SOUTHERN NEVADA

Southern Nevada Trauma System Needs Assessment

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Prepared for:
Clark County Health District

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Executive Summary

Specialized trauma care has been a significant part of the nation's healthcare landscape for 20 years. According to the Centers for Disease Control, unintentional injury is the leading cause of death in the US for people aged 1 – 34. In Nevada, unintentional injury is the leading cause of death for those between the ages of 1 to 44.

Early leadership by the State of Nevada created a trauma network for the state in the mid to late 1980s. The Southern Nevada trauma center program began in 1988 with the designation of the University Medical Center (UMC) as a Level II trauma center. Refinements have been made to the UMC trauma center including upgrading the trauma center to a large freestanding, Level I trauma center. Recently trauma center status has been sought by two other hospitals in the community. This study was designed to evaluate the current trauma network capabilities and needs and make recommendations for the future.

The trauma patient is served by a network of public safety answering points (PSAPs), 12 first responders, 4 ground ambulance providers, 1 air transportation provider, and the trauma center at UMC. These components form the framework of the Southern Nevada trauma system delivery network. The current trauma center in Southern Nevada treats in excess of 3,900 patients per year – with that volume expected to grow to between 4,600 to 5,300 patients over the next 6 years.

The communities in Southern Nevada should be amply reassured that the network of prehospital providers and the UMC trauma center provide high-quality, state-of-the-art injury care. The emergence of new hospitals in Southern Nevada with trauma center interest is primarily based on a perceived future need for expansion but not due to any existing significant trauma center shortcomings. The community should have confidence that, even though enhancements to the trauma center network are being recommended in this report, the current trauma center network continues to provide a superior level of service to its residents.

There are developing challenges for assuring a future stable network of trauma centers in Southern Nevada and in the country:

- Growing demand for trauma and emergency department (ED) services
- Lack of adequate funding and compensation for trauma and emergency-related services
- Shortages in available workforce
- Increases in the cost of liability insurance for hospitals and physicians

Key to these challenges is the ongoing staffing challenges for physician specialists at the EDs and the trauma center(s). Another critical issue is hospital capacity and ED saturation in Las Vegas. These issues remain a serious threat to any composition of the Southern Nevada trauma network and the ongoing system. Cooperative hospital planning will be needed to prevent further erosion of resources and to mitigate the effects of the other stability challenges described in this report.

System stakeholders in Southern Nevada are eager for continued improvements commensurate with assured quality and cost efficiencies. There should also be significant emphasis to assure a financially stable trauma system for the future.

The Abaris Group has summarized the key recommendations on system improvements that meet these goals:

(1) A trauma system leadership structure at the Clark County Health District should be immediately established in Southern Nevada based on delegated authority from the Nevada State Health Division and with the additional scope and funding recommended in this report through voluntary participation and funding by the trauma providers.

(2) A multidisciplinary Regional Trauma Advisory Committee (RTAC) should be established to assist with further planning and monitoring of system components.

(3) The Nevada State Health Division should complete a comprehensive statewide trauma system plan involving broad stakeholder input and support.

(4) Targeted community and policymaker education should occur on the current capabilities of the trauma center(s) in Southern Nevada.

(5) Comprehensive empowerment legislation should be established statewide with the clear authority for and definition of the dimensions of an integrated trauma care system.

(6) Ongoing financial planning should occur at the trauma provider and public policy levels to inventory and develop stable funding sources for the trauma system and trauma center(s).

(7) Injury prevention programs in Southern Nevada should be inventoried, coordinated and publicized through a central clearinghouse. Additional data should be published on the epidemiology of trauma center patients to further guide targeted prevention efforts.

(8) A strategic plan should be developed to assess, plan and monitor the key human resource needs in the community for trauma care.

(9) The RTAC and lead agency should encourage further integration of the prehospital delivery network into the trauma system with targeted ongoing education, outreach and quality improvement (QI) programs.

(10) One additional Level III trauma center should be designated in the southern portion of the region and further expansion considered for elsewhere in the region commensurate with need as growth and demand increases. The Abaris Group would urge caution in the use of provisional designation and have the assurance of the American College of Surgeons or any site visit team that any trauma center applicant fully meets all of the critical standards that are not volume driven before designation.

(11) A Blue Ribbon Committee should be established to monitor progress of the new ED "no diversion" protocol and a planning processes should be implemented to assure emergency medical service (EMS) resources and patient flow are optimized. This Blue Ribbon Committee should also be charged with the further study of community ED on-call physician specialist challenges, expectations and capabilities, developing a plan for responding to gaps in coverage, and providing guidance to the lead agency on a plan for implementation of the inclusive trauma system recommended in this report.

(12) The lead agency should conduct planning sessions with the lead injury rehabilitation centers in the community to further integrate the post acute care system into the delivery network.

(13) Additional resources should be added at the state level trauma registry to develop a robust and potent information management resource for the trauma system. This entity would monitor hospital compliance with the trauma registry and act as an ongoing resource to drive strategic planning, injury prevention and delivery systems for the future and to assist lead agencies with monitoring system performance.

(14) A trauma system Medical Audit Committee (MAC) format should be established similar to that used in San Diego County to assure collaborative practices and policies are developed on delivery and to assist with QI opportunity and change processes.

(15) A trauma system QI plan should be adopted with measurable performance parameters for all system participants that includes event-based and strategic reviews.

(16) Continuing support for trauma injury research should occur.

Overview

Introduction to the Study

The Abaris Group was retained by the Clark County Health District to perform an assessment of the need for a trauma system in Southern Nevada. This assessment has included conducting an inventory of the trauma components currently in place in Southern Nevada and making recommendations to develop and implement a comprehensive trauma system for the future. It should be noted that this study is being conducted based on the interest of two hospitals who desire to improve their service to the community and not because of a pressing need for the immediate addition of trauma centers.

The study has involved extensive trauma stakeholder and public input via one-on-one interviews, focus groups and town-hall meetings, as well as an in-depth analysis of data provided by the hospitals, EMS providers and the UMC trauma registry. In addition to the work of The Abaris Group, the American College of Surgeons (ACS) conducted a consultative review of the trauma system in Southern Nevada.

In order to assure an objective and unbiased approach to the study, the Clark County Health District Board of Health created a Citizens Trauma Task Force. The task force is comprised of nine business and community leaders in the Las Vegas region.

The ACS and The Abaris Group studies will provide recommendations to the Citizens Trauma Task Force to enable them to make recommendations, which will be presented to the Clark County Health District Board of Health. The Clark County Health District Board of Health will then present its recommendations to the Nevada State Health Division Administrator.

Methods

As part of the Southern Nevada Trauma Needs Assessment, The Abaris Group conducted site visits at the UMC Trauma Center, all 12 adult EDs, and the 2 pediatric EDs. The purpose of the site visit was to meet with each hospital's ED management team to obtain a baseline inventory and resource data on each facility and to obtain input on the needs of the trauma system. The Abaris Group also participated in a ride-along with a ground ambulance provider.

In addition to the site visits, The Abaris Group also interviewed greater than 100 key stakeholders in a variety of venues to obtain their input. These stakeholders included:

- air ambulance providers
- ground ambulance providers
- fire departments
- hospital CEOs
- insurance payers
- Nevada State Health Division staff
- Clark County Health District staff
- Trauma Institute staff

A series of focus groups was also conducted. The purpose of the focus groups was to obtain information in a group setting and to help cull out ideas and allow the exchange of different perspectives. The following focus groups were held:

- ED medical directors
- ED nurse managers
- EMS supervisors
- Hospital CEOs
- Clark County Health District staff

And finally, a series of Town Hall meetings was also held. The purpose of these meetings was to enable the public to learn about the study and provide input to the process. Town Hall meetings were held in:

- Boulder City
- Clark County
- Henderson
- Las Vegas
- Mesquite
- North Las Vegas

A summary of the interviews, town hall meetings and data collected as well as trauma care resources in Southern Nevada are all documented in a supplemental report to this needs assessment, presented in March 2004.[1]

Using these study tools (interviews, surveys, Town Hall Meetings, etc.), The Abaris Group was able to inventory the resources relevant to trauma in Southern Nevada, obtain stakeholder input, and analyze pertinent data. The information and data obtained was then used as the framework for The Abaris Group recommendations for the Southern Nevada trauma system.

1 *Current Trauma Status Report – Southern Nevada Trauma System Study*, The Abaris Group, Walnut Creek, CA, April 2004.

Trauma Development

Trauma System versus Trauma Center

A trauma system is a multidisciplinary effort by a region to respond to the risk and occurrence of injury by coordinating resources throughout the trauma care spectrum. Such a system often involves, among other elements, the participation of the local public health system, emergency medical services (EMS), designated trauma centers, and efforts at injury prevention and rehabilitation.

According to the National Highway Traffic Safety Administration's (NHTSA) document *Trauma System Agenda for the Future*, the true value of a trauma system is derived from the seamless transition between each phase of care, integrating existing resources to achieve improved patient outcomes. Success of a trauma system is largely determined by the degree to which it is supported by public policy. Further, regionalized trauma systems make efficient use of health care resources. They are based on the unique requirements of the population served, such as rural, inner-city, urban, or Native American communities.

Trauma systems are developed with an expectation that these efforts will lead to significant reductions in morbidity and mortality. Previous studies have supported that trauma systems have an impact on morbidity and mortality.[2, 3]

The trauma center is an important component of a trauma system. It is where the injured person receives the majority of their care. There are four different levels of trauma centers authorized by Nevada statute and regulation, Levels I through IV, with the most advanced level being a Level I. The major difference among the levels is the type of injury the center can care for – the most severely injured are treated at a Level I or II, less severe injuries are treated at a Level III or IV. Level I trauma centers are required to have residency and research programs on trauma. Within a trauma system there can be as few as one trauma center to many trauma centers. The number of trauma centers and their level depends on the region's needs and designation methods.

