percent in 2004.

AHCCCS has established goals and minimum standards for childhood immunization rates, which are used in evaluating Contractor performance. Contractors must meet a Minimum Performance Standard (MPS) for each vaccine or vaccine series; if they fail to do so, they must implement corrective action plans. Those health plans that are meeting the MPS for any vaccine or series must strive for the AHCCCS goal for that measure. AHCCCS also has set long-range goals, or benchmarks, which reflect Healthy People 2010 objectives.

Methodology

To conduct this assessment, AHCCCS identified a representative random sample of children who were born on or between Oct. 1, 2002, and Sept. 30, 2003, and who were continuously enrolled for 12 months prior to and including their second birthdays. The sample was stratified by AHCCCS Contractor and by county.

Data initially were obtained from the Arizona State Immunization Information System (ASIIS), an automated registry. When an incomplete record or no record was found in ASIIS for a particular child, the case was sent to the appropriate Contractor for further data collection. Health Services Advisory Group (HSAG), an external quality review organization, was utilized to coordinate data collection, and to aggregate and analyze results.

Overall Results and Analysis

The final sample size consisted of 5,935 children enrolled in AHCCCS. This number included 5,253 Medicaid-eligible children enrolled with 10 health plans and 682 KidsCare members enrolled with eight health plans.

Completion rates for the combined Medicaid and KidsCare samples, along with comparative data, are as follows:

Summary of Immunization Completion Rates by 24 months of Age, for the Measurement Period Ending Sept. 30, 2005

	DTaP (4 doses)	IPV (3 doses)	MMR (1 dose)	Hib (3 doses)	HBV (3 doses)	VZV (1 dose)	4:3:1 Series	4:3:1:3:3 Series
Current Total (%)	**84.5**	**93.0**	**93.6**	**85.7**	**89.5**	**86.7**	**82.6**	**73.2**
Previous Total (CYE 2004)	82.8	90.9	93.0	85.8	86.3	84.6	80.0	70.3
Current AHCCCS Goal	86	90	90	77	88	81	83	75
2004 National Medicaid Mean	75.6	84.8	88.1	79.1	81.9	84.7	N/A*	65.4

* The National Committee for Quality Assurance does not have a measure for the 4:3:1 combination.

Compared with the previous measurement period, total rates of completed immunizations for all individual vaccines, except MMR and Hib, and both vaccine series showed statistically significant improvement. Relative percentage increases ranged from 2.1 percent for completion of the DTaP vaccine to 4.1 percent for the five-antigen vaccine series.

AHCCCS overall rates exceeded the most recent national averages for Medicaid health plans for every antigen, and for the 4:3:1:3:3 series. In addition, AHCCCS overall rates exceeded AHCCCS goals for most individual vaccines. The AHCCCS goals were not met for DTaP, and the two vaccine series, despite increases in those rates in the current period.

Overall rates for IPV and MMR vaccines exceeded the Healthy People 2010 goals of 90 percent, and the overall rate for HBV was only 0.5 percent below the national goal. However, more work remains to ensure that children are fully immunized with all recommended vaccine doses.

Conclusion

In 2004, several Contractors were required to implement Corrective Action Plans to improve rates of childhood immunizations, based on the results of this measurement for CYE 2003. In order to help ensure continued progress toward AHCCCS and Healthy People 2010 goals, AHCCCS implemented a Performance Improvement Project for childhood immunizations that included all Acute-care Contractors and DDD, regardless of their level of performance in these measures. The focused interventions resulting from this project and the corrective actions implemented earlier appear to have had a beneficial effect on overall rates.

AHCCCS has provided data from this measurement to Contractors for further analysis and identification of additional barriers and interventions to improve their performance in this area. Contractors are continuing aggressive outreach efforts to encourage parents to complete immunizations for their children.

Contractors also are working to ensure that health care professionals providing immunizations to their members report all vaccinations to the Arizona State Immunization Information System (ASIIS). This automated registry can be a valuable tool in helping providers determine the immunization status of children they are seeing, so that opportunities to vaccinate are not missed. This is especially important when children receive immunizations at multiple sites and parents do not have current immunization records. In 2005, AHCCCS and its Contractors initiated a Performance Improvement Project (PIP) to increase provider reporting to ASIIS through consistent education and outreach to primary care practitioners.

AHCCCS will continue to work with and monitor contracted health plans, especially those with the lowest rates, to assist them in making progress toward state and national goals.

[1] National Immunization Program. 2005 Annual Report: Immunization for the 21st Century. Centers for Disease Control and Prevention. Available at: http://www.cdc.gov/nip/webutil/about/annual-rpts/ar2005/2005annual-rpt.htm. Accessed April 19, 2005.

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Arizona Health Care Cost Containment System (AHCCCS)

Biennial Report of IMMUNIZATION COMPLETION RATES BY 24 MONTHS OF AGE

Measurement Period Ending Sept. 30, 2005

I. INTRODUCTION

Background

Routine immunization of children and adults is a safe and cost-effective method of preventing serious, often life-threatening diseases.[1-3] Many of these diseases, such as measles and varicella (chicken pox) may be thought of as mild illnesses that are part of childhood. But measles is a highly infectious disease that can cause severe pneumonia, diarrhea, encephalitis (inflammation of the brain) and even death.[4,5] Before widespread use of the varicella vaccine, chicken pox was responsible for 11,000 hospitalizations and 100 deaths per year.[5]

While successful immunization programs have virtually eliminated measles in the United States, dozens of cases have originated from foreign sources over the past few years, resulting in transmission of the disease here. During 2004, 37 cases of measles were reported to the Centers for Disease Control and Prevention (CDC). This was the lowest number of measles cases ever reported in the U.S. during a one-year period. Nearly all of these cases were found to be imported or import-linked; that is, occurring in persons infected outside the U.S. or through close contact with people who had imported cases of measles.[4] In May and June of 2005, 34 people who had not been vaccinated were infected with measles in a single outbreak, which was traced to a U.S. resident who was infected abroad.[6] The total number of measles cases reported for 2005 was 62.[7] The CDC has found that most cases of measles due to imported sources could have been prevented through vaccination.[4,6,8] Given that measles is endemic to most of the world, maintaining immunity through high vaccination coverage levels (90 percent or more) is essential to limit the spread of this disease in the U.S.[4]

