

Emergency Departments in the Health Care System: Use of Services in California Counties

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Background

Emergency Departments (EDs) fill a critically important role in the health care delivery system, treating a wide array of illnesses and injuries 24-hours-a-day, seven-days-a-week. Yet there is concern regarding the continued ability of California's EDs to accommodate current operational and financial pressures among policymakers, the public, media, and health care providers.

While a previous issue brief analyzed statewide trends in emergency department capacity and utilization, the findings revealed an ED delivery system in transition, but not one facing imminent collapse or the need for significant external intervention on a statewide basis by policymakers or regulators. (See *California's Emergency Departments: System Capacity and Demand*, April 2002.)

Analyzing California's EDs based on statewide averages alone may mask more turbulent capacity and demand scenarios within specific communities. The "big picture" of emergency services in California comes into clearer focus by examining a representative sample of counties to learn the ways in which their individual situations correspond or conflict with statewide trends. In addition, exploring the various potential factors (e.g., population trends, patient acuity, numbers of uninsured, etc.) that might be influencing ED

capacity and demand in specific counties may help lead to the development of innovative policy or operational solutions by the counties themselves.

Methodology

This issue brief is based on a study commissioned by the California HealthCare Foundation and conducted by the USC Center for Health Financing, Policy & Management. It is the fourth in a series of issue briefs published by the California HealthCare Foundation on the capacity, use, and financial performance of the state's emergency departments.

The study used data on California's general acute care hospitals from the Office of Statewide Health Planning & Development (OSHPD). These data were supplemented by federal census information. Statewide data from 1990 through 2000 were presented in the earlier issue brief, *California's Emergency Departments: System Capacity and Demand*, published in April 2002, in which detailed notes on data sources and study methods are available.

For this analysis, data sub-sets were assembled for seven California counties, including: Contra Costa, Los Angeles, Sacramento, San Diego, San Francisco, San Luis Obispo, and Santa Clara. Counties were selected to represent a mix of

geographic location and population. Data were aggregated for reporting hospitals in each county to create comparable profiles of emergency department capacity and utilization trends.

The analysis sought to explore the following questions regarding ED use and capacity:

- How does ED system capacity at the county level vary in relation to both California statewide trends and the other counties studied?
- What is the demand for ED care, and how does it differ by county and over the length of the study period (1990 to 2000)?
- What factors may help to explain differences, if any, between and among county ED systems' use rates?

The study looked at indicators of ED *capacity*, such as ED closures, licensing levels, available ED beds, and numbers of beds per 100,000 population, as well as indicators of *demand*, such as population growth and demographic issues (e.g., percentage of elderly, numbers of uninsured). It also looked at indicators of *acuity*, such as the EDs' own classifications of patient acuity and inpatient admission rates at the county level. While not a part of the formal study, other factors were noted that might have an impact on a county's ED capacity and demand, such as employment and commuting patterns, medical referral relationships, supply of specialists, availability of critical care beds, and situations in neighboring counties. All of these indicators helped to reveal the complex story of the ED situation in each of the seven counties studied. Capsule descriptions of each county studied are located near the end of this issue brief.

California hospitals have three types of emergency departments:

- **Standby.** Hospital maintains a designated area for emergency services, capable of receiving patients with urgent medical problems, but a physician is not on duty at all times;
- **Basic.** Hospital has physician and staff on duty at all times for urgent medical problems. It is possible for a basic ED also to be classified as a trauma center;
- **Comprehensive.** Hospital has in-house capability for managing all medical conditions on a definitive and ongoing basis. This is typically associated with a large tertiary and/or academic medical center, with specialty programs such as burn centers and psychiatric units. All EDs licensed as comprehensive facilities are trauma centers.

The types of visits to emergency departments fall into three broad categories:

- **Critical/emergent.** Acute injuries or illnesses that could result in permanent damage or death without immediate intervention, such as head injuries, chest pain (regardless of final diagnosis), vehicular accidents, or gunshot wounds;
- **Urgent.** Acute injuries or illnesses where loss of life or limb is not an immediate threat, such as broken bones or lacerations;
- **Non-urgent.** Relatively minor injuries or illness, such as toothaches or colds.

