Emergency Department Visits

A report to the Maricopa County Community
from *Arizona HealthQuery*
a Community - University Partnership

Center for Health Information & Research
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School of Computing
and Informatics

Emergency Department Visits is the 5th in a series of Community Reports published by the Center for Health Information & Research (CHIR). These reports are designed to inform our data partners and our community about health and health care utilization in Arizona. If you have a topic you would like us to consider for a future Community Report, email us at chir@asu.edu.

CHIR *Emergency Department Visits* Project Team

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Background

The AZHQ database provides valuable information for the community on the prevalence of disease and utilization of health services by Arizona residents.

This report, *Emergency Department Visits,* is one in a series of Community Reports using data from *Arizona HealthQuery* (*AZHQ*). The *AZHQ* database provides valuable information for the community on the prevalence of disease and utilization of health services by Arizona residents. The *AZHQ* data system is unique for its ability to provide vast amounts of continuously updated patient-centric health care information across health care systems and insurers and over time. The data are voluntarily shared with *AZHQ* by health systems, physician groups, hospitals, and governmental agencies such as Arizona's Medicaid agency, Arizona Health Care Cost Containment System (AHCCCS). Each of the data partners maintains ownership of their data; use of the data is governed by a data agreement approved by the data partner and the Arizona Board of Regents on behalf of the Center for Health Information & Research. *AZHQ* contains information on over 2.3 million unique people who utilized health care services in Arizona during the timeframe of interest for this report, July 2004 through June 2005, of which 1.5 million were residents of Maricopa County.

This report reviews the data of children and adults in Maricopa County who received care in selected emergency departments (EDs) for the 12 month time period July 2004 through June 2005. Hospitals are included if complete data was available from AZHQ during the time period of interest. The hospitals in this report are the five self-designated level 1 trauma centers in Maricopa County as well as six other Maricopa County hospitals. The report does not include data from all of the hospitals in Maricopa County and therefore the results presented are not meant to be representative of the entire population of Maricopa County (see Technical Notes for description of the hospitals included and definitions). The eleven hospitals included represent 100% of the level 1 trauma centers and approximately 65% of the licensed hospital beds for Maricopa County hospitals with some level of emergency services.[1]

According to the guidelines published by the American College of Surgeons Committee on Trauma, level 1 trauma centers are expected to provide comprehensive care for the most severely injured patients and have immediate availability of trauma surgeons, anesthesiologists, and certain other specialties (Branas et al., 2005). In Arizona, trauma center designation is currently voluntary and health care systems are not prohibited from providing care to trauma patients if they are not designated as a trauma center (Arizona Department of Health Services [ADHS], 2005). When compared to non-trauma hospitals nationally, on average, level 1 trauma centers are more likely to be larger hospitals, publicly owned, members of the Council of Teaching

1 The number of licensed hospital beds and level of emergency services was determined using information from the Uniform Accounting Report available at http://www.azdhs.gov/plan/crr/cr/uar.htm. Hospitals indicating they did not provide emergency services were not included in the denominator for the total county bed count.

Hospitals, and to treat more patients with a major trauma (MacKenzie et al., 2003; MacKenzie et al., 2006). For analysis purposes, we elected to stratify the data into two categories: non-level 1 trauma EDs and level 1 trauma EDs (see Technical Notes for description of the hospitals included). Although we decided to use the trauma designation to compare the hospitals, we elected not to report detailed information on injury-related visits. The *AZHQ* database captures all of the ICD-9-CM diagnosis-related information, but not all hospitals currently provide E-codes with their data submission and we felt this might not provide an accurate picture of the injuries treated at each ED.[2] E-codes supplement ICD-9-CM diagnosis reporting of injuries by capturing information on the cause (e.g., how the injury or poisoning happened), the intent (unintentional such as accidental injuries; or intentional, such as injuries that are self-inflicted or due to assault), and the location the event occurred.

Emergency Department Visits

In 2003, 501,000 ambulances were diverted from overcrowded EDs nationally.

Emergency departments provide unscheduled care for patients 24 hours a day, 7 days a week. According to a recent series of reports from the Institute of Medicine (IOM), the nation's emergency medical system is overburdened, underfunded, and highly fragmented. ED visits have increased in the past decade yet the number of EDs has decreased resulting in overcrowding and diversion of ambulances. In 2003, 501,000 ambulances were diverted from overcrowded EDs nationally. Approximately 75% of the nation's hospitals report difficulties finding specialists willing to see ED patients. With EDs already working at capacity, the nation's emergency system is not prepared to adequately handle a major disaster, especially if emergency pediatric care is needed (Institute of Medicine [IOM], 2006).

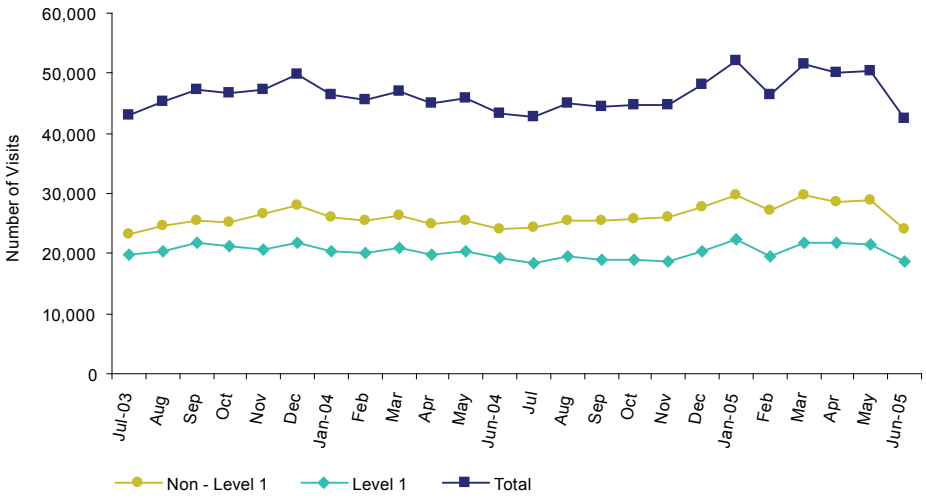
In the United States (U.S.), ED visits accounted for approximately 10% of all ambulatory medical care visits in 2001 and 2002 (Schappert & Burt, 2006). The number of ED visits and the overall utilization rate of the ED is increasing. The number of visits increased 18% from 1994 to 2004, from 93.4 million to 110.2 million visits annually, and the overall ED utilization rate increased 6%, from 36.0 visits per 100 persons to 38.2 visits per 100 persons (McCaig & Nawar, 2006). During the same period, the number of available EDs decreased by approximately 12%, contributing to the problems with overcrowding. The increase in ED utilization may be due to both changes in the population (e.g., more patients preferring ED care to office care) and changes in the health system (e.g., increases in the number of uninsured, lack of available office appointments; Billings, Parik, & Mijanovich, 2000a, 2000b; Cunningham, 2006; IOM, 2006; McCaig & Nawar, 2006; Ragin et al., 2005).

2 The Arizona Department of Health Services provides statistics and information on injury and poison related inpatient hospital visits and emergency department visits including information on the cause and manner or intent. The reports can be found at http://www.azdhs.gov/plan/hip/for/injury/index.htm.

Figure 1 depicts the number of ED visits for the *AZHQ* selected hospitals by month from July 2003 through June 2005 (Arizona HealthQuery *[AZHQ]*, 2006). Although there was some variation by month, the overall number of ED visits increased only slightly at the selected hospitals in the last two years from 552,333 visits (July 2003 – June 2004) to 555,242 visits (July 2004 – June 2005) with little seasonal variation in the number of visits. The monthly trend is similar for both level 1 and non-level 1 hospitals (*AZHQ*, 2006). The National Hospital Ambulatory Medical Care Survey (NHAMCS) also reported that there is little seasonal variation in visits to the ED by calendar quarter, although the patient complaints differed by quarter with ED visits for respiratory complaints more common in the first quarter of the year and visits for injuries more common in the second quarter (McCaig & Nawar, 2006). For the balance of our report, we will focus on the most recent period of time, July 2004 through June 2005.

The overall number of ED visits increased only slightly at the selected hospitals in the last two years.

Figure 1 – Number of ED Visits, July 2003 – June 2005

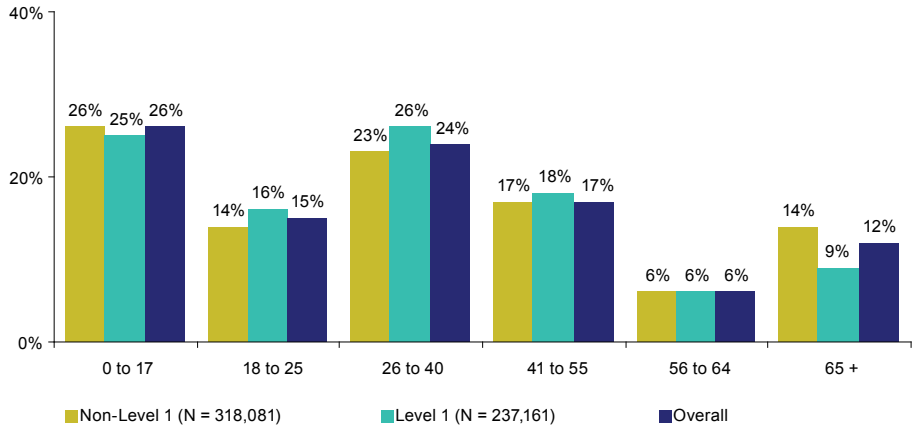


Source: AZHQ, 2006.