Finally, a trauma center differs from an ED in that trauma centers consistently have 24-hour resources to care for the more severely injured patients (e.g. serious car crash), while an ED would treat those people with less severe injuries.

Elements of a Trauma System

The ACS has identified 11 components of a trauma system. Their *Consultation for Trauma Systems*[4] document identifies the definitions and key capabilities of each of the components of the trauma care system. The components of a trauma care system are:

A. Administrative Components
   a. Leadership
   b. System Development

2 Mullins RJ, Veum-Stone J, Hedges JR, et al. "Influence of a statewide trauma system on location of hospitalization and outcome of injured patients." *J Trauma* 1996;40:536-546.
3 Mullins RJ, Veum-Stone J, Helfand M, et al. "Outcome of hospitalized injured patients after institution of a trauma system in an urban area." *JAMA* 1994;271:1919-1924.
4 *Consultation for Trauma Systems*, American College of Surgeons, Chicago, IL, 2002

c. Legislation
d. Finances

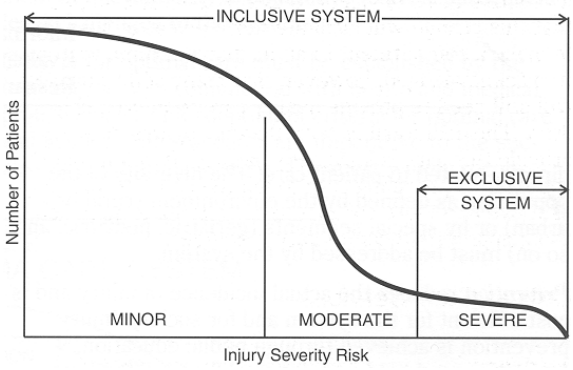
B. Operational and Clinical Components

a. Injury Prevention and Control
b. Human Resources
c. Prehospital Care
d. Definitive Care
e. Information Systems
f. Evaluation
g. Research

Inclusive Trauma System

An inclusive trauma system is one that strives to meet the needs of all injury patients requiring an acute care facility, regardless of severity. In an inclusive system the trauma center remains a key component but the system recognizes the necessity of other health care facilities. Exhibit 1 graphically shows the scope of a trauma care system and the injury population.[5] An inclusive system would have hospitals (EDs) that have made a commitment to treat minor and moderate injuries to the standard of practice and a trauma center to treat the most severe injuries. Inclusive trauma systems have been recommended by ACS and NHTSA and have been the template for many new trauma systems.

Exhibit 1 – Scope of Trauma Care System



5 *Model Trauma Care System Plan*, Health Resources and Services Administration (HRSA), Division of Trauma and Emergency Medical Services, Rockville, MD, 1992.

Model Trauma System

As indicated previously, the ACS has established standards and a consultation process to assist state and local communities to achieve fully integrated trauma systems.

One of the acknowledged lead trauma systems in the country is the San Diego County trauma system. Members of the Trauma Citizens Task Force participated in a site visit to San Diego to learn first hand about the San Diego County trauma system. The county's 1.6 million residents are served by five adult and one pediatric trauma centers. Two of the highly successful components of the San Diego County trauma system are the Medical Audit Committee (MAC) and the highly collaborative nature within the trauma stakeholder groups and between the trauma centers and the lead agency for the trauma system, the County of San Diego. MAC is the trauma system quality assurance committee that includes the trauma medical directors and the trauma program managers from each trauma center, among others. While MAC meets monthly, every other month they meet to discuss trauma cases, with candid discussion of case treatment between the peer trauma centers. On the alternate months the committee discusses administrative and system issues.

The high level of collaboration among the key trauma stakeholders has been identified as a unique strength of the San Diego system. It is apparent that the trauma medical directors and trauma program managers confer regularly even outside of the MAC process on important trauma center issues. In addition, many other key stakeholder groups communicate regularly, including the sister committee to MAC, the Prehospital Audit Committee (PAC). The PAC generally operates similarly to MAC, but has a wider participation base (ambulance providers, emergency department physicians, base hospital coordinators, etc.).

It is believed by system stakeholders that all of these components and others have contributed to the culture of quality review and the overall success of the San Diego County trauma system. This system's best practice approach to trauma care is clearly a model for the country and one that has been used to develop other model systems nationwide.

Trauma Care in Southern Nevada

Overview

According to the Centers for Disease Control, National Center for Health Statistics, unintentional injury is the number one cause of death in the US for persons aged 1 to 34 in 2001. Unintentional injury is also the number one ranked cause of death in Nevada, but for a larger portion of the population, those ranging in age from 1 to 44.[6]

Currently there is one trauma center in Southern Nevada, UMC, which is a State designated and ACS verified Level I trauma center. In the fall of 2003, two hospitals in Southern Nevada notified the Nevada State Health Division that they would like consideration for designation (Sunrise Hospital and Medical Center is seeking a Level II designation and St. Rose Dominican-Siena is seeking a Level III designation). If these two hospitals are to be approved as a trauma center, they must first obtain verification by ACS and then be designated by the Nevada State Health Division Administrator, the State agency that has the responsibility for designation of trauma centers.

Under Nevada Revised Statutes (NRS 450B), the responsibility for establishing the trauma program for the treatment of trauma and for designation rests with the Nevada Board of Health. The oversight of this process for the trauma center application, designation and monitoring process is performed by the Nevada State Health Division through its Licensing Section. The Nevada State Health Division's EMS Section's role with trauma centers is limited to approving the field triage standards. The Nevada State Health Division's role is set by statute to include developing and monitoring the:

- Trauma center application process
- Trauma verification and designation meeting ACS standards
- Trauma center monitoring
- Trauma patient destination policies
- Statewide Trauma Registry

Under State statute (NRS 450B.077), the EMS personnel and clinical supervision of the prehospital system for Clark County has been delegated to the Clark County Health District. The District is governed by a 13-member policy making board composed of representatives from each of the region's six governmental entities, as well as a physician member at-large. As such, it represents a unique consolidation of the public health needs of Boulder City, Las Vegas, North Las Vegas, Mesquite, Henderson, and Clark County into one regulating body. The Clark County Health District Board of Health, through policy development and direction to staff, identifies public health needs and, as mandated by County Ordinance 163, establishes priorities on behalf of local taxpayers, residents, tourists/visitors, and the commercial service industry, "to establish and conduct a comprehensive program of health to prolong life and promote the well-being of the people of Clark County" (Subsection b of Section 6).

The District has no official role with trauma except as it interfaces with the authority shared with the State on prehospital care policy. However, the Nevada State Health Division requested the Clark County Health District conduct an assessment of the trauma system in the Las Vegas region. This assessment is being conducted partially by a system consultation visit by the ACS and through a needs assessment being conducted by The Abaris Group, a consulting firm that specializes in assessing trauma systems.

6 Centers for Disease Control, National Center for Health Statistics, Vital Statistics System, 10 Leading Causes of Death, Nevada, 2001.

In order to assure an objective and unbiased approach to the study, the Clark County Health District Board of Health created a 9 member Citizens Trauma Task Force. The task force is comprised of business and community leaders in the Las Vegas area. Once the ACS and The Abaris Group's assessment have been completed, the Task Force will make recommendations to the Clark County Health District Board of Health regarding the future trauma system and its configuration. The Clark County Health District Board of Health will present its findings and recommendations to the Nevada State Health Division Administrator for the ultimate decision.

Statewide Trauma Efforts

A Trauma-EMS Stakeholders Group was established in 2000 in response to the federal funding from the Health Resources and Services Administration (HRSA) for their Trauma-EMS Systems Program. This is a 14-member group assembled to provide advice on the key goals of the HRSA grant project. The Trauma-EMS Stakeholder's Group is affiliated with the Trauma Institute, which is a freestanding non-profit organization based in Las Vegas with a primary focus on injury research. While trauma system planning is an area of interest for this committee and for the State, there are significant resource limitations that have hindered the progress of this group towards developing momentum on statewide planning and monitoring of a trauma system.

Nevada Trauma Centers

In addition to UMC, the other trauma center in Nevada is Washoe Medical Center in Reno, a State-designated and ACS-verified Level II trauma center. The following comparative data is from the Nevada Report on Injury 2000 – 2002 published in May 2004.

Exhibit 2 – Nevada Trauma Registry Patients

Nevada Trauma Registry Patients, 2000-2002					
Trauma Center	2000	2001	2002	Percent Change 2000-01	Percent Change 2001-02
University Medical Center	3,117	3,570	3,714	14.5%	4.0%
Washoe Medical Center	2,123	2,120	2,520	-0.1%	18.9%
Other[1]	329	654	672	98.8%	2.8%
Total Trauma Cases	5,569	6,344	6,906	13.9%	8.9%

[1] Other: All other Nevada counties, unknown in Nevada, out of state, and unknown.

Source: Center for Health Data & Research, Bureau of Health Planning & Statistics, NV State Health Div.

Assessment of Trauma System Components

Overview

The trauma system components identified by ACS and NHTSA form the backbone of any quality trauma system in the country. Southern Nevada has portions of some of the trauma system components in place and others that need to be completely addressed.

The following table provides a summary of current status of each component of the trauma system based on The Abaris Group review and research. A more complete assessment of each component and set of recommendations follows.