Major Findings

Significant differences among the counties studied, as well as in comparison with statewide data, clearly demonstrate the difficulty in evaluating whether there is a California-wide ED crisis, and, if so, what to do about it. But specific, county-level information spotlights local issues and emerging trends that may require action or further study.

- *Each county's situation is unique.* While comparing an individual county's performance to the statewide average can indicate potential constraint issues for a particular county, comparing the study counties to each other is somewhat of an "apples and oranges" situation. The variations among county populations and ED systems, along with differences in medical trade patterns (e.g., physicians on staff at more than one ED), access to contiguous county ED resources, and demographic factors require that caution be taken in comparing one county to another.
- *Counties experience wide variation in ED system capacity.* Los Angeles County, for example, had the largest number of EDs among the seven counties studied, but it lost 21 percent of its EDs over the period 1990 to 2000. During this time period, the number of EDs in some of the other counties remained unchanged. However, the number of EDs in a given community is just one aspect of capacity; the concept also encompasses licensing and service capabilities (e.g., trauma versus nontrauma), as well as the number of available ED beds. The distribution of EDs by level of care also varied by county, as did the number of ED beds per 100,000 population.
- *County ED systems have been evolving to meet demand.* ED demand rose in five of the seven study counties (Los Angeles, Sacramento, San Diego, San Luis Obispo, and Santa Clara) between 1990 and 2000. Despite a number of ED closures among the study counties, all seven increased their ED capacity, as measured by ED beds. Increases ranged from 3 to 25 percent, which suggests that ED systems were evolving to meet demand by adding to the supply of ED beds, rather than the number of EDs.
- *ED systems' ability to keep pace with a growing population varied across counties.* For example, while California's ED bed capacity rose 19 percent on 15 percent population growth, San Diego County's ED bed capacity grew at only half the rate of its population increase. But population size and growth alone cannot drive system expansion, as other factors, ranging from physician resources, medical/surgical or critical care bed availability, the nursing shortage, and demographic mix (e.g., age mix, numbers of uninsured) come into play.
- *Traditional indicators of constraint may not tell the whole story.* Lower ED visit per bed ratios do not necessarily reflect a less constrained system, as they do not adjust for patient complexity and other factors. An analysis of ED visits per bed illustrates the comparative pressures on county-level ED systems. Sacramento's ED system had 2,190 visits per ED bed, followed by Santa Clara, Los Angeles, San Luis Obispo, and San Diego, all of which had ED visits per ED bed ratios higher than the statewide average of 1,876. Only Contra Costa and San Francisco posted lower ED visits per bed rates than the state. But San Francisco's comparatively higher patient acuity and higher admit rate, for example, suggest that more seriously ill patients, who may require more ED time and resources than the norm, may account for its lower number of visits per ED bed.

■ *Patient acuity in EDs has been rising over time, both statewide, and in the counties studied.* Combined urgent/emergent visits generally increased during the study period, although in San Luis Obispo county, non-urgent visits increased sharply in recent years. The supply of community-based physicians, rather than changes in the patient population, appeared to be influencing this trend. Another indicator of increasing patient acuity was the rate of ED patients who were treated and subsequently admitted to the hospital. The most recent inpatient admission rates ranged from 16.5 percent of all ED patients in San Francisco County, to 13 percent in Santa Clara. The more urbanized study counties in the study tended to have higher admission rates than their less urbanized counterparts.

These key findings, which highlight similarities and differences among the studied counties and compare them with statewide data, clearly reflect the unique market dynamics at play in these counties. While key indicators may point to potential capacity constraints or other issues, underlying and related factors, such as the interplay of each county's ED system with that of neighboring communities, also must be taken into consideration.

Use and Capacity of Emergency Departments

ED Closures

From 1990 through 2000, the number of licensed emergency departments in California declined almost continuously, decreasing a net 10 percent, from 405 to 364 EDs. Within the counties studied, changes in system capacity as measured by the number of EDs fluctuated from the statewide average, although five of seven counties experienced a loss of one or more ED.

