

The Yuma Project On Uninsured Children

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Acknowledgements

In 1999, the Flinn Foundation funded *The Yuma Project on Uninsured Children* to evaluate the feasibility of using administrative data to more accurately identify uninsured children and to provide better information about the healthcare needs of children. The study began as a cooperative effort between Arizona State University and the Arizona Healthcare Federation, a statewide consortium of healthcare providers including Yuma Regional Medical Center.

A pilot study was conducted during the summer of 1998 to test the willingness of community organizations in Yuma to participate in the study and contribute their data to a community health data system. The Yuma community has, from the beginning, been enthusiastic and visionary—seeking to find ways of solving problems and willing to cooperate in the effort to improve the health of its children. The members of the Advisory Committee, under the leadership of community representative and chairman Steve Bell, have each made important personal contributions to the success of the project, giving freely of their time and expertise. In addition, a special thanks goes to several other contributors within the community. Without their support, this report could not have been possible.

William G. Johnson, Ph.D., Arizona State University, is the principal investigator. Project staff includes Sandra E. Johnson, M.P.A., The Flinn Foundation, who serves as liaison to the community; Steven C. Marcus, Ph.D., University of Pennsylvania, the architect of the information system; Ann G. Lawthers, Sc.D., University of Massachusetts, who provides expert assistance on the analysis of outcomes of care; and Amy Bartels, M.Ph., Arizona State University, with responsibility for data management and analysis.

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Introduction

Attempts to increase the healthcare insurance coverage of children in the United States have been dogged by a lack of good information on the number of uninsured children. The information problem is especially severe in small states and counties within states because national survey data cannot provide reliable estimates. Many different attempts are underway to redress the problem, including statewide surveys and revisions to national surveys. This report describes a different approach. It shows how a community can pool its existing data to create a rich source of information that can be used not only to count uninsured children but also to track their use of healthcare and the nature of the conditions for which care is provided.

The data routinely collected by healthcare providers, insurers, and health-related community agencies are a rich source of information on children's health, healthcare, and health insurance. Unlike surveys, administrative data are collected continuously, permitting analysis of geographic mobility, shifts in insurance status, and changes in children's healthcare utilization. Administrative data more accurately measure insurance status, healthcare utilization, health conditions, and healthcare costs than interviews with patients. Estimates from administrative data are also subject to much smaller variances than sample-based data because much larger number of children is included in the community data. One important limitation of administrative data, however, is that they do not include the measures of patient satisfaction that can only be obtained from interview surveys.

This report describes the creation of a community health data system from preexisting, routinely collected data...

Despite the clear advantages of community-based administrative data, the data are frequently thought to be unusable because of the practical problems of convincing agencies to submit data to a common data bank and because of the technical problems of merging data from disparate platforms and systems. This project demonstrates that these problems are not insoluble. This report describes the creation of a community health data system from preexisting, routinely collected data for a semi-rural county in Arizona.

The Yuma Community Health Data System (CHDS) is a centralized data set created through the cooperative efforts of the Yuma community and the Flinn Foundation/Arizona State University Yuma Project on Uninsured Children.

The Yuma County experience suggests that the following conditions must be met to create a CHDS:

- ❑ The active participation of the most important healthcare and health-related organizations in the community.
- ❑ The full involvement of the community in establishing the rules governing the management and disclosure of information.
- ❑ Simplifying data delivery requirements by accepting data from any platform using any software rather than asking participants to create files that match the final CHDS formats and software.
- ❑ Designing the CHDS to permit answers to questions of purely local interest as well as the more generally recognized concerns with children's health insurance.

A Profile of Yuma County and its Children

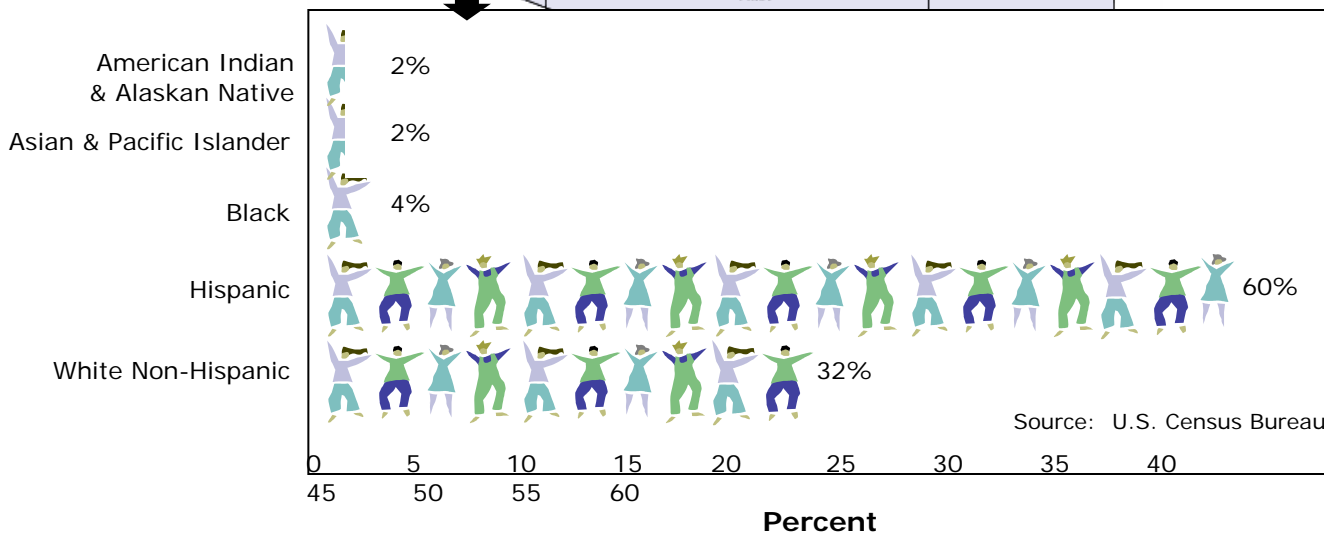
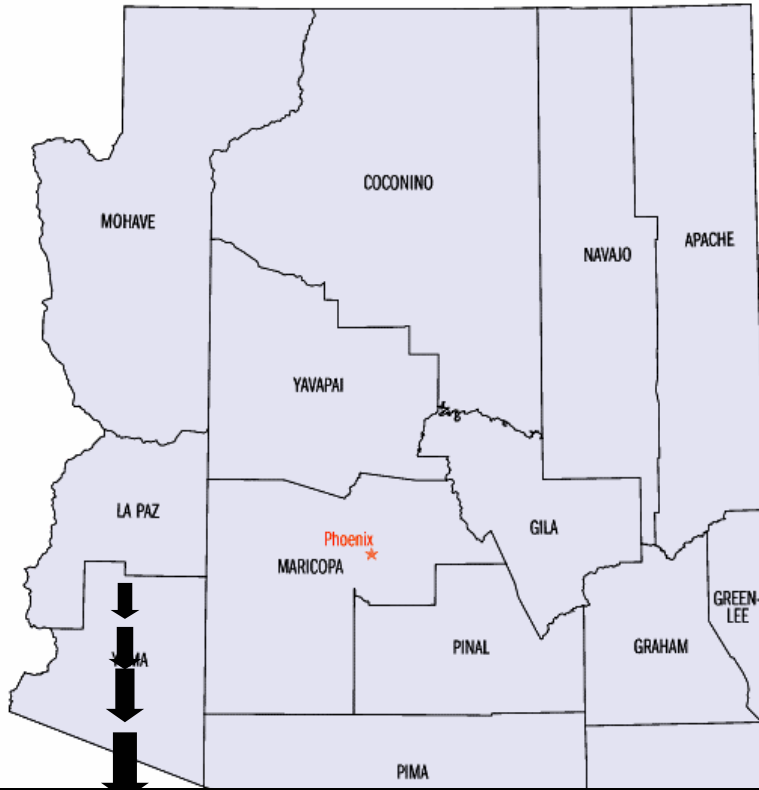
Yuma County is a thinly populated area of more than 5,000 square miles bordered by California to the west and Sonora, Mexico, to the south. Yuma's healthcare system is more or less self-contained, located approximately 200 miles from any large city.¹ Yuma is home to a U.S. Marine Corps airbase, but most of the workforce is employed in agriculture and related support activities. The county is home to more than 50,000 children (U.S. Census, 2000). The population of children below age 18 increased by nearly one-and-one-half times (1.47) between 1990 and 2000. The proportion of children who are Hispanic increased from approximately 40 percent in 1990 to more than 70 percent in 2000.

