

**REPORT OF THE  
JOINT LEGISLATIVE AUDIT  
AND REVIEW COMMISSION**

# **The Use and Financing of Trauma Centers in Virginia**

**TO THE GOVERNOR AND  
THE GENERAL ASSEMBLY OF VIRGINIA**



**HOUSE DOCUMENT NO. 62**

**COMMONWEALTH OF VIRGINIA  
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2004**

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## Preface

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House Joint Resolution 183 (2004) directed the Joint Legislative Audit and Review Commission (JLARC) to study the use and financing of trauma centers in Virginia, and to identify any steps that can be taken to maintain appropriate and necessary trauma services in the Commonwealth. This study was directed as a result of concerns that access to trauma centers in Virginia might be compromised, given recent experience in Virginia Beach in which the trauma center downgraded its designation level due to staffing shortages.

Hospital administrators consistently cited physician availability as the primary issue that could jeopardize access to trauma centers. A disproportionately large number of uninsured trauma patients, rising medical liability costs, and poor quality of life have reduced the number of physicians willing to treat trauma patients. By providing financial relief for uncompensated care, the State could help to attract more physicians to trauma centers.

The financial analysis of trauma programs in Virginia revealed that uncompensated care, low reimbursement rates from public insurers, and readiness costs created a \$44 million loss across Virginia trauma centers in 2003. Because this level of economic losses could result in the closure of trauma programs, the State may wish to provide financial support to trauma centers.

State support could also provide an incentive for additional hospitals to seek trauma center designation in areas that are currently underserved. An analysis of access to trauma centers found that a large number of Virginians live too far away from a trauma center to receive prompt treatment, particularly if ground transportation is used. While air medevac services enhance access to trauma care, air transportation is not always available.

Finally, an analysis of triage effectiveness in the State found that a large number of critically injured trauma patients are not treated in designated trauma centers, while many moderately injured patients receive the highest level of trauma care. A systematic analysis of triage patterns should be conducted by the Virginia Department of Health to optimize the health outcome of trauma patients.

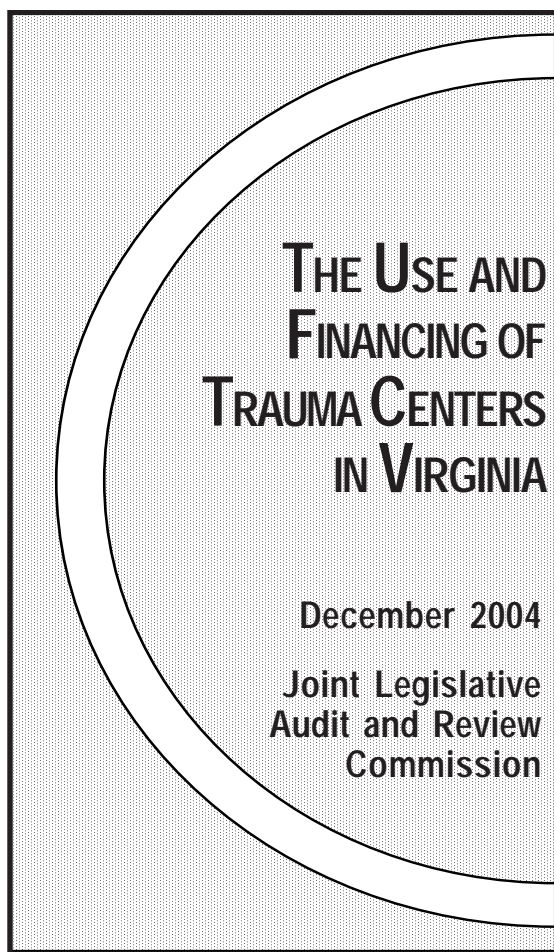
On behalf of the JLARC staff, I wish to express our appreciation for the assistance and cooperation provided during the course of this study by the leaders of each of the 13 designated trauma centers in Virginia as well as their administrative, financial, and clinical staff, the Virginia Hospital and Healthcare Association, and the Office of Emergency Medical Services.

Philip A. Leone  
Director

December 18, 2004



# JLARC Report Summary



**H**ouse Joint Resolution 183 (2004) directed the staff of the Joint Legislative Audit and Review Commission (JLARC) to review the use and financing of Virginia's trauma centers, as well as to identify the steps that could be taken to maintain access to trauma services across the Commonwealth. This study was directed shortly after Virginia Beach General Hospital's trauma center downgraded its designation level due to staffing shortages. Also, during the 2004 Session, a fund was created to support trauma centers through the revenue resulting from an increase in DUI fines. Although this step has been praised by the

trauma community, the limited amount in the fund is unlikely to address the challenges faced by Virginia trauma centers and the physicians providing trauma care.

One in every 350 Virginians is affected by trauma each year, most of whom will be treated in a trauma center. Trauma can affect anyone, and typically occurs during routine activities. While people of all ages and both genders can be victims, traumatic injuries tend to occur more frequently in young and elderly men, and are most frequently caused by motor vehicle crashes and falls. When injuries are serious, the specialized equipment and prompt access to physicians available in trauma centers can make a significant difference in the patient's health outcome, as trauma centers have been shown to reduce preventable deaths by more than 20 percent as compared to other hospital care.

Trauma centers and the system within which they operate are able to reduce deaths and disability because they are designed to respond to and treat injuries in a prompt and coordinated manner. By improving mortality and morbidity, trauma centers not only improve patient outcomes, but also reduce the negative economic consequences of injury. Moreover, trauma centers play an integral role in reducing the incidence of preventable injuries by conducting community outreach and education campaigns. Finally, trauma centers are a critical element of the State's ability to respond to and treat the victims of mass casualty events.

In Virginia, 13 hospitals have volunteered to provide the higher level of care necessary to be designated trauma centers. Despite the value they provide to the community, trauma centers face a variety of challenges that have led to a loss of trauma center designation or downgrades in cover-

age across the nation as well as in Virginia, and are deterring additional hospitals from seeking trauma center designation.

### **Virginians Cannot Consistently Access the Trauma Services Needed to Treat Their Injuries**

A substantial number of Virginians have inadequate access to trauma centers, particularly if they need the immediate services of a level I or II facility, and some trauma patients may not be receiving the proper level of care for their injuries. The addition of trauma centers in certain regions of the State could lead to more prompt access to trauma care, and the analysis of trauma triage patterns may help to ensure that Virginia trauma patients receive the most effective and efficient care for their injuries. Based on other states' experiences, the challenges currently faced by Virginia's trauma system could prompt existing trauma centers to downgrade or relinquish their trauma center designation.

#### ***Additional Trauma Centers May Be Needed in Certain Regions of the State.***

A substantial number of Virginia trauma patients do not arrive at a trauma center or community hospital within one hour of injury, potentially leading to suboptimal health outcomes. The most frequently cited reason for delayed transportation of trauma patients is the distance to the nearest trauma center, which can be compounded by adverse traffic conditions when emergency ground transportation is used. Statewide, 20 to 40 percent of Virginians do not have access to a trauma center within an hour's drive, depending on traffic conditions. The map on the facing page illustrates how access to trauma centers increases when traffic conditions improve from heavy to light, and when air medevac is added as a means to transport patients. While air medevac improves access, air transportation is not always available.

Despite the availability of emergency air transportation and neighboring states' trauma centers, certain regions in the State remain underserved and could benefit from having access to additional trauma centers. However, financial challenges associated with trauma center designation have played a large role in deterring community hospitals from seeking designation, and have perpetuated existing gaps in access to trauma centers in the State. Winchester Medical Center is the only hospital currently pursuing trauma center designation, a step that will increase access to trauma services in the northwestern part of the State.



#### ***Virginia Trauma Patients May Not Be Consistently Treated in the Proper Medical Setting.***

Despite the adoption of trauma triage protocols in 1997, it appears that a substantial proportion of seriously and critically injured trauma patients are not being treated in designated trauma centers, possibly resulting in under-triage of these patients, as illustrated by the figure on page IV. Conversely, almost half of the trauma patients treated in level I trauma centers are only moderately injured, and are potentially being over-triaged to these facilities.



While over-triage creates inefficiencies in the trauma system, under-triage may lead to suboptimal health outcomes of patients, suggesting the need for more stringent analysis of the State's triage protocols. It does not appear that any such analysis is currently conducted by the Office of Emergency Medical Services (OEMS). Consequently, JLARC staff recommend that OEMS begin conducting analysis on trauma triage patterns and promote compliance with trauma triage protocols. In addition, OEMS should link its pre-hospital patient care reporting care database with its trauma registry in order to create a more comprehensive record of trauma patients' experience with the Virginia trauma system.

# Estimated Trauma Center Service Areas Within One Hour Via Ground and Air Transportation

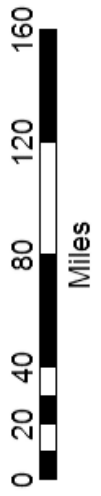
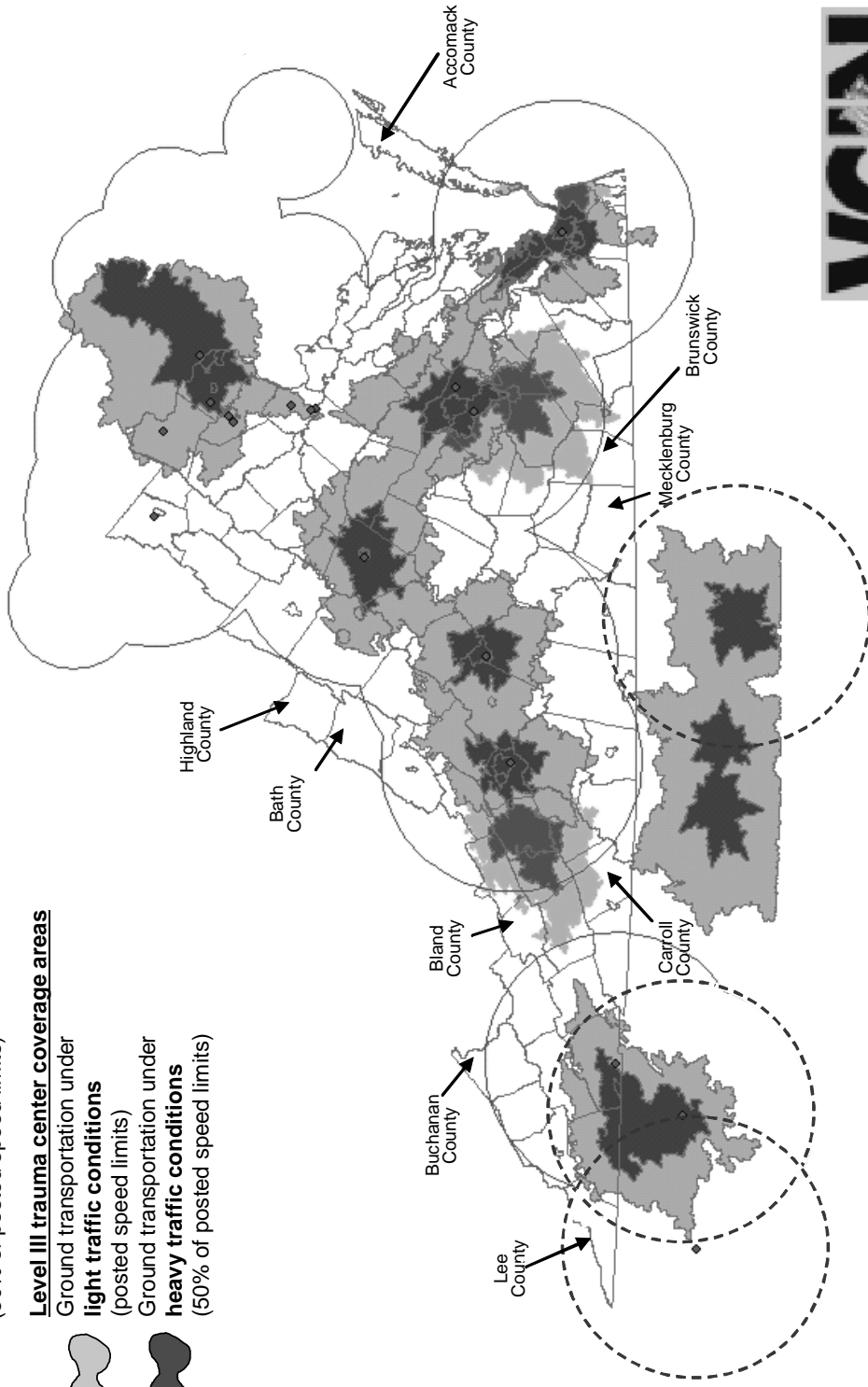
## Levels I and II trauma center coverage areas

-  Ground transportation under **light traffic conditions** (posted speed limits)
-  Ground transportation under **heavy traffic conditions** (50% of posted speed limits)

## Level III trauma center coverage areas

-  Ground transportation under **light traffic conditions** (posted speed limits)
-  Ground transportation under **heavy traffic conditions** (50% of posted speed limits)

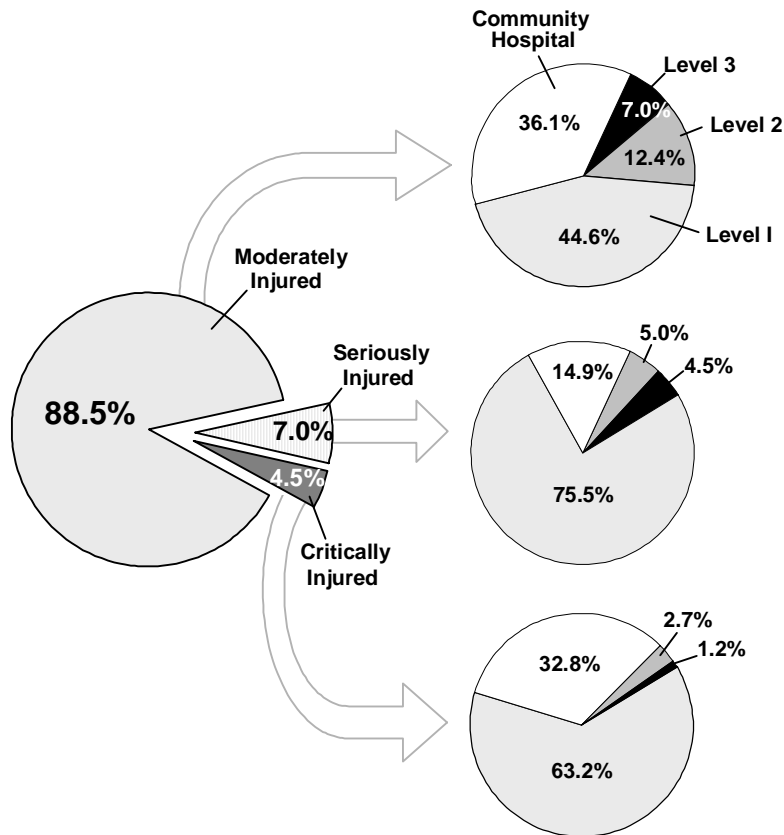
NOTE: A color version of this map is included in the online version of this report, which is available at <http://jtrc.state.va.us> under "Reports/Recent."



\*\* Note: Maryland State Police are willing to travel up to 30 miles into an adjoining state on a mutual-aid basis, only if requested by that state.



## Transport Destinations of Virginia Trauma Patients by Severity of Injury (2002)



***Patient Outcomes May Be Compromised if Challenges Faced by Virginia's Trauma System Are not Addressed.*** A large number of hospitals located throughout the country have discontinued their trauma center capabilities entirely in recent years due to the same challenges that currently face Virginia's trauma system. This suggests that a similar fate may confront the State's trauma centers. Staffing and financial challenges have already contributed to the downgrade in designation level of Virginia Beach General Hospital in 2003, and to the near-downgrade of Roanoke Memorial Hospital in 2002. The downgrade in level or loss of designation of any one trauma center, particularly if it is a level I or II facility, could ad-

versely impact patient outcomes by leaving an even larger portion of the State without access to a nearby trauma center.

### **Securing Adequate Physician Coverage Is the Most Critical Issue Facing Virginia's Trauma System**

Hospital administrators in Virginia and across the nation cite the inability to secure necessary surgical coverage as the primary reason that trauma centers might downgrade or discontinue their trauma program. Physicians have become less interested in treating trauma patients due to a variety of factors. The result of this declining interest is that fewer doctors are currently available for trauma call in Virginia trauma centers compared to five years ago.

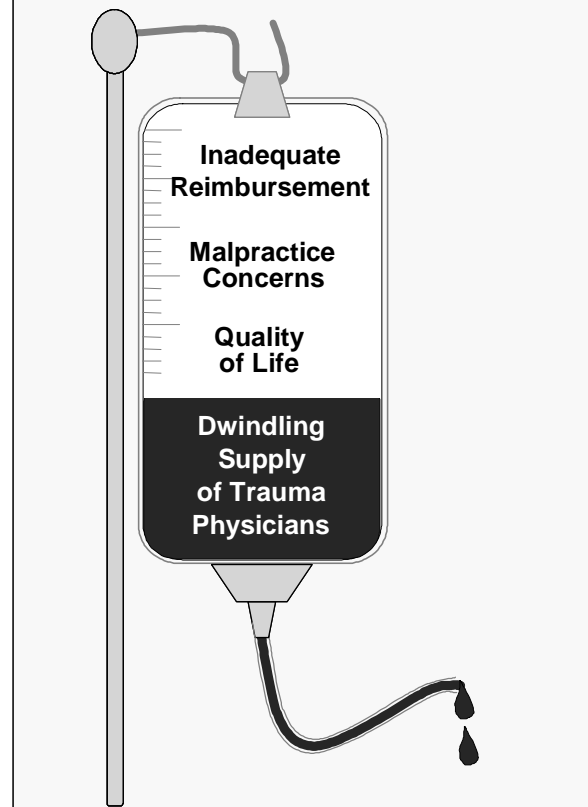


**Trauma Center Initiatives.** Faced with increasing difficulties in securing surgical trauma coverage, trauma centers have taken steps to help ensure that adequate coverage will be available. Hospitals have employed more surgeons who, as part of their employment contract, must be on trauma call. Trauma centers are also attempting to secure trauma coverage by paying physicians when they are on trauma call. Approximately half of Virginia's trauma centers currently pay surgeons to be on trauma call, and those facilities that do not currently pay for on-call coverage are often approached by physicians to do so.

**Inadequate Reimbursement.** The increased urgency of several competing factors has led to the physician coverage crisis faced by many trauma centers, as illustrated in the figure on this page. One of the primary reasons why physicians are less willing to provide care for trauma patients is inadequate reimbursement. When physicians agree to be available for trauma call, they are three times as likely to treat an uninsured patient as if they had decided not to care for trauma patients. While some uninsured patients may pay out-of-pocket for their health expenses, physicians are often able to collect only a small portion of the services for which they bill. In addition, trauma physician reimbursements from Medicare and Medicaid generally have not kept pace with inflation in recent years. Although the issue of declining public payments is not unique to physicians on trauma call, it is compounded by the fact that trauma physicians serve a disproportionate number of uninsured patients, which leaves them with only a small pool of patients paying market rates.

A further issue is the opportunity cost of being on trauma call, which is the time that physicians could have devoted to their private practices. When physicians are on trauma call, they often must reschedule sur-

## Factors Related to the Decline in Trauma Physicians



geries in their private practice to meet the unpredictable and immediate needs of trauma patients, who can require care at any time of day or night. These disruptions translate into lost revenue to physicians, because the patients they see in their private practice are more likely than trauma patients to be insured by private insurers that reimburse at market rates.

### **Medical Liability Insurance Costs.**

While reimbursements for the treatment of insured trauma patients have generally stayed flat or decreased, medical liability insurance premiums have increased rapidly in recent years. Because those specialties that are most frequently involved in trauma tend to be charged higher malpractice rates than other specialties, these increases have had a particularly large

impact on trauma physicians. However, it is unclear the extent to which being on trauma call affects those malpractice premiums. With certain insurers, it appears that being on trauma call does increase medical liability premiums, but that is not the case across all insurers. Moreover, there is no clear evidence that providing care for trauma patients increases physicians' risk of litigation.

**Quality-of-Life Issues.** An additional issue affecting whether physicians decide to be available for trauma call is how it affects their quality of life. Because trauma patients take priority over other cases, physicians must rearrange both their personal lives and their private practices whenever they are needed in the trauma service. The declining interest of physicians in being on trauma call has a compounding effect on quality-of-life issues. As the number of surgeons on call diminishes, the burden left on the remaining physicians is heavier, making trauma care even less attractive.

**Addressing the Problem of Physician Staffing.** Of the challenges faced by trauma physicians, the State could most effectively and directly address the issue of inadequate reimbursements, which stems primarily from the provision of uncompensated care and inadequate Medicaid rates. To offset the cost of uncompensated care, a special fund could be established, as Maryland and Mississippi have done. Alternatively, the State could create a tax credit for the provision of uncompensated care, or increase Medicaid rates. The implementation of any of these options is estimated to cost approximately \$6.0 million. In conjunction with, or instead of, addressing uncompensated care, the State could provide student debt relief to doctors who agree to be on trauma call. If this program were used for the five trauma fellowships available in the

State, it would cost approximately \$0.6 million per year.

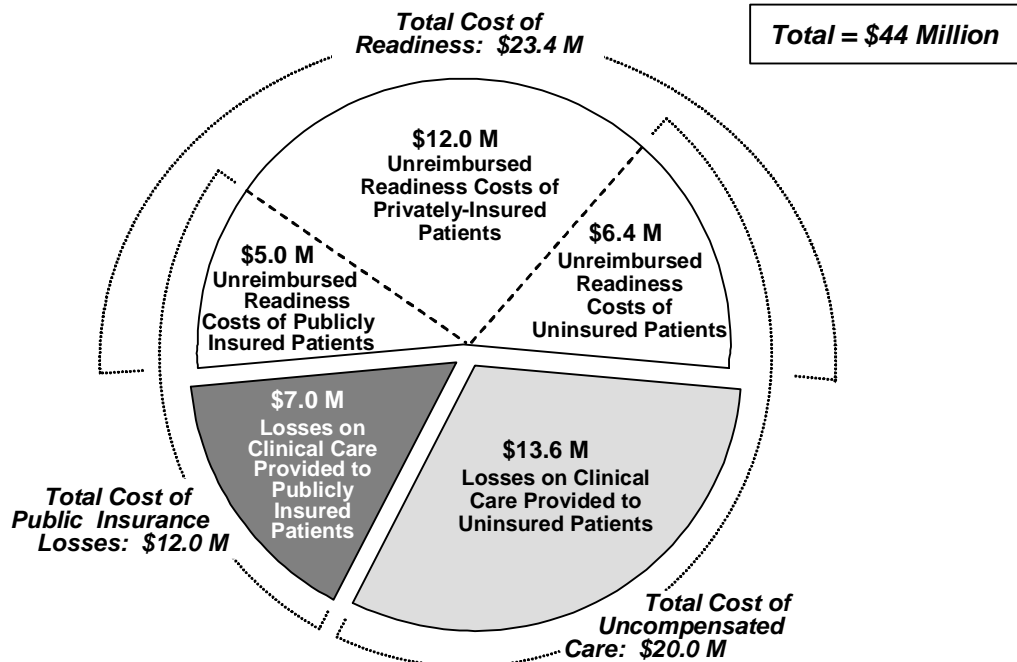
### **Trauma Centers Face Significant Financial Challenges**

Trauma programs are generally unprofitable due to the high proportion of patients who lack health insurance, public insurers that reimburse below the cost of clinical care provided to trauma patients, and high incremental costs associated with the higher level of care provided in trauma centers. Moreover, physicians have turned to hospitals to supplement reimbursement rates that they feel are inadequate for treating trauma patients, thereby compounding hospitals' financial difficulties. The figure at right illustrates the financial implications of these trends.

**Uncompensated Care.** The financial drain created by the large amount of uncompensated care provided threatens access to trauma services in general for all trauma victims, not just uninsured ones, because it threatens hospitals' ability to maintain their trauma center designation. Although the cost of caring for the uninsured is a universal problem for hospitals and health care providers, it is a particularly large challenge for trauma centers because trauma patients are three times as likely to be uninsured as other hospital patients. In 2003, trauma centers lost a combined \$13.6 million on clinical care they provided to uninsured trauma patients.

While payment mechanisms such as the Disproportionate Share Hospital (DSH), State and Local Hospitalization (SLH), and Indigent Health Care Trust Fund programs mitigate the cost of caring for the indigent, they do not cover these costs completely, leaving hospitals to make up for these losses through other means. Moreover, these funding streams do little to compensate for the bad debt losses incurred as a result of treat-

## Sources of Losses Incurred by Trauma Centers for Treatment of Trauma Patients (2003)



Note: Data exclude Southside Regional Medical Center.

ing uninsured, albeit not indigent, patients who do not qualify for any of the three aforementioned programs.

**Inadequate Medicare and Medicaid Reimbursements.** Another problem faced by trauma centers is inadequate reimbursements from public insurers. Every hospital incurs a baseline level of cost to provide clinical care to patients. These costs of clinical care do not appear to be covered by the payments made by public payers such as Medicaid and Medicare. As a result, trauma centers lose, on average, \$3,000 for every Medicaid patient they treat, and nearly \$3,700 for every Medicare trauma patient, not including the incremental costs of readiness incurred by trauma centers.

Because private insurers tend to reimburse well in excess of the costs of clinical

care, trauma centers are able to partially offset the losses they experience on publicly insured and uninsured trauma patients with privately insured trauma patients. However, for certain trauma centers which treat a large proportion of uninsured or Medicaid patients, there are not enough privately insured patients to completely offset the uninsured and Medicaid shortfalls. Facing a financially adverse mix of payers creates a challenge for the financial health of the entire hospital, and may have an effect on the hospital's ability or willingness to continue providing specialized trauma services.

**Unreimbursed Costs of Readiness.** In addition to the costs of providing clinical care, trauma centers spent more than \$23 million in order to provide the higher level of care required to maintain trauma center des-

ignation in 2003. Trauma centers incur these incremental “readiness” costs because they must be ready to treat trauma patients any time of day and night, have a host of specialists available to care for patients for any condition, employ a larger clinical staff, and maintain an administrative infrastructure designed to ensure that the highest level of care is consistently provided. Securing the availability of physicians and fully-staffed operating rooms comprised more than half of the readiness costs that trauma centers incurred in 2003.

Although they incur higher operating costs, trauma centers are generally not reimbursed at a higher rate than other hospitals for the trauma services they render. The costs of readiness are not, for the most part, included in the reimbursement rates provided by health insurers. This problem occurs, in part, because insurers reimburse health care providers for treating patients, rather than for being ready to treat. In addition, most insurers establish rates based on the expected cost of treating a patient in an average hospital, rather than on the resources actually deployed to treat that patient. Finally, readiness costs tend to be mostly fixed and do not vary with patient volume, unlike the costs of clinical care. The same number of specialty physicians and equipment, and the same quality processes must be available in a trauma center every day, because the number of trauma patients requiring services is not predictable.

Despite staffing and financial pressures, Virginia trauma centers have remained committed to providing trauma services to their communities. However, they must continuously evaluate whether operating a trauma program is the best use of limited financial and human resources, in light of other health care priorities. As financial losses continue to escalate, driven in part by physicians’ mounting requests for on-

call pay and the overall rise in health care costs, the opportunity costs of maintaining trauma center designation are becoming more difficult to justify for some hospitals and may eventually exceed its benefits.

***Addressing Financial Challenges of Trauma Centers.*** To address the challenges faced by trauma centers, and ensure that trauma services remain available to Virginia residents, the State may wish to play a more active role in supporting its trauma system. Medicaid rates could be adjusted to compensate trauma centers for 100 percent of the cost of clinical care. In addition, the Medicaid program could include readiness costs in its calculation of reimbursement rates. In conjunction with this effort, trauma centers could approach private insurers to start including readiness costs in their reimbursement rates. If reimbursements from private insurers for readiness costs prove to be inadequate, the State could assist by establishing a fund that would compensate trauma centers directly for unreimbursed readiness costs. Finally, support could be provided to trauma centers in recognition of the disproportionate amount of uncompensated care they provide, either through a fund or through enhanced Medicaid payments.

### **Several Funding Options Are Available to Support the Trauma System in Virginia**

If the General Assembly chooses to support the trauma system in Virginia by providing funding to trauma physicians and the trauma centers where they practice, there are a variety of funding options that are available. The two most viable options may be to increase fines and fees, and to supplement this revenue stream with federal funds by using the Medicaid program. Increasing fines and fees to support the trauma system is an alternative that has been employed

by a number of other states. The benefit of higher fines and fees on a targeted number of activities and offenses closely linked to trauma is that they provide a dedicated revenue source and do not compete for State general funds.

The General Assembly could also choose to appropriate general funds to support trauma. However, this option has not been widely used by other states and would

be continuously subject to the annual appropriation process. Finally, administering funding through the Medicaid program would enable the State to share the cost of trauma system funding with the federal government because State Medicaid funds are matched dollar for dollar with federal funds, whether the State's share is raised through fines and fees, or through general funds.



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## I. Introduction

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The provision of trauma care improves public health by reducing the risk of injury-related mortality by more than 20 percent. In Virginia, 13 hospitals have volunteered to provide the higher level of care necessary to be a designated trauma center. Although trauma services have been shown to create tremendous value for the community, trauma care tends to be unprofitable in the private market for both physicians and hospitals. Staffing and financial difficulties have jeopardized many trauma centers across the nation, and have most recently impacted two of Virginia's trauma centers, while problems are experienced by several others.

While it is difficult to assess precisely how long hospitals and physicians will continue to provide trauma services at a loss, it seems likely that the lack of adequate financial reimbursement could result in the loss of trauma services in some Virginia communities. In response to concerns about continued access to trauma care in the Commonwealth, the 2004 General Assembly session enacted House Joint Resolution 183 (Appendix A) directing the Joint Legislative Audit and Review Commission (JLARC) to study the use and financing of Virginia's designated trauma centers, and to identify any steps that can be taken to maintain appropriate and necessary trauma services in Virginia hospitals.

### OVERVIEW OF TRAUMA CENTERS AND THE TRAUMA SYSTEM

Trauma centers and the system that supports them can save lives and allow individuals who have sustained severe injuries to return to productive lives faster. Traumatic injuries are caused by external factors ranging from motor vehicle collisions to falls. Trauma systems are designed to ensure that every patient promptly receives the level of care appropriate for these injuries. When injuries are serious, the specialized equipment and prompt access to physicians available in trauma centers can make a material difference in the patient's health outcome. Thirteen Virginia hospitals have voluntarily committed to providing the higher level of care required to be designated as a trauma center by the State. The designation and periodic verification process, created in the early 1980s, is administered by the Office of Emergency Medical Services (OEMS) within the Department of Health.

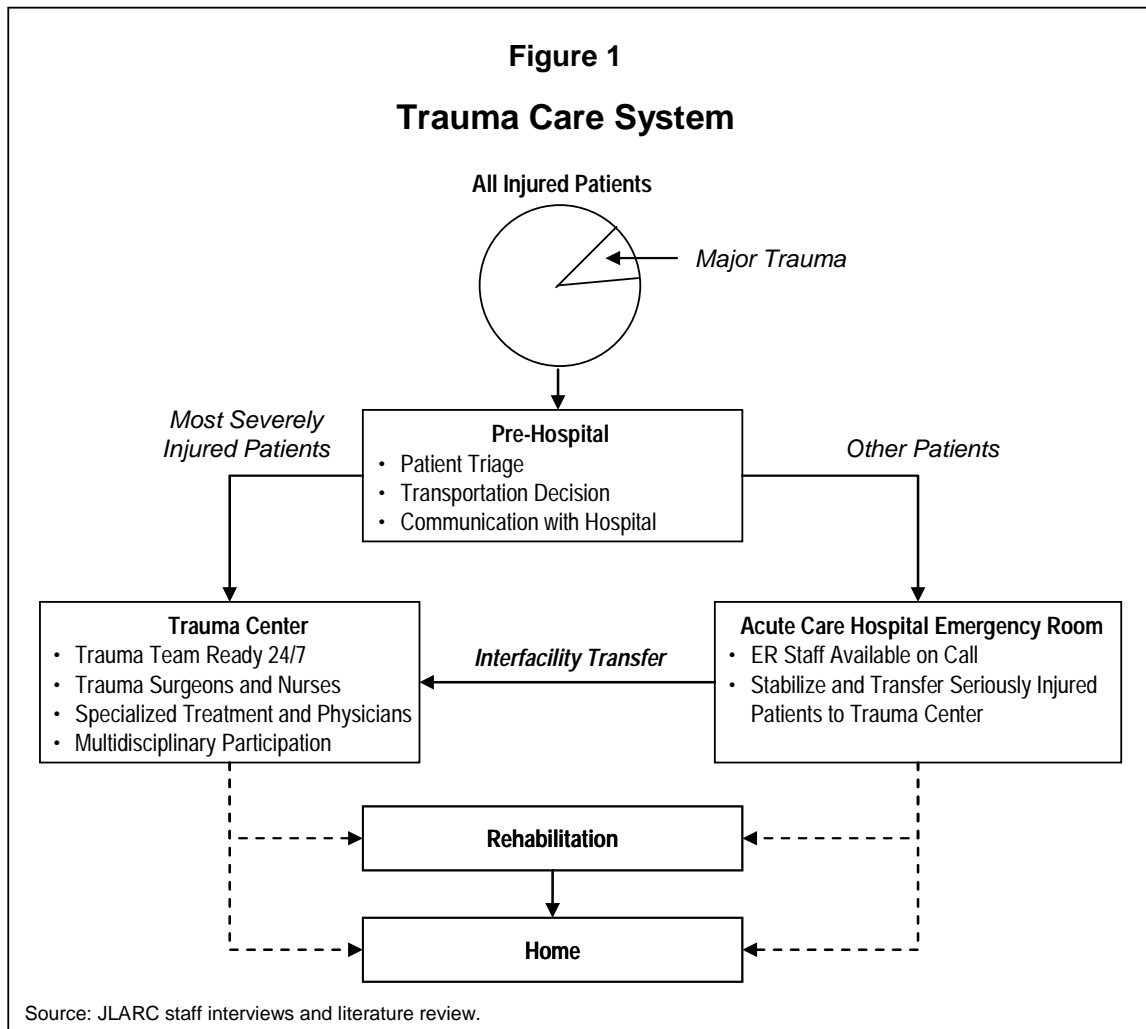
#### What Is Trauma?

Trauma refers to injuries that are caused by external forces applied to the body either deliberately or unintentionally. Injuries associated with motor vehicle and motorcycle crashes or falls can be categorized as blunt, as opposed to penetrating injuries that result from foreign objects, such as knives or bullets, passing through the body tissue. A broad array of diagnoses can be labeled as traumatic injuries, but their severity can range widely, from a simple arm fracture to irreversible brain injury. The injury severity score (ISS) is the standard methodology used by the medical community to capture whether a patient is severely injured or not. The ISS is assigned on a scale of zero to 75 (75 being most severe) based on a retrospec-

tive assessment of the patient's physiologic response to the injuries he sustained. Some differences of opinion seem to exist among experts as to what constitutes a critically injured patient. However, it has been generally accepted that a patient with an ISS of 15 or greater is severely injured and most at risk of death or disability, and consequently a primary beneficiary of an established trauma system.

### What Is a Trauma System?

A trauma system is an organized and multidisciplinary approach to caring for seriously injured patients from the time of their injury, through transportation to an acute care facility and, ultimately, rehabilitation (Figure 1). A severely injured patient's probability of survival is greatly enhanced if he receives hospital care within the first 60 minutes (the so-called "golden hour") following the injury. Together, participants in the care of trauma patients work to ensure that patients are promptly treated in the setting most suitable for their injuries in an effort to minimize mortality and residual disability, as well as to avoid inefficiencies in the delivery of care.



The trauma system is engaged when a patient sustains an injury. Emergency medical personnel must assess if the victim needs the level of care available only in a trauma center, whether the patient must be stabilized at the closest hospital prior to transport to a trauma center, and if air transportation is necessary. To facilitate this assessment, EMS providers follow triage and transportation protocols that incorporate regional differences in access to both trauma centers and transportation. Emphasis on coordination and speed of treatment are the primary reasons for improved mortality and morbidity outcomes that have been shown to result from organized trauma systems across the country.

From the injury location, the seriously injured trauma patient is transported to a trauma center to receive definitive care. Upon notification that a seriously injured patient is en route, a trauma team consisting of six to 12 hospital personnel, including a trauma surgeon, anesthesiologist, several nurses, and laboratory and radiology technicians, will be activated at the trauma center and be ready to begin treatment as soon as the patient arrives.

### **What Are Trauma Centers?**

Hospitals that have sought trauma center designation have made a voluntary commitment to providing a higher level of care specially designed for seriously injured patients. Trauma centers provide immediate, around-the-clock access to experts and services that are not available in the emergency room of community hospitals. Moreover, the care provided by trauma centers stretches well beyond the emergency department and throughout a patient's stay and subsequent recovery. While each patient's itinerary varies based on his condition and injuries, all units within a trauma center, from the emergency department to rehabilitation facilities, play a role in the diagnosing and treatment of trauma patients.

In addition to the superior capabilities they offer, trauma centers can treat major trauma patients more effectively than community hospitals because of the level of expertise they foster. Since a limited number of hospitals function as trauma centers, the number of severely injured patients is concentrated within these facilities. The resulting volume of trauma patients treated in these hospitals allows trauma center staff and physicians to build a level of expertise necessary to deal with complex and extensive injuries. In addition, organized trauma programs leverage pre-established treatment protocols and quality assurance processes to orchestrate the most efficient and effective delivery of care. The distinction between the types of injuries that can be treated in the emergency department of a community hospital versus a trauma center is illustrated in Table 1.

***Trauma Center Designation Requirements.*** The American College of Surgeons (ACS), the recognized leader in improving the quality of trauma care, has established a list of requirements that hospitals should meet in order to be a designated trauma center. These requirements fall into 11 categories (Exhibit 1) and can be deemed either "essential" or "desired," depending upon the designation level that

Table 1

### Comparison of Traumatic Injuries Treated in Emergency Rooms *versus* Trauma Centers

#### ***Emergency Room Injuries***

Broken Leg  
Back Sprain  
Broken Rib  
Laceration  
Concussion

#### ***Trauma Center Injuries***

Multiple Fractures  
Paralysis  
Punctured Lung  
Stab Wound  
Brain Injury

Source: U.S. Trauma Center Economic Status Overview.

Exhibit 1

### American College of Surgeons' Hospital Categories of Criteria for Trauma Center Designation

Hospital Organization  
Facility Resources / Capabilities  
Physician Outreach Program  
Trauma Research Program  
Trauma Service Support Personnel  
Hospital Transfer Agreements

Clinical Capabilities  
Quality Improvement Program  
Prevention / Public Education  
Continuing Education  
Organ Procurement Activity

Source: American College of Surgeons' Committee on Trauma, "Resources for the Optimal Care of the Injured Patient"

a hospital aspires to achieve. Most states, including Virginia, have adopted these requirements as the baseline for their trauma center designation process. Appendix B provides a detailed listing of the Hospital Criteria for Trauma Facility Designation adopted in Virginia, based on ACS standards.

***Trauma Center Designation Levels.*** Because the level of care needed by a trauma patient varies with the extent of his injuries, trauma centers may be designated at several levels to respond to the varied needs for trauma services. Although the ACS recognizes four designation levels, levels I, II, and III are most frequently used by states, including Virginia. The key differences in designation levels include the types of specialists who must be available, whether these physicians are in-house or on-call, and the surgical capabilities and equipment that must be provided. Because each level fills different patient needs, the ACS recommends that a trauma system include an appropriate number of facilities at every designation level based on the population to be served and the geography of the region.

Level I trauma centers have the capability of providing total care for every aspect of injury, from prevention through rehabilitation. Level I trauma centers are fully staffed around the clock with the widest array of surgical specialties, nurses, and staff. In addition, a fully staffed operating room must be continuously available and reserved only for trauma patients. These facilities are regional centers often located at teaching hospitals with medical residents involved in the provision of trauma services. In addition, they serve as a regional resource, and provide leadership in education and trauma system planning. In order to foster and maintain expertise in the treatment of severe injuries, level I trauma centers must treat at least 1,200 trauma patients per year, including a minimum of 240 major trauma patients.

Level II trauma centers must meet essentially the same criteria as level I facilities, but the volume performance standards are not required. Level II trauma centers are not fully staffed onsite 24 hours a day, but rather have on-call and promptly available access to specialists around the clock. These facilities provide comprehensive trauma care either as a supplement to a level I trauma center in a large urban area, or as the lead hospital in a less populated area. Staffing requirements are not as stringent for level II trauma centers, and they are not expected to provide leadership in teaching and research.

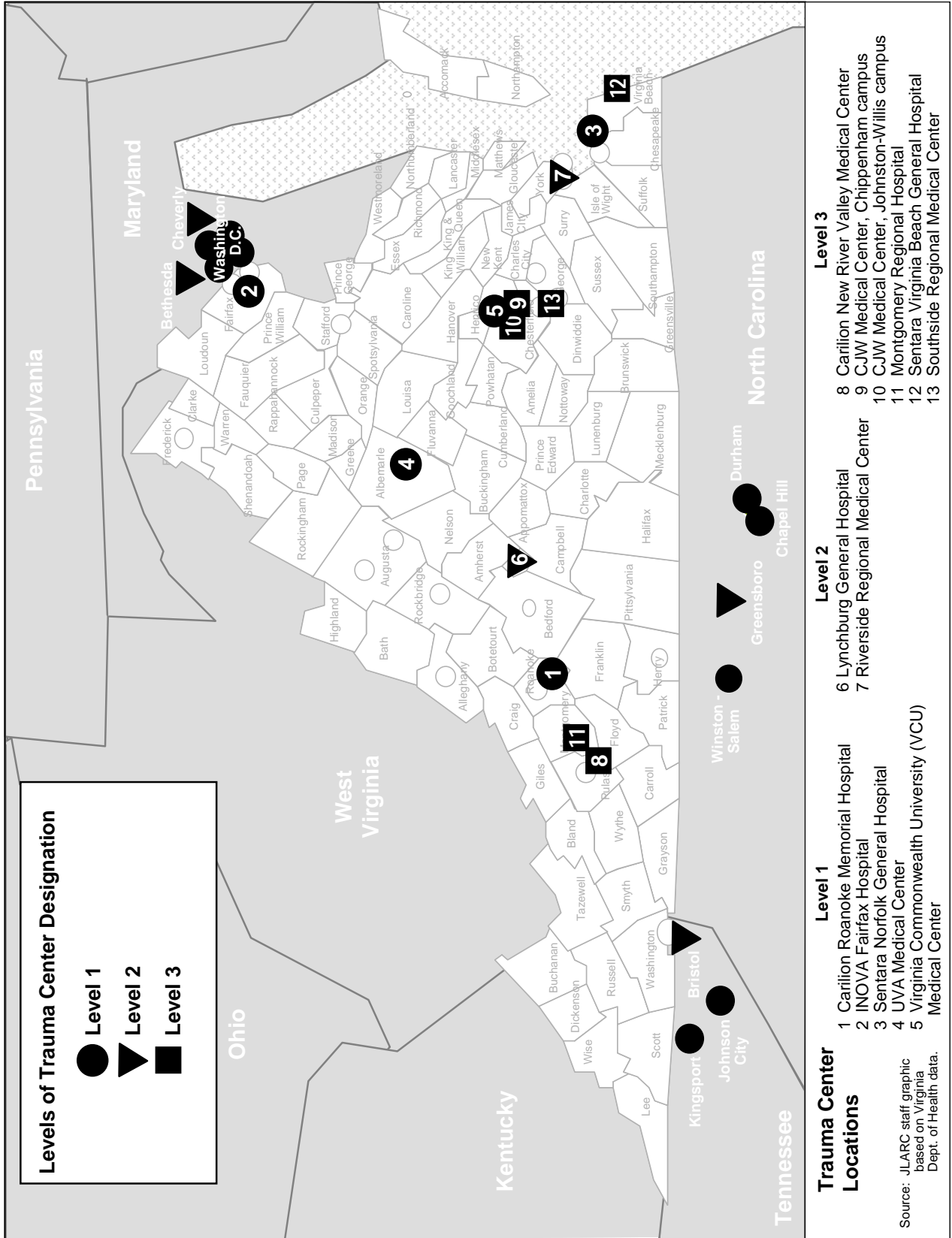
Level III trauma centers must have the capability to stabilize severely injured patients for transfer to a higher level trauma facility. Their only specified staffing requirement is to provide continuous on-call general surgical coverage. Level III facilities typically serve communities that do not have immediate access to a level I or level II trauma center.

