Biennial Report of

IMMUNIZATION COMPLETION RATES BY 24 MONTHS OF AGE

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

Measurement Period Ending Sept. 30, 2009

Arizona Health Care Cost Containment System
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EXECUTIVE SUMMARY

Background

Routine immunization of children and adults is a safe and cost-effective method of preventing serious and potentially life-threatening diseases.[1-3] Many of these diseases, such as measles, often are considered mild illnesses that are a normal part of childhood. But measles is a highly infectious disease that can cause severe pneumonia, diarrhea, encephalitis (inflammation of the brain) and even death. 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).

Based on the CDC's recommendations, the U.S. Department of Health and Human Services (DHHS) established a goal that, by the year 2010, 90 percent of children 19 to 35 months of age will be fully vaccinated for universally recommended vaccines. The most recent rates reported by the National Committee for Quality Assurance (NCQA), which has developed a standardized methodology for managed care organizations to measure childhood immunizations, indicate that, overall, Medicaid health plans have not met the 90-percent goal for most vaccines.[4]

Since 1993, the Arizona Health Care Cost Containment System (AHCCCS) has regularly measured the immunization status of children at 24 months of age. Arizona Revised Statute 36-2904 requires that AHCCCS submit a report to the Governor and Legislature that represents a statistically valid sample indicating the number of children who were AHCCCS members and received immunizations recommended by the CDC by age 2. The report, which is due every other year, must show immunization completion rates by AHCCCS-contracted health plan.

This report includes results of the most recent measurement of immunization for 11 childhood diseases, generally using the following vaccines (or antigens): DTaP, inactivated poliovirus (IPV), MMR, Haemophilus influenza type b (Hib), hepatitis B virus (HBV), varicella zoster virus (VZV,) and pneumococcal conjugate vaccine (PCV). Rates are reported for individual vaccines and for two combinations of the vaccines. The measurement includes children who turned 2 years old during the contract year ending (CYE) Sept. 30, 2009, and who were enrolled with AHCCCS health plans (known as Contractors) under Medicaid (Title XIX of the Social Security Act) or KidsCare (Title XXI, the state's Child Health Insurance Program).

AHCCCS has established goals and minimum standards for childhood immunization rates, which are used in evaluating Contractor performance. If Contractors do not meet the Minimum Performance Standard (MPS) for a particular vaccine or combination, they must implement corrective action plans, and may be subject to sanctions if they fail to improve their rates.

Methodology

AHCCCS used NCQA Healthcare Effectiveness Data and Information Set (HEDIS) 2009 measurement criteria to conduct this assessment. A representative random sample of children who turned 24 months old on or between Oct. 1, 2008, and Sept. 30, 2009, and who were continuously enrolled with one Contractor for 12 months prior to and including their second birthdays, was selected. The sample was stratified by AHCCCS Contractor.

All data were collected according to applicable privacy and confidentiality laws and safeguards. AHCCCS first obtained data from the Arizona State Immunization Information System (ASIIS), an automated registry of vaccinations provided to children and adolescents maintained by the Arizona Department of Health Services (ADHS). These data were merged with any vaccination data for administration of vaccines collected from the AHCCCS encounter system. AHCCCS provided health plan-specific data collection files with the vaccination data that it was able to collect to Contractors. Contractor staff then collected additional data from medical records and/or any claims (encounters) not yet received or processed by AHCCCS.

Overall Results and Analysis

The final sample size consisted of 3,871 children enrolled in AHCCCS. This number included 3,099 Medicaid-eligible children enrolled with 10 health plans and 772 KidsCare members enrolled with six health plans.

Overall completion rates for the combined Medicaid and KidsCare population exceed AHCCCS and Healthy People 2010 goals for five vaccines (IPV, MMR Hib, HBV and VZV) and the 4:3:1:2:3:1 combined series exceed AHCCCS and Healthy People 2010 goals.

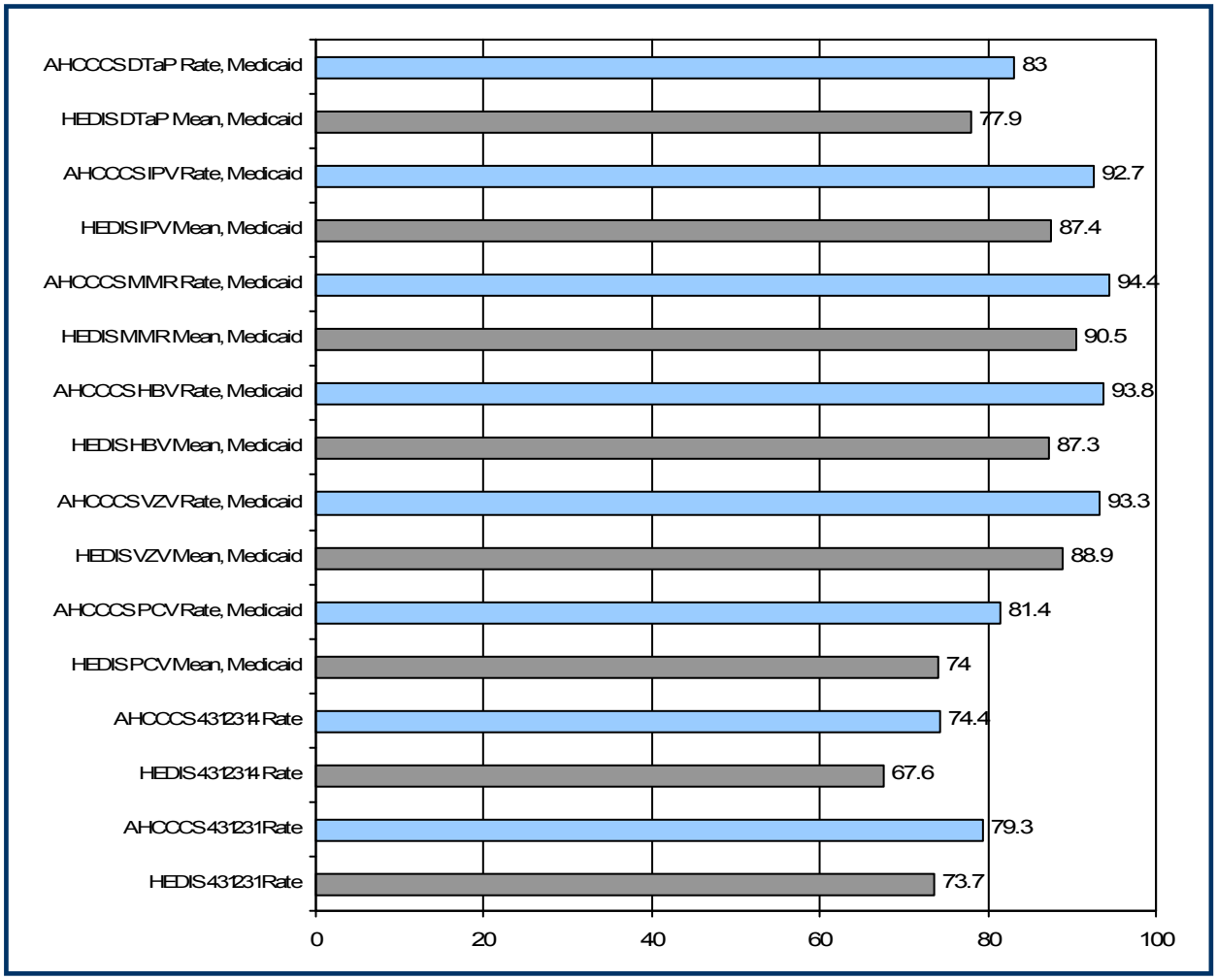
Immunization Completion Rates by 24 months of Age, All Members, Compared with Goals and Rates for the Previous Measurement

	DTaP (4 doses)	IPV (3 doses)	MMR (1 dose)	Hib (2 doses)	HBV (3 doses)	VZV (1 dose)	PCV (4 doses)	4:3:1:2:3:1 Combo	4:3:1:2:3:1:4 Combo
Current AHCCCS Rate (%)	**84.8**	**93.4**	**94.9**	**96.7**	**94.0**	**94.0**	**83.2**	**81.1**	**76.3**
AHCCCS/ HP 2010 Goals	90	90	90	90	90	90	90	80 [1]	80 [1]
Previous AHCCCS Rate	85.6	93.2	94.2	96.8	94.0	92.0	81.6	N/R [2]	N/R [2]

[1] Goals established by AHCCCS; DHHS did not set goals for these vaccine combinations in "Healthy People 2010".
[2] NCQA revised HEDIS methodology for the 2009 measurement, changing the number of Hib doses required for completion from three to two because of a Hib vaccine shortage during the measurement period. Combination rates with only two doses of Hib were not reported in the previous measurement.