The U.S. Census Bureau provides detailed estimates of the number and characteristics of children in Yuma County in the years between the decennial Census years. The Census Bureau estimates that there were 47,417 children age 0-19 in Yuma County in 1999. Sixty-one percent (n=28,922) of the children were Hispanic; 32 percent (n=15,005) were White, Non-Hispanic; and slightly less than 4 percent (n=1,732) were Black. Although there are minor variations, the children are distributed quite evenly across the four age groups.

¹ San Diego is 170 miles, Phoenix is 190 miles, and Tucson is 240 miles.

Figure 1.1

Yuma County Children by Race



The CHDS Data Set

The data used for this report are for 1999, the first year in which the data are complete for all of the principal healthcare providers in Yuma County. The 1999 data include 30,504 children, representing approximately two-thirds of all children living in the county. The CHDS is a living data set that continues to be fed information on the health, healthcare utilization, insurance status, and costs of care for the county's children.

This report presents estimates of the number and characteristics of uninsured children based on counts from the CHDS. An alternative estimate is obtained by using hospital discharge records for children with conditions that required mandatory inpatient care. Comparisons to the 1999 Current Population Survey (CPS) show that both of the community-based estimates are substantially lower than the number of uninsured children estimated from the CPS.

The CHDS data also provide the information needed to describe the patterns of healthcare utilization among Yuma's children and to analyze the effect of insurance coverage on utilization of different modes of care. Results are presented for the first two in a series of questions currently being analyzed by the project. The questions addressed in this report include the effect of insurance coverage on children's access to a medical home and on the utilization of emergency department services. Subsequent reports will present the results for questions that include patterns of healthcare insurance coverage over time and differences in admissions for ambulatory care sensitive conditions between insured and uninsured children.

2

Creating a Community Data Set Focused on Children Yuma's Community Health Data System

The Process

Community-based data are frequently ignored because of the belief that competing organizations will not submit data to a common data bank and because of the technical problems of merging data from disparate platforms and systems. We met the first challenge by organizing a community committee composed of healthcare providers, employers, and public agencies. The committee took an active part in the definition of the types of information to be produced for the community from its CHDS.

The healthcare providers include Yuma's only hospital system, Yuma Regional Medical Center (YRMC); the YRMC-sponsored school health clinics; Yuma's largest private pediatric practice, Pediatric Associates (PEDS); Sunset Community Health Care centers (SUN); the Yuma County Health Department (YCHD); and the regional behavioral care agency, Excel. The local organizations with health-related interests include the Western Arizona Area Health Education Center Inc. (WAHEC); Pasquinelli Produce Company, an agricultural employer; and Arizona Public Service (APS). The participating state agencies included the Arizona Health Care Cost Containment System (AHCCCS), a managed care Medicaid program, and Arizona Department of Health Services (ADHS).

The conditions governing the management and disclosure of information were defined with the cooperation of the committee. The simple guarantee was that no information on any child would be released to any organization or person for any reason, and that no information, not otherwise public, on any organization would be released without its prior authorization. The data acquisition process was approved by the human subjects review committees of the relevant agencies and Arizona State University. Consent forms were created for data that had not received prior approval for research purposes.

We minimized technical obstacles by allowing contributors to supply data in any format using whatever software was convenient for them. When one of the community partners could only provide hard-copy records, the records were data-entered by the project and copies of the data set were given to the partner contributors.

We obtained data on all healthcare encounters from all of the five "safety net" healthcare organizations in Yuma County. Data were also obtained from a survey conducted annually by WAHEC of primarily Hispanic neighborhoods in the towns of San Luis and Somerton. *Transborder Resources de Mexico*, an insurer

for two employers in Yuma County, provided data on employer-based health insurance claims.

The state of Arizona provided data from AHCCCS and from the statewide immunization data file maintained by ADHS. The two state agency data sources added several thousand children who were not treated by the safety-net providers. For the most part, these children received care from private physicians who did not contribute data to the CHDS.

Data sets continue to be added, the most recent of which is school health data for the 2000-2001 school year. The project hopes to establish a permanent CHDS that can be maintained by the community after the current project ends. The results that are presented in this report refer to calendar year 1999, for which all the data sets except school health are included.

The Method

The CHDS consists of unique records for every child, whether insured or uninsured. These records contain all information collected for each child from the participating healthcare providers and from the statewide databases.

The process of data matching begins by reviewing one of the available data sets and finding all uninsured children in the data set. This becomes the Master List of uninsured children. The second data set is compared to the first, and any additional uninsured children that appear in the second data set, but not the first, are added to the Master List. This process continues until all data sets have been reviewed.

Where possible, the data used for matching include first and last name, date of birth, gender, and insurance status. Additional useful information includes ethnicity and address.

Because nicknames are common in administrative data sets, name matching was performed using a technique that computes a score, comparing the spelling similarity of two words. The score assigns "costs" to the different transposition of letters in a word that are necessary to create another word. For example, changing the first letter of a word "costs" 50 points, and transposing two letters in the middle of a word "costs" 30 points. A final score is computed by summing the costs and dividing by the total number of letters in the word. The pair of words with the minimum score is the best match. Most matches in our data had a score of 0, meaning that the matches were exact.

In past projects, we have matched disparate data sets, including matches of women from Arizona vital statistics, hospital discharge records, the WIC program, and the HealthStart program. Our experience with computer matching, repeated here, is that 80-85 percent of the final matches can be accomplished by relying on computer algorithms accompanied by evaluations of the results. In both

the past and present project, the ability to match a higher proportion of records required manual checking of records to uncover problems—such as misspelled names, partial dates, and other variations in the data—that are often obvious from human inspection but impossible to eliminate effectively by reliance on computer matching alone.

One promising approach to validating the matching of data sets is the use of an algorithm developed by Dr. Steven Banks, a biostatistician at the University of Massachusetts Medical School. Dr. Banks developed a mathematical model to calculate the number of unique individuals appearing in two or more data sets. His method uses probability theory and counts of unique birthdays in the data sets being compared to estimate the number of people in the data sets (Banks and Pandiani, 1998).

The advantage of Dr. Banks' method is that one-to-one matching of individuals, based on potentially confidential information such as name or address, is avoided. The disadvantage of his method is that it cannot distinguish among children by insurance status within a data set.

The CHDS data include information on 30,504 children, approximately 64 percent of the 47,417 children living in Yuma County in 1999.

We asked Dr. Banks to apply his method to our data. Using only birth date and gender from the YRMC, Sunset, School Health, and WAHEC data sets, Dr. Banks estimated the number of insured children to be within 1 percent of the counts that we obtained from the CHDS.²

The Data

The CHDS data used in this report include information on 30,504 children, approximately 64 percent of the 47,417 children living in Yuma County in 1999. An understanding of the empirical results presented in this report requires an understanding of the fact that different subsets of the data are used for different sections. Figure 2.1 is designed to help the

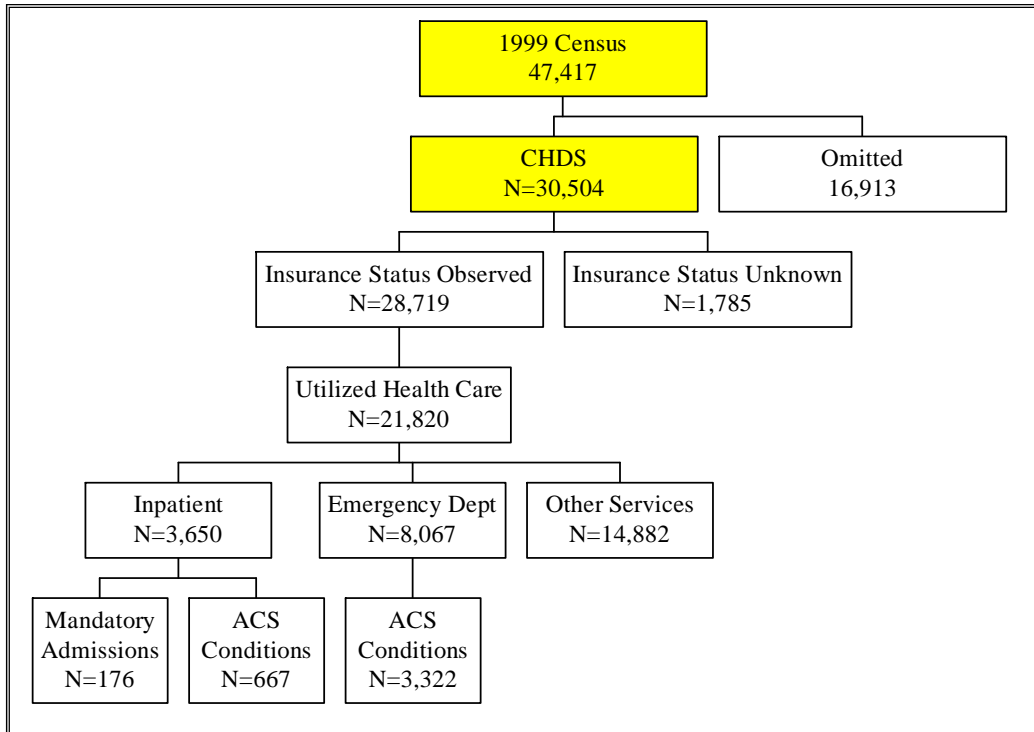
reader keep track of changes in the data being used in different sections of the report. The figure is repeated at each point in the report when the data set used for analysis changes. The data set in use for the section in question will be highlighted.