### **Where Are Trauma Centers Located in Virginia?**

Of the 68 acute care hospitals in Virginia, 13 have chosen to make a commitment to providing the level of care necessary to be designated as a trauma center. In 1974, Virginia's Board of Health was given authority as a result of the Federal Emergency Medical Services Act of 1973 to develop "a comprehensive, coordinated emergency medical care system of the Commonwealth." The Commonwealth's trauma system development began voluntarily in the early 1980s with a trauma designation program and the creation of a statewide trauma registry. In 1981, the Medical College of Virginia (now VCU Medical Center) in Richmond became the State's first designated trauma center, and has remained a level I trauma center ever since. A total of five hospitals are currently designated as level I trauma centers, including both academic health centers; two hospitals are designated as level II trauma centers; and six hospitals are designated as level III trauma centers. The map in Figure 2 illustrates the locations of Virginia's 13 trauma centers. Because patients injured in Virginia can be taken to a neighboring state's trauma center if it is closer, the map also includes out-of-state level I and level II trauma centers that are within approximately one hour's drive (55 miles) from the State's borders.

Although the trauma center designation process is voluntary on the part of Virginia hospitals, the State, acting through the Department of Health's Office of

Figure 2: Virginia Designated Trauma Centers

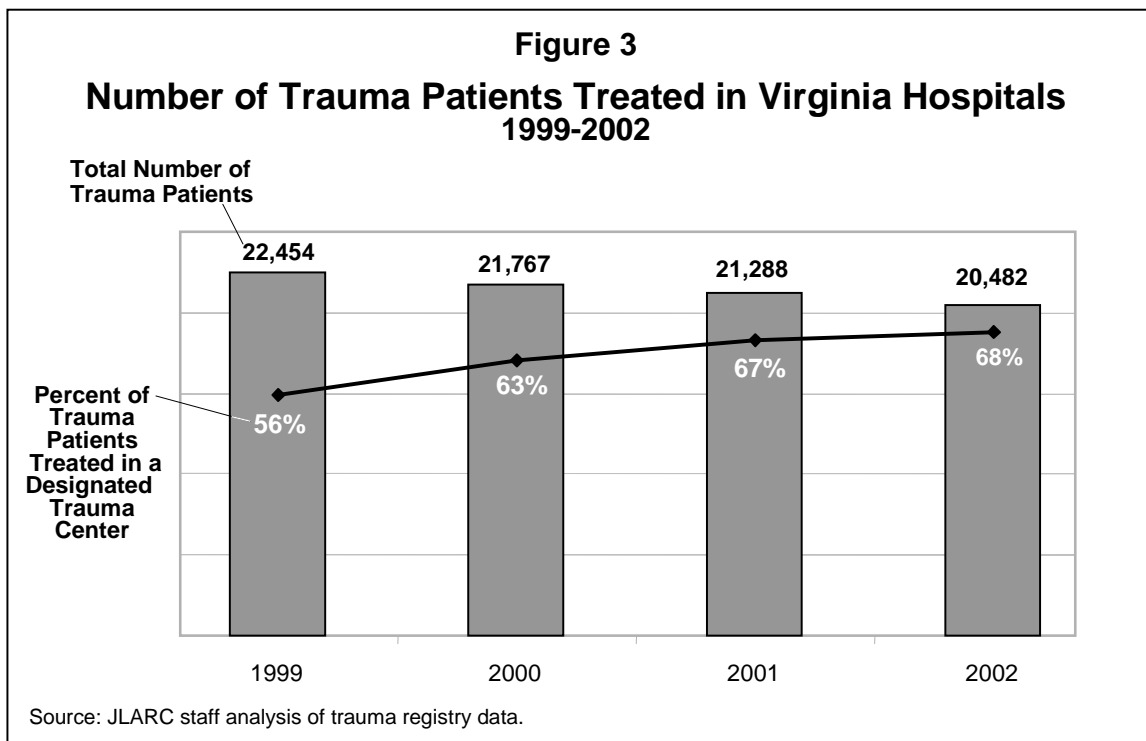


Emergency Medical Services (OEMS), is responsible for maintaining trauma center designation requirements, conducting designation assessments, and verifying designated facilities' compliance with designation requirements every three years. A multidisciplinary team composed of trauma surgeons, nurses, emergency department physicians, and hospital administrators conducts a site visit for both the initial designation and subsequent verification processes. Upon the team's review and consensus, a recommendation for or against designation is provided to the Health Commissioner, who has the authority to make the designation.

### Who Is Injured in Virginia?

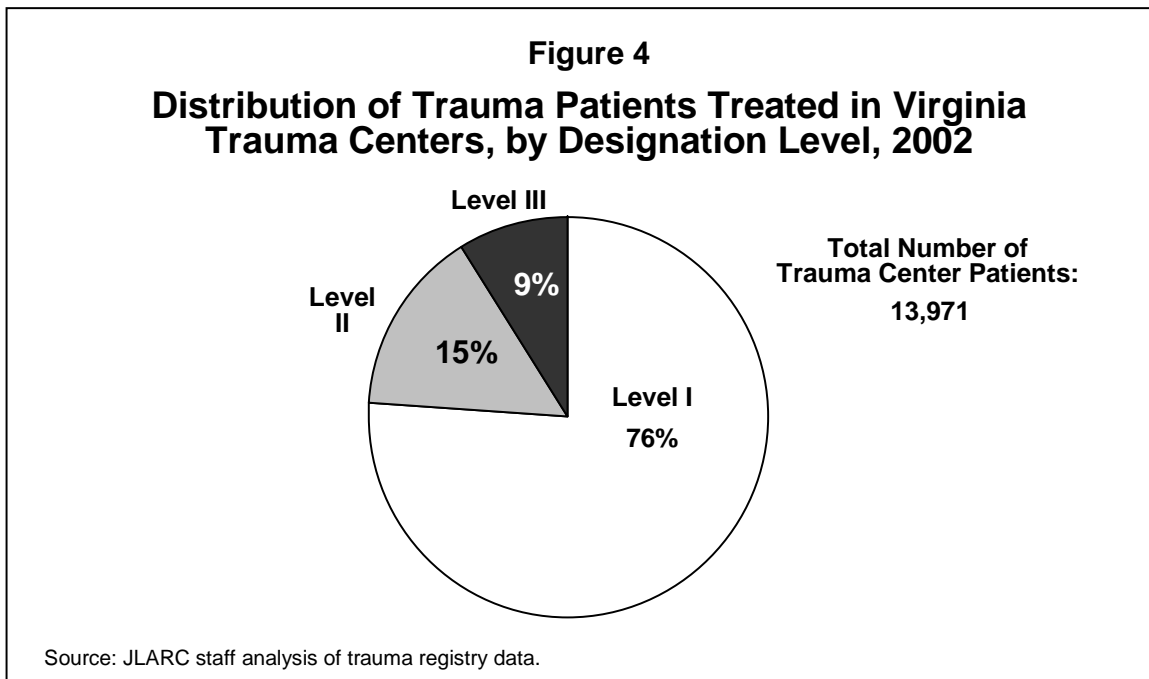
Tens of thousands of Virginians benefit from the superior treatment they receive in trauma centers every year. Trauma can affect anyone, and typically occurs during routine activities. While people of all ages and both genders can be victims, traumatic injuries tend to occur more frequently in young and old men, and are most often caused by motor vehicle crashes and falls. The following sections provide a profile of trauma patients and the injuries they sustain both in Virginia and nationally. It should be noted that Lynchburg General Hospital is not included in these totals because until recently, it did not report data to the State trauma registry. The trauma registry contains information on all trauma patients treated in Virginia hospitals.

**Volume of Trauma Patients.** Each year, one in every 350 Virginians is affected by trauma, most of whom will be treated in a trauma center. More than 20,000 people were treated in a Virginia hospital as a result of trauma, and more than six hundred of them (three percent) died from their injuries in 2002. The total number of injured Virginians has decreased by 10 percent cumulatively over the last four years, as illustrated in Figure 3.



The proportion of trauma patients treated in designated trauma centers has increased during this time period. Most recently, nearly two-thirds (13,971) of Virginia trauma patients were treated in a trauma center. Utilization of trauma center services is higher in Virginia (two in 1,000 residents) than nationally, where only one in 1,000 Americans were admitted at a trauma center in 2002.

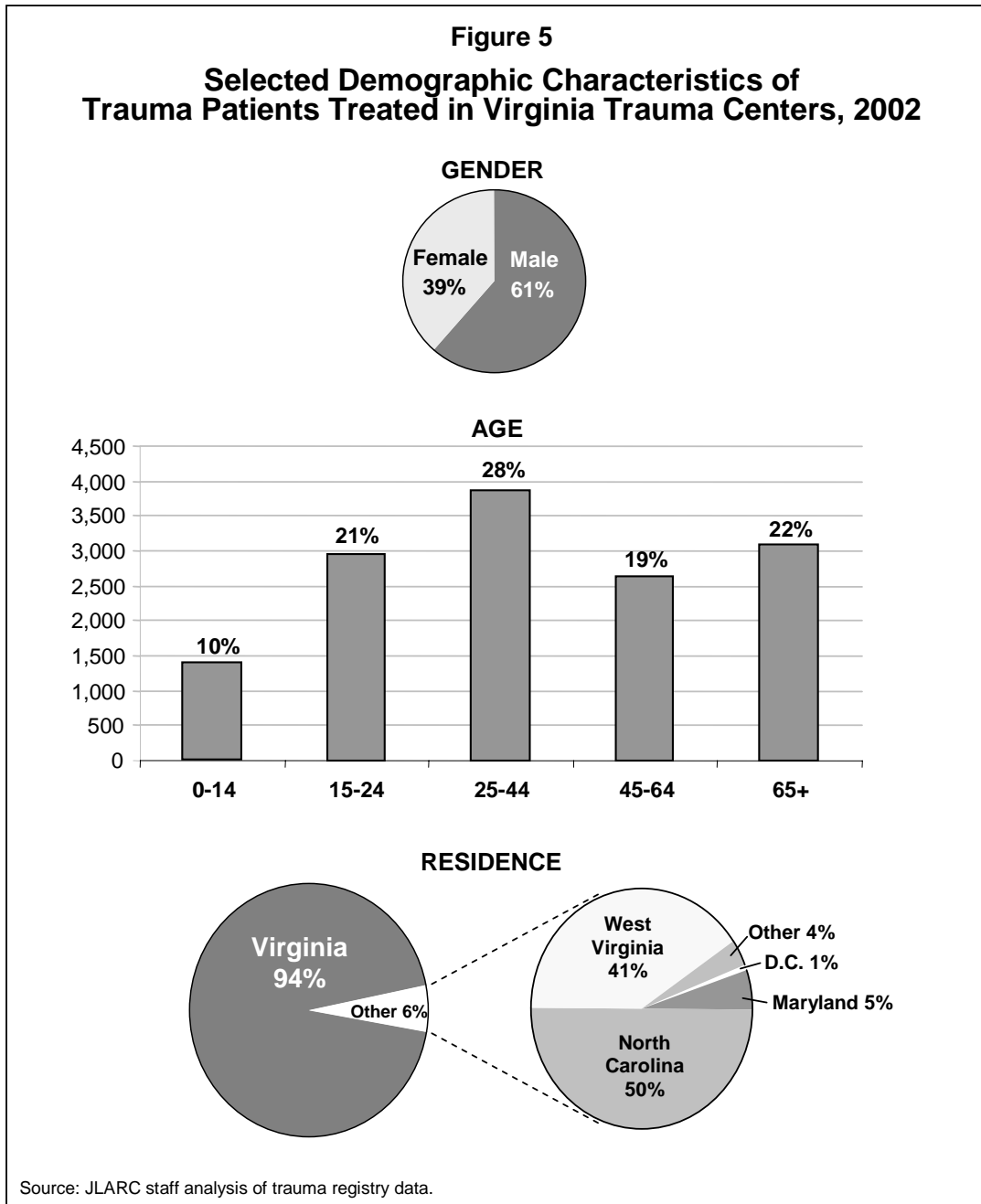
More than three quarters of patients treated at a trauma center in Virginia received care at a level I, 15 percent at a level II, and nine percent at a level III trauma center (Figure 4). This distribution has remained fairly stable over the last four years. Appendix C provides the number of trauma patients treated in each Virginia trauma center in 2002.



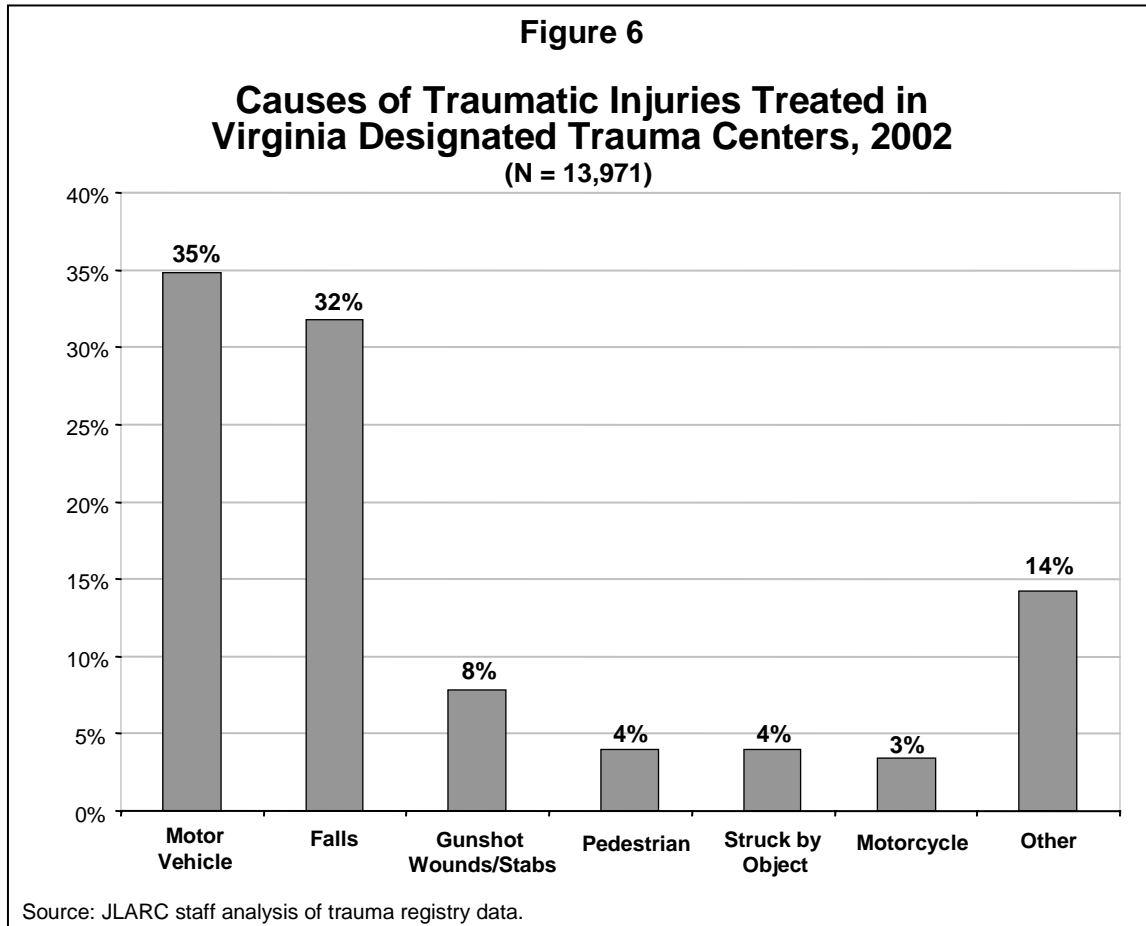
**Demographic Characteristics of Trauma Patients.** Men and young adults are disproportionately affected by trauma, both in Virginia and nationally (Figure 5). Men in Virginia are treated at trauma centers one and a half times as often as women. Virginians between the ages of 25 and 44 are also more likely to suffer from traumatic injuries than any other age group, representing 28 percent of all injuries.

Access to trauma care must cross State boundaries to best respond to trauma patient needs. Although the majority of trauma patients treated in Virginia are State residents (94 percent), about six percent of patients are transported to Virginia trauma centers from neighboring states. These patients are primarily from North Carolina (50 percent of out-of-state patients), and West Virginia (41 percent), often due to a lack of trauma centers in certain parts of those states, according to staff of the Office of Emergency Medical Services (OEMS).





**Causes of Traumatic Injuries.** In 2002, motor vehicle crashes and falls were the most common of the 41 causes of injuries sustained in Virginia, accounting for 67 percent of all traumas. Gunshot wounds and stabs, the most common causes of penetrating injuries, accounted for about eight percent of all traumas. Figure 6 displays the most common types of injury mechanisms among Virginians, based on data from Virginia’s 2002 trauma registry. A table of all causes of traumatic injuries is included in Appendix D.

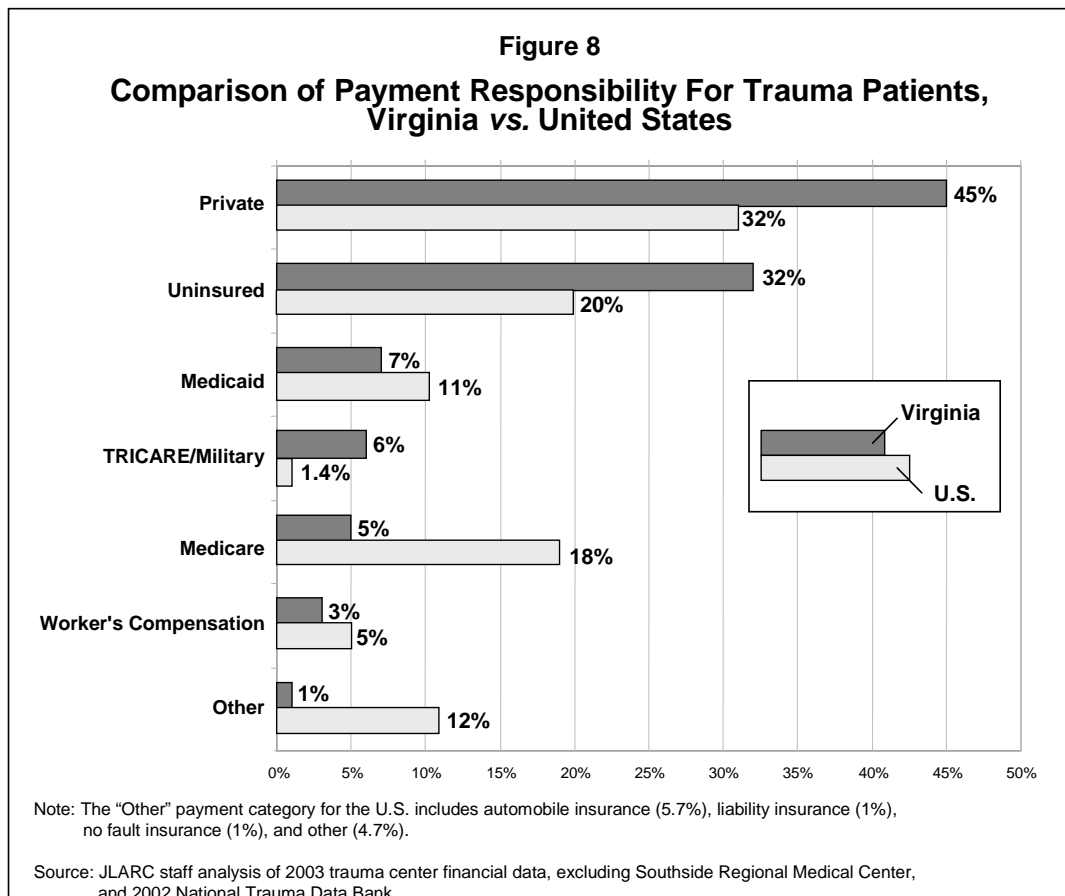
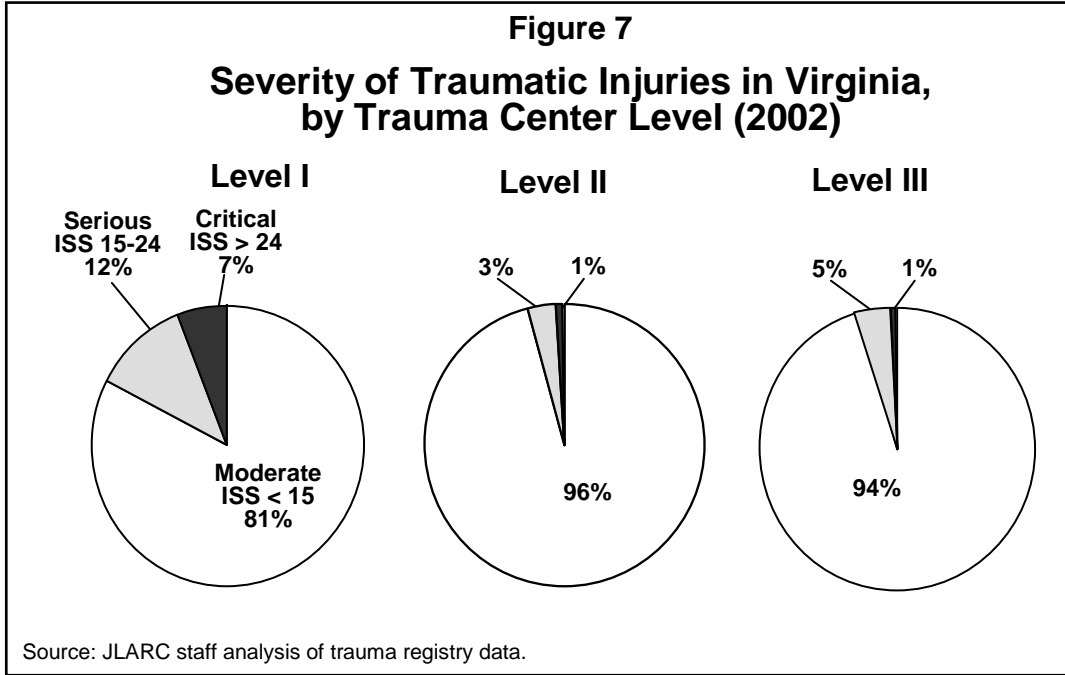


Virginia's experience is generally consistent with national trends. Data from the National Trauma Data Bank (the largest aggregation of trauma registry data in the nation developed by the American College of Surgeons) indicates that the most common causes of injuries nationally were also motor vehicle crashes and falls, representing 61 percent of all injuries in 2002. The national proportion of penetrating injuries is slightly higher than in Virginia, representing 11 percent of all traumas. Appendix E includes additional analysis on the characteristics of the most frequent causes of traumatic injuries in Virginia.

***Severity of Trauma Injuries.*** Most traumatic injuries tend to be moderate. Similar to national trends, 87 percent of trauma patients in Virginia experienced moderate injuries (injury severity score below 15), while eight percent were seriously injured (ISS between 15 and 24), and five percent were in critical condition (ISS above 24). As might be expected, level I trauma centers treated a larger proportion of seriously and critically injured trauma patients than other designation levels, while level III trauma centers treated predominantly moderate injuries in 2002 (Figure 7).

***Insurance Profile of Trauma Patients.*** Forty-five percent of trauma patients treated in Virginia trauma centers in 2003 had private health insurance,

while 18 percent were insured through a public program, and 32 percent had no health insurance at all (Figure 8). Nationally, only 32 percent had private health insurance in 2002. More people were on Medicaid and Medicare, but fewer people were uninsured across the nation than in Virginia. Appendix E includes additional analysis on the payment responsibilities of Virginia's trauma patients.



## TRAUMA CENTERS PROVIDE A PUBLIC SERVICE

Every year, thousands of Virginians avoid death and a lifetime of disability because of the superior level of care they receive in trauma centers. Many individuals will not sustain a traumatic injury during their lifetime, but anyone can suffer an injury from a fall or a motor vehicle crash, and can consequently benefit from having access to a nearby trauma center. Trauma centers also play an integral role in reducing the incidence of injuries, which are often preventable, by conducting community outreach and education campaigns. In addition, trauma centers are a critical element of the State's ability to respond to and treat the victims of mass casualty events.

Traumatic injury is a significant, if underappreciated, public health issue which is the fourth leading cause of death after heart conditions and cancer, often affecting individuals during their young and most productive years. While the emotional costs of injury are immeasurable, the financial burden of injury can also be tremendous for the victim, their family, and the community at large. By improving mortality and morbidity, trauma centers not only improve patient outcomes, but also the economic implications of injury, as illustrated by several case studies in Exhibit 2.

### Trauma Centers Save Lives and Mitigate Disability

Trauma centers and the system within which they operate have been shown to reduce the toll that traumatic injuries take on the nation. Trauma systems can mitigate death and disability because of their emphasis on getting the injured patient to the appropriate level of care without delay. Through coordination, prompt delivery of services, and access to experts, trauma centers reduce the number of preventable deaths.

***Trauma Centers Reduce the Probability of Mortality and Morbidity from Everyday Injuries.*** Numerous studies have demonstrated that the health outcomes of severely injured patients improve when treatment is delivered in trauma centers. Beginning in the 1980s, studies have shown that when trauma centers are available, the preventable death-rate among trauma patients decreases compared to death rates in community hospitals, death rates prior to the implementation of a trauma system, and expected death rates in major trauma patients based on national norms.

National retrospective studies that examined trauma patients admitted to community hospitals found that 20 to 40 percent of deaths could have been avoided had a higher level of care been provided. Consistently, other studies have shown that the proportion of deaths judged to be preventable is 50 percent lower when the most severely injured patients are treated in trauma centers rather than in community hospitals.

**Exhibit 2****Case Studies from Virginia Trauma Victims**

**Head-On Collision With a Drunk Driver** - In February 1998, Sue, a mother of two children, was involved in a head-on collision with a drunk driver. It took approximately 40 minutes for the paramedics to extract her from the vehicle. She was then transported via ground to INOVA Fairfax Hospital, the nearest level I trauma center, with several fractures to her leg and pelvis, among several other injuries.

Following a seven-hour surgery, she was admitted into the intensive care unit (ICU). CT scan films indicated a need for additional surgeries. After undergoing additional surgeries, Sue returned to the ICU. On February 15, she was transferred to an inpatient room where she discussed with one of the nurses the next steps for her recovery. Thirteen days after her motor vehicle crash and after several tests to ensure that Sue's injuries were healing properly, she was transported to a rehab facility to begin physical therapy. During her physical therapy process, Sue returned to INOVA Fairfax Hospital for two additional surgeries. On March 30, 1998, Sue was discharged from rehab and was able to return to her home. In April 2002, more than four years after her accident, Sue underwent additional surgery on her ankle. During the spring of 2003, she was fitted with a custom metal leg brace to relieve the pain she experienced in her ankle.

After more than five years since the accident, Sue has been a spokesperson on behalf of Mothers Against Drunk Driving (MADD) at radio stations, press conferences, Victim Impact Panels, fair booths and Fairview High School in Sterling, VA. She is currently very involved with her children and their activities to the extent to which she is physically capable. Sue is also participating in INOVA Fairfax's REBUILD group, which provides a supportive network for adults to share their experiences and consequences associated with traumatic injuries. Sue also continues to receive psychiatric counseling to learn how to deal with the physical challenges that she and her family have experienced over the last five years.

**Fall From Seven Stories** – In July 2001, a 41 year old female brick mason was working seven stories up at a construction site when she suddenly fell through the scaffolding, landing in a pile of construction debris. Her injuries included a fractured leg, multiple rib fractures, broken neck, broken back, fractured and dislocated elbow, liver laceration, concussion and collapsed lung. She was transported to Virginia Beach General Hospital, the nearest trauma center, and received care from a trauma surgeon, neurosurgeon, and orthopedic surgeon immediately upon her arrival. The severity of her injuries required several procedures performed by these specialists. She never suffered any spinal cord damage, and spent 21 days in the hospital before she was transferred to inpatient rehabilitation. Today, she is back at her job working as a brick mason.

**Virginia Sniper Victim** - In October 2002, the Washington area sniper hit Richmond, Virginia. A young couple traveling from Pennsylvania to Florida stopped in Ashland, Virginia at a restaurant for dinner. While walking from the restaurant to his vehicle, the 39 year old man was shot with a high powered rifle. Emergency medical services were activated, and within eight minutes the ambulance had reached the patient and was en route to VCU Medical Center, a level I trauma center. After a 10-minute transport to the hospital, the patient was taken to the trauma bay where a trauma team promptly assessed the patient and determined that he required immediate surgery. The patient was in the trauma bay for exactly 12 minutes, and within 35 minutes from the time of injury, the patient was moved to the operating room. The patient's stomach was torn, his pancreas injured, and his spleen shattered. He was hospitalized for one month, and spent ten days in the ICU. He was discharged and returned to Florida where he is able to have a productive and functional life. If the trauma system had not been in place and the level I trauma center had not been where it was, this patient could have been another fatality of the DC sniper.

Source: JLARC staff summary of Virginia trauma center accounts.

Furthermore, multiple studies have examined whether improvements in mortality and morbidity occurred after the implementation of a trauma system, and nearly all found a positive effect on both measures. One of the most dramatic illustrations of this improvement occurred after the implementation of a regional trauma system in San Diego County, where the proportion of fatalities that were preventable fell from 13.6 to 2.7 percent. A more specific review of deaths resulting from motor vehicle crashes, the most common source of traumatic injuries nationally, revealed an eight percent decrease in mortality when a trauma system was available.

Finally, several studies compared actual patient outcomes in trauma centers to expected outcomes based on the national experience of major trauma patients. Such studies were conducted in suburban counties, major urban areas, and rural hospitals. Despite the different settings, results consistently found actual death rates in trauma centers to be approximately 15 percent lower than expected.

***Trauma Centers Help to Reduce the Incidence of Injury Through Prevention Efforts.*** Another important element of a trauma center's mission is to focus on injury prevention, which is an integral part of curbing the rise, and eventually decreasing, the occurrence of major injury. Part of the trauma center designation process involves a focus on injury prevention through community education and research, particularly for level I trauma centers. Level I trauma centers conduct a variety of programs in their community. Community-based injury prevention programs have been demonstrated to prevent injury-related mortality and disability. In addition, trauma centers serve as a regional resource center on injury prevention programs, conduct research related to injury prevention in their region, and assess the outcomes of the prevention efforts initiated.

Some examples of injury prevention efforts are conducted in the Northern Virginia Injury Prevention Center of INOVA Fairfax's level I trauma center. They focus on teen drinking and driving (Reality Check Program and SAFE), motor vehicle crashes and safety, aggressive driving (Smooth Operator Program), and children falling from windows (Kids Can't Fly Program). In addition, Roanoke Memorial Hospital's level I trauma center offers community education programs and provides health and safety tips through a newsletter, and by sending nurses into classrooms and local organization meetings.

During interviews, trauma center staff and physicians indicated that although community-based prevention initiatives can yield strong results, they can often work better when certain legislative measures are adopted. For example, states have successfully reduced motor vehicle crash and motorcycle-related deaths and severe injuries by adopting a primary seat belt law and mandatory helmet law.

***Trauma Centers Provide an Infrastructure to Support Emergency Preparedness.*** In addition to the day-to-day role they perform in responding to severe injury, trauma centers are also a critical element of emergency preparedness and response planning. Although Virginia residents are much more likely to be the victim of everyday traumatic injuries than of terrorist attacks, the possibility of mass casualties does exist, particularly given the Commonwealth's proximity to Washington, D.C. and the presence of the Pentagon and several military bases lo-

cated in the State. Terrorist attacks have most frequently involved explosives that resulted in severe traumatic and burn injuries, a trend that is unlikely to change in the foreseeable future. Because of their established communication mechanisms with EMS agencies, the elevated level of care they can provide, and their expertise in treating such injuries, trauma centers are best positioned to deal with the victims of mass casualties. All six hospitals that have volunteered to act as central command units for a mass casualty event in Virginia are also designated trauma centers. Although federal guidelines have not mandated that specific capabilities be incorporated into the existing trauma system, some funding has been made available to build up trauma capacity. In light of other priorities and limited resources, Virginia has opted not to use this optional funding at this time.

### **Trauma Centers Help to Mitigate Productivity Losses from Injuries**

Traumatic injuries constitute a significant public health issue because they lead to the premature death and disability of so many Virginians, translate into great productivity losses, drain health care dollars from both public and private sources, and result in public transfer payments that support trauma victims and their families. Reductions in trauma-related deaths and injury severity, such as those resulting from access to trauma centers, can therefore lead to lower costs. A few studies have found that despite its high upfront expense, the provision of medical care in trauma centers is cost-effective when considered globally. A 1995 study of workers' compensation claims in 17 states over ten years found that total payments for medical and rehabilitative care in states with trauma systems were, on average, five to 18 percent lower per episode than in states without such systems, and that productivity (days of work) was improved, yielding a net financial benefit.

#### ***The Cost of Injury Includes Medical Care and Productivity Losses.***

Trauma was estimated to cost society \$260 billion nationally in 1996, the same as cancer and heart diseases combined (Table 2). The high toll of trauma can be explained, in large part, because injuries tend to disproportionately affect the young, who lose many productive years to either death or long-term disability, while victims of cancer or heart diseases tend to be older. The average number of lost years of productivity for trauma fatalities was 36 years in 1989 (latest data available), compared to 16 years for cancer, and 12 years for cardiovascular diseases (the two leading causes of death).

The cost of injury to society can be calculated using a human capital approach, which values productivity lost or reduced due to injuries. The direct costs of medical care for trauma patients, both acute care at the time of injury and longer-term rehabilitation, accounted for 12 percent of health care spending in the U.S. in 1994 for a total of \$69 billion, second only to the treatment of cardiovascular disease (\$80 billion). Despite their magnitude, medical costs are only one element (29 percent) of the greater financial burden experienced by society as a result of trauma. Disability from injury and premature fatalities translate into indirect costs because they result in lost productivity. The indirect cost of disability accounts for the largest portion (41 percent) of the overall cost of injury, followed by the indirect cost of mortality (30 percent).

**Table 2**  
**Estimated Cost of Diseases and Number of Deaths**

Disease / Condition	Years of Potential Life Lost Before Age 75 (1996) per 100,000 people	Cost Estimate (\$ billion) 1996	Number of Deaths (1996)
Traumatic Injury	1,919	260	147,126
Cancer	1,554	115	539,533
Heart Diseases	1,223	145	733,361
HIV / AIDS	402	n/a	31,130
Stroke; Cerebrovascular Diseases	210	33	159,942
Chronic Obstructive Pulmonary Diseases	161	32	106,027
Diabetes	154	103	61,767
Chronic Liver Disease and Cirrhosis	146	5	25,047
Pneumonia and Influenza	115	25	83,727

Source: 1989 Report to Congress on the Cost of Injury in the United States.

***Preventable Death and Disability Lead to Societal Costs.*** A large portion of injury-related costs are paid through public funds. It is estimated that 28 percent of medical expenditures were paid by federal, state, and local governments, and the remainder by private sources. In Virginia, 28 percent of payments received by trauma centers in 2003 were made through Medicaid, Medicare, and TRICARE (health insurance programs for military personnel and their families). This does not include governmental payments for the care of uninsured trauma patients through programs such as Disproportionate Share Hospital, State and Local Hospitalization, and the Indigent Health Care Trust Fund. Together, these public funding streams are estimated to account for another ten percent of payments for injury-related medical care.

In addition, governments at all levels also bear a material portion of the indirect cost of injury-related deaths and disabilities. Several federal programs pay disability and death benefits under Social Security Disability Insurance, Supplemental Security Income, and the Veterans' Administration. In addition, states often provide complementary payments to the federal programs. For example, Virginia supplements federal disability insurance payments, and administers programs targeted at the disabled through the Department of Rehabilitative Services. Moreover, all levels of government forego tax revenues when individuals die or are disabled and consequently experience a loss of income.



## JLARC REVIEW

The goals of this study were to identify which challenges faced by trauma centers and physicians may jeopardize access to trauma care in Virginia, and what steps can be taken to alleviate such challenges. Based on the study resolution and relevant literature, JLARC staff identified the following research questions as critical in meeting these goals:

- Do Virginians currently have adequate access to trauma centers?
- What are the challenges faced by physicians providing trauma care?
- What are the challenges faced by trauma centers?
- What can the State do to promote continued access to trauma care for all Virginians?

The research activities conducted to answer these questions are described below.

### **Research Activities**

A variety of research activities were conducted during the course of this study. Site visits were made to all Virginia designated trauma centers, and interviews were conducted with hospital administrative and clinical staff. A technical advisory panel comprised of trauma center representatives was convened to provide additional guidance to the JLARC study team, and surveys of trauma center coordinators and EMS regional directors were completed. Extensive financial data was collected from every Virginia trauma center, and analyzed by JLARC staff. A profile of trauma patients in Virginia and nationally was created, as was a spatial analysis of access to trauma centers in the State. Finally, an extensive review of available literature was performed.

***Structured Interviews and Site Visits.*** Interviews were conducted with the CEO of each health system containing a trauma center, the administrator of each of the 13 designated trauma centers, and key hospital leadership staff such as the chief financial officer (CFO), the trauma program medical director, and its coordinator. These interviews focused on identifying the most pressing issues faced by trauma centers, their root causes, potential solutions that would alleviate existing challenges, and the intangible benefits of operating a trauma center. In conjunction with these interviews, a site visit of each trauma center was conducted. During the visit, JLARC staff followed the path that a major trauma patient would take from arrival to discharge.

Group interviews were also held with a subset of trauma centers' clinical staff as well as their financial teams. The focus of these interviews was much more specific in identifying the root causes of the general staffing and financial problems highlighted by hospital leadership teams.

Finally, interviews were held with three Virginia hospitals that treat a large volume of trauma patients but are not designated trauma centers. Feedback from these discussions allowed JLARC staff to better understand the barriers to entry into the Virginia trauma system.

**Technical Advisory Panel.** A panel comprised of administrative and clinical representatives from each designated trauma center was convened with the help of the Virginia Hospital and Healthcare Association (VHHA). The panel met twice during the course of the study, and provided JLARC staff with guidance on data availability, consistency, methodology, and policy options.

**Operational Survey.** An operational survey was administered in order to obtain answers to key staffing and infrastructural issues on a consistent basis. Trauma center coordinators were asked to rank the importance of the various staffing issues described during site visits, as well as provide data on current and historical physician call coverage.

**Survey of EMS Regional Directors.** To gauge whether access to trauma services is perceived as an issue in the EMS community, JLARC staff conducted a survey of EMS regional directors. Their answers were supplemented by feedback gathered during structured interviews by JLARC staff. Moreover, JLARC staff used results from a survey on air medevac services availability conducted by OEMS.

**Financial Analysis.** All trauma centers were asked to provide financial information on the costs and revenue associated with the care of every major trauma patient they treated in 2003. Costs were broken out between the cost of clinical care (the level of care that can be provided by all hospitals) and the incremental costs incurred solely to comply with trauma center designation requirements (readiness costs). Revenues included payments collected from all sources. All of the trauma centers were able to provide data with the exception of Southside Regional Medical Center, a level III trauma center. From the data collected, a total picture of costs and revenues incurred at each trauma center was created to assess the extent and root causes of trauma centers' financial challenges. To preserve the confidentiality of each trauma center's financial data, analytical results are presented in the aggregate by designation level. The data request instrument sent to each trauma center, as well as a more detailed description of the analysis performed on this data, are available in Appendix F.

**Descriptive Statistics.** Using data from the Virginia trauma registry and the National Trauma Data Bank, a profile of trauma victims in the State and the nation was constructed. The indicators in this profile included volume, demographic characteristics, causes and severity of injury, and insurance coverage.

**Spatial Analysis.** With the help of the Virginia Geographical Information Network (VGIN), a division of the Virginia Information Technologies Agency (VITA), JLARC staff conducted a spatial analysis to determine whether Virginia's trauma centers are appropriately located to provide reasonable access to Virginia residents, and whether certain regions in the State are underserved in their access to trauma

care. The analysis included an evaluation of access via both ground and air transportation.

***Literature Review.*** The JLARC study team consulted numerous studies of trauma centers and trauma systems. Such studies included assessments of the effectiveness of trauma centers, and several reviews of the challenges faced by trauma systems across the country. In addition, analysis of trauma center costs and revenues conducted in Florida and Maryland provided a baseline for the financial analysis conducted for this report. Reports on medical malpractice and other physician issues were consulted, as were states' responses to the system challenges they experienced. Finally, information on a variety of issues was obtained from *Bishop + Associates*, a widely recognized national organization focused on solving trauma system challenges.

### **Report Organization**

The answers to each of the four research questions identified for this study are addressed in a separate chapter of this report. Chapter II examines the adequacy of access to trauma care across the State. Chapter III discusses the most pressing challenges faced by physicians who provide trauma care, while Chapter IV describes the issues that affect the facilities that have chosen to become designated trauma centers. Finally, Chapter V offers several options that the State may wish to consider to maintain access to trauma services in the Commonwealth, along with possible revenue sources to fund the implementation of these options.



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## II. Access to Trauma Centers in Virginia

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To optimize recovery, seriously injured patients should be treated within one hour of their injury. Based on this standard, a substantial number of Virginians have inadequate access to trauma centers, particularly if they need the immediate services of a level I or II facility. While the availability of emergency air transportation, level III trauma centers, and out-of-state facilities greatly enhances access to trauma care, certain regions of the State remain underserved, suggesting the potential need for additional trauma centers. However, the staffing and financial challenges that tend to affect trauma centers appear to be deterring community hospitals from seeking designation.

Further compounding the issue of access to trauma centers is the fact that trauma patients may not be consistently transported to the proper facility given the severity of their injuries. Improper triage can lead to adverse health outcomes and inefficiencies in the trauma system. Despite explicit requirements stated in the *Code of Virginia*, it does not appear that the State is conducting analysis of triage patterns or promoting compliance with trauma triage protocols.

The downgrade in level or loss of designation of any one trauma center, particularly if it is a level I or II facility, could adversely impact patient outcomes by leaving an even larger portion of the State without access to a nearby trauma center. National and local experiences suggest that the challenges currently faced by Virginia trauma centers could lead to such a downgrade or loss of trauma center designation.

### **MANY VIRGINIANS DO NOT RECEIVE TRAUMA SERVICES WITHIN ONE HOUR AFTER INJURY**

Virginia trauma patients do not consistently receive trauma care in a prompt manner, and in some cases are not treated in a trauma center even though the severity of their injuries suggests that this level of care would be beneficial to their health outcomes. The addition of trauma centers in certain regions of the State could lead to more prompt access to trauma care, while the analysis of trauma triage patterns could be used to promote compliance with triage protocols and help to ensure that Virginia trauma patients receive the most effective and efficient care for their injuries.

### **Additional Trauma Centers May Be Needed in Certain Regions of the State**

Seventeen percent of major trauma patients (whose injury severity score is greater than 15) transported by ambulance and 23 percent of those patients transported by helicopter did not arrive at a trauma center or community hospital within one hour of injury in 2002, potentially leading to suboptimal health outcomes. The number and location of level I and II trauma centers as well as the availability of air medevac services appear to be the primary factors that affect how promptly a Vir-

ginia trauma patient will receive care at a designated trauma center. The staffing and financial challenges associated with trauma center designation have played a large role in deterring community hospitals from seeking designation, and have perpetuated existing gaps in access to trauma centers in the State.

***Some Virginia Regions Appear to Have Inadequate Access to Trauma Centers Via Emergency Ground Transportation.*** Many Virginians do not have prompt access to trauma care in levels I or II trauma centers via ground transportation (which comprises nearly three-fourths of all trauma transports) as illustrated by the map in Figure 9. Level III trauma centers fill some gaps in certain areas of the State by offering the capability to stabilize trauma patients for transfer to a level I or II trauma center (Figure 9). In addition, trauma centers in Virginia's neighboring states occasionally provide services to Virginia residents if the patient's place of injury is closest to them. Level I and level II trauma centers in Tennessee, Washington, D.C., and Maryland provide areas of Virginia with access to trauma services that would not have access otherwise. More than 700 trauma patients injured in Virginia were transported out-of-state for treatment in 2003.