Age

In the United States, 20% of all ED visits in 2004 were for children under the age of 15 and 29% were for persons 25 to 44 years of age (McCaig & Nawar, 2006). Using slightly different age groupings, results are similar for the Maricopa County EDs in this study. Twenty-six percent of ED visits were for children under the age of 18 with no difference by type of hospital and 24% were for persons 26 to 40 years of age, with only slight differences by hospital type (Figure 2; *AZHQ*, 2006). This is similar to the age distribution in Maricopa County. In 2004, approximately 28% of residents were under the age of 18 and approximately 23% were between the ages of 26 and 40 (American Community Survey [ACS], 2004).

Figure 2 – Percent Distribution of ED Visits by Age Group, July 2004 – June 2005 (N = 555,242)



Source: AZHQ, 2006.

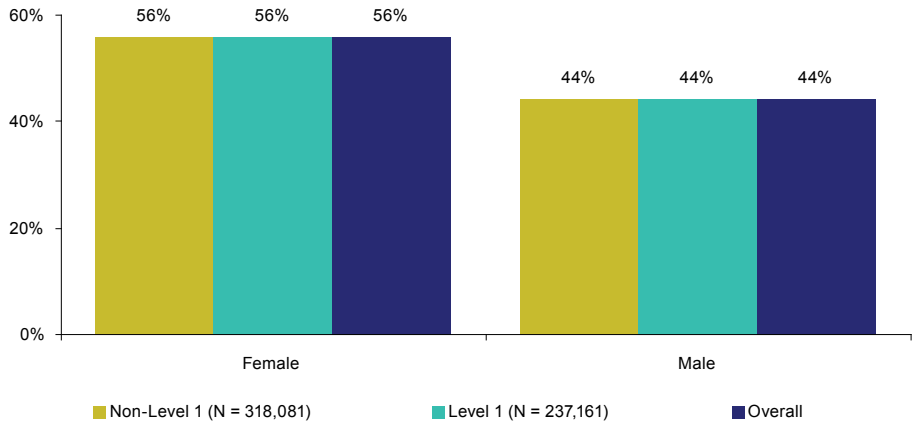
26% of ED visits were for children under the age of 18.

There was also little variation between level 1 and non-level 1 hospitals in the distribution of visits by age group with the largest difference (5%) for visits for people over the age of 65. Since people are more likely to utilize an ED that is close to their home (Ragin et al., 2005), this difference may simply reflect that the elderly are more likely to live outside of the central Phoenix corridor and in retirement communities where there are no level 1 EDs (U.S. Census Bureau, 2000a).

Gender

The distribution of ED visits was higher for females than males, with no difference by hospital type. Fifty-six percent of all ED visits were for females and 44% were for males (Figure 3).

Figure 3 – Percent Distribution of ED Visits by Gender, July 2004 – June 2005 (N = 555,242)



Source: AZHQ, 2006.

56% of all ED visits were for females.

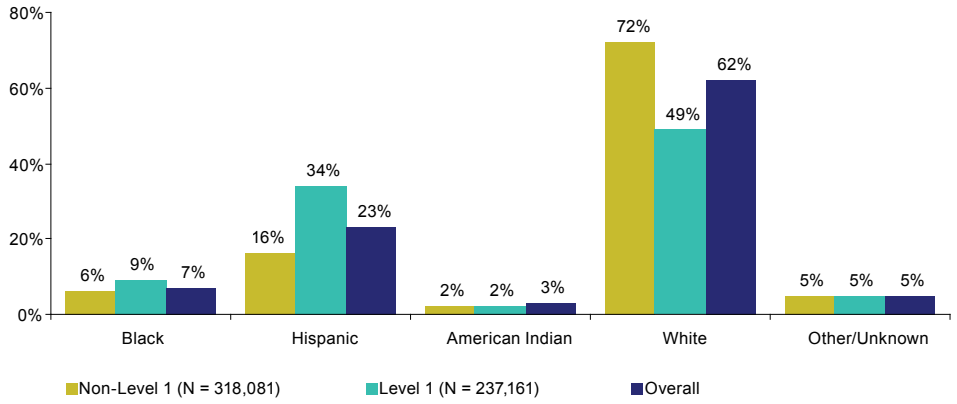
Race/Ethnicity

The distribution of ED visits by patient race/ethnicity varies by hospital type, but the distribution for all hospitals is very similar to the percent distribution of the population of Maricopa County by race. Overall, approximately 62% of visits were made by Whites and 23% of visits were made by Hispanics (Figure 4; *AZHQ*, 2006); compared to the 2004 population distribution for Maricopa County, 62% of the population is White and 28% is Hispanic (Figure 5; ACS, 2006). The percentage of visits by Hispanics was higher at level 1 EDs (34%) than at non-level 1 EDs (16%) and a higher percentage of visits were for Whites at non-level 1 EDs (72%). This difference may be a result of geographical variations with higher numbers of Hispanics living near level 1 EDs than non-level 1 EDs (U.S. Census, 2000b).

62% of ED visits were made by Whites and 23% of visits were made by Hispanics.

Figure 4 – Percent Distribution of ED Visits by Race/Ethnicity, July 2004 – June 2005 (N = 555,242)

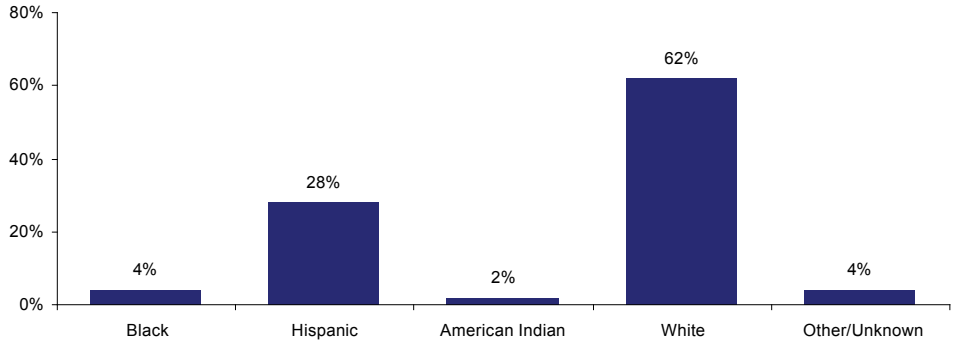
Source: AZHQ, 2006.



Note: Hispanic may be of any race. Single races are non-Hispanic.

Figure 5 – Percent Distribution of the Population by Race/Ethnicity, Maricopa County, 2004 (N = 3,456,219)

Source: U.S. Census Bureau, American Community Survey, 2004 Data Profile, Maricopa County, Arizona,



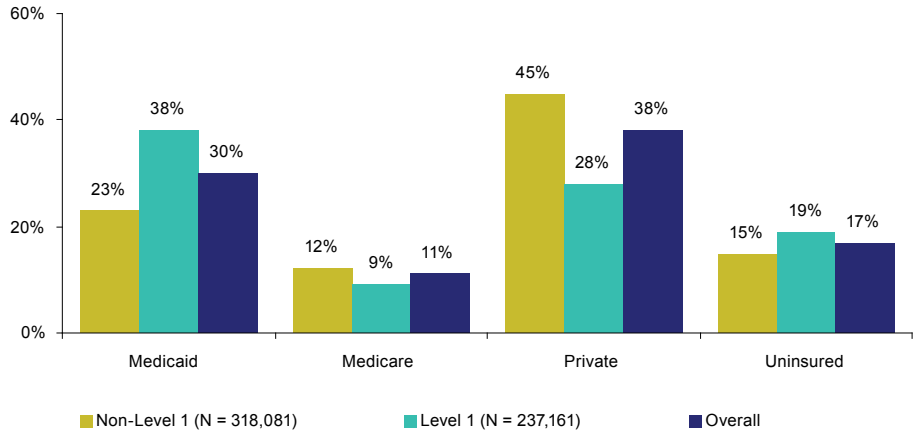
General Demographic Characteristics.
Note: Hispanic may be of any race. Single races are non-Hispanic.

Payer

The most common source of payment for ED visits overall was private insurance (*AZHQ*, 2006). Private insurance was the source of payment for 38% of visits, Medicaid (AHCCCS)[3] was the payer for 30% of visits, Medicare was the payer for 11% of visits, other insurers represented 4% of visits, and there was no insurance payer for 17% of ED visits (Figure 6). There was, however, a difference in the percent of visits by payers for level 1 and non-level 1 EDs. Medicaid was the most common payer for level 1 EDs, paying for 38% of all visits, whereas the most common payer for non-level 1 EDs was private insurance at 45% of all visits. As seen in Figure 6, there were much smaller differences between level 1 and non-level 1 EDs in the percentage of visits where the payer was Medicare or the uninsured. Our overall findings are similar to data from NHAMCS, which reported that private insurance was the payer for 36% of ED visits in the U.S. in 2004 and 16% were uninsured or self-pay (McCaig & Nawar, 2006).

The most common source of payment for ED visits overall was private insurance.

