# The Current Regionalized Pre-hospital and Inter-hospital Trauma Triage Program Reviewed

An assessment of trauma triage, to benefit the trauma, stroke, and STEMI programs in Virginia.

Virginia Department of Heath
Office of Emergency Medical Services
Division of Trauma/Critical Care

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**Executive Summary**

The Commonwealth of Virginia's Trauma System compared to other statewide trauma programs is considered a "mature system". A trauma system includes all components of trauma care including: injury prevention, access to specialty trauma care, acute hospital care, rehabilitation, and research. The State Board of Health (BOH) is the State agency that ultimately oversees the Virginia Trauma System through the Virginia Department of Health (VDH). The VDH has several Divisions dedicated to injury prevention and acute care hospital licensure. Access to trauma care and trauma system development is managed through VDH's Office of Emergency Medical Services (OEMS). OEMS performs these functions in consultation with a state level trauma committee, the Trauma System Oversight and Management Committee, which is comprised of related organizations.

OEMS oversees the development and maintenance of Virginia's trauma center designation criteria and assures compliance by the designated trauma centers with those criteria. The Virginia Trauma System includes five Level I trauma centers, the highest level, four Level II centers, and five Level III centers. Level I and II centers by definition provide definitive trauma care, with the most complex patients typically requiring to be managed in Level I centers. Level III centers were traditionally considered to be most valuable at stabilize trauma patients in areas were the development of a Level I or II center is not feasible. Level III centers can also benefit the system by having a more involved role with managing specific types of trauma patients and helping to decompress the patient volume at higher level centers.

The Virginia Trauma System is in place to care for the over 7.7 million citizens of the Commonwealth and its visitors. One in every 350 people in Virginia will be affected by trauma each year. Currently, the bulk of these patients are being treated in designated trauma centers. As little as ten years ago, it could not always be stated that the most seriously injured patients, or *trauma patients* as they are commonly referred, were being treated in trauma centers. Because trauma centers have been proven to greatly benefit trauma patients, a system that addresses *access* was put into place to assure these patients are rapidly moved to a trauma center. The process used in Virginia is called pre-hospital and inter-hospital trauma triage (trauma triage).

OEMS is also responsible for assuring that emergency medical services (EMS) providers (EMTs and paramedics) and healthcare providers at non-trauma designated hospitals, referred throughout this document as *community hospitals*, treat and transfer trauma patients to designated trauma centers in a timely fashion. The focus of this document is on the *access* portion of the trauma system.

This document will address the question of whether regionalized trauma triage is effective in Virginia. Current triage plans are developed by the regional EMS councils as part of their annual performance based contract with OEMS. The ultimate goal is to have patients move through the EMS system and community hospitals so they may reach specialty care centers in an optimal fashion with improved patient outcomes. To fully

appreciate the analysis that follows some background information on Virginia's trauma triage system is offered in the next section.

**Background**

Trauma triage is simply the process used by EMS providers and hospitals to assure that seriously injured patients reach designated trauma centers in a timely fashion. Multiple studies over the past 20 or more years have shown that treating trauma patients in designated trauma centers can reduce mortality by 20% – 30% depending on the year and location of the study. This document only measures "triage" or the movement of patients and whether the current regionalized triage process continue to serve its intended purpose. This document is NOT intended to measure the quality of care being provided by EMS or hospitals; there are an adequate number of studies that demonstrate outcome data on trauma patients.

In Virginia, trauma triage exists both in law and regulation. The *Code of Virginia* § 32.1-111.3 the *Statewide Emergency Medical Care System*[1] was amended to add establishing and maintaining a process of designating hospitals as trauma centers based on nationally accepted standards. In 1997, Senate Bill (SB) 1034[2] again amended § 32.1-111.3 and added the requirement that the Board of Health (BOH) promulgate regulations which …ensure that trauma patients receive rapid access to organized trauma care…

The 1997 amendment to § 32.1-111.3 came after two years of interest in the topic by the legislature. Initially in 1995 Senate Joint Resolution 353[3] resolved to have the Joint Commission on Health Care (JCHC) study the need for establishing a pre-hospital and inter-hospital trauma triage plan. The JCHC report or Senate Document 23 was titled the *Study of the Need For and Efficacy of a Statewide Trauma Triage Plan…*[4] This report did summarize that up to 32% of seriously injured were being admitted to non-trauma designated hospital depending on the region of the State that the injury occurred. The report also concluded that "statewide triage protocols" would provide for a more efficient use of our designated trauma centers and that with the vast amount of data available on the benefits of trauma patients being treated in trauma centers that many injured person would benefit from these protocols.