In Los Angeles County, the number of EDs dropped the most, falling 21 percent, from 107 to 85, while the counties of Sacramento and San Luis Obispo remained stable over time, with ten and five EDs, respectively. Among other counties, San Diego County's ED capacity decreased 13 percent, from 23 to 20 EDs. San Francisco County and Contra Costa Counties, with 11 EDs each in 1990, both lost two facilities, for a net decrease of 18 percent. Santa Clara also lost one ED, for a total of 11. However, ED closures alone are not signals of major crisis, as a host of other factors, such as neighboring counties' ED resources, come into play.

Service Capabilities by ED

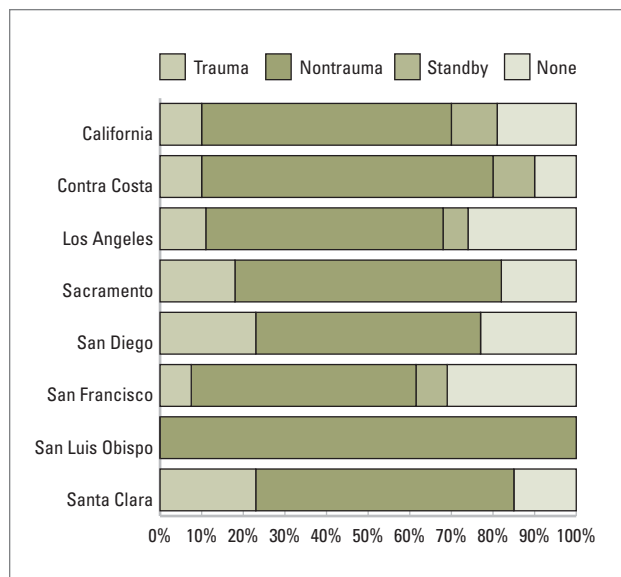
The distribution of EDs by licensure or service capability varied by county. In 2000, the San Luis Obispo County ED system was comprised of five EDs, all of which were licensed as basic. There was no trauma center within its geographic boundaries. This contrasted with San Diego County where six of its 26 hospitals, or 23 percent of the total, had trauma centers; 23 percent had no ED. Somewhat similarly, Santa Clara's 13 hospitals included three trauma centers.

In Los Angeles County, with 85 EDs, there were 13 trauma centers in 2000. Among the 72 non-trauma EDs, seven provided standby services only. More than one quarter of Los Angeles County hospitals did not offer ED services at all. In San Francisco County, one-third of all hospitals did not have EDs. Among the nine EDs county-wide, there was one trauma center. The rest were non-trauma EDs, of which one was standby.

Neither a comparatively higher percentage of hospitals without an ED — such as in Los Angeles, San Diego,

and San Francisco counties — nor the lack of a county trauma center necessarily result in compromised ED care for that county’s residents. A number of planning considerations may influence a local hospital’s decision to operate an ED. These may include hospital system development in which duplication is avoided among sister facilities, facility specialization, the geographic or regional location of EDs, inter-county medical referral relationships, and the prevalence of commuters who live in a particular county but work and seek care in a county with more comprehensive capabilities.

Figure 1: Percent Distribution of EDs Across Hospitals in California and Selected Counties, 2000



Changes in Population and ED Bed Capacity

From 1990 through 2000, California’s ED bed capacity increased by 19 percent, outpacing the state’s 15 percent population expansion. (These data exclude holding beds and observation areas.)

Just as statewide ED bed capacity grew, all seven study counties added ED capacity, but to differing degrees, ranging from a 3 percent increase in Santa Clara

County, to nearly a 25 percent increase in Contra Costa County, which expanded from 125 to 156 beds. ED bed capacity increase was not correlated with population growth. For example, Los Angeles County, with 1,340 ED beds, increased capacity by 9 percent, while its overall population grew 7 percent. But in San Diego County, with 330 ED beds, ED capacity grew only 6 percent, while the county experienced a population increase twice as great. In Santa Clara County, a 3 percent capacity increase, to 212 beds, was far outstripped by its 12 percent population growth.

Whether disproportionate changes in ED capacity versus population create or exacerbate pressure on the ED system cannot be determined without a closer examination of each community, including the availability of EDs in neighboring counties, pre-growth system capacity, and factors such as physician, nursing, and critical care bed resources.