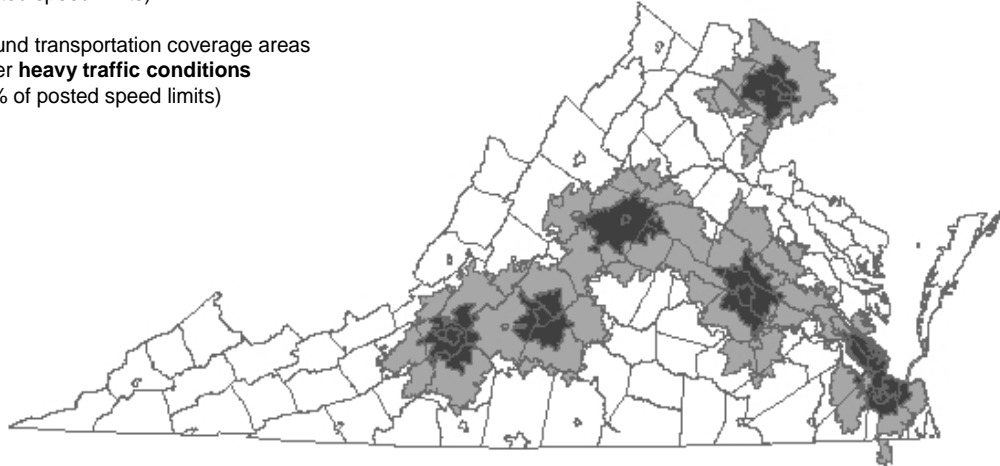
Despite the presence of level III facilities and out-of-state trauma centers, 20 to 40 percent of Virginians do not have access to a trauma center within an hour's drive, depending upon traffic conditions. Under heavy traffic conditions (meaning that ambulances can only travel at half of the posted speed limits, on average), more than 40 percent of Virginians could not be transported to a trauma center within the "golden hour" (the first hour after traumatic injury during which prompt medical attention greatly improves a patient's probability of survival and recovery). These heavy traffic conditions most often occur during the evening, which is the time of day when the majority of severe injuries occur. Even under light traffic conditions, when ambulances can travel at posted speed limits, 20 percent of Virginians do not have access to trauma services within the "golden hour."

The maps in Figures 9 and 10 were generated by the Virginia Geographical Information Network (VGIN) division of the Virginia Information Technologies Agency (VITA), which provided assistance to JLARC staff by illustrating Virginia trauma center service areas via ground transportation, as well as those level I and level II trauma centers located in neighboring states that are within 55 miles of Virginia's borders. Appendix G includes information on the assumptions and methodology used by VGIN to generate these maps for JLARC staff.

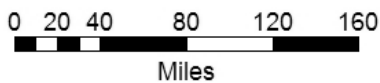
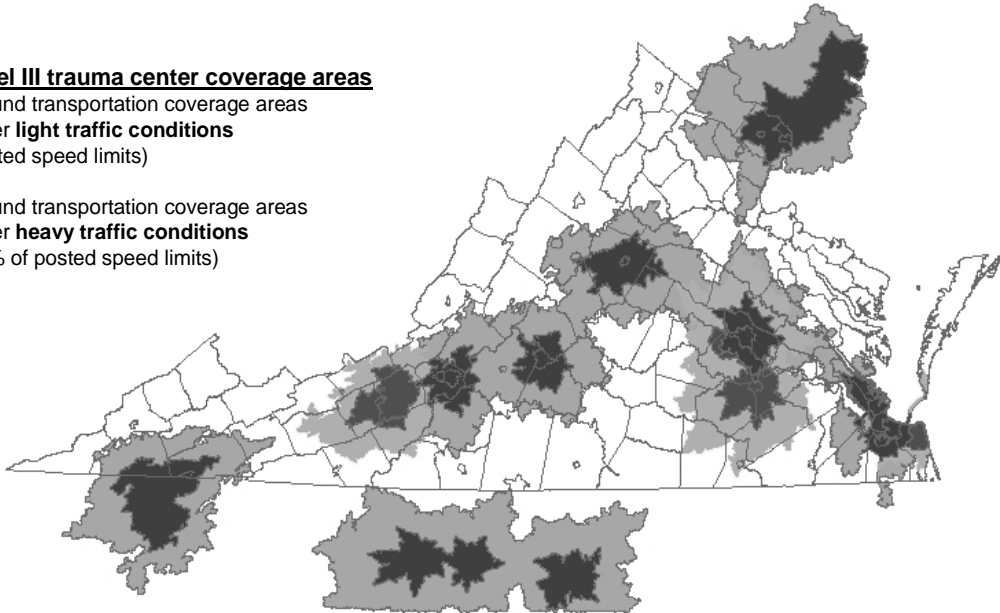
***Air Medevac Transportation, When Available, Greatly Enhances Access to Trauma Services in Virginia.*** Air medevac services greatly increase the availability of trauma services, particularly for Virginians who live in more remote areas of the State. Figure 10 illustrates that almost all regions in the State have access to trauma center services (either in- or out-of-state) within a 50 minute service area via air transportation (after accounting for a 10 minute dispatch period). The few Virginia localities that do not have access to trauma services within approximately one hour from injury, even when using air medevac, include portions of Mecklenburg and Brunswick counties in the southern part of the State, portions of Bath and Highland counties in the western region of the State, and portions of Bland and Carroll counties in the southwestern region of the State. Furthermore,

**Figure 9**  
**Estimated Trauma Center Service Areas**  
**Within One Hour Via Ground Transportation**

- Levels I and II trauma center coverage areas**  
Ground transportation coverage areas under **light traffic conditions** (posted speed limits)
- Ground transportation coverage areas under **heavy traffic conditions** (50% of posted speed limits)



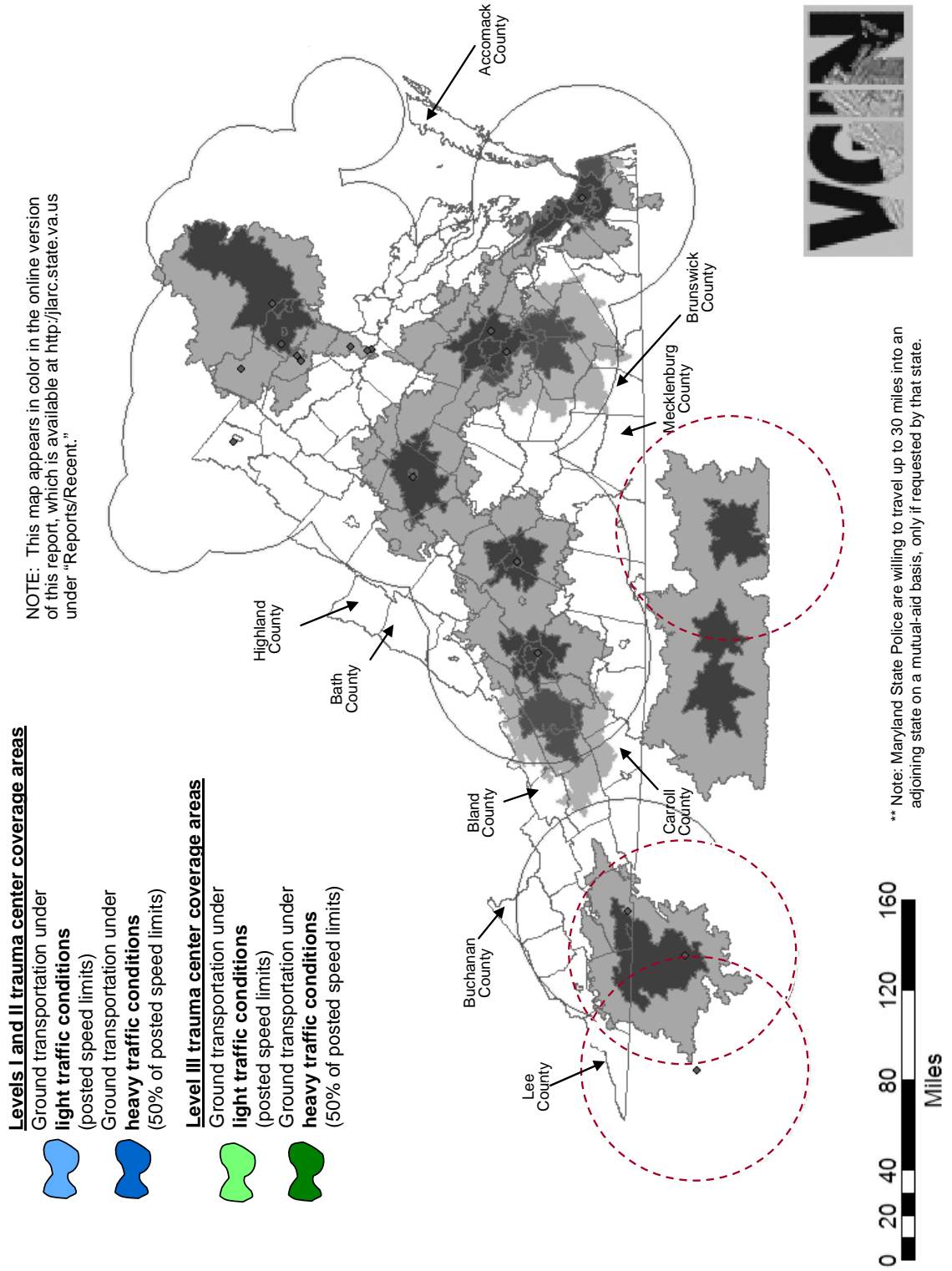
- Level III trauma center coverage areas**  
Ground transportation coverage areas under **light traffic conditions** (posted speed limits)
- Ground transportation coverage areas under **heavy traffic conditions** (50% of posted speed limits)



NOTE: These maps appear in color in the online version of this report, which is available at <http://jlarc.state.va.us> under "Reports/Recent."



**Figure 10**  
**Estimated Trauma Center Service Areas Within One Hour Via Ground and Air Transportation**





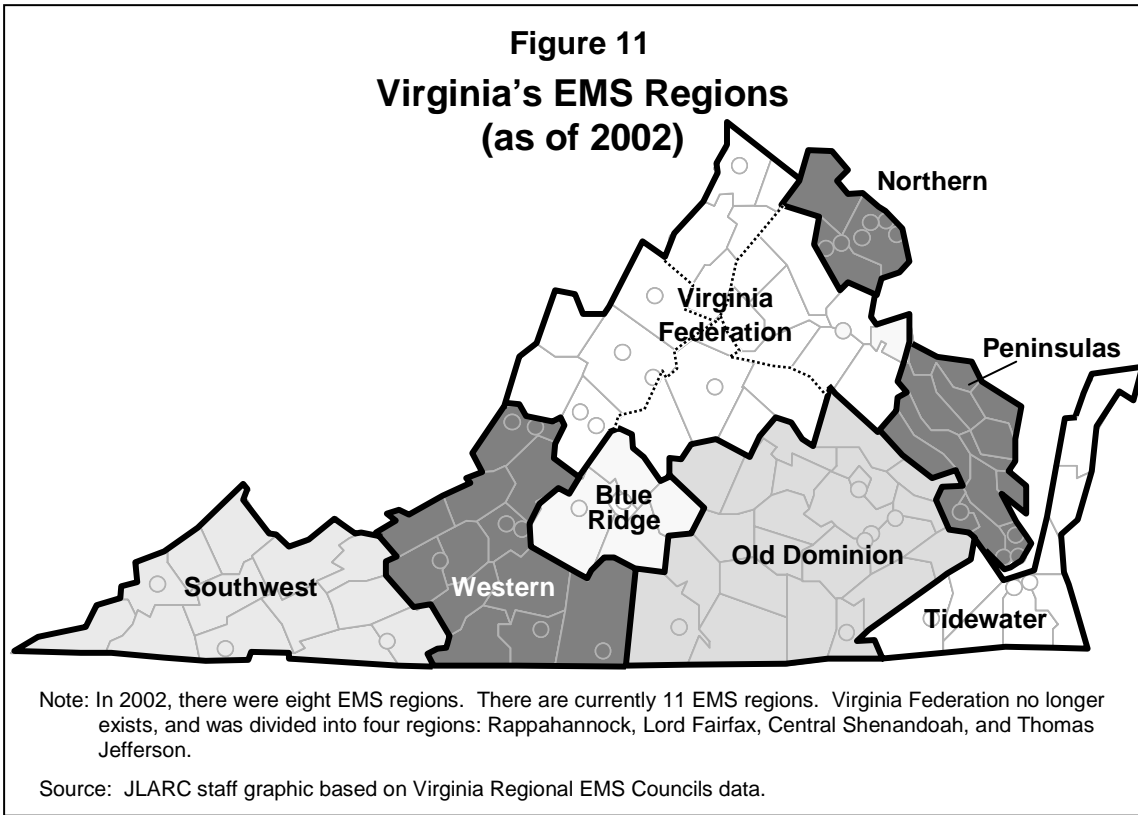
some areas of the State may only have access to trauma services within the first hour after injury if they rely on neighboring states' air medevac services. These areas include the Eastern Shore (Accomack County), southern portions of the State (Mecklenburg County), and southwestern parts of the State (Lee County).

Even though air medevac services fill most of the coverage gaps in ground transportation in Virginia, these services may not always be utilized or available to transport trauma patients. Some regions' trauma triage protocols direct EMS providers to call a supervisor for medical direction prior to calling air medevac for transport. This may occur when an EMS region does not have a trauma center, and the nearest air medevac provider is at least 30 minutes away, as is the case in the Lord Fairfax and Southwest EMS regions. As a result, these patients experience longer times between the arrival of EMS and their transport to a trauma center, and may not receive access to definitive care within the first hour after their injury.

Although EMS providers may be able to call air medevac to transport a patient who meets triage criteria, helicopters may not always be available to transport these patients. EMS regional directors report that air transportation is not available from two percent to 25 percent of the time. Weather conditions are often a factor in the availability of air transportation. Seventy-eight percent of hospitals surveyed by the Office of Emergency Medical Services (OEMS) indicated that inclement weather was the most common reason why air transportation may not be available. An additional seven percent indicated that it is common for no unit to be available to transport a patient when needed. Air medevac providers may already be on a mission, and thus unavailable to take another call. Air medevac providers transport all patients, not just trauma patients, and flew a total of 23,000 missions in 2003. Finally, certain parts of the State are very mountainous and hard to access via helicopter.

An analysis of transportation patterns across EMS regions (Figure 11) further validates that certain regions in the State have less access to air medevac services, and thus experience fewer air transports of trauma patients (Table 3). While an average of eight percent of injured patients were transported by air to trauma centers statewide, only two percent of patients in the Western EMS region were transported to a trauma center by air in 2002, and none of the patients injured in the Blue Ridge, Peninsulas, and Southwest regions were transported by air. This is particularly problematic because a large portion of these regions has inadequate access to trauma centers via ground transportation. When air transportation is used, the Southwest and Western EMS regions currently experience long flight times. Therefore, these regions of the State might benefit from having additional access to air medevac services. EMS regional directors in the Peninsulas and Southwest regions also indicated a need for more access to air medevac services.

***Certain Regions of the State Could Benefit from Access to a Trauma Center.*** Results from two JLARC surveys, as well as a regional analysis of injury volume, confirm that Virginia may need additional trauma centers in certain underserved regions in the State. Several trauma center representatives and EMS regional directors in the Peninsulas, Western, Old Dominion, Thomas Jefferson, and Rappahannock EMS regions indicated there are enough trauma victims in their re-



**Table 3**  
**Percent of Trauma Patients by Transportation Mode**  
**and Destination (EMS Region, 2002)**

EMS Region	All Transports			Trauma Center Transports			Non-Trauma Center Transports		
	Air	Ground	Other	Air	Ground	Other	Air	Ground	Other
Blue Ridge	0	68	32	0	0	0	0	68	32
Northern	12	74	14	14	77	9	0	61	39
Old Dominion	9	75	16	12	76	12	0	69	31
Peninsulas	0	84	16	0	87	13	0	72	28
Southwest	<1	69	31	0	0	0	<1	69	31
Tidewater	12	80	8	14	82	4	0	72	28
Virginia Federation	10	68	22	21	53	26	0	79	21
Western Virginia	2	71	27	4	71	25	<1	70	30
<b>TOTAL</b>	<b>8</b>	<b>74</b>	<b>18</b>	<b>12</b>	<b>75</b>	<b>13</b>	<b>&lt;1</b>	<b>72</b>	<b>28</b>

Note: In 2002, there were eight EMS regions. There are currently 11 EMS regions. Virginia Federation no longer exists, and was divided into four regions: Rappahannock, Lord Fairfax, Central Shenandoah, and Thomas Jefferson. Other transportation types include police vehicles, private vehicles, public transportation, and walk-ins.

Source: JLARC staff analysis of trauma registry data.

gion to justify having another trauma center. Specifically, the need for additional trauma centers was cited for the cities of Winchester, Danville, and Fredericksburg, Henrico or Hanover and Orange counties, and the Northern Neck and Peninsulas regions, while an upgrade in designation to level II was suggested for Radford's New River Valley Medical Center.

Nineteen percent of EMS agencies across the State confirmed that they are unable to transport major trauma patients via ground or air to a trauma center within an hour, according to results of a survey sent by JLARC staff to all EMS agencies in the State. More than half of Lord Fairfax's, 30 percent of Southwest Virginia's, and more than 20 percent of Central Shenandoah's EMS agency survey respondents reported that they are unable to transport major trauma patients within an hour. The three primary reasons cited for delays in transportation include the distance to the nearest trauma center (73 percent), inadequate transportation available (30 percent), and lack of adequately qualified EMS personnel (24 percent). (These percentages add to more than 100 percent because EMS agencies were able to select multiple reasons for not being able to transport patients to a trauma center within an hour.)

In addition, EMS personnel may be unable to transport major trauma patients to the nearest trauma center if that facility diverts them. Fourteen percent of EMS agencies in regions with a level I or level II trauma center reported that these centers have diverted patients who require trauma services. Although more than three-fourths of these respondents indicated that trauma patient diversion occurs very infrequently, 16 percent reported that these patients are diverted from the center at least once a month, and five percent reported that this happens at least once a week. In contrast, almost all trauma centers reported that major trauma patients are never diverted to community hospitals. Trauma centers indicated that they might, on rare occasion, divert a major trauma patient as a result of a lack of operating room availability or an equipment malfunction.

An analysis of regional volume of injury further validates that certain regions of the State lack adequate access to trauma centers. Nationally, the recommended number of level I or II trauma centers per million residents ranges from one to two, based on the number of people who sustain major injuries, and the number of major trauma patients who can and should be treated in either a level I or II trauma center. In the aggregate, Virginia falls just below the national recommended range at 0.99 trauma centers per million residents. However, certain parts of the State fall below the number of trauma centers needed to treat the volume of injuries that occur in these areas. The Southwest EMS region currently does not have any trauma centers, while the Blue Ridge region has 4.4 trauma centers per million residents (Table 4). Although trauma patients can be taken to a trauma center in another region, the resulting increase in transport time could lead to suboptimal health outcomes. Based on the volume of major trauma patients (ISS greater than 15) in the Southwest EMS region, it appears that at least one trauma center is needed. In addition, injury volume in the Tidewater, Old Dominion, and the Virginia Federation regions (which includes the newly created Rappahannock, Lord Fairfax, Central Shenandoah, and Thomas Jefferson regions) fall just below the range of trauma cen-

ters needed to treat those regions' major trauma patients. Although the major trauma patient volume of the Northern Virginia EMS region indicates a need for more than one trauma center per million residents, INOVA Fairfax's level I trauma center is currently the only trauma center in the Northern Virginia EMS region. However, access to trauma centers in Washington, D.C. and Maryland mitigates this problem.

EMS Region	Actual Number of Levels I and II Trauma Centers per Million Residents	Range of the Number of Trauma Centers Needed to Treat Major Trauma Patients
Old Dominion	0.8	1 – 3
Virginia Federation*	0.9	1 – 2
Tidewater	0.9	1 – 2
Northern Virginia	0.5	1 – 2
Western	1.5	1 – 2
Southwest	0.0	1
Peninsulas	1.7	1
Blue Ridge	4.4	0

\*Note: In 2002, there were eight EMS regions. There are currently 11 EMS regions. Virginia Federation no longer exists, and was divided into four regions: Rappahannock, Lord Fairfax, Central Shenandoah, and Thomas Jefferson.

Source: JLARC staff analysis of 2002 trauma registry data.

***Community Hospitals Do Not Provide the Same Level of Care as Trauma Centers, and Few Are Willing to Seek Trauma Center Designation.*** Despite the potential need for additional trauma centers in the State, the staffing and financial challenges faced by existing trauma centers are deterring new volunteer entrants into the trauma system, thereby perpetuating the regional gaps in access to trauma centers. Although they fulfill a very important role in caring for trauma patients in underserved areas, community hospitals cannot fill the geographical gaps in access to trauma centers. Some community hospitals located in underserved regions of the State are forced to treat a large volume of trauma patients due to their location, but these facilities readily admit that they do not have the same capabilities as designated trauma centers. Trauma center designation provides an enforcement mechanism, which ensures that the level of care provided to trauma patients does not erode over time. Even in those community hospitals that strive to provide excellent trauma care, standards are often relaxed, because they can be time-consuming, expensive to maintain, and sometimes hard to justify in light of the many priorities faced by hospital staff.

While these facilities may be able to frequently provide the level of care needed by major trauma patients, they may be unable to consistently provide a higher level of care on a day-to-day basis. This phenomenon also applies to a few designated trauma centers that have indicated that they are providing care at a higher level than their formal designation level, but have not sought a higher level of designation due to the inability to consistently meet the criteria required for that designation level. In either of these cases, EMS providers cannot always transport major trauma patients to these facilities because they may not be able to provide patients with the level of care they need at any given time.

Community hospitals that treat a large volume of trauma patients expressed a strong interest in being able to offer patients the best possible trauma care, but they expressed strong concerns over the financial and staffing impacts that might result from becoming a designated trauma center. Only Winchester Medical Center has chosen to seek designation despite these concerns. Many of the hospitals that could consider seeking designation are located in more rural parts of the State, and tend to treat a larger than average number of patients who are uninsured or covered through Medicaid or Medicare. Chapter IV discusses the financial losses experienced by trauma centers on the treatment of these patients.

While community hospitals already treat a large proportion of injured patients, they are concerned that trauma center designation might attract additional patients who are uninsured or underinsured. Without trauma center designation, community hospitals do not have to incur large readiness costs, or secure physician availability. The stringent staffing and physician requirements associated with designation would be difficult to meet in rural areas without providing financial incentives that would further increase the cost of designation.

Despite these concerns, Winchester Medical Center recently decided to seek level II trauma center designation, which would provide additional access to trauma services in the northwestern part of the State. However, according to hospital officials, rising estimates of the losses that could be incurred by the hospital may place their plans to become a trauma center on hold.

### **Virginia Trauma Patients May Not Be Consistently Treated in the Proper Medical Setting**

Virginia trauma patients may not be consistently triaged to the facility that can provide the level of care appropriate for the severity of their injuries, thereby possibly compromising patient outcomes and decreasing the effectiveness of the trauma system. Despite the adoption of trauma triage protocols in 1997, it appears that a substantial proportion of seriously and critically injured trauma patients are not being treated in designated trauma centers, possibly resulting in under-triage of these patients. Conversely, almost half of the trauma patients treated in level I trauma centers are moderately injured, and some patients may be over-triaged to these facilities. While over-triage creates inefficiencies in the trauma system, under-triage may lead to suboptimal health outcomes of patients.

Based on available data, it is not possible to assess whether triage decisions are improperly made by emergency medical personnel or by community hospital physicians and whether improper triage is preventable. Trauma patients are identified as moderately or critically injured, retrospectively, after they have been thoroughly examined and treated. In contrast, triage decisions made in the field by EMS providers are based upon incomplete information gathered quickly and under stressful conditions. Consequently, a certain level of inaccurate triage is likely to occur. However, a review and analysis of triage patterns could help to identify systematic breakdowns in the process, and reduce the amount of preventable over- and under-triage. It does not appear that any such analysis is currently conducted by the State or that the State is promoting compliance with trauma triage protocols.

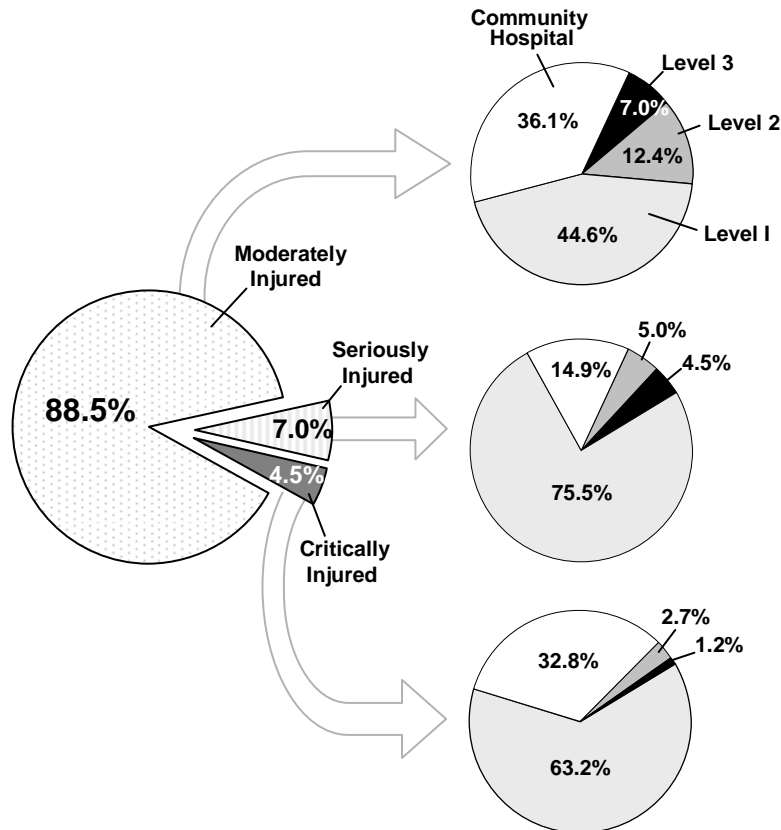
***Triage Protocols Have Been Established in Virginia.*** In 1996, the Joint Commission on Health Care (JCHC) issued a report titled a “Study of the Need For and Efficacy of a Statewide Trauma Triage Plan,” which reported that trauma triage practices varied across EMS regions of the State. The JCHC found that seriously injured patients were under-triaged to community hospitals instead of trauma centers, while a large proportion of moderately injured patients were admitted to level I trauma centers. To address these findings, statewide triage protocols were established in 1997.

Using the statewide protocols as a baseline, each of the 11 EMS regions were tasked with establishing criteria by which EMS providers could assess whether a trauma patient should be transported to a trauma center. In addition, inter-hospital triage protocols were developed to give community hospitals a tool for identifying which trauma patients require a higher level of care. Criteria of regional EMS providers for transporting a trauma patient are primarily based on the location and severity of the patient’s injury. Some EMS regions also use distance and time criteria to the nearest hospital or trauma center in addition to the statewide field-to-hospital triage protocols to determine where and how to transport a patient.

EMS agencies may not transport patients who meet trauma triage criteria directly to a trauma center because of the long transport times to get a patient to a trauma center versus the nearest community hospital. However, EMS agencies have the expectation that once a seriously injured patient is transported to the nearest community hospital, the patient will be stabilized and subsequently transferred to a trauma center, if needed. Data indicate that many community hospitals do not transfer the seriously injured patients they receive, suggesting a failure in the trauma system.

***Critically Injured Patients May Be Under-Triaged.*** Under-triage occurs when seriously or critically injured patients are not taken to trauma centers, which could result in preventable deaths or disability. The 1996 JCHC study found that approximately 24 percent of seriously injured patients and seven percent of critically injured patients were not being admitted to trauma centers. In 2002, five years after the establishment of statewide triage protocols, the percentage of seriously injured patients treated outside of a trauma center decreased to 15 percent, but the percentage of critically injured patients treated outside of a trauma center increased to 33 percent (Figure 12). While critically injured patients may be taken

**Figure 12**  
**Transport Destinations of Virginia Trauma Patients**  
**by Severity of Injury (2002)**



Source: JLARC staff analysis of trauma registry data.

to a community hospital in order to be stabilized, it is expected that most of them would subsequently be transferred to a trauma center in order to receive specialized care. However, only 35 percent of critically injured trauma patients taken to a community hospital were transferred to a trauma center in 2002. Thus, it appears that an increasing proportion of critically injured patients are not receiving the level of care needed.

***Moderately Injured Patients May Be Over-Triaged to Trauma Centers.*** Over-triage occurs when moderately injured patients are taken to a trauma center instead of a community hospital, which reduces the efficiency of the trauma system because treatment is provided in a higher-cost setting. Trauma experts generally agree that a certain amount of over-triage is necessary to avoid missing serious injuries that may be hard to identify in the field. The 1996 JCHC study found that nearly 40 percent of moderately injured patients were admitted to level I trauma centers. In 2002, 45 percent of moderately injured patients were transported to a level I trauma center from the scene of injury (Figure 12). This seemingly moderate increase translates into more than 700 trauma patients who could potentially have been treated in a lower-cost emergency room. This is another indi-

cation that the regional triage protocols may not be working effectively to ensure that trauma patients are treated in the proper medical facility.

***Triage Protocols, Provider Education, and Community Hospital Resources May Affect Trauma Triage Effectiveness.*** EMS regional directors reported that their protocols are generally adequate for determining under which conditions patients should be transported to a trauma center, in addition to whether patients should be air-lifted. It appears, however, that flexibility in triage protocols could lead to some level of under-triage of trauma patients. Seventy-four percent of EMS agencies indicated that their agency protocols or other local arrangements allow them to transport trauma patients to hospitals that are not designated as trauma centers, but have the ability to treat trauma patients. One-third of EMS agencies that responded to a JLARC survey reported that they frequently transport trauma patients to non-trauma center hospitals. Three trauma centers raised the concern that a lack of EMS provider education on assessing whether patients need trauma center services, in addition to a decrease in the number of advanced life support (ALS) providers in some areas was resulting in unnecessary over-triage.

EMS regional directors also indicated that triage protocols rarely create over-triage of patients, while trauma centers estimated that between five and 35 percent of trauma patients, on average, are over-triaged to their facility. However, the majority of trauma centers also indicated that the level of over-triage of trauma patients transported to their facility was acceptable to ensure that all major trauma patients were properly identified.

Several trauma centers and EMS agencies reported that community hospitals in their areas lack the resources necessary to provide adequate services needed to stabilize patients for transfer to a trauma center, which could also lead to some level of under-triage. Twenty percent of EMS agencies felt that community hospitals are unable to provide the services needed to stabilize and transfer patients to a trauma center due to inadequate physician coverage, and inadequate equipment needed to care for patients. In addition, a few trauma centers indicated that the majority of community hospitals in their areas lack an organized process for stabilizing and transferring patients to a trauma center. Furthermore, several trauma centers expressed concerns that over-triage may occur because community hospitals are not treating their fair share of trauma patients for “reasons of convenience,” therefore shifting a larger than necessary financial and staffing burden to trauma centers. These trauma centers perceive that community hospitals would rather avoid trauma patients because they tend to be disproportionately uninsured.

***Compliance With Triage Protocols Is Neither Measured Nor Promoted in the State.*** There is currently a lack of measurement to ensure that triage protocols are working properly and that all trauma patients are transported to the appropriate facility. Such effort could identify whether triage protocols should be revised, more education is needed for EMS providers and community hospitals, or additional resources are required for hospitals to transfer trauma patients. Furthermore, analysis of trauma triage patterns could be used to promote compliance with triage protocols.



The Office of Emergency Medical Services (OEMS) collects extensive pre-hospital and trauma patient data, but does not analyze the data to determine potential ways to improve regional triage protocols and ultimately the care received by trauma patients. Implementation of the following recommendations could help to ensure that seriously injured patients receive the level of care they need, while moderately injured patients are treated in a cost-effective setting.

***Recommendation (1).*** The Office of Emergency Medical Services (OEMS) should analyze and promote compliance with the regional trauma triage protocols to ensure that the protocols are working properly and that trauma patients are being transported to the appropriate facilities. In addition, reports on triage performance should be shared with the EMS regions.

***Recommendation (2).*** The Office of Emergency Medical Services (OEMS) should link the pre-hospital patient care reporting database (PPCR) to the State Trauma Registry database to develop a more comprehensive database that could be used to improve the effectiveness of the entire trauma system.

#### **PATIENT OUTCOMES MAY BE COMPROMISED IF CHALLENGES FACED BY VIRGINIA'S TRAUMA SYSTEM ARE NOT ADDRESSED**

The issues that have led to the downgrade or loss of designation of dozens of trauma centers across the nation are very similar to those faced by the trauma system in Virginia, suggesting that Virginians may be at risk of losing access to trauma centers in the State. Without access to designated trauma facilities, trauma patients are likely to experience adverse health outcomes, particularly if they are severely injured. Level I and II trauma centers in the State currently serve large geographical areas, and would leave large population centers underserved if they were to downgrade their level of designation.

#### **Dozens of Trauma Centers Have Downgraded or Lost Designation Across the Nation**

Despite the established value that they provide, a number of trauma centers across the nation have struggled to retain their trauma program. Over the course of 2001 and 2002 alone, 55 trauma centers located in 19 states experienced threats to maintaining their current designation level, and 12 of them discontinued their trauma program. The study of these 55 trauma centers revealed that staffing issues were the primary reason for the impending discontinuation of trauma programs in two-thirds of these hospitals. Interestingly, a similar study conducted by the General Accounting Office in 1991 found that unreimbursed hospital costs were the primary cause of trauma program shutdowns at that time, suggesting a possible shift in the nature of the problems facing trauma centers.

One of the specific concerns reflected in the literature that relates to staffing is the difficulty in securing on-call physician coverage. The growth in volume of trauma patients coupled with the shortage of specialty physicians has been found to present a mounting challenge. For those physicians who treat trauma patients, trauma care can be disruptive to their private practices and personal lives because of its around-the-clock nature. Given the large number of uninsured trauma patients they treat and the perceived risk of higher liability, some physicians cannot financially justify providing trauma care, and would rather avoid it or seek high on-call pay.

Two additional concerns consistently emerge from a review of the literature: the financial pressures placed upon trauma centers are attributed to the high costs of trauma and its low revenues received for providing trauma care. Specifically, studies identify standby capacity and on-call coverage as two key drivers of high costs. Eroding revenues have been tied to the provision of uncompensated care to a growing group of uninsured and underinsured patients, and to inadequate and declining reimbursements on the part of public payers. The following two cases illustrate how staffing and financial challenges have led to a trauma system crisis in Arizona and Nevada.

*In the fall of 2001, soaring budget deficits prompted the nationally publicized shutdown of the level I trauma programs at two Arizona hospitals whose combined financial losses totaled \$6 million. These losses were attributed to high levels of uncompensated care. To avoid leaving the southern part of the state without a single level I trauma center, the Arizona legislature formulated a one-time \$4.3 million aid package, in addition to \$0.5 million contributed by two affected localities, and made a commitment to research long-term solutions during the following legislative cycle.*

\* \* \*

*Faced with increasingly higher malpractice insurance premiums, several specialists resigned from their positions at the University Medical Center Trauma Center, causing its trauma program to be discontinued, and leaving Las Vegas, the only U.S. city of its size, without trauma care access. This situation proved to be temporary, and was resolved when specialists agreed to become county employees and consequently become subject to the hospital's malpractice liability cap.*

### **The Trauma System in Virginia Faces Significant Challenges that Are Similar to Those Experienced in Other States**

The financial and staffing challenges that have affected the viability of trauma centers across the nation are consistent with the JLARC findings described in Chapters III and IV of this report. The ability to secure physician coverage and the financial losses associated with the care of trauma patients were the most pressing challenges reported by Virginia trauma center administrators and physicians in interviews and surveys. Staffing and financial challenges have already contributed

to the downgrade in designation level of Virginia Beach General Hospital in 2003, and to the near-downgrade of Roanoke Memorial Hospital in 2002. Although crises have been temporarily averted in these two centers, new reports of similar challenges occurring in other facilities indicate that they have by no means been systematically resolved.

***Downgrade of Designation at Virginia Beach General Hospital.*** In June 2003, Sentara Healthcare System announced its decision to downgrade the level II trauma center facility in Virginia Beach to a level III trauma center due to the inability to secure orthopedic surgical coverage. After Sentara Virginia Beach General Hospital (SVBGH) was unable to reach an agreement with orthopedic surgeons regarding on-call stipends, the facility was no longer able to meet the requirements for designation as a level II facility. SVBGH downgraded its designation level and established transportation protocols to the nearest level I trauma center, located in Norfolk.

Despite assurances from Sentara that patient care would not be compromised, the Virginia Beach community expressed strong concerns over access to trauma care for their families and visiting tourists. Communications with the Office of the Governor and the Secretary of Health and Human Services only reiterated the fact that the State had no authority to intervene and compel SVBGH to maintain level II standing, given the voluntary nature of the designation process. Although SVBGH was able to secure a contract with orthopedic surgeons later in 2003, staff at the facility indicate that the hospital does not plan to seek level II designation again until it is confident that staffing issues have been stabilized, a process which could take more than a year.

***Staffing Difficulties at Carilion Roanoke Memorial Hospital.*** After failing to obtain higher on-call stipends and limited practice privileges, two of the five neurosurgeons available for trauma call at Carilion Roanoke Memorial Hospital chose to discontinue their privileges and join another local hospital. The three remaining neurosurgeons subsequently filed suit against the hospital on the grounds that they were being required to provide unfair, burdensome on-call coverage. The lawsuit was dismissed, and Carilion was able to maintain its level I designation by agreeing to enhance on-call stipends and recruit additional neurosurgeons to share the burden of being available for trauma call.

***Each Trauma Center Is a Critical Part of the System.*** Every one of Virginia's 13 trauma centers plays a critical role in providing access to trauma care to their community, while more centers may be needed to alleviate geographical disparities in access. The downgrade in level or loss of designation of any of the State's trauma centers, particularly levels I and II, would leave major population areas without access to major trauma care. Because levels I and II trauma centers are located relatively far away from each other, many trauma patients might continue to be transported to the former trauma center. However, without access to the services that distinguish designated trauma centers from community hospitals, these trauma patients are less likely to experience positive health outcomes.

Moreover, national experience has shown that trauma systems can collapse quickly when a single trauma center is forced to discontinue its trauma program or downgrade its designation level. Although Virginia trauma centers are able to handle the volume of major trauma patients that they treat today, the centers would face severe difficulties if required to handle many more patients. The adverse impacts that could result from the downgrade or loss of designation of any of Virginia's trauma centers further suggests the need to preserve all facilities that are part of today's trauma system.

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### **III. Challenges Faced by Virginia Physicians Providing Trauma Care**

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The most serious threat to trauma centers both nationally and in Virginia has been securing adequate physician coverage to meet the stringent surgical availability requirements that are placed on trauma centers. Hospital administrators in Virginia and across the nation cite inability to secure necessary surgical coverage as the number one reason that would lead them to downgrade their trauma center. In fact, this has been the cause of the downgrades or loss of trauma designation for two trauma centers in Virginia and many other centers in other states.

The increased urgency of several competing factors has led to the physician coverage crisis faced by many trauma centers. Private physicians operate much like a small business in the sense that they must generate revenue to cover their costs. In recent years, however, covering costs while still retaining adequate income has become increasingly more challenging. Physicians have experienced flat or declining reimbursement rates for many patients while simultaneously seeing their overhead costs, in particular medical malpractice premiums, rise annually. Whereas in the past when physicians were willing to take time away from their private practices to be on trauma call at the hospital, it has become less financially feasible for many physicians to do this. Being on call to treat trauma patients requires physicians to be present in the hospital or available on very short notice. Coupled with the negative quality-of-life aspects associated with being on trauma call, many physicians are simply unwilling to make both the professional and personal compromises that often result when treating trauma patients. As more and more physicians decide not to treat trauma patients, this only exacerbates the financial and quality-of-life issues for the physicians that remain on the shorter trauma call rosters.

#### **FEWER PHYSICIANS ARE WILLING TO PROVIDE TRAUMA CARE**

The number of physicians providing trauma care at Virginia's trauma centers has decreased over the past five years. However, the difficulty in securing physician coverage in trauma centers does not appear to be related to physician availability, but rather to physician willingness. This decreasing interest has led to a decline in the number of physicians willing to be on call, despite the steps taken by hospitals in an attempt to ensure adequate trauma coverage.

#### **There Does Not Appear to Be a Shortage of New Physicians Who Could Provide Trauma Care**

The pool of new physicians available to care for trauma patients appears to be relatively stable, at least for the time being. Although there has been a decline in medical school applicants over the past 15 years, the number of applicants still outstrips the number of slots available in medical schools, resulting in fairly constant enrollment levels and graduations from medical schools. This has also been the trend for specialties involved in trauma, particularly general surgery. Research

shows a declining interest among medical students choosing to specialize in general surgery. However, surgical residencies across all surgical specialties involved in trauma are still being filled at a fairly constant rate. While declining interest in general surgery may be a problem in the future, it does not appear to be affecting the supply of new surgeons at the present.

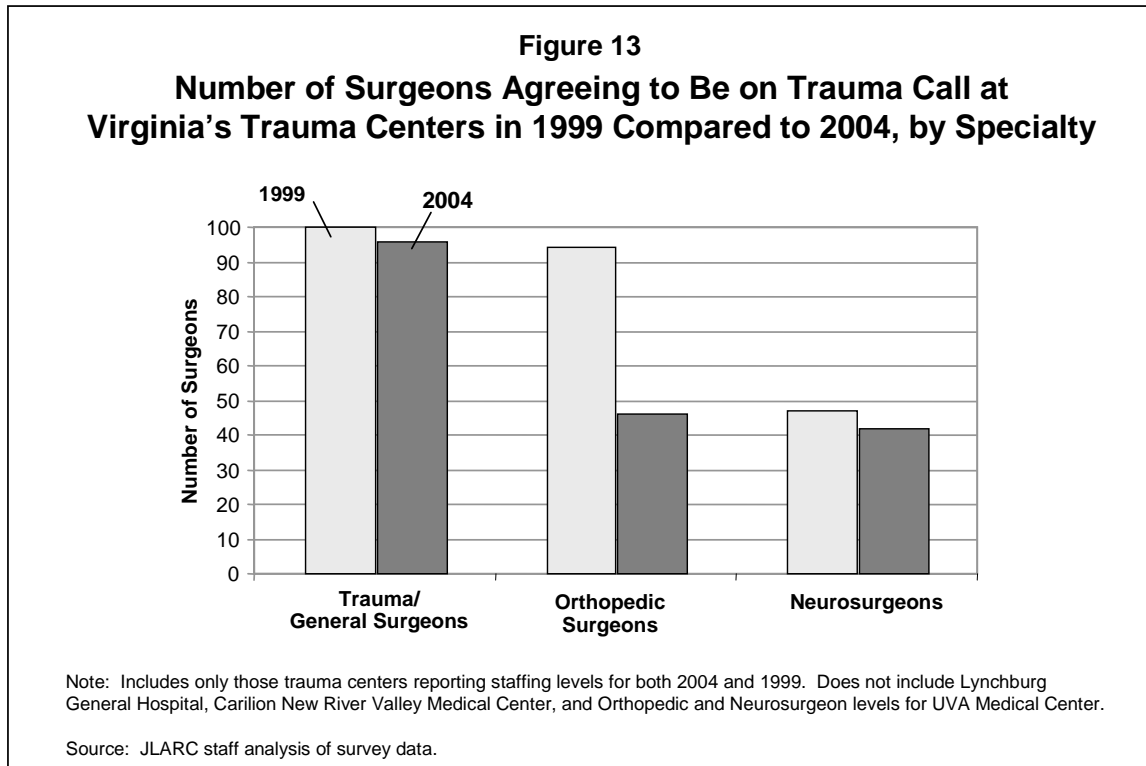
Even though the supply of surgeons has been fairly constant, evidence indicates that new surgeons may not be interested in trauma to the same extent as in the past. Trauma fellowships both nationally and within the Commonwealth have only been about half filled in recent years. Furthermore, Virginia's trauma centers have experienced a significant decline in the number of surgeons willing to be on trauma call since 1999. These trends seem to support what many trauma centers have contended: the physicians needed to provide trauma services are in the community, but they are unwilling to be on trauma call. As a result, trauma centers have had to take action in order to maintain required surgical coverage.

### **Fewer Physicians Are Willing to Provide Trauma Coverage at Virginia's Trauma Centers**

Through surveys and interviews, physicians indicated that fewer of their peers have an interest in treating trauma patients. The result of this declining interest is that fewer doctors are currently willing to be on trauma call compared to 1999. These challenges are most pronounced at level I and level II trauma centers where surgical coverage requirements are the most stringent, and at private hospitals where fewer doctors are employed by the hospital. In a survey of Virginia's trauma centers, the majority of respondents indicated having experienced either no or only mild difficulties in securing physician coverage five years ago. By contrast, the majority of level I and level II trauma centers now report moderate to severe difficulties in securing coverage, particularly for general surgeons, trauma surgeons, neurosurgeons, and orthopedic surgeons.

Figure 13 illustrates that the number of surgeons agreeing to be on trauma call across all specialties has decreased compared to five years ago. (Only those trauma centers reporting staffing levels for both 2004 and 1999 are included in Figure 13.) The most notable decrease in surgical coverage is in the area of orthopedic surgery. About five years ago, trauma centers reported that more than 90 orthopedic surgeons were willing to be on trauma call at Virginia's trauma centers. However, by 2004 there were only 46 orthopedic surgeons agreeing to be on call at these trauma centers. The decline in orthopedic coverage is reflective of the recent crisis in orthopedic coverage at Sentara Virginia Beach General Hospital. In 1999, 18 orthopedic surgeons were willing to be on trauma call at Virginia Beach General. In contrast, by 2004 only six orthopedic surgeons were covering call at Virginia Beach General, three of which were hired by Sentara to cover call for both Virginia Beach General and Norfolk General hospitals.