SB 551[5] of the 1998 General Assembly (GA) again amended § 32.1-111.3 and changed the trauma triage language from the requirement that the BOH promulgate regulations for trauma triage to include the development of formal regional trauma triage plans developed by the seven Regional EMS Councils (now 11 councils). House Bill (HB) 2161[6]of the 2007 GA amended trauma triage language and removed the requirement that trauma triage plans be developed by regional councils. The trail of trauma triage Code language ends here. It is important to know that § 32.1-116.1[7] also mandates the reporting of EMS and hospital data to support the trauma triage process and Virginia EMS Regulation 12VAC5-31-390[8] requires that EMS agencies follow trauma triage plans established in § 32.1-111.3.

To date, there has not been another review of this program performed since the 1995 JCHC study or since regional councils began establishing trauma triage plans in 1999.

During 2005 it was noted by OEMS that the trauma triage plans being financially supported by the State were at best, being minimally performed and therefore considerable effort was made to resurrect the regionalized trauma triage program "as is" without much focus on whether the program was actually of benefit.

Nationally, Emergency Medical Services (EMS) in general does not have a strong history of utilizing evidenced based practice as other medical and non-medical disciplines do. The OEMS has committed to following the recommendation made in the June 2006 Institute of Medicine (IOM) report *Emergency Medical Services at the Crossroads*[9]. The IOM makes several recommendations for lead agencies to begin utilizing evidence based practice to establish emergency and trauma patient care [protocols] for treatment, triage, and transport of patients.

Reviewing trauma triage became especially important at this time because of new legislation that was passed during the 2008 GA that began requiring the establishment of a Stroke Triage process (HB479[10] and SB344[11]) and though not required by law at present, a new Virginia Heart Attack Coalition has been formed to begin establishing a STEMI Triage process. STEMI is the common term used in health care for a patient whose ST segment on their electrocardiogram is elevated, which is the indication of a myocardial infarction or heart attack.

Regional EMS Councils are non-profit, 501(c)3 entities that function under a performance based contract with the OEMS. The regional councils hold no authority to enforce regulations or laws and function only under the assumption that agencies will desire to participate in their programs. There is often confusion within the State EMS system as to what the roles of the regional councils are and an assumption that they are an EMS authority.

In order to fully understand this issue it is also important to understand the history of how the trauma and EMS systems began to evolve in the late 1970's and early 1980's. The American College of Surgeons (ACS), Committee on Trauma (COT) has been the nationally accepted body that provides guidance to all phases of modern trauma systems and this began with their first publication entitled the *Optimal Hospital Resources for Care of the Injured Patient* in 1976. This document has continued to evolve to its most recent publication; *Resources for the Optimal Care of the Injured Patient 2006*[12]. The ACS/COT establishes standards for the designation of hospitals as trauma centers, guidelines for the flow of patients between community hospitals and trauma centers, direction for emergency medical services (EMS) providers to enter patients into the trauma system, performance improvement programs, research and other contributions to "trauma systems".

Regional councils which came to exist in EMS systems nationally when in approximately 1966 the National Highway and traffic safety Administration (NHTSA) published a white paper called the *Accidental Death and Disability: The Neglected Disease of Modern Society*[13] which identified that the lack of what is now referred to as an EMS system did not exist at that time. The NHTSA white paper is widely accepted as the birth of EMS

systems and eventually as a result the 1973 Federal *EMS System Act* was passed. The EMS System Act provided significant funding for the development of EMS systems, but only through block grants to non-profit regional councils. As a result Virginia's EMS system depended on the regional council structure to receive much need EMS funding. In the early 1970's many states did not have a state agency dedicated to EMS and with federal dollars being sent to non-profit agencies states were slow to develop state offices. In 1981, when the block grants were discontinued, States began to assume responsibility for maintaining an EMS system.

