WHEN EMERGENCY ROOMS CLOSE:

Ambulance Diversion
in the West San Fernando Valley

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Executive Summary

Los Angeles County allows an overcrowded emergency room to close its doors to additional paramedic transports, a procedure known as “diversion.” During these temporary closures, which come with little warning, paramedics scramble to find the next closest facility. They must drive longer distances, delaying patient care and prolonging response times to new incidents. In addition, other hospitals must shoulder the increased patient load when one emergency room takes itself out of the network.

This study constitutes one of the first comprehensive studies of diversion in Los Angeles County. It focuses on the West San Fernando Valley, a region noted for its higher-than-average diversion rates. This project analyzes the impact of diversion on the West Valley, identifies major problems related to diversion, and proposes recommendations to reduce inappropriate emergency room closures in this region.

FINDINGS

This analysis found that one in seven emergency patients is diverted due to emergency room crowding. At the same time, individual hospitals may not see a dramatic decline in patient volume while on diversion. On the contrary, a hospital on diversion still takes in more than half of its ambulance runs. Diversion may reduce a hospital’s probability of receiving patients, but it by no means closes an emergency room to all transports.

In addition, as more hospitals close, fewer patients are diverted, further eroding diversion’s value as a volume control mechanism. Once all hospitals are closed to paramedic transport, everyone is open to paramedic transport. The system reverts back to status quo, making diversion irrelevant. Diversion, then, seems a poor tool for communicating emergency room crowding.

PROBLEMS

This study identifies three broad policy problems that contribute to high diversion rates and emergency room closures when no crowding exists:

1. Policies and Compliance: The county does not adequately define emergency room saturation. Neither the county nor hospitals comply to existing regulations.
2. Coordination and Communication: Insufficient coordination within and among hospitals may increase diversion. In addition, diversion is not a descriptive communication tool.
3. Oversight and Consequences: There is no real-time monitoring of diversion or consequences for inappropriate diversions.

This study recommends policy solutions for each of these problems.
Executive Summary

ONE: POLICIES AND COMPLIANCE

✓ The county provides stricter guidelines for hospital diversion policies. The county should provide criteria and chains of command that hospitals must include in their internal diversion policies. Criteria should more clearly define emergency room “saturation,” and they should detail inappropriate reasons for invoking diversion.

✓ The county steps up enforcement of its policy. The county should begin to conduct unannounced site visits, require hospitals to maintain a current diversion policy on file with the county, and set regular deadlines for county and hospital policy review.

TWO: COORDINATION AND COMMUNICATION

✓ Each hospital should include a throughput plan as part of its diversion policy. The county policy should encourage hospitals to create a plan that maximizes efficiency in moving patients from the emergency room to other hospital departments. The EMS Agency should require a throughput plan from base hospitals and trauma centers as part of their contractual obligations.

✓ Hospitals must notify the base hospital before initiating diversion. Prior to going on diversion, emergency rooms must call and notify the base hospital.

✓ County establishes a regional working group. The county should establish a working group of the five West Valley hospitals to expose hospitals to more efficient operating techniques and best practices in a nonadversarial, nonjudgmental forum and to establish relationships among hospitals.

✓ County should maintain current diversion alert system. Even though diversion remains a crude “yes/no” communication tool, it is not technically nor fiscally feasible to change the system and add more variable dimensions at this time.

THREE: OVERSIGHT AND CONSEQUENCES

✓ Hospitals monitor their own diversion status. After six hours, hospitals must call the county to receive a waiver in order to remain on diversion. Otherwise, hospitals must open for a predetermined amount of time.

✓ County works with high-diversion hospitals in a threshold review procedure. If a hospital surpasses a 30 percent diversion rate for two consecutive months, the county would initiate a quality review process, which may involve warning letters, increased site visits, or the formation of an internal hospital task force to address diversion.

Ambulance diversions strain an already beleaguered EMS system. Paramedics must drive farther distances, hampering their ability to respond to incoming 9-1-1 calls; hospitals lose money when ambulance patients are turned away; and patients may suffer adverse medical outcomes. Reducing diversion events – particularly inappropriate events – will improve systemwide efficiency.

APP: When Emergency Rooms Close
Introduction

Los Angeles County runs one of the largest multi-jurisdictional emergency medical systems in the country. Spanning more than 4,000 square miles from the Antelope Valley to the tip of San Pedro, the Emergency Medical System handles 9-1-1 calls, ambulance transports, emergency room care, and trauma centers for some 10 million residents spread across 88 cities.¹

This daunting task requires a carefully orchestrated network of 76 public and private hospitals fielding patients from dozens of different city- and county-run paramedic units. Each month, more than 18,000 EMS personnel handle 20,000 emergency calls, responding to critically ill patients 24 hours a day, seven days a week.²

In such a complex, interconnected system, even the slightest misstep can trigger a devastating chain reaction. Paramedics rely on emergency room personnel to quickly unload patients so they can return to the field; emergency room personnel rely on hospital inpatient wards to quickly admit patients so they can clear beds for new cases; and the county relies on smooth transitions among all agencies so the network functions with maximum efficiency. A backup at any one stage can have systemwide impacts.

Not surprisingly, backups can – and often do – occur. Rarely a day goes by when emergency rooms do not yield under the strain and close their doors to additional paramedic transports, a procedure known as “diversion.” The volume of emergency patients, coupled with limited resources, forces hospitals to turn away ambulances for hours – and sometimes days – at a time.

During these temporary closures, which come with little warning, paramedics scramble to find the next closest facility. They must drive longer distances, delaying patient care and prolonging response times to new incidents. In addition, other hospitals must shoulder the increased patient load when one emergency room takes itself out of the network. Thus, one hospital’s decision to close, even for a short time, can upset the entire system.

On average, Los Angeles County hospitals spend one of every four hours on diversion,³ a proportion certain to rise amid mounting pressures on the health care system.

Despite the prevalence of diversion, the county knows surprisingly little about its impacts. Among the mysteries:

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³ Data provided by Emergency Medical Services Agency.

APP: When Emergency Rooms Close
Introduction

- How many patients actually are diverted?
- Under what conditions do hospitals go on diversion?
- How does one hospital’s diversion status affect other hospitals?

Though the county tracks diversion hours, it has not conducted a comprehensive analysis. As a result, diversion debates rely heavily on anecdotes, speculation, and spotty evidence. Its effectiveness as a policy remains unclear.

OVERVIEW

Nationwide, two out of three hospitals go on diversion at least once a year, while one out of 10 spend more than 20 percent of the year on diversion. Areas with high diversion rates typically have large populations, high population growth in recent years, and an above-average proportion of patients without health insurance. Predictably, fast-growing Los Angeles County, where one in four residents does not have health insurance, has one of the highest diversion rates in the country. At any one time, 25 percent of hospitals are not accepting new patients, and this rate has stayed roughly constant since 2001.

Federal and state laws guarantee a patient’s access to emergency care regardless of race, ethnicity, sex, economic status, medical condition, or ability to pay, and emergency rooms cannot turn away patients for any reason. Thus, diversion is only a request. Hospitals ask that paramedics transport to another facility, and paramedics either respect or ignore the appeal. If the paramedics go to an emergency room on diversion, the hospital must accept the patient. In general, paramedics try to respect diversion requests.

In Los Angeles County, emergency rooms receive two types of ambulances, and they can divert only one of these types. Hospitals may divert Advanced Life Support (ALS) units, which respond to 9-1-1 calls and come equipped with highly trained firefighter/paramedics. They cannot divert Basic Life Support (BLS) units, which are staffed by emergency medical technicians and treat non-life threatening injuries. ALS

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5 ibid.
6 Extrapolated from GAO data.
7 Emergency Medical Services Agency.
8 Emergency Medical Treatment and Active Labor Act (Patient Anti-Dumping Act), 42 USC 1395dd; California Health and Safety Code Section 1317.
9 Based on multiple interviews with paramedics.
10 The county does not divert BLS ambulances for two reasons: (1) Because these patients do not have life-threatening ailments, the county assumes the patients can wait in a crowded emergency room with few adverse impacts, and (2) BLS ambulances are not equipped with the computer system that broadcasts hospital diversion statuses, so the EMTs cannot readily identify closed emergency rooms. ALS units can divert because a long wait time may seriously impact patient health.

APP: When Emergency Rooms Close
Introduction

units – generally transporting the most critically ill patients – respond to roughly 75 percent of all incidents, and BLS the rest.11 On its own, diversion is not a problem. In fact, if used appropriately, diversion provides a critical communication tool. An emergency room that closes its doors sends a very clear message to paramedics: We are busy. Going to a busy emergency department means long wait times for paramedics, who cannot leave until they have transferred the patient to hospital personnel.

Yet this communication tool only works if hospitals use diversion sparingly and for short time periods, as originally intended.12 Instead, the overuse of diversion has minimized its communicative value. Today, the county mainly uses diversion hours to track general emergency room crowding trends, not as a true indicator of crowding in any one instance.

Hospitals vigorously defend diversion, seeing it as one of the few “safety valves” in a system overwhelmed and underfunded.13 Yet diversion increases pressure on the entire EMS system. When one hospital goes on diversion, others usually follow. A recent study found that when one emergency room committed to no diversion for a week, the neighboring hospital’s diversion hours dropped substantially, holding constant the patient volume.14 This study indicates that one hospital’s diversion status can profoundly impact other hospitals, setting off a systemwide chain reaction.

A COSTLY PROBLEM

When an emergency room closes its doors, the system feels the strain. Paramedics, hospitals, and patients incur costs every time diversion occurs.