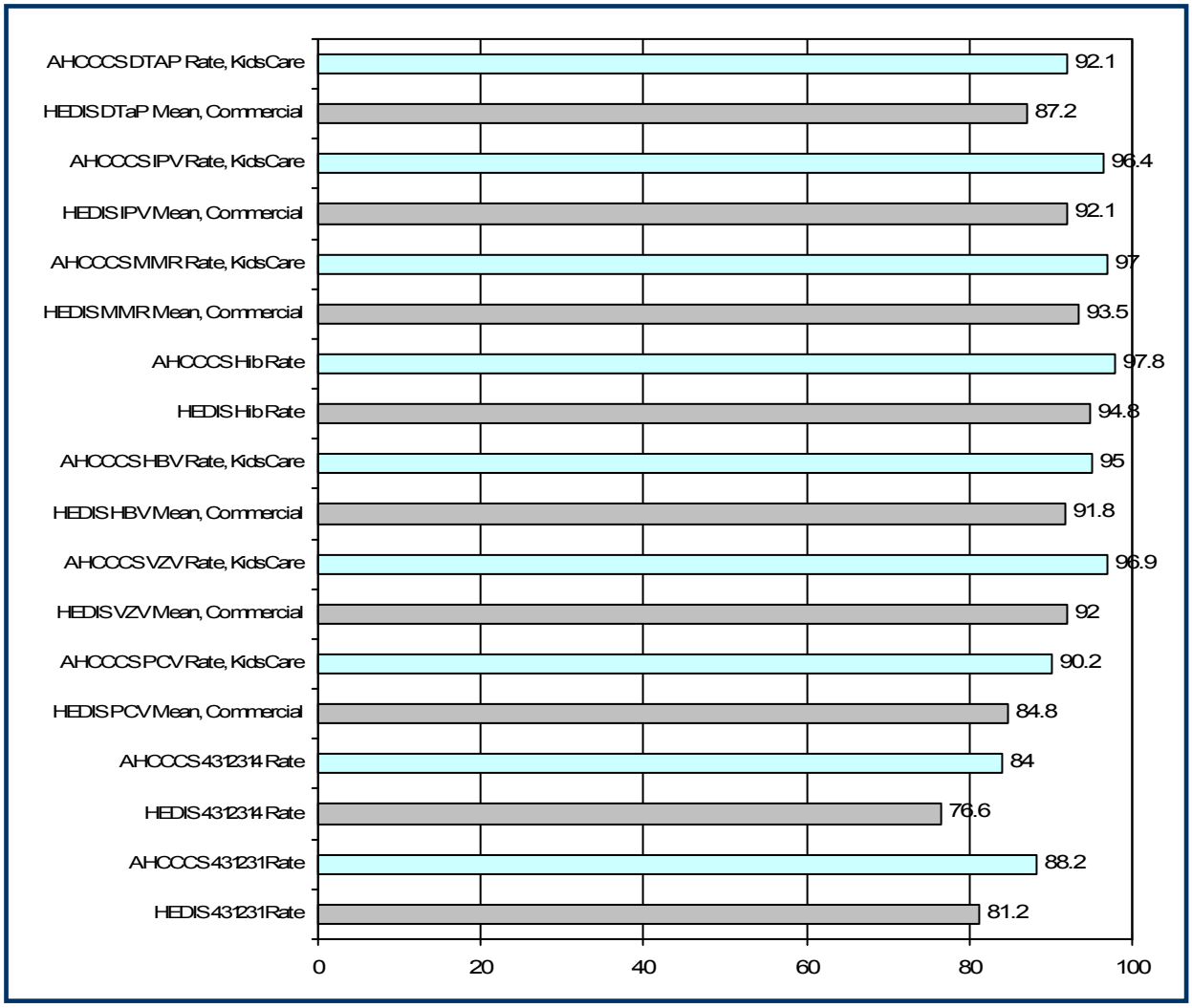
AHCCCS rates for both the Medicaid and KidsCare populations surpass national means for Medicaid and commercial health plans, respectively.

AHCCCS Rates for Medicaid Members
Compared with 2009 National HEDIS Means for Medicaid Health Plans



Note: Most recent means (averages) for Medicaid health plans available from the National Committee for Quality Assurance (NCQA) are based on the measurement year ending Dec. 31, 2008, utilizing HEDIS 2009 specifications.

AHCCCS Rates for KidsCare Members
Compared with 2009 National HEDIS Means for Commercial Health Plans



Note: Most recent means (averages) for commercial health plans available from the National Committee for Quality Assurance (NCQA) are based on the measurement year ending Dec. 31, 2008, utilizing HEDIS 2009 specifications.

In addition, AHCCCS KidsCare rates for all vaccines and combinations except HBV rank in the 75th percentile of commercial health plans nationally.

Conclusion

In CYE 2004, AHCCCS implemented a Performance Improvement Project (PIP) for childhood immunizations in order to help ensure continued progress toward AHCCCS and Healthy People 2010 goals. The focused interventions implemented by health plans appear to have been effective, so that nearly all of the AHCCCS overall rates surpass long-range goals for 2010 that were set in the last decade. In addition, AHCCCS continues to show strong performance overall in completion of childhood immunizations, compared with both Medicaid and commercial health plans nationally.

AHCCCS will provide data from this measurement to Contractors for further analysis and identification of barriers and interventions to improve performance. AHCCCS will continue to work with Contractors, especially those with the lowest rates of childhood immunization, to assist them in making progress toward state and national goals, particularly for DTaP and PCV vaccinations. Significant improvement in rates for these two vaccinations should help AHCCCS and its Contractors achieve the goal for the combined series of childhood immunizations.

References

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[3] Coffield A, Maciosek M, McGinnis, et al. Priorities among recommended clinical preventive services. *Am J Prev Med.* 2001;21:1-9.

[4] National Committee for Quality Assurance. HEDIS 2008 Audit Means, Percentiles and Ratios. Available at: http://www.ncqa.org/Portals/0/HEDISQM/Programs/CompAud/MPR/2009Update/HEDIS_2008_Medicaid_HMO_Ratios.xls. Accessed Feb. 24, 2010.

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I. INTRODUCTION

Background

Routine immunization of children and adults is a safe and cost-effective method of preventing serious and potentially life-threatening diseases.[1-3] Many of these diseases, such as measles and varicella (chicken pox), often are considered 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. A resurgence of measles from 1989 to 1991 resulted in more than 55,000 cases in the United States, with 11,000 hospitalizations, 120 deaths, and $100 million in direct medical care costs.[4] Similarly, varicella was responsible for 10,000 to 15,000 hospitalizations and more than 100 deaths per year before the vaccine became available.[5]

While successful immunization programs have virtually eliminated measles in the United States, dozens of cases have originated in persons infected outside the U.S. over the past few years.[4,6] In early 2008, an outbreak of measles, which was traced to a Swiss national visiting the United States, resulted in 13 confirmed and four probable cases in Pima County, Arizona.[7] The outbreak lasted five months, with thousands of residents receiving MMR (measles, mumps, rubella) vaccinations, hundreds of case investigations conducted by Pima County Health Department staff, and a health emergency declaration by Pima County. The outbreak cost the county an estimated $400,000 in staff time and resources to contain the risk to public health. Virtually all measles cases in the U.S. are linked to imported cases,[8] and the Centers for Disease Control and Prevention (CDC) has found that most of these cases could have been prevented through vaccination.[4,6,9]

Other diseases also continue to be a problem. In Arizona, an outbreak of pertussis, commonly known as whooping cough, occurred in mid-2005, resulting in at least one infant death. In all, 959 cases — 3.5 times the number in the previous year — were reported in the state in 2005.[10] In 2006, 508 cases of pertussis were reported in Arizona.[8] The disease is most dangerous to infants, and may result in death from asphyxia, bronchopneumonia or cerebral complications. Cases of rubella and mumps, some traced to international exposure, have been reported recently in Arizona and elsewhere.

To prevent unnecessary illness, hospitalizations and deaths, high rates of vaccination are necessary – generally 90 percent or greater, according to the CDC.

Factors resulting in children not being fully vaccinated include a lack of awareness about when immunizations should be given, refusal due to religious or personal beliefs, and a lack of perceived risks about the dangers of childhood diseases.[9] Unnecessary fears and misconceptions about the safety and usefulness of vaccines also have prevented many children from being immunized.[11] Despite 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), parental fears about the safety and benefits of immunization persist.[11, 12,13]

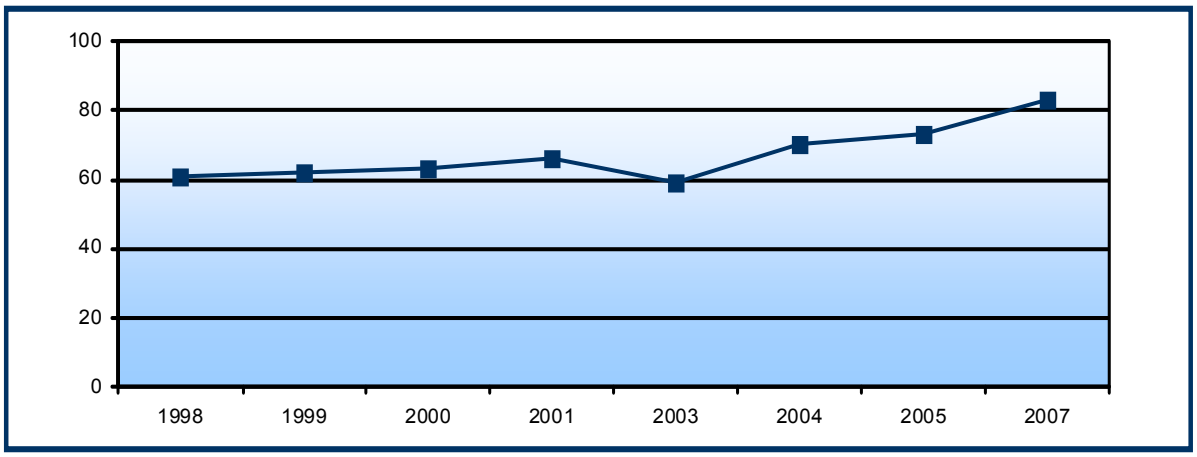
While all vaccines carry a risk of adverse effects on those who receive them, this risk is minimal compared with the serious health outcomes and possibility of death posed by different diseases *(see Appendix A, "Complications from Vaccine-Preventable Diseases vs. Risk of Adverse Reactions from Vaccines").* From Jan. 1, 2007, through Oct. 31, 2007, 253 adverse events were reported on individuals 2 months through 18 years of age in Arizona. Adverse reactions were recorded in less than 0.001 percent of all vaccinations administered to Arizona children during that timeframe.[14]

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 age or medical contraindications.

The CDC recommends that all children be immunized for 15 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, hepatitis A, rotatvirus and meningococcal disease. Most vaccines (also referred to as antigens) are given to children between two and 18 months of age (s*ee Appendix B, "Recommended Immunization Schedule for Persons Aged 0–6 Years—United States, 2009").*

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 1998 through 2001. The rate declined in 2003, likely due to shortages of some vaccines, and rose again from 2004 through 2007.

Figure 1. AHCCCS Overall Rates of Completion for the Five-antigen Vaccine Series (DTaP, IPV, MMR, Hib and HBV), by Contract Year



Rates from 1998 to 2003 include four doses of DTaP, three doses of IPV, one dose of MMR, two doses of Hib and three doses of HBV. In 2004, the combination was revised to include three doses of Hib.