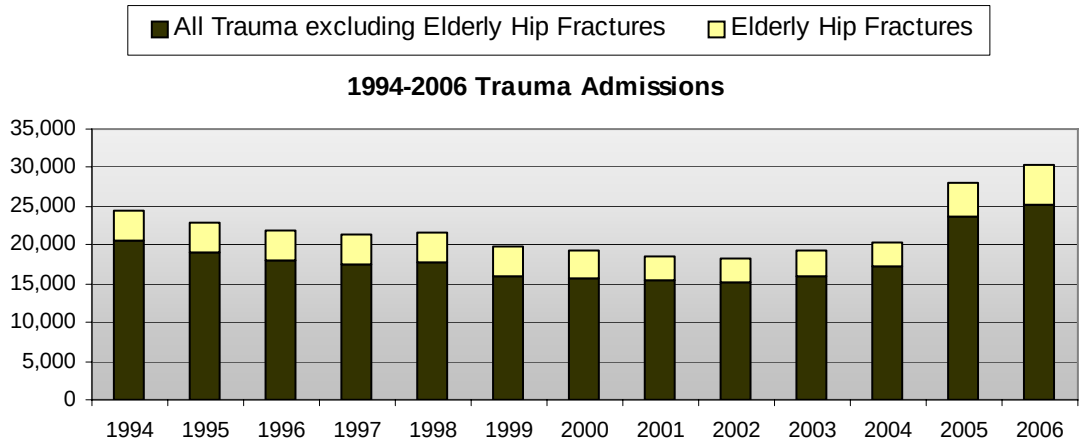
Another important item to note is that during this evolution the face of the EMS provider has changed from a majority volunteer system to a majority career system. There may currently be more licensed EMS agencies that would classify themselves as volunteer, but the volume of EMS responses is being managed by career agencies. A review of the top five EMS agencies in each EMS region by volume shows that 89% of calls (n=509,290) were managed by career/paid EMS agencies and 11% (n=60,936) by volunteer agencies[14]. During the last 25 years EMS has become a sophisticated medical discipline and emergency response system that requires oversight of standards of training, the delivery of health care, funding, and planning. Oversight of jurisdictions cannot be provided by a non-profit agency with no vested authority.

**Current Process Reviewed**

To measure the effectiveness of the trauma triage process that is currently being supported by VDH/OEMS several sources of information were used. Data from the Virginia Statewide Trauma Registry (VSTR) for the time period of 1994 through 2006 was reviewed, a survey using random sampling of EMS providers was performed, the regional trauma committee minutes, attendance, regional trauma triage plans and regional trauma performance improvement plans from the 11 regional councils was reviewed, the National Association of EMS Officials list serve was utilized to gather information, as was other state level programs from states that collaborate as the Atlantic EMS Council.

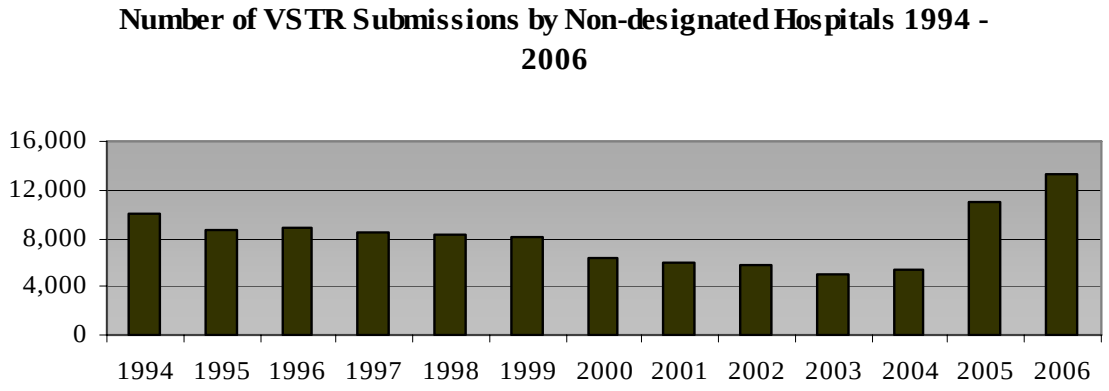
As a starting point for analyzing whether the current use of regional trauma triage plans is effective in assuring that *trauma patients,* as defined in the Virginia Statewide Trauma Triage Plan[15], reach definitive trauma care at a designated trauma center it was important to look at which hospitals were providing trauma care prior to the 1999 institution of trauma triage plans and then look at the same data after 1999. At first glance of VSTR data[16] (Figure 1) of the volume of trauma patients that were being admitted to community hospitals it appeared that there was a significant downward trend of admissions to community hospital after 1999. However, upon further evaluation, compliance with data submission by these hospitals suffered an almost identical downward trend until 2004 (Figure 2) when new attention to the program and the implementation of a Web-based VSTR were put into place.