Other diseases continue to be a problem. In Arizona, an outbreak of pertussis, commonly known as whopping cough, occurred in mid-2005, resulting in at least one infant death. In all, 959 cases of pertussis in the state were reported in 2005, which was 3.5 times the total number for 2004.[7]

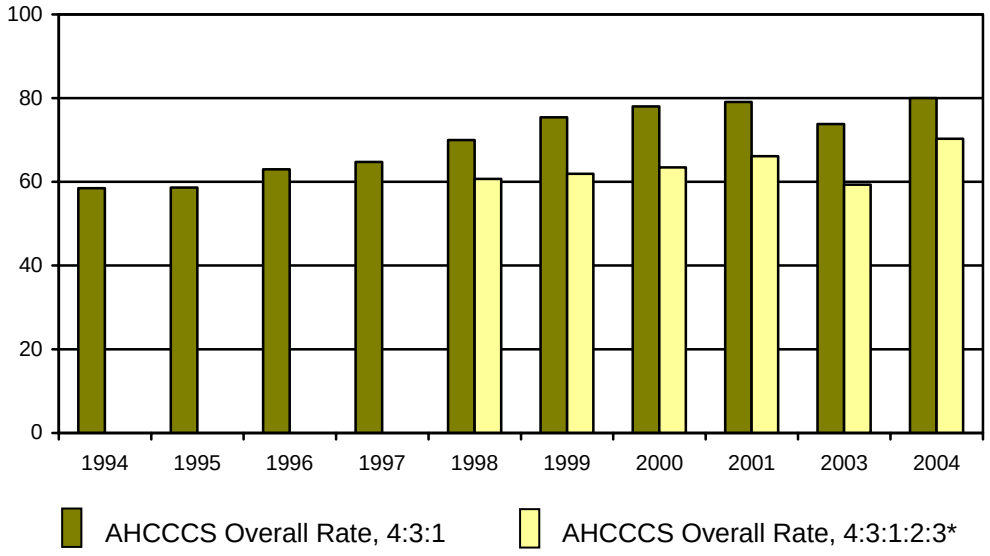
Factors resulting in children not being vaccinated include a lack of awareness about immunization guidelines, refusal due to religious or personal beliefs, and a lack of perceived risks about the dangers of childhood diseases.[8] Unnecessary fears and misconceptions about the safety and usefulness of vaccines also have prevented some children from being immunized.[9] Despite recent reports from the Institute of Medicine concluding that there is no convincing evidence to support proposed links between vaccines and diseases such as autism and sudden infant death syndrome (SIDS),[10,11] parental fears about the safety of immunizations persist. A significant portion of parents who oppose compulsory vaccination believe that vaccines are generally unsafe and not very important to the health of their children.[12]

While all vaccines carry a risk of adverse effects on those who receive them, this risk is minimal compared with the serious health outcomes and possibility of death posed by different diseases. It is estimated that if measles vaccine were discontinued today, 3 to 4 million cases of the disease would occur annually in the United States, resulting in more than 1,800 deaths, 1,000 cases of encephalitis, and 80,000 cases of pneumonia.[5] Children who are not fully immunized are not only at risk of contracting infectious diseases, but pose a significant risk of spreading diseases, particularly to those who cannot be vaccinated because of medical contraindications.

The Arizona Health Care Cost Containment System (AHCCCS) requires that children and adolescents be vaccinated according to the most current Recommended Childhood Immunization Schedule, published by the CDC. The CDC recommends that all children be immunized for 13 diseases before 2 years of age. Several of the vaccinations are combined into one "shot." The current schedule recommends immunization against diphtheria, tetanus, pertussis, poliomyelitis, measles, mumps, rubella, hepatitis B, Haemophilus influenza type b, varicella, pneumococcal disease, influenza and Hepatitis A.

Monitoring of immunization completion rates is critical to identifying undervaccinated populations and increasing coverage levels, in order to prevent outbreaks of disease. Since 1993, AHCCCS has regularly measured the vaccination status of children at 24 months of age. As seen in Figure 1, AHCCCS immunization rates increased from 1994 through 2001. They then declined in 2003, likely due to shortages of some vaccines, and rose again in 2004.

Figure 1. AHCCCS Overall Completion of DTaP, IPV and MMR (4:3:1) Series and DTaP, IPV, MMR, Hib and HBV (4:3:1:2:3)* Series, by Contract Year



* This series was updated to include 3 doses of Hib (4:3:1:3:3) in 2004.

Additional Notes:
1) The 4:3:1:2:3 combination was first measured for the AHCCCS contract year ending (CYE) Sept. 30, 1998.
2) Rates for CYE 1994 through CYE 1999 include only Medicaid-eligible children; rates for CYE 2000 through CYE 2003 include Medicaid- and KidsCare-eligible children.

Healthy People and AHCCCS Goals

Despite the previous increases, AHCCCS immunization coverage levels for all vaccines have not reached the 90-percent threshold recommended by the CDC. Based on the CDC's recommendations, the United States Department of Health and Human Services (DHHS) has established a goal that 90 percent of children 19 to 35 months of age are fully vaccinated for universally recommended vaccines by the year 2010 (the objective for completion of the full vaccine series is 80 percent).

AHCCCS has adopted a long-range goal (or benchmark) of 90 percent for completion of childhood immunizations. It also has established Minimum Performance Standards that Contractors should meet for completion of each vaccine and the two vaccine series. If Contractors already are meeting minimum standards, they should strive to meet the AHCCCS-established goals for each vaccine or series. Minimum standards and goals for the current measurement are as follows:

AHCCCS Performance Standards for Childhood Immunizations

Indicator	Minimum Performance Standard	Goal
4:3:1 Series	80%	83%
4:3:1:3:3 Series	70%	75%
DTaP - 4 doses	83%	86%
Polio - 3 doses	89%	90%
MMR - 1 dose	90%	90%
Hib - 3 doses	76%	77%
HBV - 3 doses	82%	88%
Varicella - 1 dose	77%	81%

Standards are specified in the CYE 2006 contracts with health plans.