Figure 6 – Percent Distribution of ED Visits by Payer and Hospital Category, July 2004 – June 2005 (N = 555,242)



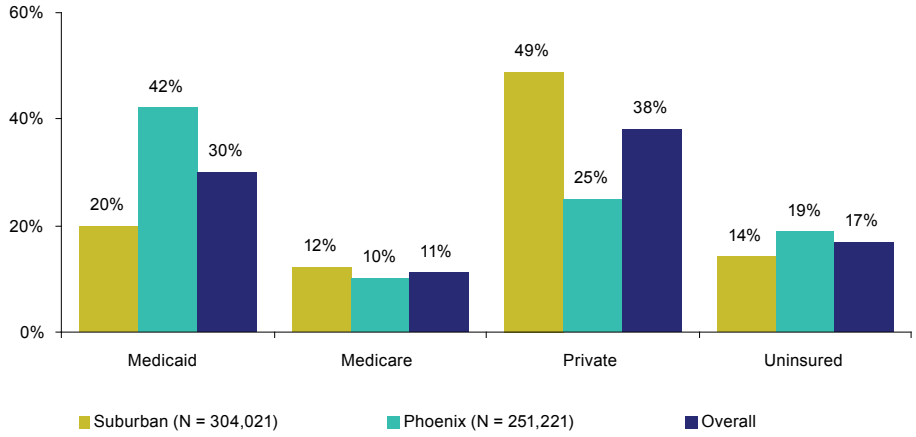
Source: AZHQ, 2006.
Note: Approximately 4% to 6% of total visits are "other insurance" (e.g., other public, worker's compensation) and are not shown.

When the hospitals are aligned by geographical region (see Technical Notes for description), private insurance, with 49% of visits, was the dominant payment source for suburban hospitals (Figure 7) and Medicaid, with 42% of visits, was the most frequent payment source for Phoenix area hospitals (*AZHQ*, 2006).

3 Insurance status reflects the payer at time of visit. Is is highly possible that individuals who were uninsured but AHCCCS eligible were enrolled at the time of the visit and therefore the payer would reflect AHCCCS. AHCCCS includes members enrolled in Fee-for-Service Plans and Managed Care Plans.

Private insurance, with 49% of visits, was the dominant payment source for suburban hospitals. Medicaid, with 42% of visits, was the most frequent payment source for Phoenix area hospitals.

Figure 7 – Percent Distribution of ED Visits by Payer and Geographical Region, July 2004 – June 2005 (N = 555,242)



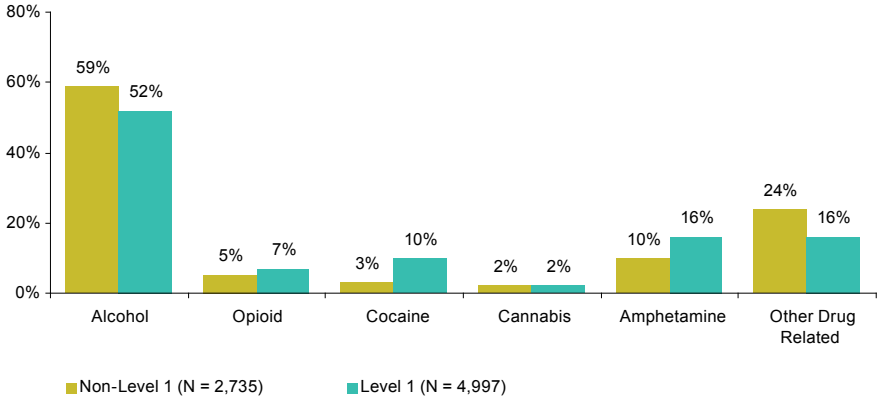
Source: AZHQ, 2006.
Note: Approximately 4 to 6% of total visits are "other insurance" (e.g.,other public, worker's compensation) and are not shown.

Alcohol and Drug Related Visits

Two percent of all visits at level 1 EDs had either a primary or secondary diagnosis that was drug or alcohol abuse related (ICD-9-CM 303.00 – 304.93, 305.00, 305.20 – 305.93) compared to 0.9% of visits at non-level 1 hospitals (AZHQ, 2006). Among the visits that were drug or alcohol related, the most commonly abused substance was alcohol (Figure 8). The second most common drug was amphetamines. Level 1 EDs had a higher percent of visits related to cocaine, amphetamine, and opioid use and non-level 1 EDs had a higher percent of visits for alcohol and other drug-related diagnoses.

Figure 8 – Percent of the number of ED Visits for Alcohol and Drug-Related Visits July 2004 – June 2005 (N = 7,732)

2% of all visits at level 1 EDs had either a primary or secondary diagnosis that was drug or alcohol abuse related.



Source: AZHQ, 2006.

Alcohol/Drug Use: Emergency visit with a primary or secondary diagnosis of dependent use or excessive use of alcohol or drugs. ICD-9-CM codes are: 303.00-304.93, 305.00, 305.20-305.93

Table 1 – Top 10 Primary Diagnosis Groups by Frequency of Visits, July 2004 – June 2005, by Hospital Type

	Non-Level 1 Trauma			*Level 1 Trauma*		
	Primary Diagnosis Group & ICD-9-CM code(s)	*Visits*	*%*	*Primary Diagnosis Group & ICD-9-CM code(s)*	*Visits*	*%*
1	Abdominal Pain (789.0)	14,788	5%	Abdominal Pain (789.0)	10,591	4%
2	Chest Pain (786.5)	13,770	4%	Acute upper respiratory infections, excluding pharyngitis (460-461, 463-466)	10,219	4%
3	Acute upper respiratory infections, excluding pharyngitis (460-461, 463-466)	13,051	4%	Chest Pain (786.5)	7,747	3%
4	Contusions w/ intact skin surface (920-924)	10,644	3%	Spinal Disorders (720-724)	7,464	3%
5	Open Wound, excluding head (874-897)	10,314	3%	Open Wound, excluding head (874-897)	7,240	3%
6	Misc. Injuries(830-839, 860-869, 900-909, 925-959)	9,846	3%	Contusions w/ intact skin surface (920-924)	7,004	3%
7	Open Wound of Head (870-873)	8,697	3%	Cellulitis and Abscess (681-682)	6,651	3%
8	Spinal Disorders (720-724)	8,088	3%	Misc. Injuries (830-839, 860-869, 900-909, 925-959)	6,631	3%
9	Fractures, excluding lower limb (800 – 819)	8,066	3%	Otitis media and eustachian tube disorders (381-382)	5,787	2%
10	Cellulitis and Abscess (681-682)	6,477	2%	Open Wound of Head (870-873)	5,666	2%
	All Other Diagnoses	214,340	67%	All Other Diagnoses	162,161	68%
	Total	318,081	100%	Total	237,161	100%

Source: AZHQ, 2006.

Most Frequent Diagnoses

In order to determine the number and percent distribution of ED visits by the leading diagnosis groups, we used the first-listed or primary diagnosis (ICD-9-CM) at the time of the visit and calculated the total number of visits based on ICD-9-CM classifications. Certain codes were combined to describe the utilization of ED services.[4]

The top 10 most frequently reported diagnoses accounted for approximately one-third of all diagnoses with few differences between level 1 EDs and non-level 1 EDs. As shown in Table 1, the most frequently reported primary diagnoses were abdominal pain, acute upper respiratory infections, excluding pharyngitis, and chest pain (*AZHQ*, 2006). In 2004, using data from the NHAMCS, the most frequently reported primary diagnoses in the U.S. were contusion with intact skin surface, abdominal pain, and open wound, excluding head (McCaig & Nawar, 2006). In 2004, for Maricopa County, the Arizona Department of Health Services (ADHS) reported that the most frequently reported primary diagnoses were abdominal pain, acute upper respiratory infections, excluding pharyngitis, and contusion with intact skin surface (ADHS, 2006). The ADHS results report on a larger number of hospitals than the hospitals included in this report but the types of diagnoses reported are similar. In addition, ADHS excludes from their analysis ED visits that later result in an admission to inpatient hospital care. Approximately 16% of the ED visits in our report were for individuals with a visit for inpatient care (e.g., hospitals, skilled nursing facilities) on the same day and another 2% of visits were for individuals with a visit on the next day.

4 The grouping of ICD-9-CM codes to form diagnosis groups was based on the groupings used in the reporting of ED visits from the National Hospital Ambulatory Medical Care Survey (NHAMCS; McCaig & Nawar, 2006) and on a clinical review of the distribution of the AZHQ ED data. The Arizona Department of Health Services (ADHS) also uses the NHAMCS data groupings as a basis for their annual reporting of ED visits.

The leading diagnoses do differ by age group, with infections and injuries more common for younger ages and chest pain and other pain related diagnoses more common in adults (Appendix Table 2). The leading diagnoses were:

- Children age 0 to 17 – acute respiratory infections, excluding pharyngitis
- Adults age 18 to 40 – abdominal pain
- Adults age 41 and over – chest pain and spinal disorders

For children under the age of 17, the top five most frequent diagnoses also accounted for a larger percentage of overall visits than any other age group–accounting for almost 35% of all visits–with the top ten diagnoses accounting for nearly 50% of all visits (*AZHQ*, 2006).

Frequent Users of ED

Frequent users of the ED account for a small percent of ED patients, but they are often responsible for a large number of visits.