Diversion forces paramedics to drive farther distances, taking them out of service for a longer time period. If paramedics go to a hospital on diversion, they must wait to transfer their patient. One out of eight Los Angeles City Fire Department ambulances waits 27 minutes or more for an available gurney, and 8 percent wait more than an hour.15 Every day, the equivalent of two ALS units is out of service while paramedics sit in a crowded emergency room.16 These waits place a time cost and financial strain on fire departments.

Also, diversion can affect a hospital’s bottom line. Patients who come by ambulance, particularly ALS ambulance, tend to be the most critical. Often, these patients require

13 Interview with Mark Gamble, Regional Vice President, Hospital Association of Southern California.
16 Emergency Medical Services Agency
Introduction

hospital admission for further testing and care. Every emergency patient admitted into the hospital generates $1,220 in profit\(^{17}\) compared to a loss of $80 for each emergency patient not admitted.\(^{18}\) Thus, a hospital that diverts ALS ambulances loses its most profitable patients. “Those are your customers,” says Mark Gamble of the Hospital Association of Southern California. “It’s like closing a restaurant when you get busy.”

Lastly, patients suffer the costs of diversion. For one, patients who cannot go to their preferred hospital because of diversion often require interfacility transfers later down the road. These transfers delay medical examinations and prolong hospital stays as the facilities exchange patient records and arrange for private ambulance transport.\(^{19}\) Secondly, family members must travel farther to visit sick loved ones in a faraway hospital.

More importantly, diversion may negatively impact patient outcomes. In one study, severely injured trauma patients in Houston had mortality rates twice as high on days when both trauma centers were on diversion as on days with no diversion.\(^{20}\) Another study found that diversion increased delays for cardiac patients, with an additional 3 minutes in transport time amounting to a month of life lost for each patient.\(^{21}\) This trend persisted even when hospitals agreed to override diversion for the most critically ill patients. Adverse patient outcomes, in turn, may exacerbate health care costs, as patients require more intensive and expensive treatments, further burdening a struggling system.

DIVERSION: NO END IN SIGHT

Unfortunately, no evidence suggests that diversion rates will decline on their own. If anything, diversion seems likely to rise over the next few years as the demand for emergency care increases and the supply of emergency rooms decreases. In California, critical emergency room visits increased 59 percent over the past decade, while the number of staffed critical care beds decreased 4 percent.\(^{22}\)

A growing elderly population coupled with increasing numbers of uninsured patients will boost the demand for emergency care over the next few decades. California’s elderly population is growing at twice the rate of the total population, and by 2020, 14 percent of the nation’s elderly will live in this state.\(^{23}\) In that same time period, Los Angeles

\(^{17}\) California HealthCare Foundation. “California’s Emergency Departments: Do They Contribute to Hospital Profitability?” Issue Brief, July 2003.
\(^{19}\) Vilke et al., 2004.
\(^{22}\) Emergency Medical Services Agency
\(^{23}\) ibid.
**Introduction**

County’s elderly population will grow 50 to 100 percent.\(^\text{24}\) The elderly require more intensive emergency health care services than the younger population, sure to strain the ailing system.

At the same time, more people – particularly those without health insurance – rely on emergency rooms for non-emergency care, whether they walk into emergency rooms on their own or call 9-1-1 for ambulance transport. One in four Los Angeles County residents has no health insurance, and these residents often use the emergency room as their family physician or go there when their untreated chronic conditions turn critical.\(^\text{25}\) More and more, emergency rooms also draw HMO patients who must wait weeks or months to see a doctor or specialist.\(^\text{26}\) Nationwide, emergency room visits climbed 23 percent from 1992 to 2002 as more patients sought primary health services from their local hospital.\(^\text{27}\)

Although many of these patients walk into the emergency room, a sizeable proportion of them call 9-1-1 for ambulance transports. One study found that 22.4 percent of patients who called 9-1-1 did not believe they had true emergencies, and 47 percent of them had alternative transportation to the hospital but chose not to use it.\(^\text{28}\) Fears of litigation encourage paramedics to transport non-emergency patients, and Los Angeles City Fire Department mandates that ALS units take patients to emergency rooms regardless of their symptoms.\(^\text{29}\) Emergency rooms, then, grapple with jammed ambulance bays on top of full waiting rooms.

Importantly, non-emergency patients, particularly “walk-ins,” do not significantly impact ambulance diversions.\(^\text{30}\) Yet these patients, mostly uninsured with no means to pay, strain a hospital’s financial resources and put many emergency rooms in the red. Uncompensated care often cancels out the profits generated by critically ill ambulance patients, resulting in net losses for emergency rooms.

California hospitals lose $460 million a year on their emergency departments,\(^\text{31}\) including $143 million lost annually among Los Angeles County hospitals. This financial hit has forced many hospitals to shutter their emergency departments.\(^\text{32}\)

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\(^\text{24}\) ibid.
\(^\text{26}\) ibid.
\(^\text{29}\) Multiple interviews
\(^\text{30}\) Studies have found that “walk-ins” require far less attention than patients who arrive by ambulance. Thus, while walk-ins may increase waiting room times and make an emergency room look crowded, they have no significant impact on ambulance diversions, according to Schull et al. (2003). Schull found that ambulance-delivered patients most often contributed to diversion, because these patients require more services, stay longer in the emergency department, and usually must wait for an inpatient bed.
\(^\text{32}\) ibid.

*APP: When Emergency Rooms Close*
Introduction

Angeles County has seen a 21 percent decrease in emergency rooms over the last decade, and six emergency rooms closed in the last 14 months.\textsuperscript{33}

With patient volume increasing and capacity decreasing, diversion will only worsen in Los Angeles County if left unchecked. Fortunately, case studies suggest that diversion has as much to do with management practices and operational efficiency as it does with external factors.\textsuperscript{34} Thus, the county may be able to reduce diversion and boost systemwide efficiency even without building more hospitals.

ABOUT THIS STUDY

Despite the seeming costs and problems associated with diversion, the Los Angeles County Emergency Medical Services Agency knows very little about this phenomenon. Although it tracks diversion hours for each hospital, the county has not determined how many patients get diverted during these closures, nor has it conducted an in-depth analysis of diversion patterns within and across hospitals.

Our project provides this analysis, and as such, it constitutes one of the first comprehensive studies of diversion in Los Angeles County. We focused our study on the West San Fernando Valley, a region noted for its higher-than-average diversion rates. Through rigorous data analysis, dozens of interviews, and a review of hospital and county policies, we identified three major problems contributing to high diversion rates in the West Valley and proposed ways to mitigate these problems, thereby reducing inappropriate diversion episodes.

Specifically, we analyzed more than 10,000 ambulance incident reports and nearly 2,500 diversion events in the West Valley for a one-year period. Using a combination of software programs (Matlab, Excel, and STATA), we assessed diversion patterns by year, month, day of week, duration, and by hospital, and we determined the number of patients diverted under various scenarios. Then, we interviewed hospital administrators, charge nurses, Los Angeles City paramedics, and county officials\textsuperscript{35} and reviewed diversion policies from six California counties. Throughout this process, we tried to keep in mind three perspectives: the patient, the hospital, and the region.

Ultimately, our study reveals that diversion has lost its value as a communication tool, at least in the West Valley. Thus, our recommendations aim to restore diversion’s value by reducing inappropriate emergency room closures in this region.

\textsuperscript{33} ibid.
\textsuperscript{34} Vilke et al., 2004.
\textsuperscript{35} Due to the topic’s sensitive nature and the limited scope of our study, we withheld names and titles to avoid embarrassment or retaliation.
Introduction

WHAT THIS STUDY DOES NOT DO

Doubtless, the increased patient volume and shrinking supply of emergency rooms contribute substantially to diversion. Yet these issues require nothing short of wholesale health care reform. Thus, our study does not propose ways to reduce patient volume nor to increase hospital capacity. Instead, we focus on management practices and policy changes to curtail inappropriate diversion events.

Furthermore, we do not propose ways to boost internal efficiency within individual hospitals, a task outside the scope of the county EMS Agency, nor do we recommend changes within fire departments and paramedic units.

Also, we do not assess diversion’s impact on patient health, because the county does not track health outcomes for 9-1-1 patients beyond transfer to the emergency room. We recognize that patient health represents a primary concern, but without specific data, we do not wish to speculate on the possible link between diversion and patient outcomes. In light of this gap in our own study, we urge the county to begin collecting health outcome data for future research.

Lastly, we caution against drawing countywide conclusions from our data analysis. We focused on a very specific region, and these results are not generalizable to the rest of the county. At the same time, we believe our recommendations would benefit the entire EMS network.
Diversion in the West San Fernando Valley

We focused on the five hospitals in the West San Fernando Valley region: Encino-Tarzana Regional Medical Center in Encino; Encino-Tarzana Regional Medical Center in Tarzana; Kaiser Permanente Woodland Hills Medical Center in Woodland Hills; Northridge Hospital Medical Center in Northridge; and West Hills Hospital and Medical Center in West Hills. Northridge is the region’s base hospital, contracted by the county to provide medical advice to paramedics in the field.36

Map 1

Emergency Rooms in the West San Fernando Valley

Source: ESRI and California Office of Statewide Health Planning and Development

The county tracks diversion events for each hospital. Separately, it maintains patient incident reports from base hospitals. These base hospital reports provide details about every ALS incident, including the closest emergency room, the actual emergency room to which paramedics transported the patient, and reasons, if any, for diverting the patient to a facility other than the closest hospital. Reasons include emergency room saturation (overcrowding), unavailable neurosurgeon, trauma overload, lack of CT scanner, urgent pediatric care, and internal disaster.37

The county maintains diversion events and base hospital reports in completely different computer systems. Thus, it has not been able to determine the impact of diversion events on individual ALS incidents. Prior to this study, the county had no idea how many patients were diverted overall and, more specifically, how many were diverted during emergency room closures. We used the data in the county systems to examine diversion rates and patient diversions in the West San Fernando Valley region from July 2003 to June 2004. For a detailed look at the methodology used in this analysis, see Appendix A.