The combination of decreasing surgical coverage and an increasing number of trauma patients at trauma centers (as illustrated in Chapter I) has led to a decrease in surgical coverage on a per-capita basis as well. For those trauma centers



reporting both prior and current surgical on-call coverage levels, there was an average of 3.7 surgeons available for every 100 trauma patients treated five years ago. (This ratio includes trauma surgeons, general surgeons, orthopedic surgeons, and neurosurgeons.) Although 2004 data on the number of trauma patients treated in Virginia's trauma centers is not yet available, a forecast based on historical trends suggests that only an average of 2.8 surgeons will be available for every 100 trauma patients in 2004.

### **Trauma Centers Have Responded to Help Ensure Trauma Physician Coverage**

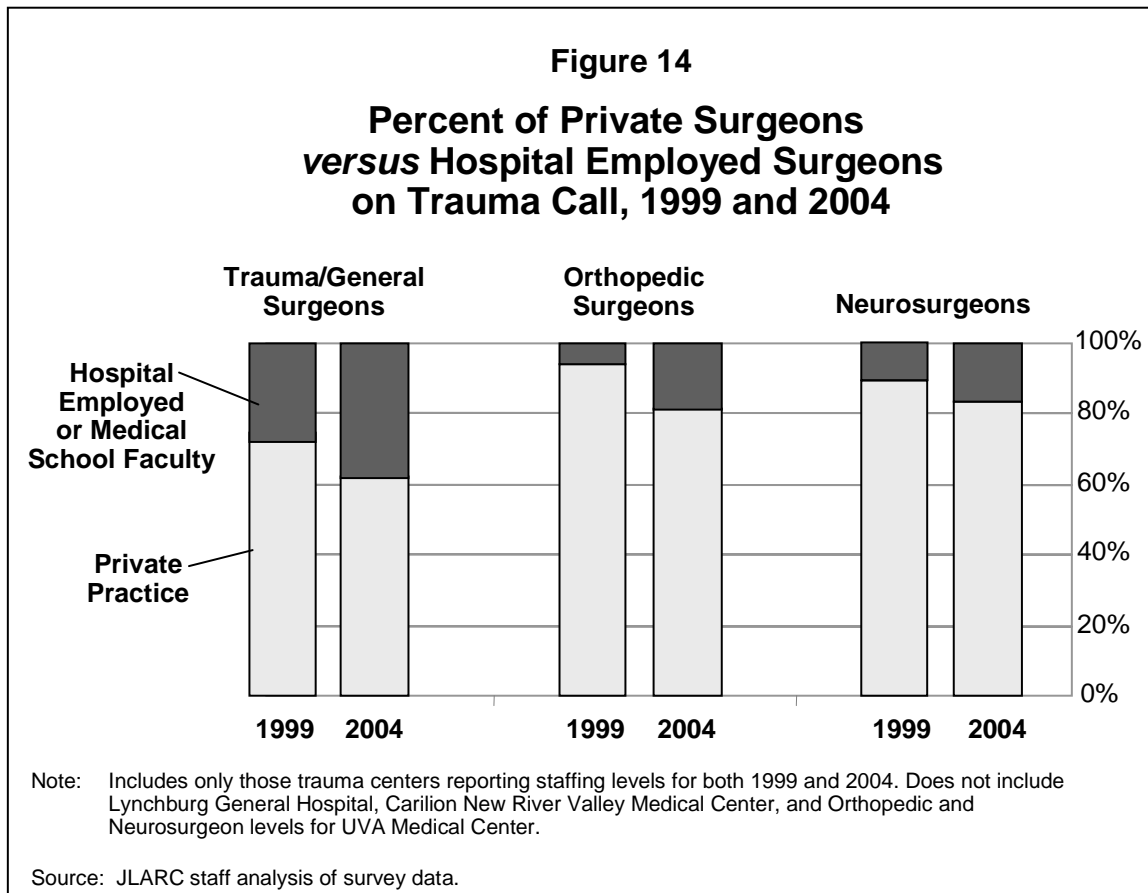
To maintain their trauma designation levels, trauma centers must meet the surgical coverage requirements in the State's trauma center designation criteria. For level I and level II trauma centers, this means having surgical call coverage for general surgery, neurosurgery, orthopedic surgery, and a variety of other specialties 24 hours a day, seven days a week. Faced with increasing difficulties in securing surgical trauma coverage, trauma centers have taken steps to help ensure adequate coverage is available.

***Trauma Centers Are Employing More Surgeons.*** In order to help meet surgical coverage requirements, hospitals have employed more surgeons who, as part of their employment contract, must agree to be available for trauma call. Surgeons are not typically employed by hospitals, but rather have their own private practices and are granted privileges by hospitals to conduct surgeries and other procedures. In these cases, trauma centers make arrangements with surgeons from private practices, for instance through call contracts, to provide trauma call cover-

age. These contracts may be relatively temporary, lasting only a couple of years. An exception to this approach is the State academic health centers, which either employ physicians directly or have faculty arrangements with certain practices.

In recent years, private trauma centers have begun employing more surgeons, in part to provide adequate trauma coverage. Employing surgeons ensures that there is a core number of surgeons available to be on call, which lessens the burden on surgeons from private practices who are on the call roster. From the physician’s perspective, being employed by the hospital ensures a minimum salary, relieves the financial exposure created by treating uninsured patients, and is frequently accompanied by medical liability coverage under the hospital’s policy.

Figure 14 shows the proportion of surgeons by specialty that are under contract from a private practice versus the proportion that are employed by the hospital or are faculty at teaching hospitals. (Figure 14 only includes those trauma centers that provided surgical coverage levels in 1999 and 2004.) The percentage of surgeons agreeing to be on trauma call that are employed by hospitals has increased in every category over the last five years. In total, only 39 surgeons were employed by the trauma centers included in Figure 14 five years ago, compared to 52 surgeons currently. The largest change is in the area of orthopedic surgery. Trauma centers reported that only five orthopedic surgeons were employed by a hospital five years ago compared to nine that are currently hospital-employed, which is an 80 percent increase. Three of these five are employed by Sentara Healthcare to cover trauma call at both Norfolk General and Virginia Beach General Hospital.



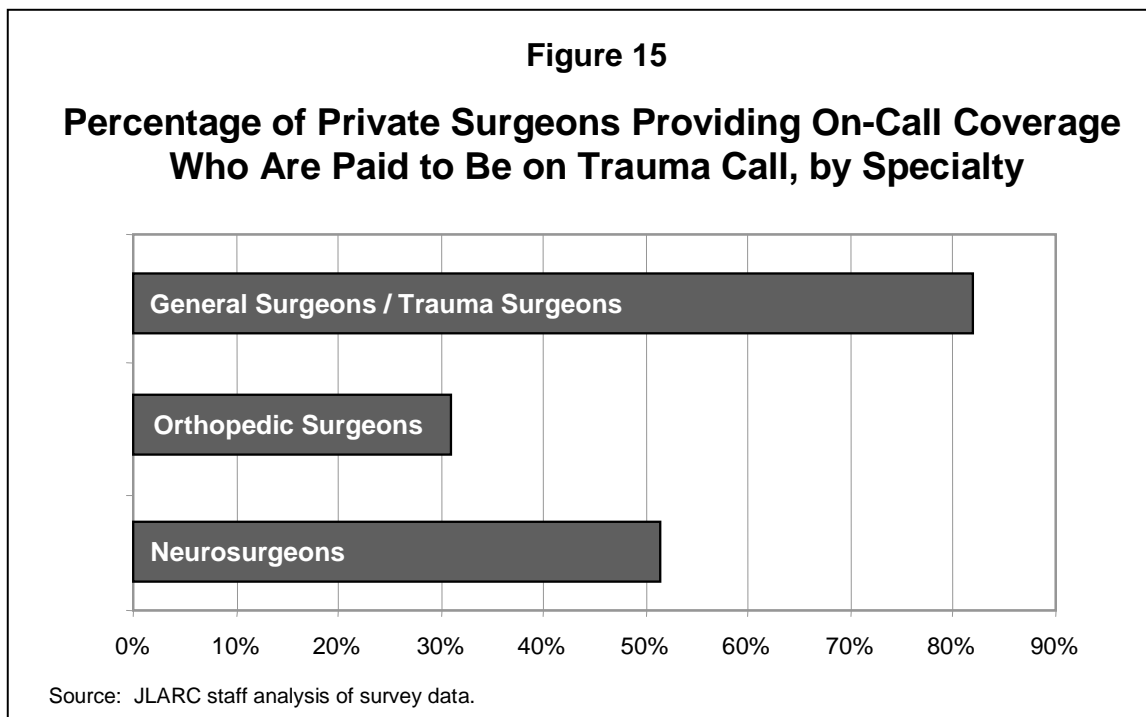


**More Trauma Centers Are Paying for Trauma Call Coverage.**

Trauma centers are also attempting to secure trauma coverage by paying physicians when they are on trauma call. More than half of Virginia's trauma centers currently pay surgeons to be on trauma call. Those trauma centers that do not currently pay for on-call coverage are often approached by physicians on this issue, and one trauma center has started paying for on-call coverage as recently as this year.

For private physicians, hospitals typically provide a call stipend for each shift (which is typically 24 hours) that the surgeon is on call. There is a large range in the amount of stipends paid both among trauma centers and for different surgical specialties. For example, in 2004 the highest reported on-call stipends per shift were \$1,400 for trauma surgeons and general surgeons, \$2,084 for neurosurgeons, and \$1,000 for orthopedic surgeons. The lowest reported stipends were \$226 for trauma surgeons and general surgeons, \$865 for neurosurgeons, and \$502 for orthopedic surgeons. Physicians who are employed by the hospital may also be compensated for being on trauma call. However, their reimbursement is usually included as part of their overall compensation package provided by the hospital, and therefore is not comparable to on-call stipend levels.

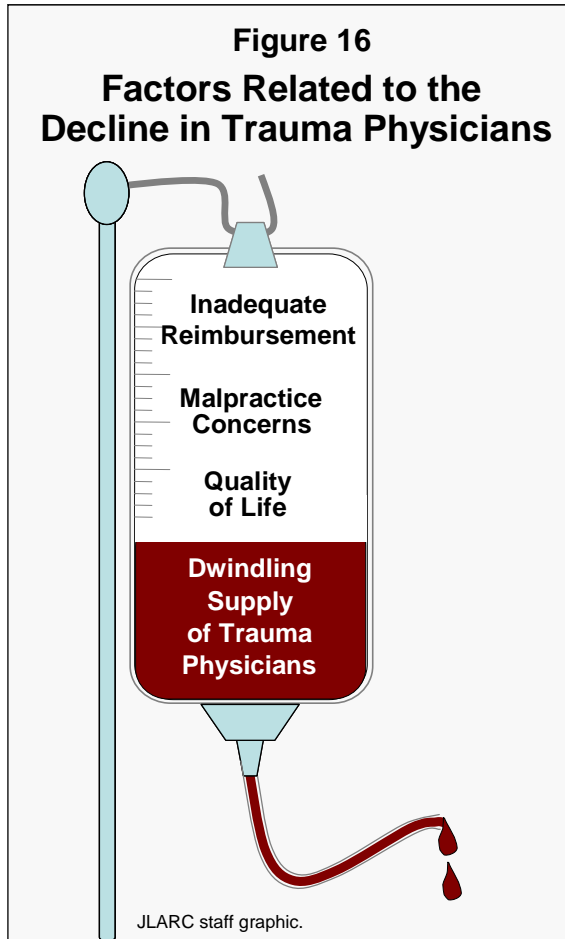
Figure 15 shows the percentage of privately employed physicians willing to be on trauma call who are paid for on-call coverage at trauma centers. General surgeons are paid most frequently for being on call, followed by neurosurgeons and orthopedic surgeons. One reason the number of orthopedic surgeons is comparatively low is that there are more orthopedic surgeons than neurosurgeons on trauma call at those trauma centers that do not pay for call coverage.



## TRAUMA CARE HAS BECOME LESS ATTRACTIVE TO PHYSICIANS

Because time is a scarce resource, physicians must decide how to structure their practice in a way that compensates them adequately for their extensive training and expertise. Factors such as inadequate reimbursement levels compounded by rising medical malpractice rates have made physicians less inclined to put their private practices on hold and sacrifice their quality of life to treat trauma patients (Figure 16). Adding to this appears to be an intergenerational shift in philosophy among physicians. While previous generations felt a responsibility towards the

community to provide a certain amount of on-call emergency care, newer generations of surgeons are increasingly going into sub-specialty areas or practicing in ambulatory surgical centers where the hours are more predictable, reimbursement is better, and litigation is perceived to be less likely.



### Physician Reimbursement for Providing Trauma Care Is Inadequate

One of the primary reasons why physicians are unwilling to provide care for trauma patients is inadequate reimbursement. Inadequate physician reimbursement largely stems from the fact that trauma patients are disproportionately uninsured, and Medicare and Medicaid reimbursement rates have not kept pace with inflation. A further issue is the opportunity cost of being on trauma call, which is the time that physicians could have devoted to their private practice.

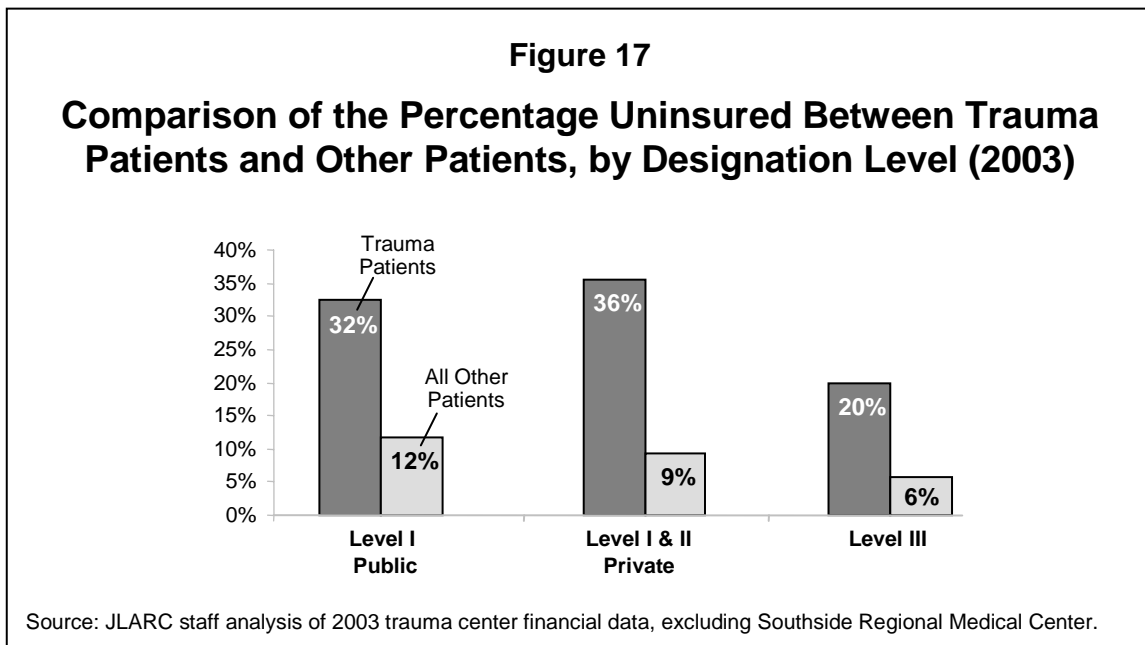
Reimbursement issues affect private physicians more than physicians who are employed by the hospital. Physicians employed by a hospital are typically salaried and therefore do not bear the costs of inadequate reimbursement levels. In these cases, the hospital would suffer the costs of inadequate patient reimbursements.

***Trauma Patients Are Disproportionately Uninsured.*** When physicians agree to be on trauma call, it is much more likely that they will be treating an uninsured patient than if they do not decide to be on trauma call. This is because the demographic characteristics of trauma patients mirror those of the uninsured population. Trauma most frequently affects young people, and young people are

more likely to be uninsured than other age groups. While some uninsured patients may pay out-of-pocket for their health expenses, physicians are often able to collect for only a small portion of the services they bill. The result is that physicians provide much of the care to the uninsured without reimbursement.

A survey of Virginia's trauma centers indicated that the volume of uninsured patients was the most significant factor contributing to difficulties in securing trauma staffing coverage. Trauma centers also reported that this problem has become more severe in recent years. Figure 17 illustrates how the problem of uncompensated care is exacerbated in trauma cases because of the large number of uninsured trauma patients compared to other patient types. On average, trauma patients are three times more likely to be uninsured than non-trauma patients. The percentage of trauma patients that are uninsured ranges from 20 percent to 36 percent across trauma center designation levels, while the percent of all other patients that are uninsured ranges from six percent to 12 percent.

One factor compounding the financial issues posed by the treatment of uninsured patients is that federal law provides for patients to receive necessary trauma care regardless of their ability to pay for services. Since the passage of the federal Emergency Medical Treatment and Active Labor Act (EMTALA) of 1986, hospitals cannot refuse to treat or transfer patients in need of emergency services because of their insurance status. Any patient who comes to the emergency department requesting examination or treatment for a medical condition must receive an appropriate medical screening examination to determine whether the patient is suffering from an emergency medical condition, as assessed by the attending physician. If the patient is found to be suffering from an emergency medical condition, the hospital must provide the patient with treatment until he is stable.



***Physician Reimbursements from Public Payers Generally Have Not Kept Pace with Inflation in Recent Years.*** Physician reimbursements from Medicare and Medicaid generally have not kept pace with inflation in recent years. This is true for both Medicare and Medicaid payments to physicians overall, as well as payments to trauma-specific physicians. While the issue of declining public payments is not unique to physicians agreeing to be on trauma call, it is compounded by the fact that trauma physicians serve a disproportionate number of uninsured patients, which leaves them with only a small pool of patients paying market rates.

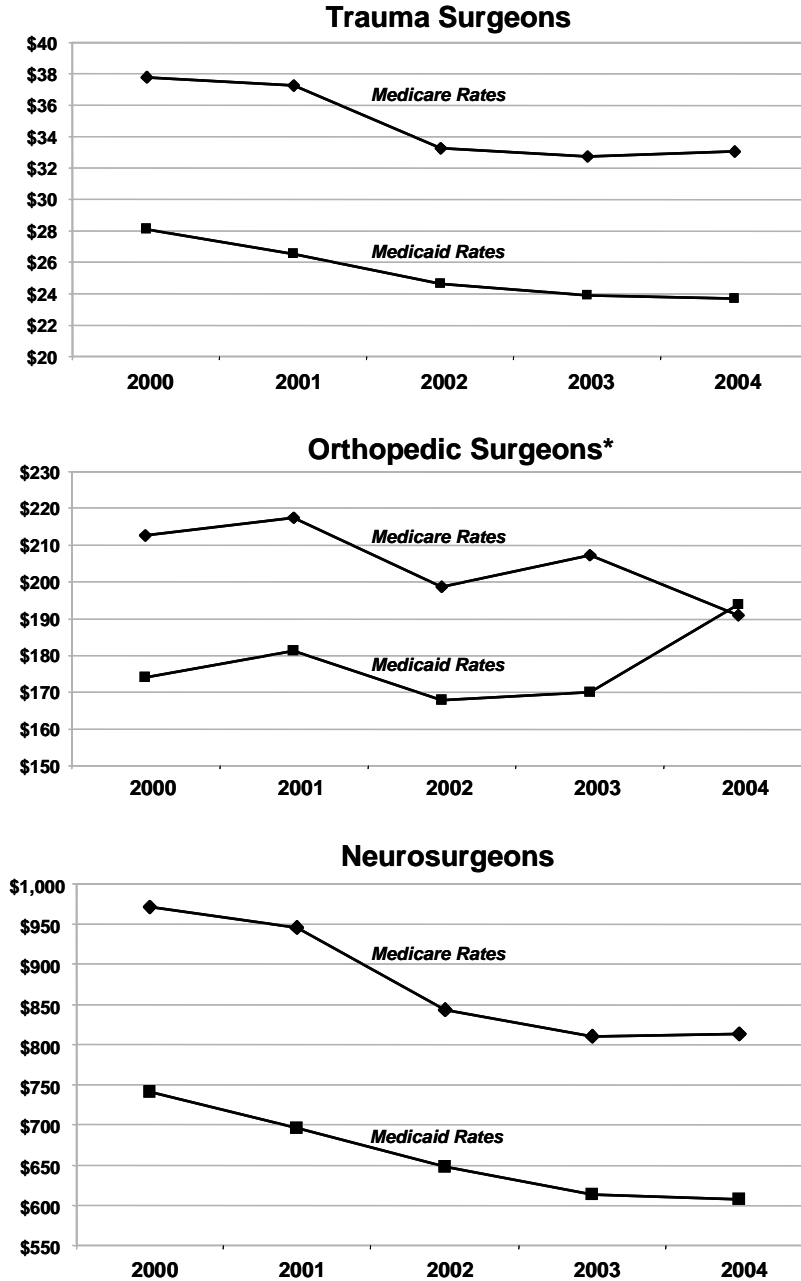
Medicare rates are set through a combination of adjustments reflecting inflation and physician labor costs. After adjusting for the effects of inflation, Medicare reimbursement rates have decreased across medical specialties over the last several years. To limit State general fund costs, Virginia's physician reimbursement rates for Medicaid also have not increased since 1995. While Medicaid uses Medicare reimbursement rates as a baseline, the Virginia Administrative Code directs DMAS to "adjust the [rates] by an additional factor so that no change in expenditure will result solely from the implementation of the [Medicare physician] fee schedule." In other words, while overall Medicaid expenditures for physician fees may increase due to utilization or increases in the physician population, expenditures cannot increase simply as a result of physician reimbursement rates. The Medicaid physician fee rates do not include any adjustment for inflation, even if Medicare rates are increased. The Governor's Work Group on Rural Obstetrical Care recently estimated that "for the Medicaid physician reimbursement rates effective June 1, 2004, Medicaid paid fees are estimated to be approximately 69 percent of the payment rate for Medicare."

Figure 18 shows average inflation-adjusted Medicare and Medicaid rates for those procedures most frequently performed by trauma surgeons, orthopedic surgeons, and neurosurgeons in a hospital setting. When rates are adjusted for inflation, neither Medicare nor Medicaid rates have generally kept pace with inflation. This is not surprising given the limits both Medicare and Medicaid have placed on overall growth in physician rates.

***Treatment of Trauma Patients Disrupts Physicians' Private Practices, for Which Reimbursement Rates Are Typically Higher.*** An opportunity cost to private physicians of treating trauma patients is the time they could have spent tending to their private practices. The more time spent away from their practices, the more likely it is that physicians will have to forgo elective surgeries that are scheduled with their practice. Physicians are less willing to forgo elective surgeries because these patients are more likely to have private health insurance, which typically reimburses at a higher rate than public payers and, obviously, the uninsured. Private reimbursement rates vary depending on what each physician is able to negotiate with different private payers. However, one large private insurer in Virginia indicated that the bulk of its physician fees for managed care have ranged between 110 percent and 125 percent of Medicare rates. A Virginia trauma center reported that, for the most frequent procedures utilized by its trauma physicians over the past three years, average private insurance reimbursements ranged from 106 percent to 199 percent of Medicare rates.

Figure 18

**Average Inflation-Adjusted Medicare and Medicaid Rates for Most Frequently Performed Trauma Procedures, by Specialty**



Note: Scales vary on graphs.

\* The increase in 2004 Medicaid rates is a result of a large increase in Medicare non-facility rates (on which Medicaid rates are based) for one procedure to reflect increases in practice expenses associated with this procedure.

Source: Top physician procedure codes (current procedural terminology, or CPT) by surgical specialty: Virginia trauma center; Medicare Physician Payment Rates: Centers for Medicare & Medicaid Services, Medicare Physician Fee Schedule; Medicaid Physician Payment Rates: Virginia Department of Medical Assistance Services.

Trauma care also disrupts a physician's private practice because of additional training requirements and time spent responding to trauma calls, and can have a negative impact on a physician's practice. Trauma surgeons are required to have ten hours of trauma/critical care continuing medical education (CME) credits annually, in addition to the CME credits required for their board certification. The time it takes physicians to achieve these additional trauma/critical care CME credits is time that could have been spent with patients in their private practice. In addition, when physicians are on trauma call, they often must reschedule surgeries in their private practice to meet the unpredictable and immediate needs of trauma patients. This can be particularly problematic for trauma-related surgeries that are very time consuming. Whether as a result of responding to trauma call during the day or losing several hours of sleep the night before, surgeons must often reschedule or cancel elective surgeries and procedures as a result of their trauma responsibilities. Several surgeons reported that, in some instances, their private patients may simply cancel the elective surgeries and go elsewhere.

### **Medical Malpractice Costs Have Increased and Are Relatively High for Trauma-Related Specialties**

Increasing medical malpractice insurance premiums have adversely affected most of the medical community in recent years. Those specialties that are most frequently involved in trauma experience relatively high malpractice rates both in Virginia and across the nation. However, it is unclear the extent to which being available for trauma call affects those malpractice premiums.

#### ***Medical Malpractice Premiums Have Increased in Recent Years.***

Premiums for medical malpractice liability insurance have increased sharply over the past several years across the U.S. The Congressional Budget Office recently reported that medical malpractice premiums for all physicians nationwide rose by 15 percent (on average) between 2000 and 2002. Premiums for high-risk specialties increased even more sharply over this time period: 22 percent for obstetricians / gynecologists and 33 percent for internists and general surgeons.

There are several reasons why medical malpractice premiums have risen so sharply. Two of the largest contributors appear to be the increasing costs of resolving malpractice lawsuits (the average payment for a malpractice claim in the U.S. has risen from about \$95,000 in 1986 to more than \$320,000 in 2002), and lower investment yields experienced by insurers in recent years.

The substantial rise in malpractice premiums has directly led to a crisis of physician coverage for trauma centers in several states. To draw attention to their concerns over rising medical malpractice premiums, more than 60 orthopedic surgeons withdrew their contracts with the University of Nevada Medical Center, causing the state's only level I trauma center to temporarily suspend its trauma program for 11 days in July 2002. One of West Virginia's medical centers lost its level I trauma designation for approximately one month in 2002 due to inadequate orthopedic surgeon on-call coverage. The hospital's level I designation was restored when additional physicians agreed to provide on-call coverage after the state extended

state-sponsored liability insurance coverage to physicians who provide a significant percentage of their services in a trauma setting.

Consistent with national trends, malpractice insurance premiums in Virginia have increased as well. The Virginia Bureau of Insurance (BOI) reviewed the rates of several of the largest malpractice insurers in the State and determined that malpractice premiums have increased by a cumulative amount of 115 percent across all physician types between 1993 and 2003. Rate information obtained through the *Medical Liability Monitor* indicates that average rates for several of the largest insurers in Virginia increased by 24 percent in internal medicine, general surgery, and obstetrics / gynecology in the past year alone. Because insurers use very different approaches to setting rates, the average increase over one year does not necessarily give a good indication of how different insurers adjusted their rates. For example, 2002 premium increases ranged from no increase for several providers to a high of 68 percent for one provider, compared to 2001.

Although premiums have increased significantly in Virginia, it is not clear that these premium increases are inappropriate. A recent study commissioned by the Virginia BOI retained Mercer Risk, Finance and Insurance Consulting to provide an analysis of the commercial insurance rates recently filed for physicians' and surgeons' liability coverage in Virginia. Mercer concluded that the rates charged by the major physician and surgeon professional liability insurance companies appear to be adequate and not excessive. In addition, rates for neurosurgeons and obstetricians / gynecologists, the highest risk specialties, appear to be reasonable. Moreover, while 23 states have caps on non-economic damages in medical practice cases, Virginia is one of only six states with a cap on total damages. (The current cap in Virginia is \$1.75 million for economic and non-economic damages combined.) While there is not a general consensus among researchers, some have found that premium rates tend to increase less in states with caps on damages.

***Concerns Over Medical Malpractice Are a Primary Reason Why Surgeons Are Unwilling to Treat Trauma Patients.*** During interviews with Virginia's trauma centers, a number of surgeons indicated that the cost of medical malpractice insurance and fear of litigation are two of the most significant reasons why they are unwilling to be on trauma call at trauma centers. Surgeons believe that agreeing to be on trauma call increases their insurance premiums and makes them more vulnerable to lawsuits. With certain insurers, it appears that being on trauma call does increase medical liability premiums. However, there is no clear evidence that providing care for trauma patients increases physicians' risk of litigation.

Whether being on trauma call increases a physician's base medical liability premium costs depends on the physician's insurance carrier. Figure 19 provides the base annual malpractice rate classifications and/or premiums for four of the largest insurance providers in Virginia. (Base rates are simply a starting amount and are not comparable across providers because they use many different methods to adjust base rates.) For three of the providers, being on trauma call places general surgeons in a higher rate classification, and two providers would place orthopedic surgeons in a higher rate category if they agree to be on trauma call. Provider B does not have a

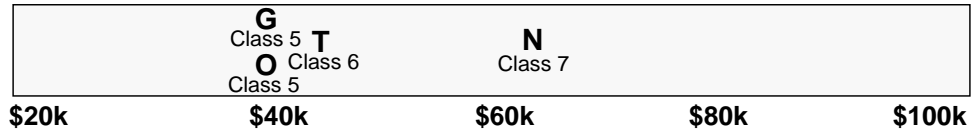
**Figure 19**

**Comparison of Base Annual Malpractice Rate Classifications and/or Premiums by Physician Type\* (as of 2003)**

**Key:** G=General Surgery O=Orthopedic Surgery T=Trauma Surgery N=Neurosurgery

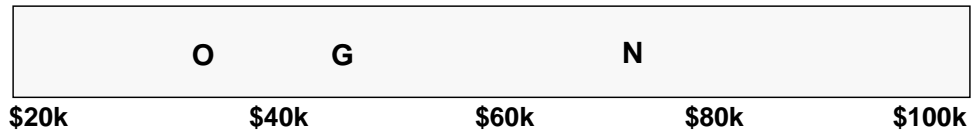
**Provider A**

*Use the highest-rated classification applying. Rate classes range from 1A to 8.*



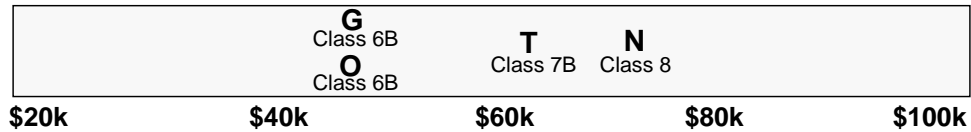
**Provider B**

*Average Virginia premiums across territories range from \$1,725 to \$73,340.*



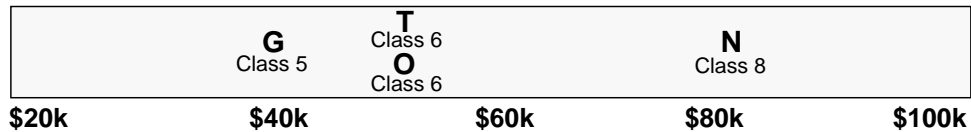
**Provider C**

*Rate classes range from 1A to 8.*



**Provider D**

*Average Virginia premiums across territories. Rate classes range from 1 to 8.*



Note: (Graphic is for illustration of rate differences among physician types within companies. Rates should not be compared across companies, because they do not take into consideration the various adjustments made by different insurance companies to base rates.)

\*\$1 million per incident/\$3 million per aggregate mature claims-made coverage.

Source: JLARC staff analysis of information provided by the Virginia Bureau of Insurance.



separate rate classification for traumatic surgery, suggesting that agreeing to be on trauma call would not affect this provider's base rates. Neurosurgeons are already in the highest rates class for all four providers, so being on trauma call should not affect their classification.

In addition to paying higher malpractice premiums, surgeons at Virginia's trauma centers asserted that the risk of litigation is higher with trauma patients. Trauma patients often arrive with a complex set of injuries, and the extent of their injuries may not be initially known. The patient's medical history is also often not available, and if the patient is unconscious, it may be difficult to learn relevant information about the patient such as drug allergies or pre-existing conditions. For these reasons, surgeons assert that they are more vulnerable to having a claim brought against them. Several surgeons also said that trauma patients as a whole tend to be more litigious than other patient types, particularly if they are economically deprived.

If lawsuits are brought against surgeons more frequently as a result of being on trauma call, one can infer that their insurance premiums would likely be affected. Unfortunately, whether this occurs cannot be substantiated for trauma surgeons. All of the providers in Figure 19 take lawsuit and claims history into account when establishing premiums. In some cases, premiums are adjusted based on claims history regardless of the outcome of the claim. However, there is not a general consensus that providing trauma care increases surgeons' vulnerability to malpractice claims and litigation. Data is not readily available to indicate whether physicians who agree to be on trauma call are more subject to litigation, since medical malpractice claims do not appear to be tracked specifically for trauma care as a specialty. Several surgeons in Virginia's trauma centers indicated that malpractice concerns are more a problem of perception than of reality. This was also echoed by a national trauma organization. However, even if the problem is based more on perception, it impacts surgeons' decisions to be available for trauma call. Consequently, there may still be a need to address their concerns.

### **Trauma Physicians Face Quality-of-Life Issues**

One of the most prominent issues affecting whether physicians decide to be available for trauma call or not is how it affects their quality of life. There are inherent quality of life issues faced by surgeons agreeing to be on call for trauma patients. As a recent Florida Department of Health report on *The Costs of Trauma Center Readiness* contends, "Trauma care is grueling work, and it can take a cumulative toll." Surgeons are typically on call for 24 hours at a time. Because trauma patients take priority over everything else, physicians must rearrange both their personal lives and their private practices whenever they are needed in the trauma service. For example, in level I trauma centers, general surgeons and trauma surgeons must be in the hospital 24 hours a day. While the requirement is not as stringent for level II and level III trauma centers, in many cases the general surgeons still must be present in the emergency department at the time of the patient's arrival, and other specialists, particularly orthopedic surgeons and neurosurgeons, must be promptly available any time of the day or night. After being called in to work for

long hours without advance notice, these physicians must then find a way to fulfill their personal and professional responsibilities.

It appears that quality-of-life concerns are becoming more relevant with the younger generation of physicians. In interviews with medical staff at Virginia's trauma centers, physicians indicated that surgeons graduating from medical school are more concerned about quality-of-life issues than were past generations. This is consistent with results of a JLARC staff survey of Virginia's trauma centers, in which nine trauma centers reported that quality-of-life issues contribute from a moderate to a large extent to the difficulties they face in securing staff to cover trauma. This is in contrast to five years ago, for which trauma centers reported that quality of life contributed to staffing issues only mildly or moderately.

This phenomenon apparently is not unique to Virginia. The *New York Times* (as quoted in *Trauma Watch*) recently reported that "medical students increasingly are trying to make medicine 'more like a 9-to-5 job' by choosing specialties that do not require weekend or on call work,"<sup>1</sup> and a recent *Journal of the American Medical Association (JAMA)* study found that "lifestyle considerations accounted for 55% of medical students' choice of specialty, while salary accounted for only 9% of the weight prospective residents gave in selecting a specialty."<sup>1</sup> New surgeons are increasingly selecting sub-specialties and conducting their work in ambulatory care centers where the hours are more predictable, there is a perceived lower risk of litigation, and reimbursements are better due to the higher number of elective surgeries performed on privately insured patients.

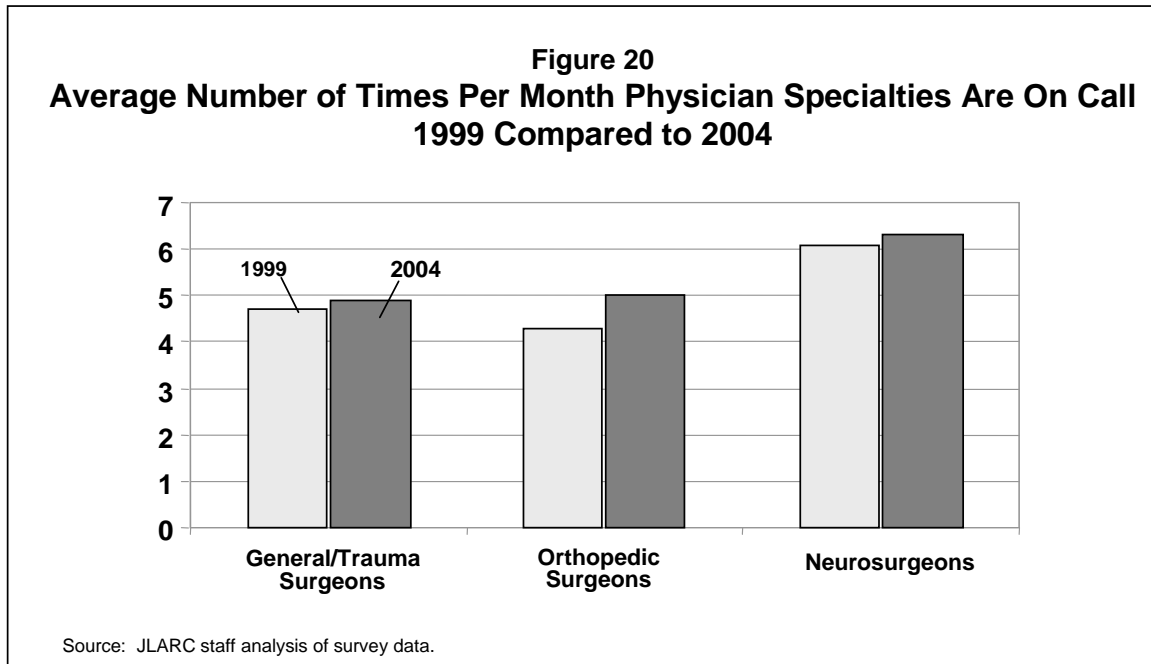
Changes in specialization and work settings not only take surgeons out of the hospital setting, it also makes them less qualified to treat trauma patients. For example, some orthopedic surgeons are choosing to specialize in hand or foot surgery. If these surgeons do not routinely deal with the broader scope of orthopedic surgery, they may not be adequately prepared to work on a trauma patient with injuries involving several body regions.

The fact that physicians do not want to be on trauma call seems to have a spiral effect. As the number of surgeons willing to be on call diminishes, the burden left on the remaining physicians is heavier, making trauma care even less attractive. As shown in Figure 20, the average number of times per month that surgeons are on trauma call has increased for every specialty, compared to approximately five years ago. On average in 2004, each surgeon who is on trauma call must be available on very short notice between 4.9 and 6.3 days out of every month, or between 15.8 percent to 20.3 percent of their time. In contrast, the average in 1999 ranged between a 13.9 percent and 19.7 percent time commitment. This means that surgeons are currently on call for almost an additional day each month.

An additional issue that may have contributed to increases in the frequency of physicians being on trauma call is a recent federal cap on resident hours worked.

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<sup>1</sup> *Trauma Watch*. January 19, 2004.



This is only an issue for trauma centers that have a residency program, which are typically level I trauma centers. As of July 2003, a new federal law requires that medical residents work no more than 80 hours per week, averaged over a month, with on-call responsibilities no more than every third night. Senior residents can fulfill some of the trauma designation requirements for physician coverage. However, with residents less available to be on call, some surgeons are reporting having to increase their on-call frequency to ensure that trauma is covered because unlike residents, surgeons are not subject to a cap on their work week.

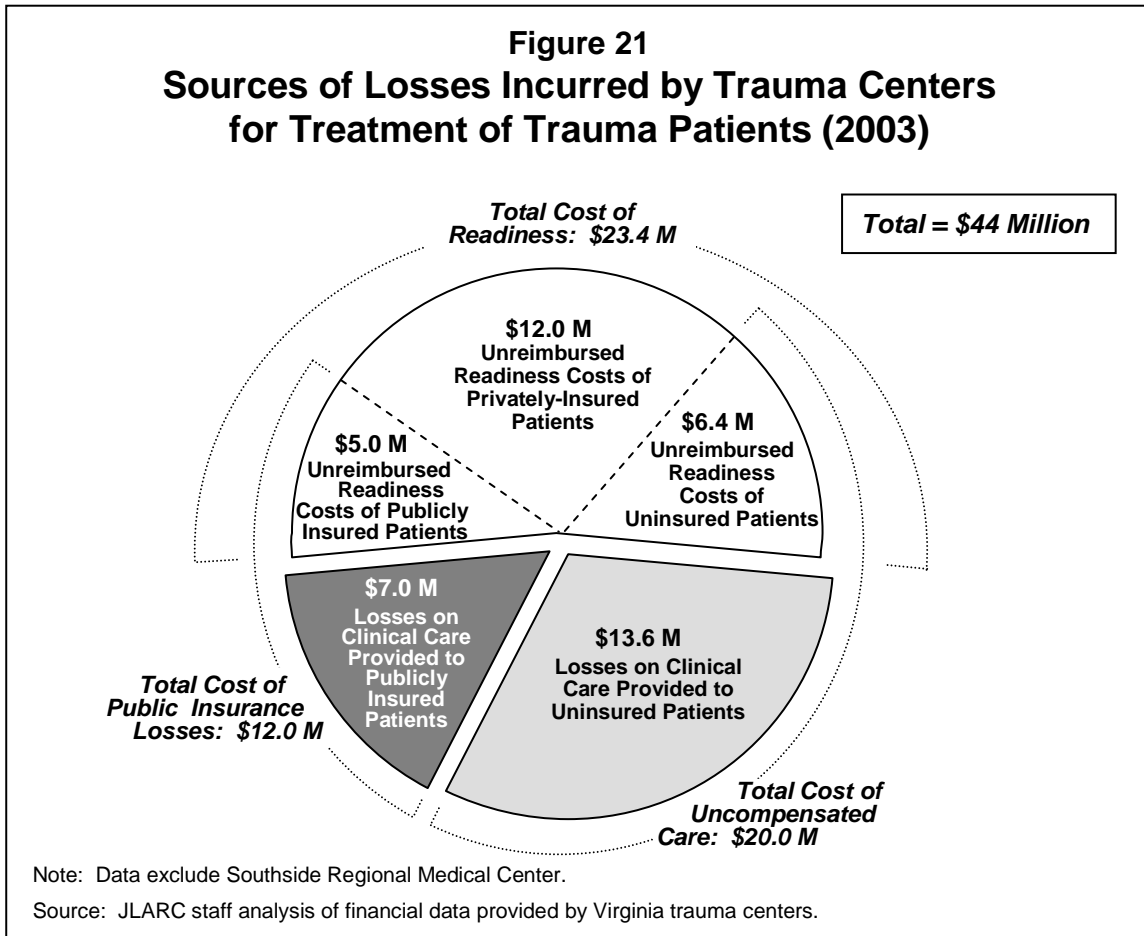
Faculty at the State's medical schools have indicated that the 80-hour work week cap could have some positive impact on trauma. More medical students may be willing to go into various surgical specialties because they see an improvement in quality of life resulting from the cap, which may increase the number of surgeons available to cover trauma in the future. However, several surgeons at trauma centers have indicated that the cap does little to lessen long-term quality of life concerns because it ceases to apply after students have completed their residency.



## IV. Financial Challenges Faced by Trauma Centers in Virginia

Trauma centers face many of the same challenges as the physicians who staff them. Trauma programs are generally unprofitable, largely as a result of treating a high proportion of patients who lack health insurance, and because insurers reimburse below the cost of clinical care. In addition, trauma centers incur large incremental costs associated with the higher level of care that they provide. Although they incur higher operating costs, trauma centers are generally not reimbursed at a higher rate than other hospitals for the trauma services they render. Moreover, physicians have turned to hospitals to supplement reimbursement rates that they feel are inadequate for treating trauma patients, thereby compounding hospitals' financial difficulties. Figure 21 illustrates the financial impact that these challenges had across Virginia trauma centers in 2003.

Trauma centers have remained committed to providing trauma services to their communities despite these financial pressures. However, hospitals are businesses that must respond to the most pressing needs of the community. Consequently, they must continuously evaluate whether operating a trauma program is



the best use of limited financial and human resources, in light of other health care priorities. Although the majority of trauma centers are public or non-profit entities, they must be profitable in order to reinvest in the facility and continuously improve the care they provide to their patients. In essence, the losses experienced in trauma programs mean foregoing improvements in other hospital departments. As financial losses continue to escalate, driven in part by physicians' mounting requests for on-call pay and the overall rise in health care costs, the opportunity costs of maintaining trauma center designation are becoming more difficult to justify and may eventually exceed its benefits.

### **INTANGIBLE BENEFITS OF OPERATING A TRAUMA CENTER**

Despite financial losses that appear to be mounting, trauma centers have maintained their designation over time, and a new trauma center even began operating in Virginia in 2003. This commitment points to the presence of non-financial benefits in the decision to maintain or seek trauma center designation.

