Riverside County Emergency Department Diversion Study

Final Report

Sponsored by:

Riverside County EMS Agency
and
Hospital Association of Southern California

Prepared by:

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Overview

Emergency department (ED) saturation and diversion has become common in urban communities throughout California and the country. Until recently, this problem has been primarily limited to the peak flu season (e.g. December – March) but now appears to be year round in many communities. A recent Congressional report found that ambulance diversions have impeded access to emergency services in the metropolitan areas of 22 states.[1]

ED diversions are a symptom of a strained hospital and healthcare system. Increased demand for healthcare coupled with the downsizing of healthcare resources has resulted in an even higher demand for ED services. From 1991 to 2001, the number of U.S. ED visits grew by 15 percent but the number of EDs dropped by 9.2 percent[2] .

Emergency Medical Services (EMS) and EDs have long been recognized as the "safety net" to the healthcare system. The increasing demand for EMS and ED services results in long waits in EDs, delays for ED patient inpatient admissions and human resource shortages. These are all indications of a healthcare system that is not matched to demand. A recent article in the Los Angeles Time indicates that a study to be published in January (Annals of Emergency Medicine, Vol 43, Number 7), overloaded EDs actually increase paramedic ambulance response times to calls[3]. The anticipated California mandatory nursing ratios for hospitals which include stricter staffing ratios for EDs will have a profound effect on the ability of California EDs to staff for this new mandate[4] and may have an impact on ED diversion in the state as well.

As ED saturation and diversion increases throughout any given community, serious threats to patient care begin to emerge. These include:

- Patient transports to other than the closest ED are extended
- Patients are faced with long waits in the ED
- The cost to patients/payers is increased
- Continuity of care issues surface
- An increased number of ambulances are needed
- "Out-of-network" health plan members must be repatriated at considerable cost, inconvenience and breaks in the continuity of care

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[1] *National Preparedness: Ambulance Diversions Impede Access to Emergency Rooms*, October 16, 2001, Prepared by Rep. Henry A. Waxman, Special Investigations Division, Committee on Government Report.

[2] *TrendWatch, Emergency Departments – An Essential Access Point to Care*, American Hospital Association, Vol 3. No 1, March 2001.

[3] "*Delays in Los Angeles Emergency Rooms Increase Response Times of Paramedics, Study Finds",* Hymon, Steve, Los Angeles Time, December 19, 2003

[4] "More nurses, state directs." Rapaport, Lisa, Sacramento Bee, January 23, 2002.

- An increasing number of EMS patients are refusing transport "against medical advise" choosing private vehicle transport rather than accepting the alternative ED due to diversion.

There are also capacity problems in the ED that have been recognized for at least a decade[5]. A review of newspaper article archives demonstrates that ED saturation and diversion have been a problem in some communities since the 1960's. Staff from The Abaris Group conducted an ED diversion study for the Sacramento-Sierra Hospital Association 16 years ago[6].

A number of converging issues make the ED saturation and diversion problem difficult to manage. The routine seasonal volume fluctuation of EDs common throughout the country for nearly two decades reached a pivotal change during 2000. This is when inpatient capacity issues began to significantly affect ED capacity year round. An ED relies on inpatient beds to move their ED admissions (approximately 13 percent of ED visits nationwide) to inpatient beds. During 2000, issues such as the movement towards the reduction of "excess" inpatient beds, more tightly managed staffing levels, on-call physician coverage issues and a nursing shortage all converged to limit access to inpatient beds thus significantly bottlenecking ED capacity. The lack of ability to move admitted ED patients to inpatient beds gridlocks EDs and forces many to go on "divert" status. The impact has become so profound that a new JCAHO draft standard calls on hospital leaders to develop and implement plans to mitigate situations that result in ED overcrowding[7].

There is substantial literature on the causal effects of diversion[8]. Some communities have taken steps to streamline the diversion policies to make them more fair and efficient. These steps do not seem to solve the underlying root causes. While more staff and beds may help, a number of communities have found that these changes alone do not solve the problem. In Congressman Henry Waxman's recent Ambulance Diversion Report, many governmental and medical leaders admitted that the repairs they are making to help solve the ED diversion problem are little more than stopgap measures[9]. It appears that few resources nationally are focused on resolving the underlying root causes and providing both short- and longer-term strategies.

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[5] "*The Sagging Safety Net"*. Friedman, E. Hospitals 1992:66-26-31

[6] *Sacramento-Sierra Hospital Association - Emergency Department Diversion Study*, EMS Systems Design, May, 1987.

[7] Joint Commission on Accreditation of Healthcare Organizations. Leadership Chapter, Section L.D. 3.4. 2004 Edition, Chicago, IL.

[8] "Overcrowding in the Nation's Emergency Departments: Complex Causes and Disturbing Effects". Derlet, R, Richards, Annals of Emergency Medicine. Vol 35, Number 1, January 2000.

[9] *National Preparedness: Ambulance Diversions Impede Access to Emergency Rooms*, October 16, 2001, page 9.

It is worth mentioning here that both Fresno and Solano counties have instituted a "no diversion" policy and the policy has had a positive affect there. Sacramento is also considering a "no-diversion" policy.

Riverside ED Diversion Study

The Riverside County EMS Agency in partnership with the Hospital Association of Southern California (HASC) has requested a study to conduct an evaluation of the following:

(1) Review the current emergency department (ED) saturation and diversion environment in the region.

(2) Study the issues and drivers that create the saturation and diversion problem with emphasis on locally controlled variables and interventions.

(3) Make recommendations and create an action plan on substantially reducing ED diversion hours and EMS ambulance bypass.

The Abaris Group carried out this study by visiting all the hospitals (one hospital was interviewed by phone), and completing an analysis of key diversion, capacity and operational policies, collecting data on beds and units of service, evaluating the current county diversion protocol, reviewing the EMS system issues and collecting information from other similar size counties. Interviews with the Riverside County EMS Agency and ambulance providers were also conducted.

This report summarizes the results of the data collection process and interviews as well as observations on key needs. A proposed plan of action is also recommended.

Study Process

Fifteen hospitals were interviewed and data collected from them for the study. (Corona Regional Medical Center was unable to be interviewed for this study). Each hospital was also asked to complete a self-assessment on capacity strategies and the results were tabulated. Individual hospital diversion policies were also studied. In addition, opinions were solicited from a wide range of stakeholders on the current ED saturation and EMS diversion policy, practices and steps that could be taken to improve the process. Data was also collected on capacity, demand and resource consumption trends.

Data on Resources and Demand

California – Resources and Demand

California has experienced resource changes over time. From 1991 to 2001 California gained 3 hospitals and 25 EDs (see Table 1). The number of licensed ED treatment stations grew from 4,443 to 5,134 for a 15.55 percent increase. The total number of ED visits in California grew from 9,306,999 in 1991 to 9,984,712 in 2001, a 7.28 percent increase (Table 3). In comparison, the population has risen 10.02 percent for that same time period. The number of ED visits per ED rose only slightly from 22,427 to 22,693 (1.19 percent) but the number of ED visits per treatment station dropped from 2,095 to 1,945 (as shown in Table 4).

Table 1

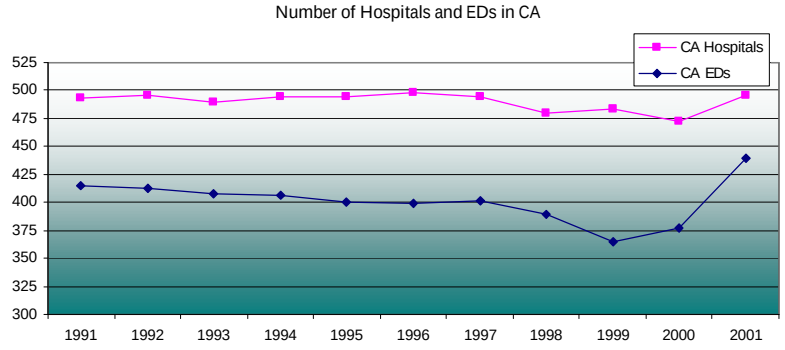


Table 2

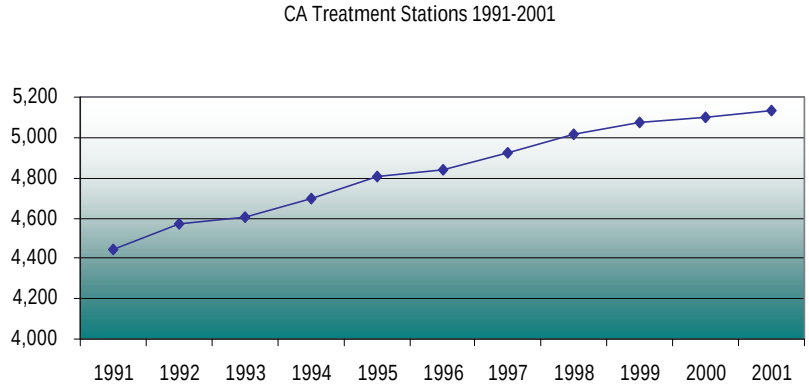


Table 3

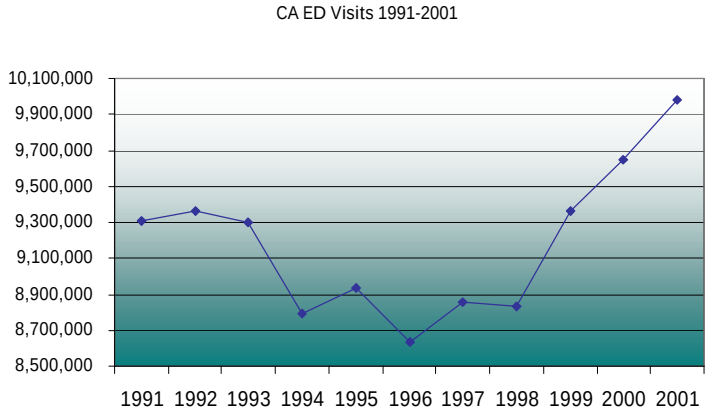
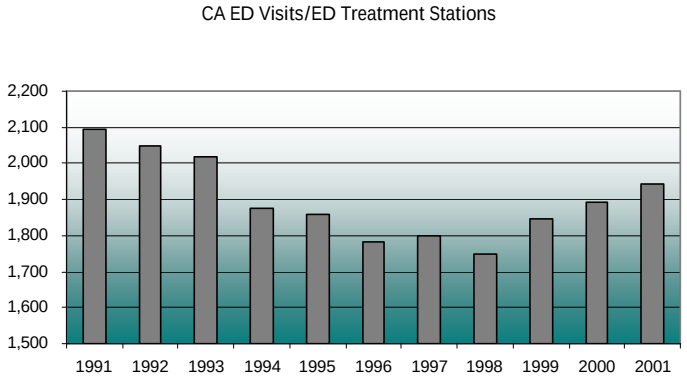


Table 4



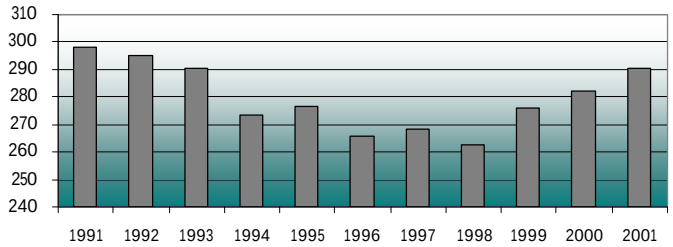
Source: OSHPD data

According to Office of Statewide Health Planning and Development (OSHPD), the number of overall hospital admissions has also risen by 2.03 percent, from 3,005,818 to 3,066,829 for the 11-year period from 1991 to 2001. Compared to the US, California has a substantially lower hospital admission rate (128/1000 versus 89/1000). Patient utilization rates for inpatient admissions for the same period went from 96/1,000 to 89/1,000.

The ED utilization rate went down slightly from 298/1,000 to 291/1,000 during that same time period. The California ED utilization rate is slightly lower than the U.S. (291/1000 versus 366/1000).

Table 5

CA ED Utilization Rate per 1000 Population



Source: OSHPD data

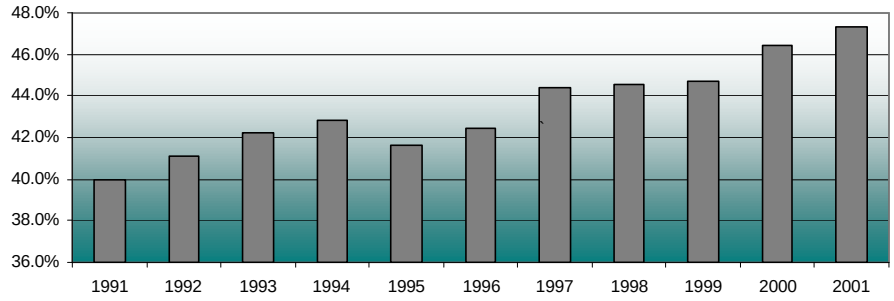
EDs in California are seeing an increasingly higher acuity patient. The percentage of ED patients admitted to the hospital increased from 12.9 percent to 14.5 percent during this 11-year period. The percentage of patients deemed critical (using OSPHD definition of "Critical Visit"[10]) rose from 11 percent to 13.1 percent for this same period.

Hospitals are also increasingly relying on the ED for their admissions. Table 6 shows that California ED admissions contributed 40.3 percent of the overall hospital admissions in 1991 and 47.3 percent in 2001.

[10] Critical Visit is defined by OSHPD as: *"A patient with an acute injury or illness that could result in permanent damage, injury or death (head injury, vehicular collision, firearm incident."*

Table 6

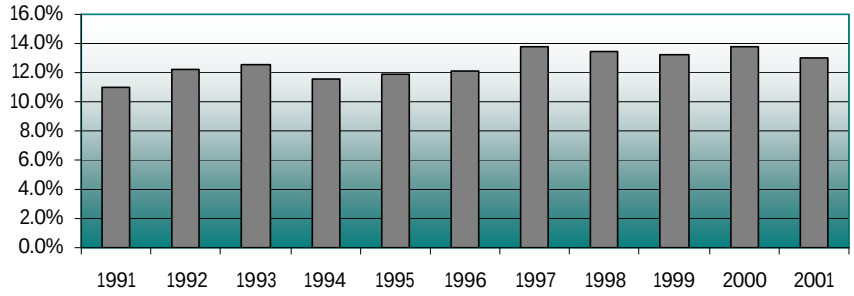
Percent of CA ED Admits to Hospital Admits



Source: OSHPD data

Table 7

Percent of CA Critical Visits/ED Visits



Riverside – Resources and Demand

ED Data

Riverside County has experienced many similar trends. From 1991 to 2001, Riverside increased the number of EDs and hospitals from 15 to 16. The number of visits per ED rose from 23,176 to 33,317(43.76 percent increase). The number of ED visits in Riverside County continues to grow. For the three-year period of 1999 to 2001, the growth rate averaged a robust 10.8 percent per year. For 2000 to 2001 Riverside County experienced a 16 percent increase. Likewise, the number of ED licensed treatment stations grew from 165 to 275, a 66.6 percent increase during the 11-year period.[11] However, the number of ED visits per ED treatment station dropped from 2,107 to 1,938 for the 11-year period.

Table 8

Riverside ED Visits/ED Treatment Station

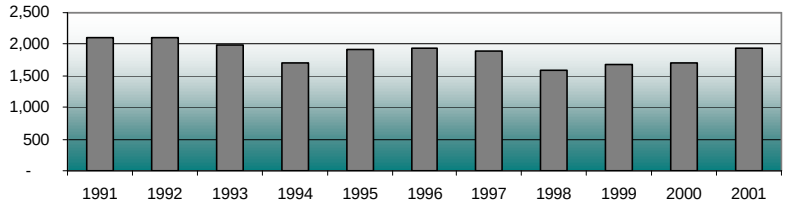
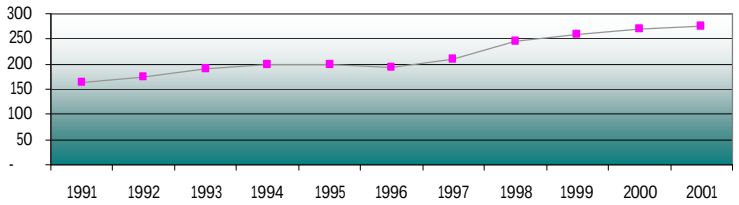


Table 9

Riverside ED Treatment Stations 1991-2001



Source: OSHPD data

For the same 11-year period, the number of Riverside County hospital admissions and ED visits increased by 29.32 percent and 53.34 percent respectively. In comparison, the population of Riverside County rose 27 percent during the same time period.