Figure 1




(Source: Virginia Statewide Trauma Registry)

Figure 2



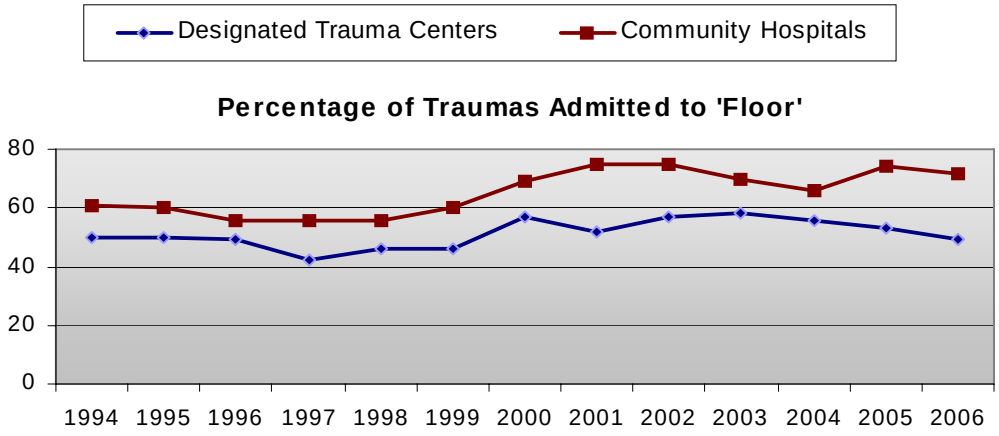

(Source: Virginia Statewide Trauma Registry)

*Admission data* compared to *submission data* seemed to show no significant change in trauma patients reaching trauma centers, but this analysis cannot be accepted as a validated comparison. To further look into any positive effect caused by the 1999 trauma triage plans data comparing the acuity of injured patients being seen in community hospitals was performed. A general assumption can be made that a patient being admitted to a medical/surgical floor (floor) where there is no advanced monitoring and a higher patient to nurse ratio would be a *low acuity* patient. Additionally, patients admitted to an intensive care unit (ICU) may be considered of *moderate acuity*, while patients admitted directly to an operating room (OR) would be of the *highest acuity*.

Figure 3 demonstrates that patients admitted to the floor of community hospitals slowly increased after 1999 with the exception of circumstances when lower data submission was occurring. This trend demonstrates an appropriate use of community hospitals, as these facilities are quite capable of managing the isolated orthopaedic injury such as an

arm or leg fracture, or admitting a patient for a short period of observation after an incident with a significant mechanism where no serious physiological symptoms exist. The slight rise may be attributable to a natural increase in patient census based on increasing population, age, or perhaps hospitals in general gaining a better understanding of what types of injured patients can safely be managed within the community hospital environment.

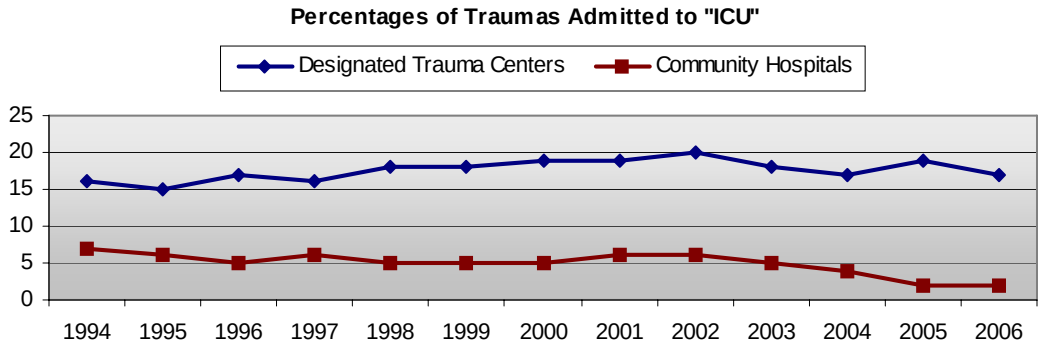
Figure 3




(Source: Virginia Statewide Trauma Registry)

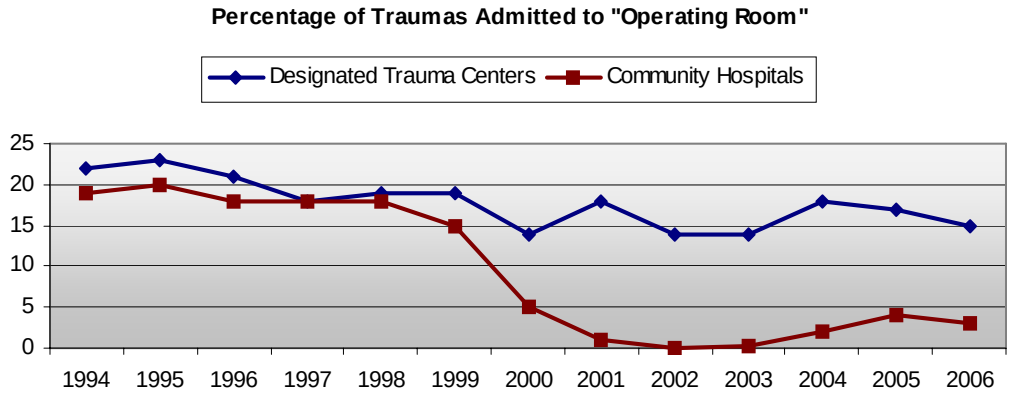
When reviewing the data on moderately injured patients, or those injured patients requiring admission to an ICU instead of to a floor, a small increase, +/- 2% could be seen from 2000 through 2004. After 2004, a trend toward decreasing ICU admissions can be seen in community hospitals, but only at a rate of +/- 3%. The variations in this data could possibly be attributed to the fluctuation in compliance with data submission. This variable is suggestive of a slight improvement in moderately injured patients not being treated in community hospital ICU's. It is also suggestive, but not conclusive that in general, the treatment of moderately injured patients outside of trauma centers was not a significant issue before or after trauma triage laws were instituted.