36 Base hospitals have a registered nurse on call at all times to field calls from paramedics, who need medical approvals before administering certain types of medication.
37 Internal disaster occurs when a hospital cannot receive patients due to a physical plant breakdown, including power outage, fire, and loss of water. For more details on these six reasons, see Appendix C.
Diversion in the West San Fernando Valley

**THE WEST VALLEY SITUATION**

West Valley hospitals went on diversion 2,488 times from July 1, 2003 to June 30, 2004. These events ranged in duration from one minute to nearly 89 hours. The average event lasted 5 hours and 5 minutes with a median event of 3 hours and 39 minutes.

Each hospital spent at least 15 percent of the year on diversion. Encino had the lowest diversion rate (15.5 percent) and Northridge had the highest (43.2 percent). We also detected seasonal patterns. December and January – the flu season – were the two busiest months respectively. In December 2003, Northridge spent 65 percent of the time on diversion. Day of week also influenced diversion rates, from a low on Tuesdays to a high on Mondays.

![Figure 1](image-url)

Source: Analysis by Mihal and Moilanen

**Patients diverted**

Overall, 2,651 patients – roughly 26.3 percent of ambulance transports – were diverted from West Valley hospitals between July 2003 and June 2004. Of these, more than half (52.4 percent) were diverted due to emergency room saturation.

Thus, paramedics diverted roughly one of every seven patients because of crowding at the nearest hospital.

Northridge diverted the most ambulance runs, accounting for nearly half of all diversions, followed by West Hills, Tarzana, and Kaiser. Encino diverted the fewest patients with less than 5 percent of the total.
To assess the link between emergency room closures and patient diversion, we identified the diversion status of the nearest and receiving hospitals for every ambulance run. We discovered that the nearest emergency room’s diversion status impacts the percentage of patients diverted.

When the nearest emergency room was open, paramedics took 88 percent of patients there. They diverted nearly 12 percent of patients, more than half of whom had requested another hospital.  

When the nearest emergency room was closed, paramedics took 54 percent of patients there, despite the closed status. Paramedics diverted 46 percent of patients. Of these diverted patients, emergency room saturation played a key role, accounting for three-quarters of all diversions.

**Figure 2**

**Closures at the Nearest Emergency Room**

<table>
<thead>
<tr>
<th>Diversion Does Not Stop Ambulance Transports</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Diversion Graph" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reasons for Patient Diversion Differ by Closure Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Reasons Graph" /></td>
</tr>
</tbody>
</table>

Source: Analysis by Mihal and Moilanen

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38 In addition to the six diversion reasons, paramedics may divert a patient who requests a specific hospital. Before diverting, paramedics assess a patient’s condition and the diversion status of the requested hospital.
Duration

Next, we evaluated the relationship between the duration of a diversion event and the number of patients diverted. We expected to find that longer diversion events would result in fewer patient diversions, as paramedics begin to doubt the validity of a hospital’s overcrowding claim.

Yet we could not draw strong conclusions about duration and patient diversions. We believe our analysis suffers from insufficient data, because only 9 percent of diversion events exceeded 10 hours. Although the analysis loses its statistical validity with so few cases, the data suggest that after a diversion event has lasted longer than six hours, patient diversions begin to decline.

Network Perspective

Lastly, we assessed the impact of multiple emergency room closures at any one time. In nearly one-quarter of incidents, three or more hospitals were on diversion simultaneously, with all five hospitals closed for roughly 3 percent of incidents.

As the number of emergency rooms on diversion increased, so did the percent of patients diverted – up to a point. With three hospitals on diversion, paramedics diverted 38 percent of patients. This trend, however, reversed once four hospitals were on diversion. At that point, with nearly all West Valley hospitals closed, paramedics began to divert fewer patients.
Diversion in the West San Fernando Valley

This analysis indicates that as more hospitals go on diversion, fewer patients get diverted. Instead, paramedics take patients to closed – and presumably crowded – emergency rooms, because they have no other options.

To confirm this trend, we pinpointed the diversion status of emergency rooms that received patients to answer the question: Where do paramedics take patients when several hospitals go on diversion?

Based on our previous findings, we hypothesized that a patient would be more likely to go to a closed emergency room if multiple hospitals were on diversion. Indeed, we found that with three or more emergency rooms on diversion, more than 40 percent of patients go to a closed emergency room. When all five hospitals are on diversion, every patient is taken to a closed emergency room.

<table>
<thead>
<tr>
<th>Number of hospitals on diversion</th>
<th>% of incidents</th>
<th>Yes</th>
<th>No</th>
<th>Closed Emergency Room</th>
<th>Open Emergency Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>28.9</td>
<td>16.6</td>
<td>83.4</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>1</td>
<td>27.0</td>
<td>23.4</td>
<td>76.6</td>
<td>12.1</td>
<td>87.9</td>
</tr>
<tr>
<td>2</td>
<td>20.9</td>
<td>32.8</td>
<td>67.2</td>
<td>27.8</td>
<td>72.2</td>
</tr>
<tr>
<td>3</td>
<td>12.9</td>
<td>38.3</td>
<td>61.7</td>
<td>40.5</td>
<td>59.5</td>
</tr>
<tr>
<td>4</td>
<td>7.3</td>
<td>36.8</td>
<td>63.2</td>
<td>63.4</td>
<td>36.6</td>
</tr>
<tr>
<td>5</td>
<td>3.0</td>
<td>26.1</td>
<td>73.9</td>
<td>100.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>26.4</td>
<td>73.6</td>
<td>21.2</td>
<td>78.8</td>
</tr>
</tbody>
</table>

Source: Analysis by Mihal and Moilanen

**Discussion**

Our analysis contradicts the widely held perception that diversion halts virtually all ambulance arrivals. Hospital personnel told us that diversion almost eliminates new ambulance patients, and paramedics said they try to avoid closed emergency rooms. Yet we found that individual hospitals may not see a dramatic decline in patient volume while on diversion.

On the contrary, we discovered that a hospital on diversion still takes in more than half of its ambulance runs. Indeed, the statistical correlation between a hospital’s diversion status and patient diversion is .52 – a surprisingly weak association given the variables. Diversion may reduce a hospital’s probability of receiving patients, but it by no means closes an emergency room to all transports.
Diversion in the West San Fernando Valley

Additionally, as more hospitals close, fewer patients are diverted. Diversion becomes less relevant when all emergency rooms purport to be crowded. Overuse lowers diversion’s value as a volume control mechanism and as a tool for communicating true saturation.

After performing this analysis, several questions emerged:

- Why do some hospitals, like Northridge, have high diversion rates, while others, like Encino, do not?
- Given that patient load may not substantially decrease when an emergency room invokes diversion, why do hospitals go on diversion so often?
- Does emergency room saturation really exist as frequently as diversion rates suggest? More specifically, how do hospitals define emergency room saturation, and do they define it differently?
- Do hospitals consider their diversion status in relation to other hospitals in the region?
- With diversion losing its value as more emergency rooms close, what mechanisms deter multiple hospital diversions?

Using these questions as a springboard, we began to investigate the qualitative aspects of emergency room diversion, interviewing dozens of hospital administrators, nurses, paramedics, experts, and county officials and collecting county and individual hospital diversion policies.

In talking with people, we discovered there is no consistent definition of emergency room saturation, little coordination within and among hospitals, and poor oversight of diversion.

First, although the county requires hospitals “to maintain a current diversion policy,” it provides few details about the content of such policies nor does it require hospitals to show proof of their internal protocols.\(^{39}\)

Of the five West Valley hospitals, three provided us with internal written protocols (the Encino-Tarzana hospitals share one policy; Kaiser and West Hills did not provide written protocols, only verbal descriptions). At a majority of hospitals, personnel could not readily produce the guidelines, and it took some searching to locate the appropriate documents. Some employees – at times those responsible for invoking diversion – did not know whether a written policy existed.

The written policies and unwritten practices reveal great variability in the West Valley, both in the rationales used to justify diversion and in the chains of command followed to complete the process. These vagaries likely result from the county’s failure to provide a

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\(^{39}\) Of note, the county recently requested diversion guidelines from various hospitals, but the hospitals have been slow to comply.
Diversion in the West San Fernando Valley

clear protocol for defining and initiating emergency room saturation. In addition, both hospitals and the county do not consistently comply with existing guidelines.

Second, we repeatedly heard one consistent refrain from people in the EMS Agency, the Los Angeles City Fire Department, and individual hospitals: “When everyone’s closed, everyone’s open,” a maxim supported by our data analysis.

Without regional coordination, emergency rooms decide in isolation to go on diversion. This decision, however, increases the patient load at surrounding hospitals, possibly causing other emergency rooms to initiate diversion. Once all hospitals are closed to paramedic transport, everyone is open to paramedic transport. The system reverts back to status quo, making diversion irrelevant.

Third, the EMS system relies on a complex network of public and private agencies across various jurisdictions and under multiple layers of authority. The sheer number of players – hospitals, emergency rooms, city- and county-run paramedics – translates into multiple opportunities for system failure. Without strong oversight, the system creates incentives to shirk responsibility.