As the population is rising, the per capita utilization of inpatient and ED services is also rising. Patient utilization rates for inpatient admissions rose from 86/1000 to 88/1000 during that same time period. Riverside County has a comparable hospital admission rate (88/1000 to 89/1000) and higher ED visit rate (336/1000 to 291/1000) when compared to the state as a whole. Riverside County's higher ED utilization rate may in part be due to a higher seasonal visitor population (e.g. Palm Springs); a population not counted in the county census.

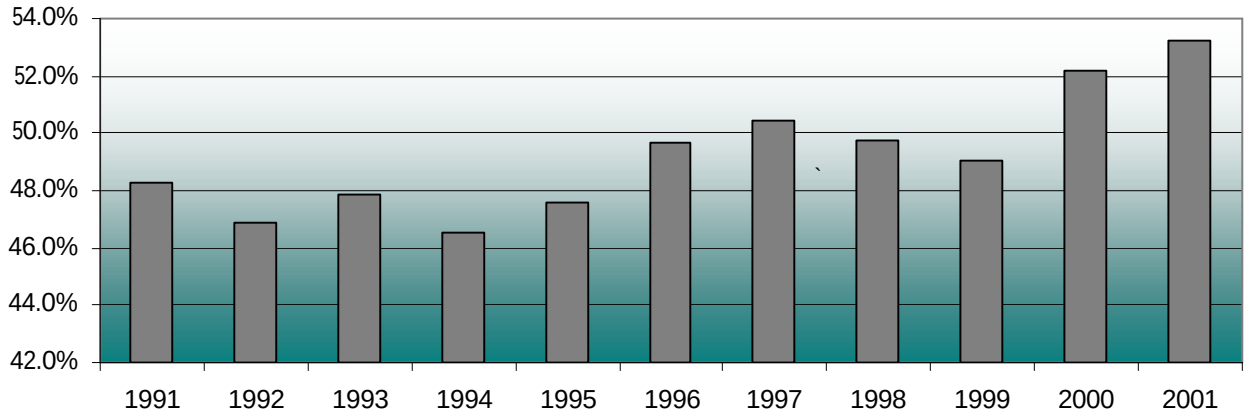
[11] Note: during this period the Air Force hospital closed (1994), the County hospital added 30 ED treatment stations (1998) and Valley Plaza Doctors Hospital opened (2000).

While there has been some variation over time, EDs in Riverside County are treating a decreasing level of acuity patients contrary to state data. The percentage of ED patients admitted to the hospital decreased slightly from 14.9 percent to 13.9 percent. The percentage of patients deemed "critical" also decreased from 11.1 to 7.8 percent for the same 11-year period. Riverside County hospitals have, however, increased their reliance on the ED for their admissions. Riverside ED admissions contributed 48.3 percent of the overall hospital admissions in 1991 and 53.2 percent in 2001.

Table 10 shows Riverside County's ED admission rates.

Table 10

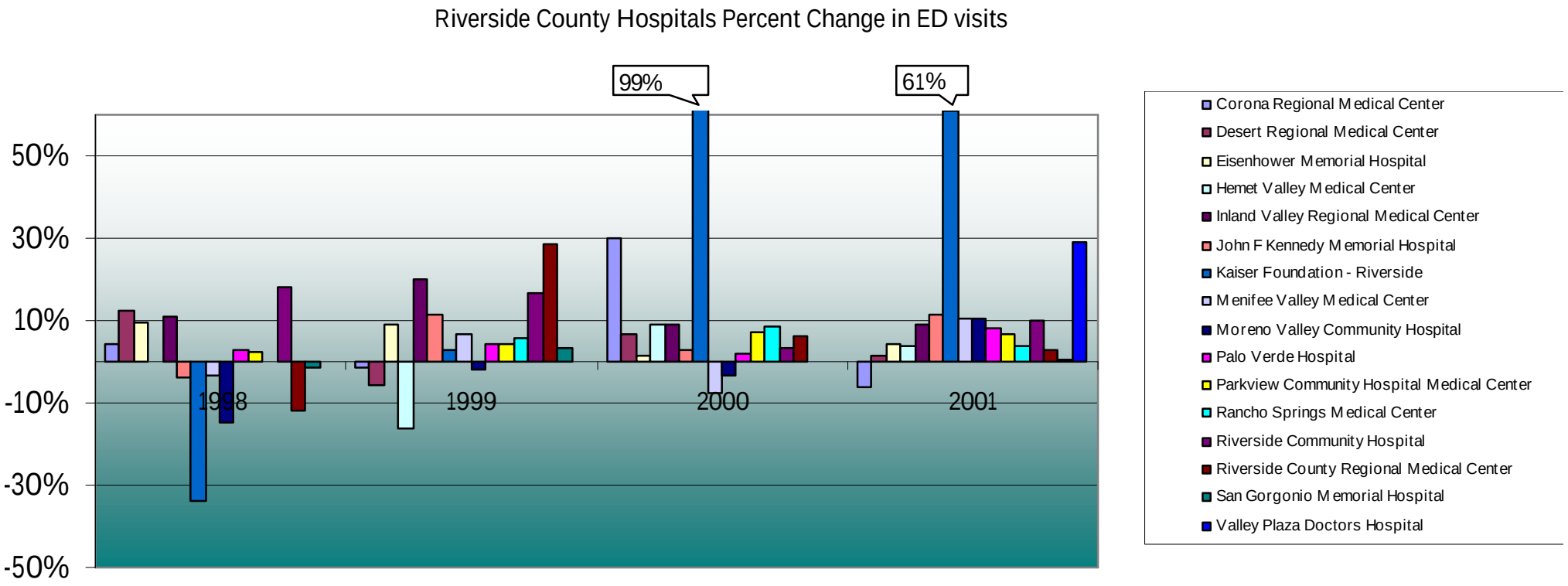
Percent of Riverside County ED Admits to Hospital Admits



Source: OSHPD data

The following chart shows the percent change in ED visits for each hospital from 1998 to 2001.

Table 11

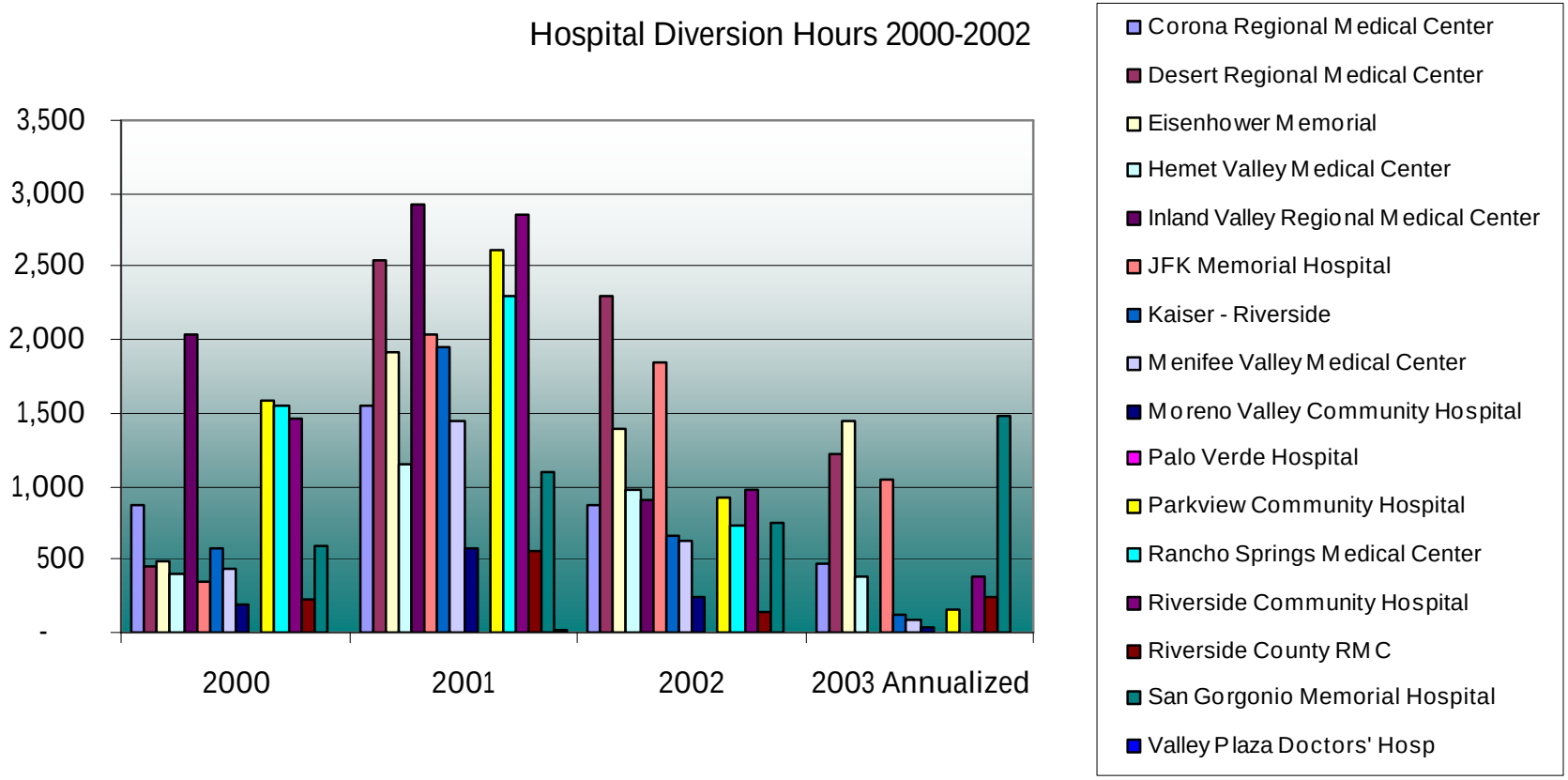


Source: OSHPD data
Note: A potential source of the large fluctuations at Kaiser is counting methodologies between “urgent care” and “ED” patients.

Diversion Hours

While Riverside County providers have made some progress on ED diversion hours, over time the ED diversion hours have increased. Diversion hours rose from 11,217 hours in 2000 to 25,512 hours in 2001, an increase of 127 percent and then due to an aggressive initiative between the County and the hospitals came down to 13,336, a drop of 48 percent in 2002. However, the overall change from 2000 to 2002 shows an increase of 19 percent[12]. Table 12 shows diversion hours by hospital from 2000 to 2003 (estimated). It should be noted that the overall projected 2003 diversion hours are down in Riverside County from 2001 and 2002.

Table 12



[12] Data before 2001 was not verifiable and probably understated as there issues of consistency of reporting.

Table 13 below indicates the causes for diversion that are reported by the hospitals to Reddinet. Although Reddinet lists all of the reasons, hospitals do not use more than a few categories on the list. The overwhelming majority of diversions (90 percent) were listed as "ED Saturation" in 2000 and 2001. Also, the data reported in Reddinet tended to overstate diversion. Some hospitals were reported to be on diversion for a few hundred hours at a time. A possible cause could be hospitals forgetting to take themselves off diversion.

Table 13

Causes for Diversion
Trauma/OR
Trauma/Neuro
Trauma/CT
ED Sat/Vomiting/Diarrhea/Gastroenteritis
ED Sat/Generalized Rash with Fever
ED Sat/Neurological Findings (excluding strokes)
ED Sat/Acute Febrile Respiratory Illness
ED Sat/Other Clinical Chief Complaint not listed
ED Sat/No Single Chief Complaint Predominates
ED Sat/In-Patient Beds Unavailable for ED Patients
ED Sat/Multiple Critical Patients
CT
Neuro
Int. Dis./Power Outage and a Non-functional Generator
Int. Dis./Fire
Int. Dis./Bomb Threat/Explosion
Int. Dis./Flooding
Int. Dis./Loss of Water
Int. Dis./HAZMAT (contamination of patient care area(s))
Int. Dis./Other
Total Time By Diversion Category:
Trauma
ED Saturation
CT
Neuro
Internal Disaster

Source: Reddinet data

Tables 14 and 15 below include the causes of diversion besides ED saturation, as reported by Reddinet.

Table 14

2001 Riverside Hospitals Diversion Hours Causes				
Hospital	**Trauma**	**ED Saturation**	**Neuro/CT**	**Int Disaster**
Corona Regional Medical Center	0	1545	0	0
Desert Regional Medical Center	0	2536	5	1
Eisenhower Memorial Hospital	0	1912	0	0
Hemet Valley Medical Center	0	1157	0	0
Inland Valley Regional Medical Center	164	2922	146	0
John F. Kennedy Memorial Hospital	0	2040	0	2
Kaiser - Riverside	0	1945	0	0
Menifee Valley Medical Center	0	1449	0	2
Moreno Valley Medical Center	0	569	0	0
Parkview Community Hospital Medical Center	0	0	0	10
Palo Verde Hospital	0	2604	0	0
Rancho Springs Medical Center	0	2305	0	1
Riverside Community Hospital	7	2852	146	0
Riverside County Regional Medical Center	54	559	6	1
San Gorgonio Memorial Hospital	0	1102	0	16
Valley Plaza Doctors Hospital	0	17	0	0
Total	225	25512	303	33

Source: RCEMSA and Reddinet data

Table 15

2002 Riverside Hospitals Diversion Hours Causes				
Hospital	**Trauma**	**ED Saturation**	**Neuro/CT**	**Int Disaster**
Corona Regional Medical Center	0	866	9	0
Desert Regional Medical Center	0	2307	0	10
Eisenhower Memorial Hospital	0	1395	0	0
Hemet Valley Medical Center	0	970	0	4
Inland Valley Regional Medical Center	34	912	157	0
John F. Kennedy Memorial Hospital	0	1839	0	2
Kaiser - Riverside	0	660	0	2
Menifee Valley Medical Center	0	619	79	1
Moreno Valley Medical Center	0	247	0	0
Palo Verde Community Hospital	0	0	0	0
Parkview Community Hospital Medical Center	0	929	0	5
Rancho Springs Medical Center	0	727	0	1
Riverside Community Hospital	6	970	117	0
Riverside County Regional Medical Center	61	146	6	0
San Gorgonio Memorial Hospital	0	749	0	15
Valley Doctors Hospital	0	0	0	0
Total	101	13336	368	40

Source: RCEMSA and Reddinet data

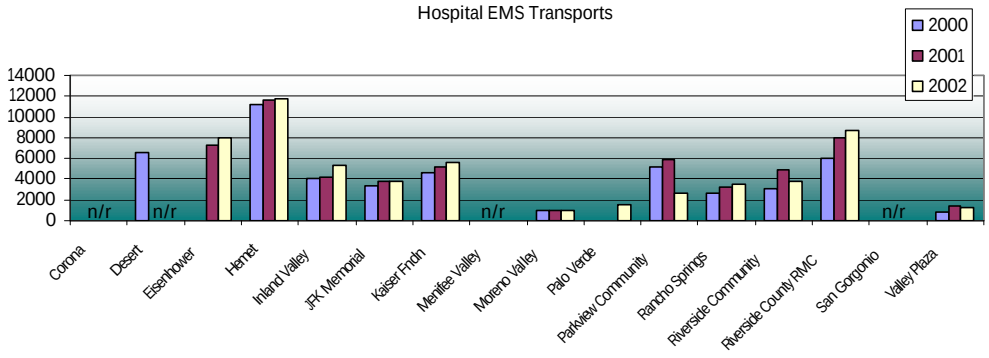
EMS Demand

Riverside County EMS transports have steadily increased. In 2001 there were a total of 69,896 transports (approximately 191 per day) and in 2002 there were 74,173 (approximately 203 per day), an increase of 6.1 percent. This trend is projected to continue, as 2003 shows an average of 219 transports per day. Table 16 lists the destination of EMS transports by individual hospitals for 2000 to 2002.