A comparative indicator of potential capacity constraint is the number of patient visits per ED bed. In California, visits per ED bed gradually declined from 1990, reaching a low in 1998. However, in 1999 visits per bed began to climb, reaching 1,876 visits per ED bed in 2000. There was no consistent parallel trend among the study counties. Contra Costa posted the largest trended decrease, from 2,536 visits per ED bed in 1990, to mirror the statewide average at 1,871 by 2000. In contrast, Santa Clara County increased from 1,943 visits per ED bed, to 2,161 by 2000, perhaps attributable to significant population increase without corresponding ED capacity expansion. Sacramento County posted the highest ratio at 2,190 ED visits per bed, where 3.6 percent of the state’s residents are served by 3.2 percent of total ED bed

capacity. Los Angeles County is third highest, with 2,048 visits per bed, 26 percent of the state's total ED capacity, serving 28 percent of its population. Lowest is San Francisco, with 1,720 visits per bed.

Although there is great variation across counties, ED beds per 100,000 population showed less volatility within counties over time — an indication that counties have been evolving to meet the demands of a growing population. Statewide, there were 14.4 ED beds per 100,000 in 1990, rising to 14.9 in 2000. Of the seven counties studied, only Contra Costa posted a measurable increase, from 15.3 to 16 ED beds per 100,000. Los Angeles and San Luis Obispo counties were stable at 13.7 and 18.7, respectively, while all other counties showed a slight decrease in the availability of ED beds per 100,000 residents.

San Luis Obispo, San Francisco, and Contra Costa counties have higher bed-to-population ratios than the state, while Los Angeles and Sacramento counties have somewhat lower ratios. The two lowest are in San Diego County, with 11.4 ED beds per 100,000, and Santa Clara County, with 12.3.

Varying Demand Underscores System Complexity

While ED demand statewide fluctuated between 1990 and 2000, total ED visits increased 8 percent. During the same period, total visits rose in five of the seven study counties, San Francisco and Contra Costa counties being the exceptions. These two counties experienced a decrease in the number of operational EDs, but ED closures are not the sole determinant of declining visit volume. Both Los Angeles and Santa Clara counties experienced decreases in the number of EDs, while

posting significant visit growth. Migration to neighboring counties, perhaps due to evolving employment and commuting patterns or changing medical referral relationships, is a factor warranting further investigation.

ED visits per 100 population, which adjusts for population growth, paints an even more complex picture of emergency services demand across counties. In California, ED visits per 100 generally have declined, from nearly 30 in 1990 to 28 by 2000, having rebounded from a low of 26.4 in 1998. Among the seven counties, Sacramento, San Diego, San Francisco, and Contra Costa all experienced decreases in ED visits per 100 between 1990 and 2000, while Santa Clara and Los Angeles counties showed little change. San Luis Obispo experienced a major rise from 25 visits per 100 to 36 visits per 100 during the period.

Among these counties, ED visits per 100 ranged from a low of 21.7 in San Diego, to highs of 29.7 in San Francisco and 36 visits per 100 in San Luis Obispo. Whether, or the degree to which, managed care utilization control plays a part is unclear. Limited access to primary care by the uninsured also may influence demand for ED services. However, there does not appear to be a clear cause-and-effect relationship between high levels of uninsured and higher per capita ED demand.

Because older adults utilize ED services at a higher rate, higher per capita demand may be partially explained by a county's proportion of the elderly. Indeed, San Francisco and San Luis Obispo counties both have a 14 percent elderly population, higher than either California, at 11 percent, or comparison counties, which ranged from 9 percent to 12 percent elderly population. Santa Clara County, with a 65+ elderly

population of 9 percent, has among the lowest number of ED visits per 100 residents, at 26.6. Yet, as with the uninsured, a clear cause-and-effect relationship cannot be concluded. San Diego County, with 21.7 ED visits per 100 is comprised of 11 percent elderly but has a lower number of ED visits per capita, and the lowest among the seven counties. The use of military medical facilities by residents of San Diego County may be a primary contributor to the low number visits per 100.