Yet the multiple layers of authority complicate oversight. The state licenses emergency rooms but has no policy on diversion. The county, on the other hand, can create a diversion policy but lacks the enforcement power of a licensing agency. Although the county contracts with base hospitals and trauma centers, it has no legal authority over privately owned and operated receiving hospitals.

If one hospital continually flouts the diversion policy, the county “has very little teeth.” Without adequate oversight, the county has no way of spotting such offenses, and without consequences, the county cannot ensure compliance.

From these interviews, we identified three broad problems affecting emergency room diversions in the West Valley, which are analyzed in greater detail below:

- **Policies and Compliance**: The county does not adequately define emergency room saturation. Neither the county nor hospitals comply to existing regulations.
- **Coordination and Communication**: Insufficient coordination within and among hospitals may increase diversion. In addition, diversion is not a descriptive communication tool.
- **Oversight and Consequences**: There is no real-time monitoring of diversion or consequences for inappropriate diversions.

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40 Multiple interviews.
41 Interview with Mark Gamble.
Diversion in the West San Fernando Valley

Criteria

Our goal is to propose policy changes to address each of these problems. We defined six criteria against which we evaluated proposed solutions.

1. **Hospital flexibility:** *The solution must give hospitals flexibility and discretion.*
   Each hospital differs by the number of beds, staffing levels, patient characteristics, and patient volume; hospitals, therefore, must have diversion policies specific to their own needs. Also, emergency medicine involves a great deal of uncertainty and unpredictability, and hospitals must have the leeway to adapt quickly. A “one size fits all” approach cannot work. The solution must give hospitals the flexibility to address their own particular needs and to respond promptly to unforeseen circumstances.

2. **Standardized framework:** *The county needs a uniform way to monitor and enforce diversion guidelines.*
   Each hospital uses its own standards in deciding whether or not to close. Some hospitals may have fairly rigid diversion standards; others may have very lax standards. The county needs to ensure that all hospitals adhere to the same general guidelines to make oversight and enforcement more effective and uniform. The solution must give hospitals local discretion within a standardized framework.

3. **Political acceptability:** *The solution must be acceptable to all EMS participants.*
   Any solution requires buy-in from individual hospitals, paramedics, and the county. Without their support, any new guidelines will fail.

4. **Minimized wait time:** *The solution must not worsen current patient wait time and paramedic downtime.*
   The solution should not reduce diversion hours at the expense of patient wait time and paramedic down time. Long patient wait times may impact health outcomes, and long down times may impede the ability of paramedics to respond to new incident calls. Emergency rooms could stay open even when crowded, but paramedics and patients would be left waiting for an open bed. The solution must not shift crowding from the emergency room to the ambulance bay.

5. **Fiscal feasibility:** *The solution must minimize the strain on resources.*
   The solution must not create undue pressure on either the financial or human resources of the already constrained EMS Agency. Likewise, the solution must minimize increased demands on hospital resources.

6. **Technical feasibility:** *The solution must be technically possible to achieve.*
   The solution must draw upon existing resources and knowledge, and it must consider current technological capabilities, human capacity, and system structure.
**Diversion in the West San Fernando Valley**

We evaluated each policy option against these criteria using pluses and minuses, with pluses being better than the status quo and minuses being worse than status quo (0 indicates no foreseeable difference). We did not use all criteria in all cases.

In addition to these criteria, we identified three objectives necessary for reducing the incidence of diversion:

- Increase the hospital’s cost of going on diversion,
- Increase the hospital’s cost of staying on diversion,
- Change the culture that legitimizes inappropriate diversion events.

To select our recommendations, we first identified the options meeting at least one of these three objectives, and then we selected the option most consistent with our criteria.
Problem 1: Policies and Compliance

An overlap of federal, state, and county laws governs ambulance diversions. At the federal level, the Emergency Medical Treatment and Active Labor Act prohibits emergency rooms from refusing to treat patients, so a crowded emergency room must take any patient who lands at its doorstep.

At the state level, an ambulance driver must take patients to the most accessible emergency medical facility “equipped, staffed, and prepared to administer care appropriate to the needs of the patients.”42 The state does not offer guidance on ambulance transports absent this scenario. Instead, it defers to counties, permitting local EMS agencies to create policies “… to meet any medical control requirements including dispatch, patient destination policies, patient care guidelines, and quality assurance requirements.”

In Los Angeles County, emergency rooms requesting ALS diversion must enter “closed” into the ReddiNet system, which broadcasts up-to-the-minute diversion statuses to computers at the county, other hospitals, and paramedic units. To complete the diversion request, the emergency room supervisor must enter the name and title of the authorizing administrator and at least one of the six diversion reasons – emergency room saturation (overcrowding), unavailable neurosurgeon, trauma overload, lack of CT scanner, urgent pediatric care, and internal disaster.

ReddiNet requires emergency rooms to reconfirm their diversion status every two hours. The computer system makes an audible sound to alert emergency room personnel of the impending two-hour cutoff. If the emergency room does not reconfirm, the system automatically takes the hospital off diversion. The county does not require any additional justifications or procedures for diverting ambulances.

The county also requires hospitals “to maintain a current diversion policy,” although it does not specify the content of such policies nor does it require proof of their existence. Such ambiguity leads to wide disparities among hospital diversion policies and poor compliance.

This study examines two major weaknesses in policies and compliance:

- The county does not provide a clear protocol for defining or initiating “emergency room saturation.”
- Hospitals and the county do not comply with existing policies.

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42 California Code Title 13, Div. 2 Ch. 5, Sec. 1.1105.
Problem 1: Policies and Compliance

(a) The county does not provide a clear protocol for defining or initiating “emergency room saturation.”

The county provides very little guidance as to what constitutes “emergency department saturation.” It allows a saturation diversion when hospitals have an “excessive volume of patients” or “inadequate resources.”

If hospitals request diversion due to excessive patient volume, they must describe the symptoms of incoming patients, from “vomiting/diarrhea/gastroenteritis” and “generalized rash with fever” to “no single complaint predominates.” Hospitals can request diversion due to inadequate resources if they have “multiple critical patients” or “no inpatient beds available for emergency patients awaiting admission.”

These categories give hospitals wide latitude in requesting diversion. “Excessive volume of patients in which no single complaint predominates” allows for closure virtually any time the emergency room feels swamped with patients. Indeed, West Valley hospitals used this reason 71 percent of the time, by far the most common diversion rationale (“unavailable in-patient beds” and “multiple critical patients” followed with 15.7 percent and 11.4 percent respectively). Moreover, hospitals routinely enter reason codes that do not correspond to actual emergency room conditions, according to county officials.

Not surprisingly, this ambiguous definition of “emergency room saturation” leads to inconsistent hospital diversion policies; some hospitals used fairly rigid standards, others very lax. Few hospitals used well-defined criteria to determine saturation.

In general, hospitals reported going on diversion when they could no longer safely treat additional patients, either due to resources or staffing. Yet when pressed, personnel could not provide a more detailed explanation. Most employees said they conducted periodic bed checks to determine the available space, a much easier task in the eight-bed Encino emergency room than 26-bed Northridge. Also, empty beds do not necessarily mean the emergency room can accommodate more patients; the number of available nurses and doctors plays an equally critical role. Without more specific criteria for evaluating emergency room capacity, supervisors often make a “judgment call.”

Encino, Tarzana, and West Hills rely almost exclusively on the broadly worded county policy for guidance, closing when “resources are fully committed.” Beyond the county policy, however, these hospitals have few other internal protocols other than visual inspections of emergency room beds.

Kaiser reports using a mathematical formula to determine emergency room saturation. According to administrators, the formula takes into account bed space and number of patients waiting. Charge nurses and doctors may use diversion only as a last resort. Often, Kaiser will close some sectors of the emergency department – such as 24-hour

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Data analysis.

Interview with a charge nurse.
Problem 1: Policies and Compliance

observation – and reassign the nurses to more pressing needs in order to avoid wholesale closure.\textsuperscript{45} It is not clear whether these procedures stem from a written policy or just good practice.

By far, Northridge maintains the most comprehensive diversion policy. Implemented in December 2004, the policy focuses on getting patients through the hospital as efficiently as possible, and it involves all departments, not just the emergency room. The policy entails a six-step process for identifying emergency room saturation and improving patient flow.

First, it requires each department supervisor to conduct bed checks every four hours and relay these results to other departments, enhancing hospitalwide communication. Second, it gives the charge nurse highly detailed standards by which to determine the level of emergency department saturation, such as “20 emergency department beds are occupied, 15-minute wait for triage.” Lastly, it requires the charge nurse to notify the hospital operator before requesting diversion, citing a specific reason for the backup. For example, if radiology has caused the backup, the operator will notify a radiology representative. Together, the charge nurse and radiology representative must resolve the problem by implementing their own pre-specified “action plan.”

In addition to the overly broad standards for defining saturation, the county policy neglects to impose a chain of command. The decision to go on diversion “should be made jointly by representatives of the hospital’s administration, emergency department, specialty services, and nursing.”\textsuperscript{46}

In a crowded, chaotic emergency room, the chance of a joint decision among so many parties seems unlikely, and the county offers no guidance should the parties disagree. Although well-intentioned, this unrealistic expectation almost guarantees noncompliance. The county policy offers no hierarchy for decision making, and in a system with so many players, this flaw raises the likelihood of finger-pointing and complete abrogation of responsibility.