In 2004, 20% of the U.S. adult population made one or more ED visits and 7.5% had two or more visits (McCaig & Nawar, 2006). Demographic, socioeconomic, and health factors are strongly related to an individual's ED use. Frequent users of the ED are often believed to contribute to problems with ED overcrowding. Research suggests that, although frequent users of the ED account for a small percent of ED patients, they are often responsible for a large number of visits (Cook et al., 2004; Hunt, Weber, Showstack, & Callaham, 2006). Hunt and others found that patients with four or more visits made up 8% of the total adult ED population but were responsible for 28% of all adult ED visits (Hunt, et al., 2006). Factors associated with more frequent ED use include indicators of lower socioeconomic position, insurance status, poor health status, and access to care (Cook et al., 2004; Cunningham, 2006; Hunt et al., 2006; Sun, Burstin, & Brennan, 2003; Zuckerman & Chen, 2004).

There is no widely accepted definition of frequent ED use. Most studies use a preset number of visits to define as frequent use (i.e., individuals with three or more visits annually are frequent users). For this report, we examined all ED visits during the time period July 2004 – June 2005 and tallied the number of visits per patient, ranking the patients by number of visits from highest to lowest. The top 5% of the patients with the highest number of visits were classified as frequent users and the other 95% (at least one ED visit during time period) were used as the comparison group. For this section of the report, our unit of analysis is the person rather than the hospital, so the numbers represented in Figures 9 – 13 depict the percent of unique people (unless noted) and not the percent of visits as represented in previous Figures 2 – 4.

As shown in Table 2, the average number of visits per person for the frequent user group was 6.0 (Standard Deviation [*SD*] = 4.6) compared to 1.3 (*SD* = 0.6) for all other users (*AZHQ*, 2006). Although they represent approximately 5% of the overall ED population, the frequent users accounted for 17% (91,254 visits) of all visits during the analysis period (*AZHQ*, 2006).

Frequent users in the study represented 5% of the overall ED population and 17% of all visits.

Table 2 – ED Users, July 2004 – June 2005

			Frequent Users: Top 5%			
	All	*All Other Users (95%)*	*Total*	*1 – 2 hospitals*	*3 – 4 hospitals*	*5 or more hospitals*
Number of Visits	542,286	451,032	91,254	67,122	17,529	6,603
Number of patients	370,931	355,728	15,203	12,512	2,382	309
Mean visits per patients	1.5 (*SD* = 1.4)	1.3 (*SD* = 0.6)	6.0 (SD = 4.6)	5.4 (*SD* = 2.7)	7.4 (*SD* = 5.7)	21.4 (*SD* = 15.2)
Range of visits	1-92	1-3	4-92	4-73	4-92	4-88
Percentage Male	46%	46%	40%	39%	42%	56%
Mean Age	34 (*SD* = 23.7)	34 (*SD* = 23.7)	35 (*SD* = 22.1)	34 (*SD* = 23.0)	37 (*SD* = 17.5)	36 (*SD* = 11.9)

Source: AZHQ, 2006.

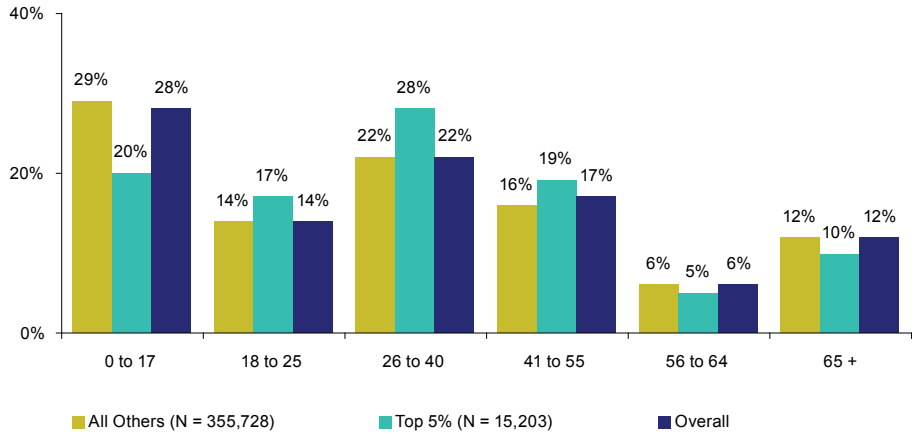
Table 2 also shows the results of stratifying the frequent users by the number of hospitals visited during the year (99.7% of all other users frequented one or two hospitals). The majority of the frequent users visited only one or two hospitals; 83% (12,512 people) of the frequent users attended one to two EDs, 15% (2,382 people) of frequent users attended three to four EDs, and 2% (309 people) attended five or more. Compared to all other users, frequent users attending five or more hospitals have on average more visits per person (21.4) and are more likely to be male (56%).

Demographics

Compared to all other users of the ED, frequent users are less likely to be between the years of 0 and 17 (20% versus 29%; Figure 9) and more likely to be Black (10% versus 6%; Figure 10; *AZHQ*, 2006).

Frequent users are more likely to be adults than children.

Figure 9 – ED Users by Age Group, July 2004 – June 2005 (N = 370,931)

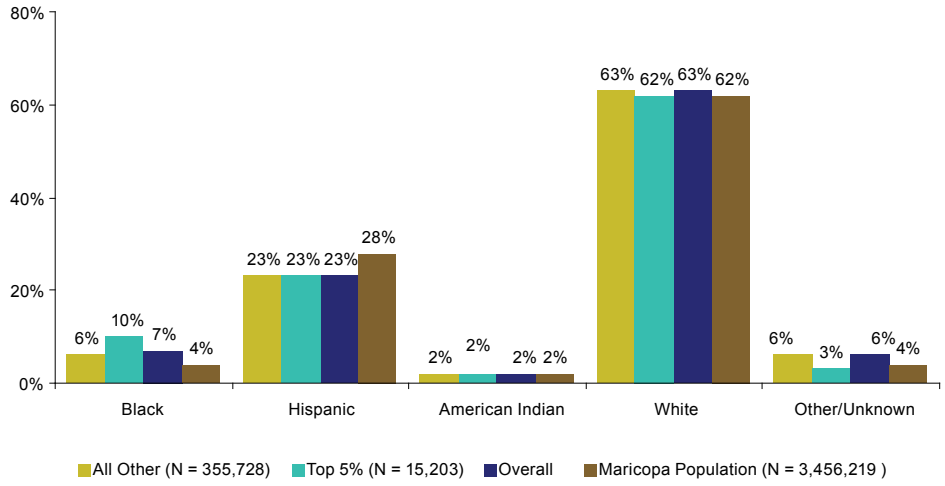


Source: AZHQ, 2006.

Our findings support prior research which found that Black adults are more likely be frequent users of the ED (Zuckerman & Shen, 2004) and that the ED utilization rate, regardless of age, for non-Hispanic Black people is higher than for non-Hispanic White people (McCaig & Nawar, 2006; Schappert & Burt, 2006). Compared to the overall population of Maricopa County, our results (Figure 10) show that a higher percent of ED users were Black (7% for all users versus 4% of population), and a lower percent were Hispanic (23% for all users versus 28% of population; *AZHQ*, 2006). While the reasons for these racial/ethnic differences are beyond the scope of this report, some possibilities include disparities in access to ambulatory care, insurance status, cultural preferences for ED care, and citizenship status. Since our data does not include all ED users in Maricopa County, the same racial/ethnic differences seen here may not exist if we examined all ED users from Maricopa County.

Compared to the overall population of Maricopa County, our results show that a higher percent of ED users were Black and a lower percent were Hispanic.

Figure 10 – ED Users by Race/Ethnicity, July 2004 – June 2005 (N = 370,931)

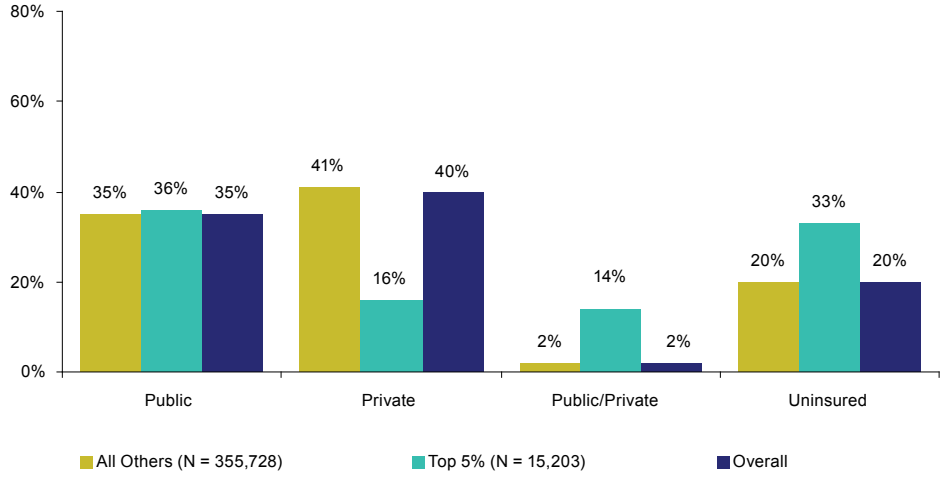


Source: AZHQ, 2006.