Unlike most other business ventures, hospitals have a responsibility to save and improve lives by delivering the best care possible, sometimes unprofitably. This notion clearly applies to trauma centers that voluntarily make a commitment to providing a level of care that is believed to be generally unprofitable. All Virginia trauma centers cited their commitment to the community as the primary reason for their continued trauma center designation. In most cases, the geographic location and population density of the community pointed to the need for a facility that could treat severely injured patients locally.

Having trauma center designation also appears to be a key component of hospitals' ability to fulfill their mission, particularly for facilities with residency programs. Every level I trauma center noted that medical students should be exposed to trauma in order to receive comprehensive training. In addition, several facilities noted that being a trauma center raised the bar in the qualifications of their staff and physicians due to the high training requirements and process improvement reviews. This higher level of qualification, coupled with continuous access to equipment and services, was said to benefit all patients. A few facilities indicated that although some physicians and staff may be attracted to a trauma center because of the prestige attached to this designation, it was just as likely to be a deterrent in light of the quality-of-life and other challenges described in the previous chapter.

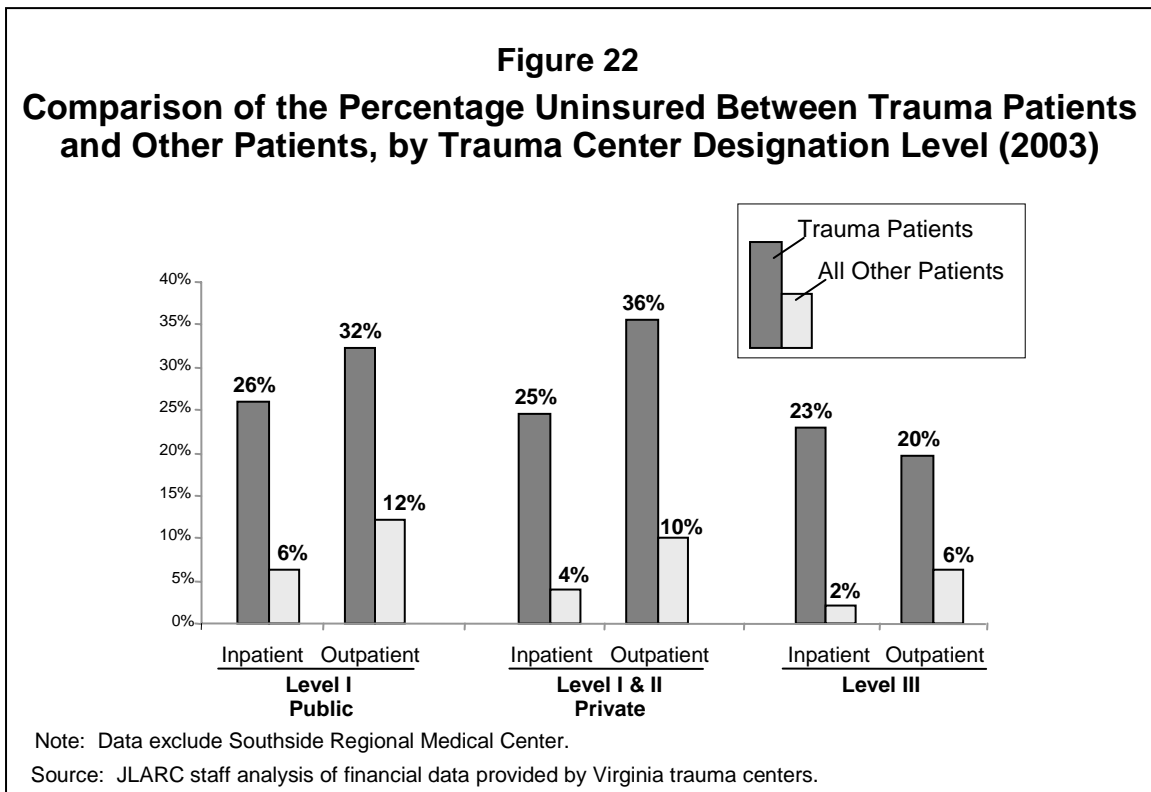
### **TRAUMA PATIENTS ARE DISPROPORTIONATELY UNINSURED**

Although the cost of caring for the uninsured is a universal problem for hospitals and health care providers, it is a bigger challenge for trauma centers because of the disproportionately large number of uninsured trauma patients that they treat, and because trauma patients face medical emergencies which must be treated regardless of insurance status, as described in Chapter III. While payment mecha-

nisms such as the Disproportionate Share Hospital (DSH), State and Local Hospitalization (SLH), and Indigent Health Care Trust Fund programs mitigate the cost of caring for the indigent, they do not cover these costs completely, leaving hospitals to make up for these losses through other means. Moreover, these funding streams do little to compensate for the bad debt losses incurred as a result of treating uninsured, albeit not indigent, patients who do not qualify for any of the three aforementioned programs.

**Trauma Patients Admitted to a Trauma Center Are Six Times as Likely to Be Uninsured as Other Patients**

As discussed in Chapter III, trauma patients are far more likely than other non-trauma patients to be uninsured. While trauma patients are three times as likely to be uninsured overall, this discrepancy is much more pronounced for patients who are admitted to the hospital compared to patients who are released from the emergency room (or “outpatients”). For hospitals, treating an uninsured patient is much more consequential if the patient is admitted for an inpatient stay, because hospital stays tend to be much more costly, on average, than outpatient visits. On average, trauma patients who are admitted to the hospital are six times as likely to be uninsured as other inpatients (Figure 22). Emergency departments in general tend to receive a large number of uninsured patients who must be seen and treated under the federal EMTALA statutes, but who do not need to be admitted to the hospital for an inpatient stay. Consequently, the discrepancy between the proportion of uninsured trauma and other patients who are released from the emergency department is not as pronounced.



## **Reimbursement for Uncompensated Care Is Marginal for Private Trauma Centers**

The financial drain created by the large amount of uncompensated care threatens access to trauma services in general for all trauma victims, not just uninsured ones. In 2003, trauma centers in Virginia lost a combined \$13.6 million on the clinical care they provided to uninsured trauma patients. Not only do trauma centers face a large proportion of uninsured trauma patients, they are obligated to treat each of them. To abide by federal EMTALA requirements, hospitals and physicians must stabilize and treat all patients who face a medical emergency regardless of their insurance status. EMTALA does not require them to provide services to an uninsured patient who needs elective surgery. Consequently, trauma centers and physicians providing trauma care have no choice but to provide uncompensated care. Given the large proportion of uninsured patients, the burden of uncompensated care that they face is greater than the experience of other hospitals and physicians.

***Public Funding Is Available to Partially Offset the Cost of Uncompensated Care.*** Three programs are currently in place to mitigate the amount of uncompensated care provided by hospitals. Funding from the Disproportionate Share Hospital (DSH), State and Local Hospitalization (SLH), and the Indigent Health Care Trust Fund programs are awarded to hospitals to offset some of the costs of care provided to uninsured indigent patients (with family incomes below 100 percent of the federal poverty line). Although these funding streams are not designed to offset the cost of treating only trauma patients who are uninsured, hospitals can utilize a portion of these funds to reduce the financial losses of their trauma program.

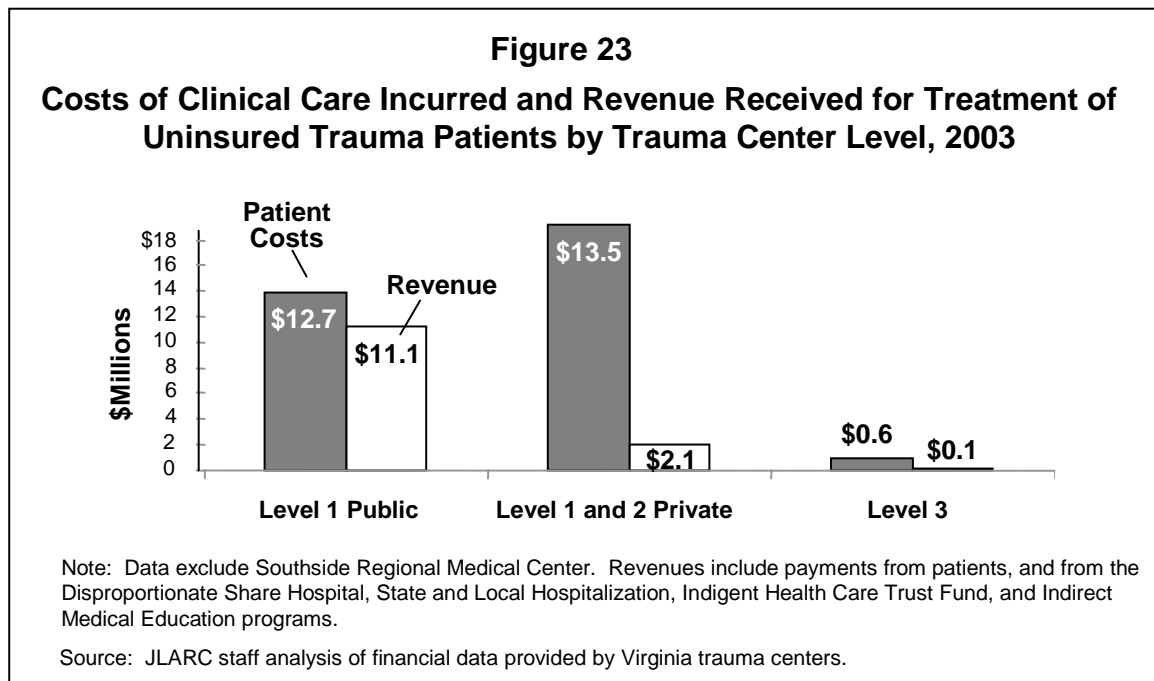
The Medicaid and Medicare programs make lump-sum payments to eligible hospitals that treat uninsured indigent patients. Medicaid funds the largest portion of Disproportionate Share Hospital (DSH) payments, although Medicare has a similar but much smaller program. DSH payments are made to compensate hospitals for the cost of caring for the indigent, from whom no payment is typically received. The magnitude of DSH payments is determined by the proportion of services provided to Medicaid patients. In Virginia, a decision was made to provide academic health centers with enhanced DSH funding. This decision recognizes the important role that these facilities play in creating a healthcare safety net for the uninsured, and the public interest in ensuring the financial viability of these centers. In addition to funding uncompensated care, Medicaid DSH payments made to Virginia's academic health centers include some compensation for the discrepancy that exists between hospital costs and Medicaid reimbursements, known as Medicaid losses.

Hospitals may also receive funding through the State and Local Hospitalization (SLH) program when indigent patients qualify for the program. SLH is a venture between the State and local governments that provides health care coverage to indigent patients who are not eligible for Medicaid. Because the program is capped, hospitals received only \$12 million in payments from the program, although claims totaling \$33 million were approved for payment in fiscal year 2003.



Finally, hospitals that provide charity care in excess of the median level of charity care costs (calculated across all hospitals in the State) receive a lump-sum payment through the Indigent Health Care Trust Fund to partially cover the cost of providing this care. Those hospitals that provide charity care below the median must contribute to the fund. The amount of funds available under the program is capped, and typically falls short of fully funding the amount of indigent care provided by hospitals every year. Staff from the Department of Medical Assistance Services (DMAS), which administers the Fund, indicated that the funds are usually exhausted by mid-year.

**Uncompensated Care Leads to Financial Losses Despite Public Funding Received.** Even after including payments such as DSH, SLH, and the Indigent Health Care Trust Fund, all trauma centers experience a loss on the treatment of uninsured trauma patients, with private trauma centers being most severely affected. In fact, private trauma centers bear more than half of the costs of clinical care provided to the uninsured, and receive only 15 percent of all revenue provided to defray the financial burden of uncompensated care (Figure 23). Moreover, State and federal assistance focuses on providing some financial relief to hospitals for their treatment of indigent patients (earning less than 100 percent of the federal poverty line, or \$18,400 for a family of four in 2003). This leaves hospitals to absorb the cost of treating uninsured patients who earn too much to be considered indigent, but frequently too little to pay high medical bills out-of-pocket. In 2003, only 23 percent of uninsured trauma center patients were indigent and could have qualified for State funds or programs. Although each hospital’s guidelines vary, hospitals consistently recognize that uninsured individuals who are not indigent will have difficulty paying medical bills, and reflect this in their self-pay programs, which offer discounts and payment arrangements to individuals with household incomes up to 300 percent of the federal poverty line (\$55,200 for a family of four in FY 2003). Despite the payment flexibility provided through these programs, uninsured patients who



are not indigent usually pay for only a fraction of the cost of care they received, and there are no public funds available to offset these costs.

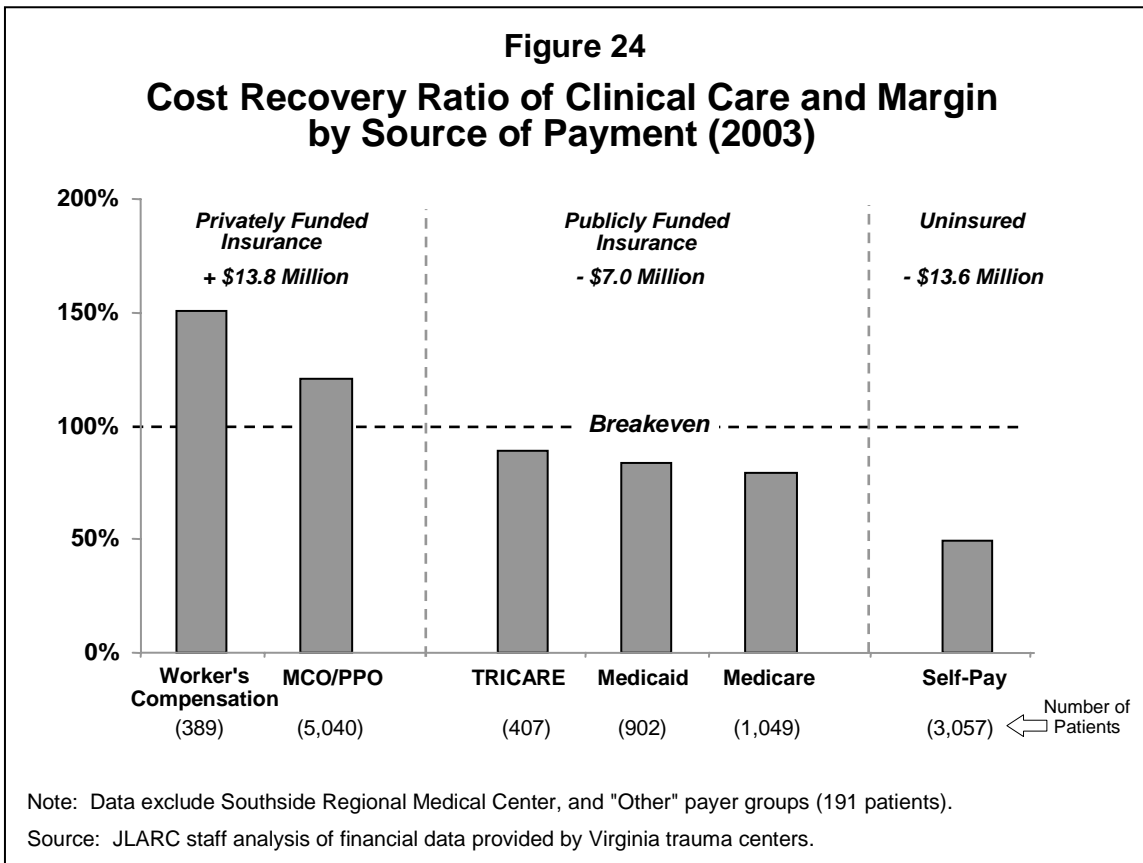
### **PUBLIC INSURERS AND UNINSURED PATIENTS CREATE AN ADVERSE FINANCIAL SITUATION FOR TRAUMA CENTERS**

In addition to the large incremental costs that trauma centers incur in order to meet designation requirements and provide a higher level of care, every hospital incurs a baseline level of direct and indirect patient costs that include the salaries and benefits of nursing staff and technicians, supplies, and utilities among many others. These costs, referred to as “costs of clinical care” throughout this report, do not appear to be covered by the payments made by public payers such as Medicaid and Medicare. As a result, trauma centers lose, on average \$3,000 for every Medicaid patient they treat, and nearly \$3,700 for every Medicare trauma patient, not including incremental costs of readiness which will be discussed in the next section of this chapter. Because private insurers tend to reimburse well in excess of costs, trauma centers are able to partially offset the losses they experience on publicly insured and uninsured trauma patients with privately insured trauma patients. However, trauma centers still experience a \$6.8 million shortfall between the costs of clinical care they provide and revenues collected. Finally, certain trauma centers can incur additional costs when treating uninsured and Medicaid patients because these patients are more difficult to discharge into post-acute care facilities. This problem occurs because Medicaid reimbursement rates to long-term care facilities are low, and uninsured patients seldom have the means to pay for extended stays in post-acute care facilities.

#### **Medicaid and Medicare Pay Trauma Centers Approximately 80 Percent of the Cost of Providing Clinical Care to Trauma Patients**

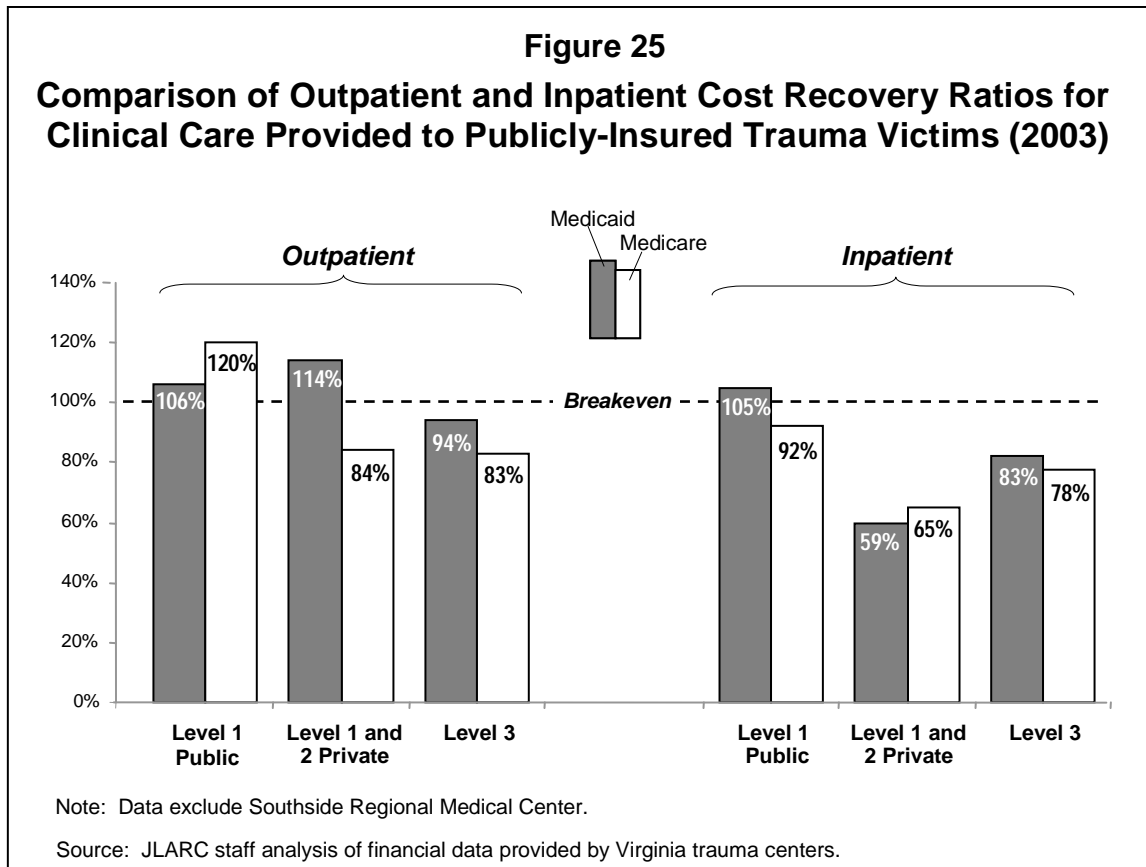
Public insurers consistently reimburse hospitals below the cost of clinical care that they provide, yielding an aggregate loss of approximately \$7.0 million for trauma centers in 2003. Figure 24 illustrates that private payers (including HMOs, PPOs, commercial, and industrial insurers) and Workers’ Compensation reimbursed trauma centers for 121 and 156 percent of their cost of clinical care, respectively. On the other hand, TRICARE (a government program insuring military families) paid trauma centers for an average of 89 percent, while Medicaid and Medicare paid 84 and 79 percent, respectively. Because of the relatively small number of trauma patients covered by TRICARE and other military health insurance programs, the rest of this section focuses only on Medicaid and Medicare.

The losses experienced by trauma centers on the treatment of Medicaid and Medicare patients do not occur across the board, but rather apply largely to those patients who were admitted for an inpatient stay (Figure 25). Although more than a third of trauma patients are discharged from the hospital the same day that they were injured (outpatients), the issue of inadequate public payer reimbursements manifests itself predominantly with inpatient services for two key reasons. First, outpatient services are reimbursed on a different basis by public payers than are



inpatient services. Reimbursement rates for outpatient services are tied to the costs incurred by the facility to treat that specific patient, while inpatient services are tied to a statewide or national average cost of treatment that does not reflect the fact that trauma centers tend to treat sicker, more complex (and therefore more costly) patients. Consequently, trauma centers are more likely to recover a greater portion of the cost of outpatient trauma services than of inpatient services. Second, the average cost of outpatient trauma services is less than ten percent of the cost of an inpatient trauma center stay. As a result, the financial implications of outpatient reimbursement adequacy are not nearly as large as they are for expensive inpatient stays.

Figure 25 also shows that inpatient reimbursement rates from both Medicaid and Medicare are substantially worse for private than for public trauma centers. While Medicaid reimbursed public trauma centers for 105 percent of their costs, level I and II private trauma centers were reimbursed for only 59 percent, and level III facilities for 83 percent of their cost of clinical care, on average in 2003. Similarly, Medicare reimbursed public trauma centers for 92 percent of their costs, compared to 65 percent to private level I and II, and 78 percent for level III trauma centers.



The Virginia Medicaid program differentiates payment methodologies between public and private hospitals, leading to the differences in reimbursement levels. For operating payments related to specific claims, Medicaid calculates reimbursement rates by applying a 28 percent (FY 2005) discount factor to private hospital costs. The adjustment factor was initially applied to prevent the Medicaid budget from increasing as a result of a change in the program's reimbursement methodology in the late 1990s. Private hospitals were initially able to absorb this decrease in reimbursement rates by reducing operating expenses and the average length of stay of their patients. However, it has become increasingly difficult to achieve productivity improvements in excess of 20 percent year after year without compromising patient care. It should be noted that in 2003, the same discount factor that has been applied to payments made to private hospitals also began to be applied to public hospitals' reimbursements. However, this decrease in operating payments was offset by an increase in other Medicaid payment to public hospitals, therefore leaving overall reimbursements to academic health centers unchanged.

In addition to the differences in methodology affecting operating payments made to private and public hospitals, Medicaid payments that support the indirect costs of medical education (IME) are also allocated to public hospitals on a different and more favorable basis. IME payments are made to hospitals that provide medical training in recognition of the higher costs they incur to operate a medical program, such as resident salaries and benefits. In addition, IME payments cover part

of the additional patient costs that hospitals with a teaching program tend to bear. These incremental costs are believed to result from treating sicker patients, and conducting unsponsored research.

The Virginia Medicaid program also uses DSH payments to make up for shortfalls in Medicaid operating payments compared to the cost incurred by academic health centers to treat Medicaid patients (also called Medicaid losses). Private hospitals, in contrast, do not receive compensation for Medicaid losses through DSH payments.

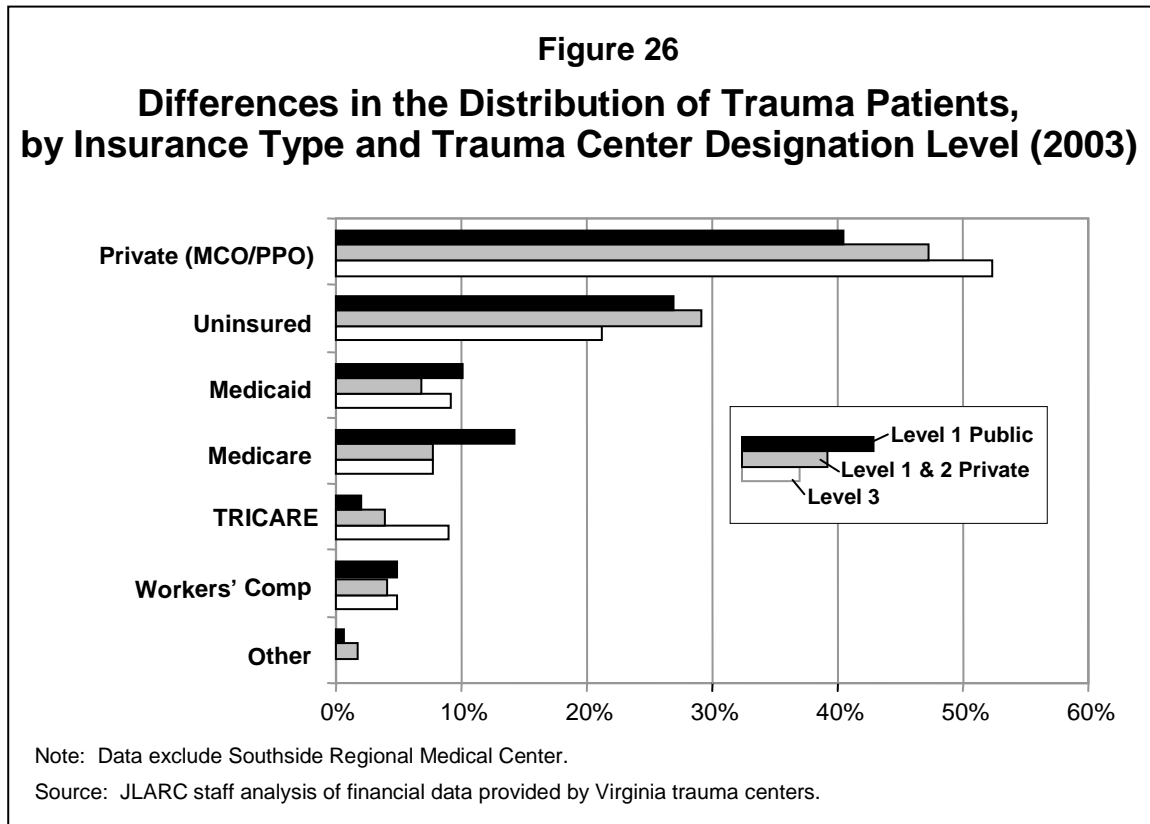
Trends in Medicare reimbursements are not as disparate between public and private trauma centers because the basis for reimbursement for both types of facilities is the same. Medicare operating payments, IME funding, and DSH payments are calculated based on the same methodology for all hospital types. Public hospitals tend to receive more funding through IME because they have more medical residents. However, the cost of training these residents offsets most, if not all, of the IME support received through Medicare.

### **The Payer Mix Can Create an Adverse Financial Situation for Certain Trauma Centers**

In the aggregate, certain trauma centers may be able to cover some, if not all, reimbursement rate shortfalls and uncompensated care because private reimbursements rates tend to exceed the cost of care. This practice, known as cross-subsidization, shifts profits from privately insured patients to make up for other losses. However, for certain trauma centers which treat a large proportion of uninsured or publicly insured patients and do not receive enhanced funding from the Medicaid program, there are not enough privately insured patients to completely offset other shortfalls. Facing a financially adverse mix of payers creates a challenge for the financial health of the entire hospital, and may have an effect on the hospital's ability or willingness to continue providing specialized trauma services.

Payer mix varies substantially across designation levels, as illustrated in Figure 26. Those facilities with a large proportion of self-pay, Medicaid, Medicare, or TRICARE trauma patients will face more adverse financial conditions than trauma centers with a high proportion of privately-insured patients. Level I public trauma centers tend to treat fewer privately insured patients than private trauma centers at all levels of designation, and care for a larger share of Medicaid and Medicare patients. The proportion of self-pay patients is highest in level I and II private trauma centers, and level III trauma centers have the highest share of privately insured trauma patients.

Even within designation levels, the proportion of trauma patients covered by private insurance varies widely from one trauma center to the next, limiting some facilities' ability to cost-shift. The percentage of privately insured trauma patients ranges from as little as 32 percent to as high as 62 percent across level I and II trauma centers, and from 43 to 56 percent in level III facilities. The adverse impact of this trend in payer mix is compounded because those facilities with a lower pro-



portion of privately insured trauma patients do not have a higher proportion of patients insured by other payers, but rather have a higher uninsured population.

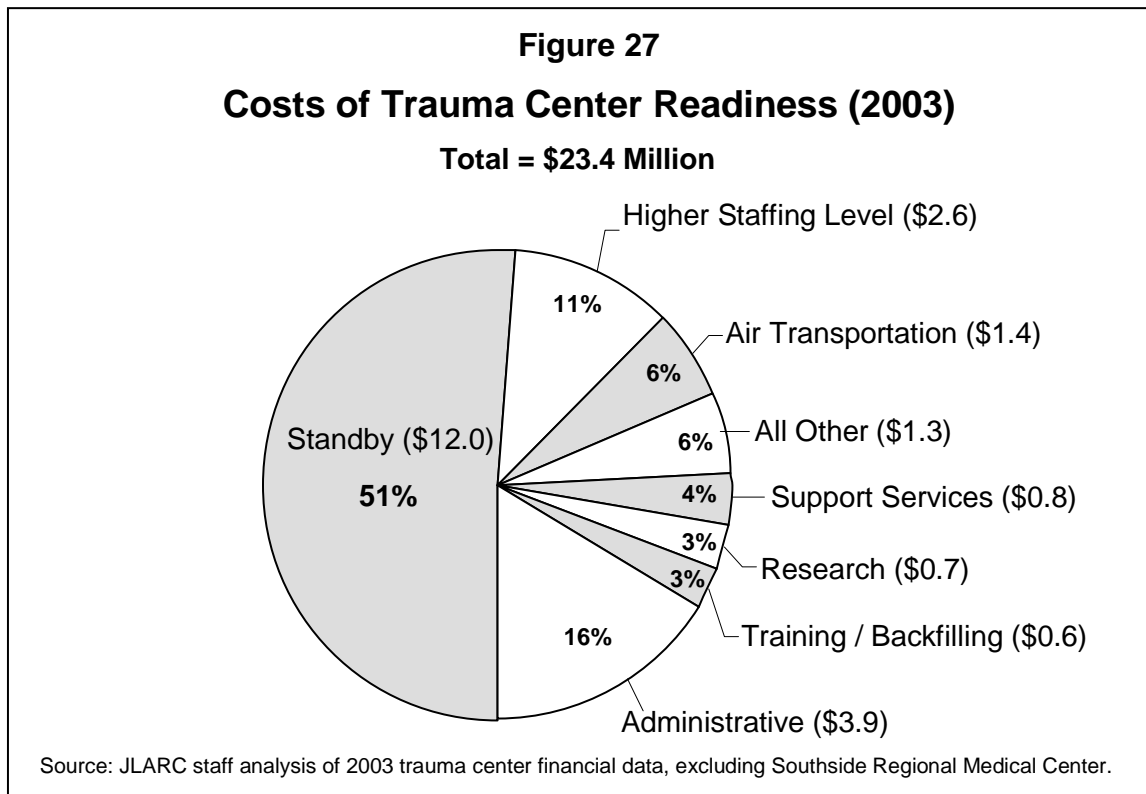
### **Publicly Insured and Uninsured Trauma Patients May Be Difficult to Discharge into Long-Term Care Facilities**

All trauma centers appear to experience difficulties discharging trauma patients into post-acute care settings such as rehabilitation facilities or nursing homes, often keeping patients for several “avoidable” days after they are medically ready to leave. These avoidable days can be costly to trauma centers, especially if the patients are uninsured, or on Medicaid. In addition, “avoidable” days are highly inefficient from a health care delivery perspective because hospitals are a much higher-cost setting than post-acute care facilities. Delays in trauma patient discharges tend to occur most frequently when patients are uninsured or on Medicaid, because these patients are unlikely to pay market rates for services they receive in post-acute care facilities. In addition, few facilities have the ability to care for patients who are ventilator-dependent or have sustained traumatic brain injury. Finally, many facilities do not accept trauma patients who have substance abuse problems, as they can be disruptive to the rest of the patients in a facility.

## TRAUMA CENTERS BEAR UNREIMBURSED COSTS OF READINESS

Trauma centers spent more than \$23 million in order to provide the higher level of care required to maintain trauma center designation in 2003. If hospitals decided to discontinue their designation as trauma centers, these costs would not be incurred because they include items that community hospitals do not have to provide, and are therefore incremental to the costs of clinical care. These incremental costs can be thought of as “readiness” costs. Trauma centers incur readiness costs because they must be ready to treat trauma patients 24 hours a day, have a host of specialists available to care for patients in any condition, employ a larger clinical staff, and maintain an administrative infrastructure designed to ensure that the highest level of care is consistently provided (Figure 27).

The cost of readiness is not, for the most part, included in the reimbursement rates provided by health insurers. This disconnect occurs because insurers reimburse health care providers for treating patients, rather than for being ready to treat them. In addition, many insurers set rates based on the expected cost of treating a patient in an average hospital, rather than on the actual cost of the resources deployed to treat the patient. Finally, the costs of readiness for a given designation level do not seem to vary substantially based on the volume of trauma patients, at least in the short-term.



### **Higher Level of Care Provided in Trauma Centers Translates into Higher Costs**

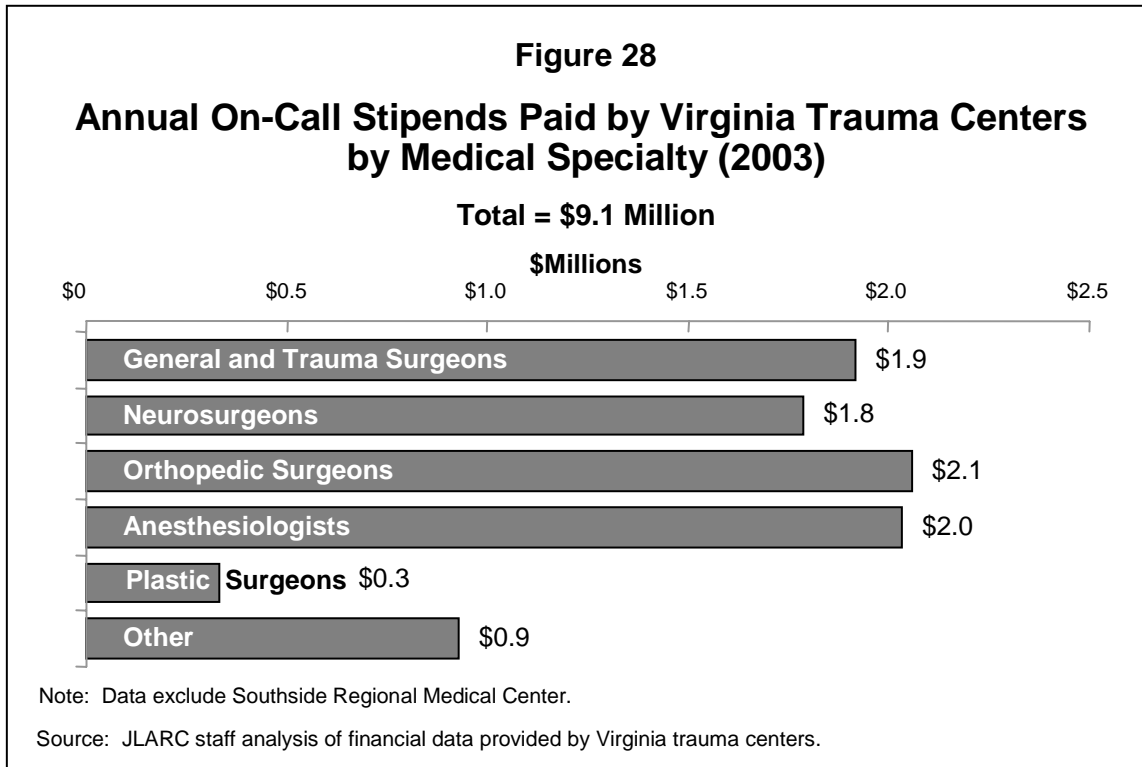
It is impossible to predict when traumatic injuries will occur and what resources will be required to handle the specific nature and severity of a particular injury, but it has been well established that the most successful way to treat severe injuries is to do so as promptly as possible. As a result, trauma centers must have around-the-clock access to a full array of physicians, staff, operating suites, and equipment to deal with all types of traumas at any given time. Meeting the staff and facility availability requirements to be a designated trauma center is very costly, particularly because the requirements involve highly trained professionals and state-of-the-art facilities. Such costs are high despite efforts by the hospitals to fully utilize standby resources: rather than being in-house, on-call arrangements are set up for physicians and clinical staff; in-house personnel are responsible for administrative and organizational tasks while on standby; and operating rooms may be used by level II or III trauma centers for simple and quick procedures that would not delay a trauma patient's access to the operating room.

Although the standby arrangement employed by trauma centers may seem inefficient on the surface, it is analogous to the way that most emergency services, such as fire departments or emergency medical services (EMS) units, have been intentionally established. In order to be ready to respond to reports of fire or medical emergencies, fire departments and EMS units must be continuously staffed and equipped, even though staff may spend only a portion of their time responding to such emergencies. For these two public services, the cost of readiness is considered to be more than offset by the resulting benefits to public safety and health, and taxpayers often bear this expense in recognition of the benefits they will receive in case of an emergency.

***Standby Resources Ensure Consistent Availability of Trauma Services.*** Securing the availability of physicians and fully-staffed operating rooms comprised more than half of the readiness costs that trauma centers incurred in 2003 (Figure 27). Physicians have turned to hospitals to supplement inadequate reimbursements through on-call stipends, which has resulted in the transfer of a portion of the physicians' financial challenges to trauma centers. In the aggregate, trauma centers compensated physicians more than \$9 million to be in-house or readily available in 2003 (Figure 28). Most of the cost was for the services of general, trauma, neuro-, and orthopedic surgeons, as well as anesthesiologists.

As discussed in Chapter III, specialists believe that the demands of providing trauma care are not adequately compensated by health insurers, and these specialists have consequently turned to hospitals for additional pay. Because these specialists are necessary for the hospital to maintain trauma center designation, many trauma centers have agreed to provide stipends to physicians who are on trauma call. This trend has accelerated in recent years. Several trauma centers only recently began paying certain surgeons on-call stipends, while others have had to increase on-call pay amounts, and many have broadened the number of specialties included in the arrangement. Some facilities remain able to secure physician avail-





ability without resorting to paying for on-call duty. Some of these hospitals have said that they would discontinue their trauma center designation rather than begin this practice because of its financial implications.

A second component of standby costs relates to the requirement for having fully staffed operating rooms (OR) around the clock. Because severely injured trauma patients may require surgery on short notice, an operating room must remain available and ready for the next trauma surgery in all level I trauma centers and some level II facilities. Beyond the opportunity cost that results from not being able to use the room to perform other, often more lucrative procedures, trauma centers spent a total of \$3 million keeping operating rooms staffed and supplied. While OR staff can perform many tasks while on standby, they remain unable to participate in revenue-generating procedures for the hospital.

***Many Resources Are Involved in Providing a Higher Level of Care.*** Standby capability is only one of many elements that allows trauma centers to deliver a higher level of care than other hospitals. To meet designation requirements, trauma centers must also staff at higher levels than community hospitals, establish an administrative infrastructure that supports the trauma program, ensure that their staff and physicians receive extensive training, perform quality assurance reviews to continuously improve upon patient outcomes, and conduct research and community outreach to assist in preventing the incidence of trauma. The sum of these requirements amounts to half of the readiness costs incurred by Virginia trauma centers, totaling an estimated \$11.4 million in 2003.

Because of the severity and complexity of the injuries that they treat, trauma centers must staff at higher levels than other hospitals. In addition to physician requirements, nursing staffing ratios are more stringent in intensive care units, where major trauma patients spend an average of 6.8 days in the initial part of their hospital stay. Additional staff are required to ensure continuous access to laboratory and diagnostic services. Altogether, the additional staffing requirements that must be met to maintain trauma center designation cost an estimated \$2.6 million in 2003, or 11 percent of total readiness costs across facilities.

Administrative activities that support trauma programs also create additional costs. The administration of trauma programs is conducted by a medical director, a program coordinator who is often a nurse, and a trauma registrar who gathers and analyzes trauma patient data. For those trauma centers that serve a large number of patients, several coordinators and data registrars are often needed. In addition to the salaries and benefits of these individuals, trauma centers must also purchase and maintain registry software to comply with State requirements. The administrative component of the trauma program ensures that all aspects of trauma center designation are consistently met, from staffing to triennial verification by the State. In 2003, this infrastructure is estimated to have cost \$3.9 million across all designated facilities.

To ensure that physicians and clinical staff build and maintain the competencies necessary to deal with extensive trauma, they must meet stringent training requirements. Trauma centers pay for their employees to attend classes and conferences, as well as to backfill staff while they attend training. Moreover, some facilities have chosen to pay for classes that private physicians must attend. Altogether, providing training and backfilling personnel is estimated to have cost trauma centers approximately \$0.6 million in 2003.

Trauma centers are also very involved in injury prevention efforts through research, education programs and community outreach initiatives, as described in Chapter I. While trauma program coordinators are typically in charge of these efforts, physicians and other clinical staff also participate. When combined with supplies, marketing, and travel expenditures, these initiatives cost an estimated \$0.7 million in 2003.

Finally, readiness costs include quality assurance initiatives and verification preparation efforts. When dealing with the severity of cases treated in trauma centers, it is extremely important to constantly assess what could have been done better and to utilize this knowledge in the treatment of future patients. This process, known as quality assurance, is a critical element of trauma center designation requirements. Panels comprised of trauma program administrators, physicians, staff, and EMS providers, review the deaths of all trauma patients treated in their facility. This formalized process allows trauma centers to constantly improve the quality of care that they provide, but it also requires a large time commitment from all participants.

Another demand placed upon clinical staff and physicians stems from the triennial designation verification process conducted by the State. This process en-

sure that trauma centers remain in compliance with designation requirements, as evidenced by a review of sample cases treated in the preceding three years. Much preparation goes into ensuring that visits are efficient, and that State review panels are supplied with all the necessary documentation. Several facilities use consultants to facilitate preparation efforts. In 2003, trauma centers spent a total of \$0.1 million preparing for their verification visit.