Exhibit 3 – Status of Trauma System Components in Southern Nevada

Status of Trauma System Components in Southern Nevada				
Trauma System Component:	**Definition:**	**In Place**	**Partially**	**Not in Place**
Administrative Components				
Leadership	Establishing an agency that has the authority, responsibility, and resources to lead the development, operations, and evaluation of a trauma system in their area.			X
System Development	Identified planning process that addresses resources, components and method of implementation and monitoring.			X
Legislation	Comprehensive legislation for planning and monitoring trauma system development			X
Finances	Identifying the financial health and developing stable funding sources to ensure a viable, long-term system.			X
Operational and Clinical Components				
Injury Prevention	Establishing an injury prevention program/coalition that will help reduce morbidity, mortality and costs associated with trauma.		X	
Human Resources	Addressing shortages in the number of trauma care professionals and assuring relevant education resources.			X
Prehospital Care	Addressing EMS, dispatch and PSAP issues		X	
Definitive Care	Assessing resources in and for acute and post acute trauma care, making sure adequate volume is available to maintain trauma center skills, assuring transfer agreement to higher level of care		X	
Information Systems	Establishing viable databases and information management systems to be used in assessing a trauma system.		X	
Evaluation	Monitoring of trauma center and trauma system performance			X
Research	Identifying a consensus and acting on trauma research priorities		X	

Source: Trauma System Components as identified by the ACS, Consultation for Trauma Systems document, 2002

Administrative Components

Leadership

The ACS defines the leadership requirement for a trauma system to be a "lead agency…with the authority, responsibility and resources to lead the development, operations and management of the trauma system."[7] The Nevada State Health Division is designated by Nevada statute as having primary authority over EMS for the entire state, except in Clark County, and for trauma throughout the state. In that regard, the statute would imply that the State Health Division is the current "lead" agency as defined by NHTSA and ACS documents. However, the State's current authority on trauma only includes trauma center designation, destination protocols and trauma registry and those functions are split between the Licensure and Certification and EMS Sections. The Clark County Health District is designated by State statute to oversee the EMS system in Clark County. This role includes a role on prehospital components of trauma in Southern Nevada.

There has been some confusion about the division of authority between the State and the Health District on the issue of prehospital trauma triage and transport protocols. There is clearly statutory authority for the Clark County Health District Board of Health to develop minimum standards for the "treatment of patients who are critically ill or in need of immediate treatment" (NRS 450B.130), while the State has authority for setting trauma triage and transport standards. While there are some differences of opinion, The Abaris Group's review of the statute appears to grant the Clark County Health District Board with the specific authority for establishing prehospital triage protocols including trauma patients.

The Clark County Health District's important local stakeholder access and role was recognized by the Nevada State Health Division when the Division requested the local trauma needs assessment be conducted by the District. Still there remains a lack of continuity on the authority structure between the State and Clark County Health District on trauma system leadership. As noted by NHTSA: "The fragmentation of trauma leadership is a major impediment to the development of a national trauma system."[8] The same could be said for statewide and regional planning as well. It is also important to note that neither the State of Nevada nor Clark County have a formal trauma system or trauma plan and, as identified in this needs assessment, there are many missing trauma components needed for a comprehensive trauma system in Southern Nevada.

Having a trauma leadership structure is critical to developing and monitoring a trauma system but becomes even more crucial as the trauma system grows because of the need to interface between multiple trauma center providers and to facilitate revised protocols (e.g. prehospital treatment and triage). The leadership structure should be designed to be assured of significant stakeholder input and buy in.

There are many different models for trauma system leadership or governance. These include:

- Statewide trauma leadership integrated with the State's EMS Bureau
- Delegated or statutory authority to a local governmental entity such as the Clark County Health District

7 *Consultation for Trauma Systems*, ACS, Chicago, IL
8 *Trauma System Agenda for the Future*. NHTSA, April 2002, Washington DC.

- Establishment of a state or local foundation (501(c)3) supported by contract authority with the trauma stakeholders (e.g. Pennsylvania Trauma Foundation)
- Combinations of the above entities

Leadership Conclusions

Establishing and funding a statewide trauma system leadership structure with empowering legislation would likely take two to four years. Due the immediate need and the acknowledged sensitivity to local needs, The Abaris Group recommends that the Clark County Health District be designated as the lead trauma system agency for Southern Nevada. To accomplish this, trauma center designation authority should be delegated from the State to the District by contract with other elements of the trauma system (e.g. QI, prevention, human resources, etc.) and implemented locally through voluntary commitments from stakeholders until full statutory authority can be granted. Preliminary funding of the lead agency should be acquired from the trauma center applicants through designation fees.

The leadership structure should include a multidisciplinary committee of stakeholders that meets frequently to discuss key issues for the trauma system and plan system improvements. Similar committee structures are in place throughout the country but a particularly effective model structure is the regional trauma advisory committees (RTACs) in Texas. Suggested membership includes:

- 2 – 3 EMS providers
- Trauma center medical director and nurse coordinator
- 2 – 3 ED medical directors
- 2 – 3 ED nurse managers
- 1 CEO from a non-trauma center
- 1 surgeon from a non-trauma center

System Development

The original trauma center development occurred in the mid 1980s in Nevada and while there have been some minor adjustments in trauma center activity since that period, no substantial system development has occurred for nearly 18 years. This needs assessment and the parallel ACS trauma system consultation will go a long way to defining the needs and initiating an up to date system assessment.

System assessment initially starts with a resource and needs assessment (accomplished through this study) and eventually leads to the development of a trauma system plan. The Nevada State Health Division has indicated that they intend to prepare a statewide trauma plan in the near future and to pursue alternative funding sources to support the state structure and potentially include support for uncompensated care.

The planning process and ultimate plan development should be a public and inclusive process. It should also analyze the financial impact of all proposed goals and prepare recommendations on funding. The planning process would conclude with approval from the highest levels of authority in the state and ultimately be implemented.

System Development Conclusions

The Nevada State Health Division should prepare a comprehensive statewide trauma plan and pursue alternative funding sources involving broad stakeholder input and subsequent approval by State policymakers.

Legislation

Comprehensive legislation is essential for trauma system development. The creation of statutes and regulations to authorize the development of a trauma system and to empower a leadership agency is crucial to a trauma system's success. Key provisions in trauma legislation should include the authority to:

- Develop a trauma system plan
- Integrate the program with the EMS system
- Identify the role and priority of prevention programs
- Adopt guidelines for pre-hospital care
- Mandate data collection and the resources to support the effort
- Provide for patient record and reviewer confidentiality
- Provide the authority to designate trauma centers
- Provide authority for intra/interstate trauma planning and coordination

Legislation Conclusions

The Abaris Group would like to emphasize the importance of omnibus trauma legislation for the state that establishes the clear need, authority and the dimensions for a statewide trauma system. This would include a statewide plan, definition of the elements of a trauma system and establishing long term funding for the leadership functions as well as financial support to trauma system providers.

Finance

The cost of trauma care and the technology needed to meet the complex needs of the trauma patient continue to rise. Current revenue sources for trauma patients are fragile and constantly at risk. The cost of care for trauma centers is generally provided for from fees for service as a shared responsibility for private and government payers. However, the need is not generally appreciated by policy makers of the high cost associated with the "level of readiness" to provide trauma care services 24 hours per day, 7 days per week.

Creating a stable and sustainable funding source for the trauma system is a critical need. This funding is needed at the trauma center and system leadership levels.

There are areas in the country where publicly supported dollars are used for trauma centers. Trauma center tax districts do exist (e.g. Alameda, (CA), Los Angeles and Palm Beach (FL) Counties) as well as other statewide funding sources (e.g. Illinois, Oklahoma, Texas, and Washington). As documented in The Abaris Group's *Current Trauma Status Report*, their success is largely a product of developing a clear need and formal efforts to achieve public support for funding these needs. Such efforts have not been fully tested in Nevada.

Finance Conclusions

- *Optimizing Current Resources.* One of the challenges for trauma centers in developing a publicly-funded effort is to assure that all current revenue opportunities are optimized. While all potential trauma centers indicated to The Abaris Group during this study that they had or were planning to optimize internal revenue sources to improve revenue for trauma care, our experience is that this is often not accomplished without a significant trauma revenue management plan. All designated trauma centers should undertake high-priority efforts to achieve those potentials prior to soliciting other funding sources.

- *Statement of Need/Research.* Consistent with previous observations made by The Abaris Group, a clearer statement of need for public support should be developed by the trauma system to provide a stable and sustainable source of funding for the future. The funding would be used to assist with the development of trauma system components, fund the leadership structure and support trauma care providers as necessary. This effort should be followed by a careful analysis of potential public support initiatives for developing a stable source of funding for the system and consider other best-practice strategies listed in the *Current Trauma Status Report*.

- *Pursue Stable Funding Sources.* Pursuing stable funding sources for the trauma system should be a high priority as future changes to the system appear to assure a widening gap between cost and revenue. The planning for a stable funding source should be included in statewide or local trauma plans that are developed.

Operational and Clinical Components

Injury Prevention

The greater Clark County community has made an extraordinary commitment to injury prevention. There are two community coalition programs, the Clark County Safe Kids Coalition and the Clark County Safe Communities. The Safe Kids Coalition is in the process of developing a strategic plan for its organization. One of the goals of the strategic plan will be to focus on broader coalition development and funding.

There is ample evidence of excellent support from UMC for injury prevention efforts/programs. There are several injury prevention programs directed by the trauma center. There is also clear evidence of collaboration between UMC and community organizations within the community focusing on injury control efforts. UMC's programs include Traumaroo, ENA ENCARE, Take Care, Buckle Up Bear, Learning to Care, and Child Passenger Safety.

The Henderson Fire Department also has a program called Risk Watch sponsored by the National Fire Protection Association that addresses car safety, fire, poison, bicycle safety, fire arms, water, suffocation and falls.