Figure 4



(Source: Virginia Statewide Trauma Registry)
Finally, in reviewing the most seriously injured patients, those requiring admission directly to an OR, until 1998 the rate of patients treated in the OR of community hospitals versus those being treated in designated trauma centers was almost equivalent. Figure 5 demonstrates a sharp and statistically significant decrease in OR admissions to community hospitals after 1999.

Figure 5




(Source: Virginia Statewide Trauma Registry)

This high volume of acutely injured patients not being treated in specialty resource centers (trauma centers) was a significant issue and worthy of the legislation that was put into place to prevent it. Why is it important? Studies such as the one in the June 2006 issue of the New England Journal of Medicine have shown that patient mortality in the severely injured patient can be decreased by as much as 25 % when treated in a designated trauma center[17].

To further evaluate the effectiveness of Virginia's regional trauma triage plans and what those plans have contributed to patients being transported to trauma centers either directly by EMS or by community hospitals rapidly transferring trauma patients to trauma centers EMS providers were surveyed[18]. A random sampling survey of the EMS provider community was conducted to elicit the comfort level in indentifying a trauma patient by the "front line" provider, and by what means the provider received an understanding of the decision process they use for "triaging" the patient, to receive appropriate trauma care in a timely fashion.

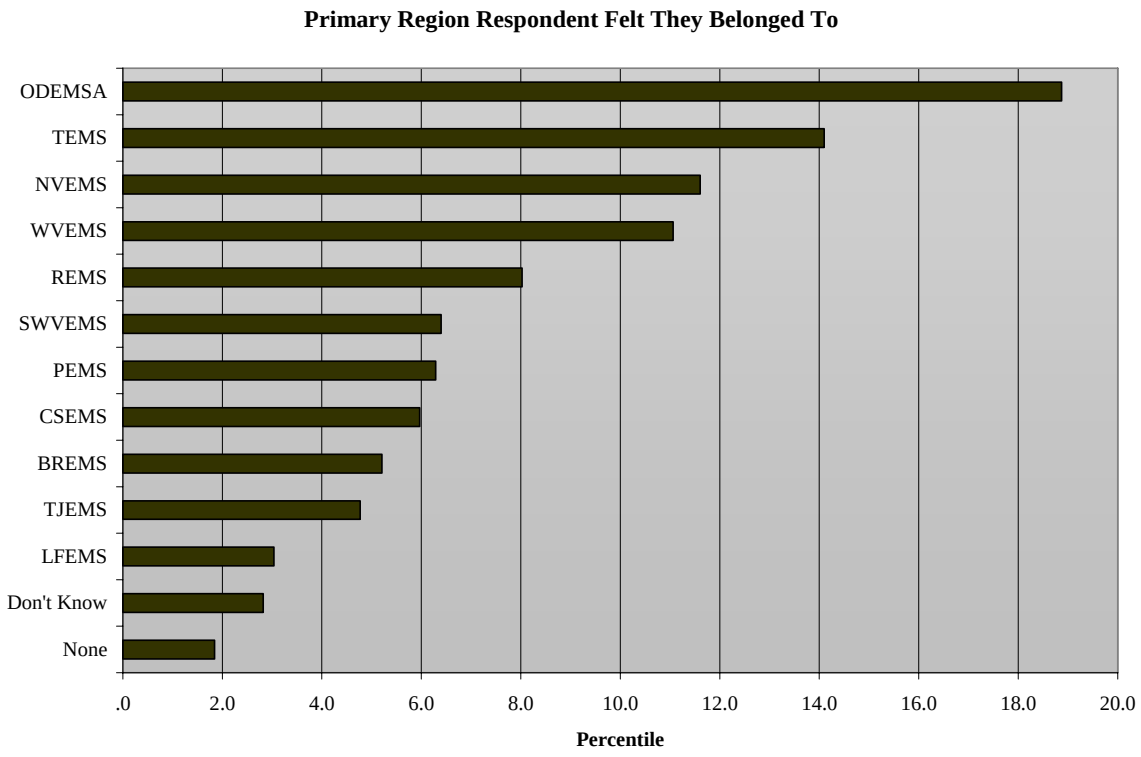
Virginia has approximately 33,000 certified EMS providers at various levels of basic and advanced life support levels. The survey also allowed the respondent to choose "Registered Nurse" (RN) as their highest level of certification. Any respondent that chose RN would also hold some type of EMS credential.