Table 16

Hospital EMS Transports 2000 -2002			
Hospital	2000	2001	2002
Corona Regional Medical Center	n/r	n/r	n/r
Desert Hospital	6,648	n/r	n/r
Eisenhower Memorial Hospital	n/r	7,327	7,978
Hemet Valley Medical Center	11,202	11,673	11,777
Inland Valley Regional Medical Center	4,068	4,258	5,379
John F Kennedy Memorial Hospital	3,394	3,713	3,753
Kaiser Foundation Hospital	4,633	5,141	5,601
Menifee Valley Medical Center	n/r	n/r	n/r
Moreno Valley Community Hospital	1,020	939	913
Palo Verde Hospital	n/r	n/r	1,481
Parkview Community Hospital Medical Center	5,178	5,901	2,624
Rancho Springs Medical Center	2,633	3,204	3,535
Riverside Community Hospital	3,057	4,901	3,849
Riverside County Regional Medical Center	5,952	7,944	8,628
San Gorgonio Memorial Hospital	n/r	n/r	n/r
Valley Plaza Doctors Hospital	777	1,389	1,329

Source: Individual Hospitals
n/r = Not Reported



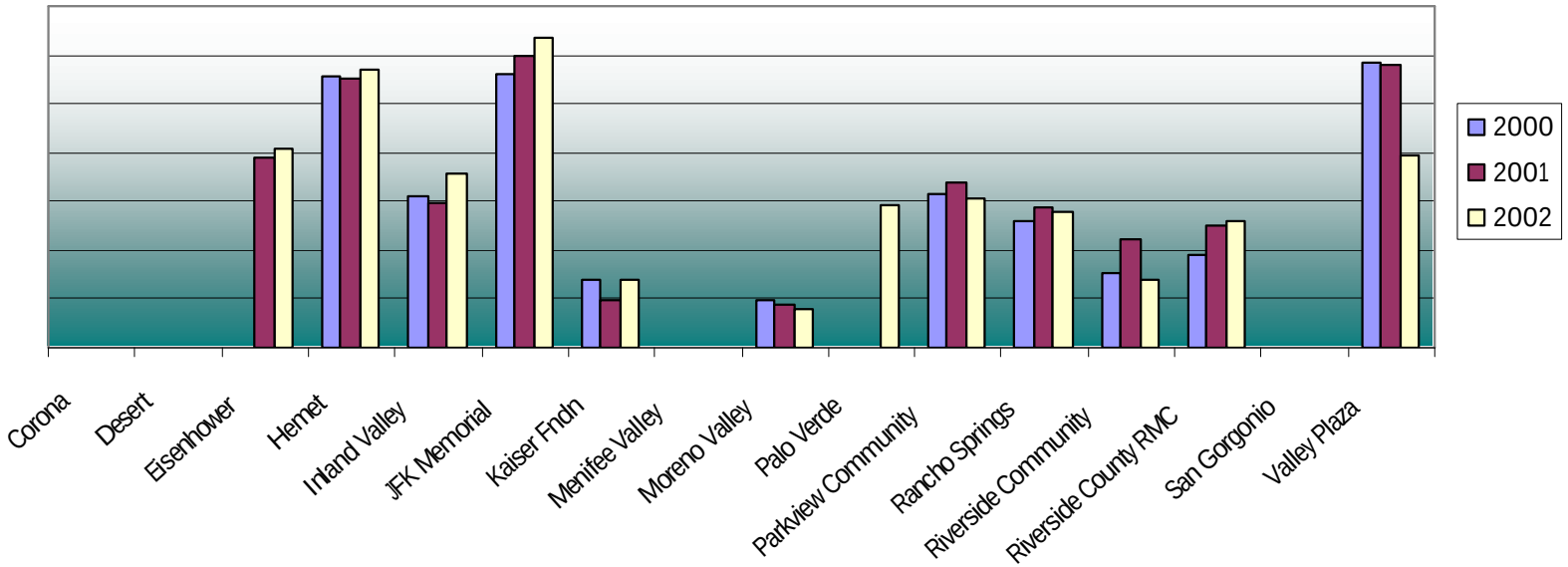
EMS arrivals as a percentage of total ED visits varies by hospital. Table 17 below indicates that the range was from 4 percent to 32 percent of ED visits for 2002. This table shows that most hospitals indicated an increase in EMS arrivals for the three-year period. Four hospitals show a decline in patients arriving by ambulance.

Table 17

Percent ED Volume from EMS Transports			
Hospital	2000	2001	2002
Corona Regional Medical Center	n/r	n/r	n/r
Desert Hospital	n/r	n/r	n/r
Eisenhower Memorial Hospital	n/r	20%	20%
Hemet Valley Medical Center	28%	28%	28%
Inland Valley Regional Medical Center	15%	15%	18%
John F Kennedy Memorial Hospital	28%	30%	32%
Kaiser Foundation Hospital	7%	5%	7%
Menifee Valley Medical Center	n/r	n/r	n/r
Moreno Valley Community Hospital	5%	4%	4%
Palo Verde Hospital	n/r	n/r	14%
Parkview Community Hospital Medical Center	16%	17%	15%
Rancho Springs Medical Center	13%	14%	14%
Riverside Community Hospital	8%	11%	7%
Riverside County Regional Medical Center	9%	12%	13%
San Gorgonio Memorial Hospital	n/r	n/r	n/r
Valley Plaza Doctors Hospital	29%	29%	20%

Source: Individual Hospitals

Hospital ED Volume from EMS Transports 2000 - 2002



Note: No data means hospital did not report.

Source; Individual Hospitals

ED Diversion Policies

California

ED diversion is a common practice in urban areas in California. The diversion issue has driven a number of California counties to develop diversion protocols that define and in some cases restrict the hospital's ability to divert ambulances. The American College of Emergency Physicians (ACEP) has published standards for diversion protocols[13]. The Emergency Nurses Association (ENA) has also identified four broad groupings of diversion policies[14] as follows:

(1) "All or Nothing" Diversion - In this type of diversion, the hospital is either on or off diversion. When the policy is activated, no ambulance patients are transported to the hospital.

(2) Patient Triage Categorization - With this version of diversion policy, patients are categorized by their acuity type, type of treatment needed or type of admission required.

(3) Specialty or Service – This policy allows for diversion of patients requiring specialty care or specific equipment.

(4) Geographical Grouping – This diversion system is sensitive to geographical zones with each zone having a certain number of hospitals and the diversion rules applying only to that region.

Many community policies on diversion use a hybrid of two or more of the above policies. Appendix A provides a summary of 17 California counties surveyed by the Los Angeles County EMS Agency on the issue of their diversion policies. Appendix B provides a more detailed and updated review completed by The Abaris Group of seven counties that more closely match the population of Riverside County or that have a "no diversion" policy. This appendix also compares population, ED visits, EMS transports and provides some comparison calculations.

Based on the two appendices, it is clear that there is wide variation in the type, method and level of control of the county policies on diverting ambulances. Common themes found with most of these county policies are:

- There are written policies to allow management of diversion by the local EMS agency
- Hospitals are required to have internal diversion policies
- Diversion requires approval from hospital administrator/designee

[13] *Guidelines for Ambulance Diversion*. American College of Emergency Physicians, Arlington, TX, October 1999.

[14] *Diversion Policy Resource Guide*. Emergency Nurses Association, Des Plaines, IL, 2000.

- There is a general principal adopted that "if all are closed, all are open"
- Diversion is documented on logs
- The EMS agency/EMS providers and base hospitals are all notified of most diversions
- The policy is predominantly applicable to advanced life support (ALS) EMS units only
- Most diversion policies allow for the following categories of diversion:
    - ED saturation
    - Internal disaster
    - CT scan
    - No diversion for patients in "extremis"

Survey and anecdotal data from California counties reinforces the fact that there are two major categories of activity in the state. There are some counties that have probed the causal factors and have experienced relatively strong improvement in their diversion hours. Their approach has been either "no diversion" (e.g. Fresno and Solano Counties) or through cooperatives, a robust reduction in diversion hours (e.g. Orange, Sacramento, San Diego Counties). Some communities have seen a reduction in diversion hours only to see them rise again (e.g. Kern, Los Angeles, and Riverside Counties). There are some relatively small counties that either do not experience diversion or do not allow diversion because of the limited number of EDs (e.g. Merced, San Luis Obispo). In those counties where the total diversion hours are beginning to rise again, it appears that the policies and practices put in place to mitigate diversion are becoming less effective in managing diversion. This may be due to rising volume, erosion of the policy or other factors.

It is interesting to note that not every county has a goal to limit or reduce diversion hours. There are three notable exceptions. Fresno and Solano Counties have effectively eliminated diversion by local EMS agency mandate. Sacramento County has received a commitment from the hospital CEOs to eliminate diversion and is looking at a policy now that would effectively achieve that. For a county that allows diversion, Santa Clara County has the most restrictive policy from the standpoint of time elements and county supervision. Another similarly restrictive county is Contra Costa where diversion hours were 402 hours for 2002 (approximately 1.1 hours per day). Contra Costa County reports this as largely due to the restrictive permission process with after-hour and weekend permission for divert only achieved by speaking to the on-call health officer.

Riverside Diversion Protocol

The Riverside County EMS Agency has developed its own diversion policy for the Riverside hospitals. The elements of the diversion policy are as follows:

- Hospitals make every effort to prevent diversion of ambulances. However, patients with airway compromise are not diverted.
- The individual hospital divert decision should be made based on each hospital's own policy.
- Patients arriving by basic life support (BLS) service provider are not diverted.
- Trauma cases are diverted only under special conditions.
- The Riverside County EMS Agency provides regular reports to each ED manager of diversion data for that hospital.
- Diversion records are expected to become part of the Continuous Quality Improvement process within each hospital and the Riverside County EMS Agency.
- The County EMS "duty officer" is notified of a diversion request and based on the total requests for the region, makes a determination and grants or denies diversion.
- Permission to divert is generally only given for two hours within an eight-hour shift. Hospitals are automatically taken off diversion after two hours.
- Each hospital enters into the Reddinet system the start and end time of diversion with each event listing the reason for divert.
- Hospitals in the Palms Springs area do not use the policy and "work" diversion out amongst themselves.
- Trauma Centers needing to go on CT/Neuro or Trauma diversion do not need to contact the Riverside County EMS Agency.

Riverside County Diversion – Analysis and Findings

Overview

Interviews and assessments were conducted at each hospital (with the exception of Corona Regional Medical Center due to a lack of hospital availability), at the Riverside County EMS Agency and with a sample of EMS providers. The Abaris Group's approach was to evaluate each hospital's ED diversion protocol and efforts at hospital bed flow and capacity-building strategies from the standpoint of optimization of process for improving access and flow to patients and reducing diversion.

It is clear from this analysis that Riverside County in cooperation with the hospitals have taken substantial steps to manage and mitigate the diversion problem.

Input from Stakeholders

The current protocol has received endorsement by a number of hospitals in Riverside County. While most approve of the two-hour limit for diversion, there were a few hospitals that felt the process to contact the Riverside County EMS Agency, answer detailed questions and receive an answer took too long. Many others felt that the additional time this created to be approved was necessary to hold the hospitals accountable for meeting a reasonable standard for going on diversion and to assure multi-hospital coordination.

A brief summary of the identified strengths and weaknesses of the current Riverside County diversion policy is provided in the table that follows.

Table 18

Riverside County EMS Agency Diversion Policy	
Strengths	**Weaknesses**
- Allows hospitals to divert based on their individual needs - Assures the highest acuity patient goes to the closest hospital - Has contributed to the significant reduction in diversion hours - The two hours window acts as a gatekeeper and prevents misuse - RCEMSA staff act as impartial gatekeepers in monitoring and adjudicating requests for diversion. - Perceived as being fair by most hospitals	- The policy needs to be communicated in "policy format" to all hospitals. Currently it is only a memo - Significant variation in the understanding of the policy from hospital to hospital - ED/EMS diversion adds considerably to the cost of EMS services. - The zone concept is not seem to be clearly understood by all hospitals - The current policy is only affecting minimal behavior/practice changes in the hospital - Hospitals are not held accountable for their diversion hours - In most EDs overcrowding continues to be an issue - The approval process for diversion appears slow and resource intensive - Some hospitals are denied diversion even when they believe they really need to be on diversion - There is frustration of the EMS providers over a lack of fairness how the policies are enforced in the east/west parts of the county even though the east county hospitals requested self control. - Reddinet data and diversion driver data entry are not used affectively.

Source: Riverside County EMS Agency Diversion Protocol and Input from Stakeholders

The Abaris Group Findings

Most hospitals feel the current diversion policy is effective and some attribute the reduction in diversion hours in the county solely to the relatively new policy. Many hospitals have some sort of an internal diversion policy that needs administrative approval before going on divert. However, when asked for a copy of their diversion policy, four hospitals indicated they "follow the County policy". Only one hospital had detailed pre-emptive action plans to be implemented when the ED was full and beds were not available or nurses were not available in order to attempt to avoid diversion.

Some hospitals also felt that, although the Riverside County EMS Agency diversion policy was necessary, there were delays in obtaining approval, and too many questions were being asked. There was also a perception by one hospital that the questions did not match the diversion issue. One hospital indicated that they believed they were unfairly denied their requests for diversion over half of the time. Another expressed that the Riverside County EMS Agency data on their hospital's diversion hours was overstated.

There was also significant variation in the understanding of the Riverside County EMS Agency policy from hospital to hospital. One ED manager was not familiar with the "two-hour" rule. Also, the zone concept is not clearly understood by all the hospitals. On occasion, it appears that hospitals forget to take themselves off diversion status. This has resulted with the hospital being on diversion in the Reddinet system for more hours than needed. Issues of behavioral health, inebriates and frequent ED users were not showcased during their interviews by hospitals as drivers of the ED saturation and EMS diversion problem.

For all EDs, overcrowding and saturation continues to be an issue. At least two hospitals have made substantial progress on implementing most of the published best practice strategies. At the interview time, one of these hospitals had not had one diversion hour since the first quarter of 2002, a substantial accomplishment. There are six other hospitals that stated they feel they have implemented or tried virtually every strategy to varying degrees of success. Still others have been challenged and either had failed at implementing best practice strategies (e.g. discharge lounge and hospitalist program) or had not attempted many of the published practices. One hospital flatly stated they did not have a diversion policy and felt they did not need one even though the Riverside County EMS Agency's policy requires one. Most hospitals do not trend diversion events and develop action plans to mitigate diversion.

Most hospitals are impacted by ED "boarders" or patients waiting for inpatient beds. ED boarders substantially reduces ED bed availability with some hospitals reporting that up to 50 percent of their ED beds are used for boarders at one time or another. Many hospitals expressed frustration at not having medical staff collaboratives to improve inpatient flow. Most ED managers also expressed concern of the lack of their own empowerment to impact inpatient issues.

Interviews from prehospital providers were mostly consistent. ED saturation and subsequent EMS saturation has a big impact on their resources, costs and response time performance. While there is some recognition of improvement in the reduction of the number of hospital hours of diversions, most EMS providers interviewed do not think the hospitals are doing enough. One creative approach by a fire chief is a plan to open an urgent care center at one of his fire stations but he is unable to find a hospital partner. One EMS provider expressed frustration with the east/west county policy variation and the lack of consistency in accountability. The EMS providers feel they were lobbied

by the east county hospitals to support their being exempt from the countywide policy with a promise that these hospitals would "fix" the problem on their own. According to one EMS provider interviewed, this has not happened in the east county and yet the west part of the county has had substantial declines in ED diversion hours. Another complaint is re-routing. Not only are the transport times increased due to diversion, there are events where the ambulance is half way to the primary ED only to be diverted to a more distant ED. These EMS providers collectively feel the EDs themselves are responding to the best of their ability but the hospitals as a whole have not responded. The lack of accountability was a common perception during these interviews

The largest ambulance provider interviewed was a contrast to other interviewees. They feel hospitals are doing all that they can and the diversion hours have not impacted their performance as they have the ability to flex their unit hours. All EMS providers stressed their willingness to be part of the solution what ever the direction is. According to the EMS providers interviewed, ED saturation and EMS diversion is an acceptable practice but as an exception not as the rule.

The Riverside County EMS Agency policy itself on ED saturation and EMS diversion is relatively undocumented. The policy is in a memo format at the request of the hospitals. It takes tremendous County resources to respond and react to diversion requests (24 on-call staff person). The process for review and approval by the on-call staff person is subjective as the questions asked are not scripted. It is a "first come first serve" system as it is currently structured. That is, the first requests are honored over others although there is some negotiation. There is no clear standard on what the hospital must have attempted or will attempt to do to mitigate individual diversion events or trended diversion events. The Riverside County EMS Agency admits for the most part that their staff has no special training in ED and hospital operations. The Riverside County EMS Agency expects the hospitals to have diversion policies but does not review or verify their existence.

There are no current efforts to predict peak volume periods (e.g. flu season) and to have pre-emptive collaborative efforts with the hospital and EMS providers and advanced capacity planning. The east part of the county are allowed to "manage" their diversion practices and policies and do not contact the Riverside County EMS Agency for permission to divert.