II. PURPOSE OF THE MEASUREMENT

The measurement was conducted to reliably assess the immunization status of AHCCCS members by 2 years of age. This report includes measurement results for 10 childhood diseases, generally using the following vaccines (or antigens): diphtheria, tetanus, and acellular pertussis (DTaP); inactivated poliovirus (IPV); measles, mumps and rubella (MMR); Haemophilus influenza type b (Hib); hepatitis B virus (HBV), and varicella zoster virus (VZV). In order to evaluate performance overall and by Contractor, results of the current measurement are compared with rates from the previous measurement and with current performance standards.

III. QUALITY INDICATORS

This immunization study is based on Health Plan Employer Data and Information Set (HEDIS®) 2005 specifications for measuring childhood immunizations. All quality indicators are based on identical denominator criteria. Quality indicators are listed below with the numerator criteria.

1. DTaP/DT Immunization Rate
The number of children in the denominator who received four DTaP (diphtheria, tetanus and acellular pertussis) vaccinations or an initial DTaP vaccination followed by at least three DT or individual diphtheria and tetanus shots by their second birthdays

2. IPV Immunization Rate
The number of children in the denominator who received at least three inactivated poliovirus vaccinations by their second birthdays

3. MMR Immunization Rate
The number of children in the denominator who received at least one measles, mumps and rubella vaccination on or between their first and second birthdays

4. Hib Immunization Rate
The number of children in the denominator who received at least three Haemophilus influenza type b vaccinations by their second birthdays, with at least one of them falling on or between the first and second birthdays

5. HBV Immunization Rate
The number of children in the denominator who received at least three hepatitis B virus vaccinations by their second birthdays, with at least one of them falling on or between six months and two years of age

6. VZV Immunization Rate
The number of children in the denominator who received at least one varicella vaccination on or between their first and second birthdays

7. Traditional 4:3:1 Combination
The number of children in the denominator who received four DTaP/DT vaccinations, three IPV vaccinations, and one MMR vaccination by their second birthdays (this combination is no longer measured under HEDIS)

8. HEDIS 2001 Combination #1 (4:3:1:3:3)
The number of children in the denominator who received four DTaP/DT vaccinations, three IPV vaccinations, one MMR vaccination, three Hib vaccinations and three HBV vaccinations by their second birthdays

In accordance with HEDIS criteria, any vaccines administered after 24 months of age were not included in the numerator. Single doses of combined vaccines; e.g., Tetra-immune (TETRA), which combines DTaP and Hib in a single immunization, and COMVAX, which combines Hib and HBV together, were counted as the appropriate primary vaccines.

In addition to the vaccines and vaccine series specified above, AHCCCS also collected data on pneumococcal conjugate vaccine (PCV). This antigen was introduced for general use in 2000, with four doses recommended by the time a child turns 2. However, the vaccine has been in short supply for much of the time since its introduction, most recently in 2004. In light of the most recent shortage, the CDC recommended that providers administer only three doses to most children. Results for PCV are still being analyzed by AHCCCS, and are not included in this report. HEDIS will include measurement of PCV for the first time in its 2006 specifications.

It also should be noted that universal vaccination of children for influenza and Hepatitis A are relatively new recommendations by the CDC, implemented in Fall 2004 and in January 2006, respectively, and are not included in this measurement. HEDIS does not include measurement of these antigens in its current specifications.

IV. METHODOLOGY

AHCCCS retained Health Services Advisory Group (HSAG), an external quality review organization, to collect and analyze data for the measurement of childhood immunizations. HSAG has been involved in these assessments for several years.

This measurement included children who turned 2 years old during the contract year ending (CYE) Sept. 30, 2005, and who were enrolled in AHCCCS under Medicaid (Title XIX of the Social Security Act) and KidsCare (Title XXI, the State Child Health Insurance Program).

Study Sample

AHCCCS identified a representative random sample of children stratified by Contractor, accounting for distribution of members by county. Sample selection was calculated for each Contractor to provide a 95-percent confidence level and 5-percent confidence interval.

The original sample consisted of 6,083 children whose second birthdays occurred on or between Oct. 1, 2004, and Sept. 30, 2005 (born on or between Oct. 1, 2002, and Sept. 30, 2003), and who had at least 12 months of continuous enrollment with one Contractor prior to, and including, their second birthdays. One gap in enrollment of up to 31 days was allowed. The original sample included 5,387 Medicaid-eligible children and 696 KidsCare members.

Data Collection

Data first were obtained from the Arizona State Immunization Information System (ASIIS), an automated registry maintained by the Arizona Department of Health Services (ADHS). AHCCCS provided ASIIS with database files containing the sample cases of Medicaid and KidsCare children. ASIIS staff searched the registry by first name, last name, and date of birth and cross-matched the AHCCCS sample against patients in the registry. ADHS then provided to HSAG all immunization data in the registry for those patients it was able to match.

HSAG calculated immunization completion rates by Contractor, based on the ASIIS data. HSAG sorted those members with incomplete or no records found in ASIIS by Contractor and created an Excel spreadsheet for each Contractor, listing the plan's members who had incomplete or no records in ASIIS, and including any vaccination data obtained from ASIIS. HSAG sent each Contractor its data file with instructions for collecting additional data.*

AHCCCS allowed Contractors to collect data from two sources: medical records and administrative (claims) information, in accordance with HEDIS methodology. Contractors entered data into the Excel spreadsheets and returned the files to HSAG for analysis.