Questions involving healthcare utilization are addressed to the CHDS data restricted to children who used one or more healthcare services during 1999. The data set of children who used services includes 21,820 of the 26,084 children whose insurance status was recorded. Service users from among the 21,820 are then classified into groups using emergency department care (n=8,067) and children admitted for inpatient care (n=3,650). The latter is further divided by

² The comparison is based on the data set before the addition of the immunization data and has not been performed on the current data.

type of conditions: ambulatory care sensitive (ACS) or mandatory admissions. The subsets of data are generally mutually exclusive, but the data on inpatient care, emergency department care, and other services include some records from the same children.

Figure 2.1: Data Sets Used in This Report

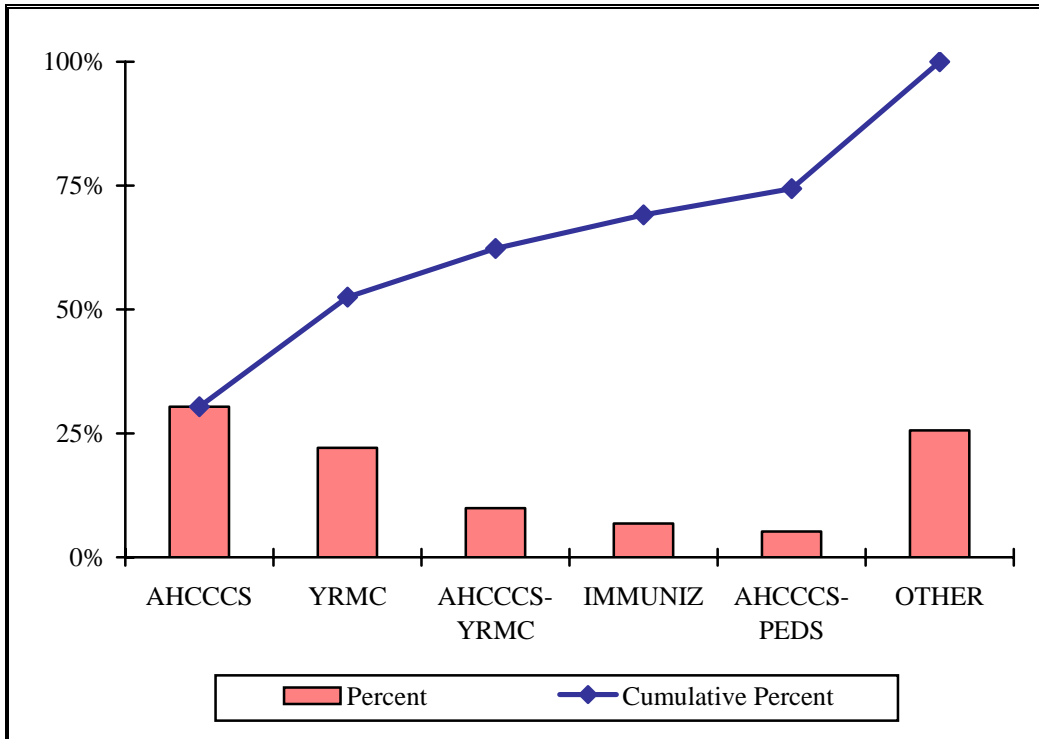


*Counts are unduplicated with the exception of utilization of inpatient services, emergency department, and other services.

A comparison of the age distribution of children in the CDHS to the age distribution of the total population of children in the Census data provides a profile of the omitted children. The data clearly show that the CHDS coverage is most nearly complete for the youngest of the four age groups. Approximately 92 percent of all children age 0-4 are included in the CHDS. The proportion of Yuma's children captured by the CHDS decreases as age increases. Approximately 58 percent of children in the 5-9 group are included in the CHDS, but less than 50 percent of children ages 10-14 and approximately only 40 percent of children ages 15-19 are in the CHDS.

As indicated in Figure 2.2, most of the children appear in more than one of the data sets that are included in the CHDS. More than three-quarters of the children are identified from AHCCCS, YRMC, and the state immunization database either as sole sources of data or in combination with data from Yuma County-based healthcare providers.

Figure 2.2: Children by Source of Data



Source: CHDS, 1999.

3

Estimating the Number of Uninsured Children

The number of uninsured children was estimated from the CHDS using three different methods. The first method counts the number of children in one of three groups: 1) children who were insured at all times that their data appeared in 1999; 2) children who were insured and uninsured at different times during 1999; and 3) children who were uninsured at all times during 1999. The age-specific rates of insurance coverage are then applied to all children in the Yuma County population. In effect, the CHDS rates are applied to the children outside the data set (estimated from the Census) and added to the total number of uninsured.

The second method records the proportion of insured children among all children who are admitted for health conditions for which inpatient care is defined as mandatory. The observed proportions for the admitted cohort are assumed to represent the proportion of children who are insured in the population of Yuma County children.

The two estimates from the CHDS data are then compared to the estimated number of uninsured children in Yuma County calculated from the 1999 CPS.

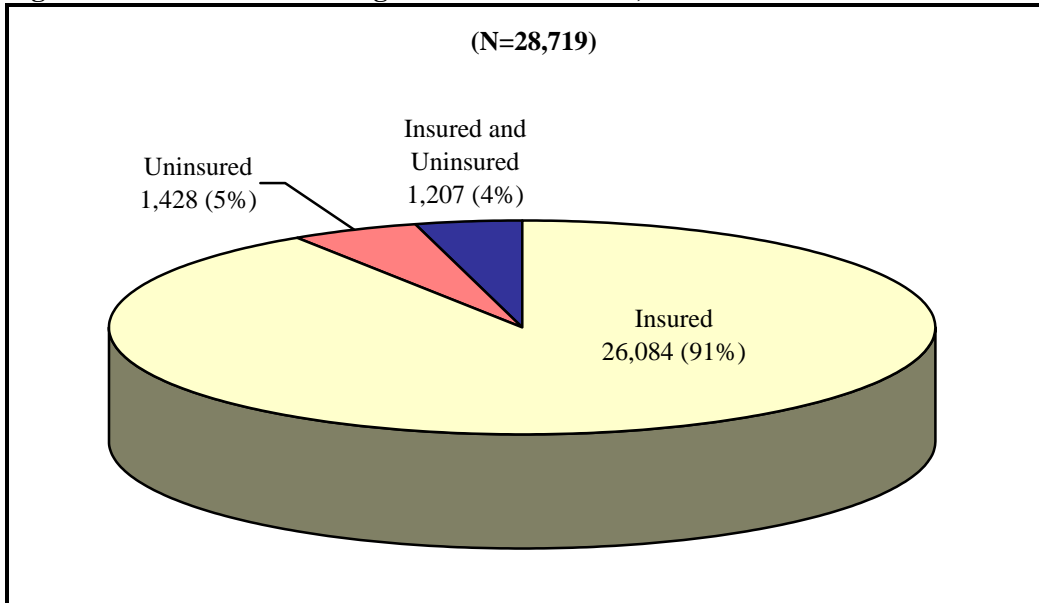
CHDS Estimates

The CHDS rates of insurance coverage are based on the counts of uninsured children among 28,719 children (approximately 61 percent) of all the children of Yuma County in 1999.³

As indicated in Figure 3.1, approximately 91 percent of the children (n=26,084) in the 1999 CHDS were insured throughout 1999. An additional 5 percent (n=1,428) were uninsured throughout 1999 and approximately 4 percent (1,207 children) were observed to be uninsured and insured at different points in time during 1999. Thus, among children in the CHDS with known insurance status, approximately 9 percent were uninsured at some time during 1999.