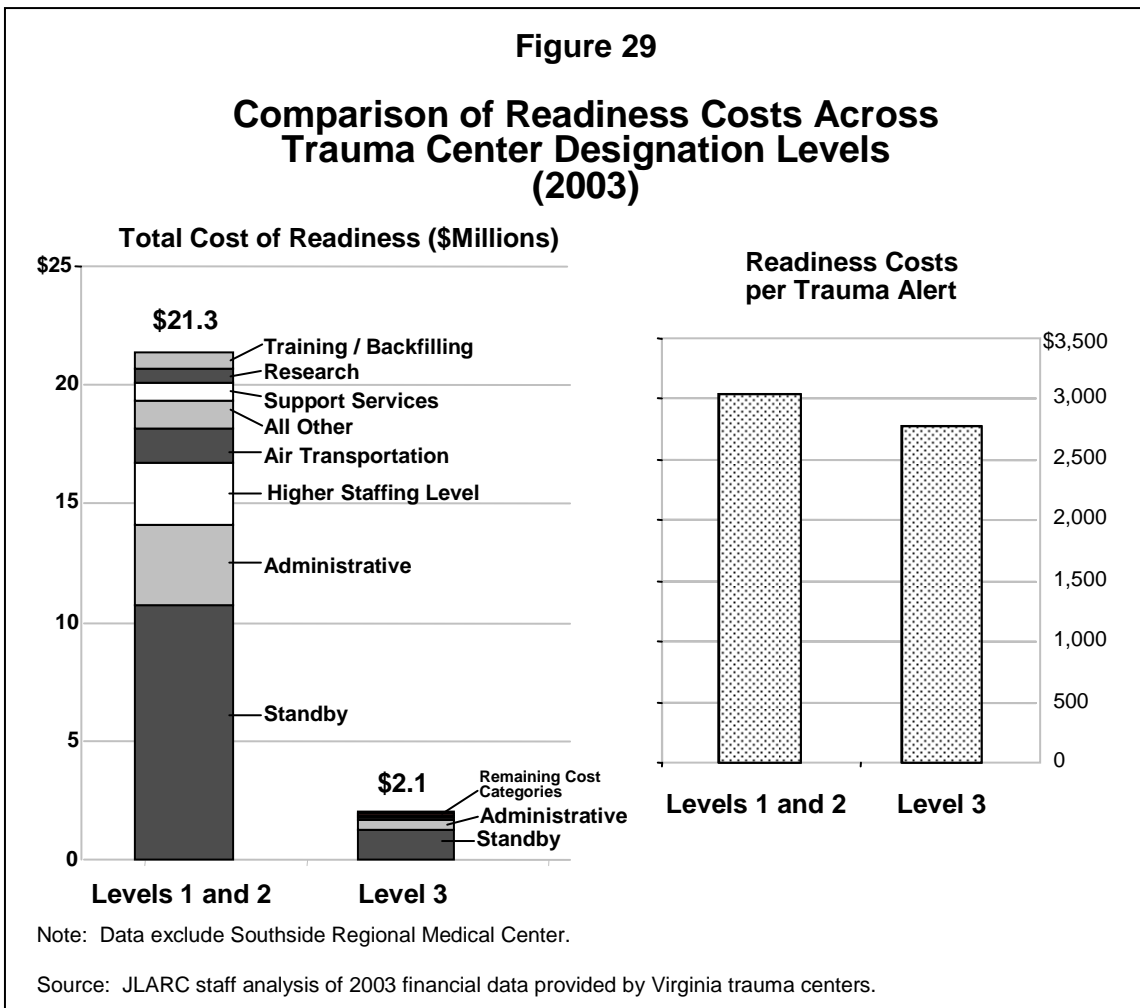
Although not required for designation, several trauma centers have offered certain services that improve the care received by trauma patients, and the support provided to their families in light of the devastating circumstances that bring them to a trauma center. All level I trauma centers have their own air transportation program to secure the availability of rapid transportation for their severely injured patients. Moreover, most employ additional social workers and chaplains to assist families in dealing with the emotional and financial consequences of major trauma. In the aggregate, providing these enhanced services are estimated to have cost \$0.8 million in 2003.

### **The Cost of Readiness Varies by Trauma Center Designation Level and Ownership Type**

The cost of readiness is highest for level I and II private trauma centers, followed by public level I centers, and finally level III facilities. Because the designation requirements for trauma centers are much more stringent in levels I and II than in level III facilities, it is not surprising that their cost of readiness is considerably higher (Figure 29).

Unlike their level I and II counterparts, level III trauma centers do not require specialists or intensivists (physicians on duty in the ICU) to be on call or in-house 24 hours a day (with the exception of a general surgeon), nor must they keep a fully staffed operating room available at all times, which minimizes their standby costs. They are also not required to have a trauma program medical director or a program coordinator and are not compelled to conduct outreach programs, which limits their administrative expenditures. Although their readiness costs are substantially lower in total, level III trauma centers also treat a much lower volume of trauma patients than their level I or II counterparts. Consequently, the cost of readiness per trauma alert in level III trauma centers is not considerably lower than in level I and II facilities (\$2,800 compared to \$3,000).

The main differences in readiness cost between public and private trauma centers are in the areas of on-call coverage and staffing levels (Figure 30). Academic health centers can utilize their large number of residents to meet many in-house and on-call availability requirements at minimal additional expense. Moreover, attending physicians employed by each academic health center are compensated for being on call through a somewhat higher salary, which is generally less costly to the hospital than paying them through daily on-call stipends. Because academic health centers tend to treat a large volume of patients, the additional staffing required for



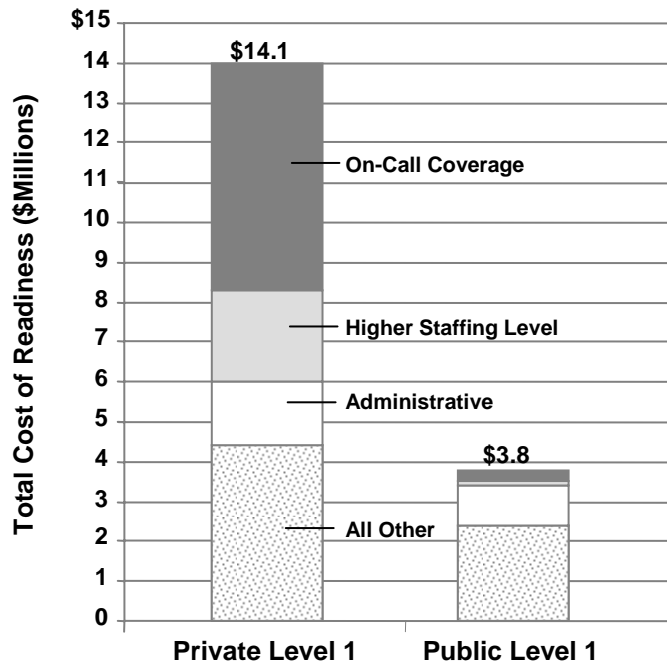
trauma center designation would likely be necessary to run other hospital operations, and can therefore not be entirely considered an incremental cost of trauma center designation.

**Current Reimbursement Structures Do Not Incorporate the Cost of Readiness**

The cost of trauma center readiness is seldom reflected in health insurance reimbursement rates, and must therefore be absorbed by the hospital. When readiness costs are added to the costs of direct care for patients, the shortfalls between health insurance reimbursements and revenues are even more dramatic, as illustrated in Figure 31. In fact, trauma centers generate a profit only on the care they provide to trauma patients insured through the Workers’ Compensation program. Overall, trauma centers lost a total of \$29.7 million on the treatment of trauma patients, with the inclusion of readiness costs.

Increasingly, health insurers have been compensating hospitals based on the average cost of treating an average patient based on their diagnosis, or on how

**Figure 30**  
**Comparison of Readiness Costs Between Private and Public Level 1 Centers (2003)**

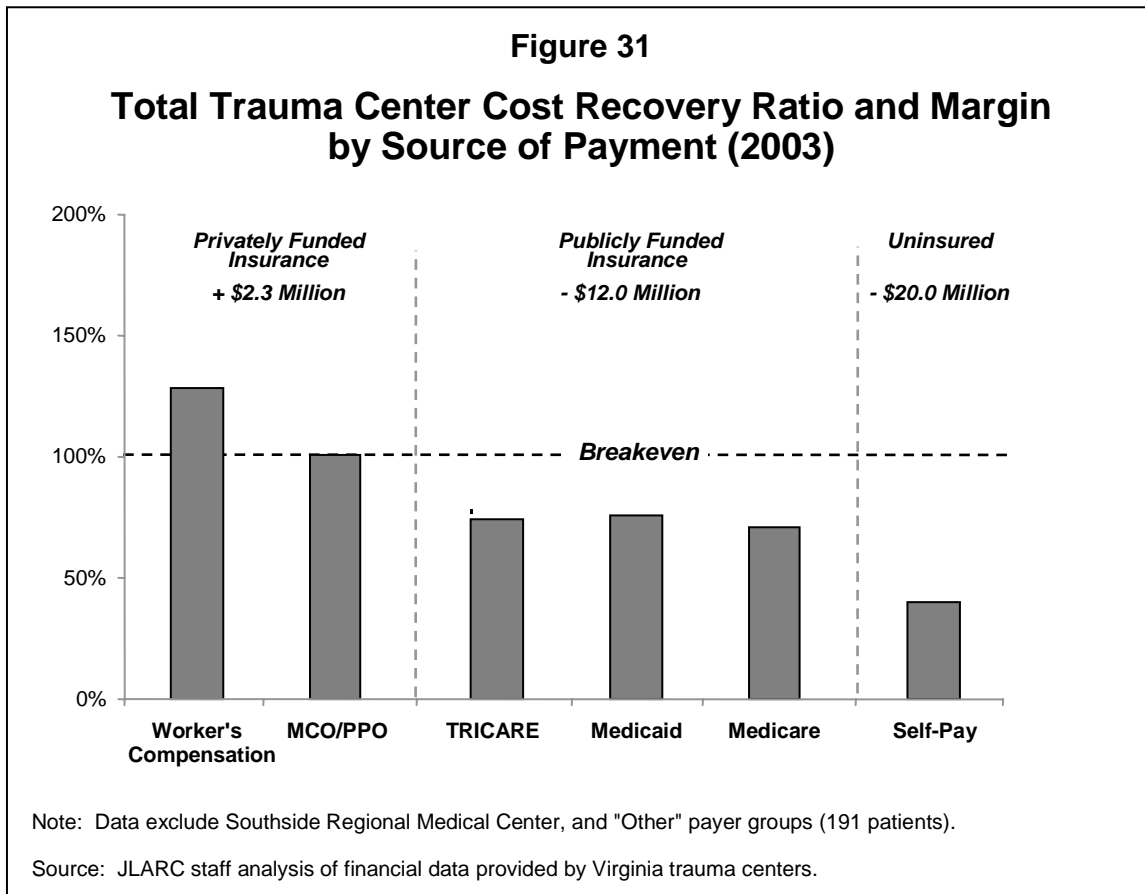


Note: Data excludes Southside Regional Medical Center.

Source: JLARC staff analysis of 2003 financial data provided by Virginia trauma centers.

much it costs per day to treat an average patient, rather than based on the resources deployed to treat a specific patient. Average costs are calculated across the State or the nation (depending on the insurer) and are based on the cost of treatment provided in any hospital, rather than the cost structure of the facility where treatment is provided. To the extent that a diagnosis or length of stay fails to capture the severity of a patient's injury, this reimbursement method will create inequities. Given that trauma centers incur higher operating costs than other hospitals and that they treat the most seriously injured rather than the average patient, trauma centers consistently spend more than the average to treat trauma patients, but are reimbursed at the same level as other hospitals.

Moreover, existing reimbursement structures are patient-driven, while readiness costs are largely fixed and do not vary with patient volume. The same number of specialty physicians and equipment, and the same quality processes must be available in a trauma center all day, every day, because the number of trauma patients requiring services is not predictable. In addition, many trauma centers, particularly levels I and II, keep a fully staffed trauma unit on standby for the next trauma patient to ensure that patients are treated immediately upon arrival to the hospital.



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## **V. Options to Promote the Availability of Trauma Services in Virginia**

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The experience of trauma centers nationally and in Virginia suggests that trauma centers may be nearing a crisis situation. If physicians are unwilling to provide care for trauma patients and if financial losses continue to accrue to trauma centers, the availability of trauma services in some regions of the State could be lost, and the health of patients could be adversely affected. Tens of thousands of Virginians benefit from the care provided by trauma centers every year, and nearly everyone stands to benefit from the availability of trauma centers at some point in their life. It now appears possible for trauma centers to pursue reimbursements from insurers that more fully reflect costs. However, because trauma centers provide an important public service, it may also be appropriate for the State to play a more active role in supporting Virginia's trauma system.

Trauma centers could help ensure their own continued viability by charging a trauma team activation fee and renegotiating contracts with private insurers to differentiate reimbursement rates for the care of trauma patients. Several of Virginia's trauma centers have successfully taken these steps to help recover their readiness costs. Because these trauma centers have established a precedent, it may be difficult for private insurers to deny such reimbursements for other trauma centers.

The State could also consider action to promote the availability of trauma services rather than waiting for a crisis, such as those experienced in other states, to occur. In fact, the General Assembly has already recognized the importance of providing support to the trauma system in Virginia. During the 2004 Session, the Virginia General Assembly passed House Bill 1143, which established a State Trauma Center Fund and, for the first time, provided funding to support Virginia's trauma system (Appendix H). The Fund will receive revenue from a \$50 fine that will be imposed on any individuals who are convicted of two or more DUI-related offenses within 10 years. The new fine is expected to raise \$200,000 annually.

The trauma center community appears to be appreciative of the State's efforts to establish the Trauma Center Fund. However, findings from this study show that an annual amount of \$200,000 will do little to effectively address the needs of trauma centers throughout the State. In addition, no funding is currently provided through the Fund to address the concerns raised by physicians who provide trauma care.

The State could provide additional funding beyond an annual amount of \$200,000 to better meet the challenges faced by physicians and trauma centers, which would help promote continued access to trauma services in Virginia. In particular, additional funding could mitigate the impact of treating uninsured patients, improve Medicaid reimbursement rates, and help offset the costs of trauma center readiness. If the General Assembly wishes to provide increased support for trauma, there are a variety of options available. Several states have raised revenue through fees and fines to support their trauma systems, while a few have appropriated gen-

eral funds (Appendix I). In addition, funding could be supplemented by the federal government for options that involve the Medicaid program.

### **THE STATE COULD HELP ADDRESS THE CHALLENGES FACED BY PHYSICIANS PROVIDING TRAUMA CARE AT TRAUMA CENTERS**

There are several ways in which the General Assembly could mitigate the various challenges that contribute to physicians' unwillingness to treat trauma patients. Physicians at Virginia's trauma centers indicated that the three primary causes contributing to trauma coverage issues are inadequate reimbursements, rising medical malpractice insurance costs, and personal concerns about quality-of-life. Of these three, the State could most effectively and directly address the issue of inadequate reimbursements. To improve physician reimbursements, the State could provide funding to support the uncompensated care provided by physicians, and help reduce the medical school debt burden faced by many physicians. Reimbursing physicians for uncompensated care would most directly address the concerns physicians have over inadequate reimbursements, while debt relief may help attract new physicians to trauma.

Improving physician reimbursements would alleviate some of the quality of life concerns and malpractice concerns voiced by physicians who treat trauma patients. The best way to improve trauma physicians' quality-of-life is to attract more physicians to treat trauma patients. If more physicians were providing trauma care, the burden on any one physician would be lessened. To the extent that improving reimbursements would have the effect of increasing the number of physicians willing to be on trauma call, better reimbursements could indirectly lessen the negative quality-of-life issues caused by trauma that affect physicians.

Increasing reimbursements would also allow physicians to better meet their overhead costs, in particular medical malpractice insurance costs. It is not clear whether or to what extent physicians' medical malpractice liability burden is affected by their decision to treat trauma patients. Therefore, rather than dealing with the issue of malpractice in a piece-meal fashion for one specialty area, it may be more advisable to address the issue of malpractice on a more general level. The General Assembly sought to take this approach during the 2004 session by passing SB601. SB601 provides that beginning on July 1, 2006, any physician licensed by the Virginia Board of Medicine may purchase medical malpractice insurance through a risk management plan administered by the State. SB601 established a joint subcommittee to review: (1) the availability and affordability of medical malpractice liability insurance in Virginia, (2) the practices of malpractice insurance carriers related to premiums, (3) the impact of a new State-run risk management program, and (4) malpractice insurance programs in other states. Including the concerns of physicians who treat trauma patients in the SB601 effort will likely lead to a more comprehensive solution to the malpractice concerns faced by these physicians.



### **Reimbursing Physicians for Providing Uncompensated Care Would Most Effectively Address a Core Trauma Physician Concern**

Addressing the comparatively high level of uncompensated care that physicians provide to trauma patients would be one of the most effective ways that the State could address inadequate reimbursement, which is a root cause of physicians' unwillingness to be on trauma call. The State could provide funding to trauma physicians for the provision of uncompensated care either through an uncompensated care fund, by providing a tax credit for the cost of uncompensated care, or by increasing Medicaid physician rates. These three approaches are summarized in Exhibit 3.

The total cost of providing financial support to trauma physicians who deliver uncompensated care depends on the medical specialties included, the amount of uncompensated care provided, and how that care is valued. Based on feedback from trauma centers regarding the specialists most difficult to secure for trauma on-call coverage, the State may wish to focus on trauma, general, neuro-, and orthopedic surgeons. The experience of other states suggests that the average amount of uncompensated care provided per physician in Virginia is approximately \$25,000, estimated as 100 percent of Medicare eligible costs. Using these assumptions, Virginia's 244 trauma, general, neuro-, and orthopedic surgeons at trauma centers provide approximately \$6 million of care to uninsured trauma patients every year. (Approximately \$2 million of this total represents surgeons employed by hospitals, and therefore, any State assistance would go directly to the hospital.) The uncompensated care amounts per physician reported by other states (on which the \$6 million estimate is based) ranges widely. Therefore, the total amount of uncompensated care in Virginia could range from \$1.5 million to \$10 million annually.

There is general agreement within the trauma community that only those physicians agreeing to be on trauma call at designated trauma centers should be eligible for any uncompensated care reimbursement. In addition, only uncompensated care provided to trauma patients (as defined by their primary diagnosis) should be included in any State program. While any of 15 different specialties can be involved in the care of trauma patients, trauma surgeons, general surgeons, orthopedic surgeons and neurosurgeons are the surgical specialists who are most frequently involved in treating trauma patients. Trauma centers report that either trauma or general surgeons are involved with nearly all trauma patients, while orthopedic surgeons and neurosurgeons are involved in an average of 55 percent and 22 percent of trauma cases, respectively. Moreover, these are the specialties that are most difficult to retain for on-call coverage. Several of Virginia's trauma centers also mentioned that securing plastic surgeons and anesthesiologists to cover trauma is emerging as an issue, although it does not appear that the availability of these specialties is currently threatening Virginia's trauma system. These specialties are therefore not included in the options listed in Exhibit 3. If physician coverage of these two specialties becomes an issue, the State could consider expanding an uncompensated care program to include them at a later date.

<b>Exhibit 3</b>		
<b>Supporting Uncompensated Care Provided by Trauma Physicians</b>		
<b>Advantages</b>	<b>Disadvantages</b>	<b>Estimated Impact</b>
<b>Uncompensated Care Fund</b>		
<ul style="list-style-type: none"> <li>• Direct relationship between uncompensated care provided and benefit</li> <li>• Precedent in other states</li> <li>• Limited financial exposure</li> </ul>	<ul style="list-style-type: none"> <li>• 100 percent State funded</li> <li>• New administrative infrastructure needed</li> <li>• Size of fund does not vary with need</li> </ul>	High impact because there is a direct and visible link between uncompensated care provided and reimbursement.
<b>Tax Credit for Provision of Uncompensated Care</b>		
<ul style="list-style-type: none"> <li>• Direct relationship between magnitude of uncompensated care provided and benefit</li> <li>• Existing administrative infrastructure</li> <li>• Outside of appropriations process</li> </ul>	<ul style="list-style-type: none"> <li>• More difficult to monitor and enforce</li> <li>• Difficult to certify the value of uncompensated care provided</li> <li>• 100 percent State funded</li> <li>• Further complicates tax code</li> <li>• No limit on financial exposure</li> <li>• No precedent in other states</li> </ul>	Moderate to high impact because it would be fairly transparent. However, there would be a direct link between uncompensated care provided and reimbursement.
<b>Increased Medicaid Rates</b>		
<ul style="list-style-type: none"> <li>• 50 percent federal match</li> <li>• Existing administrative infrastructure</li> <li>• No allocation mechanism needed</li> </ul>	<ul style="list-style-type: none"> <li>• Volume of Medicaid patients is only a proxy for volume of uninsured patients</li> <li>• No limit on financial exposure</li> <li>• Manual process</li> <li>• No precedent in other states</li> </ul>	Moderate impact because reimbursement would be rolled into Medicaid rates and therefore somewhat transparent. Also may not be perfect match between amount of uncompensated care provided and increase in Medicaid reimbursements for each doctor.
<b>Estimated Annual Cost: \$6.0 million*</b>		
<p>*Note: Annual costs could range from \$1.5 million to \$10 million annually.                      Source: JLARC staff analysis of uncompensated care programs in other states.</p>		

Data are not available on the amount of uncompensated care that is provided to trauma patients by physicians in Virginia. Because every physician conducts their own billing, physician financial data is extremely fragmented and scarcely available. However, certain organizations focused on trauma care, and states that have recently implemented funding mechanisms for uncompensated care have been able to derive some estimates. These estimates were used as a proxy for Virginia experience.

The National Foundation for Trauma Care has reviewed uncompensated care issues for both physicians and hospitals in several other states. Applying the Foundation's experience to Virginia's patient and physician population, the average annual amount of uncompensated care provided by each trauma physician is estimated to be approximately \$43,000, based on 100 percent of Medicare eligible costs. Mississippi established a trust fund in 1999 to reimburse physicians and hospitals for uncompensated care provided to trauma patients. In 2002, the average physician reimbursement from the trust fund was \$6,235, based on 100 percent of Medicare eligible costs. In 2003, Maryland also established a fund to reimburse trauma physicians for uncompensated care. Based on the first nine months of the fund's existence, reimbursements for uncompensated care averaged \$27,770 per physician, based on 100 percent of Medicare eligible costs. Because these three estimates are so divergent, an average among the three of approximately \$25,000 is used for purposes of the options described in Exhibit 3.

***The State Could Create a Fund to Support Physicians for Providing Uncompensated Care to Trauma Patients.*** The most direct and visible way the State could support physicians for uncompensated care is through a designated fund. The primary benefit of such a fund is that there is a direct relationship between the amount of uncompensated care provided and the size of the benefit received by physicians. The State could also limit its financial exposure by capping the fund at a desired level. The primary disadvantage of this approach is that the State would have to devise an administrative structure for the fund, and it would be 100 percent Virginia funded.

Both Mississippi and Maryland have established designated funds to improve reimbursements to physicians treating trauma patients. A Virginia fund could use either of these two states' frameworks. Among other items, Mississippi's Trauma Care Trust Fund allows for reimbursement for uncompensated trauma care provided by trauma surgeons, general surgeons, orthopedic surgeons, neurosurgeons, and anesthesiologists. In 2003, \$2.3 million was allocated from the Fund for uncompensated physician care.

Maryland recently established the Trauma Physician Services Fund during the 2003 legislative session. The fund has several uses, including reimbursement to trauma physicians for uncompensated care. Trauma surgeons, orthopedic surgeons, neurosurgeons, critical care physicians, anesthesiologists, and emergency room physicians are eligible for payment from the fund. During the first nine months of the fund's operation, \$1.1 million was disbursed to physicians for uncompensated care they provided. (The Maryland Health Care Commission expects disbursements for uncompensated care to increase as physicians become more familiar with the Fund.)

***State Tax Credit for Uncompensated Care.*** The General Assembly could provide a tax credit for the care that physicians provide to uninsured trauma patients, similar to the State's existing Neighborhood Assistance Program (NAP). The NAP program provides income tax credits for donated professional services, including physician services, to approved nonprofit organizations designed to benefit impoverished people. A tax credit program similar to the NAP program could be established for physicians providing uncompensated trauma care.

There are several advantages of providing reimbursement through the tax system. Most notably, there is an existing administrative infrastructure in place, and the credit would be outside of the appropriations process. The main disadvantages of a tax credit are that it would further complicate the tax code, it may be difficult to certify the value of uncompensated care claimed by physicians, and it would decrease general fund revenue. Compared to establishing a trust fund, a tax credit may also be less effective because it would be less visible.

***Increase in Medicaid Rates to Cover Treatment of Uninsured Trauma Patients.*** The State could alternatively increase Medicaid rates to physicians providing trauma care at trauma centers to offset the cost of providing uncompensated care to trauma patients. Because using Medicaid to offset uncompensated care would be somewhat transparent and less visible, it may not have as high of an impact as an uncompensated care fund. However, it would still likely influence physicians' decisions to provide trauma care, because it would increase their overall income.

The primary advantage of an option involving Medicaid is that about half of the costs would be paid with federal funds. DMAS also provides an existing administrative infrastructure and allocation methodology. The most significant disadvantage of this option is that there is no limit on the State's financial exposure. Even if fines and fees were used to fund this option, the State would have to make up any shortfalls between revenue raised and Medicaid payments through general funds. In addition, Medicaid patients are only a proxy for the volume of uninsured patients in a given area, and do not always mirror the proportion of uninsured patients. Consequently, trauma physicians who treat a large number of uninsured patients but a relatively small number of Medicaid patients may not benefit from this option to the degree commensurate with the amount of uncompensated care they provide. A further disadvantage of this option is that DMAS would have to regularly re-establish the appropriate rate increases based on the amount of uncompensated care provided to trauma patients, as well as manually maintain a list of eligible physicians.

### **The State Could Establish a Loan Repayment Program for Physicians Who Provide Trauma Care**

Another way in which the State could induce physicians to provide care for trauma patients is by helping to repay medical school loans for those surgeons who agree to provide trauma care at trauma centers. This would not directly improve reimbursements for these physicians, but it would still have the impact of reducing the overall costs associated with their practices. Providing physicians with medical school debt relief may also help attract more new physicians to provide trauma care.

A loan repayment program benefiting trauma physicians could be structured similarly to an existing program designed to attract physicians to work in medically underserved areas of Virginia. General practitioners and psychiatrists are eligible to participate in the current State program, and may receive loan repayment amounts up to \$120,000 over a four-year period.

The cost of a trauma loan repayment program would be based on how many surgeons the State wishes to admit into the program and the loan repayment award for each participant. If the State chose to provide funding to the trauma loan repayment program based on the five trauma/critical care fellowships at Virginia's medical schools, the program could ultimately cost up to \$600,000 annually, assuming a total award of \$120,000 (over four years) to each participant (Exhibit 4). However, this cost could be scaled up or down, depending on the number of surgeons the State wished to admit to the program and the level of loan repayment awards.

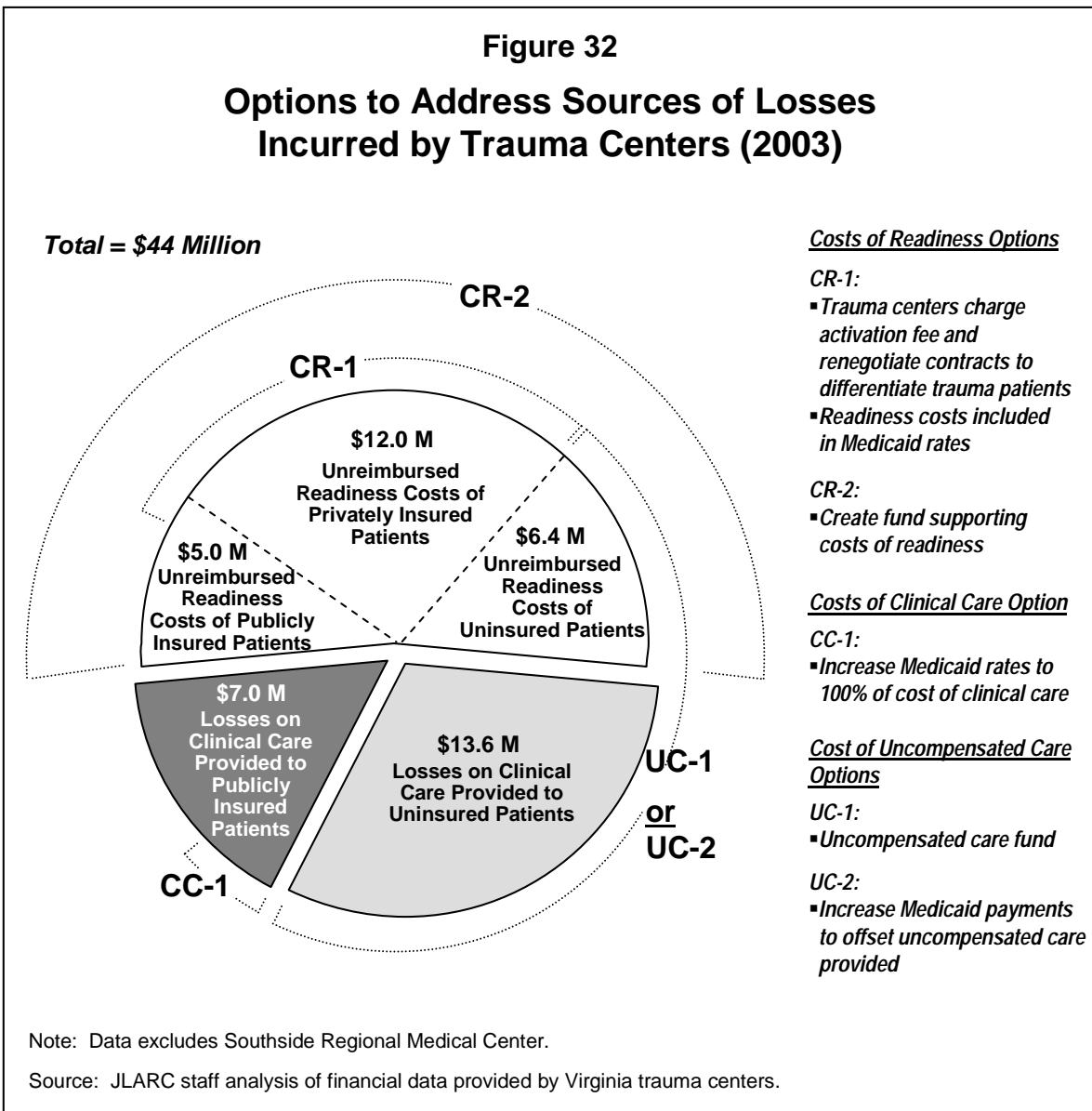
The primary advantage of the State trauma loan repayment program is that it would be relatively easy to implement because the State already administers a similar program. Moreover, the State could easily limit its financial exposure by pre-determining the size of the fund. The disadvantage of establishing such a program is that little evidence exists to show that loan repayment programs are effective. In addition, this solution would only be temporary because physicians would no longer be eligible to participate in the program after they repaid their student debt. Finally, the entire cost of the program would be State funded.

<b>Exhibit 4</b>		
<b>Trauma Loan Repayment Program</b>		
<b>Advantages</b>	<b>Disadvantages</b>	<b>Estimated Impact</b>
<ul style="list-style-type: none"> <li>• Relatively low-cost</li> <li>• Easy to implement</li> <li>• Administrative infrastructure in place</li> </ul>	<ul style="list-style-type: none"> <li>• Difficult to assess effectiveness</li> <li>• Likely low impact</li> <li>• Temporary solution</li> <li>• 100% State funded</li> </ul>	<p>May impact new surgeons considering trauma, but relatively low long-term impact because physicians ineligible for program when loans are fully paid.</p>
<p><b>Estimated Annual Cost:</b> \$600,000, but easily scaled up or down</p>		
<p>Source: JLARC staff analysis of information provided by the Virginia Department of Health.</p>		

### **THE STATE COULD HELP ADDRESS THE CHALLENGES FACED BY TRAUMA CENTERS**

The financial challenges faced by trauma centers are essentially three-fold: (1) insurers do not reimburse hospitals for the cost of readiness incurred to deliver the high level of care required of designated trauma centers, (2) some public payers, such as Medicare and Medicaid, do not even cover the cost of clinical care, and (3) hospitals are reimbursed for only a fraction of the costs they incur to treat uninsured trauma patients, who represent a disproportionately large proportion of the overall trauma patient population. Together, these challenges created a \$44 million loss across Virginia's trauma centers in 2003.

Figure 32 summarizes several options that are designed to address the financial challenges discussed in Chapter IV. Different combinations of options can be used to address the financial challenges of trauma centers to varying degrees and involve different sources of funding. Actual 2003 financial data from Virginia trauma centers were used as the baseline for providing a fiscal impact estimate for each option. Should these options be considered by the General Assembly, more recent data should be used prior to implementation. It should be noted that financial data from one level III trauma center was not available, although the absence of that data is unlikely to change the general magnitude of the estimates provided in this section.



### The State Could Partner with Trauma Centers to Address the Unreimbursed Cost of Readiness

The continuous availability of the highest level of trauma care reduces the odds of dying or being severely disabled as a result of traumatic injuries, yet the financial losses that readiness creates are undermining the viability of the entire trauma system. In 2003, trauma centers absorbed more than \$23 million to ensure the availability of their services for trauma victims. Health insurers generally do not recognize the high costs of trauma center readiness in today's health care reimbursements structure. Moreover, unlike other emergency services providers, such as some rescue squads and fire departments, trauma centers do not receive public funding to ensure continuous and immediate access to their services. Because trauma centers provide a service that clearly benefits public health, and the provision of unprofitable services may not be sustainable in the private market, the State has a strong interest in ensuring the viability of trauma programs. The first option that the State may wish to consider is ensuring that Medicaid reimbursements include readiness costs, while trauma centers should be responsible for negotiating similar arrangements with private insurers. Alternatively, a fee-based fund could be established to diffuse the cost of being ready to treat *all* Virginia trauma victims, as summarized in Table 5.

<b>Table 5</b>			
<b>Funding Options for Trauma Center Cost of Readiness</b>			
<b>Advantages</b>	<b>Disadvantages</b>	<b>Estimated Annual Cost (\$ Million)</b>	
		<i>Virginia</i>	<i>Federal</i>
<b>Increase Medicaid Rates to Include Readiness Cost for Private Trauma Centers; Trauma Centers Negotiate Rates with Private Insurers</b>			
<ul style="list-style-type: none"> <li>• Payment responsibility shared equitably across all insurers</li> <li>• Funding automatically adjusts to level of readiness costs</li> <li>• Small budgetary impact on Virginia</li> </ul>	<ul style="list-style-type: none"> <li>• Private insurers may be unwilling to increase rates</li> <li>• Medicaid rate adjustments may vary with budget conditions</li> <li>• No control over Medicare</li> </ul>	\$0.7	\$0.7
<b>Establish Cost of Readiness Fund for All Trauma Centers</b>			
<ul style="list-style-type: none"> <li>• Certainty of funding</li> <li>• Consistent with public good model for many emergency services</li> <li>• Flexibility to address facility-specific challenges</li> </ul>	<ul style="list-style-type: none"> <li>• Cost is borne entirely by the State</li> <li>• Allocation may be imprecise</li> <li>• Size of fund does not adjust to need</li> </ul>	\$23.4	\$0
Source: JLARC staff interviews and analysis of financial data provided by Virginia trauma centers.			

***Trauma Centers and the State Could Share Responsibility for Seeking Appropriate Reimbursement from Insurers.*** The cost of trauma center readiness is a financial burden, in large part, because it is not reimbursed by health insurers. The most straight-forward option to resolve this financial challenge is for all health insurers to begin including readiness costs in their reimbursement methodologies. By agreeing to include trauma center readiness costs in its reimbursement rate calculation, the Virginia Medicaid program could set a precedent which may prompt private insurers to follow suit. In addition, trauma centers that have not already taken this step could begin charging insurers for trauma team activation fees, and renegotiate contracts to differentiate reimbursement rates for the care of trauma patients.

When a seriously injured patient is expected to arrive at a trauma center, a “trauma alert” is called, and the facility’s trauma team, which is comprised of six to 12 physicians and nurses, is activated. Readiness costs, in particular standby resources, are incurred in preparation for trauma team activations. Until recently, trauma centers did not have a way to include a charge for trauma team activation on their claims form. However, the National Uniform Billing Committee (NUBC) created a new trauma revenue code that went into effect on October 1, 2002. Since that time, trauma centers across the country, and three in Virginia, have successfully included trauma team activation charges, which are based on readiness costs, on their claims to private insurers.

Trauma team activation fees can be used to recover readiness costs from insurers that reimburse hospitals for a percentage of their charges (the specific percentage goes up to 100 percent, and is negotiated between insurers and hospitals). Based on an analysis of 2003 financial data provided by trauma centers, JLARC staff estimate that an appropriate activation charge could range from \$2,000 for a partial trauma team activation (usually appropriate for seriously injured patients) to \$4,000 for a full trauma team activation (typically involved with critically injured patients) at a level I or II trauma center. In level III trauma centers, a partial trauma team activation could warrant \$1,000 and a full activation \$2,000, approximately.

Health insurers for a majority of trauma patients reimburse hospitals for a fixed amount that is driven by the number of hospital days, or the diagnosis for which the patient is treated, rather than based on the charges associated with the services received by the patient. With insurers that do not reimburse based on charges billed, trauma team activation charges will not yield an incremental reimbursement. In those cases, trauma centers could renegotiate contracts to exclude trauma patients from a fixed reimbursement methodology, and seek instead a reimbursement methodology based on costs or charges. As a result, the level of reimbursement would vary with the amount of resources deployed, including standby and other readiness resources. Three Virginia trauma centers have successfully pursued this approach, and have consequently established a precedent which insurers may find harder to deny to other trauma centers.

Finally, the State could increase Medicaid inpatient and outpatient reimbursement rates to reflect the cost of trauma center readiness. This change should



be made only for private designated trauma centers, because public hospitals are already reimbursed at 100 percent of their actual costs (including readiness costs). Based on 2003 financial data, the cost of this initiative would be approximately \$1.4 million, of which the State would be responsible for about half, after federal reimbursement.

For outpatient trauma services, the adjustment factor currently applied to private hospital reimbursements could be improved for claims submitted by trauma centers for the treatment of trauma patients (adjusted by primary diagnosis). The adjustment factor should differ between levels I or II, and level III trauma centers, given the disparity in the level of readiness costs that they bear.

Medicaid reimbursement rates for inpatient services provided by private trauma centers could also be increased. The rate increase would apply to trauma patients, identified by admission type for whom a trauma team activation was triggered. The simplest way to implement the increase would be to apply a factor to the regular reimbursement rate, which would increase overall payments by the desired amount. The Medicaid adjustment should also distinguish levels I and II trauma centers from level III trauma centers. To apply these changes to both the Medicaid fee-for-service and managed care populations, the Medicaid program would have to adjust HMO capitated rates in order to compensate managed care providers for implementing these changes in their reimbursement rates, which are negotiated with each hospital.

By combining State and trauma center action, this approach offers several advantages. First, responsibility for the payment of readiness costs is spread equitably across health insurers. Secondly, increased reimbursements will automatically match the level of readiness costs borne by each trauma center, assuming that trauma team activation charges and contractual adjustments are properly determined. Finally, the State fiscal impact of this option would be small. This option, however, does present a significant disadvantage. Specifically, it provides no guarantee that private health insurers and Medicare (who, combined, cover 89 percent of insured trauma patients) will be willing to approve trauma team activation charges or differentiate trauma patients in their contracts. This is particularly true for large health insurers that exert a lot of leverage over health care providers. Because the renegotiation process could be time-consuming, it may take months for trauma centers to find out whether this course of action will be successful. If these efforts fail, access to trauma services may, once again, be jeopardized, while the momentum for State action may have slowed.

***The State Could Establish a Fund to Cover Readiness Costs.*** To promote continued access to trauma services if trauma center negotiations with private insurers are unsuccessful, the State may wish to consider establishing a fund that would reimburse some of the cost of readiness borne by trauma centers. The size of the fund could be determined by the General Assembly, and could be financed either through increased fines and fees or from general funds. Based on the readiness costs incurred by trauma centers in 2003, it is estimated that approximately \$23.4 million would be necessary to completely support trauma center readiness. The fund could be allocated to all designated trauma centers, both public and private,

based first on their designation level, and secondly on the volume and acuity of trauma patients they treat. The two-pronged allocation mechanism recognizes that while all trauma centers must meet the same requirements within a given designation level, those facilities that treat a particularly large volume of trauma patients, or disproportionately severe injuries, will incur additional readiness expenditures. In this context, trauma patients would include only those who had contact with the trauma service either through a trauma team activation, or a consultation.

In addition to guaranteeing the availability of funding, this option would also be consistent with the public good model upon which other emergency services providers, such as fire departments and rescue squads, are funded. The expenditures associated with the delivery of public goods and services are almost always publicly funded (through taxes or donations) or subsidized because these activities tend to be unprofitable, a model that fits the trauma center paradigm very well. Receiving stable and predictable compensation for the readiness costs they incur would allow trauma centers the flexibility to address the challenges that threaten their continued operation.

The primary disadvantage of this option is that readiness costs would be assumed entirely by the State. Moreover, funds would be allocated to each trauma center based on a formula which may not perfectly compensate each facility for the actual cost of readiness that they incur. In addition, the size of the fund would not automatically adjust based on needs. Should the cost of readiness continue to increase, or new hospitals achieve trauma center designation, each remaining trauma center's allocation will decrease unless fines and fees are further increased, or the general fund appropriation is enhanced.

### **The State Could Increase Medicaid Reimbursement Rates for the Clinical Care Provided to Trauma Patients**

Notwithstanding the high costs of trauma center readiness, Medicaid reimbursements are insufficient to cover even the cost of clinical care provided to trauma patients who are admitted to private trauma centers. Since the late 1990s, private hospitals have been paid between 62 and, as of fiscal year 2005, 72 percent of their costs in part on the basis that this policy would trigger efficiencies and expense reductions. For every Medicaid trauma patient who had an inpatient stay at a private trauma center in 2003, that facility lost an average of \$9,700, and a total of \$3.2 million across all trauma centers. This loss is subsidized, in part, by other insured patients, while the rest is absorbed by the facility.

Because trauma centers are designed to treat the most severe injuries, and must abide by very specific staffing and operating requirements, these facilities may face more difficulties than other hospitals in reaping cost efficiencies. Consequently, the State may wish to consider eliminating the adjustment factor applied to the reimbursement of Medicaid fee-for-service inpatient trauma services in private hospitals. Furthermore, Medicaid would have to adjust HMO capitated rates in order to compensate managed care providers for implementing this rate increase. Improving rates to cover 100 percent of the cost of clinical care provided to trauma patients

would have cost an estimated total of \$3.2 million in calendar year 2003, of which the State would be responsible for about 50 percent (Table 6). Should this option be explored further, DMAS staff would need to conduct a more detailed analysis of the fiscal impact of this option based on actual Medicaid usage and cost data.

<b>Table 6</b>			
<b>Improving Reimbursements for Clinical Care Provided to Medicaid Trauma Patients</b>			
<b>Advantages</b>	<b>Disadvantages</b>	<b>Estimated Annual Cost (\$ Million)</b>	
		<i>Virginia</i>	<i>Federal</i>
<ul style="list-style-type: none"> <li>• 50 percent federal match</li> <li>• Equitable to other insured patients</li> </ul>	<ul style="list-style-type: none"> <li>• Possible financial exposure</li> </ul>	\$1.6	\$1.6
Source: JLARC staff interviews and analysis of financial data provided by Virginia trauma centers.			

### **The State Could Help Reimburse Trauma Centers for Providing Uncompensated Care to Trauma Patients**

The provision of uncompensated care to trauma patients is the second largest financial loss experienced by trauma centers, after readiness costs, and is estimated at approximately \$20.0 million (including readiness costs) in 2003. Because of its magnitude, uncompensated care threatens access to trauma services for all Virginians regardless of insurance status and should, therefore, be considered in addressing trauma center challenges. State support of this issue could be provided through a variety of mechanisms. The two mechanisms that present the most potential for supporting uncompensated care include establishing a fund, and leveraging the Medicaid program. An evaluation of the merits and shortfalls of these two approaches is presented below, and summarized in Table 7.

***Establishing an Uncompensated Care Fund.*** A fund could be established to reimburse trauma centers for the cost of uncompensated care that they incur to treat uninsured trauma patients. The size of the fund could be determined by the General Assembly. An uncompensated care fund benefiting designated trauma centers could be allocated to each facility based on the number of uninsured trauma patients they treat, as well as their designation level in order to reflect differences in the cost of readiness component of uncompensated care. Based on the estimated amount of uncompensated care provided by all trauma centers in 2003, \$20.0 million would be required to support trauma centers for the full extent of uninsured patient costs. This amount includes both the cost of clinical care (\$13.6 million) as well as readiness costs (\$6.4 million) incurred to treat uninsured trauma patients. If the State chooses to create a fund supporting overall readiness costs, as discussed earlier, an uncompensated care fund would only need to reimburse trauma centers for the cost of clinical care provided to uninsured trauma patients.

<b>Table 7</b>			
<b>Comparison of Funding Options for Uncompensated Trauma Care</b>			
<b>Advantages</b>	<b>Disadvantages</b>	<b>Estimated Annual Cost (\$ Million)</b>	
		<i>Virginia</i>	<i>Federal</i>
<b>Establish Uncompensated Care Fund for All Trauma Centers</b>			
<ul style="list-style-type: none"> <li>• Precise allocation</li> <li>• Reaches all facilities</li> <li>• No financial exposure</li> </ul>	<ul style="list-style-type: none"> <li>• 100 percent Virginia funded</li> <li>• Size of fund does not adjust to need</li> </ul>	\$13.6 - \$20.0	\$0
<b>Increase Medicaid Payments to Private Trauma Centers</b>			
<ul style="list-style-type: none"> <li>• 50 percent federal match</li> <li>• Existing infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• Allocation proxy may be imprecise</li> <li>• Financial exposure</li> <li>• Subject to federal approval</li> <li>• Not all trauma centers would benefit</li> </ul>	\$6.0 - \$10.0	\$6.0 - \$10.0
Source: JLARC staff interviews and analysis of financial data provided by Virginia trauma centers.			

The primary benefit of this option is that it could provide each trauma center with funding that is commensurate with the magnitude of uncompensated care provided. In addition, the size of the fund would be either pre-established during the budget process, or determined by the amount of fines and fees collected, either way creating no financial exposure for the State. This mechanism has precedents in several other states where it appears to be functioning well.