While all hospitals agreed there has been progress, most state the old unrestricted process was, to quote one hospital, "horrible". The current policy breeds less animosity and there is less of a domino effect on hospital diversions. Hospitals appear to be willing to make further refinements to the policy and to their own practices. As one hospital commented, "maybe there will be a day where they could get to 100 percent no diversion."

County Comparisons

The Abaris Group contacted counties with similar populations to benchmark EMS and ED and diversion trends. This analysis demonstrates, as provided on the chart below, that Riverside County has made substantial progress on diversion mitigation. Of the counties studied, Riverside County had the largest single drop (49 percent) between 2002 and 2003 (projected). However, many of the counties have lower diversion and hours rates in spite of similar EMS transport and ED visit ratios. The apparent most important variable for that difference is that the lower diversion-hour counties appear to take a very conservative view of diversion and therefore have developed restrictive policies that reinforce that conservative view.

Similar Divert Counties Year 2002 Diversion Impact								
Statistic	Alameda	Contra Costa	Fresno,Kings, Madera	Riverside	Sacramento	San Francisco	Santa Clara	Solano
Population	1,484,698	980,870	1,091,236	1,645,319	1,280,920	789,062	1,716,755	405,642
ED Volume(2001)	440,099	316,378	320,873	533,074	377,135	227,225	452,976	107,892
ED Treatment Stations*	228	149	170	299	250	137	235	53
EMS Transports	67,000	47,858	96,478	74,173	110,120	52,500	60,019	16,349
Diversion Hours	2,863	402	2,052	13,847	10,475	6,985	1,819	0
ED UR/1000 Population**	298	325	297	330	298	288	264	268
ED Visits/ED Tx Station	1,930	2,123	1,887	1,783	1,509	1,659	1,928	2,036
Diversion Hours/Population	0.002	0.000	0.002	0.008	0.008	0.009	0.001	0.000
Diversion Hours/EMS Transports	0.04	0.01	0.02	0.19	0.10	0.13	0.03	0
Diversion Hours/ED Tx Station	12.6	2.7	12.1	46.3	41.9	51.0	7.7	0.0
Ranking Hours/ED Tx Station	4	7	5	2	3	1	6	8
Year 2003 - Diversion Impact								
Diversion Hours, annualized	n/r	399	944	7,070	6,619	6,258	n/r	0
Percent Change 2002/2003	n/a	-1%	-54%	-49%	-37%	-10%	n/a	0
Diversion Hours/ED Tx Station	n/a	2.68	5.55	23.65	26.48	45.68	n/a	0

Source: OSHPD data, Individual Counties

*Using 2001 ED Tx Stations for Alameda and Fresno

**ED Utilization Rate for 2001

n/r = Not Reported

n/a = Not Applicable

Hospital Response to Capacity Needs

Significant steps have been taken by Riverside County in collaboration with the hospitals to respond to divert issues. Some of these steps have included ED and inpatient capacity strategies but for the most part the reduction in diversion hours has occurred due to a stronger Riverside County EMS Agency policy.

However, there is considerable variability at the hospital levels on the philosophy of divert and the steps that have been taken to mitigate diversion through policy and capacity management. One hospital has as many as three bed review meetings a day. Some hospitals only did pre-divert activities on an informal daily basis, with no written or formal process in place. No hospital has an effective real-time divert avoidance system. Some hospitals have historically worked on, are working on, or are actively planning ED and in-house initiatives, and change processes that are designed to build capacity, but this is not true for all.

All hospitals interviewed indicated that more could be done especially for inpatient bed capacity strategies to limit the number of ED "boarder" patients and thus ED saturation and EMS diversion. In particular a number of hospitals indicated that they did not have the level of executive administrative support or empowerment to mitigate the in-house bed capacity problems and thus their efforts were limited to ED strategies.

Appendix C provides a table of published better/best practices and an inventory of the status of these practices at Riverside County hospitals. Each hospital was asked to inventory the strategies for improving flow by whether they have implemented, considered, rejected or not considered the best practice. These "best practice" steps are published in a variety of forms and periodically updated and have been shown to significantly improve patient flow, bed capacity and reduce diversions.[15,16,17] Each hospital was also asked to add other practices or steps that have been taken to mitigate diversion. There were no additions to the list offered.

It is interesting to note that when comparing ED to inpatient strategies, most hospitals indicated they had implemented a significant number of ED strategies but most had not implemented key inpatient strategies. Another concern was the inconsistency of responses on this self-assessment inventory process. 10 out of 13 hospitals indicated they had written policies on when to go on and off diversion and the policies required senior level approval for each diversion event. Yet only six hospitals actually demonstrated they had such a policy and only four of these actually required senior level approval. Ten hospitals indicated they had bedside triage practices but all were observed during the onsite visits to have traditional triage. No hospital actually has a clinical decision unit (CDU) and only three were considering one. Only one hospital

[15] "S*trategies to Alleviate Overcrowding Hospital Emergency Department"*. American Hospital Association, Chicago, IL, December 21, 2001.

[16] *"Ten High Leverage Strategies to Improve ED Patient Flow and Capacity".* The Abaris Group, Walnut Creek, CA, 2000

[17] *"31 High Leverage Strategies to Improve Inpatient Flow and Capacity."* The Abaris Group, Walnut Creek, CA, 2001

had a written policy to limit the use of the ED by private practitioners for direct admission for elective procedures, a practice that often has a substantial effect on ED saturation/diversion.

It is likely that some hospitals did not understand the best practice topics for the self inventory and others may need help understanding how they may be applied. There is community expertise on best practice patient flow and ED diversion mitigation strategies and in change processes but there is no mechanism to share this expertise.

Conclusions and Recommendations

The conclusions of The Abaris Group are:

- The diversion problem in Riverside County region is similar to many urban communities across the country.
- Riverside County EMS Agency and the hospitals in the region have made substantial progress towards reducing ED saturation and EMS diversion.
- Recent data on diversion suggests there may be some erosion to this effort.
- Site visits and the inventory of hospital specific policies and practices suggest significant additional opportunity to improve patient flow, capacity and thus reduce diversion.
- Riverside County has key environmental and population factors, including substantial ED volume increases that contribute substantially to the saturation and diversion problem.
- Saturation and diversion have a significant impact on the Riverside County EMS providers, patient access to preferred health care resources and to continuity of care.
- The current Riverside County EMS Agency protocol for diversion has not been formalized into an official policy and may not have the statutory support needed to assure protection. Questions that are asked of hospitals are not scripted and responses cannot be tracked.
- The current protocol is driven by the desire of the hospitals to have event driven approval from the County because of mistrust amongst the providers.
- The diversion protocol is resource intensive to execute.
- The diversion protocol is not uniformly enforced throughout the county at the request of some of the hospitals.
- There is considerable variation on whom, when, and on what basis hospitals activate diversion status.
- There is also considerable variation on what steps the hospitals have taken to mitigate diversion within their institution.
- Reddinet's full potential is not being utilized to evaluate, trend and managed variations of diversion.

- Hospitals believe they need facilitation on best practices to achieve momentum especially in the inpatient strategies and clearer executive leadership support to approach the inpatient opportunities.

- There are short- and long-term strategies that may effectively eliminate the saturation and diversion problem for Riverside County.

Specific Steps to be Taken:

- This report should be disseminated and a summary presented to hospital chief executives, EMS leaders, the Medical Society and HASC staff and leadership.

    - The support of key hospital leadership (e.g., Board of Directors, administration, medical staff) should be solicited and guaranteed and this leadership actively engaged in process improvement to reduce and eventually eliminate diversion in Riverside County.

    - A stakeholder ED/EMS Diversion Summit should be scheduled to inventory best practices, share successes and create a plan and call to action for the future.

    - The process should have the involvement of all stakeholders.

    - Each hospital should be asked to examine optimization of resources and engineering tools to study their own systems more effectively.

- The current EMS protocol should be written into a formal policy with the accountability on the hospitals to follow the rules and clearer standards set for when should a hospital go on diversion, what steps must precede diversion and when they must go off diversion.

- The policy, monitoring and action plans should be uniform countywide.

- Clear communication of the policy is required for all hospitals to understand the various zones and thus for the policy to operate more effectively.

- Each hospital should be asked to:

    - Prepare a clear policy on when and what steps must be followed for a hospital to go on and off diversion consistent with the revised County policy.

    - Conduct a “root cause” analysis of their individual drivers to ED saturation and EMS diversion and develop a plan of action to respond to these issues.

- Prepare a pre-diversion protocol to assist with avoiding diversion and then mitigating it when it happens.
- Prepare a policy to assure hospitals take themselves off diversion when appropriate from the Reddinet system

- Reddinet's full potential for studying, trending and managing diversion potential should be exploited.
- Ongoing policy development and sharing of best practices should be done collaboratively with all disciplines involved (hospitals, EMS providers, medical society and the Riverside County EMS Agency).
- Public health, population (e.g., demand management) and peak demand predictive initiatives (e.g. flu season) should all be included in this effort.
- Studies should continue on the impact and other communities best practice efforts on behavioral health, inebriates, frequent ED users and other safety net impacts on ED saturation and EMS diversion.
- Riverside County EMS Agency should host regular meetings and have the various EDs present best practices. This would allow all the EDs to learn of the best practices, open lines of communication, and hopefully enhance teamwork.

General Philosophies:

- Voluntary efforts are preferred over regulatory mandates.
- The goal should be to optimize the processes such that there is at least an average of 1,800 patients per ED treatment station in the community.
- All hospital processes are affected and therefore should be evaluated as part of the process including ED and inpatient admission processes.
- The eventual goal of a "no divert" philosophy and practice (using a practical timetable) should be pursued.
- Population based strategies that emphasize the appropriate utilization of ED services should include all patient sources including nursing homes, inebriates and mental health patients.
- Evaluate methods to decompress ED volume by limiting direct admissions, reducing medical clearances (e.g. inebriates) and improving hospital bed availability time by using or creating underutilized space and adopting use of specialty product line (e.g. "discharge-lounge") concepts.

Appendix A: California County Diversion Policies – Comparison

Diversion Requirements	Alameda	Contra Costa	Fresno, Kings, Madera	Imperial	Los Angeles	Marin	Merced	Northern California	Orange	Riverside	Sierra-Sac	San Diego	San Joaquin	Santa Barbara	Santa Clara	Tulomne	Tulare
EMS Agency is notified of each diversion		X	X		X	X	X		X	X							X
Control Facilitiy is notified of each diversion			X							X	X						
Central Dispatch/Fire Departments/ Ambulance Providers is notified of each diversion		X	X	X	X	X	X			X	X			X			X
Base Hospital is notified of each diversion		X	X	X	X	X	X		X	X				X			X
Receiving hospitals are notified of each diversion			X							X							
Diversion applicable to walk-ins	X														X		
Diversion applicable to BLS								X	X			X			X		
Diversion applicable to ALS					X		X	X	X	X		X					
Diversion applicable to CCT															X		
Diversion applicable to IFTs/Direct Admits																	
DIVERSION CATEGORIES:																	
General			X							X							X
Case-by-case										X							X
ED Saturation	X	X		X	X		X	X	X	X		X	X		X		
Internal Disaster/Physical Plant Casualty	X	X		X	X	X	X	X	X	X		X	X				
Trauma	X				X	X			X	X				X	X		
CT Scan	X	X	X	X	X	X			X			X	X	X	X		
Pediatric Critical Care Center					X												
Neurosurgery					X				X			X					
ICU/No Critical Care Beds/Critical Patient Overload	X													X			
No Diversion of Specific Patients (i.e., extremis)	X			X		X	X	X	X	X	X	X		X			
Diversion applicable to work action/staffing problems																	
Maximum Transport Times are identified when patients are diverted					X							X					
Maximum transport times for diverted trauma patients					30 mins					45 mins							

Source: LA County EMS Agency Survey 2001 amended for Riverside County updates.

Appendix B – Summary of Similar County Diversion Policies

The summaries provided are based on interviews The Abaris Group staff conducted with the appropriate EMS agency personnel during October 2003.

LEMSA Diversion Information – Alameda County
Cindy Abbissinio, EMS Director
(510) 267-3299

Population: 1.48 million
EMS transports: 67,000
ED visits: 440,099 for 2001

Alameda County has a population of 1.5 million and has 14 EDs with a 2001 ED volume of 440,099.

The County's diversion policy was last updated in March 2000. The policy has direct oversight by the County EMS Agency. It states that "…all hospital participants in the EMS system must abide by equally strict internal procedures for diversion that results in a fair and equitable system." Partial ED diversion is permitted for CT failure and Adult Trauma Overload. Complete diversion is allowed for ED saturation, physical plant casualty and facility critical patient overload. The policy specifies that "The facility must exhaust all measures to resolve the condition(s)…" and provides specific examples. This policy requires the hospital's senior administrative officer on duty to approve the divert status before requesting diversion. If two hospitals within a region (north/south) go on diversion, then an on-all diversion officer makes a determination of whether diversion should to be continued. There is a time limit of six hours for each event.

No new amendments to this policy are being planned. The policy is believed to work pretty well by the ED managers and the EMS agency as it was collaboratively developed. If there are times where there is a perception of abuse by one particular hospital, the ED managers meet and conduct an informal peer review.

LEMSA Diversion Information – Contra Costa County
Art Lathrop, EMS Agency Director
(925) 646.4690

Population: 980,870
ED transports: 47,858
ED visits: 316,378 in 2001

Contra Costa County believes they have a highly effective diversion policy that has been in effect since 1998. The key to their success is that the hospitals have to call the EMS office during the day or on-call health officer after hours to get approval. Diversion requires prior approval.

Historically, the County has sent EMS Agency staff to review the hospital when they went on diversion to check the status of hospital and why they diverted.

The County asks the following questions when it verifies the status of a diverting hospital:

- How many admits waiting in ED?
- When do you expect to have those admits completed?
- Will an hour do it for you? If it will not, they must call back.

They have not done this since 1998 with the new policy.

There is only one hospital that contributes most of the diversion in the County, but this may be because it is a small ED serving a large, growing area and has severe overcrowding issues. Diversion episodes are limited to one to two hours and the hospital is scrutinized about "what's going on".

The hospitals are required to have an internal diversion policy that is approved by the agency and a copy is to be on file with the agency. Reddinet was implemented in 2001. However, hospitals have to get approval from the EMS agency before they enter diversion status on Reddinet.

What is working for the policy?

Now the EMS Agency has more control as it can scrutinize the reasons hospitals go on diversion. The EMS agency may give two hours to go on diversion, and then the hospital would have to call back in case it needs to continue. In this case, some questions are asked before diversion is approved.

What is not working for the policy?

- Though the policy was aimed at making it difficult for hospitals to go on diversion, as time goes on, some hospitals can "go through the hoops" so there is an increase in diversions in at least one hospital.
- They do not have a uniform means of measuring the ED overload factor that leads to diversion. For example, if two hospitals A and B are on divert; there is no adequate means of measuring if hospital A is really more loaded than B. An example mentioned was that there were two hospitals that used to frequently go on diversion. After one hospital changed its ED supervisor, it stopped going on diversion.

Generally hospitals are happy with the way the policy is working and so is the EMS agency, which can trust that hospitals do not misuse the policy.

There is at least one hospital that is a "best practice" hospital for diversion: Mount Diablo Medical Center. Also it was mentioned that San Pablo hospital has a policy of "No diversion".

Overall, there is general satisfaction with the policy and no changes to the policy are planned.

LEMSA Diversion Information – Fresno, Madera, Kings Counties
Tim Williams, EMS Coordinator
(559) 445-3387

Population: 1,091,236
ED visits: 320,873 in 2001

Fresno County has a "no-diversion" policy. The earlier policy was terminated in Feb 2003. In the new policy, diversion is used only for equipment failure. The first few months of implementing the new policy were rough. Now they feel that the policy is working well. There is also no animosity among hospitals. People are seeing the benefits, and patients are going where they want. Physicians especially have been glad to see diversion gone. Other facts:

- Reports they terminated their diversion policy February 24, 2003
- Now diversion is used only for equipment failure
- It was "a little rough" for the first few weeks or even month; since then it has gone very well
- Now less animosity between the hospitals, and patients are glad to go to their home hospitals
- Stakeholder's see the benefit
- Physicians especially have been glad to see diversion gone
- No ambulance offload waiting which is an indication that the hospitals did re-engineer their systems
- The Abaris Group spoke with a number of CEOs in April 2004 and they were surprisingly pleased with the results

LEMSA Diversion Information – Sacramento County
Bruce Wagner, EMS Chief
(916) 875-9753

Population: 1,280,920
EMS transports: 110,120
ED visits: 377,135 in 2001

Sacramento has reduced diversion hours significantly since early 2002. A two year collaborative with outside consulting assistance (The Abaris Group) has been highly effective in reducing diversion hours. The first year there was as 51 percent reduction and the second year

(2003) is heading for another 37 percent reduction. In the spring of 2002, a new policy was implemented which requires hospitals to come off of diversion after a maximum of three hours. In the fall of 2002, an additional policy was implemented which divided hospitals into zones and required that at least one hospital always be accepting ambulance transports within each zone. These policies have been successful, although one hospital frequently exceeds the three-hour limit on diversion events.