³ Approximately 6 percent of the children in the CHDS (1,785/30,504=.0585) were missing information on insurance status. The majority of the children with missing insurance status are from the state immunization database. Approximately 70 percent of the children were ages 0-4; an additional 22 percent were 5-9 years of age.

Figure 3.1: Insurance Coverage Rates from CHDS, 1999



Source: CHDS, 1999.

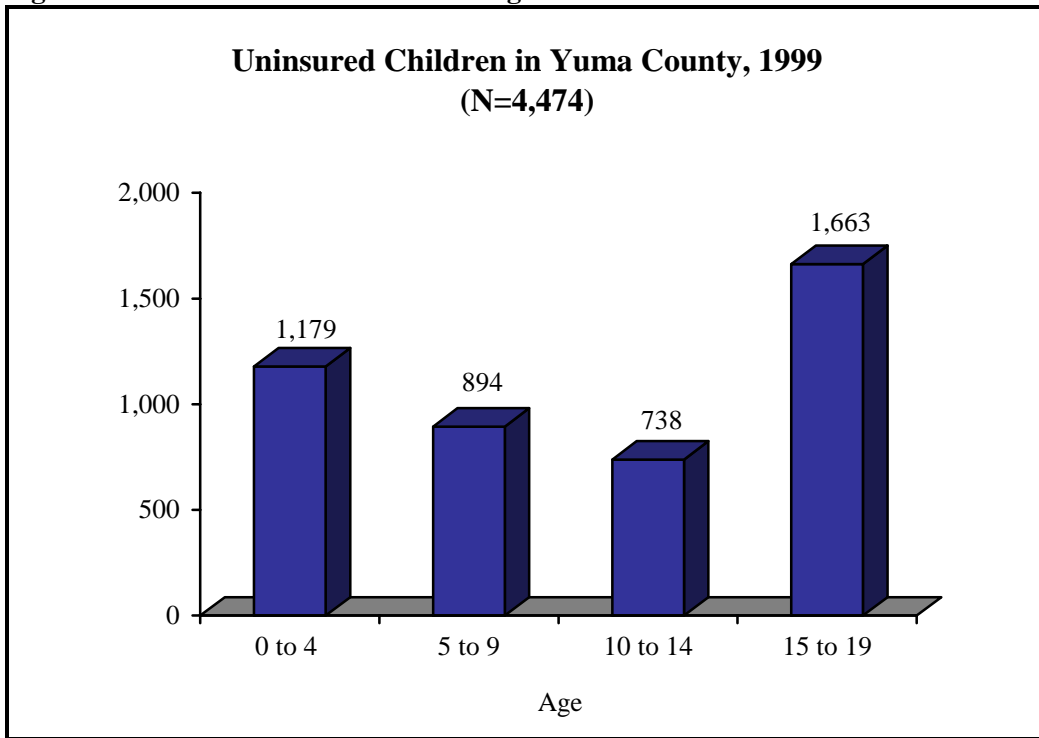
To estimate the number of uninsured children in Yuma’s population, we apply the CHDS age-specific rates of uninsurance to the number of children in the respective age groups in the population.⁴ We also assume that a child who is uninsured at any time in 1999 is “uninsured.” This assumption tends to inflate our estimates since the 1,205 children with dual insurance status account for slightly less than one-half of the total count of uninsured children. Other assumptions, detailed in a subsequent section, may have opposing effects.

The extrapolation of the age-specific rates of uninsurance to approximately 18,700 children whose insurance coverage was not observed yields an estimate of approximately 4,500 Yuma County children uninsured at some time during 1999. The differences in the age distribution of the children in the omitted group relative to the CHDS group increase the percentage of uninsured children from approximately 9 percent to approximately 10 percent.

The distribution of uninsured children by age is presented in Figure 3.2. The largest number of uninsured children is found in the 15-19 age group, reflecting relatively high rates of uninsurance in that age group. The second largest number of children is in the 0-4 age group for which uninsurance rates are low but the number of children in the population is relatively large.

⁴ It was not possible to use age by ethnicity-specific rates because ethnicity was not recorded for a large number of children in the CHDS.

Figure 3.2: Estimates of Uninsured Using CHDS Rates



Source: CHDS, 1999.

Any estimate must be interpreted within the constraints of the data and the assumptions on which it is based. The estimate of an uninsurance rate of approximately 10 percent is subject to the following cautions:

Influences that tend to make the estimated uninsurance rate too high:

- The estimate counts children as uninsured who were insured and uninsured at different times during 1999.
- The omitted children are disproportionately representative of children whose healthcare was provided by private physicians and who were covered by private insurance. These children are more likely to be from higher-income families with an above-average probability of being covered by health insurance.

The influences that tend to make the estimate too low:

- The omitted group of children includes a higher proportion of children who did not utilize care during 1999. The estimate, therefore, omits the effect of a correlation between failure to utilize care and being uninsured.

Despite the appropriate cautions expressed here, it is equally important to recognize that the estimates described are based on nearly two-thirds of the entire population of children in Yuma County using a data set unparalleled in size and detail concerning the health insurance coverage of children in such a small geographic area.

We next consider an alternative method of estimation that can be compared to the CHDS estimates for Yuma County. This method relies on the uninsurance rates among children with conditions for which inpatient care is mandatory and is not, therefore, affected by a patient's insurance coverage. The "mandatory admissions method" offers the advantage of requiring a much smaller set of data than we have acquired.

The Mandatory Admissions Estimate

Concept

The concept of a mandatory hospitalization is the admission of a patient with "an acute condition that is life threatening or has the potential to produce long-term disability" (McConnochie et al. 1997). Children with conditions such as appendicitis receive inpatient care regardless of their insurance coverage. Therefore, the prevalence of uninsured children among children with conditions for which emergent or inpatient care is mandatory is an estimate of the prevalence of uninsurance in the population of children (McConnochie et al. 1997). The conditions are described in Table 3.1.

The estimate should be unbiased unless the incidence rates of the conditions that lead to these required "mandatory" admissions are significantly correlated with health insurance coverage. If, for example, uninsured children are more likely to contract the conditions then the mandatory admissions estimate of uninsured children would be too high.

The definitions of mandatory admissions were created with reference to children age 0-2. The use of the conditions for older children is predicated on a belief that it seems to be a reasonable assumption for the older children as well. Nevertheless, we have asked the pediatricians on the Community Advisory Committee as well as a nationally known expert in pediatrics to review this portion of the report and to provide us with an evaluation of potential problems of applying the mandatory admissions approach to older children. The preliminary results of the reviews suggest that it is reasonable to apply the mandatory admissions approach to older children as well as to those age 0-2 years.

Table 3.1: Conditions Requiring Hospitalization

Condition	ICD9 Codes
Gastrointestinal emergency, appendicitis, bleed, obstruction, perforation	540.0, 540.9, 550.02, 550.1x, 552.3, 552.8, 553.3, 557.0, 557.9, 560.0, 560.1, 560.2, 560.8x, 560.9, 567.2, 567.8, 569.83, 750.5, 751.0
Bacteremia, septicemia	003.1, 036.2, 038.0, 038.1, 038.2, 038.3, 038.4x
H influenzae meningitis	320.0, 038.41, 464.30 482.2, 711.0x
Orbital cellulitis	360.00, 376.01
Severe fracture	808.2, 808.8, 820.01, 821.0x, 821.10, 821.2s
Third-degree burn	941.3x, 941.43, 943.3x, 944.3x, 945.3x, 945.49, 946.3, 948.10, 948.2x, 948.30, 949.4
Other pulmonary emergency, e.g. pneumothorax, emphysema	510.9, 511.8, 511.9, 512.0, 512.8, 513.0, 518.0, 518.4, 518.5, 519.2
Cardiovascular emergency, e.g. arrest, dysrhythmia, thrombosis, infarct, embolism, shock	415.1, 420.9x, 421.0, 422.91, 423.9., 427.1, 427.41, 427.5, 444.2x, 453.8, 459.2, 785.5x
Other bacterial meningitis	036.0, 320.1, 320.2, 320.3, 320.8, 320.9, 324.0, 325
Respiratory failure	518.81
Foreign body in airway	934.0, 934.1, 934.8, 934.9
Severe trauma, e.g. near drowning, rupture of liver, penetrating wound to eye	861.00, 861.21, 863.30, 863.54, 870.1, 870.2, 871.0, 871.1, 871.4, 871.6, 895.0, 958.0. 994.1
Severe head trauma	432.1, 800.10, 800.2x, 800.33, 801.06, 801.42, 850.1, 851.82, 852.0x, 852.2x, 852.41, 854.0x
Seizure, intractable	345.3, 345.41, 345.91