The OEMS certification database was randomly queried for a representative sample of the EMS community. 2,500 providers were invited to participate in the survey through a direct mailing. Each potential respondent was given a unique identifier which limited their response to only one entry and allowed for a follow up invitation for those who did

not initially respond. This unique identifier also allowed for the assurance of a representative sample from each EMS region and for each level of EMS certification. Respondents were asked to go to a survey Website (Survey Monkey) or respond by using an enclosed hard copy survey and return it in a supplied postage paid envelope.

The level of response to the survey allows the claim that the survey was statistically significant based on the distribution of respondents, primary regional affiliation, and the volume of responses. A +/- 3 sampling error could be assigned, which is a significant accomplishment.

Figure 6



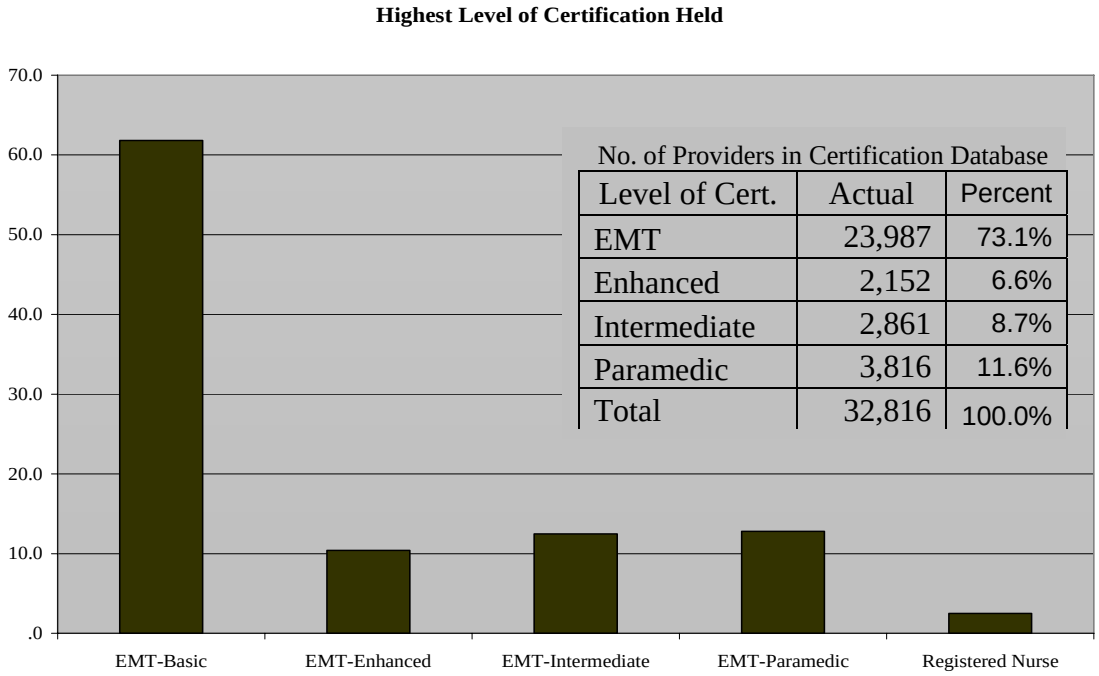

The respondents closely mirror the relative size of EMS regions within Virginia. Variations to the number of EMS agencies and localities in each region can be explained by the relative size of the region based on population. Table 1 contains the number of licensed EMS agencies, localities and the population that make up each regional council area

Table 1

| Council | Agencies | Localities | Population |
|---|---|---|---|
| ODEMSA | 106 | 27 | 1,207,127 |
| WVEMS | 103 | 18 | 672,029 |
| SWEMS | 91 | 17 | 400,848 |
| REMS | 73 | 10 | 380,027 |
| CSEMS | 64 | 10 | 258,789 |
| TEMS | 63 | 10 | 1,172,508 |
| PEMS | 56 | 16 | 588,737 |
| NVEMS | 55 | 8 | 2,200,000 |
| BREMS | 43 | 6 | 227,986 |
| LFEMS | 43 | 6 | 186,816 |
| TJEMS | 42 | 7 | 212,168 |