Excluded Cases

Based on data returned by Contractors, some members were excluded from the study because their medical records indicated parental refusal or contraindication to vaccination, or because it was found that they did not meet the study criteria (e.g., their second birthdays did not occur on or between Oct. 1, 2004, and Sept. 30, 2005). HSAG excluded 148 cases from the combined sample (134 Medicaid members and 14 KidsCare members). Three members were excluded because they did not meet the study selection criteria and 145 cases were excluded because documentation of parental refusal of vaccines or contraindication was provided by Contractors.

Data Analysis

Once data collection was finalized, HSAG managed the database and performed analysis using statistical software. The primary analysis provided results on the percentage of 2-year-old members who were age-appropriately immunized by 24 months for each quality indicator, overall, by individual Contractor and by county. Following HEDIS specifications, if the data showed that an individual member received two doses of the same vaccine with dates of service that were within 14 days of each other, the doses were considered a single immunization. This allowed for data from different sources to be combined, while reducing the possibility of counting the same immunization twice due to data entry errors.

Additional analysis was conducted to identify missed opportunities for completion of DTaP vaccination, as this vaccine appears to have the greatest effect on whether children are complete for the five-antigen series.

Based on the data provided by HSAG, AHCCCS performed statistical analysis using Pearson's chi-square test to compare current results with the previous measurement (degree of freedom = 1, $p <= .05$).

V. RESULTS

The final sample size consisted of 5,935 children enrolled in AHCCCS. This number included 5,253 Medicaid-eligible children enrolled with 10 health plans and 682 KidsCare members enrolled with eight health plans. Final sample sizes by individual Contractor ranged from 115 to 1,977 cases.

* Contractors were asked to collect additional data for any member who, based on data contained in ASIIS, did not have four doses of DTaP, three doses of IPV, one dose of MMR, three doses of Hib, three doses of HBV, one dose of VZV and four doses of pneumococcal conjugate vaccine.

Completion rates for the combined Medicaid and KidsCare samples, along with comparative data, are as follows:

Summary of Immunization Completion Rates by 24 months of Age, for the Measurement Period Ending Sept. 30, 2005

	DTaP (4 doses)	IPV (3 doses)	MMR (1 dose)	Hib (3 doses)	HBV (3 doses)	VZV (1 dose)	4:3:1 Series	4:3:1:3:3 Series
Current Total (%)	**84.5**	**93.0**	**93.6**	**85.7**	**89.5**	**86.7**	**82.6**	**73.2**
Previous Total (CYE 2004)	82.8	90.9	93.0	85.8	86.3	84.6	80.0	70.3
Significance Level (p-value)	**.016**	**<.001**	.208	.886	**<.001**	**.002**	**<.001**	**.001**
Current AHCCCS Goal	86	90	90	77	88	81	83	75

Significance levels in bold indicate statistically significant changes from the previous measurement

Compared with the previous measurement period, total rates of completed immunizations for all individual vaccines, except MMR and Hib, and both vaccine series showed statistically significant improvement. Relative percentage increases ranged from 2.1 percent for completion of the DTaP vaccine to 4.1 percent for the five-antigen vaccine series (note that the rate for an immunization series is not an average of the individual vaccination rates, but a measurement of the number of children who had all of the required doses of each vaccine in the series by 24 months of age).

Six of 10 Contractors met the AHCCCS Minimum Performance Standard for each vaccine and series. Two Contractors, Pima Health System and University Family Care, met all vaccine and series goals established by AHCCCS. Individual vaccine and combined series rates, by Contractor, are presented in Tables 1A, 1B, 2A, 2B, 3A and 3B.

VI. ANALYSIS

AHCCCS overall rates of completed immunizations for most antigens increased significantly for the second consecutive year. Moreover, the percentage of children who had completed the combined vaccine series (4:3:1:3:3) that protects against 9 childhood diseases also increased for the second year.

Nearly all Contractors achieved rates of 90 percent or better for vaccination against polio, measles, mumps and rubella, meeting Healthy People 2010 goals and AHCCCS benchmarks.

When compared with national means for the HEDIS childhood immunization measures, the AHCCCS overall rates outscore Medicaid health plan rates for calendar year 2004. The AHCCCS rates compare favorably to the averages for commercial managed care plans for that year.

AHCCCS Immunization Completion Rates by 24 months of Age (CYE 2005), Compared with National Managed Care Means (2004)

	DTaP (4 doses)	IPV (3 doses)	MMR (1 dose)	Hib (3 doses)	HBV (3 doses)	VZV (1 dose)	4:3:1 Series	4:3:1:3:3 Series
AHCCCS Total (%)	**84.5**	**93.0**	**93.6**	**85.7**	**89.5**	**86.7**	**82.6**	**73.2**
2004 National Medicaid Mean	75.6	84.8	88.1	79.1	81.9	84.7	N/A*	65.4
2004 National Commercial Mean	85.9	90.1	92.3	87.8	87.2	87.5	N/A*	76.4

* The National Committee for Quality Assurance does not have a measure for the 4:3:1 combination. National averages were reported by NCQA in the 2005 State of Health Care Quality Report.

As part of the analysis of results, HSAG calculated Contractor rates for DTaP completion if those children who had gotten three doses of the vaccine had received a fourth dose by their second birthdays. This analysis of possible "missed opportunities" for DTaP vaccination shows that the completion rate for this vaccine would have increased to 95.4 percent if these members had received just one more dose, compared with the actual completion rate of 84.5 percent (Table 4). Not surprisingly, the Contractors that achieved the largest increases in the rate of DTaP vaccination from the previous measurement also showed the greatest reductions in their percent of missed opportunities.

HSAG also provided completion rates overall and by Contractor based on the data collected from ASIIS. Overall, the percent of children complete for the 4:3:1:3:3:1 vaccine combination using only ASIIS data was 47.3 percent, compared with 41.7 percent in the previous period (Table 5). While the percent of complete records in ASIIS did not necessarily improve a Contractor's overall immunization rates, a higher rate of complete records in the immunization registry meant that Contractors had to collect vaccination data on relatively fewer members.