Healthy People and AHCCCS Goals

Based on the CDC's recommendations, the U.S. Department of Health and Human Services (DHHS) established a goal that, by 2010, 90 percent of children 19 to 35 months of age will be fully vaccinated for universally recommended vaccines. This goal applies to completion of the appropriate doses of individual vaccines. A second goal is that 80 percent of children receive the full series of five vaccines (DTaP, IPV, MMR, Hib and HBV) by age 3.

AHCCCS has adopted Goals of 90 percent for completion of individual childhood vaccines and 80 percent for two combined vaccine series, based on the Healthy People 2010 objectives. The agency also has set minimum standards that contracted health plans (Contractors) should meet for completion of each vaccine and combination of vaccines in the current measurement. The Minimum Performance Standard (MPS) for each vaccine or combination is set at or above the most recent HEDIS national mean for Medicaid health plans. It should be noted that a Contractor may not meet the MPS for all individual vaccines but may meet it for a particular combination, as these minimum standards are generally lower than those for single vaccines.

AHCCCS Acute-care Performance Standards for Childhood Immunizations
For the Measurement Period of CYE 2009

Indicator	Minimum Performance Standard
4:3:1:2:3:1 Series	71%
4:3:1:2:3:1:4 Series	66%
DTaP - 4 doses	85%
Polio - 3 doses	90%
MMR - 1 dose	90%
Hib - 3 doses	86%
HBV - 3 doses	90%
Varicella - 1 dose	86%
PCV – 4 doses	47%

II. PURPOSE OF THE MEASUREMENT

This measurement was conducted to reliably assess the immunization status of AHCCCS members by age 2, as required by state law *(ARS 36-2904)*, and to evaluate Contractor performance. This report includes measurement results for 11 childhood diseases, generally using the following vaccines: diphtheria, tetanus, and acellular pertussis (DTaP); inactivated poliovirus (IPV); measles, mumps and rubella (MMR); Haemophilus influenza type b (Hib); hepatitis B virus (HBV), varicella zoster virus (VZV) and pneumococcal conjugate vaccine (PCV).

Overall rates are reported for the combined Medicaid and KidsCare populations to demonstrate the immunization completion status of children enrolled in AHCCCS. In order to evaluate performance by Contractor, completion rates also are reported separately for the Medicaid and KidsCare populations (Tables 1 through 4). Results of the current measurement are compared with AHCCCS Minimum Performance Standards and goals, as well as national means and percentiles for Medicaid and commercial health plans. Results also are reported for the complete series of all vaccines by county, in order to evaluate opportunities for improvement by geographic area.

III. QUALITY INDICATORS

This immunization study is based on Healthcare Effectiveness Data and Information Set (HEDIS) 2009 specifications for measuring childhood immunizations. HEDIS is a widely adopted measure set that is used by approximately 90 percent of managed care organizations in the U.S. All quality indicators are based on identical denominator criteria. These indicators are listed below with the numerator criteria.

1. DTaP Immunization Rate

The number of children in the denominator who received initial DTaP (diphtheria, tetanus and acellular pertussis) vaccinations followed by at least three DTaP, DT or individual diphtheria and tetanus shots with different dates of service on or before their second birthdays

2. IPV Immunization Rate

The number of children in the denominator who received at least three polio vaccinations (IPV) with different dates of service on or before their second birthdays

3. MMR Immunization Rate

The number of children in the denominator who received at least one measles, mumps and rubella (MMR) vaccination with a date of service on or before their second birthdays

4. Hib Immunization Rate

The number of children in the denominator who received at least two Haemophilus influenza type b vaccinations with different dates of service on or before their second birthdays

5. HBV Immunization Rate

The number of children in the denominator who received at least three hepatitis B virus vaccinations with different dates of service on or before their second birthdays

6. VZV Immunization Rate

The number of children in the denominator who received at least one varicella vaccination with a date of service on or before their second birthdays

7. PCV Immunization rate

The number of children in the denominator who received at least four pneumococcal conjugate vaccinations with different dates of service on or before their second birthdays

8. HEDIS 2009 Combination #2 (4:3:1:2:3:1)

The number of children in the denominator who received four DTaP/DT vaccinations, three IPV vaccinations, one MMR vaccination, two Hib vaccinations, three HBV vaccinations and one VZV vaccination on or before their second birthdays

9. HEDIS 2009 Combination #2 (4:3:1:2:3:1:4)

The number of children in the denominator who received four DTaP/DT vaccinations, three IPV vaccinations, one MMR vaccination, two Hib vaccinations, three HBV vaccinations, one VZV vaccination and four PCV vaccinations on or before their second birthdays

In accordance with HEDIS criteria, any vaccines administered after 24 months of age were not included in the numerators. Doses of DTaP, IPV and Hib that were administered prior to 42 days after a child's birth also were not counted, consistent with minimum age restrictions specified in the recommended immunization schedule.

Single doses of combined vaccines — such as Pentacel®, which combines DTaP, IPV and Hib in one dose, or ComVax®, which combines Hib and HBV together — were counted as the appropriate individual vaccines.

It also should be noted that, while the CDC recommends vaccination of children for influenza, hepatitis A, rotavirus, and meningococcal disease, these vaccines are not included in the 2009 HEDIS measurement methodology.

IV. STUDY METHODS

This measurement included children who turned 2 years old during the contract year ending (CYE) Sept. 30, 2009, and who were enrolled with AHCCCS Contractors and were eligible under Medicaid (Title XIX of the Social Security Act) or KidsCare (Title XXI, the state's Child Health Insurance Program).

Study Sample

AHCCCS identified a representative random sample of children stratified by Contractor with a 95-percent confidence level and 5-percent confidence interval. The sample consisted of 3,871 children whose second birthdays occurred on or between Oct. 1, 2008, and Sept. 30, 2009, 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 one month was allowed.

Data Collection

All data were collected according to applicable privacy and confidentiality laws and safeguards. AHCCCS first obtained data from the Arizona State Immunization Information System (ASIIS), an automated registry maintained by the Arizona Department of Health Services (ADHS). AHCCCS provided ASIIS with electronic files containing the sample cases of Medicaid and KidsCare children. The ASIIS registry was searched by first name, last name and date of birth to match members in the AHCCCS sample against patients in the registry. If members in ASIIS were not exact matches by first name, last name and date of birth on the AHCCCS file, the registry was further searched to match against other factors, such as AHCCCS identification number or mother's social security number, if available. ADHS provided to AHCCCS all immunization data in the registry for those patients it was able to conclusively match.

These data were merged with any vaccination data for administration of vaccines collected from the AHCCCS encounter system through the AHCCCS Data Decision Support (ADDS) data warehouse. AHCCCS then provided health plan-specific data collection files, with the vaccination data that it was able to collect, to each Contractor, along with specific instructions for collecting additional data. Contractor personnel also were instructed on the purpose of the study, data collection methods and internal quality control/validation procedures to ensure that data were collected and reported to AHCCCS in a consistent and reliable manner.

Contractor staff then collected additional data from medical records and/or any claims (encounters) not yet received or processed by AHCCCS. Data collected were entered into the Excel files, which were returned to AHCCCS for analysis. Data source documentation was retained by Contractors.

This data collection methodology, which utilizes administrative data such as registry records and encounters, along with information from medical records, is known as a hybrid methodology.

Data Analysis

Once data collection was finalized, AHCCCS merged the data from Contractors and performed analysis using Cognos software in the ADDS system. The primary analysis provided results on the percentage of 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.

Deviations from Previous Methodology

NCQA has made revisions to the HEDIS childhood immunization measures since the previous measurement conducted by AHCCCS. These changes include:

- In the previous measurement using HEDIS 2007 specifications, medical record notations of "documented history of illness" or "seropositive test result" were counted as evidence of DTaP, IPV, Hib or PCV compliance. HEDIS no longer accepts evidence of disease as numerator compliance for these vaccines (documented history of illness or seropositive test result still counts toward the numerators for MMR, HBV and VZV).
- For administrative data collection, HEDIS now requires four acellular pertussis vaccines for the DTaP antigen (previously, HEDIS counted an initial DTaP — diphtheria, tetanus and acellular pertussis — vaccination followed by at least three DTaP, DT or individual diphtheria and tetanus shots by a child's second birthday). However, for data collected from medical records, HEDIS 2009 allows immunizations documented in the chart using a generic header of DTaP/DTP/DT to be counted as evidence of DTaP.
- NCQA revised the required number of doses for the Hib vaccine, per ACIP recommendations, to defer the third Hib dose during a vaccine shortage, which occurred during most of 2009.

See Appendix C of this report for the complete study methodology.

V. RESULTS

The sample included 3,099 Medicaid-eligible children enrolled with 10 health plans and 772 KidsCare members enrolled with six health plans.

Overall completion rates for the combined Medicaid and KidsCare population exceed AHCCCS and Healthy People 2010 goals for five vaccines (IPV, MMR Hib, HBV and VZV) and the 4:3:1:2:3:1 combined series exceed AHCCCS and Healthy People 2010 goals.

Immunization Completion Rates by 24 months of Age, All Members, Compared with Goals and Rates for the Previous Measurement

	DTaP (4 doses)	IPV (3 doses)	MMR (1 dose)	Hib (2 doses)	HBV (3 doses)	VZV (1 dose)	PCV (4 doses)	4:3:1:2:3:1 Combo	4:3:1:2:3:1:4 Combo
Current AHCCCS Rate (%)	**84.8**	**93.4**	**94.9**	**96.7**	**94.0**	**94.0**	**83.2**	**81.1**	**76.3**
AHCCCS/ HP 2010 Goals	90	90	90	90	90	90	90	80 [1]	80 [1]
Previous AHCCCS Rate	85.6	93.2	94.2	96.8	94.0	92.0	81.6	N/R [2]	N/R [2]

[1] Goals established by AHCCCS; DHHS did not set goals for these vaccine combinations in "Healthy People 2010".
[2] NCQA revised HEDIS methodology for the 2009 measurement, changing the number of Hib doses required for completion from three to two because of a Hib vaccine shortage during the measurement period. Combination rates with only two doses of Hib were not reported in the previous measurement.