In many emergency rooms, one employee – typically the charge nurse – almost unilaterally decides whether to go on diversion. Although some hospitals say they require a joint decision between the head doctor and charge nurse, in practice, the charge nurse initiates the diversion request and the doctor merely approves or disapproves. At least one hospital reported that in the charge nurse’s absence, another senior ranking nurse can make the call.

Doubtless, no other emergency room employee understands the available resources and patient demand more than the charge nurse. Yet with so much authority vested in one person, the process leaves much to individual personality.

\textsuperscript{45} Interviews with Kaiser hospital administrators.
\textsuperscript{46} Los Angeles County diversion policy.
Some charge nurses frazzle more easily than others, and they may rush to place the emergency room on diversion.\textsuperscript{47} One charge nurse, for example, put the emergency room on diversion to give nurses some “breathing room” and a chance to catch up on paperwork and patient monitoring. Other charge nurses may feel more comfortable juggling a heavy patient volume. Quite simply, the decision to go on diversion often “depends on who is in charge.”\textsuperscript{48}

In general, hospital guidelines impede internal and external oversight. They lack consistency as to what conditions necessitate closure and who makes the call. Absent a standardized framework, oversight becomes grossly complicated. If the county wants to ensure appropriate use of diversion, it must provide meaningful standards to determine what “appropriate” means. Currently, the county policy has no such capacity, making it difficult to assess compliance.

**Options**

1. **The county creates a standard saturation protocol for all hospitals.**
   The county will provide all hospitals with a standard definition of saturation and a clear chain of command. The saturation definition will include highly detailed criteria, like “Emergency beds at 100 percent occupancy; three or more critical patients.” This option would not allow for differences across hospital size, staffing resources, or patient characteristics.

2. **The county devises a mathematical formula to determine saturation.**
   The formula should include individualized hospital variables – such as bed capacity and staffing – and situational variables, such as bed occupancy and patient load. To determine their current saturation level, hospitals would calculate the formula, filling in the individualized and situational variables.

3. **The county will provide stricter guidelines for hospital diversion policies.**
   The county will provide hospitals with specific criteria and chains of command to include in their own policies. The internal policies, for example, would need to address ways of assessing emergency room bed capacity, throughput barriers, staffing resources, and patient needs. The county would not tell hospitals how to assess these resources, but merely mandate that hospitals include them. Also, the county would provide a chain of command and guidelines for inappropriate diversions.

4. **Status quo.**

\textsuperscript{47} Interviews with multiple sources.
\textsuperscript{48} Interview with a hospital administrator.
# Problem 1: Policies and Compliance

## Comparing the Options

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### Objectives

- **Increase cost of going on diversion**
  
- **Increase cost of staying on diversion**
  
- **Change culture of diversion**

## Recommendation

- The county will provide stricter guidelines for hospital diversion policies.

This option gives hospitals the flexibility to create diversion protocols specific to their own needs. At the same time, the additional county guidance enhances uniformity.

Specifically, we recommend the following language:

- “Emergency Department Saturation – The acceptance of another patient with a life-threatening illness or injury would severely compromise patient care and safety (volume and acuity of patients at the time are the determining factors).
- “An emergency department must assess saturation based on the following factors:
  - Emergency department bed occupancy
  - Medical and nursing staff appropriate to current acuity
  - Inpatient bed occupancy
  - Diagnostic and monitoring equipment availability
- “Hospitals must make every effort to avoid diversion. The following are unacceptable reasons to divert ambulances:
  - Lack of non-medical staff
  - Full waiting room
  - Backlog of administrative paperwork
  - Low staff morale or exhaustion
- “The hospital must obtain authorization from ALL of the following people prior to instituting diversion:
  - Emergency department supervisor/designee
  - Emergency department physician director/designee
  - Administrator on-call.”

49 We borrowed much of this language from the Riverside County diversion policy.

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*APP: When Emergency Rooms Close*
b) Hospitals and the county do not comply with existing policies.

No evidence suggests that hospitals maliciously disobey county policy, yet some hospitals do in fact go on diversion when emergency room saturation does not exist. These inappropriate diversion episodes may reflect employee error or ignorance of county policy, but they have significant systemwide ramifications. Compliance with county and internal hospital policies remains a key challenge.

Oftentimes, hospitals make exceptions to their own diversion guidelines. One charge nurse admitted to closing the emergency room for 30 minutes to give nurses some “breathing room.” This same charge nurse routinely uses diversion as a staff “morale booster,” ensuring a rest period during an otherwise busy day, even though the hospital’s policy precludes diversion for such reasons.

Also, hospitals frequently make exceptions to their chains of command. One hospital requires the charge nurse to consult the doctor before diverting ambulances, but the charge nurse can “always go above the doctor,” according to the administrator. At one hospital, the senior relief nurse sometimes makes the call.

The county, too, does not comply with its own policy. We found three instances in which the county did not maximize its enforcement capacity:

- “Hospitals shall maintain a current diversion policy.” Until recently, the county has not asked hospitals to produce these internal diversion policies, so it does not know whether hospitals do in fact maintain these guidelines. A few months ago, the county began to request proof of hospital diversion policies, but the hospitals have been slow to comply.
- “The name and title of the authorizing hospital administrator or designee are required to complete the diversion request process.” Charge nurses enter a name and title into the ReddiNet computer system to complete the diversion process, but the county has not evaluated these data to ensure validity and proper procedure. Possibly, charge nurses input a name and title without actually securing diversion approval.
- “The EMS Agency staff may perform unannounced site visits to hospitals requesting diversion to ensure compliance with these guidelines.” In 2002, the county performed sporadic site visits, but it has performed no site visits in the last two years.

Lax enforcement sends the message that hospitals can flout county policy. Periodically, the county steps up monitoring of hospital diversion hours, and when it does, the diversion rates often decline.\textsuperscript{50} This trend indicates that minimal enforcement can reduce diversion hours. Even without formal enforcement authority, the county’s presence can have positive effects. “When you start looking at things more closely, behaviors do change,” says Carol Meyer, director of the EMS Agency.

\textsuperscript{50} Interviews with county EMS officials
Problem 1: Policies and Compliance

Options

1. The county steps up enforcement of its diversion policy.
   The county will begin to conduct announced site visits, will mandate that hospitals keep their internal guidelines on file with the county, and will impose review deadlines for internal and county policies.

2. Status quo.

COMPARING THE OPTIONS

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Objectives

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RECOMMENDATION

- Stricter enforcement of county policy.

The county should begin to conduct site visits immediately. Recently, the county hired someone to address diversion issues, and this employee can assume responsibility for such checks.

Also, the county should add the following language to its policy: “Hospitals shall maintain a current diversion policy on file with the EMS Agency. Hospitals must review these policies not less than every two years and make changes as necessary.” When conducting an unannounced site visit, EMS officials should bring along the hospital’s diversion policy, enabling them to verify compliance to internal protocols.

The county should review its own policy every two years and post a copy on its Web site.
Problem 2: Coordination and Communication

Although one hospital’s diversion status impacts neighboring emergency rooms, we found little evidence to suggest that hospitals consider such impacts when clicking the “closed” box in ReddiNet. “Our decision to go on diversion is only about patient safety, not what others are doing,” says one emergency department director.51

Such unilateral decision-making has systemwide impacts. As one emergency room closes to ambulance transports, patient load transfers to nearby hospitals. Though patient volume within the system stays constant, resources to provide for those patients decrease as emergency rooms leave the network.

In the absence of a coordinated approach to diversion, one hospital’s decision to go on diversion may trigger a domino effect of closures.52 Moreover, this system may encourage hospitals to initiate diversion as a defensive tactic, closing their emergency rooms to preempt the impending patient surge.53 “If you keep trying to stay open when others don’t, you’ll get killed,” says one West Valley charge nurse.

Within such a system, hospitals have little incentive to improve internal efficiency, because they can always shift their patients to other emergency rooms. Indeed, we heard over and over again that throughput – the ability to move patients from the emergency room to the rest of the hospital – greatly affects emergency room crowding. Yet hospitals have little pressure to streamline their operations, because diversion offers a convenient loophole.

At best, this system of isolated decision-making minimizes efficiency; at worst, it fosters a competitive, self-interested culture in a network so dependent on regional cooperation. Coordination and communication greatly impact diversion. Eventually, as the number of emergency rooms on diversion increases, diversion status becomes irrelevant. If all hospitals are closed, all are open.

This study examines four major weaknesses in coordination and communication:

- Poor internal coordination increases emergency room saturation.
- Hospitals decide unilaterally to close their emergency rooms.
- Hospitals do not communicate or coordinate their ongoing efforts to reduce diversion.
- Diversion is a blunt communication tool.

51 Interview with a hospital administrator.
52 Vilke et al., 2004
53 Ibid.
Problem 2: Coordination and Communication

a) Poor internal coordination increases emergency room saturation.

An emergency room does not operate in isolation from the rest of the hospital. Patients who enter the emergency room may require the services of other departments and may need to be admitted to the hospital. The efficiency of the process of moving patients from the emergency room to the hospital can determine the emergency room’s capability to receive additional patients.

A conceptual model explains emergency room crowding as three interdependent components: input, throughput and output.\(^\text{54}\) As the number of patients entering the emergency room – input – increases, a build-up occurs. The staff cannot process this rising volume quickly enough. Once in the emergency room, the patient must be discharged or admitted into the hospital – throughput. If the hospital cannot admit the patient to the inpatient ward or intensive care unit – output – then the patient must remain in the emergency room until a bed becomes available.