II. CONCLUSIONS AND RECOMMENDATIONS

In 2004, several Contractors were required to implement Corrective Action Plans to improve rates of childhood immunizations, based on the results of this measurement for CYE 2003. In order to help ensure continued progress toward AHCCCS and Healthy People 2010 goals, AHCCCS implemented a Performance Improvement Project for childhood immunizations in 2004, which included all Acute-care Contractors and DDD, regardless of their level of performance in these measures. The focused interventions resulting from this project and the corrective actions implemented earlier appear to have had a beneficial effect on overall rates.

However, more work remains in order to ensure that children are fully immunized with all recommended vaccine doses. AHCCCS has provided detailed results to all Contractors for analysis and identification of additional barriers and interventions to improve rates of childhood immunizations.

Two health plans operated by the Arizona Department of Economic Security (DES) face unique barriers in achieving significant improvement in their immunization rates. The Comprehensive Medical and Dental Program (CMDP), which serves children who have been removed from their homes because of abuse or neglect, showed an increase in only one antigen rate over the previous measurement. One of the challenges faced by CMDP is assessing the immunization status of children when they are removed from their homes. In these situations, information on what vaccinations children have received may not be readily available, although it is likely that immunizations are not up to date. Case managers and foster parents face the additional challenge of getting these children "caught up" on immunizations by age 2 because minimum intervals of four weeks to six months are required between doses of certain vaccines. When children are in the process of being adopted or are placed in permanent guardianship prior to 2 years of age, CMDP has difficulty collecting complete data on these children, who may be receiving services paid for by the adoptive parents' or guardians' private insurance. Collecting data on immunizations not paid for through AHCCCS may require additional time and effort to identify providers that administered the vaccines and obtain records from those providers.

The DES Division of Developmental Disabilities (DDD) subcontracts with acute-care health plans that deliver medical services, such as immunizations, to their members. However, immunization data for DDD members also may be significantly underreported because many are covered by other insurance. In the current measurement period, DDD's immunization rates improved significantly, which may reflect the ability of the Division and its contracted acute-care plans to collect more complete data from medical records, regardless of payer source.

AHCCCS continues to work with Contractors to assist them in making progress toward immunization goals. The following recommendations to improve immunization-completion rates among 2-year-olds enrolled in AHCCCS were compiled from evidence-based research, including strategies developed by the CDC. Most AHCCCS Contractors have implemented several of these strategies, and their continued use should help improve immunization levels even more.

- AHCCCS Contractors must continue outreach efforts to encourage parents to complete their children's immunizations. Mail and telephone reminders to parents and providers have been found to be effective in improving immunization-completion rates.[13] In addition, some Contractors offer incentives, such as a $25 gift certificate, to parents of children who complete all immunizations by 24 months.

- Given the fact that four doses are needed to complete the DTaP vaccine, and the effect that missing only one dose has on completion rates for this immunization, health plans and providers should particularly focus on ensuring that children receive all the necessary doses of this vaccine.

- Since all childhood vaccines can be completed at about 15 months, some Contractors begin checking the immunization status of members at 12 months of age. If members are lacking doses, parents are encouraged to take them to their doctor for completion of immunizations. Several factors have been associated with significant delays in completing immunizations, including a mother who is unmarried or does not have a college degree, living in a household with two or more children, being non-Hispanic black, and using multiple health care providers.[14]

- Contractors should continue member education to overcome parental fears regarding vaccination. This includes clearly explaining the potential consequences of not having children fully immunized, including seizures, meningitis, hearing impairment and even death due to infectious diseases.

- Contractors should target outreach activities to certain groups or geographic areas. National data indicate that Native American, African American and Hispanic children are likely to have lower immunization coverage levels, compared with non-Hispanic white children.[15] Additionally, monitoring coverage in specific geographic areas, such as at the county level, may help Contractors target interventions to increase immunization. Results for the current measurement show that immunization rates for the 4:3:1:3:3 series were lowest in the following rural counties: Cochise, Gila, Graham, Mohave, Navajo and Pinal (Table 6). AHCCCS provided detailed county-specific data to the health plans included in this study.

- Contractors should ensure that health care professionals providing immunizations report all vaccinations to ASIIS. With complete reporting, this automated registry could be a valuable tool in helping providers determine the immunization status of children they are seeing at any visit, so that opportunities to vaccinate are not missed. This is especially important when children receive immunizations at multiple sites and parents do not have current immunization records. Use of ASIIS to check patients' immunization status should prevent the need for them to return for vaccinations.

- Contractors should consider conducting practice-based assessments of immunization rates and provide feedback to physicians and office staff. These assessments could be tied to incentives for practices that meet immunization-completion standards.

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Table 1A. Immunization Completion Rates by 24 Months of Age, by Contractor: Individual Vaccines, All Members (Medicaid and KidsCare) For the Contract Year Ending September 30, 2005