Another key participant in the trauma injury prevention arena is the Trauma Institute of the Nevada School of Medicine Department of Surgery. The Trauma Institute receives private funding and applies for grant awards to develop population based studies of injuries and their presentation. They have completed many research projects and have several they are currently investigating. These include:

- CODES (Crash Outcome Data Evaluation System) 10/97-07/03
- Domestic Violence 9/97-9/01
- Suicide Prevention Research Center 10/98-09/04
- EMS-C 3/98-2/06
- Trauma – EMS System 9/02-9/05

Finally, the Clark County Health District has staff dedicated to injury prevention, and they work closely with other the injury prevention stakeholders.

Injury Prevention Conclusions

Trauma systems inherently need prevention programs as the work for the injured does not start with the care delivery system, it starts with prevention. As the National Committee for Injury Prevention and Control was stated:

> *"Support for the development of comprehensive trauma care systems by all levels of government and by the health care and public health professions must be a priority. Trauma care systems have been proven effective in reducing injury-related mortality and morbidity. They are an essential component of a systematic approach to injury prevention from primary prevention through rehabilitation."* [9]

9 *Injury Prevention: Meeting the Challenge*. The National Committee for Injury Prevention and Control, 1989, Oxford Press, New York, NY.

Ongoing maturity of the injury prevention program for Southern Nevada should include establishing a clearinghouse for injury prevention, perhaps at the Trauma Institute, and developing trauma registry-driven initiatives. It is important that prevention programs more precisely match the epidemiology of injuries treated within the trauma system.

Human Resources

Workforce Issues

The development and maintenance of a stable workforce in the healthcare industry is an ongoing challenge. This problem is particularly rampant in the trauma care field where the availability of nurses and key physician specialists are designed around immediate response systems.

There are significant challenges in the Las Vegas community with on-call ED coverage for physician specialists. A recent survey by The Abaris Group summarized in the *Current Trauma Status Report* documented that nearly two-thirds of the EDs faced challenges with on-call physician coverage. This study also noted that many of the EDs rely on the trauma center at UMC for backup coverage should they not be able to get coverage for key specialties for minor to moderate injuries that do not meet trauma center triage standards. The challenge is that UMC and other trauma centers in the country are rarely positioned or have the resources to act as the "safety net" hospital or ED for on-call physician coverage challenges.

There are also significant challenges with nursing shortages. The state ranks 49 of 50 for the largest shortage in the country. Recently, three new hospitals have opened and they have aggressively recruited from existing hospitals. Therefore not all beds in the community are staffed although no formal inventory has been conducted.

Education and Advocacy

Trauma injury is a public health problem and the leading killer for ages 1 – 44 in Nevada. However, there is little public appreciation of injury as a public health disease. There is also a profound lack of public and legislative awareness of the scope of injury problems and the challenges for payment for injury care to trauma care providers. Finally, private and public policy makers frequently lack an appreciation of the nature of the injury problem and the value of a trauma system in supporting the wellness of a community.

Human Resource Conclusions

Human resource limitations at the trauma center, ED on-call physician specialist, and nursing categories are particular challenges in the Southern Nevada region. Developing significant new staffing levels for new trauma centers will also be a challenge should additional trauma centers expect high volumes and therefore staffing levels. The Abaris Group recommends that a strategic plan be developed to assess, plan and monitor the availability of key specialists in the community for trauma care. Considerations for long-term strategies include:

- Develop patient-focused team responses to trauma care
- Develop new categories of health professionals (e.g. physician extenders, hospitalists) to address the need for resources
- Create recruitment and retention opportunities
- Assure sufficient reimbursement to encourage participation
- Develop incentives for key physician specialists
- Develop and fund tertiary care centers for critical shortage specialist services
- Develop long term methods to address the burden of liability for practitioners
- Develop practitioner-driven care maps to leverage the key specialist

This planning effort should be supplemented by a Blue Ribbon Committee formed with hospital CEOs, physicians, and nursing staff leadership to study the existing community on-call specialist issue and other human resource needs particular to trauma and EDs. It should plan community standards and strategies to respond to gaps in coverage.

The Abaris Group also recommends that a vision be created through targeted activities to increase the overall awareness of trauma systems and their role in community safety and health to the public and public policy levels. The following activities should be considered:

- Develop a compelling campaign to position injury as a disease rather than a random occurrence and to publicize the value of trauma care
- Target education programs to inform public policy makers about the value of community trauma systems
- Encourage large scale involvement of providers, payers, advocates and corporations to conduct public education programs based on the epidemiology of Southern Nevada's injury patterns
- Educate health payers about the cost effectiveness of integrated injury care and prevention programs
- Develop advocacy programs to facilitate the passage of comprehensive legislation designed to improve the implementation of a coordinated trauma system and reduce the incidence of trauma

Prehospital Care

Clark County has a sufficient number of 9-1-1/Public Safety Answering Points (PSAPs), dispatch agencies, first responders and ground and air medical providers to meet the needs of the community and in particular for trauma care.

The EMS activity for the region is governed by the Clark County Health District EMS Department. They regulate prehospital care as provided in Nevada Revised Statutes Chapter 450B and in the EMS regulations for Clark County Health District.

EMS data collection is going through a major overhaul with information technology (IT) interfaces expected to be rolled out through the end of 2004. Not all EMS providers will be required to use the IT interfaces but they will be required to report data in a format that can be seamlessly integrated into a database. There is no current plan to integrate this data with the trauma registry.

EMS QI, including trauma cases, is coordinated through an EMS Quality Improvement Directors Committee consisting of a director from each provider agency. It meets monthly to evaluate safety and compliance issues related to prehospital care and provide input to protocol development and clinical performance measures. The committee reports systemwide issues to the Medical Advisory Board (MAB).

UMC, as part of its trauma patient review process, evaluates prehospital care and the timing of service. There are regularly scheduled Trauma Review Sessions that include prehospital care issues. However, while there is a review of the prehospital care portion of the trauma continuum there is no focused review of such care and the prehospital outreach efforts have become somewhat sporadic.

While there are an adequate number of ambulances for timely transport of patients to the appropriate facilities, an historically major impact on the resources for ambulance services is the lengthy delays incurred at the hospitals to off load their patients. There may be as many as five to six ambulances backed up at any one hospital waiting for the hospital to assume responsibility and care for the patient. Delays average 50 minutes and recent data suggests that 90 percent of the time it takes 70 minutes for the hospital to assume care of the patient. This leaves an ambulance out of service for hours.

During this trauma study, The Abaris Group noted a number of hospitals that still did not have a written diversion policy and plans of action to deal with the ED saturation and inpatient flow issues that were creating ambulance diversion. The Abaris Group also noted considerable variation between the hospitals on their practices for going on and off diversion as they related to actual versus perceived capacity and methodologies to manage surge volume in real time.

Clark County Health District has implemented EMSystem software to track hospital closures and ambulance backup. The problem has been evaluated at various committees for years as well as the QI Committee but a long-term workable solution has not been developed. The community began pilot testing eliminating the "ED closure" protocol in April 2004 for 90 days. Initial results are positive.

It is interesting to note that one payer indicated an interest to financially support further studies on solutions to this important problem in Southern Nevada.

Prehospital Care Conclusions

The Abaris Group would encourage further integration of prehospital care into the trauma system by careful analysis of care needs, trended activities, quality control opportunities, and through regular and consistent outreach to the prehospital care agencies. In addition, a Blue Ribbon Task Force should evaluate the current ED saturation and EMS diversion problem, including the long off load times, and monitor the progress of the new pilot study and ultimately develop a plan that leads the community to a sustained "no diversion" practice with short off load time.

Definitive Care

Acute Care Overview

The trauma center at UMC has been in existence since 1988 and significantly expanded its physical plant for trauma care in 1992. The trauma center capability at UMC was primarily designed for a large influx of trauma cases due to a lack of interest from other hospitals to participate at the trauma center level. There is one Level II trauma center in Northern Nevada.

It should be noted that in the past there have been changes in the number of trauma centers throughout the state including Sunrise Hospital and Medical Center as a Level III trauma center from 1989 – 1995. The chronology of trauma centers in the state is documented in the *Current Trauma Status Report*.

The clinical capabilities at UMC are substantial and there are only four other similar centers in the country. Other freestanding trauma centers include R Adams Cowley Shock Trauma Center, Ryder Trauma Center at the University of Miami/Jackson Memorial Medical Center, the Elvis Presley Trauma Center in Memphis, and the Martin Luther King/Drew Hospital in Los Angeles. These trauma centers typically have large freestanding trauma resuscitation areas with dedicated support services (e.g. laboratory and radiology), dedicated operating rooms (ORs) and dedicated trauma intensive care units (TICUs). These centers have the capacity to treat larger volumes of cases, typically three to four times more than a typical trauma center.

Exhibit 4 – Freestanding Trauma Center Volume, 2003

Freestanding Trauma Centers Volume, 2003	
Name	**Volume**
Elvis Presley Memorial Trauma Center at The Med	4,500[1]
Martin Luther King/Drew Trauma Center	2,222[2]
R Adams Cowley Shock Trauma Center	6,000[1]
Ryder Trauma Center at Jackson Memorial Hospital	3,531[3]
UMC	3,899

1 Value approximate

2 Full year estimated based on first two quarters

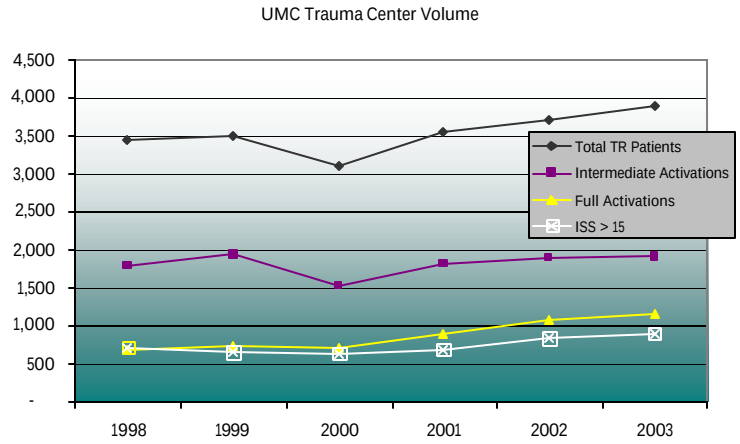
3 FY2002.