The emergency room must care for these patients, tying up bed space and staffing resources. A Toronto study found that poor throughput increases diversion, with each additional patient awaiting admission adding another five minutes to the diversion event.\(^\text{55}\) The emergency room has more influence over output than input; thus, by hastening patient throughput, the emergency room can boost its capacity to take in patients, thereby decreasing the need to go on diversion.

Hospitals vary in how they deal with patient flow issues. Some hospitals have no throughput policy or documented process for moving patients from the emergency room to the rest of the hospital, while others make a concerted effort to improve procedures.

Northridge’s new internal policy tackles the throughput issue by forcing the emergency room to work with other departments to identify and resolve throughput barriers. Preliminary evidence suggests Northridge cut its diversion hours by two-thirds in the first month following implementation.\(^\text{56}\)

Hospital personnel and administrators cited the inability to move patients into the hospital as one of the most important factors in emergency room crowding. To decrease diversion, hospitals must maximize the efficiency of patient flow from the emergency room to other departments.

\(^{54}\) Asplin et al., 2003
\(^{56}\) Diversion hours declined by at least 65 percent in December 2004 as compared to December 2003.
Options

1. **County requires hospitals to establish an internal task force.**
   Each hospital will create a task force to improve communication among hospital departments. Various departments will work together to identify potential breakdowns in the system that moves patients from the emergency room to other departments within the hospital. Improving internal processes will maximize efficiency.

2. **County encourages each hospital to maintain a throughput plan.**
   Each hospital will create and maintain a throughput plan to deal with issues that cause emergency room saturation. This document will detail processes and strategies to maximize efficiency of patient throughput from the emergency room to other departments within the hospital.

3. **Status quo.**

### COMPARING THE OPTIONS

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**Objectives**

- Increase cost of going on diversion
- Increase cost of staying on diversion
- Change culture of diversion

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**RECOMMENDATION**

- **Each hospital should include a throughput plan as part of its diversion policy.**
  The county has no authority to order non-contracted hospitals to maintain a throughput policy. Still, the county policy should *encourage* hospitals to create a throughput plan, and the EMS Agency should *require* a throughput plan from base hospitals and trauma centers as part of their contractual obligations.

Throughput plans must address issues regarding intrahospital coordination, outlining strategies to maximize efficiency in moving patients from the emergency room to other
Problem 2: Coordination and Communication

hospital departments. Also, the plan should include a process for dealing with system breakdowns, including detailed steps and action plans for each department.

In addition, we urge the county to undertake a comprehensive study examining throughput issues, pinpointing reasons for and solutions to system failures.

b) Hospitals decide unilaterally to close their emergency rooms.

Once a hospital has made the decision to go on diversion, someone—usually the charge nurse or emergency department director—will update the diversion status in ReddiNet. The county does not require any advance notification or communication with nearby hospitals, paramedics, or the county. Prior to ReddiNet’s implementation in 1984, emergency room personnel needed to call the county communication center and local base hospitals before going on diversion. Without this step, hospitals find it easier to initiate diversion.57

Evidence suggests that emergency rooms do not consider the impact of their closure on neighboring hospitals. Charge nurses at several hospitals said they generally do not check to see if other emergency rooms are on diversion.58 One charge nurse said emergency room personnel do not have time to check, and they “just know” when others are on diversion, because their patient load increases.59

Hospitals exist within an interconnected network, and decisions to go on diversion affect the volume of patients at nearby hospitals. As the number of emergency rooms on diversion increases, the value of diversion decreases.

Options

1. Before going on diversion, hospitals must notify the base hospital by phone.
Once a hospital has decided to go on diversion, it will call the base hospital in addition to entering its updated status into the ReddiNet system. These calls were standard protocol prior to ReddiNet’s implementation.

2. Before going on diversion, hospitals must notify the county by phone.
The hospital requesting diversion will call the county in addition to entering the information into ReddiNet. Such calls were standard protocol prior to ReddiNet. Currently, hospitals must call the county to close for internal disaster, but these events are rare. Under this scenario, the county likely would need to hire an additional employee to field the incoming calls or add the responsibility to an existing position.

57 Interview with a charge nurse
58 Multiple interviews
59 Interview with a charge nurse

APP: When Emergency Rooms Close 27
3. Hospitals must negotiate among themselves who goes on diversion.
Before hospitals go on diversion, they must call neighboring hospitals to negotiate closure status. Only a small number of hospitals may close at any one time, forcing compromise among the emergency rooms.

Riverside County recently implemented this system, requiring hospitals to negotiate with their closest neighbor before going on diversion. Though patient load remained constant, diversion rates dropped by almost 75 percent from 2003 to 2004.\(^6\) No data exist, however, on the effect of this drop on patient outcomes.

4. Status quo.

### COMPARING THE OPTIONS

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<th>Objectives</th>
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<tbody>
<tr>
<td>Increase cost of going on diversion</td>
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<tr>
<td>Increase cost of staying on diversion</td>
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<tr>
<td>Change culture of diversion</td>
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</tbody>
</table>

### RECOMMENDATION

- **Hospitals must notify the base hospital when initiating diversion.**

  The base hospital currently acts as an informal coordinator for the group of hospitals within its coverage area. With this framework already in place – as well as prior experience with this exact process – we believe the base hospital can assume this function with minimal impact on other responsibilities. At the same time, the additional step of making a phone call may raise the cost of going on diversion – even if only slightly – and deter hospitals from closing inappropriately.

  Importantly, the base hospital would not grant or deny permission for hospitals to go on diversion; it would only receive notification. Had this system been in place from 2003 to

---

\(^6\) Data provided by Laura Wallin, EMS Specialist, Riverside County Department of Health Services.
Problem 2: Coordination and Communication

2004, Northridge would have received an average of five calls a day from hospitals requesting diversion, with a low of one call a day to a high of 12. At most, we believe these phone calls would add an extra 10 minutes to the base hospital’s daily workload.

c) Hospitals do not communicate or coordinate their ongoing efforts to reduce diversion.

Each hospital tracks its diversion statistics differently. If one hospital decides to make changes to its internal processes or procedures to lower diversion rates, it rarely communicates its success or failure; hospitals do not share “best practices.”

For example, Northridge’s new throughput policy has reduced the total number of diversion hours as compared to a year ago. Yet, when asked, other hospitals in the area did not know about Northridge’s attempts at reducing diversion. In fact, hospitals do not even know the diversion rates of other hospitals, giving them no indication of their relative performance. There is no informal network within this group of hospitals to share strategies to lower diversion hours.

Hospitals act in a vacuum, but their decisions to go on diversion have a ripple effect on other hospitals in the region. A lack of communication among hospitals allows each hospital to work only in its best interest, without considering the impact of its actions on other hospitals.

Options

1. County breaks the EMS Agency into regional units for better management of localized diversion decisions.
   By breaking the EMS Agency into smaller regional units, the county can better monitor diversion on a localized basis. Each hospital’s diversion status affects patient load at surrounding hospitals, and this smaller network approach would promote solutions appropriate for that particular region.

2. County establishes regional working groups of hospitals to discuss ways of coordinating diversion and reducing diversion hours.
   The county will create regional working groups to discuss ways of coordinating diversion within the region and to share best practices. Each hospital’s decision to go on diversion affects the number of patients other regional hospitals receive. Fostering dialogue among regional hospitals will help address coordination issues among the hospitals.


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61 Based on data analysis
62 Emergency Medical Services Agency
Problem 2: Coordination and Communication

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<tr>
<td>Total</td>
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</tr>
</tbody>
</table>

Objectives

- Increase cost of going on diversion
- Increase cost of staying on diversion
- Change culture of diversion

**RECOMMENDATION**

- County establishes a regional working group for the five West San Fernando Valley hospitals to share best practices and to create workable solutions for reducing diversion hours.

The county should launch a pilot program establishing a working group of the five West Valley hospitals. The group, facilitated by the county, should meet monthly. Members should include one county representative, one charge nurse from each of the five hospitals, the base hospital coordinator, city leaders, and community representatives. The county should distribute each hospital’s monthly diversion report to all members, letting each emergency room see its diversion rate relative to others.

This working group serves two functions. One, it exposes hospitals to more efficient operating techniques and best practices in a nonadversarial, nonjudgmental forum. Second, it establishes relationships among hospitals, creating a psychological deterrent to diversion: Emergency room supervisors may hesitate to dump their patients on another hospital when they personally know the other emergency room’s employees.

The county has established such working groups in the past, notably in the San Gabriel region, where diversion rates declined substantially during the process. Yet when the county did not stay involved, the group disbanded, and diversion rates climbed. The county must remain actively committed to this working group.

---

63 Interview with Richard Tadeo

*APP: When Emergency Rooms Close*
Problem 2: Coordination and Communication

d) Diversion is a blunt communication tool.

Diversion status is a binary indicator; a hospital is either on diversion or not. This designation does not allow for variations of status or levels of resources available. An emergency room may not be able to take one major case but it could have the resources to take two smaller cases. Currently, the hospital would be closed to all types of patients, which does not indicate its true capacity.

Our analysis shows that West Valley hospitals still accepted more than half of their patients while on diversion. Paramedics try to honor a hospital’s diversion status by diverting patients to other hospitals if at all possible, yet diversion status is not always a true indicator of how many patients will be diverted.

Options

1. County implements a tiered diversion system.
   A hospital’s diversion status will vary by severity of saturation. A tiered system of green, yellow, or red will indicate the emergency room’s ability to accept patients, indicating full capacity, diminished capacity, or no capacity respectively.

2. Hospitals broadcast their paramedic wait times rather than yes/no diversion status.
   Instead of going on diversion, hospitals enter the estimated wait time for a patient arriving via ambulance, allowing paramedics to make a more informed decision as to where to transport the patient.