		PERCENT IMMUNIZATION COMPLETED BY 24 MONTHS OF AGE					
AHCCCS CONTRACTOR	**Final Sample Size**	**4 DTaP**	**3 IPV**	**1 MMR**	**3 Hib**	**3 HBV**	**1 VZV**
Maricopa Health Plan	275	**85.5 (p=.049)**	**96.0** (p=.975)	**94.2** (p=.417)	**89.5** (p=.242)	**85.1 (p=.037)**	**91.3** (p=.858)
	321	90.7	96.0	95.6	92.2	90.7	92.8
Pima Health System	250	**94.8** (p=.073)	**98.0 (p=.024)**	**97.6** (p=.170)	**96.4** (p=.202)	**92.8** (p=.626)	**95.6** (p=.093)
	140	90.0	93.6	95.0	93.6	91.4	91.4
Arizona Physicians IPA	1,977	**85.3 (p=.002)**	**93.7 (p<.001)**	**93.9 (p=.002)**	**88.0 (p<.001)**	**92.8 (p<.001)**	**86.3 (p<.001)**
	1,854	81.6	90.1	91.3	82.8	88.1	81.7
DES/CMDP	299	76.6 (p=.713)	87.6 (p=.120)	**91.0** (p=.217)	73.2 **(p=.011)**	77.3 (p=.089)	**86.0** (p=.766)
	200	78.0	92.0	94.0	83.0	83.5	85.0
Phoenix Health Plan	511	**85.7 (p=.036)**	**93.7** (p=.390)	**94.9** (p=.950)	**88.8** (p=.107)	**89.4** (p=.071)	**87.5** (p=.833)
	480	87.9	95.0	95.0	91.9	92.7	87.9
Mercy Care Plan	1,167	**85.7** (p=.881)	**92.3** (p=.850)	**94.1** (p=.924)	**89.3** (p=.719)	**90.3** (p=.640)	**88.9 (p=.001)**
	1,199	85.9	92.5	94.0	89.7	89.7	84.3
University Family Care	177	**87.6 (p=.036)**	**94.9** (p=.103)	**96.0** (p=.793)	**89.3** (p=.413)	**92.7** (p=.559)	**87.0** (p=.999)
	200	79.5	90.5	95.5	86.5	91.0	87.0
Health Choice Arizona	986	82.8 **(p<.001)**	**92.8 (p<.001)**	**92.4** (p=.984)	75.3 **(p=.001)**	**86.6 (p<.001)**	**82.3** (p=.094)
	541	74.7	86.0	92.4	82.4	66.7	85.6
DES/DDD	115	73.0 (p=.354)	84.3 **(p=.028)**	84.3 (p=.268)	**81.7** (p=.295)	**83.5 (p=.003)**	**82.6** (p=.725)
	104	67.3	72.1	89.4	76.0	66.3	80.8
Care 1st HealthPlan	178	75.8	**90.4**	**90.4**	**85.4**	**87.1**	**82.0**
	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TOTAL	5,935	**84.5 (p=.016)**	**93.0 (p<.001)**	**93.6** (p=.208)	**85.7** (p=.886)	**89.5 (p<.001)**	**86.7 (p=.002)**
PREVIOUS TOTAL	5,039	82.8	90.9	93.0	85.8	86.3	84.6

Shaded rows include previous results (CYE 2004).
Immunization completion rates in bold face indicate the Contractor met or exceeded the AHCCCS Minimum Performance Standard. Statistically significant changes are indicated in bold face ($p \leq .05$)

Table 1B. Immunization Completion Rates by 24 Months of Age, by Contractor: Vaccine Series, All Members (Medicaid and KidsCare) For the Contract Year Ending September 30, 2005

AHCCCS CONTRACTOR	Final Sample Size	Traditional DTaP, IPV & MMR Rate (4:3:1)	DTaP, IPV, MMR, Hib &HBV Rate (4:3:1:3:3)
Maricopa Health Plan	275	**85.5** (p=.224)	**74.2** (p=.182)
	321	88.8	78.8
Pima Health System	250	**92.4** (p=.089)	**84.4** (p=.202)
	140	87.1	79.3
Arizona Physicians IPA	1,977	**83.6 (p<.001)**	**77.1 (p<.001)**
	1,854	78.6	70.2
DES/CMDP	299	71.9 (p=.607)	53.2 (p=.084)
	200	74.0	61.0
Phoenix Health Plan	511	**83.8** (p=.139)	**76.5 (p=.025)**
	480	87.1	82.3
Mercy Care Plan	1,167	**84.5** (p=.349)	**77.5** (p=.170)
	1,199	83.1	75.1
University Family Care	177	**85.3** (p=.068)	**76.8** (p=.135)
	200	78.0	70.0
Health Choice Arizona	986	**80.4 (p<.001)**	62.6 **(p<.001)**
	541	71.2	50.1
DES/DDD	115	71.3 (p=.069)	65.2 **(p=.003)**
	104	59.6	45.2
Care 1st HealthPlan	178	74.2	68.5
	N/A	N/A	N/A
TOTAL	5,935	**82.6 (p<.001)**	**73.2 (p=.001)**
PREVIOUS TOTAL	5,039	80.0	70.3

Shaded rows include previous results (CYE 2004).
Immunization completion rates in bold face indicate the Contractor met or exceeded the AHCCCS Minimum Performance Standard. Statistically significant changes are indicated in bold face ($p \leq .05$)

Table 2A. Immunization Completion Rates by 24 Months of Age, by Contractor: Individual Vaccines, Members covered under Medicaid For the Contract Year Ending September 30, 2005

		PERCENT IMMUNIZATION COMPLETED BY 24 MONTHS OF AGE					
AHCCCS HEALTH PLAN	Final Sample Size	4 DTaP	3 IPV	1 MMR	3 Hib	3 HBV	1 VZV
Maricopa Health Plan	228	**84.6** (p=.067)	**95.6** (p=.744)	**93.9** (p=.231)	**88.6** (p=.199)	**84.6** **(p=.034)**	**89.9** **(p=.070)**
	263	90.1	96.2	96.2	92.0	90.9	94.3
Pima Health System	231	**94.4** (p=.058)	**98.3** **(p=.009)**	**97.8** (p=.086)	**96.1** (p=.174)	**93.1** (p=.371)	**95.7** (p=.087)
	125	88.8	92.8	94.4	92.8	90.4	91.2
Arizona Physicians IPA	1,760	**84.5** **(p=.004)**	**93.6** **(p<.001)**	**93.8** **(p<.001)**	**87.6** **(p<.001)**	**92.3** **(p<.001)**	**86.0** **(p<.001)**
	1,600	80.7	89.9	90.7	82.8	87.8	80.7
DES/CMDP	299	76.6 (p=.713)	87.6 (p=.120)	**91.0** (p=.217)	73.2 **(p=.011)**	77.3 (p=.089)	**86.0** (p=.766)
	200	78.0	92.0	94.0	83.0	83.5	85.0
Phoenix Health Plan	407	**83.3** (p=.193)	**92.6** (p=.332)	**94.1** (p=.891)	**87.7** (p=.106**)**	**88.5** (p=.092)	**85.3** (p=.740)
	388	86.6	94.3	94.3	91.2	92.0	86.1
Mercy Care Plan	978	**84.3** (p=.679)	**91.4** (p=.663)	**93.4** (p=.836)	**88.2** (p=.603)	**90.1** (p=.731)	**87.9** **(p=.003)**
	982	84.9	92.0	93.6	87.5	89.6	83.2
University Family Care	175	**87.4** **(p=.030)**	**94.9** (p=.116)	**96.0** (p=.642)	**89.1** (p=.375)	**92.6** (p=.485)	**86.9** (p=.941)
	179	78.8	90.5	95.0	86.0	90.5	86.6
Health Choice Arizona	894	82.6 **(p<.001)**	**93.0** **(p<.001)**	**92.1** (p=.957)	74.3 **(p=.001)**	**87.0** **(p<.001)**	**81.8** (p=.191)
	461	74.2	85.5	92.0	82.2	67.2	84.6
DES/DDD	115	73.0 (p=.354**)**	84.3 **(p=.028)**	84.3 (p=.268)	**81.7** (p=.295)	**83.5** **(p=.003)**	**82.6** (p=.725)
	104	67.3	72.1	89.4	76.0	66.3	80.8
Care 1st HealthPlan	166	74.1	**89.8**	89.8	**84.3**	**86.1**	**80.7**
	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TOTAL	5,253	**83.5** **(p=.029)**	**92.7** **(p<.001)**	**93.2** (p=.258)	**84.9** (p=.496)	**89.2** **(p<.001)**	**86.0** **(p=.003)**
PREVIOUS TOTAL	4,302	81.8	90.4	92.6	85.4	86.1	83.8