The current dedicated trauma center capabilities at UMC are:

- 11-bed resuscitation area
- 14-bed trauma intensive care unit (ICU)
- 3 dedicated operating room suites
- dedicated high speed computed tomography (CT) scanner and angiography suite
- dedicated diagnostic radiology

Exhibit 4 indicates that the trauma volume at UMC has continued to grow. With this growth there is a need to discuss increasing the capacity for acute care trauma. It is not likely that funds or physical space will be available at UMC in the near future to meet the increasing demand. In addition, UMC, being one of the busiest trauma centers in the country, is vulnerable based on being the solo trauma center in the Las Vegas area and there is community sentiment that there should be some backup trauma center.

Exhibit 5 – UMC Trauma Cases 1998 – 2003



There are some indications that the UMC trauma center is approaching its capacity. The estimated average length of stay for trauma patients in the hospital ICUs is 2 days, which equates to an average of 21 ICU patients per day for the 3,900 annual trauma patient volume. With only 14 dedicated trauma ICU beds available, this suggests that the trauma patient load is putting a strain on the overall hospital ICU capacity. In addition there have been times that the trauma center at UMC has not been able to accept non-trauma center triage criteria patients due to capacity constraints. This indicates other potential resource limitations within the hospital.

Part of the historical challenge at UMC has been the preferential triage of non-triage criteria patients to the trauma center (approximately 8,400 per year). These are cases that could be managed at the local ED but the patient or paramedic preference has been UMC because of the skills and short off-load times. The recent change in trauma triage standards was intended by the Clark County Health District to reduce this patient load at UMC and should help on the low to moderate injury levels.

An inclusive trauma center system would assist in this regard as the other included hospitals would be asked to participate in the trauma system by making a commitment consistent with the standard of practice for patients that do not meet trauma triage standards. Under any scenario the UMC trauma center would continue to receive mild to moderate injuries with its role as a local ED for the region it serves.

Trauma Volume Projections

The challenge for planning additional trauma center capability is to match the need for additional trauma centers with patient demand and resources. There is also the challenge of assuring sufficient patient volume at UMC to support the community commitment that has been made to sustain the large injury care resources available at UMC. In order to assess this need, trauma volume projections were calculated.

Population growth and the tourist population to Clark County were considered in The Abaris Group's volume projections. It has been the experience of The Abaris Group that trauma volume growth does not always match population growth. One can see this with the Las Vegas trauma volume growth which has been significantly slower than the population growth over the last few years.

The Abaris Group's calculations on the trauma center incident rate for visitors show it to be about equal to that of the region's residents. Thus, while the visitor population is impressive (approximately 41 million per year for the region), due to their short stay (averaging 3.4 nights), the impact on the trauma system is nominal.

Exhibit 5 shows trauma patient projections calculated by The Abaris Group using three different growth rates based on historical growth in trauma volume: a 9-year trend (average 0.6 percent), a 5-year trend (average 2.5 percent), and a 2-year trend (average 4.6 percent).

The trauma volume projections suggest that trauma patient volume will grow over the next 6 years achieving a new patient annual volume between 154 to 1,429 cases in 2010 or a new daily average of 0.4 to 3.9 cases per day depending on the use of the 9, 5 or 2 year trend. Even using the more liberal 2 year growth rate of 4.6 percent over the next 6 years, the growth of trauma cases will not achieve sufficient volume for a new Level II trauma center (estimated need of 1,200 new cases per year) in that time.

Exhibit 6 – Southern Nevada Actual Trauma Volume & Projections

Southern Nevada Actual Trauma Volume from 1994 to 2003				
Year	Actual Trauma Volume	Percent Change	Annual Volume Change	Daily Volume
1994	3,714	-	-	-
1995	3,706	-0.2%	(8)	0.0
1996	3,571	-3.6%	(135)	-0.4
1997	3,644	2.0%	73	0.2
1998	3,461	-5.0%	(183)	-0.5
1999	3,518	1.6%	57	0.2
2000	3,114	-11.5%	(347)	-1.0
2001	3,573	14.7%	112	0.3
2002	3,710	3.8%	249	0.7
2003	3,899	5.1%	438	1.2
Growth from 1994 - 2003		0.6%	185	0.5
Growth from 1998 - 2003		2.5%	438	1.2
Growth from 2001 - 2003		4.6%	326	0.9

Projected Volume Based on Growth from 1994 to 2003				
Year	Projected Trauma Volume	Percent Change	Projected Trauma Volume Change from 2003	Projected Daily Volume Based on Change From 2003
2004	3,921	0.6%	22	0.1
2005	3,942	0.6%	43	0.1
2006	3,964	0.6%	65	0.2
2007	3,986	0.6%	87	0.2
2008	4,008	0.6%	109	0.3
2009	4,030	0.6%	131	0.4
2010	4,053	0.6%	154	0.4

Projected Volume Based on Growth from 1998 to 2003				
Year	Projected Trauma Volume	Percent Change	Projected Trauma Volume Change from 2003	Projected Daily Volume Based on Change From 2003
2004	3,998	2.5%	99	0.3
2005	4,099	2.5%	200	0.5
2006	4,203	2.5%	304	0.8
2007	4,309	2.5%	410	1.1
2008	4,418	2.5%	519	1.4
2009	4,530	2.5%	631	1.7
2010	4,645	2.5%	746	2.0

Projected Volume Based on Growth from 2001 to 2003				
Year	Projected Trauma Volume	Percent Change	Projected Trauma Volume Change from 2003	Projected Daily Volume Based on Change From 2003
2004	4,077	4.6%	178	0.5
2005	4,263	4.6%	364	1.0
2006	4,457	4.6%	558	1.5
2007	4,661	4.6%	762	2.1
2008	4,873	4.6%	974	2.7
2009	5,096	4.6%	1,197	3.3
2010	5,328	4.6%	1,429	3.9

Source: UMC Trauma Registry, The Abaris Group

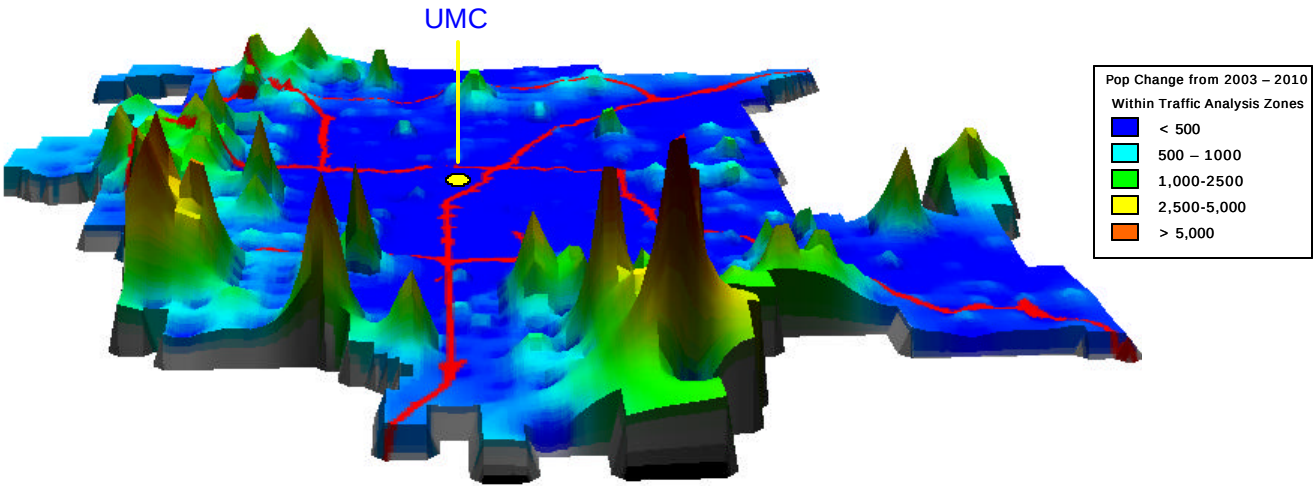
Value of Added Capacity

There is no question of the important role that UMC has played in the trauma care network in Southern Nevada and many stakeholders agreed that UMC's role should not be diminished. However, there is value in considering additional capacity beyond the one trauma center. Clearly added capacity is one of the values but others include redundancy during peak periods, major emergencies, during labor actions, and improving access through sensitivity to the appropriate geographic locations of added centers. There is also the potential for expanded professional input into strategic planning,

clinical protocols and best practice development that could occur with an expanded network of trauma centers.

The only source of projected population data at a smaller geographic area than Clark County is at the traffic analysis zone (TAZ). Population projections by TAZ are calculated by the Southern Nevada Regional Transportation Commission (RTC). The map below shows the RTC's projections for population growth by TAZ, which demonstrates that the largest population growth is expected to be in the southern portion of the region.