Results by Contractor

For the purpose of evaluating Contractor performance, AHCCCS analyzes Medicaid and KidsCare populations separately. For the Medicaid population, nine of 10 Contractors had completion rates for the 4:3:1:2:3:1 combination that were above the AHCCCS Minimum Performance Standard (MPS) for this measure. All Contractors' rates exceeded the MPS for the 4:3:1:2:3:1:4 combination. The AHCCCS minimum standards are set at a level that exceed the most recent HEDIS national mean available when contracts are implemented.

For KidsCare members, all six Contractors had completion rates that exceeded the AHCCCS minimum standards for both vaccine combinations. Individual vaccine and combination rates by Contractor and overall are presented in Tables 1 through 4.

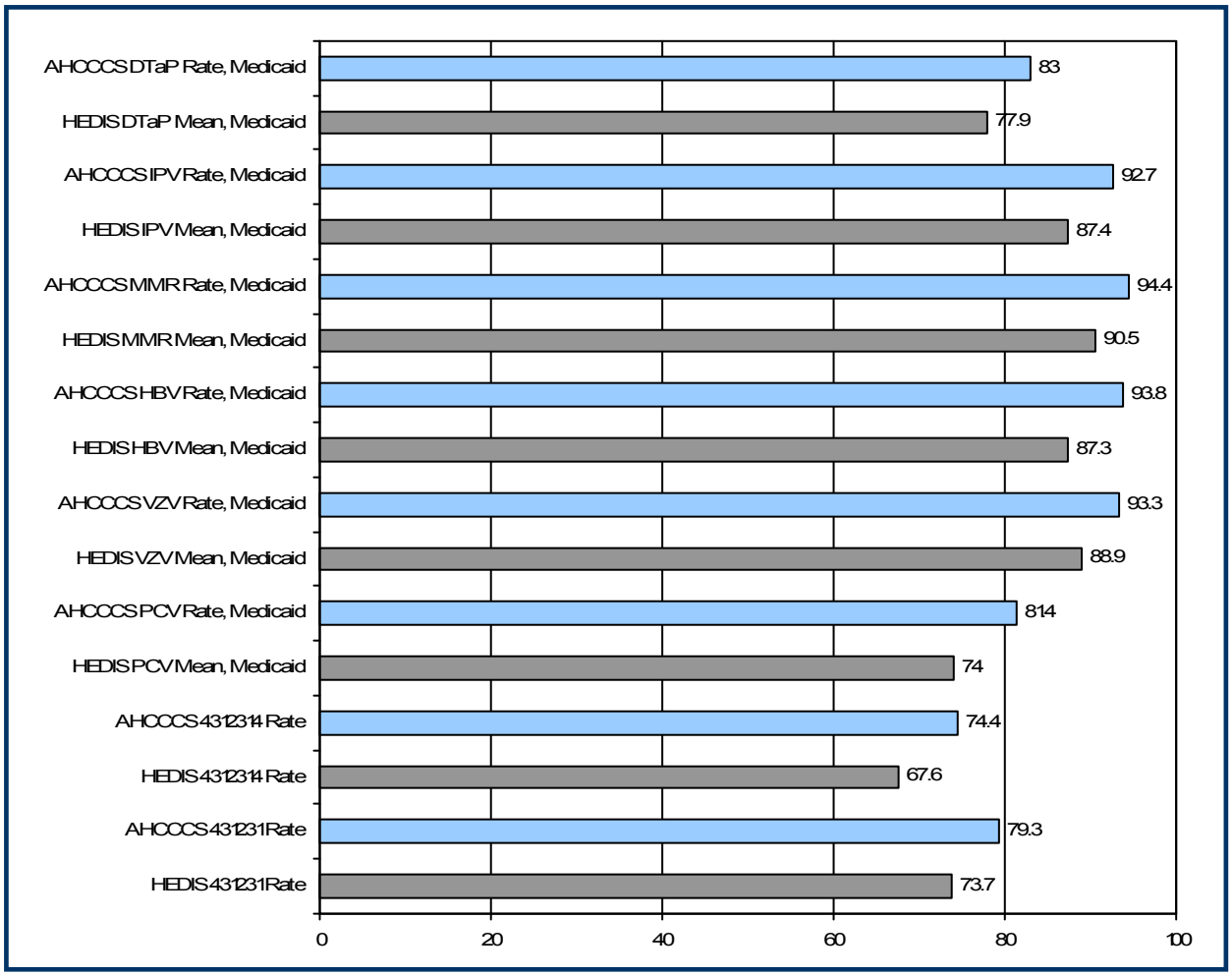
Results by County

When analyzed by county, data for the Medicaid and KidsCare populations were combined because several counties had KidsCare samples that were too small to analyze independently. Rates of completion of the 4:3:1:2:3:1:4 combination varied widely by county, from 100 percent in Santa Cruz County, which had only three members that met the sample selection criteria, to 46.1 percent in Navajo County. Rates by county are shown in Table 5.

Comparison with National Benchmarks

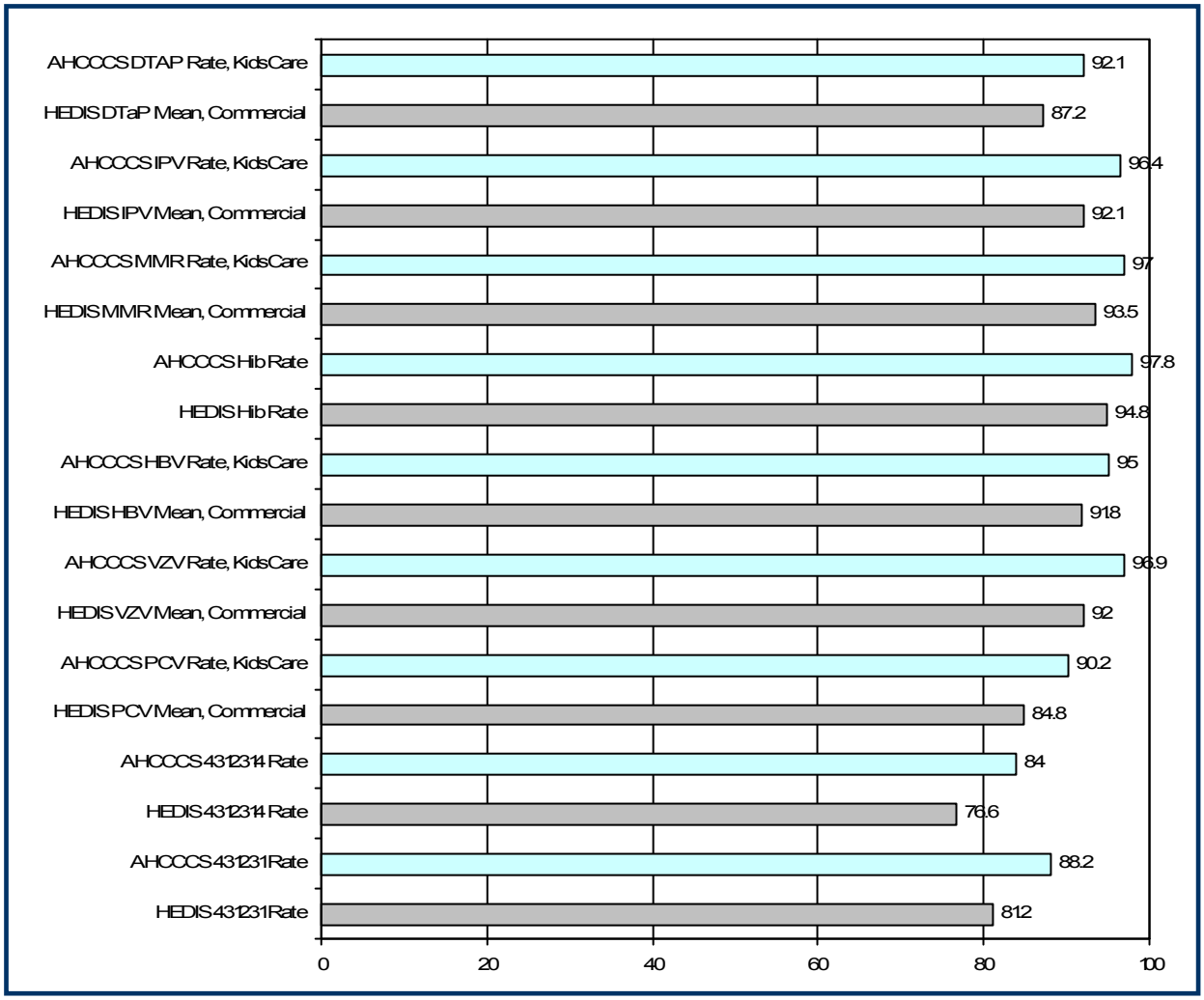
AHCCCS rates for both the Medicaid and KidsCare populations surpass national means for Medicaid and commercial health plans, respectively. In addition, AHCCCS rates for both the Medicaid and KidsCare populations surpass national means for Medicaid and commercial health plans, respectively.

Figure 2. AHCCCS Rates for Medicaid Members Compared with 2009 National HEDIS Means for Medicaid Health Plans



Note: Most recent means (averages) for Medicaid or commercial health plans available from the National Committee for Quality Assurance (NCQA) are based on the measurement year ending Dec. 31, 2008, utilizing HEDIS 2009 specifications.

Figure 3. AHCCCS Rates for KidsCare Members Compared with 2009 National HEDIS Means for Commercial Health Plans



Note: Most recent means (averages) for Medicaid or commercial health plans available from the National Committee for Quality Assurance (NCQA) are based on the measurement year ending Dec. 31, 2008, utilizing HEDIS 2009 specifications.

In addition, AHCCCS KidsCare rates for all vaccines and combinations except HBV rank in the 75th percentile of commercial health plans nationally.