Although non-citizens are frequently blamed for ED overcrowding, there is conflicting data from researchers using nationally representative surveys about the use of the ED by non-citizens.[5] For example, Cunningham (2006) found that non-citizens of all ages had lower levels of ED use than citizens, but Zuckerman and Chen (2004) found that relative to U.S. born citizens, foreign-born citizens age 18 to 64 were more likely to be a frequent ED user (three or more visits in a year) versus an occasional user.

Approximately 33% of frequent users of the ED were uninsured.

Figure 11 – ED Users by Insurance Status, July 2004 – June 2005 (N = 370,931)



Source: AZHQ, 2006.

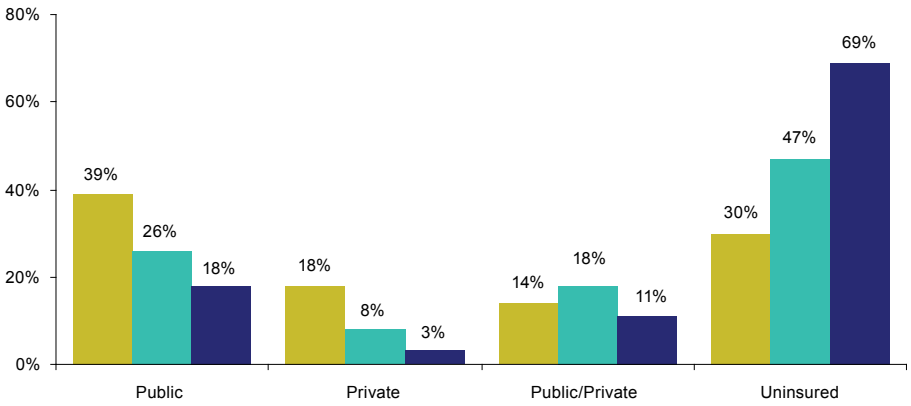
5 Cunningham (2006) uses data from the 2003 Community Tracking Survey household survey. The survey is designed to produce representative estimates of health insurance, access to care, and use of services for the U.S. civilian noninstitutionalized population and sixty randomly selected communities. Phoenix, Arizona is one of the selected communities (p. W325). The overall sample is approximately 46,000 people and includes children and adults. Zuckerman & Chen (2004) use data from the Urban Institute's National Survey of America's Families (NSAF). NSAF is a nationally representative survey of over 100,000 children and non-elderly adults that collects economic, household, and health information.

Previous research on ED utilization has shown that as the number of ED visits increase, the type of payer changes. Less frequent users of the ED are more likely to be covered by private insurance and frequent users are more likely to be covered by public sources or be uninsured (Cook et al., 2004; Hunt et al., 2006; Zuckerman & Shen, 2004). As shown in Figure 11, our results are similar; only 16% of frequent users were continuously covered by private insurance compared to 41% of less frequent users. Approximately 33% of frequent users of the ED were uninsured at some point during the selected timeframe compared to 20% of all other users (*AZHQ*, 2006). Patients who switched between public and private insurance were also more likely (14% versus 2%) to be frequent users (*AZHQ*, 2006). This difference may be due to loss of continuity of care associated with changes in insurance plans that often require changing primary care providers and medications.

The percentage of frequent users with a gap in insurance coverage during the year increases as the number of hospitals attended increases. As seen in Figure 12, stratifying the frequent users by the number of hospitals visited results in a dramatic increase in the percentage of frequent users with a gap in coverage; from 30% for frequent users attending one to two hospitals to 69% for people attending five or more hospitals (*AZHQ*, 2006). The increase in the number of hospitals used by the uninsured puts both the uninsured and the providers at risk for further fragmentation of care because medical records from other hospitals will not be available to the providers treating them.

69% of people attending five or more hospitals had a gap in insurance coverage.

Figure 12 – Frequent ED Users by Insurance Status, Stratified by Number of Hospitals Visited, July 2004 – June 2005 (N = 15,203)



Source: AZHQ, 2006.

Conditions and Comorbidities

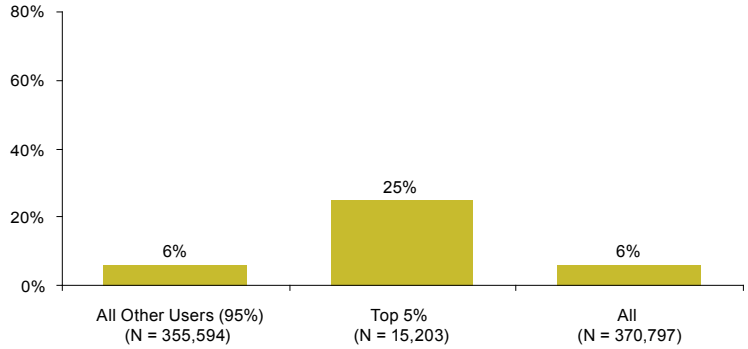
Frequent ED users are more likely to visit the ED for non-emergent reasons than all other users.

Frequent ED users are more likely to visit the ED for non-emergent reasons than all other users[6]; 53% of their total visits in 2004/2005 were for non-emergent conditions compared to 46% for all other users (*AZHQ*, 2006).

As shown in Figure 13a, frequent users are also much more likely to have identified behavioral health issues. Twenty-five percent of frequent users had at least one health care visit (all sources)[7] during 2004/2005 with a primary or secondary behavioral health related diagnosis, compared to 6% of all other users and total users. In addition, as the number of hospitals visited by frequent ED users increases (Figure 13b), the likelihood of the person having an identified behavioral health issue increases. Approximately 74% of users who visited five or more hospitals had a behavioral health related diagnosis during the year compared to 20% of users who frequented one to two hospitals. Prior research has shown that frequent users of the ED are more likely to be in poor health status and have problems with chronic diseases such as asthma and behavioral health conditions (Hunt et al., 2006; Sun et al., 2004; Zuckerman & Shen, 2004).

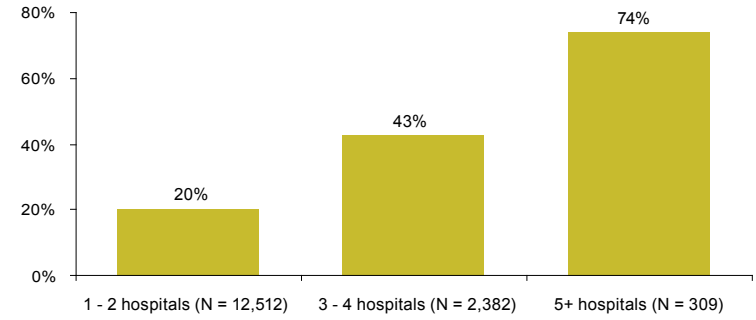
Frequent users are also much more likely to have identified behavioral health issues.

Figure 13a –ED Users with any Behavioral Health Condition, July 2004 – June 2005 (N = 370,931)



Source: AZHQ, 2006

Figure 13b - Frequent Users with any Behavioral Health Condition, Stratification by Number of Hospitals (N = 15,203)



Source: AZHQ, 2006

Behavioral Health Conditions:
Persons visiting the ED who also had a behavioral health related diagnosis (ambulatory or hospital based) in the prior 12 months.
ICD-9-CM codes are: 291.00-292.9, 295.00-306.9, 308.00-309.9, 311-314.9

6 See Technical Notes for classification definition.
7 All visits included in AZHQ and not just ED visits during the period 2004 and 2005 were used to determine if an individual had a primary or secondary behavioral health related diagnosis. See Technical Notes for definition.

Top Diagnoses by Type of ED User

As shown in Tables 3 and 4, compared to all other users, frequent users of the ED are more likely to have visits with primary diagnoses that are associated with pain. The most prevalent diagnoses for visits for frequent users of the ED were headaches (6%), abdominal pain (5%), and spinal disorders (5%). In addition, as the number of hospitals visited by the frequent ED users increases, the percent of visits related to headaches, back problems, joint problems, and other sprains or strains increased. For frequent ED users attending five or more hospitals, these diagnoses accounted for 33% of all visits compared to 9% for frequent users accessing one to two hospitals. Cook et al. (2004) found similar findings, where 23% of all visits by frequent users attending five or more hospitals were related to sprains, headaches/ migraines, and back problems.