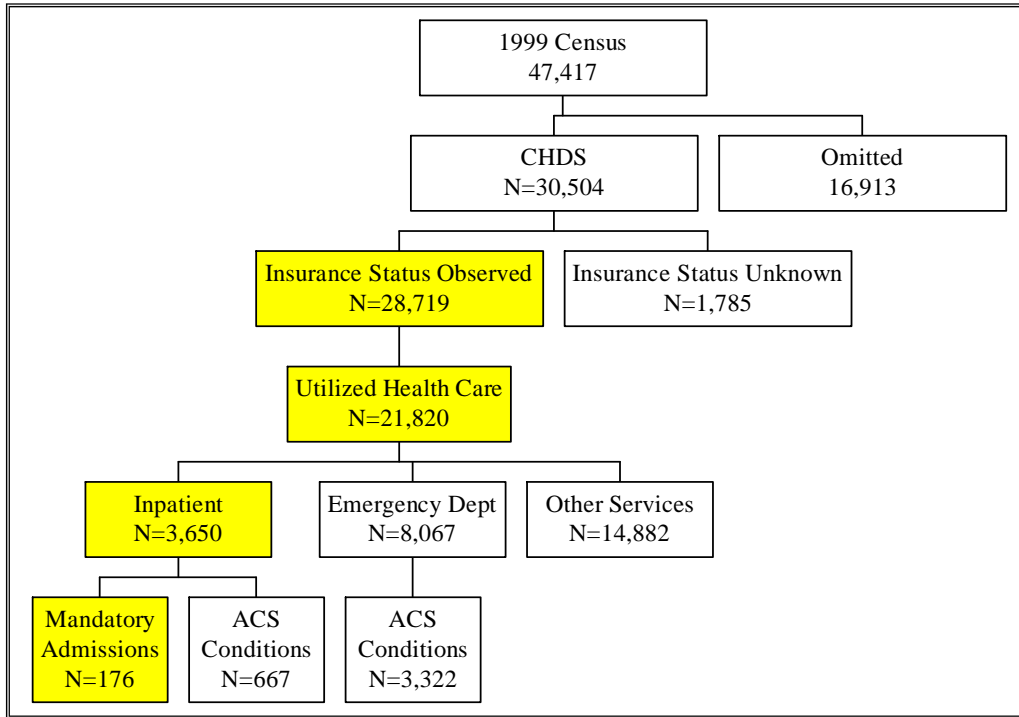
Source: McConnochie et al. 1997.

The Mandatory Admissions Results

Nearly 3,700 children were admitted for inpatient care at YRMC in 1999. It is important to remember that YRMC is the only hospital in Yuma County. Slightly less than 5 percent of these children received care for conditions for which admission would be classified as mandatory.

Slightly less than 12 percent of the children with mandatory admissions during 1999 were uninsured at some time during that year. The probability of uninsurance is higher among males than females and is generally higher among children in the 10-19 age group than in the younger groups. More than 62 percent of the children admitted for mandatory care are Hispanic, but the proportion of Hispanic children that is uninsured is lower than that of White, non-Hispanic children in the mandatory admissions cohort.

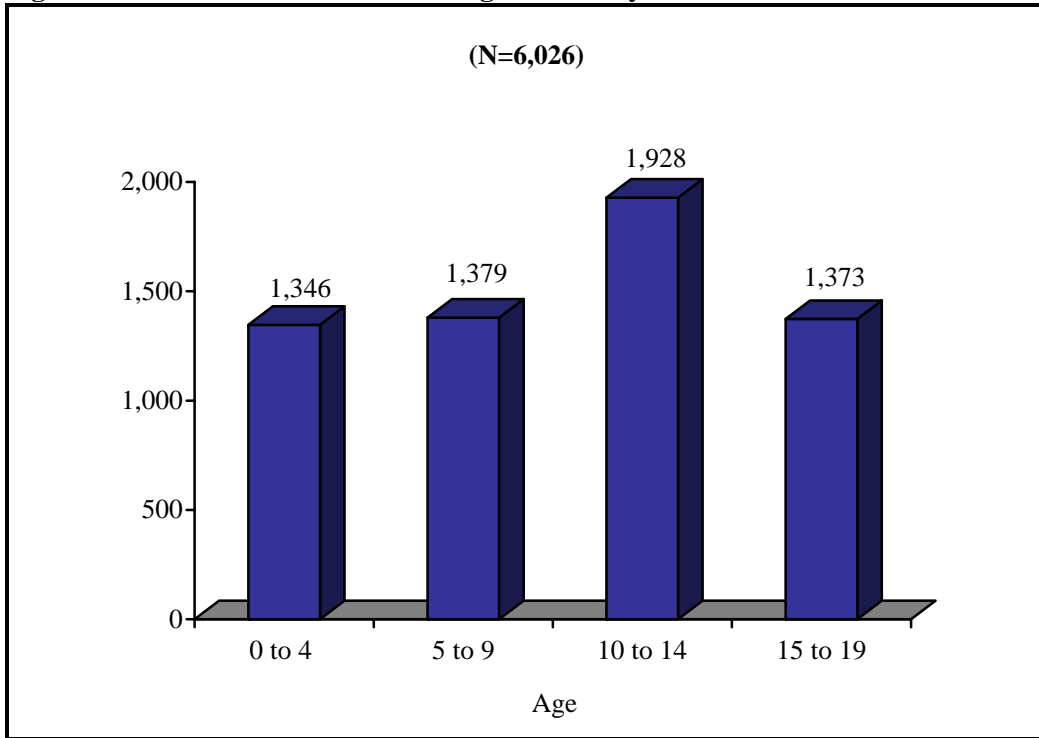
Figure 3.3: Data Used for Mandatory Admissions Estimates



We estimated the number of uninsured children in Yuma County in 1999 by applying the age-specific percentages of uninsured children from the mandatory admissions to the 1999 population of Yuma County children from the U.S. Census. The mandatory admissions method estimates that approximately 6,100 children in Yuma County were uninsured at some time during 1999. As with the estimates of uninsurance rates, the application of the CHDS rates to the omitted children results in a slightly higher percentage of uninsured children (approximately 13 percent vs. 12 percent) because of differences in the age distribution.

The potential limits of the CHDS estimates have been described in a previous section. The CHDS estimates, however, must be interpreted with a higher level of confidence than the mandatory admissions estimates because of the large differences in the number of cases on which the rates are based. The CHDS rates are based on more than 28,000 children, representing more than 60 percent of the total population of Yuma County children in 1999. The mandatory admissions estimates are based on only 176 children, which is less than one-half of 1 percent of children ages 0-19 in the 1999 population.

Figure 3.4: Estimated Uninsured Using Mandatory Admissions Rates



Source: CHDS, 1999.

The mandatory admissions method does, however, benefit from the compelling argument that the conditions that are represented must be treated regardless of insurance status and, thereby, represent the incidence of those conditions in the population. We hope to further explore the possibility that the incidence of some of the mandatory admissions conditions might differ significantly with health insurance coverage.

One final caution is the possibility that some divergence exists between the admission rates at YRMC and the incidence of mandatory admissions conditions in the population because some children may receive care across the border in Mexico. We do not know if cross-border treatment for the most serious and most urgent health conditions is of sufficient frequency to affect the mandatory admissions estimates. If possible, it would be useful to test the mandatory admissions approach in a county that does not share a border with another country or state.

The third estimates for uninsured children are calculated from the CPS, which is the primary source of estimates of health insurance coverage of children in many states and is often used as a reference against which to compare the State Children's Health Insurance Program (SCHIP) enrollments.

The CPS Estimate

As previously noted, the CPS is recognized as a highly inaccurate source of information on health insurance coverage of children in relatively small states, such as Arizona, and more generally for counties in nearly any state. If we were to simply accept the estimates from the CPS that we describe next, we would conclude that nearly 20,000 children in Yuma County were uninsured. The result, representing nearly one-half of all the children in Yuma County in 1999, reflects the inherent error in the CPS in estimating the size of the population of children plus the error in estimating the percentage of Yuma's children who are uninsured.

The CPS sampled only 39 Yuma County children in 1999, of whom 18 were uninsured. Small samples do not necessarily preclude viable inferences to larger populations, but the limits of applying the CPS to counties are represented by the confidence intervals for the CPS estimates. Even when a three-year average is used to reduce the variances, the estimated number of uninsured children is slightly less than 20,000 with a 95 percent confidence interval that ranges from 11,000 to 28,312. The CPS estimate of the average rate of uninsurance over three years is 19.3 percent. The confidence interval expresses the fact that we can be 95 percent certain that the true rate of uninsurance is somewhere between 1 percent and 37.6 percent. The range, which includes both of our community-based estimates, is obviously too large to be useful.