Immunization Completion Rates by 24 months of Age, KidsCare Members, Compared with Compared with 75th Percentile of Commercial Health Plans Nationally

	DTaP (4 doses)	IPV (3 doses)	MMR (1 dose)	Hib (2 doses)	HBV (3 doses)	VZV (1 dose)	PCV (4 doses)	4:3:1:2:3:1 Combo	4:3:1:2:3:1:4 Combo
AHCCCS KidsCare Rate (%)	**92.1**	**96.4**	**97.0**	**97.8**	**95.0**	**96.9**	**90.2**	**88.2**	**74.0**
Commercial Plan 75th Percentile	91.1	95.3	95.7	97.6	95.7	94.6	89.7	85.6	82.1

VI. DISCUSSION AND CONCLUSIONS

The basic methods used to conduct this study have been used by Medicaid health plans since 1995, and provide a reliable way to measure whether children who have been enrolled in these plans for approximately a year or more are up to date on immunizations by the time they turn 2. In 2004, AHCCCS implemented a Performance Improvement Project (PIP) for childhood immunizations, which included all Acute-care Contractors and DDD, regardless of their level of performance in these measures. The focused interventions implemented by health plans appear to have been effective, so that nearly all of the AHCCCS overall rates surpass long-range goals for 2010 that were set in the last decade.

To assist Contractors with quality improvement efforts, AHCCCS will perform further analysis of rates for DTaP vaccination. This analysis will evaluate "missed opportunities" for completion of this vaccine among children who received three doses of DTaP by their second birthdays to gauge the impact that administering one more dose would have had on the completion rate.

AHCCCS also will perform further analysis of rates by county to identify potential opportunities for improvement. Working with Contractors, the Arizona Department of Health Services, The Arizona Partnership for Immunization (TAPI) and county health departments, AHCCCS undertook a quality improvement initiative in 2007 to increase rates of childhood immunization in specific counties, based on previous assessments. Efforts initially focused on Pinal County, which were among the lowest in the state. The group identified barriers and resources to address some of the reasons for low rates of vaccination. One of the barriers identified was a need for education among provider offices in immunization requirements, use of the ASIIS registry, and strategies for office staff to reassure parents about immunization safety and encourage return visits, in order to bring patients up to date on their vaccinations. Several educational sessions were held for providers. The immunization work group evolved to include Apache, Gila, Mohave and Navajo counties. The current measurement supports continued work to improve rates in these counties.

AHCCCS will provide data from this measurement to Contractors for further analysis and identification of barriers and interventions to improve performance. AHCCCS will continue to work with Contractors, especially those with the lowest rates of childhood immunization, to assist them in making progress toward state and national goals, particularly for DTaP and PCV vaccinations. Significant improvement in rates for these two vaccinations should help AHCCCS and its Contractors achieve the goal for the combined series of childhood immunizations.

The following recommendations to improve or maintain immunization completion rates among 2-year-olds enrolled in AHCCCS were compiled from evidence-based research, including strategies developed by the CDC.[13,15] Most AHCCCS Contractors have implemented several of these strategies, and their continued use should help sustain or further improve performance.

1. Contractors should continue using a variety of means to reach parents/guardians and encourage them 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. In addition, Contractors may offer incentives, such as a $25 gift certificate, to parents of children who complete all immunizations by 24 months.

2. In addition to ongoing monitoring of completion of all childhood vaccines, Contractors should focus on rates of DTaP completion, particularly those children who have received only three doses. Given the effect that missing the fourth dose has on completion rates for the full series of immunizations, health plans and providers should particularly focus on ensuring that children receive all the necessary doses of this vaccine.

3. Since all childhood vaccines can be completed at about 15 months, Contractors should begin checking the immunization status of members at 12 months of age. If members are lacking doses, this could give parents time to get immunizations completed by the time their children turn 2. Contractors should utilize the CDC's "catch up" immunization schedule, which is included in Appendix B, to help plan for completion of vaccines. When children are overdue, Contractors should consider the additional step of assisting parents/guardians with making appointments with their PCPs and make arrangements for transportation assistance if needed.

4. Contractors should continue or enhance member education to overcome parental fears regarding vaccination. This includes direct communication with members and working with providers to ensure that parents and guardians understand the potential consequences of not having children fully immunized — including seizures, meningitis, hearing impairment and even death due to infectious diseases.

This task remains a challenge for both health plans and providers as celebrities and advocacy groups continue to support claims that the number of vaccinations recommended for children and the ingredients contained in those vaccines are dangerous. A growing number of internet websites contain statements linking vaccinations with specific adverse reactions and chronic diseases such as multiple sclerosis, autism, and diabetes; claims that vaccines provide only temporary protection and that the diseases prevented are mild; and allegations of cover-ups to hide the truth about vaccine safety.[15] While no scientific link has been found between vaccines and autism, and the safety of immunizations have been thoroughly tested, such claims undermine efforts to achieve optimum vaccination coverage levels. In the course of collecting data for this measurement, Contractors identified several cases in which children's medical records noted parental refusal of vaccinations.

Contractors should use and encourage their network providers to utilize resources from the CDC's National Immunization Program (NIP), such as Vaccine Information Statements, which provide easy-to-understand information on the benefits and risks of specific vaccines. A Vaccine Information Statement (VIS) must be provided to the recipient of any vaccine covered by the National Childhood Vaccine Injury Act (NVCIA), which includes most immunizations given in childhood, and are available for all vaccines licensed in the U.S. Copies of VISs are available from state health authorities responsible for immunization, or they can be obtained from the CDC's website (http://www.cdc.gov/nip) or from the Immunization Action Coalition (http://www.immunize.org). Translations of VISs into languages other than English also are available from the Immunization Action Coalition website and may be available from state immunization programs.

Other resources include the CDC's *Epidemiology and Prevention of Vaccine Preventable Diseases*, known as the "Pink Book," which includes strategies for providers to increase immunization rates in their practices, as well as to address questions and myths regarding vaccine safety. "When a parent or patient initiates discussion regarding a vaccine concern, the health care provider should discuss the specific concern and provide factual information, using language that is appropriate," advises the CDC. "Effective, empathetic vaccine risk communication is essential in responding to misinformation and concerns." The CDC further notes that Vaccine Information Statements provide an outline for discussing vaccine benefits and risk, and recommends the use of two fact sheets, "Vaccines a Safe Choice" and "Helping Parents Who Question Vaccines" (available at http://www.cdc.gov/nip).[13]

One approach to overcoming unwarranted parental refusal that is seeing some success nationally is to educate providers that a parent's refusal at one visit does not necessarily mean that unnecessary fears and objections cannot be overcome in the future. Providers should continue to try educating parents that have previously refused vaccines, focusing on those that are the subject of the least amount of misinformation. Parents may agree to a few vaccines at first and their fears may be eased over time.

5. Contractors should target outreach activities in specific geographic areas, as needed. Education in vaccine management and delivery for providers serving some areas of the state may be helpful. For example, one Contractor found that a major provider in Apache County was not providing the required number of PCV doses due to a lack of understanding of vaccine requirements. Provider education resources are available through The Arizona Partnership for Immunization (http://www.whyimmunize.org) and ADHS (http://www.azdhs.gov/phs/immun).

6. Contractors should continue to ensure that health care professionals providing immunizations report all vaccinations to ASIIS. With complete reporting, an automated registry is a valuable tool in helping providers determine the immunization status of children they are seeing at each 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.

7. Contractors should consider assessing immunization rates at the provider level and provide feedback to physicians and office staff. These assessments could be tied to incentives for practices that meet immunization-completion standards.

AHCCCS and its Contractors will continue to monitor immunization coverage levels among children. AHCCCS also will continue to work with low-performing Contractors to ensure they meet contractual standards and goals.

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Table 1. Immunization Completion Rates by 24 Months of Age, by Contractor: Individual Vaccines, Members covered under Medicaid For the Contract Year Ending September 30, 2009

AHCCCS Contractor	Final Sample Size	PERCENT IMMUNIZATIONS COMPLETED BY 24 MONTHS OF AGE						
		4 DTaP	3 IPV	1 MMR	2 Hib *	3 HBV	1 VZV	4 PCV
Arizona Physicians IPA	**703**	82.4	**92.3**	**94.3**	**96.3**	**93.2**	**93.2**	**82.4**
	1,353	81.5	91.1	91.5	95.6	92.6	89.1	76.3
Care1st Health Plan	**73**	**93.2**	**97.3**	**98.6**	**97.3**	**98.6**	**98.6**	**91.8**
	224	95.1	97.8	98.2	97.8	99.1	98.2	91.1
DES/CMDP	**303**	84.8	**94.1**	**96.4**	**98.3**	**96.0**	**95.4**	**80.5**
	326	81.3	89.3	95.4	98.5	88.0	92.6	76.4
DES/DDD	**74**	78.4	83.8	82.4	**89.2**	78.4	**86.5**	**73.0**
	97	89.7	95.9	95.9	95.9	92.8	94.8	81.4
Health Choice Arizona	**659**	82.4	**90.3**	**93.0**	**94.4**	**93.0**	**91.4**	**78.6**
	846	85.1	91.7	92.9	95.2	92.9	89.7	79.2
Maricopa Health Plan	**164**	82.9	**95.1**	**97.0**	**97.6**	**97.6**	**97.6**	**82.3**
	201	86.1	96.5	96.0	98.5	98.0	95.5	86.6
Mercy Care Plan	**584**	**85.1**	**95.2**	**96.2**	**97.6**	**96.7**	**94.9**	**82.4**
	826	86.4	93.0	94.9	97.0	93.6	92.0	82.2
Phoenix Health Plan	**473**	79.7	**91.8**	**93.0**	**96.8**	**90.3**	**91.3**	**80.1**
	404	79.5	92.3	93.3	96.5	94.6	91.3	78.5
Pima Health System	**3**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.00**
	207	89.4	97.6	95.7	98.6	96.6	92.8	86.5
University Family Care	**63**	84.1	**96.8**	**96.8**	**98.4**	**98.4**	**93.7**	**82.5**
	79	78.5	96.2	93.7	98.7	98.7	87.3	78.5
TOTAL	3,099	83.0	92.7	94.4	96.4	93.8	93.3	81.4
PREVIOUS TOTAL	4,563	84.2	92.6	93.7	96.5	93.5	91.2	79.9

Shaded rows include previous results (measurement period ending CYE 2007).