(Source: OEMS licensure database[19] and U.S Census Bureau[20])

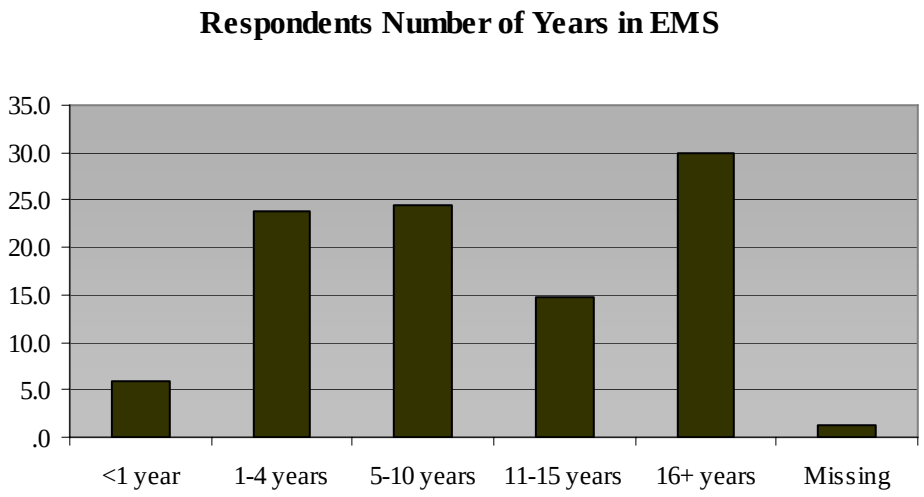
Figure 7




*Note:* at the time of developing the sampling frame there were 1,332 certified first responders. The first responder level was eliminated from the survey as they are not likely to be in the position of making transport decisions autonomously. Additionally two certification levels were omitted from the survey because they have essentially been phased out with the exception of a small number of providers that do not expire until

January 2009. Those two levels are the EMT-Shock Trauma (27) and EMT-Cardiac Tech (87).

Figure 8




Respondents were asked to rate how comfortable they felt in determining which patients are "trauma patients" and where these patients should be transported to. Table 2 and Table 3 provide their responses.

Table 2

| How comfortable do you feel in determining whether patient has trauma? | |
|---|---|
| | Percent |
| Very Comfortable | 67.6 |
| Somewhat Comfortable | 28.9 |
| Somewhat Uncomfortable | 2.1 |
| Very Uncomfortable | 1.5 |
| Total | 100 |

Table 3

| How comfortable do you feel in determining where to take trauma patient? | |
|---|---|
| | Percent |
| Very Comfortable | 71.6 |
| Somewhat Comfortable | 23.3 |
| Somewhat Uncomfortable | 3.3 |
| Very Uncomfortable | 1.7 |
| Total | 99.9 |
| Missing | 0.1 |
| Total | 100 |

*Note:* 96.5% of providers are comfortable, on some level, with identifying injured patients as "trauma patients" and 94.9% are comfortable, on some level, with determining the appropriate hospital to transport to. Previous trauma registry data demonstrated that patients are being currently transported to the appropriate hospital type. The survey also demonstrated that 84% of providers state that they are comfortable bypassing a community hospital and transporting directly to a trauma center.