The large variances and overestimates of the population of children reflect the fact that the design of the CPS does not support the estimation of the insurance status of children at the county level. The comparison is nevertheless important because of the widespread use of CPS point estimates, which, although accompanied by suitable disclaimers, often become the *de facto* estimate in public policy discussions. It is understandable but regrettable that the media often present estimates of the percentage of uninsured children from the CPS data, as if they are exact measures.

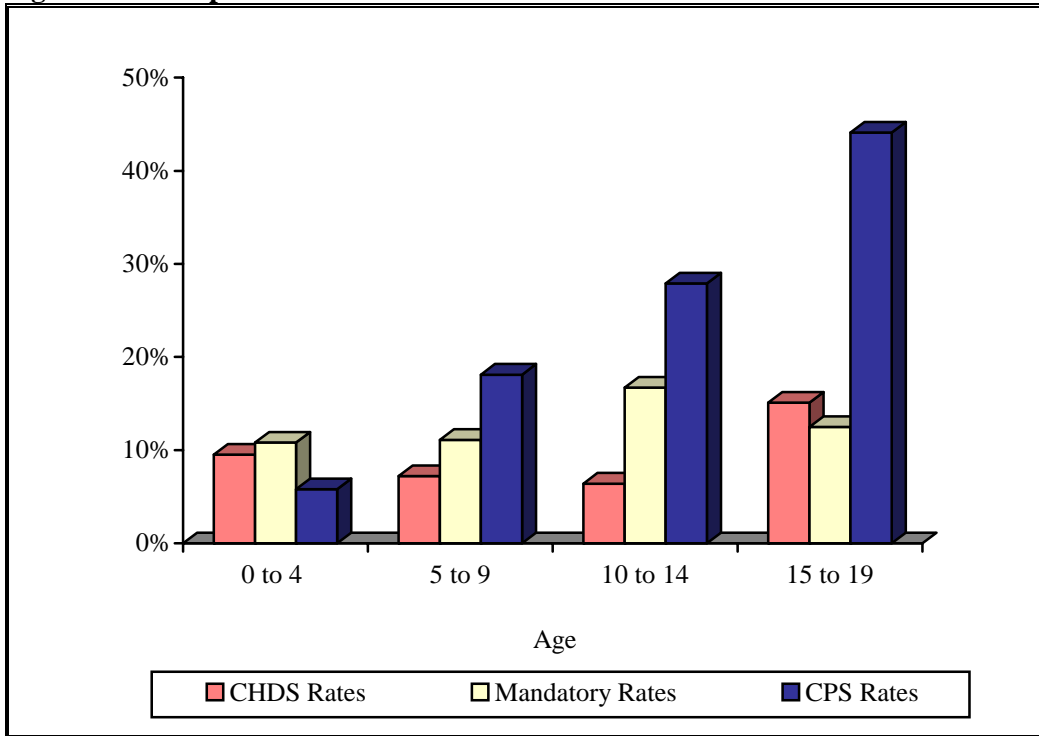
...the CPS is recognized as an inaccurate source of information on health insurance coverage of children in relatively small states, such as Arizona, and more generally for counties in nearly any state.

The Estimates Compared

The data in Figure 3.5 include the CPS estimates but our primary focus is the differences between the mandatory admissions estimates and the rates obtained from the healthcare utilization segment of the CHDS.

The community-based estimates of the proportion of children who are uninsured (10-13 percent) are substantially below the rates expected for communities, such as Yuma, with a high proportion of Hispanic children living in low-income

Figure 3.5: Comparison of Estimates of Uninsurance Rates



Source: CHDS, 1999.

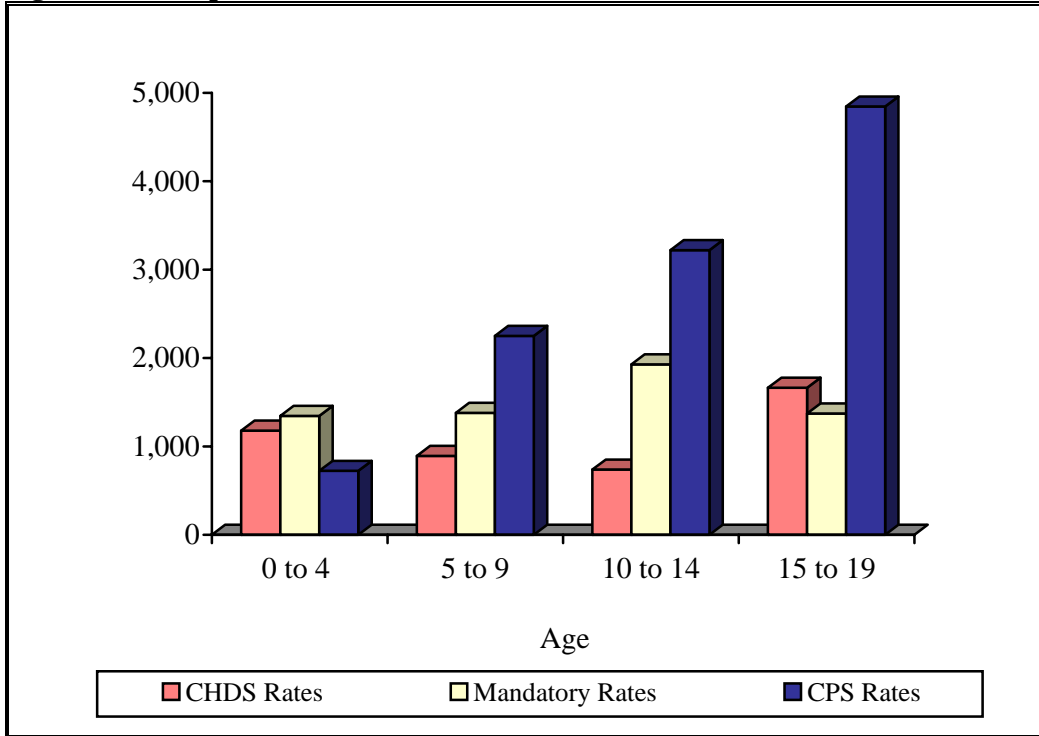
households, including many families headed by migrant workers. The results are a useful alternative to the opinions and fragmentary evidence that is often cited in public debates on the success of the SCHIP program and community-based attempts to insure children for healthcare.

The proportion of children without insurance appears low relative to expectations of rates greater than 20 percent. The difference should not, however, be interpreted to mean that the lack of insurance coverage is not a problem in Yuma County. The community-based estimates show that approximately 4,500-6,100 children were uninsured at some time during 1999.

The community-based results permit a more focused and presumably more cost-effective approach to interventions on behalf of children than would less-specific data. The estimates for 1999, for example, show that the age group with the largest number of children without insurance is teenagers, age 15-19. Recognizing that outreach strategies must address all the age groups, the information demonstrates that the benefits of interventions designed to address the special characteristics and needs of teenage children are relatively large. The data

also include the location of the groups of uninsured children, allowing geographic targeting of intervention efforts as well.

Figure 3.6: Comparison of Estimates of Number of Uninsured Children



Source: CHDS, 1999.

The results also offer some interesting implications for the use of the mandatory admissions approach to the estimation of health insurance coverage for small geographic areas. Many states maintain hospital discharge data sets. The mandatory admissions method could, if successful, be applied to these data sets to estimate rates of insurance coverage for small areas within states. The method cannot be used to identify individuals or evaluate the impact of insurance coverage on patterns of healthcare utilization. It does, however, offer the possibility of a low-cost, timely approach to the creation of periodic estimates of insurance coverage.

The mandatory admissions estimates reported here are being reviewed by experts in pediatric medicine, and the differences in the details between the mandatory results and the CHDS rates are being evaluated. The preliminary results suggest that the mandatory admissions method is a potentially useful means of obtaining more accurate estimates for states that maintain hospital discharge data sets.

The objective of health insurance coverage is to provide timely access to appropriate care for children. The assumption that insurance coverage eliminates the obstacles to achieving the objective should, however, be tested empirically.

The next section describes the results from the first stage of the analysis of patterns of healthcare utilization from the CHDS and their implications for the effects of expanding the health insurance coverage of children.