Table 3: Top 10 Primary Diagnosis Groups by Frequency of Visits, July 2004 – June 2005, by User Type

	All Other Users (95%)			*Frequent Users (Top 5%)*		
	Primary Diagnosis Group & ICD-9-CM code(s)	*Visits*	*%*	*Primary Diagnosis Group & ICD-9-CM code(s)*	*Visits*	*%*
1	Acute upper respiratory infections, excluding pharyngitis (460-461, 463-466)	21,720	5%	Headache (784.0)	5,070	6%
2	Abdominal Pain (789.0)	19,663	4%	Abdominal Pain (789.0)	5,015	5%
3	Chest Pain (786.5)	17,714	4%	Spinal Disorders (720-724)	4,672	5%
4	Open Wound, excluding head (874-897)	16,396	4%	Acute upper respiratory infections, excluding pharyngitis (460-461, 463-466)	4,190	5%
5	Contusions w/ intact skin surface (920-924)	15,262	3%	Chest Pain (786.5)	3,365	4%
6	Misc. Injuries (830-839, 860-869, 900-909, 925-959)	14,255	3%	Cellulitis and Abscess (681-682)	2,726	3%
7	Open Wound of Head (870-873)	13,318	3%	Other Rheumatism, excluding back (725, 727.1-727.9,728,729.0, 729.2-729.9)	2,032	2%
8	Fractures, excluding lower limb (800 – 819)	12,593	3%	Contusions w/ intact skin surface (920-924)	2,021	2%
9	Cellulitis and Abscess (681-682)	10,946	2%	Diseases of teeth and supporting structure (520-579)	1,969	2%
10	Spinal Disorders (720-724)	10,370	2%	Joint derangements and other unspecified joint problems (717-719)	1,809	2%
	All Other Diagnoses	298,795	66%	All Other Diagnoses	58,385	64%
	Total	451,032	100%	Total	91,254	100%

Table 4: Frequent Users (Top 5%) Stratified by Number of Different Hospitals Visited

	1 to 2 Hospitals			3 to 4 Hospitals			5 or More Hospitals		
	Primary Diagnosis Group & ICD-9-CM code(s)	*Visits*	*%*	*Primary Diagnosis Group & ICD-9-CM code(s)*	*Visits*	*%*	*Primary Diagnosis Group & ICD-9-CM code(s)*	*Visits*	*%*
1	Acute upper respiratory infections, excluding pharyngitis (460-461, 463-466)	3,504	5%	Spinal Disorders (720-724)	1,493	9%	Spinal Disorders (720-724)	810	12%
2	Abdominal Pain (789.0)	3,460	5%	Headache (784.0)	1,297	7%	Headache (784.0)	601	9%
3	Headache (784.0)	3,172	5%	Abdominal Pain (789.0)	1,104	6%	Diseases of teeth and supporting structure (520-579)	559	8%
4	Spinal Disorders (720-724)	2,369	4%	Chest Pain (786.5)	734	4%	Abdominal Pain (789.0)	451	7%
5	Chest Pain (786.5)	2,314	3%	Diseases of teeth and supporting structure (520-579)	553	3%	Chest Pain (786.5)	317	5%
6	Cellulitis and Abscess (681-682)	2,083	3%	Acute upper respiratory infections, excluding pharyngitis (460-461, 463-466)	548	3%	Joint derangements and other unspecified joint problems(717-719)	303	5%
7	Otitis media and eustachian tube disorders (381-382)	1,679	3%	Cellulitis and Abscess (681-682)	514	3%	Sprains + strains: back, neck(846,847)	258	4%
8	Pregnancy related complications (648.93)	1,504	2%	Other Rheumatism, excluding back (725, 727.1-727.9,728,729.0, 729.2-729.9)	491	3%	Contusions w/ intact skin surface (920-924)	250	4%
9	Misc. Infectious Diseases (001-033,034.1-041.9,045.0-078.0, 078.2-079.8, 080-104,111,114-139)	1,436	2%	Contusions w/ intact skin surface (920-924)	456	3%	Sprains + Strains, excluding back and ankle (840-844,845.1,848)	210	3%
10	Other Rheumatism, excluding back (725,727.1-727.9,728,729.0, 729.2-729.9)	1,347	2%	Joint derangements and other unspecified joint problems (717-719)	440	3%	Other Rheumatism, excluding back (725,727.1-727.9,728,729.0, 729.2-729.9)	194	3%
	All Other Diagnoses	44,254	66%	All Other Diagnoses	9,899	56%	All Other Diagnoses	2,650	40%
	Total	67,122	100%	Total	17,529	100%	Total	6,603	100%

As the number of hospitals visited by the frequent ED users increases, the percent of visits related to headaches, back problems, joint problems, and other sprains or strains increased.

For frequent ED users attending 5 or more hospitals, these diagnoses accounted for 33% of all visits compared to 9% for frequent users accessing 1 to 2 hospitals.

Summary

This report on emergency department visits provides valuable information for the community on emergency health services in Maricopa County utilizing the *AZHQ* data system. Because *AZHQ* contains continuously updated patient-centric health care information across health care systems and insurers and over time, we are uniquely able to determine patterns of emergency health care utilization by patients who are frequent users of the ED.

This report reviews the data of children and adults who received care in one or more EDs of eleven *AZHQ* data partners located in Maricopa County during the 12 month time period July 2004 through June 2005. Key findings in the report for these hospitals are:

- The overall number of ED visits increased only slightly at represented *AZHQ* hospitals in the last two years from 552,333 visits (July 2003 – June 2004) to 555,242 visits (July 2004 – June 2005) and there was little seasonal variation in the number of visits.
- Approximately one quarter of all ED visits were for children younger than 17 years old and the leading ED diagnosis for this age group was acute respiratory infections.
- The most common payer for ED visits was private insurance, but 17% of ED visits were by patients who were uninsured.
- Approximately 5% of the ED population accounted for 17% of all ED visits and these frequent users, on average, visited the ED six times per year (range: 4-92 visits).
- Frequent ED users were more likely to have gaps in insurance coverage or have switched between private and public health insurance coverage during the year.
- Frequent ED users were more likely to visit the ED for non-emergent conditions than other ED users.
- Among frequent ED users, 25% had diagnosed behavioral health conditions.
- The most common diagnoses for visits for frequent ED users were headache, abdominal pain, and spinal disorders.

These findings demonstrate that EDs are being utilized by patients who could be receiving care in less expensive office settings and that the current crisis in ED care cannot be addressed solely by improving the insurance status of Arizona residents. In addition, our findings highlight the need to identify and intervene in the health care utilization of the small group of high ED utilizers who could be receiving care in other settings. Although prior research has shown that frequent users are often heavy users of health care services in general, this group of patients taxes the ED system with frequent visits for non-emergent conditions and often have associated behavioral health problems or other chronic health problems that are unlikely to be adequately addressed in the ED setting. These high utilizers also choose to visit many different EDs, furthering fragmenting their health care.

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Technical Notes

Data Sources: *Arizona HealthQuery* Data

Arizona HealthQuery (*AZHQ*) is a community health data system that houses essential and comprehensive health information for Arizona residents. This data system is located at Arizona State University and managed by the Center for Health Information & Research (CHIR). *AZHQ* collects and houses health care information voluntarily provided by state agencies, hospitals, health care systems, insurers, physician groups, community health centers, and other ambulatory care centers.

AZHQ serves as a resource for performing analyses directed at improving health and health care costs, identifying medical service needs of certain populations, providing outcomes evaluations, performing quality improvement assessments, and conducting cost management analyses as well as operational analyses for contributing data partners.

This report reviews the data of children and adults in Maricopa County who received care in selected emergency departments (ED) for the 12 month time period July 2004 through June 2005.

Definitions

Terms used throughout the text and graphs are defined below:

ED Visits: For selected hospitals (listed below) we included all visits coded as an emergency room visit in *AZHQ,* even if the person was later admitted to the hospital. We excluded records in which the first-listed diagnosis was coded as a follow-up visit or other supplementary classification (ICD-9-CM code of V20-29, V50-V59, V67, V65.3 and V70-V85).

Hospital Designation: Hospitals are included if we had complete data in *AZHQ* during the time period of interest. The hospitals included do not represent all hospitals in Maricopa County. For some of the results, break-outs are reported by level 1 trauma centers and non-trauma centers. The classification of level 1 trauma centers was based on a document listing self-designated level 1 trauma centers from the Arizona Department of Health Services (ADHS) and verified on the individual hospital's website.[8] The rules and standards for designating hospitals or hospital systems as level 1 through level 4 trauma centers was approved on October 6, 2005 by the Governor's Regulatory Review Council. According to the State Trauma Advisory Board's 2005 report,

> "The rules provide for a 90-day grace period from the October 6, 2005, effective date for the self-designated Level I trauma centers to submit an application for trauma center designation. The grace period allows the seven existing trauma centers to obtain state designation without first having to successfully complete a site visit by the American College of Surgeons – Committee on Trauma (ACS). Upon successful submission of an application, a self-designated Level I trauma center can continue operating as a Level I trauma center for 36 months from October 6, 2005, with the proviso that they will seek ACS's verification or determination that the health care institution meets the state's criteria for designation during the 36-month period" (p. 4).

8 The ADHS document is located at http://www.azdhs.gov/bems/trauma-pdf/2005_annual_stab_report.pdf. Page 7 of the report provides a list of "self-designated Level 1 Trauma Centers. There are other hospitals that may be seeking Level 1 designation but for this report, we used the hospitals in Maricopa County that are currently self-designated.

The hospitals included in the report are listed below:

Level 1:	John C. Lincoln – North Mountain (Phoenix)
	Banner Good Samaritan Medical Center (Phoenix)
	St. Joseph's Hospital and Medical Center (Phoenix)
	Maricopa Medical Center (Phoenix)
	Scottsdale Healthcare Osborn (Suburban)
Non-Level 1:	Banner Baywood Medical Center (Suburban)
	Banner Desert Medical Center (Suburban)
	Chandler Regional Hospital (Suburban)
	John C. Lincoln – Deer Valley (Suburban)
	Phoenix Baptist Hospital (Phoenix)
	Scottsdale Healthcare Shea (Suburban)

Race and Ethnicity: In the figures and tables, race and ethnicity are reported together. The term Hispanic refers to people of Hispanic or Latino origin but they may be of any race. Single races (White, Black, American Indian/Alaska Native, Asian/Pacific Islander and Other) are non-Hispanic. Due to smaller numbers, we combined Asians and Pacific Islanders into one category and, for this report, included them with "other" race and ethnicity although they are usually reported separately in U.S. Census reports. In *AZHQ*, race and ethnicity are included on the encounter record and are typically self-reported categories. We recognize that the categories are based on social context and may have no biological or genetic basis; not everyone identifies herself or himself by these categories.