Multiple Factors Affect EDs

Beyond demographics (e.g., growth rates, numbers of uninsured, age mix), other factors can influence ED demand. Market capacity and physician supply are also important considerations in understanding ED system drivers. For example, in San Luis Obispo County, a shortage of primary care physicians reportedly has caused patients to seek routine care at the ED or in urgent care centers. Further, closure of an ED in a neighboring county during the late 1990s produced an influx of patients to the closest San Luis Obispo County ED, skewing per capita visit trends upwards.¹ The complex interplay of ED capacity and demand underscores the dynamic nature of emergency services and the necessity of exploring specific issues driving trends in each community.

Patient Acuity Rising

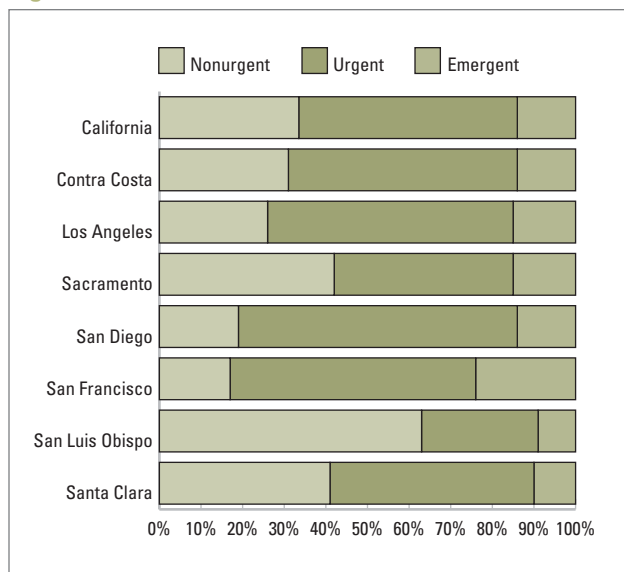
Across California, the acuity of ED patients generally has increased over time, placing additional pressure on system resources and contributing to higher costs. While the percentage of non-urgent visits decreased statewide, from 42 percent in 1990 to 34 percent by 2000, when urgent ED visits comprised 53 percent

of all ED visits. Fourteen percent were emergent, requiring the most immediate medical attention.

Although acuity was generally increasing, significant differences existed among the seven study counties. For example, in San Francisco County in 2000, nearly one-quarter of ED patient visits were emergent in nature, 59 percent were urgent, and just 17 percent were classified as non-urgent. Sacramento County, which had 15 percent emergent and 43 percent urgent visits, classified 42 percent of patients as non-urgent.

Despite clear variances among the counties, care must be taken in comparing acuity mix. The lack of consistent definitions and classifications of patient acuity among EDs and ED physicians adds considerably greater complexity to this issue.

Figure 2: Percent Distribution of ED Visits, 2000



Generally, urgent/emergent visits combined as a percentage of total visits increased while non-urgent visits declined in all counties but two: San Luis Obispo and Santa Clara. In San Luis Obispo County, non-urgent visits increased sharply in recent years, accounting for 63 percent of all ED visits by 2000, up from 48 percent in 1990. A declining supply of community-based physicians, rather than dramatic population-based changes, has been cited as a primary reason that county residents appear to be increasingly accessing EDs for non-emergency care.² Thus, geographic trends and variations on the supply side of the equation (physicians, EDs), as much as resident demographic characteristics, are important contributors to understanding differences in patient ED acuity across the state.

Increased ED patient acuity is generally translating into higher inpatient admission rates across the state's ED system, with a slightly rising trend in the last two study years. Indeed, in 2000, 14.5 percent of California ED visits resulted in admission, up from 13.5 percent in 1990. Among the study counties, San Francisco had the highest admit rate, at 16.5 percent of ED visits,

followed by San Diego at 16.4 percent, and Los Angeles County at 15.5 percent. In Sacramento County, some 14 percent of ED visits resulted in an inpatient admission. Lowest among the study counties were Contra Costa, 13.4 percent, San Luis Obispo at 13.3 percent, and Santa Clara, where 13 percent of ED patients were admitted. Notably, Contra Costa County, while still well below the state average, increased from an admit rate of 8.8 percent in 1990 to a rate of 13.4 percent. Overall, however, more urbanized counties tended to have higher admission rates than their less urbanized counterparts; the underlying causes may warrant further investigation.