4

Insurance Coverage and Healthcare Utilization

The CHDS offers an opportunity to explore the effect of health insurance coverage on children's patterns of healthcare utilization. An initial set of questions for analysis has been defined with the cooperation of the Community Advisory Committee. Results are presented in this section for the first two of the questions, namely: the effect of health insurance coverage on 1) children's access to a medical home; and 2) utilization of emergency department care.

Subsequent reports will present the results of our ongoing efforts to:

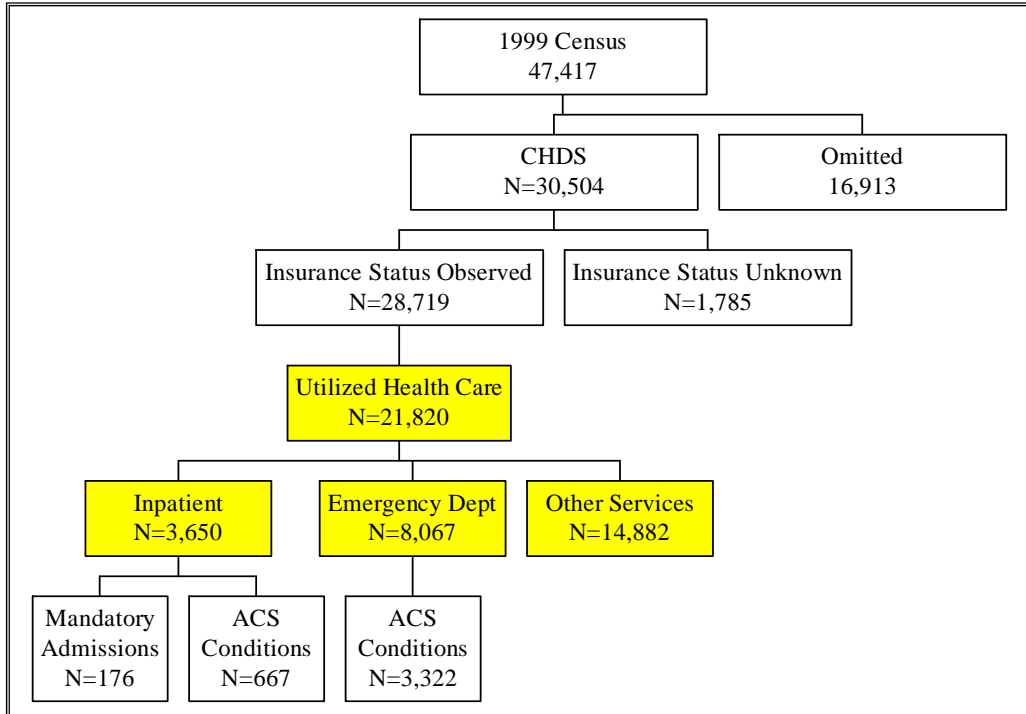
- ❑ Explore the dynamics of health insurance coverage and patterns of utilization over several years as we collect more years of data and examine in greater detail the 1999 result that nearly one-half of the children counted as uninsured were insured at some point in time in 1999.
- ❑ Analyze the reasons that both insured and uninsured children would use the emergency department as their sole provider.
- ❑ Compare the patterns of care of insured vs. uninsured children with ambulatory care sensitive conditions with an emphasis on asthma and dental problems.
- ❑ Map the locations (by zip code) of uninsured children and, by comparing locations to provider locations, evaluate the extent to which the absence of public transportation is a barrier to access to primary care.

The Data

The answers to the question of insurance status, a medical home, and the utilization of emergency department care require restricting the data set to children who utilized some form of care during 1999. The results that follow do not, therefore, measure the number of children who went without care in 1999. If we were to calculate utilization based on the total number of children in the population, the utilization rates would include, for example, children who were insured by AHCCCS but who did not use care. The absence of comparable data on privately insured non-users would seriously bias our results.

Therefore, we exclude from this analysis children from the WAHEC survey or from the AHCCCS records for whom no utilization of care was recorded in one or more of the other parts of the data sets. These exclusions create a database consisting of 21,820 children.

Figure 4.1: Data for Comparisons of Healthcare Utilization



*Counts are unduplicated with the exception of utilization of inpatient services, emergency department, and other services.

Do Uninsured Children Have a Medical Home?

Many uninsured children lack a regular medical home. The absence of a continuing medical history for a child can lead to unnecessary duplication of tests and immunizations, in addition to limiting a provider's ability to observe changes in a child over time that could signal the need for care. Less is known, however, concerning the extent to which insured children have a medical home.

Subject to the caveat that not all physicians in Yuma County contribute data to the CHDS, we can identify each source of care used by any child during 1999.⁵ We assume that the group of children who used care but whose only source of care in 1999 was the YRMC did not have a regular medical home for their primary care. It is important to recognize that the current results do not identify children who received care from multiple providers but who had no regular medical home.

⁵ The immunization data contain information on providers that could not be included at this time but will be added in future reports, as will information on school healthcare services.

Given those constraints, the results show that YRMC was nearly 1.4 times as likely to be the sole provider of care for uninsured children as for insured children. Approximately 65 percent of the uninsured children who received care were served only by YRMC.

The disproportionate use of the hospital system, primarily through its emergency department, as a sole provider for uninsured children is not a surprise. It is more surprising that the YRMC was the sole provider for approximately 47 percent of the insured children receiving any care in 1999. Although the proportion is much lower than the result for uninsured children, it is quite large in absolute terms. The results suggest that insurance coverage is only one of the obstacles to developing a continuing relationship between a child and a primary healthcare provider.

This finding, although preliminary, is consistent with the Community Advisory Committee suggestions that use of emergency department services is influenced by a number of obstacles that are not eliminated by the provision of health insurance, namely:

- Cultural barriers;
- Limits on availability of off-hour primary care (i.e., evening and weekend hours); and
- Language barriers and lack of information on available primary care.

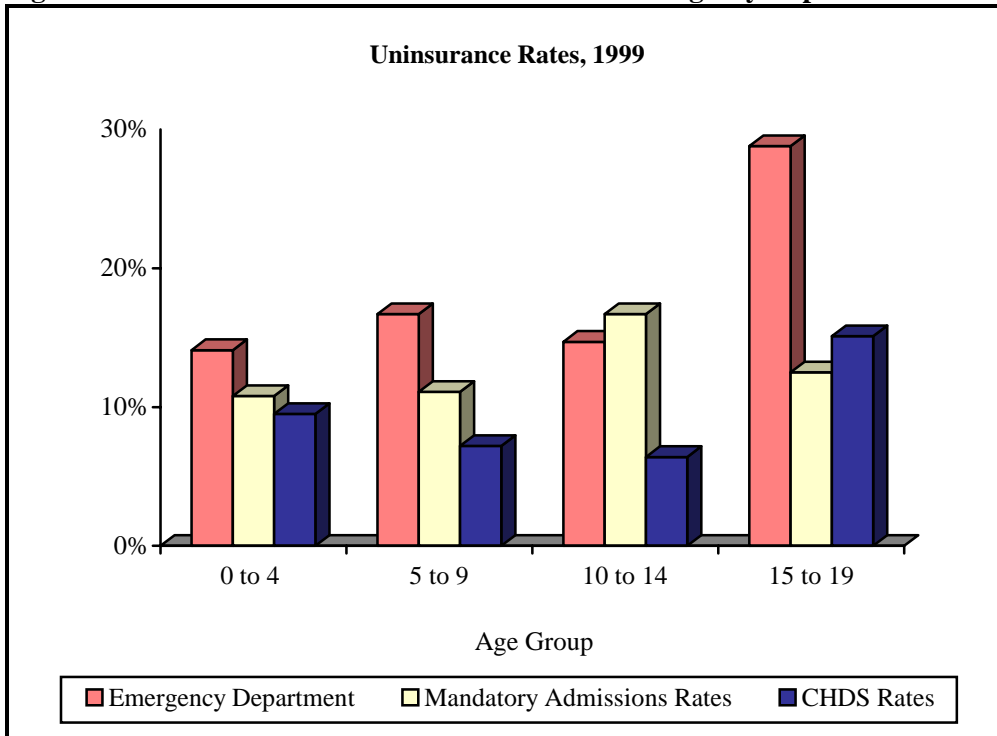
We plan to take advantage of additional data from 2000 and 2001 to investigate the characteristics of the children whose sole provider in 1999 was YRMC, and also to attempt to identify the reasons that children do not have a medical home. One of the first tests will be based on children insured by AHCCCS, since those data capture healthcare utilization regardless of whether the provider supplies data directly to the Yuma CHDS.