Insurance Status (AZHQ): The insurance status differs based on whether the analysis is at the visit level or the person level. For the examination of differences by hospital, the analysis is at the visit level. In this case, the insurance status represents the source of payment at the time of the ED visit with five possible insurance types: uninsured, Medicaid (AHCCCS), Medicare, private insurance, or other (e.g., worker's compensation) . It is possible that patients may have arrived at the ED uninsured but if they were AHCCCS eligible, they may have been enrolled in an AHCCCS plan during the visit and the source of payment for the visit would reflect as AHCCCS. AHCCCS includes visits for members enrolled in Fee-for-Service plans and for members enrolled in managed care plans.

For the section of the report on frequent users of the ED, the unit of analysis is the person and therefore we created four patterns of health insurance coverage experienced by individuals utilizing the ED in the analysis period. The patterns represent combinations of three possible states of coverage: uninsured, publicly insured (e.g., AHCCCS, Medicare), or privately insured (including employment-related coverage). Three of the four patterns are defined by consistent insurance coverage over the analysis period (public only, private insurance only, and public and private insurance). The uninsured pattern is defined by periods of either chronic or sporadic spells of uninsurance. The insurance patterns are:

Uninsured: The patient had at least one gap without insurance during the analysis period.

Public/Private continuously insured: The patient was insured by a combination of public and private payers during the analysis period with no gaps in insurance.

Public continuously insured: All health care encounters during the analysis period were for public payers (e.g., AHCCCS and Medicare) with no gaps in insurance or other coverage.

Private continuously insured: All health care encounters during the analysis period were for private payers with no gaps in insurance or other coverage.

Other: None of the above categories are applicable.

ED Diagnoses: In order to determine the number and percent distribution of ED visits by the leading diagnosis groups we used the first-listed diagnosis (ICD-9-CM) at the time of the visit and calculated the total number of visits based on ICD-9-CM classifications. Certain codes were combined to describe the utilization of ED services and those combinations are listed in the tables. The diagnoses were ranked from the most frequent to the least frequent number of visits and were not weighted or adjusted.

Emergent and Non-emergent Classification: In 1999, John Billings and colleagues at New York University developed an emergency department use profiling algorithm that creates an opportunity to analyze ED visits according to several important categories.[9] The algorithm was developed after reviewing thousands of ED records and uses a patient's primary diagnosis at the time of discharge from the ED to assign probabilities representing the relative percentage of cases for that diagnosis. Visits with a primary ED discharge diagnosis of injury, behavioral health, certain pregnancy-related visits, and other smaller incidence categories are not assigned to algorithm classifications of interest.

The algorithm assigns a specific percentage of the ED visit into the categories of non-emergent, emergent/primary care treatable, emergent/ED care needed – preventable and avoidable, and emergent/ED care needed – not preventable or avoidable. For example, a visit can be classified as 30% emergent and not preventable, 9% emergent and preventable, 31% emergent and primary care treatable, and 20% non-emergent.

To determine whether an ED visit is non-emergent, the probabilities of the non-emergent category and the emergent and primary care treatable category are summed. An individual visit is then classified as non-emergent if this sum is greater than 50%. In the above example, one would total the 31% emergent and primary care treatable and the 20% non-emergent to get 51% and then classify the visit as non-emergent.

The data from the ED utilization category must be interpreted cautiously and are best viewed as an indication of utilization rather than a definitive assessment of whether the ED visit was appropriate.

Comorbid Conditions: All visits from all sources of care (ambulatory and hospital based) in *AZHQ* were used to determine whether a person had a comorbid condition of behavioral health related issues in either 2004 or 2005.

If the person had either an ICD-9-CM diagnosis of 291.xx, 292.xx, 295.xx, 296.xx, 297.xx, 298.xx, 299.xx, 300.xx, 301.xx, 302.xx, 303.xx, 304.xx, 305.xx, 306.xx, 308.xx, 309.xx, 311.xx, 312.xx, 313.xx, or 314.xx from any source or had a prescription filled for a drug used to treat behavioral health conditions, they were considered to have a behavioral health condition.

9 For a discussion of the development of the algorithm and the potential implications of its findings, see: Billings, J., Parikh, N., & Mijanovich, T. *Emergency room use: The New York story*. New York, NY: The Commonwealth Fund, November 2000.

Appendix Tables

Table Appendix 1 – Top 5 Primary Diagnosis Groups by Frequency of Visits by Gender, July 2004 – June 2005, by Hospital Type

	Non-Level 1 Trauma			Level 1 Trauma		
	Primary Diagnosis Group & ICD-9-CM code(s)	Visits	%	Primary Diagnosis Group & ICD-9-CM code(s)	Visits	%
	Females					
1	Abdominal Pain (789.0)	9,991	6%	Abdominal Pain (789.0)	6,917	5%
2	Chest Pain (786.5)	7,642	4%	Acute upper respiratory infections, excluding pharyngitis (460-461, 463-466)	5,319	4%
3	Acute upper respiratory infections, excluding pharyngitis (460-461, 463-466)	6,575	4%	Chest Pain (786.5)	4,209	3%
4	Contusions w/ intact skin surface (920-924)	5,589	3%	Spinal Disorders (720-724)	4,047	3%
5	Spinal Disorders (720-724)	4,718	3%	Contusions w/ intact skin surface (920-924)	3,614	3%
	All Other Diagnoses	142,085	80%	All Other Diagnoses	108,042	82%
	Total	176,600	100%	Total	132,148	100%
	Males					
1	Acute upper respiratory infections, excluding pharyngitis (460-461, 463-466)	6,476	5%	Acute upper respiratory infections, excluding pharyngitis (460-461, 463-466)	4,900	5%
2	Open Wound, excluding head (874-897)	6,394	5%	Open Wound, excluding head (874-897)	4,681	4%
3	Chest Pain (786.5)	6,128	4%	Cellulitis and Abscess (681-682)	3,827	4%
4	Open Wound of Head (870-873)	5,469	4%	Misc. Injuries (830-839, 860-869, 900-909, 925-959)	3,780	4%
5	Misc. Injuries (830-839, 860-869, 900-909, 925-959)	5,411	4%	Open Wound of Head (870-873)	3,761	4%
	All Other Diagnoses	111,595	79%	All Other Diagnoses	84,063	80%
	Total	141,473	100%	Total	105,012	100%

Table Appendix 2 – Top 5 Primary Diagnosis Groups by Frequency of Visits by Age Group, July 2004 – June 2005, by Hospital Type

	Non-Level 1 Trauma			*Level 1 Trauma*		
	Primary Diagnosis Group & ICD-9-CM code(s)	*Visits*	*%*	*Primary Diagnosis Group & ICD-9-CM code(s)*	*Visits*	*%*
	0 to 17					
1	Acute upper respiratory infections, excluding pharyngitis (460-461, 463-466)	8,377	10%	Acute upper respiratory infections, excluding pharyngitis (460-461, 463-466)	6,638	11%
2	Otitis media and eustachian tube disorders (381-382)	5,046	6%	Otitis media and eustachian tube disorders (381-382)	4,795	8%
3	Open Wound of Head (870-873)	4,966	6%	Pyrexia of Unknown Origin (780.6)	3,081	5%
4	Pyrexia of Unknown Origin (780.6)	4,371	5%	Digestive Symptoms (e.g, nausea, heartburn) (787)	2,526	4%
5	Misc. Injuries (830-839, 860-869, 900-909, 925-959)	4,340	5%	Misc. Injuries (830-839, 860-869, 900-909, 925-959)	2,440	4%
	All Other Diagnoses	56,298	68%	All Other Diagnoses	40,557	68%
	Total	83,398	100%	Total	60,037	100%
	18 to 25					
1	Abdominal Pain (789.0)	2,936	6%	Abdominal Pain (789.0)	2,215	6%
2	Open Wound, excluding head (874-897)	2,032	4%	Open Wound, excluding head (874-897)	1,576	4%
3	Contusions w/ intact skin surface (920-924)	1,546	3%	Pregnancy related complications (648.93)	1,400	4%
4	Chest Pain (786.5)	1,435	3%	Contusions w/ intact skin surface (920-924)	1,084	3%
5	Pregnancy related complications (648.93)	1,314	3%	Cellulitis and Abscess (681-682)	1,065	3%
	All Other Diagnoses	36,722	80%	All Other Diagnoses	31,320	81%
	Total	45,985	100%	Total	38,660	100%
	26 to 40					
1	Abdominal Pain (789.0)	4,556	6%	Abdominal Pain (789.0)	3,312	5%
2	Chest Pain (786.5)	3,515	5%	Spinal Disorders (720-724)	2,639	4%
3	Spinal Disorders (720-724)	2,732	4%	Cellulitis and Abscess (681-682)	2,242	4%
4	Open Wound, excluding head (874-897)	2,613	4%	Chest Pain (786.5)	2,192	4%
5	Contusions w/ intact skin surface (920-924)	2,183	3%	Open Wound, excluding head (874-897)	1,968	3%
	All Other Diagnoses	56,500	78%	All Other Diagnoses	49,147	80%
	Total	72,099	100%	Total	61,500	100%
	41 to 55					
1	Chest Pain (786.5)	3,963	7%	Spinal Disorders (720-724)	2,444	6%
2	Abdominal Pain (789.0)	2,705	5%	Chest Pain (786.5)	2,330	5%
3	Spinal Disorders (720-724)	2,301	4%	Abdominal Pain (789.0)	2,114	5%
4	Open Wound, excluding head (874-897)	1,668	3%	Cellulitis and Abscess (681-682)	1,828	4%
5	Contusions w/ intact skin surface (920-924)	1,658	3%	Other Rheumatism, excluding back (725,727.1-727.9,728,729.0, 729.2-729.9)	1,361	3%
	All Other Diagnoses	40,686	77%	All Other Diagnoses	32,893	77%
	Total	52,981	100%	Total	42,970	100%
	56 to 64					
1	Chest Pain (786.5)	1,582	8%	Chest Pain (786.5)	842	6%
2	Abdominal Pain (789.0)	810	4%	Spinal Disorders (720-724)	544	4%
3	Spinal Disorders (720-724)	673	3%	Abdominal Pain (789.0)	538	4%
4	Contusions w/ intact skin surface (920-924)	600	3%	Contusions w/ intact skin surface (920-924)	399	3%
5	Heart Disease, excluding ischemic (391-392.0, 393-398,402,404,415-416,420-429)	594	3%	Other Rheumatism, excluding back (725,727.1-727.9,728,729.0, 729.2-729.9)	387	3%
	All Other Diagnoses	15,601	79%	All Other Diagnoses	10,590	80%
	Total	19,860	100%	Total	13,300	100%
	65 +					
1	Chest Pain (786.5)	2,436	6%	Chest Pain (786.5)	957	5%
2	Heart Disease, excluding ischemic (391-392.0, 393-398,402,404,415-416,420-429)	2,290	5%	Contusions w/ intact skin surface (920-924)	877	4%
3	Contusions w/ intact skin surface (920-924)	1,519	3%	Heart Disease, excluding ischemic (391-392.0, 393-398,402,404,415-416,420-429)	799	4%
4	Abdominal Pain (789.0)	1,311	3%	Fractures, excluding lower limb (800 – 819)	725	4%
5	Fractures, excluding lower limb (800 – 819)	1,300	3%	Abdominal Pain (789.0)	678	3%
	All Other Diagnoses	34,902	80%	All Other Diagnoses	16,658	80%
	Total	43,758	100%	Total	20,694	100%