Shaded rows include previous results (CYE 2004).
Immunization completion rates in bold face indicate the Contractor met or exceeded the AHCCCS Minimum Performance Standard. Statistically significant changes are indicated in bold face ($p \leq .05$)

Table 2B. Immunization Completion Rates by 24 Months of Age, by Contractor: Vaccine Series, Members covered under Medicaid For the Contract Year Ending September 30, 2005

AHCCCS HEALTH PLAN	Final Sample Size	Traditional DTaP, IPV & MMR Rate (4:3:1)	DTaP, IPV, MMR, Hib & HBV (4:3:1:3:3)
Maricopa Health Plan	228	**84.6** (p=.248)	**72.8** (p=.222)
	263	88.2	77.6
Pima Health System	231	**92.6** **(p=.033)**	**84.4** (p=.076)
	125	85.6	76.8
Arizona Physicians IPA	1,760	**83.0** **(p<.001)**	**76.4** **(p<.001)**
	1,600	77.5	69.3
DES/CMDP	299	71.9 (p=.607)	53.2 (p=.084)
	200	74.0	61.0
Phoenix Health Plan	407	**81.1** (p=.072)	**74.4** **(p=.028)**
	388	85.8	80.9
Mercy Care Plan	978	**82.8** (p=.844)	**76.2** (p=.401)
	982	82.5	74.5
University Family Care	175	**85.1** (p=.053)	**76.6** (p=.153)
	179	77.1	69.8
Health Choice Arizona	894	**80.4** **(p<.001)**	62.1 **(p<.001)**
	461	70.7	50.1
DES/DDD	115	71.3 (p=.069)	65.2 **(p=.003)**
	104	59.6	45.2
Care 1st HealthPlan	166	72.3	66.3
	N/A	N/A	N/A
TOTAL	5,253	**81.7** **(p=.001)**	**72.1** **(p=.001)**
PREVIOUS TOTAL	4,302	78.9	69.3

Shaded rows include previous results (CYE 2004).
Immunization completion rates in bold face indicate the Contractor met or exceeded the AHCCCS Minimum Performance Standard. Statistically significant changes are indicated in bold face ($p \leq .05$)

Table 3A. Immunization Completion Rates by 24 Months of Age, by Contractor: Individual Vaccines, Members covered under KidsCare For the Contract Year Ending September 30, 2005

		PERCENT IMMUNIZATION COMPLETED BY 24 MONTHS OF AGE					
AHCCCS HEALTH PLAN	**Final Sample Size**	**4 DTaP**	**3 IPV**	**1 MMR**	**3 Hib**	**3 HBV**	**1 VZV**
Maricopa Health Plan	47	**89.4** (p=.510)	**97.9** (p=.626**)**	**95.7** (p=.689)	**93.6** (p=1.00)	**87.2** (p=.698**)**	**97.9** **(p=.040)**
	58	93.1	94.8	93.1	93.1	89.7	86.2
Pima Health System	19	**100.0** (p=1.00)	**94.7** (p=1.00)	**94.7** (p=1.00)	**100.0** (p=1.00)	**89.5** (p=4.92)	**94.7** (p=1.00)
	15	100.0	100.0	100.0	100.0	100.0	93.3
Arizona Physicians IPA	217	**92.2** (p=.091)	**94.5** (p=.191)	**95.4** (p=.953)	**91.7** **(p=.008)**	**96.3** **(p=.006)**	**88.5** (p=.819)
	254	87.4	91.3	95.3	83.5	89.8	87.8
Phoenix Health Plan	104	**95.2** (p=.603)	**98.1** (p=1.00)	**98.1** (p=1.00)	**93.3** (p=.706)	**93.3** (p.546)	**96.2** (p=1.00)
	92	93.5	97.8	97.8	94.6	95.7	95.7
Mercy Care Plan	189	**93.1** (p=.310)	**96.8** (p=.342)	**97.9** (p=.274)	**94.7** (p=.131)	**91.5** (p=.564)	**93.7** (p=.128)
	217	90.3	94.9	95.9	90.8	89.9	89.4
University Family Care	2	**100.0** (p=1.00)	**100.0** (p=1.00)	**100.0** (p=1.00)	**100.0** (p=1.00)	**100.0** (p=1.00)	**100.0** (p=1.00)
	21	85.7	90.5	100.0	90.0	95.2	90.5
Health Choice Arizona	92	**84.8** (p=.221)	**91.3** (p=.576)	**95.7** (p=1.00)	**84.8** (p=.853)	**82.6** **(p=.005)**	**87.0** (p=.370)
	80	77.5	88.8	95.0	83.8	63.8	91.3
Care 1st HealthPlan	12	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TOTAL	682	**92.1** (p=.370)	**95.6** (p=.065)	**96.6** (p=.412)	**92.4** (p=.412)	**91.9** **(p=.015)**	**91.9** (p=.144)
PREVIOUS TOTAL	737	88.6	93.4	95.8	88.3	88.1	89.7