Emergency Department Care

During 1999, 8,067 of the 21,820 children who received some form of care were treated at YRMC's emergency department.

As indicated in Figure 4.2, the proportion of uninsured children among those receiving emergency care is much higher than the proportion of uninsured children among those who used healthcare in 1999. Overall, approximately 18 percent of the children receiving emergency department care were uninsured. The disproportionate use of emergency care is most evident among children ages 15-19. Approximately 15 percent of the children age 15-19 who received care were uninsured, but nearly 29 percent of emergency department patients ages 15-19 were uninsured. Similar ratios are observed if comparisons are made to age-specific uninsurance rates from the mandatory admissions method even though the distribution among the age groups is somewhat different.

Figure 4.2: Uninsurance Rates and Utilization of Emergency Department Care



Source: CHDS, 1999. Rates are calculated for children who used some healthcare in 1999.

In other words, relative to all children who used healthcare in 1999, uninsured children are much more likely to access care through the emergency department than are insured children. The data support the widely held belief that children without health insurance are more likely to receive care from a hospital emergency department than children with insurance.

The finding does not answer the question of whether uninsured children receive emergency department care for conditions that could have been more effectively treated in a primary care setting (type of condition, severity at presentation). The tests of that question require consideration of the differences in the nature of health conditions for which uninsured and insured children receive emergency care and, to the extent possible, an examination of differences in the severity of conditions for which the two groups of children receive care.

Our first steps toward the analysis of the effect of health insurance on access to primary care include the identification of admissions to inpatient care and emergency department treatment of ambulatory care sensitive conditions. The underlying rationale is that there are identifiable conditions for which emergency department care and inpatient admissions can be avoided by effective and timely ambulatory care. The ACS conditions were developed to study hospital admissions. We plan to evaluate the possibility of extending the method to emergency department care as well. The extension appears to be reasonable given the fact that emergency departments often provide care for conditions that could be adequately treated in a primary care setting.

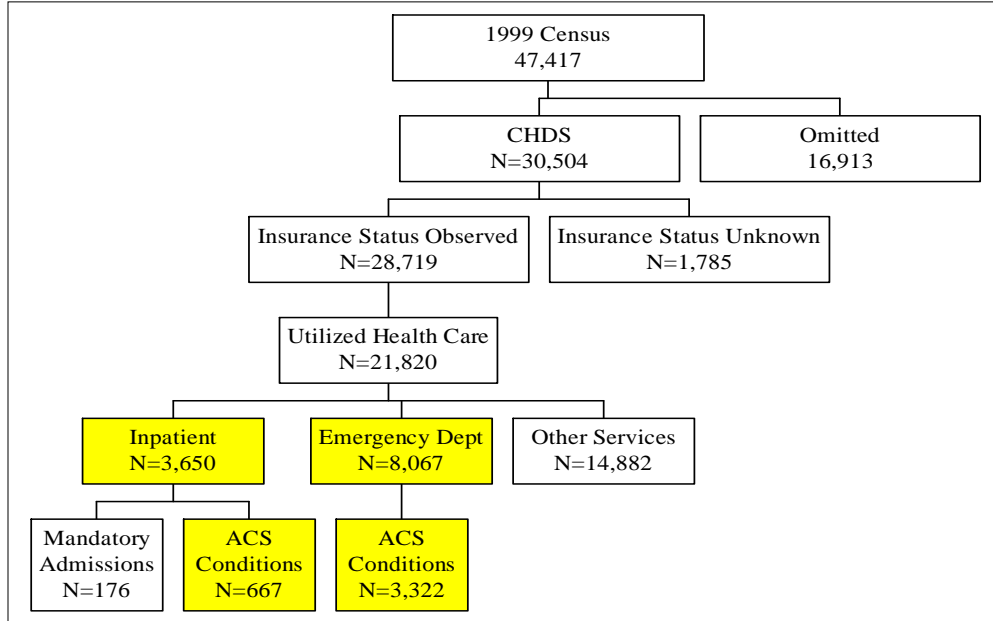
Table 4.1: Ambulatory Care Sensitive Conditions

Condition	ICD9 Code
Congenital syphilis (newborns only, secondary dx only)	090
Immunization preventable conditions (H meningitis for age 1-5 only)	033, 037, 045, 320.0, 390, 391
Grand mal status and other epileptic convulsions (grp A age 0-5, grp B age > 5)	345, 780.3
Severe ENT infections (exclude otitis media with myringotomy and insertion of tube - 20.01)	382, 462, 463, 465, 472.1
Bacterial pneumonia (exclude cases with secondary dx of sickle cell (282.6) and age less than 2 months)	481, 482.2, 482.3, 482.9, 483, 485, 486
Asthma	493
Tuberculosis	011-018
Cellulitis (exclude in cases of surgical procedure)	681, 682, 683, 686
Diabetes	250.1, 250.2, 250.3, 250.8, 250.9, 250.0
Hypoglycemia	251.2
Gastroenteritis	558.9
Kidney/urinary infection	590, 599.0., 599.9
Dehydration-volume depletion	276.5
Iron deficiency anemia (age 0-5 only)	280.1, 280.8, 280.9
Nutritional deficiencies	260, 261, 262, 268.0, 268.1
Failure to thrive (age < 1 year)	783.4

Source: Gadowski et al. 1998; Billings et al. 1993.

The number of children with ACS conditions is relatively small in the 1999 data, making it very difficult to compare insured and uninsured children within a condition. There are fewer than 100 children in many of the condition-specific categories. We have, therefore, deferred detailed analysis of the link between insurance coverage and the prevalence of ACS conditions treated by the hospital system until the data for 2000 and 2001 are added to the CHDS.

Figure 4.3: Ambulatory Care Sensitive Conditions



*Counts are unduplicated with the exception of utilization of inpatient services, emergency department, and other services.

5 Conclusions

The Yuma Project on Uninsured Children is now completing the second of three years of research activity. The most important achievement of the project is the demonstration that it is possible to create a community health data system from administrative data at relatively low cost. The second achievement describes how community data can be used to improve the accuracy of estimates of the health insurance coverage of children. The results also signal the next steps in analysis that will yield answers to many of the issues that are frequently discussed in the public policy debate on SCHIP and KidsCare, but rarely answered with hard facts.

The Creation of Yuma's CHDS

This report demonstrates that, with some technical assistance, a community can convert data routinely collected on its residents to valuable information on children's health insurance coverage and on the health and utilization of healthcare by both insured and uninsured children. Through the cooperative efforts of the majority of its healthcare providers, state health agencies, and other interested local organizations, Yuma County has (with technical assistance from ASU) created a living data system that can provide the information needed to improve the health and healthcare of its children.

One of the most valuable features of Yuma's CHDS is that it can be continuously updated, at a relatively low cost, to provide unique information on 1) children's health and health insurance coverage at points in time; and 2) patterns of healthcare utilization and changes in needs and insurance coverage over time. The dynamic nature of the data is especially valuable in a community, such as Yuma, with a rapidly changing population.

The data for 1999 include slightly less than two-thirds of all the children in Yuma County and most of the healthcare providers who treat children in the county.

The data for 2000 and 2001 will add children from the school health system and increase the information on children currently in the data system. The information includes all episodes of emergency care for all children in the county; complete records of immunizations; and complete records of all episodes of care with community health centers and one of the two largest pediatric practices in the

Through the cooperative efforts of the majority of its healthcare providers, state health agencies, and other interested local organizations, Yuma County has... created a living data system that can provide the information needed to improve the health and healthcare of its children.

county. This rich source of information has been created without requiring any new data collection. The current version of the CHDS, not yet complete for 2000, includes more than 40,000 children.

The information presented in this report provides the Yuma community with an accurate estimate of the number of its uninsured children. It answers several important questions concerning the impact of insurance coverage on the health and healthcare utilization of children. Some of the results, such as the large number of insured children who use YRMC as their sole provider, suggest that there are obstacles to access to primary care that are not solved by the provision of insurance. Indeed, many of the concerns expressed by the Community Advisory Committee on issues such as cultural and language barriers and problems of transportation suggest this to be the case.

The information obtained from community records cannot measure attitudes or satisfaction with care or the reasons for patient behavior. A community health data system, however, can be used to focus interview surveys on those questions that only interviews can answer, thereby reducing the costs and time requirements of a survey. The survey interview data can then be merged with the CHDS data, realizing the comparative advantage of each type of information.

This is the first in a series of reports on the Yuma project. It is our hope that the results will encourage other communities and states to consider the CHDS model as a permanent feature of their efforts to improve the health and healthcare of children.

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