The main disadvantage of pursuing this option is that its cost would be assumed entirely by the State. Moreover, the size of the fund would not automatically reflect the total amount of uncompensated care provided by trauma centers. Should the number of uninsured trauma patients continue to increase, or new hospitals achieve trauma center designation, each remaining trauma center's allocation would decrease unless fines and fees were further increased, or the general fund appropriation was increased.

***Increasing Medicaid Payments to Mitigate Uncompensated Care Provided to Trauma Patients.*** To provide financial relief for the care of uninsured trauma patients, the State could increase payments made to trauma centers through the Medicaid program. This approach would offer two distinct advantages over the establishment of a fund. First, this option could build upon the role that Medicaid already performs through the Disproportionate Share Hospital (DSH) program in supporting hospitals for providing uncompensated care. Second, the State

could receive federal matching funds for every dollar contributed. However, several disadvantages exist that might offset the administrative and financial benefits of this option.

The primary disadvantage of using the Medicaid program is that none of its existing funding mechanisms (operating payments, DSH, and Indirect Medical Education) are paid to hospitals based on the amount of uncompensated care that they provide, but rather on the basis of Medicaid patient volume (operating payments and DSH), or the number of medical residents working at the hospital (IME). Consequently, providing funding to trauma centers through existing Medicaid mechanisms could lead to a mismatch between the amount paid and the level of uncompensated care provided by each facility. While a new program specifically designed to compensate trauma centers for the cost of treating the uninsured could perhaps be created, more research will be necessary to assess how such a program could be structured to receive approval by the Centers for Medicare and Medicaid Services (CMS). Finally, the federal government will match State Medicaid payments only up to a certain amount. These limits have already been reached in the case of payments to public hospitals, and will soon be reached on DSH payments to all hospitals. Consequently, more analysis would have to be conducted by DMAS to assess how to structure a funding mechanism that not only meets CMS approval, but also fits within federal limits.

The cost of implementing this option would reflect the total cost of uncompensated care provided by eligible trauma centers. Should all trauma centers be eligible to benefit from this funding mechanism, approximately \$20.0 million could be paid out. If public hospitals are not eligible because payments to these facilities have already reached federal limits, the total cost of uncompensated trauma care provided by private facilities would be approximately \$17.4 million. As mentioned earlier, the portion of uncompensated care associated with readiness costs (\$7 million across all trauma centers, and \$6 million for private centers) could be subtracted if a fund is also established to compensate for the cost of readiness.

### **SEVERAL POTENTIAL SOURCES OF FUNDING ARE AVAILABLE TO SUPPORT THE TRAUMA SYSTEM IN VIRGINIA**

If the General Assembly chooses to support the trauma system in Virginia by providing funding to trauma physicians and trauma centers, there are a variety of potential funding options that could be considered. The two most viable options are to increase fines and fees, and to supplement this revenue with federal funds by leveraging the Medicaid program. Increasing fines and fees to support trauma is an alternative that has been employed by a number of other states. The benefit of collecting higher fines and fees on a targeted number of activities and offenses closely linked to trauma is that they provide a dedicated revenue source. The General Assembly could also choose to appropriate general funds to support trauma. However, this option has not been widely used by other states and could be subject to annual fluctuations in the budget. Administering funding through the Medicaid program would enable the State to share the cost of trauma system funding with the federal

government since State Medicaid funds are partially reimbursed with federal funds, whether the State's share is raised through fines and fees, or through general funds.

### **A Variety of Fines and Fees Could Be Charged to Support the Commonwealth's Trauma System**

To raise revenue that could be used to stabilize Virginia's trauma system, the State could impose a variety of fines and fees on certain offenses and activities which tend to be associated with trauma. Table 8 provides a listing of potential fines and fees, and the amount each fine or fee would need to be increased in order to reach revenue goals ranging from \$1 million to \$50 million. Most of these fines and fees deal with moving violations, driver's licenses issuance, or vehicle registrations. As motor vehicle crashes are the leading cause of traumatic injuries both nationwide and in Virginia, imposing fines or fees related to motor vehicles would result in some of the primary users of the trauma system helping to fund it. Another revenue source that has been suggested by Virginia's trauma centers is a fee paid by community hospitals that are not designated trauma centers. Table 8 demonstrates how various revenue goals could be reached by increasing fines or fees.

<b>Table 8</b>				
<b>Estimated Increase to Potential Fines and Fees Needed to Support Various Revenue Goals</b>				
Potential Fine or Fee	Revenue Goal			
	\$1 Million	\$5 Million	\$20 Million	\$50 Million
Flat Increase to the DUI Fine	\$37	\$183	\$732	\$1,830
Graduated DUI Fine Increase				
First offense fine	\$32	\$160	\$641	\$1,601
Second and subsequent offense fine	\$64	\$320	\$1,281	\$3,203
Flat Fine Increase on All Moving Violations (including DUI violations)	<\$1	\$4	\$14	\$35
Graduated Moving Violation Fine Increase				
No points	<\$1	\$3	\$10	\$26
3 points	<\$1	\$3	\$13	\$33
4 points	<\$1	\$4	\$16	\$39
6 points	\$1	\$5	\$21	\$52
Driver's License Fee Increase (Annual)	<\$1	\$4	\$15	\$37
Increase Driver's License Reinstatement Fees	\$62	\$310	\$1,242	\$3,104
Increase Vehicle Registration Fees	<\$1	\$1	\$3	\$8
Community Hospital Fee per Licensed Bed	\$79	\$395	\$1,580	\$3,949
Source: JLARC staff analysis of data provided by the Virginia Department of Motor Vehicles and Virginia Health Information.				

**Increase Fines on DUIs and Moving Violations.** The State could increase only DUI fines, or target fines on all moving violations to raise revenue for the trauma system. Increasing DUI fines would build upon the State's current approach to funding trauma, but would take it to a level more in line with the system's needs. Oklahoma and Illinois also use DUI fines to help fund their trauma system. While the Virginia surcharge is \$50 for any individual who is convicted of two or more DUI-related offenses within 10 years, Illinois and Oklahoma impose a surcharge of \$100 for every DUI offense.

Current DUI fines in Virginia are \$250 for a first offense, \$500 for a second offense, and \$1,000 for third and subsequent offenses. If Virginia were to impose a flat fine increase across all DUI convictions, the State would have to increase the fine by \$37 for every \$1 million it wishes to raise. Virginia could alternatively impose a graduated DUI fine increase. If the fine for second and subsequent offenses were twice the fine for initial offenses, every \$32 increase on the first offense and \$64 increase on the subsequent offenses would yield \$1 million in additional revenue.

The General Assembly could broaden and expand the mechanism it chose for the State Trauma Center Fund to cover all moving violations. Fines on moving violations are the most typical source of revenue for trauma funding among other states. Fines earmarked for trauma range from \$5 per moving violation in Mississippi and Washington to \$100 in Oklahoma for violations involving controlled dangerous substances. In Texas, drivers with more than six points on their license in a three-year period pay a \$100 fee to retain their driving privileges, and another \$25 for each additional point.

The required increases to moving violation fines needed are relatively modest compared to other options, given the same revenue goals. This is due to the large base across which the fines could be applied. In FY 2003, drivers were convicted of 1,415,524 moving violations on Virginia's roads. If the State were to impose a flat fine increase across all moving violations, \$1.4 million could be raised for every \$1 increase per violation. To direct the burden of fine increases towards drivers who most frequently break the law, Virginia could alternatively impose a graduated fine based on the number of points added to a drivers' license as a result of the conviction. One possible structure would be to establish a minimum fine for violations resulting in no points added to the driver's record. The fine could increase by 25 percent for three points added, 50 percent for four points added, and the fine could double for six points added. Under this structure, the State could raise \$1 million by increasing fees by less than one dollar for violations with zero to four points added to a driver's record and \$1 for every violation resulting in six points added to a driver's record.

**Increase Driver's License and Registration Fees.** Rather than increasing fines, the State could increase fees related to motor vehicles, such as driver's license or registration fees, to support the trauma system. The state of Oklahoma currently adds \$1 to its driver's license fee to support its trauma system. Maryland and Washington impose additional vehicle registration fees of \$2.50 and \$4.00, respectively, to support their trauma systems.

The current driver's license fee in Virginia is \$4 per year, for a total of \$20 paid every five years. In 2003, the Virginia Department of Motor Vehicles issued 1,367,239 driver's license originals, renewals, duplicates, and learner's permits. Due to the large base across which a fee increase could be applied, driver's license fee increases could be fairly modest, and still generate significant revenue. For every \$1 per year added to the current fee, Virginia could raise \$1.4 million.

In addition to or in lieu of a driver's license fee, the State could increase driver's license reinstatement fees to support the trauma centers. Individuals can have their licenses suspended for a variety of traffic infractions, including speeding violations and DUIs. In 2003, approximately 16,000 Virginia drivers with suspended licenses paid fees ranging from \$40 to \$120 to reinstate their licenses, depending on the type of suspension. The driver's license reinstatement fee could raise \$1 million for every \$62 added to the current reinstatement fee. Oklahoma currently charges a \$200 fee for the reinstatement of revoked or suspended driving privileges.

Increasing vehicle registration fees would result in the smallest fee increase of all of the options considered in this report. Current annual vehicle registration fees in Virginia range from \$27.50 for a motorcycle to \$34.50 for a passenger vehicle of 4,001 pounds or more. These amounts already include a fee of \$4 to support Virginia's emergency medical system. The so-called "\$4-for-Life" fee, which was increased from \$2 in 2002, is expected to generate about \$26 million in FY 2005, most of which will benefit local rescue squads.

In 2003, there were more than 6.5 million registered vehicles in Virginia. Due to the large base over which a trauma services fee could be applied, the State could raise \$1 million for every additional \$0.15 increase in registration fees. For example, an additional dollar added to the current "\$4-for-Life" fee could provide about \$6.5 million for trauma centers and physicians in Virginia.

***Charge to Community Hospitals Not Designated as Trauma Centers.*** Trauma centers maintain 24-hour, seven-day-per-week capabilities, and consequently bear additional costs, such as physician on-call stipends, beyond those faced by community hospitals. Because community hospitals can rely on the availability of specialists and equipment in regional trauma centers, they may not need to acquire the costly capabilities necessary to treat major trauma patients. Trauma centers consequently receive many increased transfers from community hospitals that are not capable of treating trauma patients, and EMS providers transport trauma patients directly to a trauma center, knowing that community hospitals are not equipped to take care of the patient.

For these reasons, several of Virginia's trauma centers suggested that community hospitals benefit from the availability of trauma centers and could contribute to a trauma fund to help offset the higher costs experienced by trauma centers. It does not appear that any states currently require their community hospitals to pay such a fee. According to information provided by Virginia Health Information, there are 68 acute care hospitals that are not designated trauma centers in Virginia. If a fee were imposed based on the number of licensed beds at community



hospitals, for every \$1 million the State wishes to raise, a \$79 fee would have to be charged for each bed. The smallest hospital would be charged \$2,900 and the largest \$43,000 for every \$1 million in incremental revenue raised.

### **General Funds Could Support the Commonwealth's Trauma System**

In addition to fines and fees, the General Assembly could appropriate general funds to support trauma. The disadvantage of general fund appropriations is that they are subject to annual review and to the fiscal health of the State. Whether using general funds or increased fines and fees to pay for the State's share of supporting Virginia's trauma system, these funds would be leveraged much more effectively if they were provided through the Medicaid program. State Medicaid funds are currently reimbursed about 50 percent by the federal government, so any State support to trauma systems flowing through the Medicaid program would be increased, though the reimbursement rate might change in future years.



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## Appendixes

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## **Appendix A**

### **Study Mandate**

#### **HOUSE JOINT RESOLUTION NO. 183 2004 Session**

*Directing the Joint Legislative Audit and Review Commission to study the use and financing of trauma centers in the Commonwealth's hospitals. Report.*

Patron-- McDonnell

WHEREAS, pursuant to § 32.1-111.3 of the *Code of Virginia*, the Board of Health is charged with developing "a comprehensive, coordinate, emergency medical system," a component of which is the "designation of appropriate hospitals as trauma centers and specialty care centers based on an applicable national evaluation system"; and

WHEREAS, trauma centers are designated as Level I, i.e., providing services for multiple trauma 24 hours a day, Level II, i.e., providing community-based trauma services for less than 24 hours a day, and Level III, i.e., providing stabilization and transfer of trauma patients to Level I and Level II centers as appropriate; and

WHEREAS, approximately 13 hospitals in Virginia are designated, according to the Board's criteria, as Level I, Level II, or Level III trauma centers; and

WHEREAS, Among these 13 trauma centers, five are or were until recently designated as Level I trauma centers, two are designated as Level II trauma centers, and six are designated as Level III trauma centers; and

WHEREAS, in 2002, of the more than 2.5 million emergency room admissions in Virginia, more than 455,00 were for the designated trauma centers; and

WHEREAS, even traditional emergency rooms can lose money for hospitals because many of the patients are young or indigent and uninsured and because the incidence of trauma has increased exponentially with the increase in the number of motor vehicles and high-speed travel; and

WHEREAS, trauma centers are much more expensive than the traditional emergency room because of the costly equipment and personnel required to meet the Board's criteria to provide such care; and

WHEREAS, in Virginia's trauma centers, the costs of the sophisticated equipment and specialized physician care appear to be exacerbated by reduced revenues because of third-party payor limitations on reimbursement, growing numbers of indigent and uninsured patients, and increases in overall volume of trauma patients; and

WHEREAS, although trauma centers play a vital role in the emergency medical care system, some of Virginia's hospitals are finding it hard to maintain designation as trauma centers because of the costs and lower revenues; and

WHEREAS, if Virginia's trauma patients are to receive trauma care during the "golden hour" following trauma, mechanisms must be developed to assist the designated trauma centers to survive and to continue to deliver the care essential for severe or multiple trauma; now, therefore, be it

RESOLVED by the House of Delegates, the Senate concurring, That the Joint Legislative Audit and Review Commission be directed to study the use and financing of trauma centers in the Commonwealth's hospitals.

In conducting its study, the Joint Legislative Audit and Review Commission shall (i) examine utilization trends vis-à-vis number of patients served and kind of services delivered; (ii) compare Virginia's utilization trends to national utilization trends; (iii) assess the demographics of patients requiring trauma center services in Virginia; (iv) conduct an insurance profile of the patients requiring these services in Virginia and, in so far as possible, the nation; (v) analyze the financial costs and benefits to hospitals of being designated a trauma center, including any public relations or other "good will" benefit from being known as a trauma center; and (vi) determine any steps that can be taken to maintain appropriate and necessary trauma services in Virginia's hospitals.

All agencies of the Commonwealth shall provide assistance to the Joint Legislative Audit and Review Commission for this study, upon request. In addition, the Joint Legislative Audit and Review Commission may seek input from the Secretary of Health and Human Resources, the Department of Health's Office of Emergency Services, and the Virginia Hospital and Health Care Association.

The Joint Legislative Audit and Review Commission shall complete its meetings by November 30, 2004, and the Director shall submit to the Division of Legislative Automated Systems an executive summary of its findings and recommendations no later than the first day of the 2005 Regular Session of the General Assembly. The executive summary shall state whether the Joint Legislative Audit and Review Commission intends to submit to the General Assembly and the Governor a report of its findings and recommendations (for publication as a document). The executive summary and report shall be submitted as provided in the procedures of the Division of Legislative Automated Systems for the processing of legislative documents and reports and shall be posted on the General Assembly's website.

## Appendix B

# Virginia Criteria for Trauma Center Designation

(Note: These criteria are currently under revision by the Trauma Systems Oversight and Management Committee. Updated criteria and standards will become effective January 2006.)

E = Essential, D = Desired

				LEVELS		
				I	II	III
<b>A. HOSPITAL ORGANIZATION</b>						
<b>1. TRAUMA SERVICE</b>						
a.	The trauma service will have a mission statement emphasizing continuous quality improvement in the management of the trauma patient. There must be a clearly delineated trauma team response to the arrival of the patient with suspected or known major trauma in the Emergency Department. There must be a means of communicating the impending arrival of such patient to the designated trauma team. The trauma service may choose to have a two tier <sup>1</sup> response to the trauma patient provided that there is demonstration of continuous quality control.	E	E	E		
b.	The Trauma Service needs to be a recognizable service within the hospital which has a surgeon as its director/coordinator/physician in charge.	E	E	D		
c.	The surgeon participating in the service and taking active call must be dedicated <sup>2</sup> to the facility the night on trauma call and show active participation in the on-going activities of the trauma service. They must have successfully completed one ATLS course. <b>Category I CME</b> trauma/critical care credits are required (twenty across the two year designation period; thirty across the three year verification period.) Updating ATLS may be included in the credits, but is not mandatory. CME documentation, intended to meet trauma center standards, should appear in the hospital credentials file.	E	E	E		
d.	Ideally, the key individuals in the Departments of Surgery Emergency Medicine, Nursing and Administration should be looked on as a core group. A Trauma Nurse Coordinator for development, implementation, and maintenance of the trauma center is addressed in Section 6.	E	E	E		
<b>2. Surgery Departments/Divisions/Services</b>						
	Cardiothoracic Surgery	E	D	E		
	General Surgery	E	E	D		
	Neurosurgery	E	E	D		
	Obstetric-Gynecologic Surgery	D	D	D		
	Ophthalmic Surgery	E	D	D		
	Oral Surgery	D	D	D		
	Orthopedic Surgery	E	E	D		
	ENT Surgery	E	D	D		
	Pediatric Surgery	E	D	D		

	LEVELS		
	I	II	III
Plastic and Maxillofacial Surgery	E	D	D
Urologic Surgery	E	D	D
<b>3. Emergency Department/Division/Services</b>			
a. The Emergency Department physician must be a recognized member of the trauma team and trauma committee. There must be a recognized participation between the Emergency Department and the Department of Surgery or Traumatology.	E	E	E
<b>4. Surgical Specialties Availabilities</b>			
(Requirements may be fulfilled by PGY 4 or PGY 5 capable of assessing emergent situations in their respective specialties. They must be capable of providing surgical treatment immediately and provide control and leadership of the care of the trauma patient. Staff specialists must also be on call and respond promptly.)	E	E	D
<b>In-house 24 hours a day:</b>			
<b>General Surgery</b>	E	E	--
(In Level II, the trauma surgeon need not be in the house 24 hours a day, but the trauma system should ensure that the trauma surgeon will be present in the Emergency Department at the time of arrival of the patient. When sufficient prior notification has not been possible a designated member of the trauma team will immediately initiate the evaluation and resuscitation. Definitive surgical care must be instituted by the trauma surgeon in a timely fashion.)			
<b>Neurosurgery</b>	E	E	--
(An attending neurosurgeon must be promptly available and dedicated to that hospital's trauma service. The in-house requirement may be fulfilled by an in-house neurosurgery resident, or a surgeon who has special competence, as judged by the chief of neurosurgery, in the care of patients with neural trauma, and who is capable of initiating measures directed towards stabilizing the patient and initiating diagnostic procedures.)			
<b>On call and promptly available from in/out of hospital:</b>			
General Surgery	--	--	E
Neurosurgery	--	--	D
Cardiac Surgery	E	D	D
Microsurgery Capabilities	E	D	D
Gynecologic Surgery/Obstetric Surgery	E	E	D
Hand Surgery	E	D	D
Ophthalmic Surgery	E	E	D
Oral Surgery	E	D	D
Orthopedic Surgery	E	E	D
ENT Surgery	E	E	D
Pediatric Surgery	E	D	D
Plastic and Maxillofacial Surgery	E	E	D
Thoracic Surgery	E	E	D
Urological Surgery	E	E	D
Gynecologic Surgery / Obstetric Surgery	--	--	D



	LEVELS		
	I	II	III

## 5. Non-Surgical Specialties Availability

### In-hospital 24 hours a day:

Emergency Medicine E E E

(In Level I and II centers, requirements may be fulfilled by senior level emergency medicine residents having had ATLS and capable of assessing emergency situations in trauma patients and providing any indicated treatment. When residents are used, an appropriate attending physician must be in the Emergency Department 24 hours a day.)

Anesthesiology E E --

(Requirements may be fulfilled by anesthesia residents capable of assessing emergent situations in trauma patients and providing any indicated treatment. Anesthesia personnel should be capable of providing anesthesia service for surgical trauma cases including major vascular, neurosurgical, pediatric, orthopedic, thoracic, ENT and other in-house surgical cases. If residents<sup>3</sup> or CRNA's are used, a staff anesthesiologist must be present in the OR suite during surgery. Training and experience in both invasive and non-invasive monitoring is essential.)

### On call and promptly available from in/out of the hospital:

Anesthesiology -- -- E

Cardiology E E D

Chest Medicine E D D

Gastroenterology E D D

Hematology E E D

Infectious Disease E D D

Internal Medicine E E E

Nephrology E E D

Pathology E E D

Pediatrics E E D

Psychiatry E D D

Radiology E E D

Obstetrics -- -- D

## 6. Nursing Administration

1. An identified Trauma Nurse Coordinator with overall management responsibility for the trauma program. E D D

2. A defined job description and organizational chart delineating the TNC's role and responsibilities. E D D

3. Trauma Service budget/monies available for public education and outreach activities. D D D

4. Trauma Nursing Philosophy/Mission Statement documented E E D

5. Written standards of care for trauma patients in all areas of the trauma center E E E

	LEVELS		
	I	II	III

**B. SPECIAL FACILITIES/RESOURCES/CAPABILITIES**

**1. Emergency Department**

a. Personnel

- |   |   |   |   |
|---|---|---|---|
| 1. Designated physician director  | E | E | E |
| 2. Physician with competence in care of the critically injured, who has successfully completed an ATLS course, and must be physically present in the ED 24 hours a day. <b>Category I CME</b> trauma/critical care course, and must be physically present in the ED 24 hours a day. <b>Category I CME</b> trauma/critical care credits are required (twenty across a two year designation period; thirty across a three year verification period). Updating ATLS may be included in the credits, but is not mandatory. CME documentation intended to meet trauma center standards should appear in the hospital credentials file. | E | E | E |

- |  |   |   |   |
|--|---|---|---|
| 3. RNs, LPNs, and nurses' aides in adequate numbers  | E | E | E |
| a. Nurse staffing in initial resuscitation area is based on patient acuity and trauma team composition.  | E | E | E |
| b. A minimum of two RNs per shift, functioning in trauma resuscitation and who have trauma nursing training.   | D | D | D |
| c. A written provision/plan for acquisition of additional staff on a 24-hour basis to support units with increased patient acuity, multiple emergency procedures and a admissions. | E | E | E |
| d. Written protocol for expectations and responsibilities of the trauma nurse during resuscitation   | E | E | E |
| e. Nursing documentation for trauma patients is on a trauma flow sheet.  | E | E | E |
| f. 100% nursing staff ACLS certified or hospital equivalent  | D | D | D |
| g. 100% nursing staff TNCC certified   | D | D | D |

b. Equipment for resuscitation and to provide life support for the critically or seriously injured shall include but not be limited to:

- |   |   |   |    |
|---|---|---|----|
| 1. Airway control and ventilation equipment including laryngoscopes, ET tubes of all sizes, bag mask, pocket masks, oxygen, and mechanical ventilator | E | E | E  |
| 2. Suction devices  | E | E | E  |
| 3. ECG oscilloscope/defibrillator   | E | E | E  |
| 4. Invasive hemodynamic monitoring  | E | E | D  |
| 5. All standard IV fluids, administration devices and catheters   | E | E | E  |
| 6. Sterile surgical packs for standard ED procedures such as thoracostomy, cutdown  | E | E | E  |
| 7. Gastric Lavage equipment   | E | E | E  |
| 8. Drugs and supplies needed for emergency care   | E | E | E  |
| 9. X-ray capability, 24-hour coverage by in-house technician  | E | E | E  |
| 10. Two way radio linked with EMS transport vehicles  | E | E | E  |
| 11. Skeletal traction device  | E | E | E  |
| 12. External rewarming devices  | E | E | -- |

		LEVELS		
		I	II	III
13.	Equipment for rapid warming and infusion of fluids and blood.	E	E	--
14.	For trauma centers taking care of pediatric patients, there shall be equipment, corresponding to the adult equipment, appropriate for age and size and information pertaining to dosage of medication.	E	E	E
<b>2.</b>	<b>Intensive Care Units</b>			
a.	Designated medical director	E	E	E
b.	Physician on duty in ICU 24 hours a day or immediately available from in-hospital. This can be met by an in-house anesthesiologist, a second emergency physician, or house physician who is capable of assessing and managing critical care crises such as cardiac and respiratory arrest.	E	E	D
c.	Nurse-patient minimum ratio of 1:2 each shift	E	E	E
d.	Immediate access to laboratory services	E	E	E
e.	Equipment:			
1.	Airway control and ventilation devices	E	E	E
2.	Oxygen with concentration controls	E	E	E
3.	Cardiac emergency cart	E	E	E
4.	Temporary transvenous pacemaker	E	E	E
5.	ECG oscilloscope-defibrillator	E	E	E
6.	Cardiac output monitoring	E	E	D
7.	Invasive hemodynamic monitoring	E	E	D
8.	Mechanical ventilators	E	E	E
9.	Patient weighing devices	E	E	E
10.	Pulmonary function measuring devices	E	E	E
11.	External rewarming devices	E	E	E
12.	Drugs, IV fluids, and supplies	E	E	E
13.	Intracranial pressure monitoring devices	E	E	D
14.	Pulse oximetry	E	E	E
15.	End-tidal carbon dioxide	D	D	D
16.	For trauma centers taking care of pediatric patients, there shall be equipment, corresponding to adult equipment, appropriate for age and size, and information pertaining to dosage of medication.	E	E	E
<b>3.</b>	<b>Postanesthesia Recovery Room (ICU acceptable)</b>			
a.	RNs and the essential personnel 24 hours a day	E	E	E
b.	Appropriate monitoring and resuscitation equipment	E	E	E
<b>4.</b>	<b>Acute Hemodialysis Capability</b> (or written transfer agreement)	E	D	D
<b>5.</b>	<b>Organized Burn Care</b>	E	E	E
a.	Physician directed burn center staffed by nursing personnel trained in burn care and equipped properly for the care of the extensively burned patient.			
	<b>OR</b>			
b.	Written transfer agreement with nearby burn center or hospital with a burn unit			

		LEVELS		
		I	II	III
<b>6.</b>	<b>Acute Spinal Cord/Head Injury Capability</b>	<b>E</b>	<b>E</b>	<b>E</b>
a.	In circumstances where a designated spinal cord rehabilitation center exists in the region, early transfer should be considered; written transfer agreements should be in effect.			
b.	In circumstances where a head injury center exists in the region, transfer should be considered in selected patients. Written transfer agreements should be in effect.			
<b>7.</b>	<b>Radiological Special Capabilities</b>			
a.	Angiography of all types	<b>E</b>	<b>E</b>	<b>D</b>
b.	Sonography	<b>E</b>	<b>D</b>	--
c.	Nuclear scanning	<b>E</b>	<b>D</b>	--
d.	In-house computerized tomography (In-house radiology technician must be able to initiate CT scanning while CT technician is reporting to the hospital. The technician must be within 20 minutes of the hospital.)	<b>E</b>	<b>E</b>	--
<b>8.</b>	<b>Rehabilitation Medicine</b>			
a.	Physician directed rehabilitation service staffed by nursing personnel trained in rehabilitation care and equipped properly for care of the critically injured patient, <b>OR</b>	<b>E</b>	<b>E</b>	<b>E</b>
b.	Written transfer agreement to a nearby rehabilitation facility when medically feasible			
<b>C. OPERATING SUITE SPECIAL REQUIREMENTS</b>				
Equipment - instrumentation				
1.	Operating room adequately staffed in-house 24 hours a day. There should be a second on-call team promptly available - within 20 minutes - that reports to and is physically present in the facility when the in-house team is participating in an operative case.	<b>E</b>	<b>E</b>	<b>D</b>
2.	Cardiopulmonary bypass capability	<b>E</b>	<b>D</b>	--
3.	Operating microscope	<b>E</b>	<b>D</b>	--
4.	Thermal control equipment for patient and blood	<b>E</b>	<b>E</b>	<b>E</b>
5.	X-ray capability	<b>E</b>	<b>E</b>	<b>E</b>
6.	Endoscopes, all varieties	<b>E</b>	<b>E</b>	<b>E</b>
7.	Craniotome	<b>E</b>	<b>E</b>	<b>D</b>
8.	Monitoring equipment	<b>E</b>	<b>E</b>	<b>E</b>
<b>D. CLINICAL LABORATORY SERVICE (24 hours a day)</b>				
1.	Standard analysis of blood, urine, other body fluids	<b>E</b>	<b>E</b>	<b>E</b>
2.	Blood typing and cross-matching	<b>E</b>	<b>E</b>	<b>E</b>
3.	Coagulation studies	<b>E</b>	<b>E</b>	<b>E</b>
4.	Comprehensive blood bank or access to a community central blood bank and adequate hospital storage facilities	<b>E</b>	<b>E</b>	<b>E</b>
5.	Blood gas and pH determinations	<b>E</b>	<b>E</b>	<b>E</b>
6.	Serum and urine osmolality	<b>E</b>	<b>E</b>	<b>D</b>
7.	Microbiology	<b>E</b>	<b>E</b>	<b>E</b>
8.	Drug and alcohol screening	<b>E</b>	<b>E</b>	<b>D</b>

		LEVELS		
		I	II	III
<b>E. QUALITY ASSURANCE</b>				
1.	Organized program to examine the care of the injured in the institution that looks towards improving outcome, decreasing complications, and improving efficiency. The process should clearly document examination and resolution of issues.	E	E	E
2.	Audit for all trauma deaths and other specified cases	E	E	E
3.	Morbidity and mortality review	E	E	E
4.	There shall be a forum for multidisciplinary review of care of the injured patient, utilizing prehospital, nursing, ancillary and medical personnel.	E	E	E
5.	Trauma registry review- documentation of revised trauma score, ISS, outcome, length of stay, etc.	E	E	E
6.	Participation in and development of regional systems of trauma care and trauma triage and review as appropriate.	E	E	E
<b>F. NURSING QUALITY ASSURANCE</b>				
1.	Nursing Quality Assurance plan and ongoing activities documented which address the trauma patient population in all phases of trauma care with inter-disciplinary involvement	E	E	E
2.	Documented nurse participation in multi-disciplinary conferences/committees for quality assurance activities, continuing education and problem-solving	E	E	E
3.	Adequate number of nursing staff must be immediately available 24 hours a day for trauma ICU, OR, PACU, Med-Surg, Rehab (if in house), based on patient acuity.	E	E	E
4.	A validated acuity-based patient classification is utilized to define workload and number of nursing staff to provide safe patient care for all trauma patients.	E	E	E
<b>G. OUTREACH PROGRAM</b>				
1.	Participation in telephone and on-site consultations with physicians and outlying facilities	E	E	D
2.	Documentation of Post Discharge Summary information to referring physician and facility personnel	D	D	D
3.	Trauma Conferences for outlying facilities and pre-hospital personnel	E	D	D
4.	Evidence of trauma/injury prevention related activities in hospital publications	D	D	D
5.	Nursing participation in community outreach programs for the public and professionals is evident	E	E	D
<b>H. PUBLIC EDUCATION</b>				
1.	Documentation of injury prevention classes and classes concerning optimal care of the injured open to the public	E	D	D
2.	Brochures, public service advertisements/announcements on injury prevention and first aid	E	D	D
<b>I. TRAUMA RESEARCH PROGRAM</b>				
1.	Evidence of documented research publications on trauma-related issues	E	D	D
2.	Evidence of research data collection incorporated into all aspects of <b>trauma patient care system</b>	E	E	D
3.	Evidence of trauma nursing research and/or publications	E	D	D

		LEVELS		
		I	II	III
<b>J. TRAINING PROGRAM</b>				
1.	Evidence of hospital support for training and continuing education <sup>4</sup> for trauma personnel. Support may be providing courses, discounts, and/or travel arrangements.			
a.	In-house trauma service/trauma program personnel	E	E	E
b.	Community/consulting physicians	D	D	D
<b>K. NURSING EDUCATION</b>				
1.	All nurses caring for trauma patients have documented knowledge and skill in trauma nursing (trauma specific orientation, skills checklist, continuing education).	E	E	E
2.	Documented specific orientation and continuing education for pediatric care and burn care if these patient populations are regularly admitted to the trauma center	E	E	E
3.	A minimum of eight hours trauma/critical care CE annually for nursing staff:	D	D	D
a.	who participate in the trauma team response			
b.	who primarily care for the injured patient in the ICU, OR/PACU, ED and surgical/trauma units			
4.	A minimum of eight hours registry or trauma/critical care CE annually for trauma registrars.	E	E	E
5.	A minimum of forty-five hours trauma/critical care CE per three years for Trauma Coordinators. Fifty percent of these hours should be obtained outside their facility.	E	E	E
6.	TNCC verification for nursing staff:	D	D	D
a.	who participate in trauma team response			
b.	who primarily care for the injured pt in the ICU, OR/PACU, ED, and surgical/trauma units			
7.	Certification in area of specialty for fifty percent of nursing staff (e.g. CEN, CCRN, CCNN, CORN, etc)	D	D	D
<b>L. HOSPITAL DOCUMENTS</b>				
1.	Evidence of American Board of Surgery Certification documented in credentials file or other documentation showing active pursuit of current certification or recertification in General Surgery by Trauma Surgeons	D	D	D
2.	Evidence of recognized Board Certification documented in credentials file or other documentation showing active pursuit of current certification or recertification in Emergency Medicine or appropriate specialty by emergency department physicians	D	D	D
3.	Successful Completion of ATLS course and continuing trauma/critical care related education documented in credentials file for trauma surgeons and emergency department physicians	E	E	E
4.	Documentation of executed transfer agreements for services not provided or that require external referral updated and revised a minimum of every three years	E	E	E
5.	A copy of hospital bylaws with reference to trauma services noted therein	D	D	D

		LEVELS		
		I	II	III
<b>M. INSTITUTIONAL COMMITMENT</b>				
1.	Roster of participating personnel with titles, by department of distribution, at opening trauma site review conference.	E	E	E
2.	Knowledge, familiarity, and commitment of upper level administrative personnel to trauma service.	E	E	E
3.	Upper level administration participation in multi-disciplinary trauma conferences/committees.	E	E	E
4.	Maintain trauma log system as defined by the state registry and identify patients where a hospital trauma code was called.	E	E	E
5.	Evidence of yearly budget support for the trauma program.	E	E	E

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## FOOTNOTES

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<sup>1</sup>A two tier response allows for the in-hospital triage of injured patients. The patient thought to be less severely injured can be evaluated with less mobilization of hospital resources and medical personnel. Full mobilization must be immediately available and demonstrable if the patient is more severely injured than expected.

Criteria for the construction of tiers of response may be developed by the institution's Trauma Committee. The composition of the response team should ensure adequate ability to evaluate and treat the injured patient. For example, for the less severely injured patient, the Trauma Surgeon need not be available in the trauma treatment area when the patient arrives, but must be notified, available and see the patient in a reasonable time period after admission. Likewise, Anesthesia, certain additional nursing, radiology and laboratory personnel need not be present in the trauma treatment area, but must be immediately available.

An example of a successful application of triage criteria for a two tier system is noted in Appendix A. A "blue" alert signifies a severely injured patient and the "yellow" alert is the stepdown status. If an institution opts to use a two tier system, then a site review team will expect to see criteria for the delineation of the tiers, the composition of the response teams for each tier, and a CQI/QA process that show the system is functioning properly.

<sup>2</sup>Dedicated is taken to mean that a surgeon is responsible to a given institution or has a readily identifiable substitute for first call responsibility when he or she is not available. The substitute should be identified by a written second call list or some other equally effective written policy.

<sup>3</sup>The in-house requirement may be fulfilled by an in-house anesthesia resident who has special competence, as judged by the chief of anesthesia, in the care of trauma patients, and who is capable of initiating measures directed towards stabilizing the patient and managing the patient's anesthesia.

<sup>4</sup>Training and continuing education such as ATLS, ACLS, Trauma Nursing Core Course (TNCC), advanced Pediatric Life Support (APLS, PALS), and CPR, and other appropriate offerings in trauma and critical care.

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## Appendix C

<b>Patient Volume of Trauma Centers in 2002</b>		
<b>Trauma Center</b>	<b>Level</b>	<b>Number of Patients</b>
INOVA Fairfax Hospital	I	3,454
VCU Medical Center	I	2,403
Sentara Norfolk General Hospital	I	2,038
University of Virginia Medical Center	I	1,574
Carilion Roanoke Memorial Hospital	I	1,175
Sentara Virginia Beach General Hospital	III	1,128
Riverside Regional Medical Center	II	1,005
Carilion New River Valley Medical Center	III	331
Southside Regional Medical Center	III	315
CJW Medical Center, Chippenham Campus	III	210
CJW Medical Center, Johnston Willis Campus	III	206
Columbia Montgomery Regional Hospital	III	132
<b>TOTAL</b>		<b>13,971</b>
Note: Excludes Lynchburg General Hospital's Level II trauma center, because they did not submit data to the State trauma registry until recently.		
Source: JLARC staff analysis of trauma registry data.		

## Appendix D

<b>Listing of Traumatic Injuries Treated in Trauma Centers in Virginia (2002)</b>	
<b>Trauma Description</b>	<b>Frequency</b>
FALL	4,439
MOTOR VEHICLE ACCIDENT (DRIVER)	3,266
MOTOR VEHICLE ACCIDENT (PASSENGER/POSITION UNKNOWN)	1,362
GUNSHOT WOUND	712
STRUCK BY OBJECT	563
PEDESTRIAN	556
MOTORCYCLE DRIVER	450
STAB	378
BODILY ASSAULT	292
BICYCLE	287
MOTOR VEHICLE ACCIDENT (UNKNOWN POSITION)	214
MACHINERY/TOOLS	201
CUTTING OR PIERCING BY SHARP OBJECT	182
BURN/SCALDS/HOT LIQUID	160
UNKNOWN	121
BURN/FLAMES	98
BURN	96
INJURY BY ANIMAL	67
CAUGHT BETWEEN TWO OBJECTS	62
INJURY FROM STRENUOUS ACTIVITY	46
BOATING ACCIDENT	37
MOTORCYCLE PASSENGER	29
CHEMICAL EXPOSURE	29
ELECTRICAL SHOCK	28
EXPLOSIVE	24
ACCIDENTAL OR NEAR DROWNING	22
POWER LAWN MOWER	15
OTHER	14
MOTOR VEHICLE ACCIDENT (PASSENGER/FRONT SEAT)	13
ALL TERRAIN VEHICLE	12
SWALLOWED FOREIGN BODY	10
AIR CRAFT ACCIDENT	9
HANGING	8
NATURAL ENVIRONMENTAL ACCIDENT	7
MOTOR VEHICLE ACCIDENT (PASSENGER/BACK SEAT)	4
SUICIDE	4
BITE OF NONVENOMOUS INSECT	2
INJURY BY MACHINERY OR TOOLS	0
WATER TRANSPORT ACCIDENT	0
SUFFOCATION	0
DRUGS, MED/BIO CAUSING ADVERSE EFFECTS IN THER USE	0
<b>TOTAL</b>	<b>13,819</b>

## Appendix E

### Additional Analysis on Virginia's Trauma Patients

This appendix describes additional analysis conducted by JLARC staff on the causes and severity of traumatic injuries sustained by Virginia trauma patients, as well as insurance coverage information.

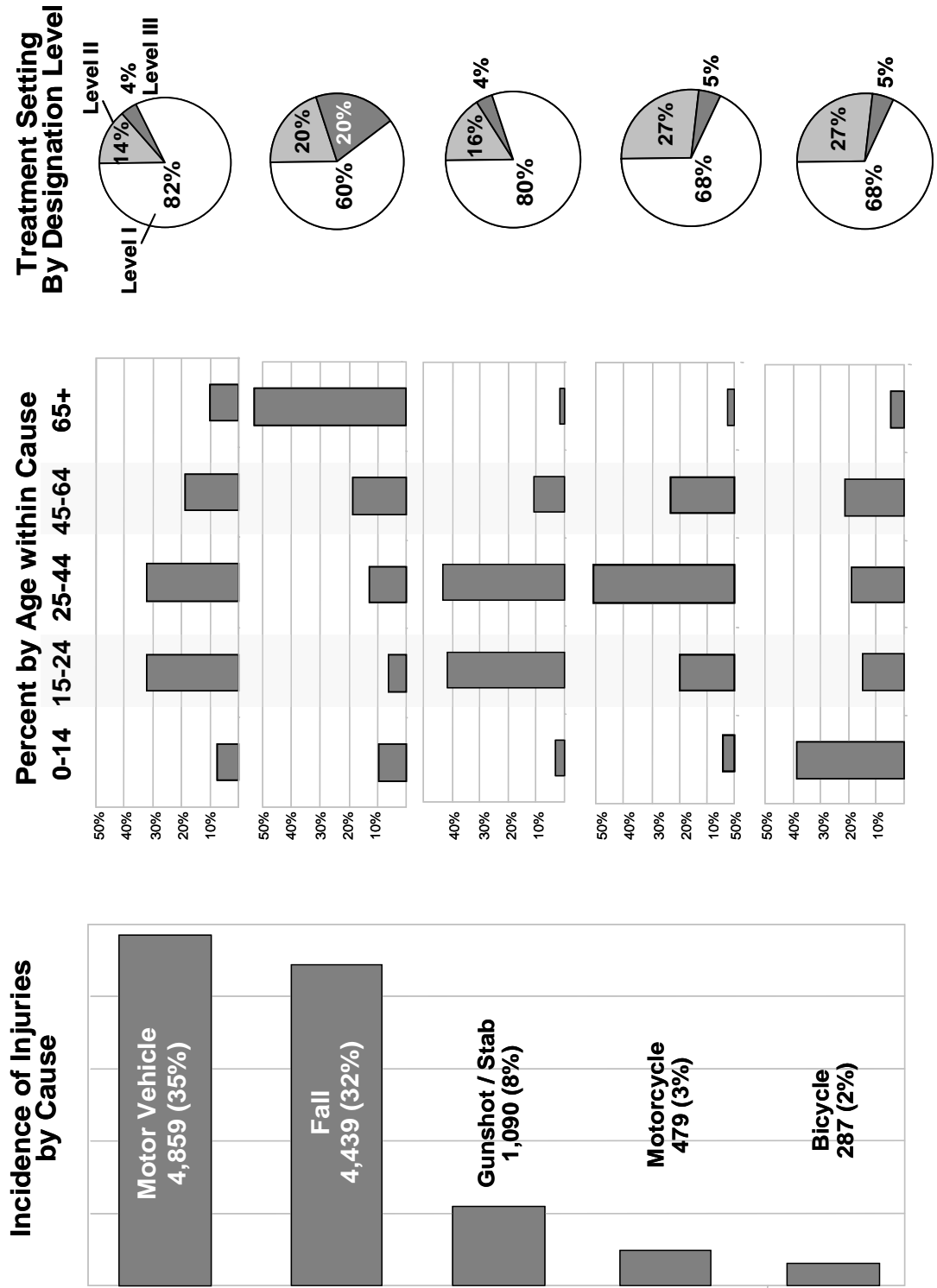
***Causes of Traumatic Injuries.*** Sixty-four percent of motor vehicle crashes and 85 percent of gunshot wounds and stabs in Virginia involved 15 to 44 year olds in 2002 (Figure E-1). More than half of fall incidents involved people 65 and older. Over 50 percent of motorcycle crashes involved 25 to 44 year olds, and nearly 40 percent of bicycle crashes involved children 14 years old or younger.

The majority of all injury types were treated in level I trauma centers in 2002 (Figure E-1). A larger proportion of motor vehicle crashes and penetrating injuries were treated in a level I trauma center than other types of injuries, as illustrated in Figure E-1. This trend may be partially explained by the fact that penetrating trauma injuries tend to be more critical (injury severity score, or ISS, greater than 24) than other types of injuries. Furthermore, a larger percentage of falls were treated in level III trauma centers in 2002, as more than 90 percent of these injuries were moderate (ISS less than 15).

***Insurance Profile of Trauma Patients.*** Trauma patients between the ages of 18 to 44 are disproportionately uninsured (more than 30 percent). In addition, trauma patients under the age of 18 are more likely to be insured through Medicaid than patients in other age groups, as shown in Figure E-2. As can be expected, the wide majority of trauma patients 65 and over are insured through Medicare, although 17 percent of them have private insurance as primary coverage.

Level I and level II trauma centers have a larger share of self-pay trauma patients (33 and 42 percent, respectively) than level III trauma centers (17 percent). Moreover, level III trauma centers have a higher proportion of privately insured patients (53 percent) than do level I and level II trauma centers (45 and 39 percent, respectively). Virginia's experience is generally consistent with national trends. Data from the National Trauma Data Bank indicate that level I trauma centers had the highest proportion of uninsured patients at nearly 40 percent, whereas level II and level III trauma centers had ten and two percent, respectively. The remaining 48 percent of uninsured patients were those of non-designated trauma center hospitals.