* NCQA revised HEDIS methodology for the 2009 measurement, changing the number of Hib doses required for completion from three to two because of a Hib vaccine shortage during the measurement period. In the previous report, AHCCCS reported rates for three doses of Hib; however, it also measured rates for two doses of Hib, which are reported in this table.

Immunization completion rates for the current measurement that are shown in bold face indicate the Contractor met or exceeded the AHCCCS Minimum Performance Standard.

Table 2. Immunization Completion Rates by 24 Months of Age, by Contractor: Vaccine Combinations, Medicaid Members For the Contract Year Ending September 30, 2009

AHCCCS Contractor	Final Sample Size	PERCENT IMMUNIZATIONS COMPLETED BY 24 MONTHS OF AGE	
		Combination #2 Rate (4:3:1:2:3:1)*	Combination #3 Rate (4:3:1:2:3:1:4)*
Arizona Physicians IPA	703	**78.9**	**75.5**
Care1st Health Plan	73	**90.4**	**87.7**
DES/CMDP	303	**79.5**	**72.3**
DES/DDD	74	68.9	**63.5**
Health Choice Arizona	659	**78.1**	**71.8**
Maricopa Health Plan	164	**81.1**	**74.4**
Mercy Care Plan	584	**82.9**	**78.8**
Phoenix Health Plan	473	**75.3**	**71.2**
Pima Health System	3	**100.0**	**100.0**
University Family Care	63	**84.1**	**79.4**
TOTAL	3,099	79.3	74.4

* NCQA revised HEDIS methodology for the 2009 measurement, changing the number of Hib doses required for completion from three to two because of a Hib vaccine shortage during the measurement period. AHCCCS did not calculate the vaccine combinations with two doses of Hib in the previous measurement, as Contractors were not required to meet performance standards for these combinations.

Immunization completion rates for the current measurement that are shown in bold face indicate the Contractor met or exceeded the AHCCCS Minimum Performance Standard.

Table 3. Immunization Completion Rates by 24 Months of Age, by Contractor: Individual Vaccines, Members covered under KidsCare For the Contract Year Ending September 30, 2009

AHCCCS Contractor	Final Sample Size	PERCENT IMMUNIZATION COMPLETED BY 24 MONTHS OF AGE						
		4 DTaP	3 IPV	1 MMR	2 Hib *	3 HBV	1 VZV	4 PCV
Arizona Physicians IPA	181	**86.2**	**92.8**	**95.6**	**95.6**	**92.3**	**96.1**	**86.2**
	268	89.9	95.1	94.8	97.8	95.5	93.7	85.4
Care1st Health Plan	37	**91.9**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**94.6**
	64	100.0	98.4	100.0	100.0	100.0	100.0	98.4
Health Choice Arizona	160	**94.4**	**96.3**	**98.1**	**97.5**	**96.3**	**97.5**	**90.0**
	180	93.3	97.8	97.8	99.4	97.2	96.1	91.7
Maricopa Health Plan	45	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**93.3**
	41	95.1	100.0	97.6	100.0	100.0	97.6	85.4
Mercy Care Plan	206	**94.7**	**97.1**	**96.6**	**99.0**	**97.6**	**97.1**	**94.7**
	242	92.6	97.9	97.5	98.3	95.9	95.9	90.5
Phoenix Health Plan	143	**91.6**	**98.6**	**97.2**	**98.6**	**90.9**	**95.8**	**87.4**
	130	90.8	93.1	96.9	97.7	94.6	96.9	90.0
TOTAL	772	92.1	96.4	97.0	97.8	95.0	96.9	90.2
PREVIOUS TOTAL	956	92.1	96.4	96.9	98.5	96.3	95.6	89.5

Shaded rows include previous results (measurement period ending CYE 2007).

* NCQA revised HEDIS methodology for the 2009 measurement, changing the number of Hib doses required for completion from three to two because of a Hib vaccine shortage during the measurement period. In the previous report, AHCCCS reported rates for three doses of Hib; however, it also measured rates for two doses of Hib, which are reported in this table.

Immunization completion rates for the current measurement that are shown in bold face indicate the Contractor met or exceeded the AHCCCS Minimum Performance Standard.

Note: DES/CMDP, DES/DDD, Pima Health System and University Family Care did not have KidsCare members that met the continuous enrollment criteria for this measurement.

Table 4. Immunization Completion Rates by 24 Months of Age, by Contractor: Vaccine Combinations, KidsCare Members For the Contract Year Ending September 30, 2009

AHCCCS Contractor	Final Sample Size	PERCENT IMMUNIZATIONS COMPLETED BY 24 MONTHS OF AGE	
		Combination #2 Rate (4:3:1:2:3:1)*	Combination #3 Rate (4:3:1:2:3:1:4)*
Arizona Physicians IPA	181	**81.8**	**78.5**
Care1st Health Plan	37	**91.9**	**91.9**
Health Choice Arizona	160	**92.5**	**87.5**
Maricopa Health Plan	45	**100.0**	**93.3**
Mercy Care Plan	206	**90.8**	**88.3**
Phoenix Health Plan	143	**83.9**	**76.2**
TOTAL	772	88.2	84.0

* NCQA revised HEDIS methodology for the 2009 measurement, changing the number of Hib doses required for completion from three to two because of a Hib vaccine shortage during the measurement period. AHCCCS did not calculate the vaccine combinations with two doses of Hib in the previous measurement, as Contractors were not required to meet performance standards for these combinations.

Immunization completion rates for the current measurement that are shown in bold face indicate the Contractor met or exceeded the AHCCCS Minimum Performance Standard.

Note: DES/CMDP, DES/DDD, Pima Health System and University Family Care did not have KidsCare members that met the continuous enrollment criteria for this measurement.

Table 5. Immunization Completion Rates by 24 Months of Age, by County: Vaccine Combination #3, All Members (Medicaid and KidsCare) For the Contract Year Ending September 30, 2009

County	Final Sample Size	PERCENT IMMUNIZATIONS COMPLETED BY 24 MONTHS OF AGE Combination #3 Rate (4:3:1:2:3:1:4) *
Apache	25	56.0
Cochise	115	73.9
Coconino	60	86.7
Gila	65	63.1
Graham	73	79.5
Greenlee	10	70.0
La Paz	33	69.7
Maricopa	1942	77.0
Mohave	142	64.8
Navajo	76	46.1
Pima	887	79.4
Pinal	209	72.2
Santa Cruz	3	100.0
Yavapai	10	70.0
Yuma	221	84.6
TOTAL	3,871	76.3

* NCQA revised HEDIS methodology for the 2009 measurement, changing the number of Hib doses required for completion from three to two because of a Hib vaccine shortage during the measurement period. AHCCCS did not calculate this vaccine combination with two doses of Hib in the previous measurement.

Appendix A
Risk of Complications from Vaccine-Preventable Diseases vs. Risk of Adverse Reactions from Vaccines

DISEASE	CLINICAL FEATURES	COMPLICATIONS
Diphtheria	Cold-like symptoms, such as sore throat, anorexia, and low-grade fever. Respiratory obstruction may occur. Eventually the tonsils and soft palate will be covered with a bluish-white membrane	The most common complications are myocarditis (characterized by abnormal cardiac rhythms, which can lead to death), and neuritis (affects motor nerves, secondary pneumonia and respiratory failure may result from paralysis of the diaphragm). Other complications include otitis media (ear infection) and respiratory insufficiency due to airway obstruction, especially in infants. Death rate is up to 20 percent among children younger than 5 years.
Tetanus	Lockjaw, stiffness of the neck, difficulty swallowing, rigid abdominal muscles, fever, hypertension, and tachycardia. Complete recovery can take months.	Laryngospasm (spasm of the vocal chords and/or muscles of respiration, which may result in difficulty breathing), fractures of the spine or long bones due to sustained contractions and convulsions, hyperactivity of the autonomic nervous system (may lead to hypertension and/or abnormal heart rhythm), nosocomial infection (related to long hospitalization), pulmonary embolism, and aspiration pneumonia. Death occurs in about 11 percent of cases.
Pertussis	Cold-like symptoms (first stage), coughing spells that end in a high-pitched whoop, and may result in cyanosis in which the patient turns blue (second stage). Vomiting and exhaustion usually follow coughing episodes.	Seizures, encephalopathy, secondary bacterial pneumonia resulting in death occurs in approximately 12 percent of infants younger than six months. Neurologic complications also are more common among infants. Other complications include otitis media, anorexia, dehydration and pressure injuries due to severe coughing.
Poliomyelitis (polio)	Response to infection is highly variable and may consist of minor, non-specific illness, including sore throat and fever, nausea, vomiting, abdominal pain, constipation, or diarrhea; or influenza-like illness. Other forms include stiffness of the neck, back and/or legs, and paralytic illness.	Nonparalytic aseptic meningitis, flaccid paralysis (diminished deep tendon reflexes). Death rate ranges from 2 percent to 75 percent, depending on age and severity of the illness.