LEMSA Diversion Information – San Francisco County
Mary Vassar, QI Coordinator
(415) 355-2611

Population: 789,062
EMS transports: 52,500
ED visits: 227,225 for 2001

The county has ten Basic and two Standby EDs and one that is relied on in San Mateo County.

In September of 2002, the county implemented a policy for advance notification of all direct EMS arrivals, with the exception of the base hospital, which is only notified for critical patients or specialty care needs. In February of 2003, the ambulance diversion policy was revised. Previously the policy did not put a cap on diversion hours and resulted in unpredictable hours of suspension status. With the new policy, when four or more full receiving hospitals are on total diversion, the EMS section duty officer may suspend diversion in six-hour increments. Diversion suspension remains in effect for six hours after which the duty officer then reassesses the situation and decides either to lift the suspension or continue suspension for an additional six hours. A major issue in the county is development of the local Emergency Medical Services Information System for quality improvement and data-driven policy development.

The items that work with the diversion policy are:

- Simplifies divert; no categories, only ED opened or closed
- Hospitals do have capabilities when they need it
- The County reserves the right to suspend

The items that do not work are:

- Does not respond to root causes
- Tremendous surge in past three years especially with closed EDs
- Do not have good information on capacity/demand and therefore the ability to respond to these key issues and master planning
- Does not respond to key public inebriate issues

There are a few "better practice" hospitals in the county, like Kaiser and St. Mary's, which rarely go on diversion. Much depends on how well the EDs are managed internally and availability of inpatient beds.

LEMSA Diversion Information – Santa Clara County
Rob Petrucci, Acting Administrator
(408) 885-4250/61

Population: 1.72 million
EMS transports: 60,019
ED visits: 452,976 for 2001

Santa Clara has a very restrictive diversion policy. There are very specific and limited criteria for diversion and then a hospital is only allowed to divert for three hours at a time and for only 36 hours in any month. The hospital must effectively budget its diversion hours. If a hospital exceeds its three-hour limit or its monthly budgeted hours it receives a written notice and if it receives more than one in a 12-month period it must undergo a review by it peers.

The County EMS Agency believes the current policy is highly effective. No changes to the diversion policy are planned. But if they do change anything it would be to provide clearer authority for the hospitals that do not follow the rules.

The top elements that work with the policy are:

- Setting diversion hour standards
- Peer review for hospitals that exceed the requirements
- Computer based EM System

Items that do not work in the policy are:

- Ability to define what the impact is if you cannot go a hospital
- Who has the ability to define whether an ED is open or closed

Hospitals are working with peers to figure out how to manage their hours on diversion.

LEMSA Diversion Information – Solano County
Michael Frenn, Agency Administrator
(707) 784-8155

Population: 402,642
EMS transports: 16,349

Solano has a no diversion policy. Patient destination is not driven by hospital staffing, in house or ED bed availability or other factors, excepting physical incapacity of a facility or physical absence of an appropriate service, i.e., CT scanner. In such cases, these are only factors for consideration as to where a patient might be taken, not a determinant in and of themselves. The policy was introduced in July 2001 and the way they see it is that they have to take walk-ins (based on EMTALA), and 911 patients should be no different.

The County EMS Agency believes the current policy is highly effective and for the past three years it has been going great although there was some initial opposition. The Agency believes there is no downside to the policy.

Other facts:

- Solano has a zero tolerance policy on diversion
- There was some concern at first, but otherwise it has been fine
- Ban was announced in July 2001
- For CT scanner down, they have an "alerting condition," but that is a "factor of consideration" for EMS rather than an actual diversion event
- Philosophy is that 911 patients should be taken at desired hospital as walk-ins are per EMTALA
- No ambulance offload waiting has been experienced

Memphis, TN
Another community with no diversion policy.

Interviewed Lynn Stath, RN, ED Manager at the Regional Medical Center at Memphis (The Med)

- Before policy of no diversion:
  - A lot of diversion, mainly at other hospitals
  - The Med (a Level I trauma center) could not meet goal of always keeping trauma open when other hospitals were on diversion
  - One hospital going on diversion commonly caused another to become inundated with the first hospital's patients

- Implementation of policy:
  - Policy of no diversion implemented 3-4 years ago
  - Was established on a city-wide basis by the City Council and the Fire Department through the EMS Council
  - Was instituted at a time when the hospitals were working together on an air medical system, so there was a collaborative setting

- Results:

  - The policy of no diversion has worked well
  - Hospitals accept all patient arrivals, but ambulances may be kept waiting
  - At The Med, as many as 7-8 ambulances may be waiting; at other non-tertiary hospitals, they might have 3-4 ambulances waiting
  - Most waits (90 percent) are short (2-3 minutes), the longest wait time in the most recent period of data collection was about 2 hours 5 minutes
  - A "Med Com" communication system is used to suggests to ambulances where to take patients and promote even distribution, although ambulances do not have to go to the suggested hospital
  - Other hospitals had a fear that they would begin receiving many more indigents without diversion, but that did not materialize
  - They only have about 38 ambulances, so it is a concern when many are at the hospitals, but there are private ambulance companies that can pick up the slack
  - EMS providers have liked not being diverted
  - It is now possible for The Med to always keep trauma open
  - Throughput has improved without the option of diversion
  - The communication link is the key to success of the policy – good balance of ambulance distribution and trust between hospitals is essential
  - Nashville and other communities are looking at the Memphis experience to determine applicability

Appendix C – Survey Results of Riverside Hospital Capacity Strategies

The following pages summarize the responses of each hospital to the specific strategy.

Riverside County Hospitals
Survey of ED/Hospital Capacity Strategies

	Category/Strategy	Description	Implemented	Considering	Tried/ Failed	Not Considered
1	ED Strategies					
a.	Fast Track	Separate area, 35 - 45 percent of pts, Avg TAT =< 60 minutes	8	3	1	3
b.	Staff Matched to Demand	Precise data matching of ED/support staffing to per hr/day/month demand.	5	4	0	5
		Evaluating/changing staff/ratios match demand and skill needs	8	4	0	3
		Back up policies/practices for peak hours (e.g. call, float, etc)	7	2	1	5
c.	ED Test Utilization	Identifying test utilization rates, steps taken to reduce	5	3	0	7
d.	Synchronize ED Processes	Bedside triage	10	2	1	2
		Bedside registration	9	3	2	0
		Patient preparation procedures	5	2	0	7
		Nursing pre-emptive ordering	12	2	0	1
		Efficient nurse documentation system	8	5	0	2
		Efficient MD documentation procedures (e.g. T System, scribe, etc)	8	6	0	1
		Electronic patient tracking system	5	7	0	3
		Specialty teams fine tuned for ED flow considerations (e.g. trauma, brain, etc)	3	1	0	11
		ED chart location optimized for access and handoffs.	11	3	0	1
		Communication devices (e.g. cell, pager and GPS name badges, etc)	6	2	0	7
		Re-engineer psych/inebriate patient processes.	4	1	1	9
e.	Move steps closer to ED	Dedicated department radiology with volume > 35,000	3	2	0	10
		Bedside wave tests for laboratory for predominant number of wave tests	9	0	0	6
		Point of care lab tests for predominant number available (e.g. IStat)	7	2	0	6
		Bedside ultrasound	8	2	0	5
f.	Medical Staff Initiatives	Policy/enforced eliminating ED as a location for direct admissions.	2	1	2	10
		Policy/enforced response times for on call specialists.	6	2	4	3
		Policy/enforced ED as location for PMD "see and hold for my arrival"	4	2	3	6
		Policy/enforced ED as location for non ED procedures/tests	4	2	2	7
		Care maps for common specialist orders/procedures.	8	0	0	6
		Individual practice variations of RN/MD that delay processes reviewed/managed	9	2	1	2
g.	ED Transition	Automated discharge instructions.	11	4	0	0
		Automated prescriptions.	4	6	0	5
		Transition area for patients waiting test results, discharge instructions, etc.	1	2	2	9
		"Bed Ahead" program	3	3	2	7
		Fax/voicemail report to floor units	6	0	5	4
		Established Clinical Decision Unit managed by the ED.	0	3	0	11
		Incentives team orientation to floor admissions with performance standard	1	3	1	9
		Evaluation of ED inpatient orders/testing practices while in ED.	7	3	0	4
		EDMD admission order system.	6	1	0	7
h.	Customer Service Initiatives	Established customer service goals	12	3	0	0
		Customer service measures	13	2	0	0

Riverside County Hospitals
Survey of ED/Hospital Capacity Strategies

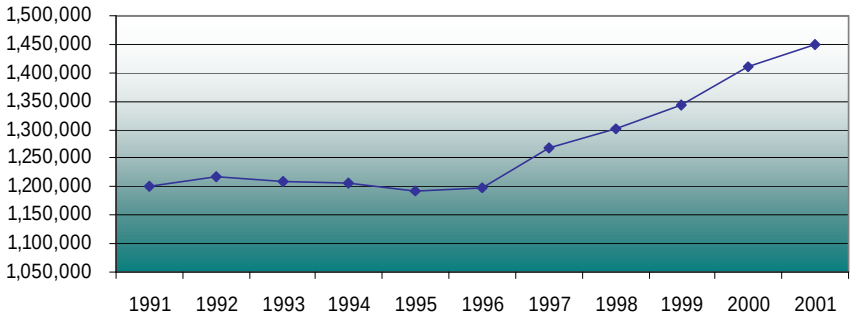
	Category/Strategy	Description	Implemented	Considering	Tried/ Failed	Not Considered
		Established staff satisfaction initiatives/measures	9	3	0	3
I.	Physical Plant	Majority of treatment rooms retrofitted for universal care (e.g. monitors, etc)	11	4	0	0
		Elimination of specialty rooms/use of cart system (e.g. lac cart)	10	4	0	1
		Work stations optimized with appropriate footprint, support equipment and flow	6	5	1	2
		Dedicated critical care rooms commensurate with demand.	8	3	0	4
		Overall # of tx rms. consistent with demand (recommend 1 rm/2,000 pts.)	8	2	1	3
j.	Diversion Avoidance Efforts	Written policy on hospital's diversion philosophy	11	1	0	2
		Written policy/enforced with specific criteria of when to divert.	11	1	0	2
		Diversion policy requires senior level approval for each diversion.	10	0	0	4
		Written policy/enforced with specific criteria of when to come off divert.	10	1	0	3
		Diversion Avoidance Response Team (DART)	4	0	1	9
		Identified root causes for ED capacity needs with targeted action plan.	7	4	0	3
			0	0	0	0
2	Inpatient Strategies					
a.	Medical Care Strategies	Hospitalist program implemented	7	1	2	4
		Medical staff LOS studies with active management of significant deviations.	5	4	2	3
b.	Staff/Processes Matched to Demand	In-house staff is matched to ED and in-house demand (e.g. housekeeping, etc)	4	3	2	5
		Discharge policy defined/enforced with steps to mitigate service/pt/MD outliers	3	2	1	8
		Discharge orders predefined at admission for appropriate dxs	2	2	1	9
		Written policy/enforced medical staff discharge day rounding policies	1	2	3	7
		Day of discharge lab policies/practices (e.g. staffing, etc) aligned with need	1	1	3	9
		Next day productivity profiling	8	2	0	3
c.	Admission/Discharge Practices	Evaluate utilization, privileges and appropriateness of ICU, step down beds.	12	1	0	1
		Access to extended care and SNF beds studied and optimized.	8	2	0	4
		Discharge lounge established and utilized.	1	4	3	6
		Rapid Admission Unit (RAU) established and utilized.	1	2	1	10
		Policy/enforced on preemptive discharge orders (e.g. day ahead)	0	3	1	10
d.	Coordination of Functions	Single integrated admission/discharge unit.	0	2	0	12
		Centralized Bed Control Command Center	7	1	0	6
		Key staff communication devices (e.g. cell phones, etc)	8	3	0	3
e.	Peak Load Strategies	"Flying Squad" nurse system for flow coordination and temporary staffing.	2	3	0	9
		Bed Czar procedure with Bed Czar having decision making authority.	5	0	1	8
		Floor flexing system with identified back up beds/staffing	5	1	0	7

Appendix D – Additional Data Tables & Charts

California	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Population	31,238,000	31,719,000	31,996,000	32,155,000	32,291,000	32,501,000	32,985,000	33,387,000	33,934,000	34,207,000	34,367,000
Hospitals	493	496	490	494	495	498	494	480	483	473	496
Hosp. Admits	3,005,818	2,959,786	2,866,716	2,817,326	2,864,289	2,825,587	2,854,815	2,924,714	3,004,182	3,036,579	3,066,829
Hosp. Beds	83,512	82,530	80,673	79,353	78,442	76,996	75,942	75,113	73,938	73,728	70,160
Admits/1,000	96	93	90	88	89	87	87	88	89	89	89
ED Data											
# of EDs	415	413	407	406	400	399	401	389	365	377	440
ED Tx Stations	4,443	4,572	4,604	4,693	4,808	4,842	4,924	5,015	5,071	5,099	5,134
Visits	9,306,999	9,365,307	9,297,056	8,796,410	8,933,203	8,635,441	8,855,036	8,766,738	9,360,456	9,652,416	9,984,712
Non-urgent	4,004,113	3,844,791	3,836,381	3,515,009	3,430,019	3,360,118	3,309,401	3,164,806	3,308,218	3,251,630	3,448,567
Urgent	4,160,939	4,370,285	4,297,387	4,266,653	4,381,885	4,146,916	4,325,793	4,424,536	4,812,476	5,073,355	5,232,623
Critical	1,025,929	1,148,959	1,163,288	1,014,748	1,059,365	1,042,790	1,219,842	1,177,396	1,239,762	1,327,431	1,303,522
ED Admits	1,202,302	1,216,871	1,209,986	1,205,820	1,192,228	1,198,989	1,267,012	1,302,779	1,342,566	1,409,999	1,450,300
Ratios & Calculations											
ED UR/	298	295	291	274	277	266	268	263	276	282	291
1000 Pop											
% ED Admits	40.0%	41.1%	42.2%	42.8%	41.6%	42.4%	44.4%	44.5%	44.7%	46.4%	47.3%
ED Admits/	12.9%	13.0%	13.0%	13.7%	13.3%	13.9%	14.3%	14.9%	14.3%	14.6%	14.5%
ED Visits											
ED Visits/	2,095	2,048	2,019	1,874	1,858	1,783	1,798	1,748	1,846	1,893	1,945
ED Tx Stations											
ED Visits/ED	22,427	22,676	22,843	21,666	22,333	21,643	22,082	22,537	25,645	25,603	22,693
% Critical Vists/	11.0%	12.3%	12.5%	11.5%	11.9%	12.1%	13.8%	13.4%	13.2%	13.8%	13.1%
ED Visits											