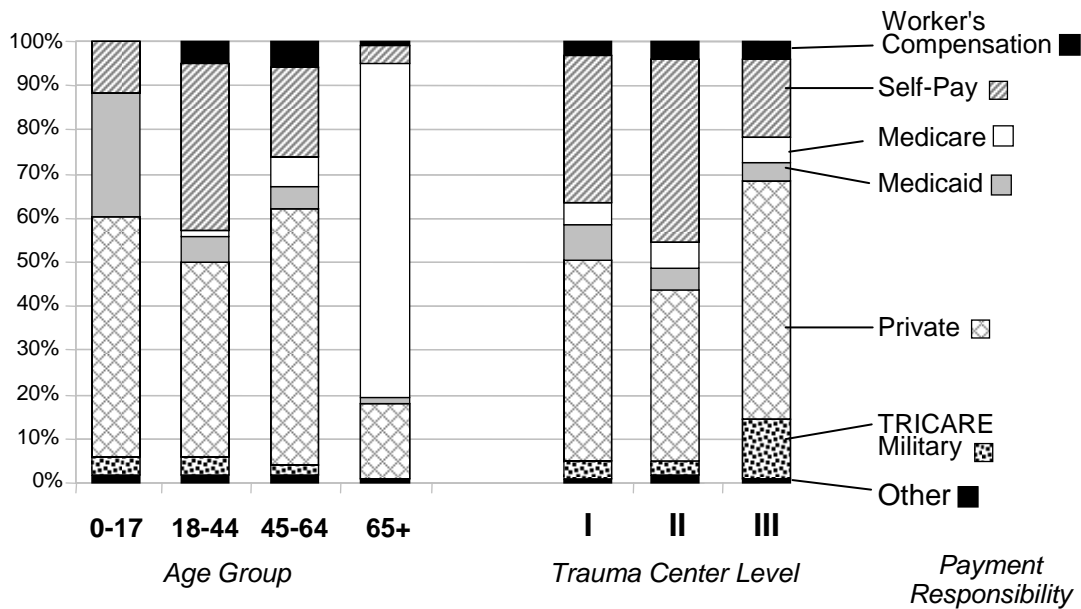
**Figure E-1**  
**Characteristics of Most Frequent Causes of Traumatic Injuries in Virginia (2002)**



Source: JLARC staff analysis of trauma registry data.

Figure E-2

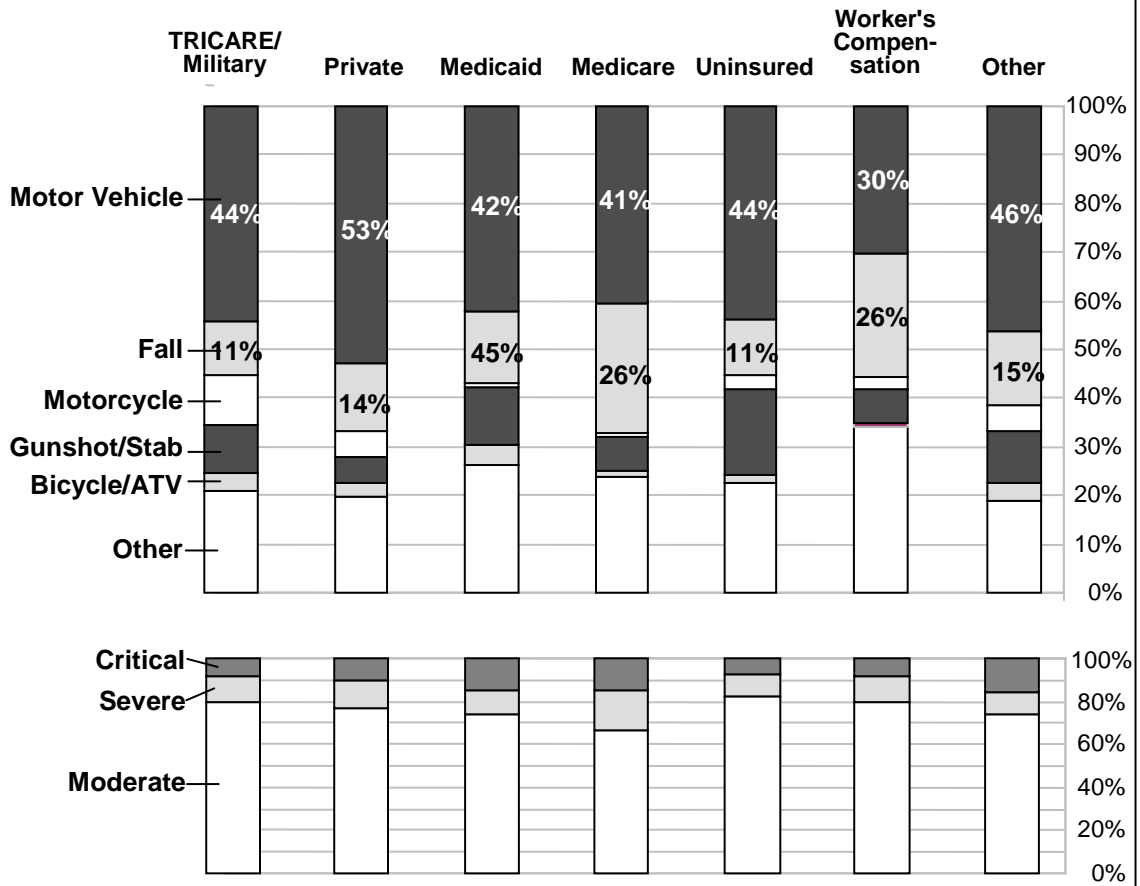
**Payment Responsibility of Virginia's Trauma Patients, 2003  
by Age Group and by Trauma Center Level**



Source: JLARC staff analysis of trauma center financial data, excluding Southside Regional Medical Center.

The distribution of both the causes of injury and their severity seem to vary by insurance type. Twenty-six percent of Medicare patients sustained injuries as a result of a fall in 2003. Forty-four percent of self-pay (uninsured) patients were victims of motor vehicle crashes, which is in line with the experience of privately insured trauma patients. However, uninsured trauma patients had a larger percentage of gunshot wounds and stabs than patients with health insurance. In addition, Medicaid and Medicare trauma patients were less likely to be in a motor vehicle crash, but Medicaid patients were more likely to have a penetrating injury. As for injury severity, Medicare recipients appear to be more likely to be treated for serious injuries (ISS between 15 and 24), compared to patients with private insurance, nearly 80 percent of whom sustain more moderate traumatic injuries (ISS less than 15). Medicaid and Medicare patients appear to be more likely to have critical injuries (ISS greater than 24).

**Figure E-3**  
**Types and Severities of Trauma Injuries in Virginia**  
**by Payment Responsibility (2002)**



Source: JLARC staff analysis of trauma registry data.

**Appendix F**  
**JLARC Finance Data Collection Instrument**  
**for Virginia Trauma Centers, June 2004**

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- Unless otherwise noted, the following information is requested for calendar year 2003
- Both costs and revenue associated with an item should be captured in the data request. For example, if you included grant funding as a revenue source because these funds are used to pay for a trauma support position, then the costs associated with the position should also be included in the cost section of the survey.

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**I. REVENUE, DIRECT COST AND INDIRECT COST OF TRAUMA PATIENT CARE**

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**(A) Patient-Level Cost and Revenue**

1. For each patient (both inpatient and outpatient) included in your facility's in-house trauma registry who had contact with the trauma service (including triggering a trauma alert), please provide the following information in the template available Tab (4) of this spreadsheet. All financial data should reflect the patients' entire stay (if admitted) through discharge. An illustration is provided at the top of tab 4.

- Direct Patient Costs broken out by the major standard categories listed below. Please include physician costs only if the physician is employed by your facility, or if you bill and collect on behalf of physicians.
  - Anesthesia / PACU
  - Cath Lab / EKG
  - Critical Care Nursing Unit
  - ED
  - Lab
  - Medical / Surgery Nursing Unit
  - Medical / Surgical Supplies
  - MRI/CT
  - OR
  - Pharmacy
  - PT/OT/Speech
  - Radiology
  - Respiratory
  - Special Procedures
  - All Other
- Indirect Patient Costs (overhead allocation). Please provide indirect costs broken by the following categories, if available. If a breakdown is not available, please provide the total amount of indirect overhead allocated to each patient.
  - Salary Overhead
  - Non-Salary Overhead
  - Supplies Overhead
  - Non-Supplies Overhead
  - Air Transportation (if applicable)
  - All Other
- Primary Payor (select one of the following options):
  - MCO/PPO/Commercial/Indemnity
  - Medicare
  - Medicaid (including Fee-for-Service, MCO, and Out-of-State)
  - Workman's Comp
  - State Local Hospitalization
  - CHAMPUS/Other Military
  - Self-Pay
  - All Other

- Net Patient Revenue / Expected Reimbursement broken out by the following categories. This amount should include payments such as DSH, GME, etc. if your facility includes these funds in expected reimbursements. If these funds are not included in expected reimbursements, please complete Section I (C).
  - Primary Payor
  - DSH
  - Indigent Health Care Trust Fund
  - GME
  - All Other Expected Reimbursements
- Amount Collected from Primary Payor (if different from expected reimbursement)
- Bad Debt Amount (negative revenue)

2. Please also include the following information so that the analysis can be segmented by injury, age, etc.

- Age
- Gender
- Race
- Under 100% of FPL? } *If unavailable, please specify whether patient is eligible for charity care based on your hospital's definition*
- Under 200% of FPL? }
- Home Zip
- Trauma Alert or Emergency Department Trauma Service Consult?
- Injury Severity Score
- E-Code
- Length of Stay - Total Hospital
- Length of Stay - ICU
- Emergency Department Disposition
- Patient Outcome (Discharge Disposition)

**(B) Hospital-Wide Comparative Statistics**

The following information reflects actual experience for all patients seen in your facility in calendar year 2003, including trauma patients. This data will be used for contrast with trauma patient statistics.

1. In total, how many patients were treated in your hospital in 2003?

<u>Outpatient</u>	<u>Admitted</u>
Only	
-	-

2. What was the average age of all patients treated in your hospital in 2003?

<u>Outpatient</u>	<u>Admitted</u>
Only	
-	-

3. For what percentage of patients was "Self-Pay" the primary payor type in 2003?

<u>Outpatient</u>	<u>Admitted</u>
Only	
0%	0%

4. What was the average inpatient length of stay in 2003?

-
---

5. What was the average cost of treating patients in 2003 (including direct and indirect costs)?

<u>Outpatient</u>	<u>Admitted</u>
Only	
\$ -	\$ -



**(C) Pass-Through / Lump Sum Revenue**

If you included all pass-through / lump sum payments (DSH, Indigent Health Care Trust Fund, GME, and grant funding for trauma) in expected reimbursements, please skip this section and proceed to Section II. Unless otherwise noted, this section captures payments received for the entire hospital, not just trauma.

1. How much did your facility receive in Medicaid and Medicare Disproportionate Share Hospital (DSH) funding in 2003?

Medicaid  
\$ -

Medicare  
\$ -

2. How many total Medicaid inpatient days were spent in your facility in 2003?

-

3. In total, how much charity care was provided by your hospital in 2003, as reported on your facility's income statement?

\$ -

4. How much did your facility receive through the Indigent Health Care Trust Fund in 2003?

\$ -

5. How many inpatients with family incomes below 100% of the Federal Poverty Line were treated in your hospital in 2003?

-

6. How much Graduate Medical Education (GME) funding was received by your facility from Medicaid and Medicare in 2003?

Medicaid  
\$ -

Medicare  
\$ -

7. On average, how many medical residents (total FTE) worked in the trauma service in 2003? How many residents (total FTE) worked in the entire facility?

Trauma Service  
-

Total Hospital  
-

8. How much grant funding received by your facility was used specifically to fund the trauma program in 2003?

\$ -

**(D) Trauma Patient Definition**

1. What criteria must patients meet in order to be entered into your facility's in-house trauma registry? What constitutes having "contact with the trauma service"?

Describe.

**II. INCREMENTAL COSTS OF TRAUMA CENTER DESIGNATION**

This section should capture all the material costs that would be not have to be incurred if your facility was not a designated trauma center (referred to as "incremental costs" in this document.) If certain incremental costs described below are already included (in whole or in part) in patient direct or indirect costs (and therefore captured in Section I (A) data), please provide an estimate of the proportion of that cost which is included in trauma patient direct or indirect costs.

*Example: Based on the hospital's allocation methodology, a total of \$40,000 (or 1 FTE) is allocated across trauma patients for security personnel. However, the hospital employs 3 Security FTEs (costing \$120,000) who would not be needed if the hospital were not a trauma center (the true incremental cost to the hospital). In this case, please report the total incremental cost of \$120,000 in Section II, and indicate that approximately 33% of that cost is already included in patient costs captured in Section I (A).*

**(A) Trauma Program Administration (Non-Clinical)**

1. What are the annual salary and benefits paid to individuals for providing non-clinical, administrative support to the trauma program? If an individual has other, clinical responsibilities that their salary and benefits also support, please pro-rate their salary and benefits to correspond with the percentage of time they spend on non-clinical administrative duties only.

	<u>Annual Salary and Benefits</u>	<u>% Included in Patient Direct / Indirect Cost</u>
Trauma Program Medical Director	\$ -	0%
Trauma Program Coordinator	\$ -	0%
Trauma Nursing Coordinator	\$ -	0%
Trauma Registrar	\$ -	0%
Other Admin./Non-Clinical (Specify Below)	\$ -	0%
Other Administrative / Non-Clinical Support to Trauma Program Include:	Describe.	

2. What was the approximate cost of incidental expenses and overhead necessary for the individuals listed above to carry out their non-clinical job responsibilities in 2003? Examples may include rent, supplies, trauma registry fees and maintenance, travel, utilities, recruiting, training, PC, etc.

\$ - 2003 Actual Cost      0% % Included in Patient Costs

**(B) Verification Process**

1. What were the estimated costs to your hospital of the actual verification site visit (most recent year)?

\$ - Consulting Fees	\$ - Miscellaneous
\$ - Visitors' Expenses	\$ - ACS Accreditation
	\$ - Total
	0% % of Total Included in Patient Cost

2. How far in advance does your facility begin to prepare for the verification site visit?

\$ - Weeks of Preparation

3. During this preparation period, which individuals are involved in the preparations, and for how much of their time?

<u>Individuals Involved</u>	<u>% of FTE</u>
Hospital Administrator	0%
Hospital CFO	0%
Trauma Medical Director	0%
Trauma Program Coordinator	0%
Trauma Nurse Coordinator	0%
Trauma Registrar	0%
Medical Records Personnel	0%
Other (Specify)	0%

4. During the preparation period, the site visit, or afterwards, does the hospital incur any additional personnel costs (including consultants), such as overtime, temporary personnel, consulting fees, or backfilling responsibilities? If yes, please estimate these costs for 2003.

No, the hospital does not incur additional personnel costs because of the verification site visit.

Yes, and the annual cost to the hospital in 2003 was:  % Included in Patient Cost

**(C) Personnel Availability**

On-Call / Stipends to Physicians

1. Does your facility provide stipends or salary enhancements to individual physicians or physician groups for providing trauma call coverage?

Yes  No

2. If you answered Yes to the above question, please indicate for each physician specialty receiving a stipend for their participation in the trauma service (a) their average daily stipend or compensation, and (b) the total stipends amount paid by the hospital in 2003.

	<u>Average Daily Stipend / Compensation</u>	<u>Total Paid in 2003</u>	<u>% Included in Patient Cost</u>
General Surgeons	\$ -	\$ -	0%
Neurosurgeons	\$ -	\$ -	0%
Orthopedic Surgeons	\$ -	\$ -	0%
Anesthesia	\$ -	\$ -	0%
ENT	\$ -	\$ -	0%
Plastic Surgery	\$ -	\$ -	0%
Interventional Radiology	\$ -	\$ -	0%
OMFS	\$ -	\$ -	0%
Other (Specify)	\$ -	\$ -	0%
Other (Specify)	\$ -	\$ -	0%
Other (Specify)	\$ -	\$ -	0%

3. Is the stipend indicated in the previous question designed exclusively to compensate physicians for trauma call coverage? If not, please enumerate what other services or costs the stipends are designed to remunerate (i.e. panels, committee work, etc.).

Yes, the stipends are exclusively for taking trauma call

No, the stipends also cover:

4. Does the hospital directly underwrite the cost of medical malpractice insurance for physicians who take trauma call? If Yes, please indicate which physicians are covered, along with the annual expense to the hospital for assuming this cost.

No, the hospital does not underwrite the cost of medical malpractice insurance.

Yes, and the annual cost to the hospital in 2003 was:   
 % Included in Patient Cost

Physicians covered (please check all that apply):

<input type="checkbox"/> General Surgeons	<input type="checkbox"/> ENT	<input type="checkbox"/> Other (Specify)
<input type="checkbox"/> Neurosurgeons	<input type="checkbox"/> Plastic Surgery	<input type="checkbox"/> Other (Specify)
<input type="checkbox"/> Orthopedic Surgeons	<input type="checkbox"/> Radiology	<input type="checkbox"/> Other (Specify)
<input type="checkbox"/> Anesthesia	<input type="checkbox"/> OMFS	<input type="checkbox"/> Other (Specify)

5. Other than call pay, does the hospital provide any supplemental payments to physicians and clinical staff that is tied directly to trauma activity (such as participation in panel, review committees, etc)? Please describe the recipients and purpose of these payments, as well as annual cost in 2003.

No, the hospital does not provide additional compensation.

Yes, and the annual cost to the hospital in 2003 was:   
 % Included in Patient Cost

Supplemental Payments to Physicians and Clinical Staff Include:

*On-Call / Stipends to Other Clinical Staff (Nurses, Technicians, ...)*

6. Does the hospital pay non-physician clinical staff a stipend to participate in trauma service? If Yes, please describe the recipients and specify annual cost to hospital in 2003.

No, the hospital does not pay stipends to non-physician staff.

Yes, and the annual cost to the hospital in 2003 was:   
 % Included in Patient Cost

Non-Physician Clinical Staff Receiving Stipends for Participation in the Trauma Program Include:

**(D) Research, Outreach, and Education**

1. Do FTEs other than those mentioned in Section II (A) (Trauma Program Administration) participate in prevention and outreach efforts? If yes, what compensation (including salary, benefits, and / or stipends) do they receive to carry out these activities?

No, no other FTEs participate in prevention and outreach.

Yes, and the annual cost to the hospital in 2003 was:   
 % Included in Patient Cost

2. Please estimate the non-salary/benefit costs of conducting research, outreach, and education activities (example may include rent, utilities, travel, marketing, consulting fees, supplies, PC, etc.) Do not include these costs if they are already captured in Section II, Question (A)(2).

2003 Actual Costs  % Included in Patient Cost

**(E) Other**

1. Are there other incremental costs incurred solely to operate the trauma program and meet designation requirements that are not captured in other areas of Section II? If yes, please enumerate these costs, and, to the extent possible, quantify each of them for 2003. Examples may include:

- Operating Room Standby
- Air Transportation
- Higher Staffing Level
- Higher Staffing Ratios
- Cost of Operating and Maintaining Additional Equipment
- Cost of More Sophisticated Equipment
- Cost of Training / Backfilling positions
- Recruiting
- Consulting Fees
- Specialized Equipment (i.e. Burn, Rehab, ...)
- Depreciation Expense on Capital Improvement Projects Related to Trauma
- Extra Security
- Social Workers
- Chaplains
- Communication Staff and Equipment

No, all incremental costs of being a trauma center were captured earlier in the survey.

Yes, there are other incremental costs that are material, and they include:

<u>Activity</u>	<u>2003 Cost</u>	<u>% Included in Patient Cost</u>	<u>Quantification Methodology or Items Included</u>
	\$ -	0%	
	\$ -	0%	
	\$ -	0%	
	\$ -	0%	
	\$ -	0%	
	\$ -	0%	
	\$ -	0%	
	\$ -	0%	
	\$ -	0%	
	\$ -	0%	
	\$ -	0%	

## **Methodology Summary**

- Patients were classified as inpatient if their total length of stay was more than 1 day.
- Patients for whom "State and Local Hospitalization" was the primary payor were grouped with "Self-Pay" patients.
- An average of readiness costs (resulting from trauma center designation) per patient was calculated and allocated to each patient.
- All patients, whether inpatient or outpatient, were allocated the same amount of readiness cost on the basis that each of these patients benefited from trauma center readiness to the same degree.
- The portion of readiness costs already included in trauma patient costs was subtracted from indirect costs so as to not double count these expenses.
- Insurance revenue include only the amount collected, not billed.
- In addition to patient-specific revenue sources (such as revenues collected from the primary payor), certain lump sum revenues were allocated to each patient (DSH, IME, Indigent Health Care Trust Fund) to create a total revenue picture. DSH and IHCTF funds were allocated to self-pay patients, and IME funding was allocated across all trauma patients
- Two cost recovery ratios were calculated by dividing total revenues by 1) the sum of patient direct and indirect costs, and 2) patient direct and indirect costs plus allocated readiness costs. These ratios are intended to illustrate what portion of trauma center costs, including both patient direct and indirect costs as well as readiness costs, are reimbursed when counting all revenue sources.
- Financial data include all trauma patients taken to a trauma center in 2003 who had contact with the trauma service either because a trauma alert was called, or a trauma physician was asked for a consultation.

## Appendix G

### **Methodology and Assumptions of the Virginia Geographical Information Network (VGIN) Division of the Virginia Technologies Agency (VITA) in Developing Trauma Center Service Area Maps**

Note: This technical discussion of the development of maps illustrating ground and air transportation access to trauma centers in Virginia was prepared by Virginia Information Technologies Agency staff.

#### ***1. Acquire road files, including surrounding states.***

Road files and block groups were acquired from ESRI's maps and data. These cover the entire state of Virginia, along with a 55 mile buffer extending into the surrounding states.

#### ***2. Determine urban/rural extents.***

The urban/rural extents were developed as five population extents determined by people per square mile using 2000 census tract data.

High Urban	3,000 or more people per square mile
Urban	1,000 – 2,999 people per square mile
Transitional Urban	100 – 999 people per square mile
Rural	7 – 99 people per square mile
High Rural	1 – 6 people per square mile

Using block groups, each was attributed with one of the five extents. Then, all the block groups were dissolved into one of the five polygons: high urban, urban, transitional urban, rural, and high rural.

#### ***3. Apply distance decay factors.***

The distance decay factors have been calculated in the spreadsheet below.

Currently, the centerlines are being attributed into each of the five population categories, and then attributed as a one of the four road types. Each line segment will then have a field added for: the average mph, the speed adjustment factor, the calculated speed using the average mph and the speed adjustment factor, the estimated rate of travel at medium congestion (75%) and estimated rate of travel at high congestion (50%).

<b>Standard 100% (No Congestion)</b>	<b>Estimated Rate of Travel <i>High Rural</i></b>	<b>Estimated Rate of Travel <i>Rural</i></b>	<b>Estimated Rate of Travel <i>Transitional Urban</i></b>	<b>Estimated Rate of Travel <i>Urban</i></b>	<b>Estimated Rate of Travel <i>High Urban</i></b>
<b>Local Roads</b>	30	30	19.2	17.4	13.2
<b>State Highways</b>	45	45	28.8	26.1	19.8
<b>US Highways</b>	55	55	31.9	30.8	29.15
<b>Interstates</b>	60	60	54.6	49.2	41.4

<b>Congestion 75%</b>	<b>Estimated Rate of Travel <i>High Rural</i></b>	<b>Estimated Rate of Travel <i>Rural</i></b>	<b>Estimated Rate of Travel <i>Transitional Urban</i></b>	<b>Estimated Rate of Travel <i>Urban</i></b>	<b>Estimated Rate of Travel <i>High Urban</i></b>
<b>Local Roads</b>	22.5	22.5	14.4	13.05	9.9
<b>State Highways</b>	33.75	33.75	21.6	19.575	14.85
<b>US Highways</b>	41.25	41.25	23.925	23.1	29.8625
<b>Interstates</b>	45	45	40.95	36.9	31.05

<b>Congestion 50%</b>	<b>Estimated Rate of Travel <i>High Rural</i></b>	<b>Estimated Rate of Travel <i>Rural</i></b>	<b>Estimated Rate of Travel <i>Transitional Urban</i></b>	<b>Estimated Rate of Travel <i>Urban</i></b>	<b>Estimated Rate of Travel <i>High Urban</i></b>
<b>Local Roads</b>	15	15	9.6	8.7	6.6
<b>State Highways</b>	22.5	22.5	14.4	13.05	9.9
<b>US Highways</b>	27.5	27.5	15.95	15.4	14.575
<b>Interstates</b>	30	30	27.3	24.6	20.7



	Road Type	Average MPH	Speed Adjustment Factor
<b>High Rural</b>	Local Roads	30	1
	State Highways	45	1
	US Highways	55	1
	Interstates	60	1
<b>Rural</b>	Local Roads	30	1
	State Highways	45	1
	US Highways	55	1
	Interstates	60	1
<b>Transitional Urban</b>	Local Roads	30	0.64
	State Highways	45	0.64
	US Highways	55	0.58
	Interstates	60	0.91
<b>Urban</b>	Local Roads	30	0.58
	State Highways	45	0.58
	US Highways	55	0.56
	Interstates	60	0.82
<b>High Urban</b>	Local Roads	30	0.44
	State Highways	45	0.44
	US Highways	55	0.53
	Interstates	60	0.69

**4. Traffic conditions and travel time of ground transportation.**

Estimated trauma center service areas within one hour after injury (50 minute travel time with a 10 minute dispatch time) were determined for three traffic conditions:

- Light traffic: ambulance may travel at posted speed limits
- Heavy traffic: ambulance may travel at 50% of posted speed limits
- Heavy traffic (2): ambulance may travel at 75% of posted speed limits

All calculations were based on the speed limits listed in the table above.

**5. Air medevac service areas.**

Air medevac service areas were based on a 50 mile radius, assuming an air speed of 120 miles per hour and a dispatch time of ten minutes. A listing of air medevac provider locations in Virginia was provided by the Office of Emergency Medical Services (OEMS). JLARC staff contacted EMS offices of Virginia's neighboring states to obtain their listings of air medevac provider locations for inclusion in VGIN's service area maps.

## Appendix H

### House Bill 1143 2004 Session

*An Act to amend the Code of Virginia by adding a section numbered 18.2-270.01, relating to DUI offenders; payment to Trauma Center Fund.*

Patron -- McDonnell

Be it enacted by the General Assembly of Virginia:

1. That the Code of Virginia is amended by adding a section numbered 18.2-270.01 as follows:

§ 18.2-270.01. Multiple offenders; payment to Trauma Center Fund.

A. The court shall order any person convicted of a violation of §§ 18.2-36.1, 18.2-51.4, 18.2-266, 18.2-266.1 or § 46.2-341.24 who has been convicted previously of one or more violations of any of those sections or any ordinance, any law of another state, or any law of the United States substantially similar to the provisions of those sections within 10 years of the date of the current offense to pay \$50 to the Trauma Center Fund for the purpose of defraying the costs of providing emergency medical care to victims of automobile accidents attributable to alcohol or drug use.

B. There is hereby established in the state treasury a special nonreverting fund to be known as the Trauma Center Fund. The Fund shall consist of any moneys paid into it by virtue of operation of subsection A hereof and any moneys appropriated thereto by the General Assembly and designated for the Fund. Any moneys deposited to or remaining in the Fund during or at the end of each fiscal year or biennium, including interest thereon, shall not revert to the general fund but shall remain in the Fund and be available for allocation in ensuing fiscal years. The Department of Health shall award and administer grants from the Trauma Center Fund to appropriate trauma centers based on the cost to provide emergency medical care to victims of automobile accidents. The Department of Health shall develop, on or before October 1, 2004, written criteria for the awarding of such grants that shall be evaluated and, if necessary, revised on an annual basis.

## Appendix I

### Summary of States Supporting Trauma Centers

<i>State</i>	<i>General State Trauma Care Fund</i>	<i>State Grants for Trauma</i>	<i>Supports Physicians and Hospitals for Uncompensated Care</i>	<i>Trauma Administration</i>	<i>Injury Prevention</i>	<i>Improve Medicaid Rates</i>	<i>Est. Annual Amount Provided</i>
Arizona							
California	x		x				\$65MM
Florida	x		x				varies
Georgia				x			\$0.7MM
Illinois	x		x	x			\$4.6MM
Maryland*	x		x				\$10.4MM
Mississippi	x		x	x			\$7.5MM
Nebraska	x			x			\$0.9MM
Oklahoma	x		x	x			\$16.4MM
Pennsylvania		x	x				\$12.5MM
Texas	x	x	x		x		\$263MM
Virginia		x					\$0.2MM
Washington		x	x			x	\$16MM

\*FY 2004 was the first year of operation of the Maryland Trauma Physicians Services Fund. Although \$10.4 million was collected, only \$4.1 million was disbursed during FY 2004.

\*\*\$263 million is the estimated annual amount expected when all legislatively approved revenue collection mechanisms are in place.

## Appendix I

### Summary of States Supporting Trauma Centers

State	SOURCES																	
	State Fines							State Fees				Local Fines and Fees	State Taxes	Local Property Taxes	Tobacco Settlement	Unclaimed Lottery	Gaming Initiative	General Funds
	DUI	Traffic Infractions	Firearm Discharges	Dangerous Substances	Open Container	Unknown	Registration	Issue License	Reinstate License	911 Surcharge								
Arizona												X				X		
California		X															X	?
Florida											X		X				X	
Georgia																	X	
Illinois	X	X	X															
Maryland							X											
Mississippi		X												X				
Nebraska																	X	
Oklahoma	X	X		X	X			X	X									
Pennsylvania		X																
Texas		X					X						X	X	X			
Virginia	X																	
Washington		X					X											

## **Appendix J**

### **Agency Responses**

As a part of the extensive validation process, State agencies and other entities involved in a JLARC assessment effort are given the opportunity to comment on an exposure draft of the report. Appropriate technical corrections resulting from comments provided by these entities have been made in this version of the report.

This appendix contains the written responses of the JLARC Trauma Study Technical Advisory Panel assembled by the Virginia Hospital and Healthcare Association, the Department of Medical Assistance Services, the Department of Health, and the Bureau of Insurance division of the State Corporation Commission. The page numbers referenced in the written comments refer to an earlier draft of the report and may not correspond to the pages of this report.





October 27, 2004

Mr. Philip A. Leone  
Director  
Joint Legislative Audit and Review Commission  
General Assembly Building, Suite 1100  
Richmond, Virginia 23219

Dear Mr. Leone,

On behalf of the clinical and administrative leaders of the Commonwealth's trauma center hospitals, assembled by the Virginia Hospital & Healthcare Association as the JLARC Trauma Study Technical Advisory Panel (TAP - roster attached), we appreciate the opportunity to comment on "The Use and Financing of Trauma Centers in Virginia" exposure draft. Let us begin by offering our thanks and compliments to Glen Tittermary, Nathalie Molliet-Ribet and the other members of the study team for conducting a high quality and thorough evaluation of Virginia's trauma system.

The report offers a clear statement of the value of an effective trauma system for all Virginians and – for the first time – a comprehensive assessment of the challenges faced by trauma service providers. The breadth of the investigation, the clarity of the findings and the comprehensive options presented provide a solid foundation on which policy makers may act to preserve, and we hope strengthen, the critical public resource represented by Virginia's trauma system.

Our comments are divided into two parts. First, we offer our input on the policy options in the hopes these sentiments will be of value to Commission members. And second, we identify a few areas where we believe technical corrections are warranted.



Mr. Philip A. Leone  
October 27, 2004  
Page 2

## Policy Options

Consistent with the report framework we will address the physician coverage issues first, before turning to the trauma center challenges relating to readiness and clinical care losses. Each is important and inter-related.

### *Physician Challenges*

The analysis does an excellent job of delineating the challenges facing physicians participating in trauma care: high proportions of uninsured, inadequate reimbursements from the publicly insured, the real and significant opportunity costs of fulfilling the on-call readiness role, rising malpractice insurance costs and increasing reluctance to suffer the quality of life impacts related to trauma care. These challenges are real and growing. The report also accurately describes the related difficulties trauma centers (and, to a lesser degree, other hospitals as well) face in securing sufficient physician specialty capabilities and call coverage, with more and more having to pay from hospital funds for call time and patient care subsidies to secure sufficient professional specialty capabilities.

TAP members strongly encourage policy-makers to pursue all mechanisms available for restoring the attractiveness to physicians of providing trauma care. In the short term, the most effective mechanism identified is to increase Medicaid payment levels for trauma-related services (this option has the important benefit of being able to draw on federal matching funds). Over the longer term, Virginia should support additional medical education, recruitment and retention efforts to expand the supply of physicians critical to trauma services in order to make the quality of life more appealing and the burdens more manageable.

### *Cost of Readiness*

Upon reviewing the JLARC study, perhaps the most critical new information provided by the analysis is the detailing of trauma center readiness costs. Assembling a highly-skilled care team, assuring stand-by operating room and other physical capacity, being ready to marshal these resources at a moments notice to offer the highest level of care possible are fixed costs that equate to a critical public good essential to the well being of all in the community. The report also notes that the quality of the care provided in these settings is superior when the facility is properly prepared.

One in every 350 Virginians is affected directly by trauma each year. And yet this stand-by capacity – analogous to fire stations in many ways – is not accessible to all Virginians today. According to the analysis 20-40% of Virginians do not have access to a trauma center within an hour's drive, and air transportation is not consistently available. Nor are the costs of readiness recognized or covered by public or private payers.





Mr. Philip A. Leone  
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Page 3

Hospitals who voluntarily seek trauma center designation have heretofore been meeting these unfunded fixed costs with revenues from other services and private payers. But the broader system trends – more services being shifted to outpatient settings, tighter private payer contracting, higher patient cost-sharing, rising uninsured, etc. - all combine to make the current indirect financing mechanisms for trauma readiness costs untenable.

Physician challenges and trauma service clinical care losses are very significant, and are particularly acute at trauma centers because of the especially high-volume of service provided to uninsured and publicly-insured patients. Important options are available to meet these challenges, at least in part, and our comments elsewhere address them. But Panel members wish to highlight the critical and unique nature of maintaining (if not enhancing) the readiness capability of Virginia's trauma centers. If this aspect of the problem is not addressed significantly and soon, the ability of our trauma system to effectively serve the public – even in the absence of any mass-casualty event – will be seriously compromised and patient outcomes will suffer.

Given the relatively fixed and fundamental nature of trauma readiness, TAP members strongly support the option for establishing a separate fund to meet these costs, with stable and broad-based revenue sources that expand or shrink according to underlying population trends. All of us are at risk of requiring sophisticated trauma services, and general tax resources are best suited to meeting such fundamental public needs as trauma center readiness.

TAP members discussed at length the option identified in the report for attempting to recoup part of these costs from private payers via the levying of “trauma activation fees”. However, there is no obligation on the part of private payers to accept this charge and most contracts don't currently allow for it. More importantly, trauma readiness capabilities are felt by TAP members to be too important to the Commonwealth to rely on the vagaries of the private marketplace to fulfill via episodic negotiations with a changing array of insurers and plan designs.

Notwithstanding the overarching recommendation for a broad-based revenue source to fund readiness costs, TAP members do support the notion of modifying Medicaid payment systems to recognize its share of trauma service readiness costs. Doing so will allow for at least part of the costs to be borne by federal match. If this option proves feasible under federal Medicaid rules, and we believe it will, then the remaining unmet readiness costs in 2003 according to the analysis were \$18.4 million.



Mr. Philip A. Leone  
October 27, 2004  
Page 4

### *Clinical Care Losses*

The report does an excellent job of highlighting the fact that while public payer shortfalls and uninsured care losses are a growing problem for all providers, they are especially problematic for trauma services. An estimated 15% of all Virginians are uninsured. But trauma patients are three times as likely as to be uninsured as other, non-trauma patients. And for the most severe cases, when inpatient treatment is required, trauma patients are six times as likely to be uninsured as other inpatients.

Moreover, public insurers consistently pay below costs for services. Medicaid payments in particular are currently designed to cover 80% of Medicaid-allowable hospital outpatient costs and 72% of inpatient costs.

The report correctly notes that correcting these trauma-related Medicaid payment shortfalls and attempting to meet the clinical-care losses for the uninsured would benefit incrementally more significantly the private trauma center hospitals. This is true because Medicaid payment policies currently come close to fully meeting the Medicaid and indigent care costs at the state teaching hospitals via medical education and DSH payments, but not so for other hospitals. However, raising inpatient payment rates will still benefit the state teaching hospitals as well by a) ensuring the viability of the trauma system overall; and b) relieving pressure on otherwise limited medical education and DSH funding streams.

Among the policy options identified for redressing trauma service clinical care losses TAP members recommend the following:

- 1) Increasing Medicaid payments so that they fully cover inpatient and outpatient clinical care costs for the patients that receive trauma services; and
- 2) Pursuing other options through the Medicaid program that will provide a more comprehensive coverage of the indigent care costs at the trauma centers.



Mr. Philip A. Leone  
October 27, 2004  
Page 5

### **Technical Comments**

Technical comments are offered in four areas, again following the order in which they occur in the report.

#### *Trauma Center Closures*

In the summary, the statement is made that “Virginia Beach General Hospital’s trauma center downgraded its designation level due to staffing shortages, a first in the history of Virginia’s trauma system” (first paragraph, pg. i). In fact, other hospitals have downgraded programs in the past – for example, Hampton General Hospital eliminated its trauma designation completely a number of years ago. Perhaps a reference to Virginia Beach General being the most recent occurrence would be more correct.

#### *Destinations of Trauma Patients*

In both the summary (pgs. v-vi) and in the full report (pgs. 45-50) the analysis relies on trauma registry data to make conclusions about the validity and consistency of triage protocols. Regarding the occurrence of over and under triaging, it is very important to keep in mind that the severity score for a patient in the registry is assigned by a trauma center well after the fact; whereas the assessment upon where to take the patient in the field relies on incomplete information, collected in a short time frame, and in stressful situations. Thus, it is premature to suggest what changes, if any, need to be made in the triage protocols; much less how such revisions should be “enforced”.

We fully support the analysis referred to in Recommendation (1), but would suggest that the question of enforcement is both premature given the data source and goes beyond the voluntary nature of the underlying system and linkages among participants.

#### *SLH/IHCTF Programs*

Only in the case of the SLH program is it locally administered and hospitals petition for qualified payments during the year. The IHCTF is an after-the fact, fixed-size redistribution of a small amount of private hospital charity care. Therefore, the last two sentences of the final paragraph on page 89 (beginning with “The amount of funds available to each locality ...”) more properly apply to the previous paragraph that describes the SLH program.



Mr. Philip A. Leone  
October 27, 2004  
Page 6

### *Medicaid Payment Systems*

Starting in the fall of last year, state teaching hospital Medicaid inpatient payments were lowered to the same proportion of costs as private hospitals (72% currently). Although these losses are made up for elsewhere for these facilities (via additional indirect medical education payments as the report notes), inpatient operating payments are now set similarly for all hospitals. There remain differences in Medicaid's hospital outpatient operating payments (80% of Medicaid allowable costs for private hospitals, no adjustment factor for state teaching hospitals), and in the IME arena. But the first paragraph on page 95 should be updated to reflect the inpatient system change made last fall.

### **Conclusion**

On behalf of all those involved in trauma care in the Commonwealth we wish to applaud the General Assembly for directing that the study on Virginia's trauma system be undertaken and thank the JLARC team for conducting it in such a comprehensive and high quality fashion.

The findings couldn't be more important nor the timing more fortuitous. The stresses are just reaching the critical phase and there is time to act to prevent any further deterioration in this critical component of the Commonwealth's health care system.

VHHA looks forward to working with commission members, the administration and others in implementing the recommendations necessary to not just stem the tide of service curtailments or closures, but strengthen the trauma system that is so critical to the well being of all Virginians.

Sincerely,

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Chairman, VHHA Trauma Study TAP

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October 27, 2004

Mr. Philip A. Leone, Director  
Joint Legislative Audit & Review Commission  
Suite 1100, General Assembly Building, Capital Square  
Richmond, VA 23219

Re: Exposure Draft *The Use and Financing of Trauma Centers in Virginia*

Dear Mr. Leone:

Thank you for the opportunity to review and comment on the exposure draft of the report titled *The Use and Financing of Trauma Centers in Virginia*. I commend you and your staff's effort in its broad examination of the issues surrounding the delivery of trauma care in the Commonwealth. The Department of Medical Assistance Services (DMAS) plays a part in that delivery system, and our paramount concern at DMAS is the proper delivery of quality health care to Medicaid and FAMIS recipients.

The draft report covers a variety of issues related to the Medicaid program, and proposes a number of options that would utilize Medicaid payment to enhance the viability, both financial and otherwise, of the trauma care delivery system. As the draft report points out, the issues surrounding use of additional Medicaid funding would need to be further examined by DMAS staff regarding both the administrative and financial aspects of the Medicaid-related options. Obviously, DMAS staff has not had the opportunity to initiate that analysis within the allotted time for review of this draft report.

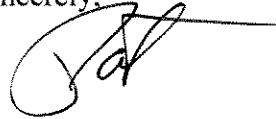
As always, DMAS stands ready to work with your staff, other agency staff, elected officials and other interested parties to further explore whatever options the Governor and General Assembly believe appropriate in response to this report and other sources of information regarding trauma care. I would be remiss, however, if I did not reiterate the point made in the draft report that any changes in the Medicaid reimbursement methods for providers involved in trauma care would require approval from the Centers for Medicare and Medicaid Services (CMS) before any federal funding would be available. Furthermore, interested parties should be aware that some of the proposed options for dealing with Medicaid payment to trauma providers constitute

Mr. Philip A. Leone  
October 27, 2004  
Page 2

significant variation from current claims processing and payment procedures. While this is certainly not a roadblock toward implementing these changes, system changes would most likely take some time to complete in order to implement these new approaches to reimbursement.

Again, thank you for the opportunity to comment on the draft report. We look forward to further discussions with your staff and others regarding implementation of any options pursued by the Governor and General Assembly.

Sincerely,

A handwritten signature in black ink, appearing to be 'P. Finnerty', with a long horizontal line extending to the right.

Patrick W. Finnerty

PWF/sf





# COMMONWEALTH of VIRGINIA

*Department of Health*

ROBERT B. STROUBE, M.D., M.P.H.  
STATE HEALTH COMMISSIONER

P O BOX 2448  
RICHMOND, VA 23218

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October 27, 2004

Mr. Philip A. Leone, Director  
Joint Legislative Audit and Review Commission  
Suite 1100, General Assembly Building  
Richmond, VA 23219

Dear Mr. Leone:

Thank you for the opportunity to review the JLARC Exposure Draft on *The Use and Financing of Trauma Centers in Virginia* dated October 14, 2004. The Virginia Department of Health's (VDH) Office of Emergency Medical Services (OEMS) has reviewed the draft report and does not have any further comments or suggested changes. VDH has no objection to the two recommendations contained in the report. I appreciate the time, effort and hard work of the JLARC staff, particularly Nathalie Molliett-Ribet, Paula Lambert, and others who participated in the research and development of this report. OEMS staff will attend the JLARC meeting on November 8. VDH does not need to be placed on the meeting agenda. Please feel free to contact me if I can be of any further assistance.

Sincerely,

A handwritten signature in cursive script, appearing to read "Robert B. Stroube".

Robert B. Stroube, M.D., M.P.H.

# COMMONWEALTH OF VIRGINIA

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## STATE CORPORATION COMMISSION BUREAU OF INSURANCE

October 26, 2004

Nathalie Molliet-Ribet  
Principal Legislative Analyst  
Joint Legislative Audit and Review Commission  
Suite 1100, General Assembly Building, Capitol Square  
Richmond, Virginia 23219

RE: Medical Malpractice Portion of JLARC Exposure Draft of *The Use And Financing of Trauma Centers In Virginia*

Dear Ms. Molliet-Ribet:

Thank you for the opportunity to review the information regarding medical malpractice insurance contained in the exposure draft of the JLARC Report *The Use And Financing of Trauma Centers In Virginia*. We have reviewed the content and have no suggested changes or alterations.

If you have any questions or need additional information, please do not hesitate to contact me. It was a pleasure working with you and Kimberly Sarte on this report.

Best regards,

Eric C. Lowe  
Principal Insurance Analyst  
Property and Casualty Division  
804.371.9628

CC: Mr. Allen Parker, Assistant to Commissioner Morrison  
Mrs. Mary M. Bannister, Deputy Commissioner, Property and Casualty Division

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*Technical Report: The Cost of Raising Children*, November 2000  
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