<table>
<thead>
<tr>
<th>COMPARING THE OPTIONS</th>
<th>Policy Options</th>
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<tbody>
<tr>
<td><strong>Criteria</strong></td>
<td>1. Tiered diversion system</td>
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Objectives

<table>
<thead>
<tr>
<th>Objectives</th>
<th>1. Tiered diversion system</th>
<th>2. Broadcast wait times</th>
<th>3. Status quo</th>
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<tr>
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<td>Increase cost of staying on diversion</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Change culture of diversion</td>
<td>✓</td>
<td>✓</td>
<td></td>
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</tbody>
</table>
Problem 2: Coordination and Communication

RECOMMENDATION

- No changes to the diversion alert system should be made at this time.

Although our matrix identifies a tiered diversion system as the best option, we recommend the status quo. We believe this matrix simply does not capture the magnitude of resources needed to dismantle the diversion alert system and create a new one. Allowing diversion status to remain the same does not address the problem, but overhauling the system to incorporate a variable diversion status is not technically or fiscally feasible at this time.

In addition, we believe if the county implements other recommendations in this report, diversion rates will decrease, and diversion status will better indicate a hospital’s capability to receive patients.
Problem 3: Oversight and Consequences

The EMS system relies on a complex network of public and private agencies across various jurisdictions and under multiple layers of authority, all of which complicates oversight. The county, without licensing authority or contractual powers for most hospitals, has almost no ability to force compliance or to impose consequences.

Given this limited enforcement capacity, oversight takes the form of mutual pressure and negotiation. Hospitals generally abide by county diversion rules, because “it’s a true system and it requires a lot of cooperation,” says Mark Gamble of the Hospital Association of Southern California. Hospitals watch out for other hospitals who abuse the system, and social pressure typically straightens out the most egregious offenders.

Yet this social pressure may take months, or even years, to produce change, and diversion produces immediate consequences. With so many failure points and multiple players, the weak oversight structure encourages hospitals to ignore – whether intentionally or unintentionally – county diversion rules. For instance, some officials report that emergency department supervisors often keep the hospital on diversion during shift changes, simply to make it easier on incoming employees. Without adequate oversight, the county has no way of spotting such offenses, and without consequences, the county cannot ensure compliance.

This study identifies two major weaknesses with county oversight and consequences:
   ➢ The system lacks real-time monitoring and management.
   ➢ The county does not have consequences for hospitals that inappropriately use diversion.

a) The system lacks real-time monitoring and management.

Oversight of diversion occurs almost entirely after the fact. Usually, hospitals review their own diversion patterns on a monthly basis. The county tracks diversion trends across months and years. Yet no one monitors diversion in real time, checking for closures on a minute-to-minute, hour-to-hour – or even day-to-day – basis.

In theory, ReddiNet provides a monitoring mechanism, because it allows hospitals and the county to see the diversion status of other hospitals. Yet communicating an “open” or “closed” status does not substitute for real-time scrutiny, or more importantly, real-time management of ongoing diversion events.

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64 Interview with Mark Gamble
Problem 3: Oversight and Consequences

Even more, evidence suggests that ReddiNet may not reflect actual emergency room crowding conditions, largely because it relies on human input, which may be flawed or deliberately misleading.

Emergency rooms have a history of failing to update their ReddiNet status on a regular basis, leaving them closed for an unnecessarily long time. When the county first introduced ReddiNet, it required hospitals to reaffirm the emergency room’s diversion status every eight hours. Yet the county found that emergency rooms simply left themselves on diversion for eight hours. In 1998, the county reduced the window to four hours; two years ago, it lowered the threshold to two hours.

Also, while ReddiNet may communicate diversion status, it cannot force hospitals or the county to look at the computer screen. Hospitals may monitor their own diversion status, but evidence suggests they rarely check the status of neighboring hospitals. The county, too, watches diversion mostly for its own hospitals. No single entity monitors real-time diversion from a comprehensive perspective.

This lack of immediate oversight precludes the county from spotting urgent needs within hospitals, across regions, and systemwide. If all five West Valley hospitals closed at once, the county likely would not detect it. Similarly, one hospital’s decision to remain on diversion for 15 straight hours may go unnoticed, absent a phone call from angry paramedics. Indeed, during our study period, Northridge and West Hills once had diversion events lasting 89 and 80 hours, respectively. The county needs a real-time oversight mechanism to detect problems as they occur, not long after they have crippled the network.

Options

1. The county monitors diversion status.
A county employee will monitor ReddiNet, watching for long diversion events and multiple diversion events in one area. The employee may call the hospitals on diversion to resolve the problem or to order them off diversion.

2. The base hospital monitors diversion status.
The base hospital will monitor ReddiNet, watching for long diversion events and multiple diversion events in one area. The base hospital may call the hospitals on diversion to resolve the problem or to order them off diversion.

3. Hospitals monitor their own diversion events.
When a diversion event approaches a predetermined time limit, ReddiNet will suspend diversion automatically. Hospitals would need to call the county and receive a waiver to stay on diversion beyond this cut-off point.

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65 Multiple interviews.
66 Interview with Richard Tadeo.
## Problem 3: Oversight and Consequences

### COMPARING THE OPTIONS

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### Objectives

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<td>✓</td>
<td>✓</td>
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<tr>
<td>Change culture of diversion</td>
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### RECOMMENDATION

- **Hospitals monitor their own diversion events.**

This option offers the most realistic monitoring mechanism, given available resources. It fosters real-time management of ongoing diversion events coupled with strict time limits, but it permits flexibility when needed. ReddiNet has the capability to suspend diversion automatically at preset intervals. At the cut-off point, the emergency room could call the county for a waiver or stay off diversion for a predetermined amount of time.

We recommend a cut-off point of six hours, slightly above the West Valley’s mean diversion duration of five hours and consistent with policies in other counties.

Roughly 30 percent of all West Valley diversion events exceeded six hours. Thus, this time limit would not impose a substantial burden on emergency rooms, as it would require no action for 70 percent of diversion events, but it would curtail a sizeable proportion of unacceptably long offenses.
Problem 3: Oversight and Consequences

b) The county does not have consequences for hospitals that inappropriately use diversion.

The county policy does not include consequences for inappropriate diversions, and even if it did, the county would have limited capacity to enforce them. The county only has legal standing over its contractually obligated base hospitals and trauma centers. Yet the county must have a way to rein in the most egregious offenders. Every hospital has an interest in containing the “outlier” hospitals that abuse diversion and increase the strain on everyone else.67

The county has only one trump card: the ability to eliminate diversion. “We could come down very hard” and unilaterally revoke diversion status, EMS Director Carol Meyer says. Yet, as Meyer points out, this tactic generates consequences of its own, punishing one sector for systemwide inefficiencies and eliminating a crucial communication tool. Even more, overly harsh penalties may chase more hospitals out of the emergency room business, threatening an already precarious system. The county needs a way to restrain diversion-prone emergency rooms without imposing onerous requirements on every hospital.

**Options**

1. **The county eliminates diversion.**
   The county would no longer allow hospitals to divert ambulances.

2. **Diversion events automatically end after a set time period.**
   A hospital diversion event could not exceed a predetermined maximum. The hospital could not request a waiver.

3. **The county works with high-diversion hospitals.**
   If a hospital exceeds a predetermined monthly diversion rate, it enters a probationary period with increased county scrutiny, called a threshold review. The county may require additional documentation of diversion events or establishment of an internal diversion task force.

4. **Status quo.**

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67 Interview with Mark Gamble.

*APP: When Emergency Rooms Close*
Problem 3: Oversight and Consequences

<table>
<thead>
<tr>
<th>COMPARING THE OPTIONS</th>
<th>Policy Options</th>
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<tr>
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</table>

**Objectives**

- Increase cost of going on diversion: ✓
- Increase cost of staying on diversion: ✓ ✓
- Change culture of diversion: ✓

**RECOMMENDATION**

- The county works with high-diversion hospitals.

A threshold review procedure allows the county to concentrate on the most diversion-prone hospitals, working with them to lower their diversion rates and boost efficiency. We recommend setting the monthly threshold at 30 percent. On average, West Valley hospitals exceeded a 30 percent diversion rate three months out of the year, although the frequency varied among individual hospitals. Northridge, for example, exceeded 30 percent every month; Encino exceeded this rate only once.

If a hospital surpasses a 30 percent diversion rate for two consecutive months, the county would send it a warning letter. If the hospital does not improve, the county may require additional documentation for every diversion episode, and it may step up unannounced site visits. If the hospital continues to lag, the county may mandate an internal diversion task force to assess reasons for and ways to reduce emergency room crowding.

The county should not treat this process as a punitive measure, but rather as a way to assist struggling hospitals. Likewise, hospitals may welcome the additional support and guidance. We encourage the county to involve the Hospital Association actively in this process.
Conclusion

Ambulance diversions strain an already beleaguered EMS system. Paramedics must drive farther distances, hampering their ability to respond to incoming 9-1-1 calls; hospitals lose money when profitable ambulance patients are turned away; and patients may suffer adverse medical outcomes. Reducing diversion events – particularly inappropriate events – will improve systemwide efficiency and welfare.

This project, though limited in scope, challenges the assumption that diversion substantially reduces patient load, at least in the West Valley. The overuse of diversion, in essence, has reduced its value as a communication tool.