Source: OSHPD data

CA ED Admissions 1991-2001



Source: OSHPD data

Riverside Data Table

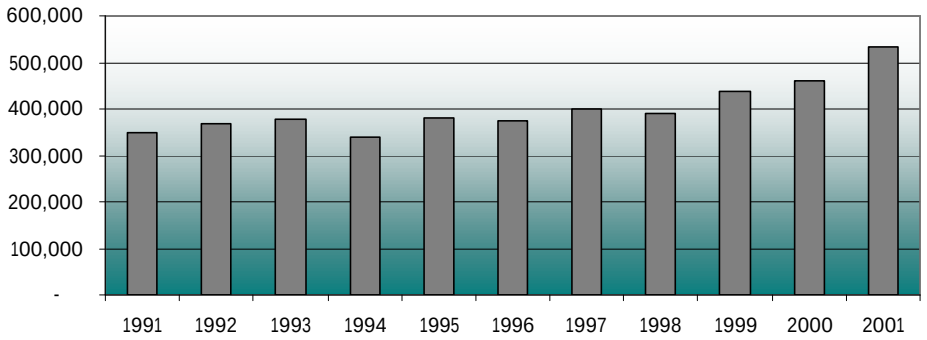
Riverside	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Population	1,246,326	1,286,364	1,315,090	1,346,651	1,373,034	1,393,732	1,423,934	1,461,916	1,507,912	1,545,387	1,584,300
Hospitals	15	16	15	15	15	15	15	15	15	16	16
Hosp. Admits**	107,347	111,900	112,763	112,828	117,661	115,496	121,631	126,841	132,634	135,658	138819
Hosp. Beds*	2,717	2,751	2,723	2,723	2,684	2,680	2,713	2,751	2,707	2752	2,736
Admits/1,000	86	87	86	84	86	83	85	87	88	88	88
ED Data											
# of EDs	15	16	15	15	15	15	15	15	15	16	16
ED Tx Stations	165	174	191	200	200	193	211	246	259	270	275
Visits	**347,638**	**366,957**	**377,227**	**340,615**	**381,807**	**373,047**	**400,920**	**389,716**	**437,777**	**459,317**	**533,074**
Non-urgent	159,702	123,694	147,747	113,491	131,968	124,034	154,423	124,794	149,064	174,767	244612
Urgent	149,509	184,539	192,236	204,681	201,662	212,400	204,948	211,531	227,335	220,010	246,818
Critical	38,427	58,724	37,244	45,167	48,177	37,101	41,549	53,391	61,378	64,540	41,644
ED Admits	**51,803**	**52,499**	**53,950**	**52,502**	**55,954**	**57,381**	**61,350**	**63,076**	**65,070**	**70,760**	**73,881**
Ratios & Calculations											
ED UR/	279	285	287	253	278	268	282	267	290	297	336
1000 Pop											
% ED Adm to Hosp adm	48.3%	46.9%	47.8%	46.5%	47.6%	49.7%	50.4%	49.7%	49.1%	52.2%	53.2%
ED Admits/	14.9%	14.3%	14.3%	15.4%	14.7%	15.4%	15.3%	16.2%	14.9%	15.4%	13.9%
ED Visits											
ED Visits/	2,107	2,109	1,975	1,703	1,909	1,933	1,900	1,584	1,690	1,701	1,938
ED Tx Stations											
ED Visits/ED	23,176	22,935	25,148	22,708	25,454	24,870	26,728	25,981	29,185	28,707	33,317
% Critical Vists/	11.1%	16.0%	9.9%	13.3%	12.6%	9.9%	10.4%	13.7%	14.0%	14.1%	7.8%
ED Visits											

Source: OSHPD data

* Hospital beds are taken as the total number of General Acute Care beds.

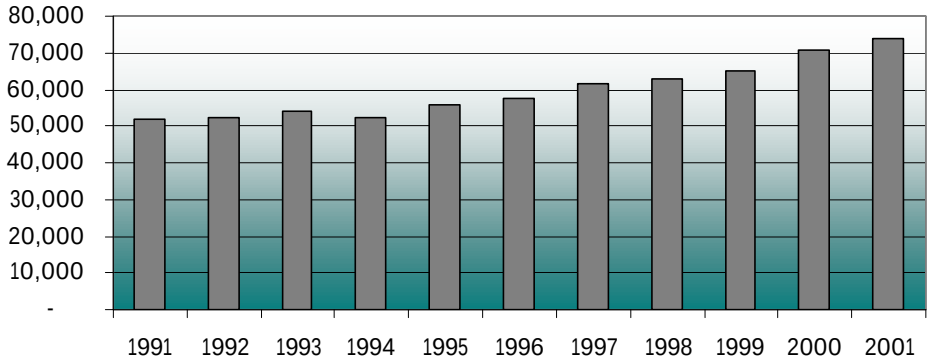
**Hospital admits are takes as the total number of General Acute Care discharges

Riverside ED Visits 1991-2001



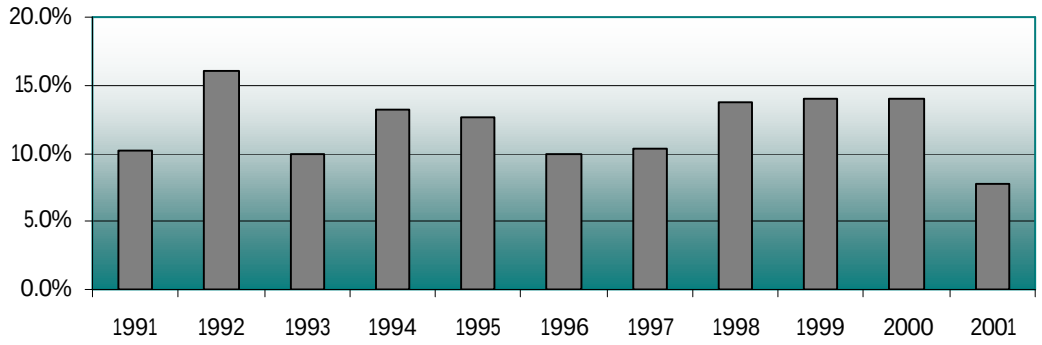
Source: OSHPD data

Riverside ED Admissions 1991-2001



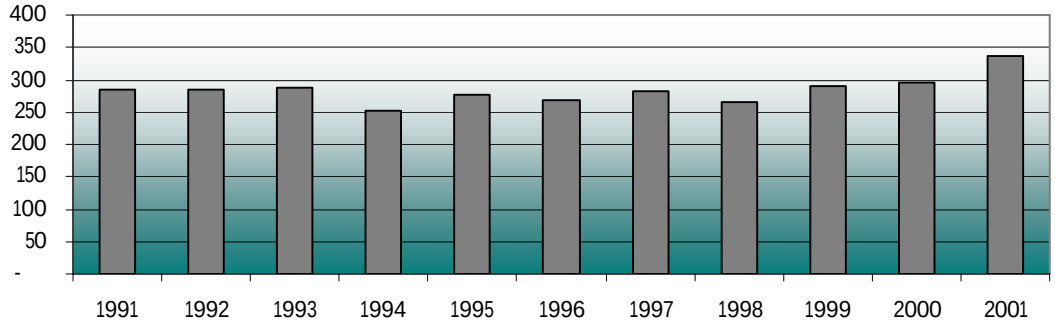
Source: OSHPD data

Percent of Riverside County Critical Visits/ED Visits



Source: OSHPD data

Riverside ED Utilization Rate per 1000 Population



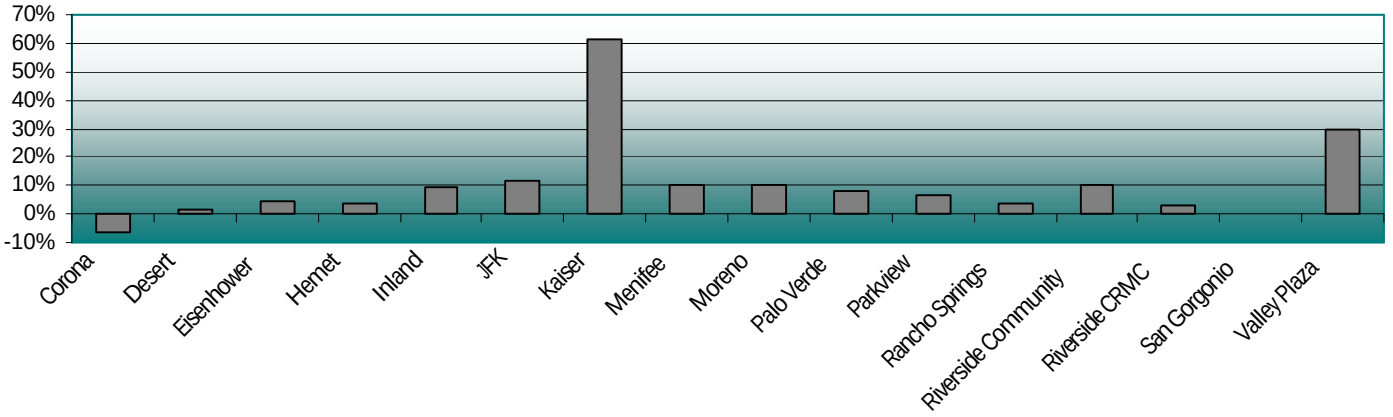
Source: OSHPD data

ED Visits Percent Change 1999-2001		
Hospital	% Change 99-00	% Change 00-01
Corona Regional Medical Center	30%	-6%
Desert Hospital	7%	1%
Eisenhower Memorial Hospital	1%	4%
Hemet Valley Medical Center	9%	4%
Inland Valley Regional Medical Center	9%	9%
JFK Memorial	3%	11%
Kaiser Foundation	99%	61%
Menifee Valley Medical Center	-8%	10%
Moreno Valley Community Hospital	-3%	10%
Palo Verde Hospital	2%	8%
Parkview Community Hospital Medical Center	7%	7%
Rancho Springs Medical Center	9%	4%
Riverside Community Hospital	3%	10%
Riversid County Regional Med Center	6%	3%
San Gorgonio Memorial Hospital	-9%	0%
Valley Plaza Doctors Hospital	n/r	29%

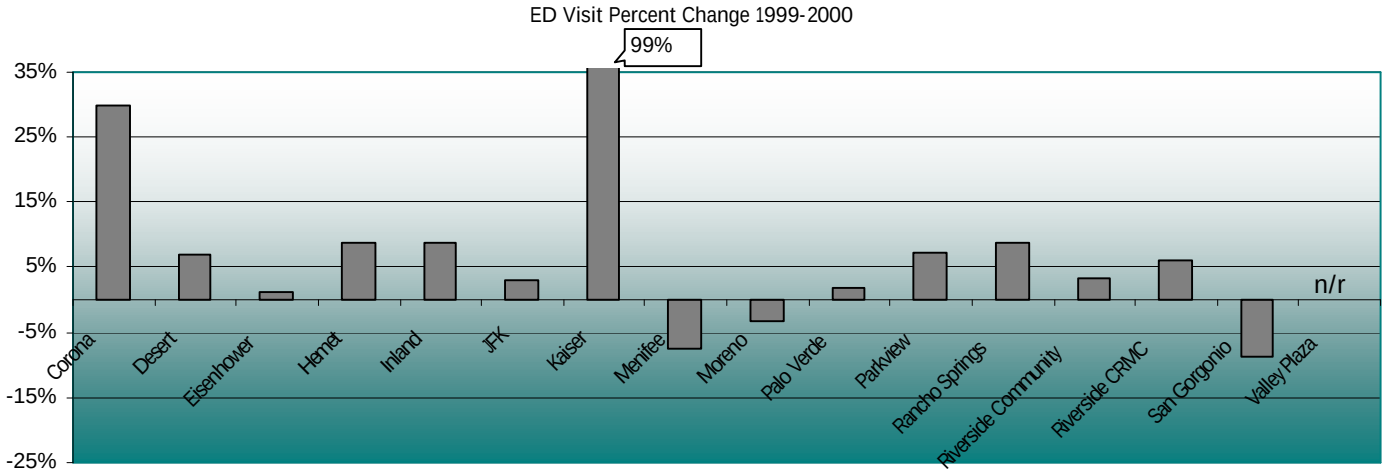
Source: OSHPD data

n/r = Not Reported

ED Visit Percent Change 2000-2001



Source: OSHPD data



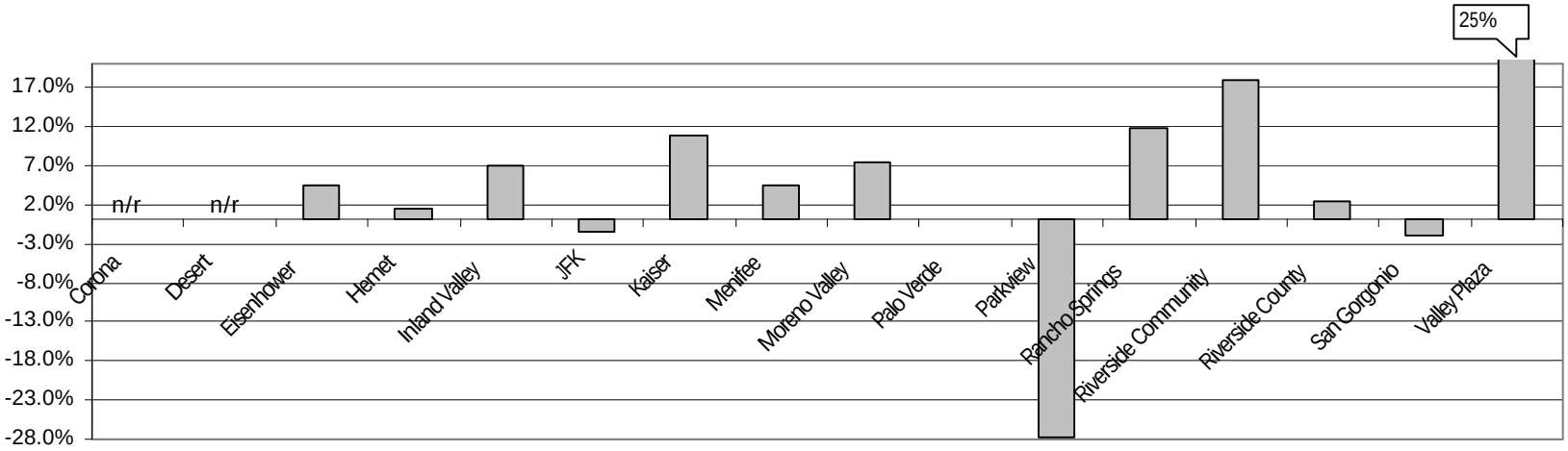
Source: OSHPD data

Hospital ED Visits Average Annual Growth 2000-2002				
Hospital	2000	2001	2002	Avg Annual Growth
Corona Regional Medical Center	n/r	n/r	n/r	_
Desert Hospital	n/r	n/r	45,997	_
Eisenhower Memorial Hospital	35,895	37,498	39,182	4%
Hemet Valley Medical Center	40,231	42,190	41,431	1%
Inland Valley Regional Medical Center	26,277	28,682	30,048	7%
John F Kennedy Memorial Hospital	12,118	12,371	11,782	-1%
Kaiser Foundation Hospital - Riverside	65,526	105,612	80,445	11%
Menifee Valley Medical Center	13,937	15,614	15,184	4%
Moreno Valley Community Hospital	20,472	21,804	23,620	7%
Palo Verde Hospital	n/r	n/r	10,219	_
Parkview Community Hospital Medical Center	32,749	34,806	17,133	-28%
Rancho Springs Medical Center	20,315	22,347	25,399	12%
Riverside Community Hospital	40,149	44,192	55,897	18%
Riverside County Regional Medical Center	63,140	63,732	66,296	2%
San Gorgonio Memorial Hospital	15,490	15,044	14,875	-2%
Valley Plaza Doctors Hospital	4,319	5,753	6,758	25%