Exhibit 7 – Population Growth 2003 – 2010



Source: Southern Nevada Regional Transportation Commission

Choices for Adding Capacity

The current choices for adding trauma center capacity are Sunrise Hospital and Medical Center (hereafter referred to as Sunrise) and St. Rose Dominican-Siena (hereafter referred to as St. Rose), both of which have indicated an interest in becoming a trauma center. The two hospitals offer contrasting proposals. Sunrise offers a Level II trauma center proposal that will provide the capacity for significant trauma patient volume with clinical capabilities similar to the Level I trauma center at UMC. That is, they would have at a minimum an in-house trauma and surgical team including a trauma surgeon and in-depth on-call physician specialist coverage including neurosurgeons. From the standpoint of initial resuscitation and stabilization management, a Level II trauma center is considered the same as a Level I. Sunrise has undergone an ACS consultation visit (results pending) to determine how they compare with trauma center standards and has recruited and retained the key trauma management team positions of a trauma medical director and trauma nurse coordinator.

Throughout this process Sunrise has exhibited a high level of commitment by their Board, key administration and nursing staff and medical staff leadership. Key medical staff commitments from the various physician specialists are not documented and the documentation may not be completed until significant medical staff recruitment is initiated and completed.

The St. Rose proposal is to develop a Level III trauma center with modest volume capabilities including at a minimum an in-house trauma team, on-call coverage for the surgical team and trauma surgeons, and some backup physician specialties. St. Rose would not be required to have the same backup physician specialty coverage as at a Level II or I trauma center. For example, an on-call

neurosurgeon is not required for a Level III. St. Rose has also indicated that they are interested in eventually expanding to a Level II trauma center as community need and volume dictate. St. Rose has not undergone an ACS consultation visit nor have they filled any key management positions. The hospital has also indicated a high degree of administrative and medical staff leadership commitment but not of medical staff that would staff the trauma center.

Both hospitals have had historical challenges with ED and inpatient capacity as witnessed by their ED saturation hours and have not submitted detailed plans on how they intend to correct these problems and respond to any new volume of trauma cases.

Trauma Volume

Trauma volume is an important consideration for trauma center configuration. Having sufficient trauma volume means a trauma center's trauma team's skills are maintained, especially the trauma surgeons'. The other critical piece of the equation is helping to ensure the overall financial viability of the trauma center. Historically, the most frequent reason for trauma center closure has been the fact that costs at some trauma centers has been greater than the revenue.[10] It is The Abaris Group's experience that this is often due to limited volumes at trauma centers due to the over-designation of trauma centers.

Earlier versions of the ACS designation criteria for trauma centers called for approximately 50 surgical cases per surgeon or approximately 800 to 1,000 cases per year for Level I and II trauma centers. No volume standard has ever been published for Level III trauma centers. The Level II standard has been removed from the current ACS trauma center criteria and the Level I ACS standard has been raised to 1,200 total cases per year. Thus, there are currently no published patient volume standards for Level II and III trauma centers. However The Abaris Group uses a benchmark of approximately 1,200 cases for a Level II and 350 - 500 cases for a Level III.

Volume also drives certain capacity needs. Using ED resuscitation bays as an example for trauma capacity, most Level I and II trauma centers have 2 to 3 resuscitation bays in their ED which is deemed to be sufficient for the 1,200 cases per year. UMC current has 11 resuscitation bays and thus has the resuscitation capacity of approximately 3.5 to 5.5 community trauma centers or at and above 3,600 trauma cases per year. Clearly other bed capacity issues must be considered including the OR, ICU, medical/surgical beds and support services.

Access

A significant concern to most of the EMS and hospital stakeholders interviewed during this study was appropriate access by EMS providers to any new trauma centers. Most advocated for improved access in their service area (e.g. northern providers requested consideration for a northern trauma center, southern providers for a southern trauma center, etc.). From the EMS provider's perspective, the predominant sentiment was that adding a Level II trauma center close to UMC (Sunrise is located approximately 3.5 miles from UMC) would not improve access. In fact, some providers suggested it would hamper their transport time as Sunrise has relatively poor freeway access.

The Henderson Fire Department in particular felt that the marginally shortened transport time savings to Sunrise was not significant enough to benefit their community. Many EMS providers in the study indicated from their experience that adding a trauma center in the south part of the county and eventually the north part made more sense from an EMS access, population growth, and traffic

10 Trauma Care, Lifesaving System Threatened by Unreimbursed Costs and Other Factors, GAO, HRD-91-57, 1991

pattern standpoint. Mercy Air indicated they did not feel either approach was an advantage or disadvantage to them as access from the air solves freeway and traffic concerns.

In most trauma systems there is a tradeoff between the issue of location and access of the trauma center(s), and on the issue of the commitment of the hospital itself to become a trauma center. National planning and accreditation bodies for trauma centers (e.g. ACS, NHTSA) clearly stipulate that commitment to being a trauma center is the single most important factor for the success of the trauma center. Generally, this commitment cannot be transferred like a commodity to another more conveniently located hospital as some have suggested during this study. However, planning experts agree that the desired commitment should be commensurate with need. For example, there has not been a suggestion during the study that a second or even third Level I trauma center be added to the network nor would it be appropriate should one or more hospitals indicate a "commitment" at the Level I trauma center level.

Configurations and Volume

Different configuration scenarios of trauma centers will drive differing volumes to the centers. The Abaris Group used 2002 UMC trauma registry data then supervised the geo-coding of each case for purposes of mapping the incident location of trauma cases. This database was then used to develop alternative scenarios for trauma service catchment zones. Transfers were equally distributed between the Level I and II trauma centers. It was assumed that, where possible, only mechanism of injury cases would sent to a Level III. The Abaris Group used the trauma registry calculated Injury Severity Score (ISS) of less than 9 as a surrogate for the mechanism of injury parameter because the data do not exist.

The purpose of the scenarios was to test the volumes of trauma cases that would be received by each theoretical trauma center and the impact of volume changes on UMC. The Abaris Group calculated trauma volumes for three separate scenarios:

(1) UMC as Level I and Sunrise as Level II trauma center
(2) UMC as Level I, Sunrise as Level II and St. Rose as Level IIII trauma center
(3) UMC as a level I and St. Rose as Level III trauma center

The following maps illustrate the sample configuration zones with one or more additional trauma centers and the impact of trauma volume on UMC and the new trauma center(s).