Measles	Rash, fever, cough, runny nose, Koplik's spots (blue-white spots on the buccal mucosa), cold-like symptoms, anorexia, diarrhea, generalized lymphadenopathy and conjunctivitis (eye infection)	Diarrhea, otitis media, pneumonia, and encephalitis. subacute sclerosing panencephalitis (SSPE), a rare degenerative central nervous system disorder is believed to be caused by persistent measles virus infection of the brain. Measles during pregnancy can result in premature labor, spontaneous abortion and low birth weight Death occurs in 0.2 percent of cases, with the risk of death higher in young children.
Mumps	Non-specific illness consisting of low-grade fever, headache, malaise, myalgia; parotitis (manifested as ear ache and tenderness of the jaw)	Central nervous system involvement (meningitis or encephalitis); orchitis (testicular inflamaation), oophoritis (ovarian inflammation), myocarditis, pancreatitis, and hyperglycemia. Less common complications are deafness, arthralgia, arthritis and nephritis. Death occurs in 1 to 3 in 10,000 cases.
Rubella	Low-grade fever, malaise, swollen glands and upper respiratory infection prior to a rash; conjunctivitis, testalgia or orchitis	Abortion (both surgical and spontaneous); gastronintestinal, cerebral or intrarenal hemorrhage; encephalitis; arthralgia and arthritis occur frequently in adults. Congenital rubella syndrome (CRS) includes deafness, blindness and mental retardation in newborns.
Haemophilus influenza type b (Hib)	Meningitis (infection of membranes covering the brain, including fever, decreased mental status and stiff neck), epiglottitis (infection and swelling of the tissue that covers the larynx during swallowing, and may cause life-threatening airway obstruction), pneumonia, otitis media, arthritis, cellulitis (rapidly progressing skin infection that usually involves the face, head or neck), osteomyelitis (bone infection) and pericarditis (infection of the sac covering the heart)	Meningitis, epiglottitis, pneumonia, arthritis, cellulitis, osteomyelitis and bacteremia. Others experience hearing impairment or neurologic sequelae, and death occurs in 2 to 5 percent of cases.
Hepatitis B (HBV)	Malaise, anorexia, nausea, vomiting, right upper quadrant abdominal pain, fever, headache, myalgias, skin rashes, arthralgias, arthritis and dark urine, progressing to jaundice, tenderness and enlargement of the liver; fatigue, which may persist for weeks or months	Chronic infection and malaise/fatigue for weeks and /or months, chronic hepatitis, cirrhosis of the liver, liver failure and carcinoma. Up to 4,000 people in the United States die each year from hepatitis B-related cirrhosis and up to 1,500 die from related liver cancer.
Varicella (VZV - also known as Chicken Pox)	Fever, malaise, rash (with lesions on mucous membranes that may rupture and become purulent before drying and crusting over), and pruritus (itching) . Herpes Zoster (shingles) occurs when the VZV reactivates.	Secondary bacterial infection, pneumonia, central nervous system symptoms (aseptic memingitis, encephalitis) and Reye's syndrome. If a woman develops varicella within five days of delivery, the neonate has a 30 percent chance of death.

No vaccine is perfectly safe or effective. Approximately 10,000 cases of adverse health effects are reported to the CDC through the Vaccine Adverse Event Reporting System (VAERS) each year. Research is under way by the U. S. Public Health Service to better understand which vaccine adverse events are truly caused by vaccines (or are coincidental to their administration) and how to reduce the already low risk of serious vaccine-related injury.

From Jan. 1, 2007, through Oct. 31, 2007, 253 adverse events were reported on individuals 2 months through 18 years of age in Arizona. Adverse reactions were recorded in less than 0.001 percent of all vaccinations administered to Arizona children during that timeframe.

Children are far more likely to be injured by a vaccine-preventable disease than by the vaccine. Still, some parents refuse to have their children immunized because of the possibility of adverse reaction to a vaccine. Below is a comparison of risks from some diseases and risks from the associated vaccines.

Risk from Disease vs. Risk from Vaccines	
Disease	Vaccine
Diphtheria Death: 1 in 20 Tetanus Death: 3 in 100 Pertussis Pneumonia: 1 in 8 Encephalitis: 1 in 20 Death: 1 in 200	DTaP Fever greater than 101°: 3 to 5 in 100 Swelling at injection site: 2 to 29 in 100
Measles Pneumonia: 1 in 20 Encephalitis: 1 in 2,000 Death: 1 in 3,000 Mumps Encephalitis: 1 in 300 Rubella Congenital Rubella Syndrome: 1 in 4 if mother is infected early in pregnancy	MMR Encephalitis or severe allergic reaction: 1 in 1 million

Economic Value of Vaccines

In addition to saving lives and improving the quality of life, immunization generates significant economic benefits. According to an extensive cost-benefit analysis by the CDC, every dollar spent on immunization saves $6.30 in direct medical costs, with an aggregate savings of $10.5 billion. When including indirect costs to society -- a measurement of losses due to missed work, death and disability as well as direct medical costs -- the CDC notes that every dollar spent on immunization saves $18.40, producing societal aggregate savings of $42 billion. Various cost-benefit analyses produce similar measurements.

The DTaP vaccine is particularly cost effective. Each dollar spent on DTaP produces $8.50 of direct medical cost savings and $24 of societal savings.

For every $1 spent	
DTaP saves	$27.00
MMR saves	$26.00
H. Influenza type b saves	$5.40
Perinatal Hep B saves	$14.70
Varicella saves	$5.40
Inactivated Polio (IPV) saves	$5.45

Source: Arizona Department of Health Services. Report on the Current National and State System for Reporting and Collecting Information Regarding Vaccine Adverse Events. March 1, 2008. Available at: http://www.azdhs.gov/phs/immun/index.htm. Accessed Feb. 23, 2010.

Appendix B
Recommended Immunization Schedule for Persons Aged 0 – 6 Years: United States, 2009

Recommended Immunization Schedule for Persons Aged 0 Through 6 Years—United States • 2009

For those who fall behind or start late, see the catch-up schedule

Vaccine ▼ Age ▶	Birth	1 month	2 months	4 months	6 months	12 months	15 months	18 months	19–23 months	2–3 years	4–6 years
Hepatitis B[1]	HepB	HepB		see footnote 1	HepB						
Rotavirus[2]			RV	RV	RV[2]						
Diphtheria, Tetanus, Pertussis[3]			DTaP	DTaP	DTaP	see footnote 3	DTaP				DTaP
Haemophilus influenzae type b[4]			Hib	Hib	Hib[4]	Hib					
Pneumococcal[5]			PCV	PCV	PCV	PCV				PPSV	
Inactivated Poliovirus			IPV	IPV	IPV						IPV
Influenza[6]					Influenza (Yearly)						
Measles, Mumps, Rubella[7]						MMR	see footnote 7				MMR
Varicella[8]						Varicella	see footnote 8				Varicella
Hepatitis A[9]						HepA (2 doses)				HepA Series	
Meningococcal[10]										MCV	

Range of recommended ages

Certain high-risk groups

This schedule indicates the recommended ages for routine administration of currently licensed vaccines, as of December 1, 2008, for children aged 0 through 6 years. Any dose not administered at the recommended age should be administered at a subsequent visit, when indicated and feasible. Licensed combination vaccines may be used whenever any component of the combination is indicated and other components are not contraindicated and if approved by the Food and Drug Administration for that dose of the series. Providers should consult the relevant Advisory Committee on Immunization Practices statement for detailed recommendations, including high-risk conditions: http://www.cdc.gov/vaccines/pubs/acip-list.htm. Clinically significant adverse events that follow immunization should be reported to the Vaccine Adverse Event Reporting System (VAERS). Guidance about how to obtain and complete a VAERS form is available at http://www.vaers.hhs.gov or by telephone, 800-822-7967.

1. Hepatitis B vaccine (HepB). ***(Minimum age: birth)***

At birth:

- Administer monovalent HepB to all newborns before hospital discharge.
- If mother is hepatitis B surface antigen (HBsAg)-positive, administer HepB and 0.5 mL of hepatitis B immune globulin (HBIG) within 12 hours of birth.
- If mother's HBsAg status is unknown, administer HepB within 12 hours of birth. Determine mother's HBsAg status as soon as possible and, if HBsAg-positive, administer HBIG (no later than age 1 week).

After the birth dose:

- The HepB series should be completed with either monovalent HepB or a combination vaccine containing HepB. The second dose should be administered at age 1 or 2 months. The final dose should be administered no earlier than age 24 weeks.
- Infants born to HBsAg-positive mothers should be tested for HBsAg and antibody to HBsAg (anti-HBs) after completion of at least 3 doses of the HepB series, at age 9 through 18 months (generally at the next well-child visit).

4-month dose:

- Administration of 4 doses of HepB to infants is permissible when combination vaccines containing HepB are administered after the birth dose.

2. Rotavirus vaccine (RV). ***(Minimum age: 6 weeks)***

- Administer the first dose at age 6 through 14 weeks (maximum age: 14 weeks 6 days). Vaccination should not be initiated for infants aged 15 weeks or older (i.e., 15 weeks 0 days or older).
- Administer the final dose in the series by age 8 months 0 days.
- If Rotarix® is administered at ages 2 and 4 months, a dose at 6 months is not indicated.

3. Diphtheria and tetanus toxoids and acellular pertussis vaccine (DTaP). ***(Minimum age: 6 weeks)***

- The fourth dose may be administered as early as age 12 months, provided at least 6 months have elapsed since the third dose.
- Administer the final dose in the series at age 4 through 6 years.

4. *Haemophilus influenzae* type b conjugate vaccine (Hib). ***(Minimum age: 6 weeks)***

- If PRP-OMP (PedvaxHIB® or Comvax® [HepB-Hib]) is administered at ages 2 and 4 months, a dose at age 6 months is not indicated.
- TriHiBit® (DTaP/Hib) should not be used for doses at ages 2, 4, or 6 months but can be used as the final dose in children aged 12 months or older.

5. Pneumococcal vaccine. ***(Minimum age: 6 weeks for pneumococcal conjugate vaccine [PCV]; 2 years for pneumococcal polysaccharide vaccine [PPSV])***

- PCV is recommended for all children aged younger than 5 years. Administer 1 dose of PCV to all healthy children aged 24 through 59 months who are not completely vaccinated for their age.
- Administer PPSV to children aged 2 years or older with certain underlying medical conditions (see *MMWR* 2000;49[No. RR-9]), including a cochlear implant.

6. Influenza vaccine. ***(Minimum age: 6 months for trivalent inactivated influenza vaccine [TIV]; 2 years for live, attenuated influenza vaccine [LAIV])***

- Administer annually to children aged 6 months through 18 years.
- For healthy nonpregnant persons (i.e., those who do not have underlying medical conditions that predispose them to influenza complications) aged 2 through 49 years, either LAIV or TIV may be used.
- Children receiving TIV should receive 0.25 mL if aged 6 through 35 months or 0.5 mL if aged 3 years or older.
- Administer 2 doses (separated by at least 4 weeks) to children aged younger than 9 years who are receiving influenza vaccine for the first time or who were vaccinated for the first time during the previous influenza season but only received 1 dose.