Source: Individual Hospitals

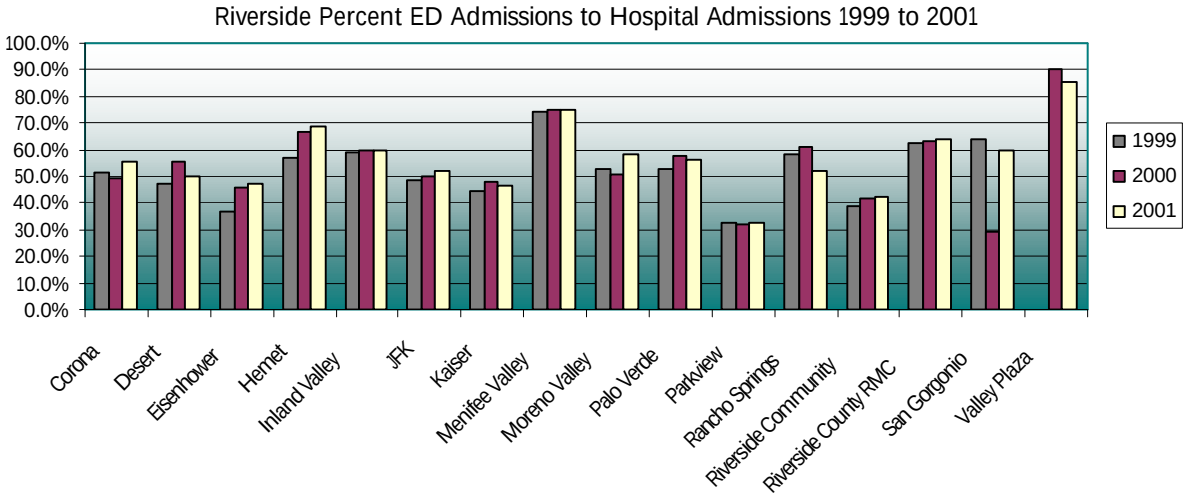
n/r = Not Reported

ED Visit Average Annual Growth 2000-2002



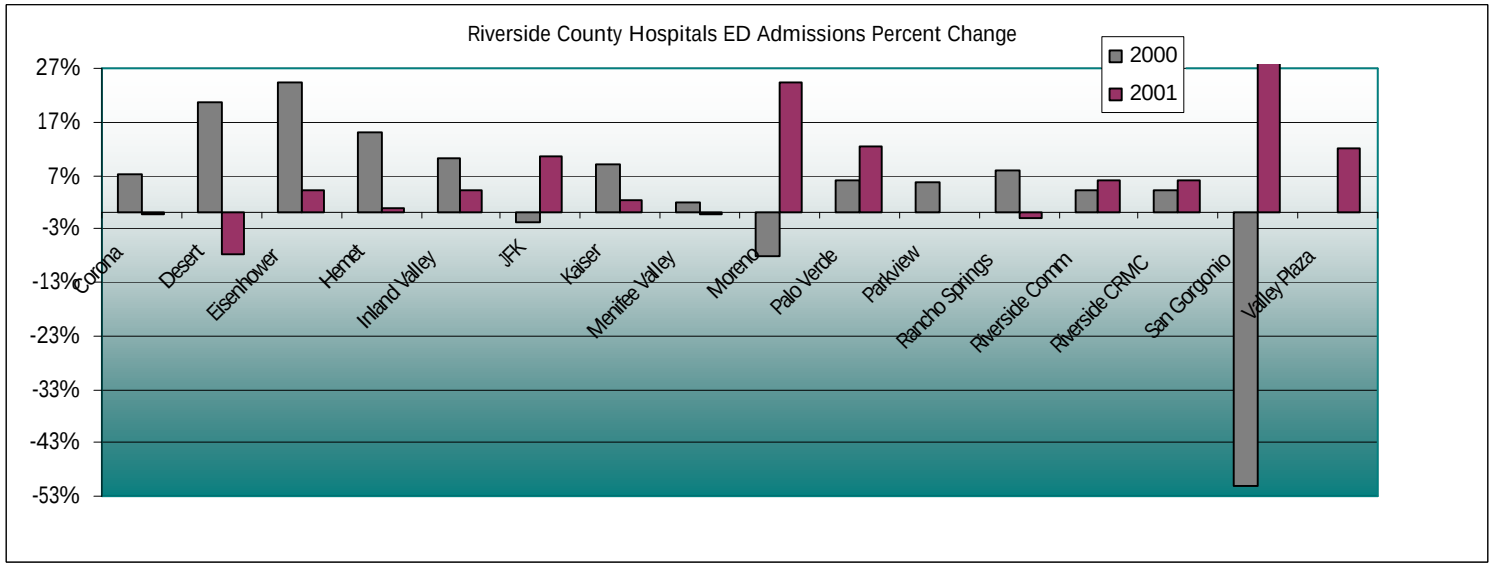
Riverside Percent ED Admissions to Hospital Admissions			
Hospital	1999	2000	2001
Corona Regional Medical Center	51.2%	49.6%	55.5%
Desert Hospital	46.9%	55.2%	50.2%
Eisenhower Memorial Hospital	36.9%	46.2%	47.1%
Hemet Valley Medical Center	57.2%	66.5%	68.5%
Inland Valley Regional Medical Center	59.0%	59.5%	60.0%
John F Kennedy Memorial Hospital	48.7%	49.9%	52.2%
Kaiser Foundation Hospital - Riverside	44.4%	47.9%	46.4%
Menifee Valley Medical Center	74.0%	75.0%	74.8%
Moreno Valley Community Hospital	53.0%	50.7%	58.4%
Palo Verde Hospital	52.9%	57.4%	56.1%
Parkview Community Hospital Medical Center	32.6%	31.8%	32.5%
Rancho Springs Medical Center	58.3%	61.4%	52.2%
Riverside Community Hospital	39.1%	41.6%	42.4%
Riverside County Regional Medical Center	62.7%	62.9%	63.7%
San Gorgonio Memorial Hospital	64.2%	29.0%	59.8%
Valley Plaza Doctors Hospital	0.0%	90.6%	85.6%
Total	**49.1%**	**52.2%**	**53.2%**

Source: OSHPD data



Riverside ED Admissions Percent Change		
Hospital	2000	2001
Corona Regional Medical Center	7%	0%
Desert Regional Medical Center	21%	-8%
Eisenhower Medical Center	24%	4%
Hemet Valley Medical Center	15%	1%
Inland Valley Regional Medical Center	10%	4%
JFK Memorial Hospital	-2%	11%
Kaiser - Riverside	9%	2%
Menifee Valley Medical Center	2%	0%
Moreno Valley Community Hospital	-8%	24%
Palo Verde Hospital	6%	12%
Parkview Community Hospital	6%	0%
Rancho Springs Med Ctr	8%	-1%
Riverside Community Hospital Medical Center	4%	6%
Riverside County Regional Medical Center	4%	6%
San Gorgonio Memorial Hospital	-51%	102%
Valley Plaza Doctors' Hospital	0%	12%

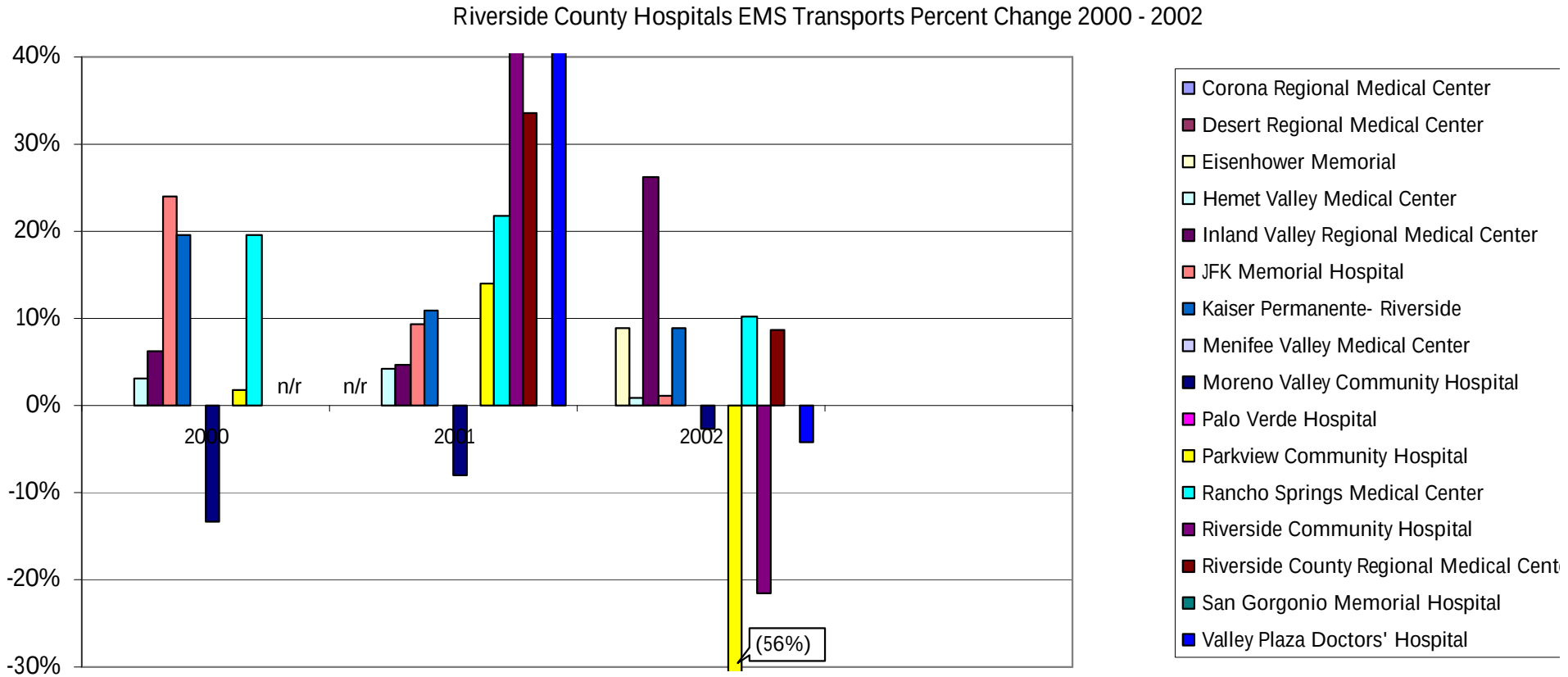
Source: OSHPD data



EMS Transports % Change			
Hospital	2000	2001	2002
Corona Regional Medical Center	n/r	n/r	n/r
Desert Hospital	n/r	n/r	n/r
Eisenhower Memorial Hospital	n/r	n/r	9%
Hemet Valley Medical Center	3%	4%	1%
Inland Valley Regional Medical Center	6%	5%	26%
John F Kennedy Memorial Hospital	24%	9%	1%
Kaiser Foundation Hospital - Riverside	20%	11%	9%
Menifee Valley Medical Center	n/r	n/r	n/r
Moreno Valley Community Hospital	-13%	-8%	-3%
Palo Verde Hospital	n/r	n/r	n/r
Parkview Community Hospital Medical Center	2%	14%	-56%
Rancho Springs Medical Center	20%	22%	10%
Riverside Community Hospital	n/r	60%	-21%
Riverside County Regional Medical Center	n/r	33%	9%
San Gorgonio Memorial Hospital	n/r	n/r	n/r
Valley Plaza Doctors Hospital	n/r	79%	-4%

Source: Individual Hospitals
n/r = Not Reported

Parkview close for period of 2001

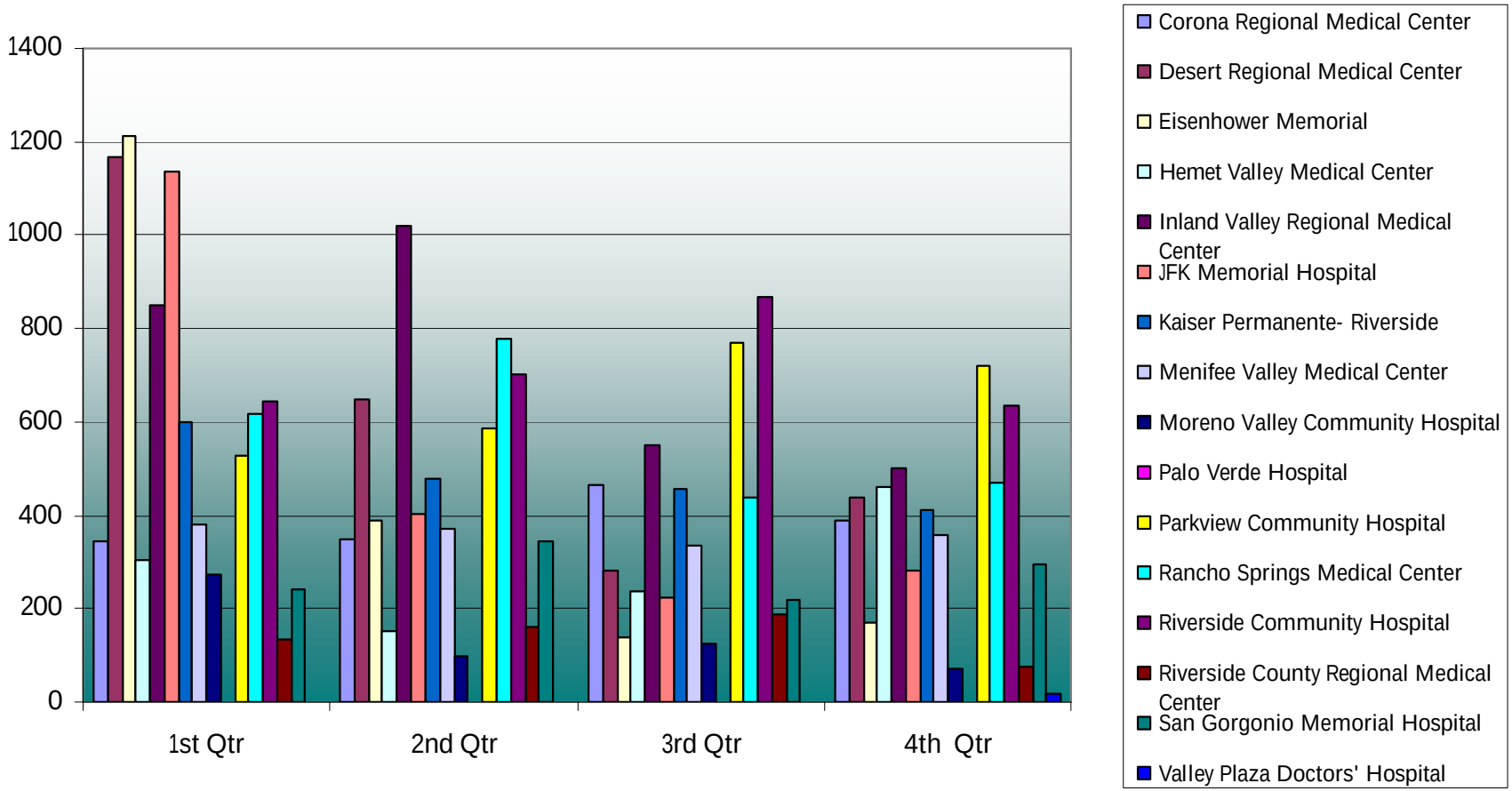


Source: Individual Hospitals
n/r = Not Reported

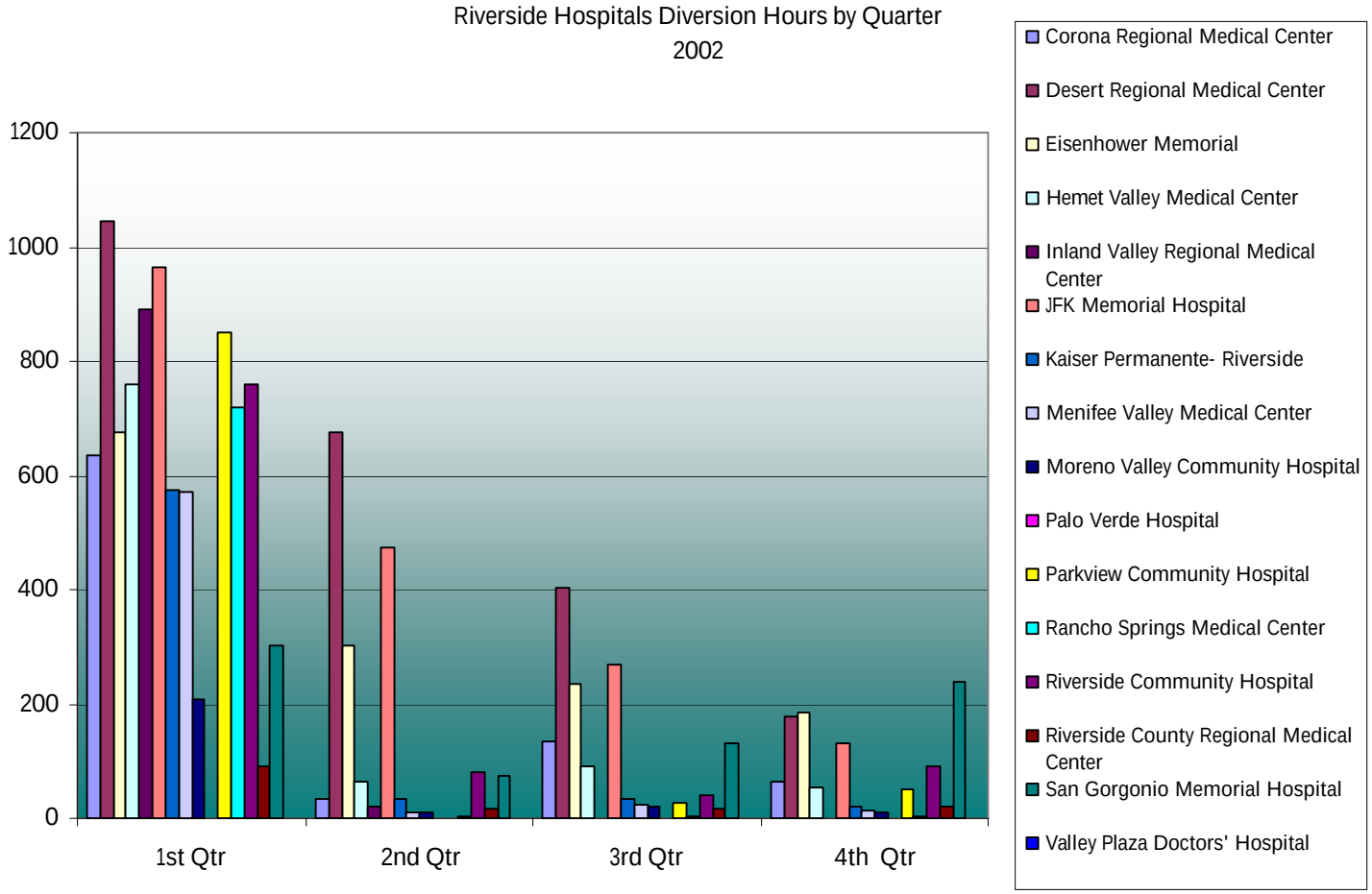
Riverside County Diversion Hours				
Hospital	**2000**	**2001**	**2002**	**2003 Annualized**
Corona Regional Medical Center	874	1,545	866	470
Desert Regional Medical Center	448	2,536	2,307	1,212
Eisenhower Medical Center	486	1,912	1,395	1,444
Hemet Valley Medical Center	401	1,157	970	376
Inland Valley Regional Medical Center	2,040	2,922	912	0
JFK Memorial Hospital	352	2,040	1,839	1,050
Kaiser Foundation - Riverside	568	1,945	660	126
Menifee Valley Medical Center	431	1,449	619	90
Moreno Valley Community Hospital	199	569	247	30
Palo Verde Hospital	0	0	0	0
Parkview Community Hospital	1,584	2,604	929	156
Rancho Springs Medical Center	1,546	2,305	727	4
Riverside Comm Hospital	1,465	2,852	970	386
Riverside County Regioanal Medical Center	229	559	146	242
San Gorgonio Memorial Hospital	595	1,102	749	1,484
Valley Plaza Doctors' Hospital	0	17	0	0
Total Diversion Hours	**11,217**	**25,512**	**13,336**	**7,070**