To reverse this trend, we have recommended several ways to impose an immediate cost for going on diversion, to impose a cost for staying on diversion, and to change the culture that legitimizes inappropriate diversions. Importantly, these recommendations do not require an overhaul of the system; rather, they represent relatively minor policy and procedural changes to enhance systemwide efficiency.
Appendix A: Methodology

About the data

The county provided us with all base hospital reports pertaining to the five West Valley hospitals from July 1, 2003 to June 30, 2004. Base hospital reports only track ALS ambulance incidents, not BLS units or walk-ins.

The Microsoft Excel spreadsheet included the date and time of each incident, the closest hospital (designated as MAR, Most Accessible Receiving), the actual receiving hospital (REC), a diversion rationale, and chief complaint. The 10,086 calls included those in which a West Valley hospital was either the closest or receiving hospital. There were 69 calls with no closest hospital listed.

Hospitals were listed by their code:
ENH: Encino-Tarzana Regional Medical Center in Encino
HWH: West Hills Hospital and Medical Center
KFO: Kaiser Permanente Woodland Hills Medical Center
NRH: Northridge Hospital Medical Center in Northridge
TRM: Encino-Tarzana Regional Medical Center in Tarzana

The county also provided us with diversion events related to emergency room saturation for the five hospitals during the same time period. The Excel spreadsheet included the start and end date, start and end time, and hospital for each event.

Determining time hospitals spent on diversion

To determine monthly diversion rates for each of the five hospitals, we created separate lists for each of the hospitals, including all data events for the year July 1, 2003 to June 30, 2004. We removed duplicate events when they occurred, which we categorized as multiple diversion events at the same exact time. These events were duplicated by the hospitals entering multiple reasons for diversion into the ReddiNet system.

To determine duration of diversion events, we assigned all events into one-hour categories according to the length of the event. The duration categories were defined as the start time to one minute before the next hour marker, e.g., 1-2 hour category encompasses all events from 60 to 119 minutes.
Appendix A: Methodology

**Determining patient diversions**

To determine whether a patient was diverted, we constructed a logical statement in Excel:

\[
\text{IF}(\text{MAR} = \text{REC}, \text{"No"}, \text{"Yes"})
\]

If the closest hospital and receiving hospital were the same, the patient was not diverted. If they were different, the patient was diverted. The formula results yielded “No” for “not diverted” and “Yes” for “diverted.” For the 69 calls without closest hospitals listed, we did a further check for diversion rationales. If a diversion rationale was listed, we counted the patient as diverted. Ultimately, we found that 2,651 patients were diverted, 7,394 were not diverted, and 41 were unknown.

**Determining diversion status for each ambulance run**

The incident calls gave us the date and time of each incident. A separate Excel spreadsheet gave us the dates and times of all West Valley diversion events. In order to know whether the closest hospital was on diversion at the time of the incident call, we needed to relate the two spreadsheets.

To that end, we first formatted all dates and times to single date-time values in Excel (for example, 9:02 p.m. on Aug. 3, 2003 became 37836.8763888889). Then, we fed the date-time values for both data sets and the corresponding hospitals into Matlab. We devised a formula that checked each incident date-time against the diversion date-times for that hospital:

\[
\text{numcalls} = \text{length}(	ext{MARcall.time});
\]

\[
\text{MARcall.on} = \text{logical}([\text{zeros}(	ext{numcalls},1)]);
\]

\[
\text{for } n = 1: \text{numcalls}
\]

\[
\text{MARcall.on}(n) = \text{any}((\text{MARcall.time}(n) > \text{diversion.time}(;1) \& \ldots \text{MARcall.time}(n) < \text{diversion.time}(;2) \& \ldots \text{strcmp}((\text{MARcall.hospital}(n), \text{diversion.hospital})));
\]

\[
\text{end}
\]

The formula produced a “0” (not on diversion) or a “1” (on diversion) depending on the closest hospital’s diversion status at the time of the incident. We repeated the process with the receiving hospitals. Then, we imported the column of 0s and 1s back into Excel. (Note: In 422 cases, the closest and receiving hospitals were non-West Valley hospitals for which we did not have diversion event information. In 69 cases, the county did not provide the closest hospital. Thus, we could not determine hospital diversion status for 491 incident calls).

Next, we sought to identify patient diversions in relation to diversion status. Our Excel spreadsheet now had the following results for each of the 10,086 calls:

<table>
<thead>
<tr>
<th>RECEIVING</th>
<th>MAR</th>
<th>DIVERTED</th>
<th>MAR On</th>
<th>REC On</th>
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</thead>
</table>

APP: When Emergency Rooms Close 40
Appendix A: Methodology

With Excel logical statements, we identified patients diverted during hospital diversion events. We used the “AND” formula, which returns “TRUE” if all parameters are true, and “FALSE” if at least one parameter is not true:

\[ =\text{AND(Diverted} = \text{“Yes”, MAR On}=1) \]

We repeated the formula for several different scenarios:

1. Patient diverted, closest hospital on diversion
2. Patient not diverted, closest hospital on diversion
3. Patient diverted, closest hospital not on diversion
4. Patient not diverted, closest hospital not on diversion

In addition, we used “AND” to look for diversion rationales under various scenarios:

\[ =\text{AND(Diverted} = \text{“Yes”, MAR On}=1, \text{Rationale} = \text{“E”}) \]

Our results yielded columns of TRUEs and FALSEs, which we totaled using Excel’s “COUNTIF” formula to get our final results:

\[ =\text{COUNTIF(T:T,TRUE)} \]

**Correlation.**

To determine the correlation between diversion status and patient diversions, we input two binary variables into STATA: “MARon” (1=closest hospital on diversion, 0=closest hospital not on diversion) and “diverted” (1=patient diverted, 0=patient not diverted). We ran the following correlation, which yielded the .52 association:

```
.corr MARon diverted  
(obs=10086)
<table>
<thead>
<tr>
<th>MARon</th>
<th>diverted</th>
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<th></th>
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</thead>
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<tr>
<td>MARon</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>diverted</td>
<td>0.5227</td>
<td>1.0000</td>
<td></td>
</tr>
</tbody>
</table>
```

**Determining multiple hospital diversion events**

To determine whether more than one hospital was on diversion simultaneously, we first isolated the diversion events by hospital. Then, we checked all incident calls against each hospital’s diversion events using Matlab:

* “E” is the rationale abbreviation for “emergency department saturation”
numcalls = length(call.time);

call.on = logical(zeros(numcalls ,1));
for n = 1:numcalls
    call.on(n) = any(call.time(n) > diversion.time(:,1) &
        call.time(n) < diversion.time(:,2));
end

This process resulted in five Excel columns, one for each hospital, with a “1” if the hospital was on diversion at the time of the incident and “0” if it was not. In a separate column, we totaled the number of hospitals on diversion at the time of the incident:

<table>
<thead>
<tr>
<th>DIVERTED</th>
<th>ENH on diversion</th>
<th>HWH on diversion</th>
<th>KFO on diversion</th>
<th>NRH on diversion</th>
<th>TRM on diversion</th>
<th># hospitals on diversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
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<td>4</td>
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</tr>
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</table>

Using Excel, we counted the patients diverted for each number of hospitals on diversion.
Appendix B: Interviews

We conducted multiple interviews with participants in the following agencies:

- Emergency Medical Services Agency, Los Angeles County Department of Health Services.
- Los Angeles City Fire Department
- Riverside County Department of Health Services
- Riverside County Fire Department
- Encino-Tarzana Regional Medical Center in Encino
- Encino-Tarzana Regional Medical Center in Tarzana
- Kaiser Permanente Woodland Hills Medical Center in Woodland Hills
- Northridge Hospital Medical Center in Northridge
- West Hills Hospital and Medical Center in West Hills
- Hospital Association of Southern California
Appendix C: Diversion Procedures and Rationales

According to “Guidelines for Hospitals Requesting Diversion of ALS Units” (county policy reference no. 503), emergency rooms requesting diversion must complete three steps:

1. Enter at least one of six diversion reasons into ReddiNet.
2. Enter the name and title of supervisor authorizing diversion.
3. Update diversion status every two hours.

Emergency room may divert ALS units for six reasons:

- **Emergency Department Saturation**: Hospital resources (beds, equipment, staffing) are fully committed and not available for the additional incoming ALS patients.
- **Neurosurgeon Unavailable**: Hospitals cannot care for patients requiring a neurosurgeon.
- **Lack of CT Scanner**: Hospital cannot provide adequate diagnostic measures due to a non-functioning CT scanner.
- **Trauma Care**: Hospitals cannot care for additional trauma patients because the trauma team is fully committed to caring for other trauma patients in the operating room, emergency room, or due to lack of diagnostic equipment.
- **Pediatric Critical Care**: Hospitals may divert patients 14 years or younger to a designated pediatric care facility.
- **Internal Disaster**: Hospital cannot receive patients due to a physical plant breakdown, including power outage, fire, and loss of water. Under this scenario, the hospital must call the county to obtain permission before closing. Internal disaster effectively closes off the emergency room.

In addition to these reasons, paramedics may divert patients requesting a different hospital, but emergency rooms have no control over these diversions.

If the emergency room selects “Emergency Department Saturation,” it must enter additional information into ReddiNet. The emergency room must describe its saturation using two major problems and eight subproblems:

1) Excessive volume of patients presenting with:
   a. Vomiting/diarrhea/gastroenteritis
   b. Generalized rash with fever
   c. Neurological findings (excluding strokes)
   d. Acute febrile respiratory illness
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e. Other single clinical chief complaint not listed
   f. No single complaint predominates

2) Emergency department treatment stations/personnel are fully committed due to:
   a. In-patient beds are unavailable for ED patients awaiting admission
   b. Multiple critical patients