Shaded rows include previous results (CYE 2004).
Immunization completion rates in bold face indicate the Contractor met or exceeded the AHCCCS Minimum Performance Standard. Statistically significant changes are indicated in bold face ($p \leq .05$)

Table 3B. Immunization Completion Rates by 24 Months of Age, by Contractor: Vaccine Series, Members covered under KidsCare For the Contract Year Ending September 30, 2005

AHCCCS HEALTH PLAN	Final Sample Size	Traditional DTaP, IPV & MMR RATE (4:3:1)	DTaP, IPV, MMR, Hib & HBV (4:3:1:3:3)
Maricopa Health Plan	47	**89.4** (p=.726)	**80.9** (p=.623)
	58	91.4	84.5
Pima Health System	19	**89.5** (p=.492)	**84.2** (p=.238)
	15	100.0	100.0
Arizona Physicians IPA	217	**88.0** (p=.483)	**83.4** **(p=.047)**
	254	85.8	76.0
Phoenix Health Plan	104	**94.2** (p=.606)	**84.6** (p=.487)
	92	92.4	88.0
Mercy Care Plan	189	**93.1** **(p=.017)**	**84.7** (p=.065)
	217	85.7	77.4
University Family Care	2	**100.0** (p=1.00)	**100.0** (p=1.00)
	21	85.7	71.4
Health Choice Arizona	92	**80.4** (p=.296)	67.4 **(p=.021)**
	80	73.8	50.0
Care 1st HealthPlan	12	**100.0**	**100.0**
	N/A	N/A	N/A
TOTAL	682	**89.7** **(p=.033)**	**82.0** **(p=.007)**
PREVIOUS TOTAL	737	86.0	76.1

Shaded rows include previous results (CYE 2004).
Immunization completion rates in bold face indicate the Contractor met or exceeded the AHCCCS Minimum Performance Standard. Statistically significant changes are indicated in bold face ($p \leq .05$)

Table 4. Potential Missed Opportunities in DTaP Completion Rates, by Contractor: All Members (Medicaid and KidsCare) For the Contract Year Ending Sept. 30, 2005

Contractor	Final Sample Size	DTaP Complete (4 Doses)		3 DTaP Doses		Potential Completion Rate	
		#	%	#	%	#	%
Maricopa Health Plan	275	235	85.5	30	10.9	265	96.4
Pima Health System	250	237	94.8	11	4.4	248	99.2
Arizona Physicians IPA	1977	1687	85.3	218	11.0	1905	96.4
DES/CMDP	299	229	76.6	48	16.1	277	92.6
Phoenix Health Plan	511	438	85.7	49	9.6	487	95.3
Mercy Care Plan	1167	1000	85.7	104	8.9	1104	94.6
University Family Care	177	155	87.6	19	10.7	193	98.3
Health Choice Arizona	986	816	82.8	119	12.1	935	94.8
DES/DDD	115	84	73.0	19	16.5	103	89.6
Care 1st HealthPlan	178	135	75.8	30	16.9	165	92.7
TOTAL	**5935**	**5016**	**84.5**	**647**	**10.9**	**5663**	**95.4**

Table 5. Complete* Records in the Arizona State Immunization Information System (ASIIS), by Contractor: All Members, (Medicaid and KidsCare) For the Contract Year Ending September 30, 2005

AHCCCS Contractor	Final Sample Size	Complete Records Found in ASIIS	Percent of Complete Records Found in ASIIS
Maricopa Health Plan	275	148	53.8
	321	56	17.4
Pima Health System	250	107	42.8
	140	62	44.3
Arizona Physicians IPA	1,977	1,082	54.7
	1,854	821	44.3
DE/CMDP	299	79	26.4
	200	54	27.0
Phoenix Health Plan	511	264	51.7
	480	261	54.4
Mercy Care Plan	1,167	548	47.0
	1,199	526	43.9
University Family Care	177	79	44.6
	200	90	45.0
Health Choice Arizona	986	382	38.7
	541	201	37.2
DES/DDD	115	47	40.9
	104	31	29.8
Care 1st HealthPlan AZ	178	72	40.4
	N/A	N/A	N/A
TOTAL	5,935	2,808	**47.3**
PREVIOUS TOTAL	5,039	2,102	41.7

Shaded rows include previous results (CYE 2004).
*A record was considered complete when a child had at least four DTaP doses, three IPV doses, one MMR dose, three Hib doses, three HBV doses and one VZV dose (4:3:1:3:3:1 series) by 24 months of age.

Table 6. Immunization Completion Rates by 24 Months of Age, by County: Vaccine Series, All Members (Medicaid and KidsCare) For the Contract Year Ending September 30, 2005

County	Final Sample Size	Traditional DTaP, IPV & MMR Rate (4:3:1)	DTaP, IPV, MMR, Hib & HBV (4:3:1:3:3)
Apache	56	87.3	74.5
Cochise	298	78.3	70.1
Coconino	228	85.0	78.3
Gila	126	78.0	67.8
Graham	119	75.9	69.6
Greenlee	23	82.6	78.3
La Paz	41	77.5	77.5
Maricopa	2,191	81.4	72.1
Mohave	248	76.7	70.0
Navajo	159	69.4	59.2
Pima	1,242	84.7	71.5
Pinal	300	74.2	59.4
Santa Cruz	190	86.7	80.6
Yavapai	307	82.7	75.3
Yuma	407	87.9	82.0
TOTAL	**5,935**	**81.7**	**72.1**