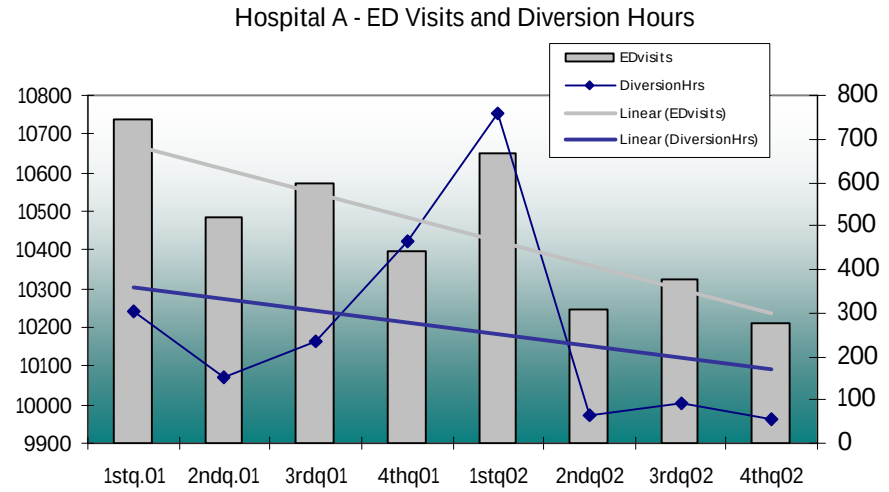
Source: RCEMSA data

Riverside Hospitals Diversion Hours by Quarter
2001



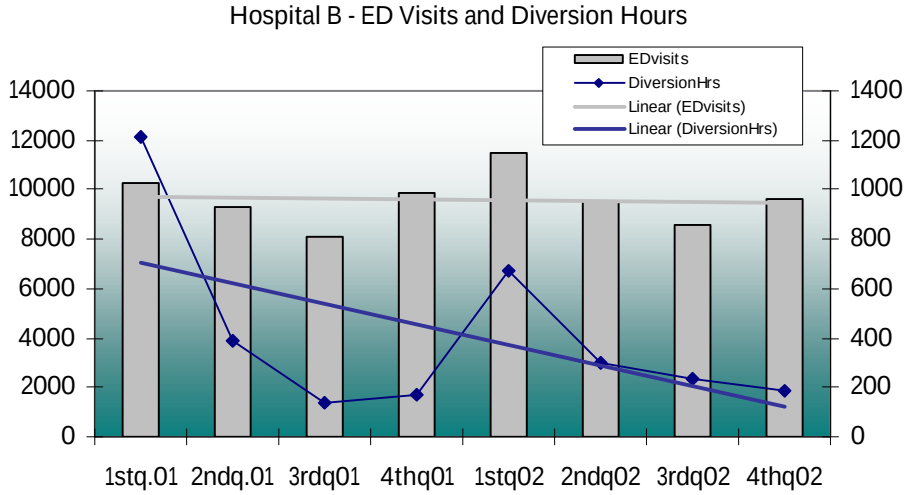
Source: RCEMSA data


Riverside Hospitals Diversion Hours by Quarter
2002
1200
1000
800
600
400
200
0
1st Qtr
2nd Qtr
3rd Qtr
4th Qtr
Corona Regional Medical Center
Desert Regional Medical Center
Eisenhower Memorial
Hemet Valley Medical Center
Inland Valley Regional Medical Center
JFK Memorial Hospital
Kaiser Permanente- Riverside
Menifee Valley Medical Center
Moreno Valley Community Hospital
Palo Verde Hospital
Parkview Community Hospital
Rancho Springs Medical Center
Riverside Community Hospital
Riverside County Regional Medical Center
San Gorgonio Memorial Hospital
Valley Plaza Doctors' Hospital

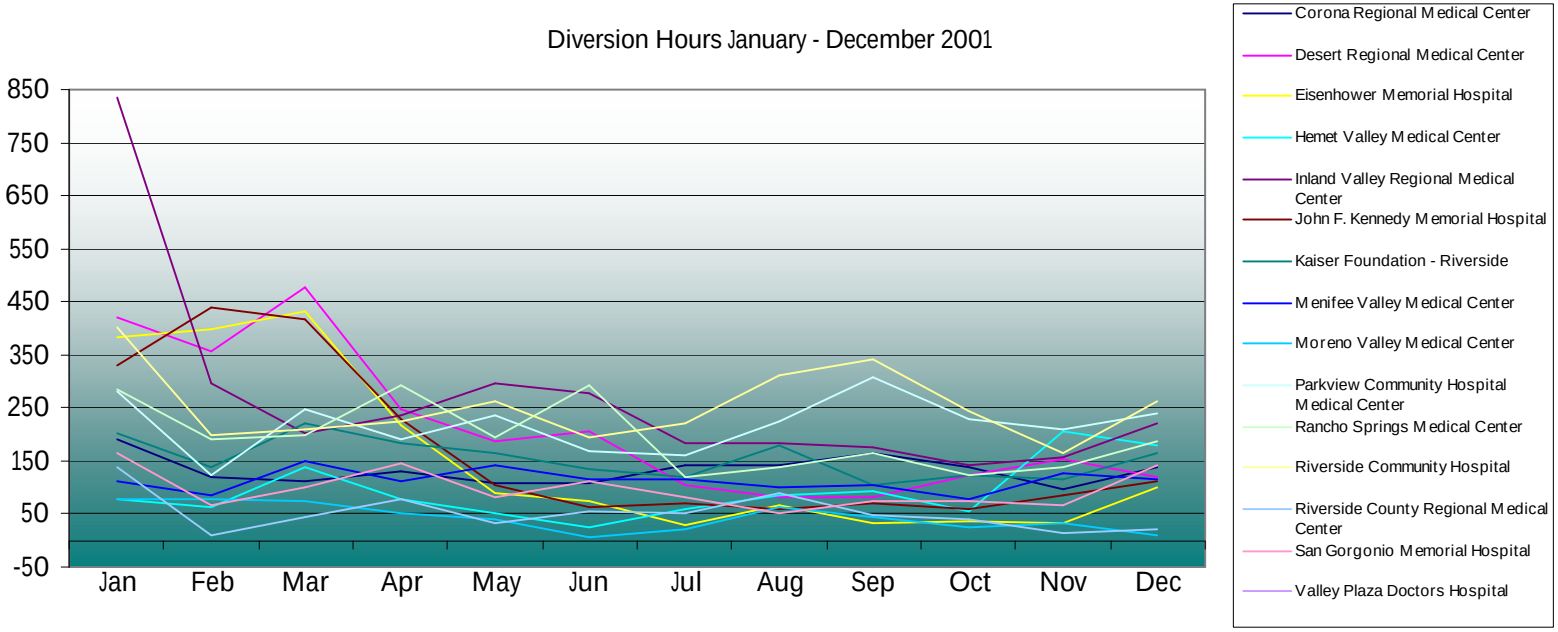


Source: RCEMSA data

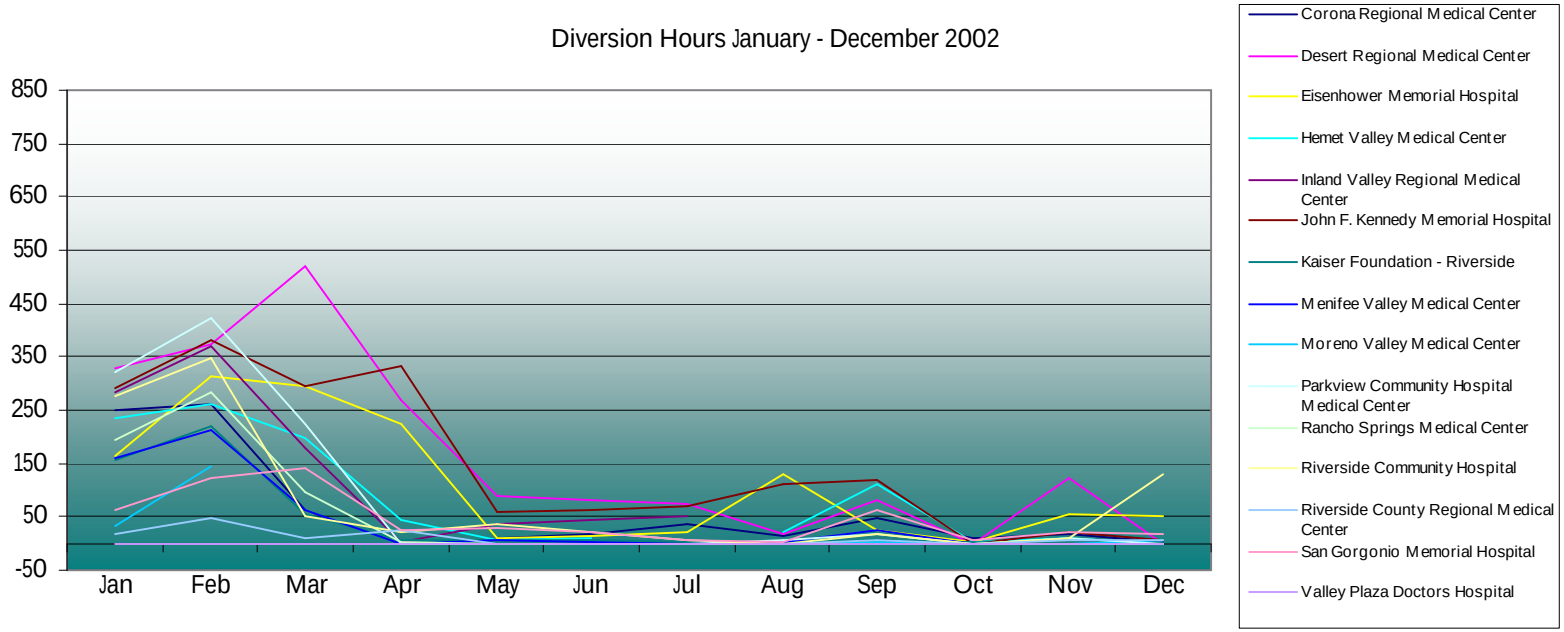
Source: Individual Hospital



Source: Individual Hospital

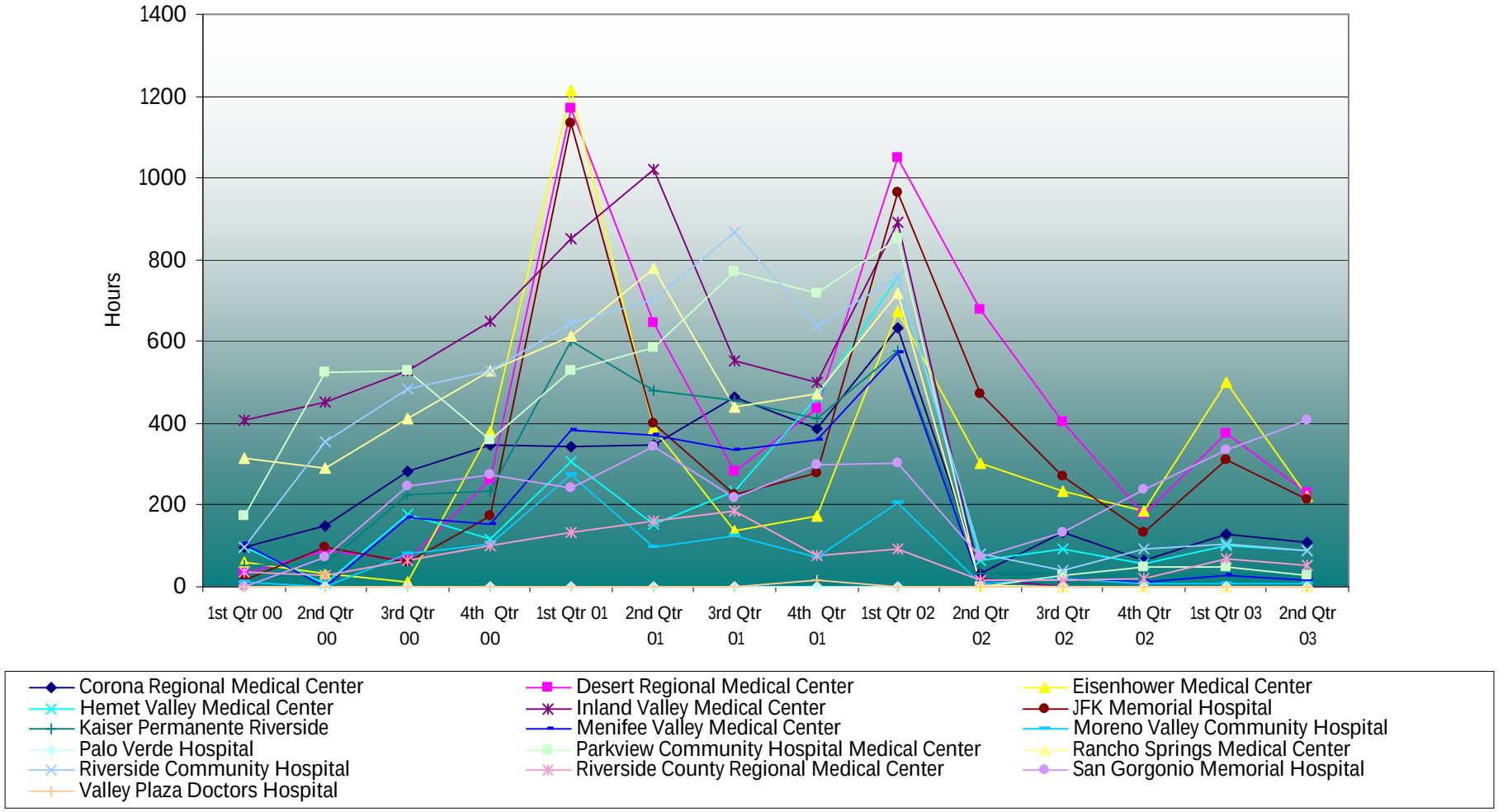


Source: Reddinet data



Source: Reddinet data

Diversion Hours from 1st quarter 2000 to 2nd quarter 2003



Source: RCEMSA data

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