Exhibit 8 – Sample Catchment Zone: UMC and Sunrise

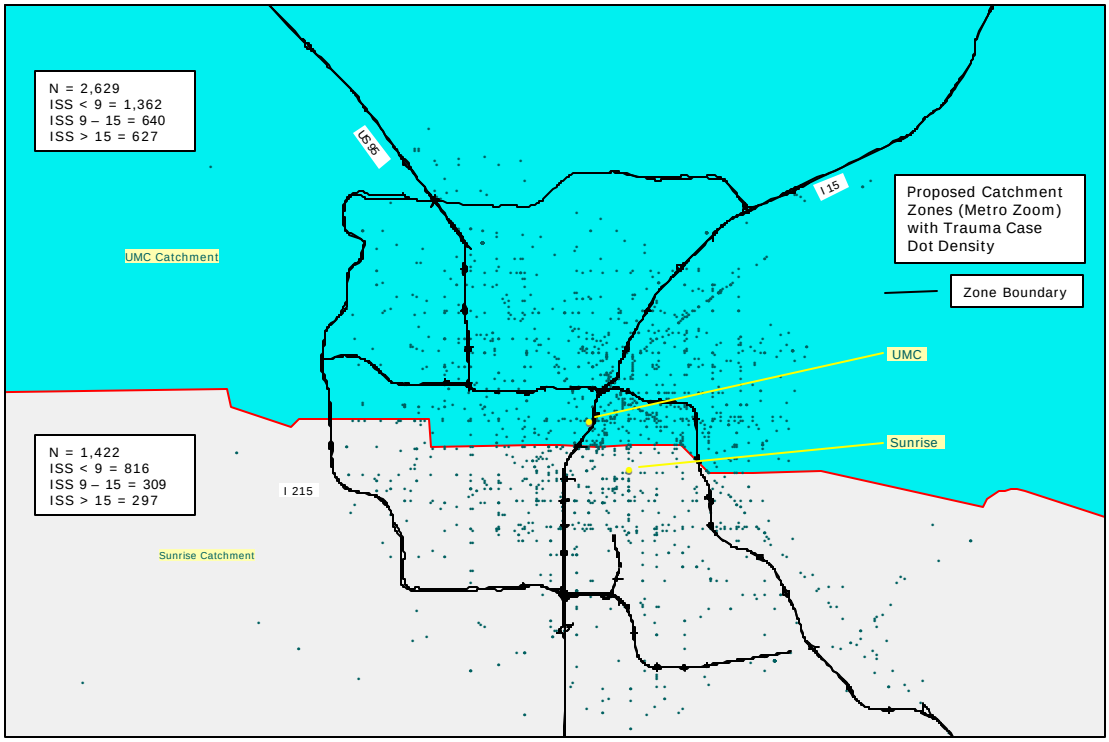


Exhibit 9 – Sample Catchment Zone: UMC, Sunrise and St. Rose

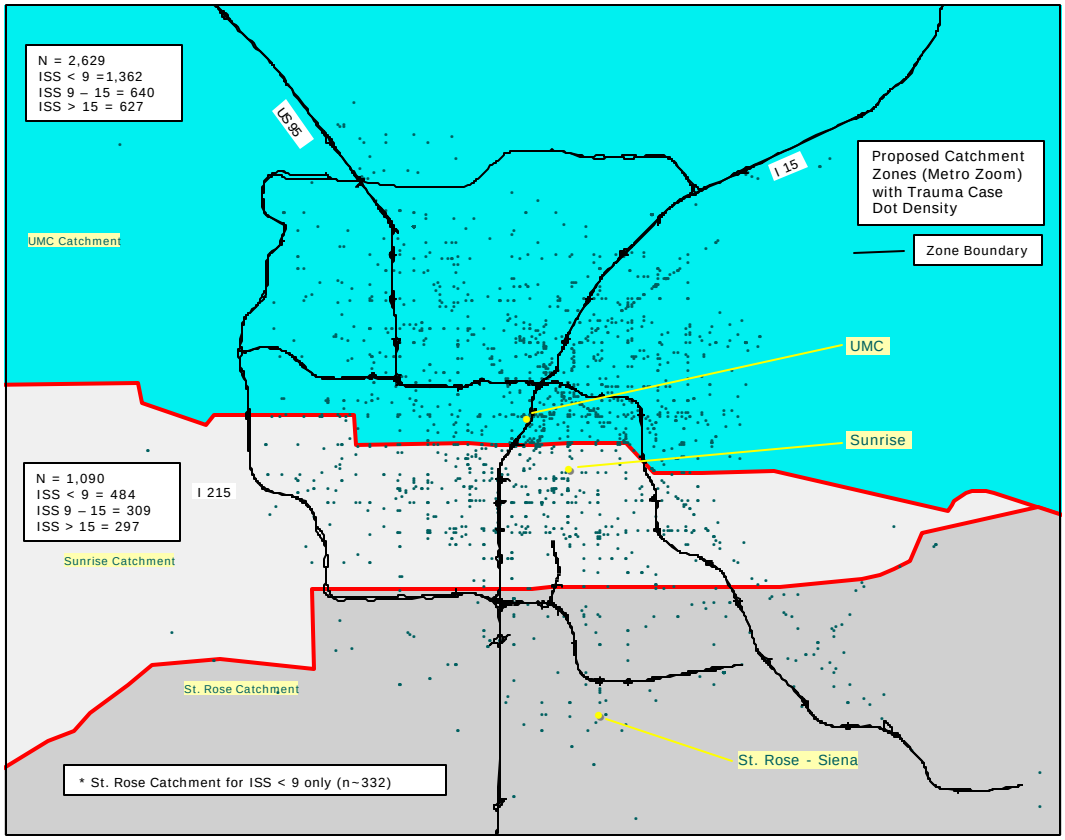
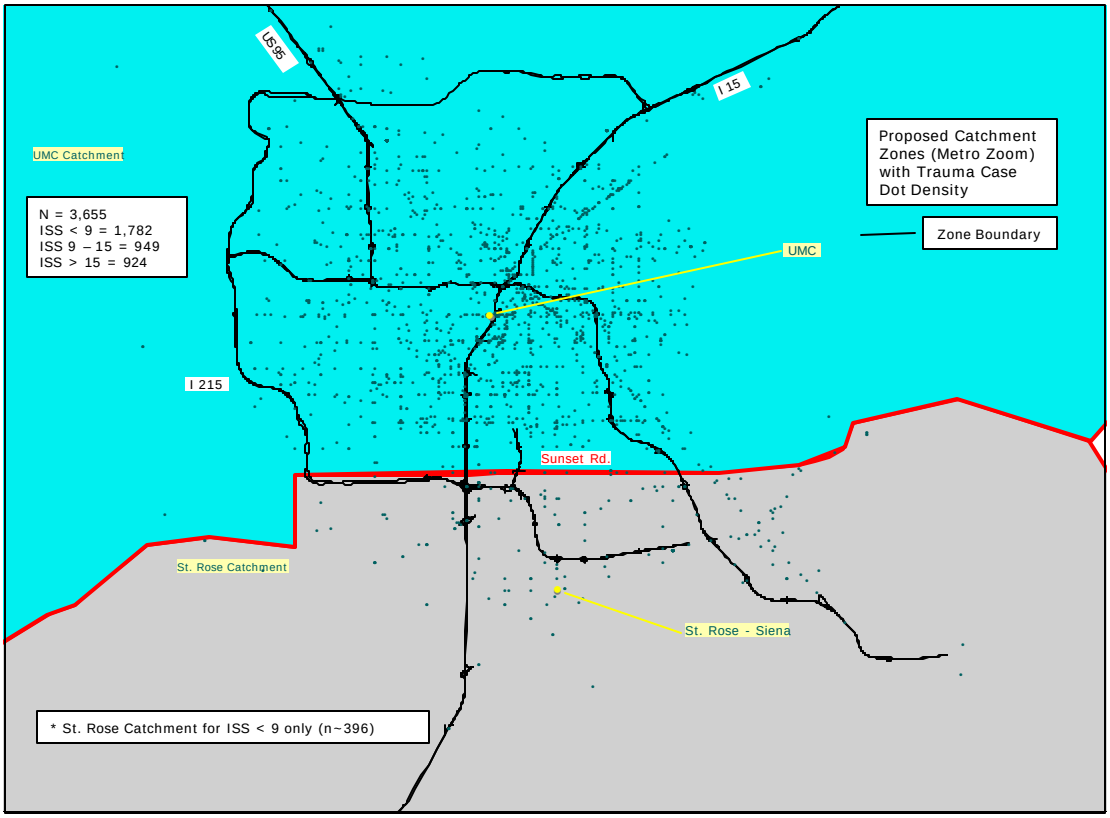


Exhibit 10 – Sample Catchment Zone: UMC and St. Rose



These summaries used logical but somewhat subjective assumptions about the catchment zones. It is also possible that the geographic location of trauma cases could significantly vary from year to year from the 2002 data used in this sample. However, the size of the UMC trauma registry database coupled with the use by The Abaris Group of logical transportation corridors to define the catchment zones and the limitation of the geographic close distance of Sunrise to UMC suggests that other scenarios would not substantially change the expected volume.

Need and Risks

The Abaris Group's analysis suggests that the projected need for additional trauma capacity for the entire community is modest based on projected growth of trauma center cases. When considering transportation and population growth, the need is greatest in the south part of the region.

There are other considerations. Designation of a trauma center at a level higher than is necessary creates significant risk to the existing trauma center at UMC from a volume, revenue and human resource standpoint. A Level II designation at Sunrise with sufficient volume will significantly erode the volume and subsequent revenue at UMC and potentially destabilize this important community resource.

The exhibit below presents the estimated volume impact by catchment zone scenario. The baseline year used was 2002 trauma volume but the volume was projected for 2004 using a more liberal growth rate of 4.6 percent per year. UMC would lose approximately 1,400 cases per year under the

UMC/Sunrise and UMC/Sunrise & St. Rose Scenarios (or 34.6 percent) and only loose approximately 396 cases per year (or 9.8 percent) under the UMC/St. Rose scenario.

Exhibit 11 – Summary of Trauma Volume by Sample Catchment Zones

Trauma Volume by Sample Catchment Zone, Projected for 2004							
Trauma Patients	UMC & Sunrise		UMC, Sunrise & St. Rose			UMC & St. Rose	
	UMC	Sunrise	UMC	Sunrise	St. Rose	UMC	St. Rose
ISS < 9	1,362	816	1,362	484	332	1,782	396
ISS 9 - 15	640	309	640	309	-	949	-
ISS > 15	627	297	627	297	-	924	-
Total	**2,629**	**1,422**	**2,629**	**1,090**	**332**	**3,655**	**396**

Source: UMC 2002 trauma registry, The Abaris Group projections and calculations

A trauma patient catchment zone cannot be sufficiently designed to counteract the high erosion to UMC under adding Sunrise as a Level II trauma center. For example, to create catchment zones with only a modest impact on trauma patient volume at UMC would require a catchment zone where Level II trauma patients would bypass the closer Sunrise Hospital to be transported to UMC to achieve the balance.

The volume level required at a Level II (e.g. approximately 1,200 cases per year) is significantly higher than that required of a Level III (approximately 300 to 500 cases per year) using The Abaris Group's standards. The paradox is that if Sunrise is to be designated as a Level II trauma center, they must be assured a sufficient volume at a Level II center level.

Obtaining specialty physician and nurse coverage at a trauma center will be a challenge for any new trauma center but substantially more of a challenge at a Level II trauma center due to the longer list of subspecialist physicians on-call, the significantly increased requirement of having trauma surgeons in house 24-hours per day, and the higher volumes of the Level II. Sunrise has acknowledged that recruiting the key physician specialists to the community to support their Level II trauma center has been difficult, and it will remain such if they do not have sufficient volume. In spite of Sunrise's intent and methods for recruitment, it is likely that some of its physician and nurse coverage will come from the UMC trauma center. This is a natural marketplace phenomenon.

There should also be consideration of the 30-minute rules (NAC 450B.772 and NAC 450B.866). The current State and local regulations stipulate that within a 30-minute radius, all trauma patients should be transported to the highest level of trauma care (bypassing a Level II for example for a Level I trauma center) based on 450B.772 and that no Level III trauma center should be located closer than 30 minutes to a Level I or II trauma center based on 450B.866. This is due to the original legislative intent on avoiding trauma center duplication and its impact on existing trauma center volumes. It is unlikely that the legislature fully considered the growth of population and trauma volume would occur within a 30-minute radius of a trauma center. While some adjustment to this rule will have to be made with any trauma center configuration scenario (although, it could be argued that traffic patterns in the south part of the region assure greater than 30 minute transport times during peak periods of each day), Sunrise's Level II application would directly conflict with the intent of the rule and would require wholesale adjustment thus obviating the original legislative intent.

The Abaris Group's analysis demonstrates that a Level III designation at St. Rose would have a small effect on UMC's volume (approximately 400 cases per year) and this volume change would tend to

balance rather than destabilize the UMC trauma center. Also, the volume achieved at St. Rose would be sufficient to achieve clinical and financial viability for a Level III trauma center.

Provisional Designation

The challenge for a new hospital approaching trauma center designation is achieving sufficient volume to support the trial of trauma center functions and to demonstrate a "track record" as is required by the ACS during verification. Provisionally designating has been suggested as an answer by Sunrise and yet provisional designation does not appear to be authorized in Nevada statute or regulation for new trauma centers. The use of provisional designation in Nevada is strictly limited to designated trauma centers that have temporary challenges to meeting all of the designation standards. The argument by Sunrise is that they cannot meet all of the ACS standards without volume.