7. Measles, mumps, and rubella vaccine (MMR). ***(Minimum age: 12 months)***

- Administer the second dose at age 4 through 6 years. However, the second dose may be administered before age 4, provided at least 28 days have elapsed since the first dose.

8. Varicella vaccine. ***(Minimum age: 12 months)***

- Administer the second dose at age 4 through 6 years. However, the second dose may be administered before age 4, provided at least 3 months have elapsed since the first dose.
- For children aged 12 months through 12 years the minimum interval between doses is 3 months. However, if the second dose was administered at least 28 days after the first dose, it can be accepted as valid.

9. Hepatitis A vaccine (HepA). ***(Minimum age: 12 months)***

- Administer to all children aged 1 year (i.e., aged 12 through 23 months). Administer 2 doses at least 6 months apart.
- Children not fully vaccinated by age 2 years can be vaccinated at subsequent visits.
- HepA also is recommended for children older than 1 year who live in areas where vaccination programs target older children or who are at increased risk of infection. See *MMWR* 2006;55(No. RR-7).

10. Meningococcal vaccine. ***(Minimum age: 2 years for meningococcal conjugate vaccine [MCV] and for meningococcal polysaccharide vaccine [MPSV])***

- Administer MCV to children aged 2 through 10 years with terminal complement component deficiency, anatomic or functional asplenia, and certain other high-risk groups. See *MMWR* 2005;54(No. RR-7).
- Persons who received MPSV 3 or more years previously and who remain at increased risk for meningococcal disease should be revaccinated with MCV.

The Recommended Immunization Schedules for Persons Aged 0 Through 18 Years are approved by the Advisory Committee on Immunization Practices (www.cdc.gov/vaccines/recs/acip), the American Academy of Pediatrics (http://www.aap.org), and the American Academy of Family Physicians (http://www.aafp.org).

DEPARTMENT OF HEALTH AND HUMAN SERVICES • CENTERS FOR DISEASE CONTROL AND PREVENTION

Appendix C

METHODOLOGY
Childhood Immunizations Status: Completion Rates at 24 Months of Age

For the Measurement Period Ending Sept. 30, 2009

Purpose
AHCCCS is required to report to the Governor and state Legislature immunization completion rates of members at 24 months of age on a biennial basis. The next report is due by April 1, 2010.

This study of members who turned 2 years of age in CYE 2009 will assess childhood immunization status overall and by AHCCCS-contracted health plan (Contractor) for the measurement period ending Sept. 30, 2009.

Study Question
What is the number and percentage of children in the sample who met the numerator criteria for each indicator?

Population
The population includes all Medicaid and KidsCare members enrolled with Acute-care Contractors and the Division of Developmental Disabilities (DDD) who turned 24 months of age during the measurement period.

Sample Frame
The sample frame consists of children whose second birthdays occurred on or between Oct. 1, 2008, and Sept. 30, 2009, and who had at least 12 months of continuous enrollment with the same Contractor prior to and including their second birthdays. Children in the sample could have no more than a one-month gap in enrollment. Prior period coverage is considered a gap in enrollment.

Sample Selection
AHCCCS identified a representative, random sample of children by Contractor, by county, for Medicaid and KidsCare members separately.

Population Exclusions
Except for children enrolled in DDD, this study does not include members in the Arizona Long Term Care System (ALTCS), or those enrolled under the Fee for Service (FFS) Program, including Indian Health Services (IHS) and the Federal Emergency Services (FES) Program.

Members with the following conditions, as identified from encounter data or, as noted, in the medical record, are excluded from the population for this study:

Immunization	Description of Exclusion	ICD-9-CM Diagnosis
Any vaccine	Anaphylactic reaction to the vaccine or its components	999.4
DTaP	Encephalopathy	323.51 with (E948.4 or E948.5 or E948.6)
MMR and VZV	Immunodeficiency, including genetic (congenital) immunodeficiency syndromes	279
MMR and VZV	HIV disease; asymptomatic HIV	042, V08
MMR and VZV	Cancer of lymphoreticular or histiocytic tissue	200-202
MMR and VZV	Multiple myeloma	203
MMR and VZV	Leukemia	204-208
MMR and VZV	Anaplylactic reaction to neomycin	As documented in the medical record
Hepatitis B	Anaplylactic reaction to common baker's yeast	As documented in the medical record

The exclusionary condition must have occurred by the child's second birthday.

Data Sources
The HEDIS hybrid specification is being used to collect data from both administrative and medical record sources. Administrative data include claims/encounters and registry data received from the Arizona State Immunization Information System (ASIIS) maintained by the Arizona Department of Health Services (ADHS). Medical record data is collected by Contractors.

Data Collection
AHCCCS selected the sample population and sent it to ADHS for collection of data from ASIIS. ADHS updated the file with vaccination data from ASIIS and returned it to AHCCCS. Data from the file were imported into the MeasureBase program of ADDS and, following Healthcare Effectiveness Data and Information Set (HEDIS) 2009 specifications, AHCCCS collected additional service data for sample members.

AHCCCS sent to each Contractor a sample file containing data for members enrolled in the health plan. Contractor files include vaccination data collected by AHCCCS from ASIIS, as well as data obtained from encounters for administration of vaccines submitted to AHCCCS by Contractors.

Contractors will collect additional vaccination data for members in the sample file, according to the HEDIS hybrid specification. These data will be collected from medical records and/or provider claims for administration of vaccines.

Medical Record Review: For immunization evidence obtained from the medical record, Contractors may count immunizations when there is evidence that the antigen was rendered from one of the following:

- A note indicating the name of the specific antigen and the date of the immunization, ***or***

- A certificate of immunization prepared by an authorized health care provider or agency, including the specific dates and types of immunizations administered.

For MMR, hepatitis B and VZV, Contractors may supply any of the following:
- Evidence of the antigen or combination vaccine ***or***
- Documented history of the illness ***or***
- A seropositive test result

For documented history of illness or seropositive test result, the Contractor must find a note indicating the date of the event, which must have occurred by the child's second birthday.

Notes in the medical record indicating that the member received the immunization "at delivery" or "in the hospital" may be counted toward the numerator. This applies only to immunizations that do not have minimum age restrictions (i.e., prior to 42 days after birth). A note that the member "is up to date" with all immunizations but does not list the dates of all immunizations and the names of the specific immunization agents does not constitute evidence of immunization under HEDIS specifications.

Note: *DTP vaccinations are no longer manufactured, but notations of DTP in medical records count toward the numerator.*

For combination vaccinations that require more than one antigen, the Contractor must find evidence of all the antigens.

Contractors will return the electronic files with their additional data to AHCCCS, as instructed. AHCCCS will check data for logical field-to-field comparisons (e.g., check for immunization dates that are prior to the member's birth). These data will then be imported into the MeasureBase to calculate each Contractor's rate of completed immunizations for the sample.

Following HEDIS specifications, immunizations found in the medical record that are within 14 days of the ASIIS date (for the same dose) will be considered to be the same immunization and will not be counted twice. The medical record date will supersede the ASIIS record date.

Final results will be used to evaluate Contractor performance for the childhood immunization measures specified in their contracts with AHCCCS.

Confidentiality Plan

All parties involved in this study are required to adhere to all state and federal confidentiality laws and regulations.

Quality Assurance Process

- Contractors have been instructed in data collection methods, sample file layout and timelines for data collection.
- Contractors receive written instructions for data collection, in addition to AHCCCS resource and contact information for assistance.
- AHCCCS will verify that all records have been returned. The distribution to Contractors and return of sample files will be monitored by the AHCCCS Data Analysis and Research (DAR) Unit.

Indicators
The percent overall and by individual Contractor of all children (Title XIX and Title XXI combined) who meet the sample frame and HEDIS numerator criteria.

Denominator
Children who turned 24 months of age in the study period and were continuously enrolled with the same Contractor for 12 months prior to and including their second birthdays, with no more than a one-month gap in enrollment.

Numerators
This study will be based on HEDIS 2009 criteria for measuring childhood immunizations.

1. DTaP Immunization
The number of children in the denominator who received four DTaP (diphtheria, tetanus and acellular pertussis) vaccinations with different dates of service on or before their second birthdays. Any vaccination administered prior to 42 days after birth cannot be counted.

2. IPV Immunization
The number of children in the denominator who received at least three inactivated poliovirus (IPV) vaccinations with different dates of service on or before their second birthdays. IPV administered prior to 42 days after birth cannot be counted.

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

4. Hib Immunization
The number of children in the denominator who received at least two Haemophilus influenza type b (Hib) vaccinations with different dates of service on or before their second birthdays

Note: The required number of doses for the Hib vaccine, per ACIP recommendations, has been revised to defer the third Hib booster during the vaccine shortage that occurred during the measurement period.

5. HBV Immunization
The number of children in the denominator who received at least three hepatitis B vaccinations with different dates of services on or before their second birthdays.

6. VZV Immunization
The number of children in the denominator who received at least one varicella vaccination (VZV) on or before their second birthdays.

7. Pneumococcal Conjugate
The number of children in the denominator who received at least four pneumococcal conjugate vaccinations (PCV) with different dates of service on or before their second birthdays.

8. Combination #2 (4:3:1:2:3:1)
The number of children in the denominator who received four DTaP vaccinations, three IPV vaccinations, one MMR vaccination, two Hib vaccinations, three HBV vaccinations and one VZV vaccination on or before their second birthdays.

9. Combination #3 (4:3:1:2:3:1:4)

Children who received all antigens listed in Combination #2 and four doses of PCV on or before their second birthdays.

Analysis Plan

Results will be analyzed according to HEDIS specifications. The primary analysis will provide results on the percentage of 2-year-old members that were immunized by 24 months for each quality indicator (DTaP, IPV, MMR, Hib, HBV, VZV, PCV and the combined series rates), overall, by Contractor and by county.

Results also will be compared to

- AHCCCS Minimum Performance Standards and Goals.
- Results for the previous measurement period
- National HEDIS averages reported by the National Committee for Quality Assurance (NCQA).

Results by race/ethnicity will be compared to each other.