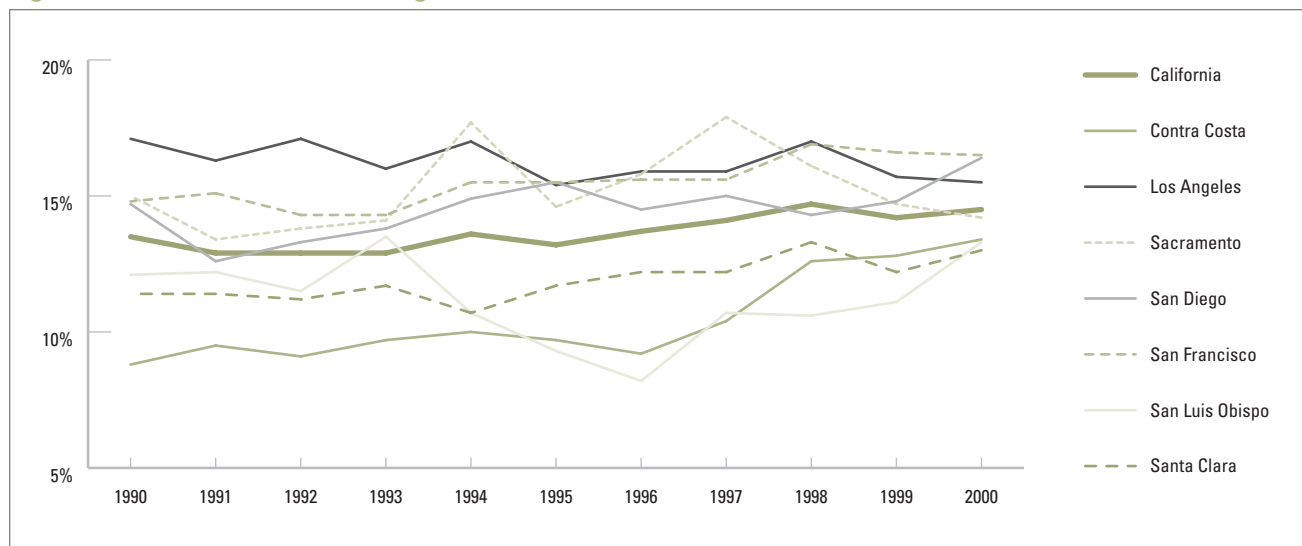
County Highlights

Following are capsule descriptions of the state of emergency care in each of the counties studied:

LOS ANGELES: Complex and constrained.

The largest of the study counties with 85 EDs and 1,340 beds, Los Angeles County lost 21 percent of its EDs between 1990 and 2000. Los Angeles County had

Figure 3. Percent ED Visits Resulting in Admissions, 1990–2000



28 percent of the state's population and 25 percent of California's total ED bed capacity. ED patients logged more than 2.7 million visits in 2000. There were 2,050 visits per ED bed and 28 ED visits per 100 population. Sixty percent of patients were classified as urgent; 15 percent emergent. Los Angeles' inpatient admission rate was among the highest, at 15.5 percent.

SACRAMENTO: Non-acute, relatively stable.

This stable ED system with ten EDs and 167 beds experienced capacity growth in line with its increased population. This county experienced increasing volume and the highest visits per bed, at 2,190. Visits per 100 population were somewhat high at 29.1, although 40 percent of patients were classified as non-urgent. The inpatient admission rate of 14.1 percent was similar to the statewide average.

SAN DIEGO: Growing population but more limited ED access.

San Diego County lost three EDs between 1990 and 2000, to a total of 20. Its bed capacity of 330 increased just 6 percent on 12 percent population growth. It provided the lowest ED beds per 100,000 at 11.4, but moderate visits per bed at 1,900. Visits were rising, but not dramatically. Visits per 100 population, at 21.7, were well under the state average, perhaps due to use of military medical facilities. Two-thirds of patients were classified as urgent; 14 percent were emergent. San Diego had a high inpatient admission rate of 16.4 percent. Access for the under- and uninsured may be an issue, with patients waiting until need was urgent before seeking care. The elderly comprised 11 percent of the population, in line with the statewide average.