Table Appendix 3 – Type Top 5 Primary Diagnosis Groups by Frequency of Visits by Payment Type, July 2004 – June 2005, by Hospital Type

	Non-Level 1 Trauma			*Level 1 Trauma*		
	Primary Diagnosis Group & ICD-9-CM code(s)	*Visits*	*%*	*Primary Diagnosis Group & ICD-9-CM code(s)*	*Visits*	*%*
	Uninsured					
1	Other Symptoms & Signs, ill-defined, unknown cause (799)	3,645	8%	Abdominal Pain (789.0)	2,491	6%
2	Abdominal Pain (789.0)	2,361	5%	Open Wound, excluding head (874-897)	1,984	4%
3	Open Wound, excluding head (874-897)	1,684	4%	Cellulitis and Abscess (681-682)	1,963	4%
4	Cellulitis and Abscess (681-682)	1,525	3%	Spinal Disorders (720-724)	1,561	3%
5	Chest Pain (786.5)	1,521	3%	Misc. Injuries (830-839, 860-869, 900-909, 925-959)	1,555	3%
	All Other Diagnoses	35,802	77%	All Other Diagnoses	35,568	79%
	Total	46,538	100%	Total	45,122	100%
	Public					
1	Acute upper respiratory infections, excluding pharyngitis (460-461, 463-466)	5,990	5%	Acute upper respiratory infections, excluding pharyngitis (460-461, 463-466)	6,837	6%
2	Abdominal Pain (789.0)	5,115	4%	Abdominal Pain (789.0)	5,069	4%
3	Chest Pain (786.5)	4,677	4%	Otitis media and eustachian tube disorders (381-382)	4,007	3%
4	Contusions w/ intact skin surface (920-924)	3,713	3%	Spinal Disorders (720-724)	3,668	3%
5	Spinal Disorders (720-724)	3,341	3%	Chest Pain (786.5)	3,418	3%
	All Other Diagnoses	96,707	81%	All Other Diagnoses	95,019	81%
	Total	119,543	100%	Total	118,018	100%
	Private					
1	Chest Pain (786.5)	7,287	5%	Abdominal Pain (789.0)	2,811	4%
2	Abdominal Pain (789.0)	7,118	5%	Chest Pain (786.5)	2,777	4%
3	Acute upper respiratory infections, excluding pharyngitis (460-461, 463-466)	5,439	4%	Open Wound, excluding head (874-897)	2,168	3%
4	Misc. Injuries (830-839, 860-869, 900-909, 925-959)	5,140	4%	Contusions w/ intact skin surface (920-924)	2,162	3%
5	Open Wound, excluding head (874-897)	5,089	4%	Misc. Injuries (830-839, 860-869, 900-909, 925-959)	2,007	3%
	All Other Diagnoses	114,232	79%	All Other Diagnoses	55,014	82%
	Total	144,305	100%	Total	66,939	100%

Table Appendix 4 –Top 5 Primary Diagnosis Groups by Frequency of Visits by Race/Ethnicity, July 2004 – June 2005, by Hospital Type

	Non-Level 1 Trauma			*Level 1 Trauma*		
	Primary Diagnosis Group & ICD-9-CM code(s)	*Visits*	*%*	*Primary Diagnosis Group & ICD-9-CM code(s)*	*Visits*	*%*
	Black					
1	Acute upper respiratory infections, excluding pharyngitis (460-461, 463-466)	956	5%	Abdominal Pain (789.0)	978	4%
2	Chest Pain (786.5)	902	5%	Acute upper respiratory infections, excluding pharyngitis (460-461, 463-466)	961	4%
3	Abdominal Pain (789.0)	891	5%	Chest Pain (786.5)	923	4%
4	Spinal Disorders (720-724)	542	3%	Spinal Disorders (720-724)	854	4%
5	Contusions w/ intact skin surface (920-924)	531	3%	Asthma (493)	649	3%
	All Other Diagnoses	15,149	80%	All Other Diagnoses	17,879	80%
	Total	18,971	100%	Total	22,244	100%
	American Indian					
1	Abdominal Pain (789.0)	267	5%	Contusions w/ intact skin surface (920-924)	233	4%
2	Acute upper respiratory infections, excluding pharyngitis (460-461, 463-466)	250	5%	Acute upper respiratory infections, excluding pharyngitis (460-461, 463-466)	227	4%
3	Chest Pain (786.5)	172	3%	Spinal Disorders	220	4%
4	Contusions w/ intact skin surface (920-924)	156	3%	Abdominal Pain (789.0)	219	4%
5	Otitis media and eustachian tube disorders (381-382)	131	3%	Open Wound of Head (870-873)	218	4%
	All Other Diagnoses	4,033	81%	All Other Diagnoses	4,727	81%
	Total	5,009	100%	Total	5,844	100%
	Hispanic					
1	Acute upper respiratory infections, excluding pharyngitis (460-461, 463-466)	2,824	6%	Acute upper respiratory infections, excluding pharyngitis (460-461, 463-466)	5,295	7%
2	Abdominal Pain (789.0)	2,426	5%	Abdominal Pain (789.0)	3,970	5%
3	Chest Pain (786.5)	1,929	4%	Otitis media and eustachian tube disorders (381-382)	3,469	4%
4	Open Wound, excluding head (874-897)	1,647	3%	Digestive Symptoms (e.g, nausea, heartburn) (787)	2,291	3%
5	Otitis media and eustachian tube disorders (381-382)	1,536	3%	Pyrexia of Unknown Origin (780.6)	2,264	3%
	All Other Diagnoses	39,275	79%	All Other Diagnoses	62,788	78%
	Total	49,637	100%	Total	80,077	100%
	White					
1	Abdominal Pain (789.0)	10,425	5%	Abdominal Pain (789.0)	4,834	4%
2	Chest Pain (786.5)	10,238	5%	Spinal Disorders (720-724)	4,418	4%
3	Acute upper respiratory infections, excluding pharyngitis (460-461, 463-466)	8,063	4%	Chest Pain (786.5)	4,349	4%
4	Contusions w/ intact skin surface (920-924)	8,061	4%	Contusions w/ intact skin surface (920-924)	4,190	4%
5	Open Wound, excluding head (874-897)	7,594	3%	Open Wound, excluding head (874-897)	4,034	3%
	All Other Diagnoses	183,078	80%	All Other Diagnoses	95,017	81%
	Total	227,459	100%	Total	116,842	100%

The Center for Health Information & Research {CHiR} is a research arm of the School of Computing and Informatics in Arizona State University's Ira A. Fulton School of Engineering, CHIR is a multidisciplinary team whose focus includes health care, clinical quality, the health care workforce, occupational illness and injury, medical malpractice, health care economics, and disability. CHIR is the home of *Arizona HealthQuery*, a community health database created by the voluntary participation of health care providers, insurers, and employers in Arizona.

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