Provisional designation has been used in other communities to allow a hospital that meets all of the critical standards for a trauma center to document their commitment during operation of the trauma center. Provisionally designating a new trauma center that does not meet all of the critical standards sets a dangerous precedent implying that a hospital can "test" their capabilities without the full rigor of a successful ACS verification. It is particularly dangerous in Southern Nevada where there is no dispute that the current care at UMC is excellent.

It is also noted that Sunrise and St. Rose report trauma cases annually to the State Trauma Registry and likely treat many more patients per year that at least meet mechanism of injury criteria and thus have adequate cases to test their systems and QI processes. The Sunrise case volume is further verified by their letter on annual trauma volume to the Nevada Bureau of Licensure and Certification where they state: "Sunrise currently treats about 250 trauma patients with about 50 with an ISS above 15."[11]

The Abaris Group would urge caution in the use of provisional designation and have the assurance of the ACS or any site visit team that any trauma center applicant fully meets all of the critical standards that are not volume driven before designation.

Strength and Weaknesses

In conducting the needs analysis for additional trauma center or centers for the community, The Abaris Group asked the following questions for each configuration scenario:

(1) Will the application improve trauma center capacity for the region?
(2) Is the applicant's commitment commensurate with the level of designation?
(3) Is there sufficient patient volume to support the clinical skills and financial demands at the level of designation requested?
(4) Will the designation negatively impact UMC?
(5) Will the application provide substantially improved geographic access to the community?
(6) Does the configuration proposed provide the best balance between need and resources?

The following exhibit summarizes The Abaris Group's analysis on the strengths and weaknesses of each potential configuration model for expanding the number trauma centers:

11 Letter from Dr. Michael Metzler and Ann Burgess to Pamela Graham, Department of Human Resources, Bureau of Licensure and Certification, dated January 12, 2004.

Exhibit 12 – Southern Nevada Trauma Center Summary of Options

Southern Nevada Trauma Center Summary of Options				
Scenario/Impact	**Scenario A Make No Change**	**Scenario B Add Sunrise & St. Rose**	**Scenario C Add Sunrise Only**	**Scenario D Add St Rose Only**
Improve capacity?	No	Yes	Yes	Yes
Commitment commensurate with level of designation requested?	n/a	Yes	Yes	Yes
Sufficient volume to support clinical and financial needs?	n/a	No	Yes*	Yes
Level of designation and resources consistent with need?	No	No	No	Yes
Not negatively impact UMC?	No	No	No	Yes
Provides substantial improved geographic access to the community?	No	Yes**	No	Yes
Best balance between need and resources?	No	No	No	Yes

* Assumes UMC significantly downsizes
** Only the St. Rose portion would substantially improve the geographic access

Inclusive System

There is an opportunity in the community to adopt a more inclusive trauma system. That means developing an understanding and a commitment from all hospitals willing to participate about the standard practice of state-of-the-art care for minor to moderate injuries that need not go to a trauma center. This commitment could also include participation in policy development, regional trauma QI, prevention programs, and potential funding of trauma system infrastructure.

Definitive Care Conclusions

The Abaris Group recommends that an additional Level III trauma center be designated for the southern portion of the region. This is based on the overall projected modest growth of trauma cases, substantial increase in population in the southern region, the limited risk of erosion of volume on the existing trauma center including revenue and staffing resources at UMC, and the balance this approach would provide between commitment offered and community need. Provisional designation should only be considered once a hospital has met all of the requirements for the level of designation, irrespective of volume. The Level III trauma center and any future trauma centers should be subject to the vigorous verification review of the ACS. Provisional designation without full compliance with all critical standards should not be permitted.

The hospital and all future trauma center applications should document to a degree of independent verification that they have the capacity to handle the volume of cases projected and rectify their documentation with historical ED saturation hours and EMS off-load times.

The Level III trauma center and all future trauma centers should be requested to voluntarily participate in the local trauma leadership structure and the development of trauma system components until statewide legislation is approved. The trauma centers in total should financially support the leadership structure through annual designation fees until alternative funding for the leadership structure is defined.

It is The Abaris Group's opinion that the volume of trauma cases will not substantially increase to a level requiring further consideration until the year 2009. At that time, this increase may justify increasing the capacity and volume at the Southern Nevada trauma center to a Level II, adding a Level III to the north part of the region, adding an additional Level II within the region, or any combination of the three. It is therefore recommended that additional analysis occur annually with a culmination in 2008 of a decision on the future trauma center configuration at that time.

A Blue Ribbon Committee should be established to monitor progress of the new ED "no diversion" protocol and a planning process should be implemented to assure EMS resources and patient flow are optimized. This Blue Ribbon Committee should also be charged with the further study of community ED on-call physician specialist challenges, expectations and capabilities, developing a plan for responding to gaps in coverage, and providing guidance to the lead agency on a plan for implementation of the inclusive trauma system recommended in this report.

Trauma Rehabilitation

There are four rehabilitation hospitals in Southern Nevada:

- HealthSouth Rehabilitation Hospital, Las Vegas
- HealthSouth Rehabilitation Hospital, Henderson
- Sunrise Hospital & Medical Center Rehabilitation Unit
- UMC Rancho Rehabilitation Center

The directors of the different rehabilitation hospitals work together informally. In addition, the UMC Trauma Center interacts closely with the UMC Rancho Rehabilitation Center. For example, representatives from trauma and rehabilitation meet monthly. The Director of Physical Medicine and Rehabilitation also organizes a rotation of community physiatrists through the trauma center. Physiatrists also conduct rounds in the trauma ICU. Typically a physiatrist will work with a patient in the trauma center and then continue that care with the patient in the Rancho Rehabilitation Center.

Rehabilitation Conclusions

The Abaris Group recommends that a formal planning session occur in concert with the lead rehabilitation center to plan care maps and early interventions designed to assure complete and seamless continuity between the trauma center and rehabilitation services. In addition, trauma patient rehabilitation data should become part of the trauma registry.

Information Systems

Information management for trauma systems should be the cornerstone documenting trauma system integrity, enabling system improvements, assist with monitoring, and driving strategic directions. The State of Nevada has as statewide trauma registry and is fortunate to have a statute that requires all acute care hospitals to report on trauma center patients.

While the trauma registry program exists at both the state and local trauma center level it does not function with the characteristics in mind. A significant challenge is the lack of state resources dedicated to the registry which leads to inconsistent reporting and poor follow up from non-reporting hospitals. The registry is not integrated with prehospital records, limiting the ability to evaluate the effectiveness of trauma triage standards. Geographic coding is not included in the registry, and this was a significant resource limitation for this study. There is also the risk that added trauma centers will not provide seamless interfaces with local and state registries, further complicating the registry output process.

Information Systems Conclusions

A robust and full-functioning trauma registry is desperately needed in Nevada to support the prevention and advocacy programs previously outlined in this report.

- Additional resources should be added to the state registry program to assure a robust, accountable and potent resource to the trauma system.
- Planning should occur to integrate prehospital data systems into the trauma registry to allow for geo-coding and reporting of the rationale for trauma triage decisions.
- All hospitals should be monitored for trauma patient inclusion to allow for the study of "missed" trauma center cases.
- All trauma centers should be required to use the same registry software and to electronically transfer the exact trauma field data to the State registry for full statewide reporting.

Evaluation

A trauma system should monitor its performance and the performance of its components. Some of the components are in fact monitored due to the parent functions (e.g. EMS provider, dispatch agency and UMC trauma center) but there is no systemwide monitoring of the interfaces with the trauma program. Compliance should be measurable and benchmarked with other trauma systems and should continuously identify quality improvement (QI) opportunities. Additionally the trauma center monitoring process should be more frequent than the once every three year event with ACS verification. In addition, by limiting the trauma center evaluation to an ACS site visit, important system wide contributions and commitments may be missed. Finally, the addition of another trauma center will provide important QI opportunities on triage, transfer and trauma center handoffs. A quality review (Medical Advisory Committee – MAC) process similar to San Diego County may also be initiated to provide deep system integrity and coordination.

Evaluation Conclusions

The Southern Nevada trauma system should initiate the following evaluation components:

- Trauma centers should meet regularly and discuss cases in a format similar to the San Diego County MAC process and also develop improved triage, transfer and coordination practices
- The leadership structure should develop a contract for trauma center performance and provide more frequent reviews of performance
- A quality improvement plan should be adopted with measurable performance parameters including performance indicators at the prehospital, acute care, and post-acute care phases for all system participants

Research

UMC conducts a vast amount of research as part of its Level I trauma center requirements. Their trauma registry is used to research topics identified by surgery residents, resulting in numerous posters and presentations. In addition, the surgery residents participate in the ACS Committee on Trauma Annual Residents Trauma Paper Competition.

Another significant research entity of trauma in Southern Nevada is the Trauma Institute, which was established with private funding in 1997. The Trauma Institute obtains its data from several sources. Its primary source is the Uniform Billing 92 Hospital Discharge data set collected by the Nevada State Health Division. The Trauma Institute also has a working agreement with a local EMS transport agency to obtain prehospital data. Funding for the Trauma Institute is obtained via grant funding from several entities including: the National Highway Transportation Safety Administration (NHTSA), Nevada Attorney General's Office, Centers for Disease Control, Health Resources and Services Administration (HRSA), and Emergency Medical Services for Children (EMSC). The Trauma Institute also receives private funding.

Research Conclusions

The Abaris Group recommends continuing the move to improved practice patterns and decision trees by supporting injury research as part of the trauma system in Southern Nevada.