SAN FRANCISCO: Small system, big impact.

The nine existing EDs represent an 18 percent reduction between 1990 and 2000. Nearly one-third of San Francisco County hospitals had no ED. The relative percentage of beds and population were aligned, at 17.3 beds per 100,000, 1,720 visits per bed, and 21.7 visits per 100 population. San Francisco County had high patient acuity and likely high resource consumption, as evidenced by its 16.5 percent inpatient admission rate and 24 percent emergent patient mix. Its location as a business hub provides San Francisco with a high degree of interaction with other counties.

SAN LUIS OBISPO: Small, stable, non-urgent.

With five basic EDs and 47 beds, San Luis Obispo's ED system grew a bit more than the 13 percent population increase. This county had a high ratio of beds per 100,000 population at 18.7. Increased visits were in part due to significant patient migration from the closure of a neighboring hospital. ED visits also were increasing due to a community physician shortage. A total of 63 percent of visits were classified as non-urgent. The low inpatient admission rate of 13.3 percent was consistent with lower admit rates in less urbanized counties.

SANTA CLARA: Population outpacing ED growth.

This county lost one ED, to a total of 11 in 2000. Santa Clara's 212 ED beds represented a 3 percent increase, compared with a 12 percent population increase. Visits per ED bed were high, at 2,161. Visit volume was increasing, but 26.6 visits per 100 population was stable and still among the lowest of the counties studied. Forty-one percent of ED visits were non-urgent and the inpatient admission rate was a low

13 percent. Only 9 percent of the county's residents were elderly.

CONTRA COSTA: Changing and evolving.

This county lost two EDs, leaving a total nine, but it experienced a 25 percent bed capacity increase, to 156 beds. The county has experienced strong population growth of 17 percent and those ages 75+ increased 51 percent between 1990 and 2000. Visit volume declined; visits per 100 dropped from 38.9 to 30, but were still above the state average. The ED visit rate of 1,871 visits per bed mirrored the state average. Contra Costa's acuity mix was one-third non-urgent, 55 percent urgent, and 14 percent emergent. Among the counties studied, Contra Costa's inpatient admission rate was on the low end, at 13.4 percent.

The Complex Picture of ED Use and Capacity by County

This county-level analysis vividly demonstrates the dynamic and complex nature of the ED system in California. Each county's system is unique, shaped not only by its geography and demographics (e.g., age mix, level of uninsured), but also by an evolving network of physician, hospital, and emergency services resources and capabilities.

Further, access to and the delivery of emergency services frequently transcends political borders, confounding our ability to neatly compartmentalize the ED system at the local or regional levels. As a practical matter, employment and traffic patterns, physician availability, and other factors bring communities together in ways that are fluid and changing.

System-wide signals of growing patient acuity appear to extend beyond regional variations in access, capacity, and demand. A pendulum shift toward less constrained managed care and expanded use of the ED for admitting patients from private medical practices may be partial explanations. Our ability to understand and respond to this trend will be increasingly important as the state's population continues to grow and age. Adoption of uniform standards and definitions for classification of emergent, urgent, and non-urgent ED visits could facilitate meaningful comparisons among systems and enhance our understanding of the issue of patient acuity.

While limited in its scope, the county-level analysis does point to communities where ED resources and capacity appear constrained. By examining the variation among the counties studied, it becomes clear that the big picture of California's ED system is created from a mosaic of local and regional sub-systems; thus one-size-fits-all solutions may do more harm than good. Additional work is required at the local and regional levels to identify those California communities or regions for which intervention is warranted, and to determine the most appropriate means by which to do so.

FOR MORE INFORMATION CONTACT

Glenn A. Melnick, Ph.D.

Anil Bamezai, Ph.D.

Lois Green, M.H.S.A.

Amar Nawathe, M.D.

USC Center for Health Financing,

Policy & Management

University of Southern California

Los Angeles, CA 90089

(213) 740-6842

ENDNOTE

- 1,2. "The California Report," KQED radio, December 2, 2002; Telephone interview with S. Grahame, marketing manager, Arroyo Grande Hospital; San Luis Obispo County Medical Society.