Figure 9

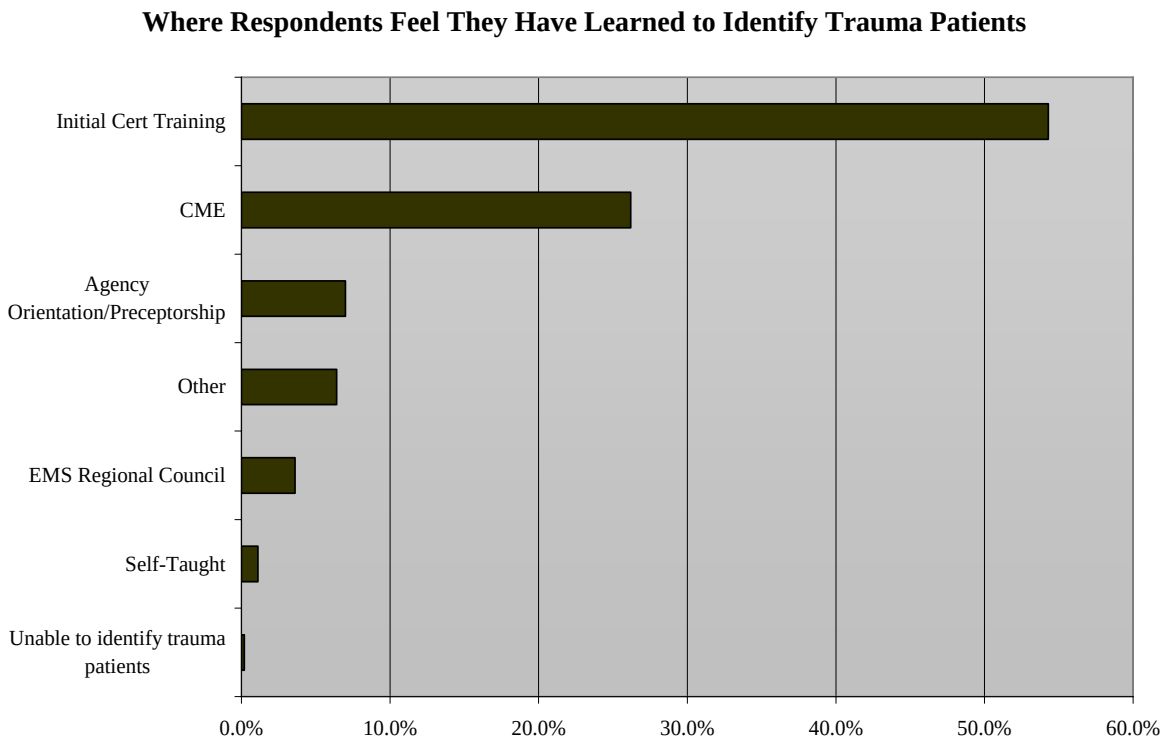



Figure 9 above shows how EMS providers state they learned to recognize the clinical conditions that identify patients as trauma patients. Overwhelmingly, respondents state they gain this understanding through initial training, ongoing continuing medical education (CME), and through agency specific orientation.

When measuring a mandatory statewide program typically a rate of 95% compliance or participation with the program would be considered excellent, 90% being satisfactory and down to 80% may be expectable. Programs with success rates of 80% - 90% should most likely be further developed so that the level of participation can be increased to 90% or better. Table 4 and Table 5 below are based on survey respondents' answers to whether they were familiar with regional trauma triage plans and which trauma triage plan their primary EMS agency utilizes.

Table 4

**Number of Respondents Familiar With Their Regional Trauma Plan**

| | NVEMS | LFEMS | REMS | PEMS | CSEMS | TJEMS | ODEMSA | TEMS | BREMS | WVEMS | SWVEMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Yes | 58.3% | 62.5% | 57.1% | 58.8% | 37.5% | 33.3% | 47.6% | 60.0% | 75.0% | 67.5% | 55.6% |
| No | 41.7% | 37.5% | 42.9% | 41.2% | 62.5% | 66.7% | 52.4% | 40.0% | 25.0% | 32.5% | 44.4% |

Table 5

**Respondents Were Asked What Triage Plan They Follow**

| | NVEMS | LFEMS | REMS | PEMS | CSEMS | TJEMS | ODEMSA | TEMS | BREMS | WVEMS | SWVEMS | Statewide |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Agency | 69.2% | 28.6% | 28.4% | 17.2% | 18.2% | 25.0% | 43.1% | 32.3% | 18.8% | 26.7% | 40.7% | 31.6% |
| Region | 20.6% | 42.9% | 59.5% | 70.7% | 65.5% | 70.5% | 39.1% | 57.7% | 66.7% | 61.4% | 39.0% | 53.9% |
| State | 7.5% | 17.9% | 6.8% | 6.9% | 10.9% | 2.3% | 9.8% | 6.2% | 12.5% | 8.9% | 18.6% | 9.8% |
| None | 0.9% | 3.6% | 2.7% | 0.0% | 0.0% | 0.0% | 5.2% | 3.1% | 0.0% | 2.0% | 1.7% | 1.7% |
| Other | 0.9% | 0.0% | 2.7% | 0.0% | 3.6% | 2.3% | 2.3% | 0.0% | 0.0% | 0.0% | 0.0% | 1.1% |
| Don't Know | 0.9% | 7.1% | 0.0% | 5.2% | 1.8% | 0.0% | 0.6% | 0.8% | 2.1% | 1.0% | 0.0% | 1.8% |
| Total | | | | | | | | | | | | 100% |

The intent of having regionalized trauma triage plans is to assure that all EMS agencies in any particular region have a sense of a point of entry plan to manage the appropriate disposition of the trauma patient. Point of entry plans should guide the attendant in charge (primary EMS caregiver) with making the correct decision about where to transport the patient. Point of entry should predetermine when to transport to the closest community hospital and when it is more beneficial to travel extra time and distance to a trauma center. Point of entry should also identify when it is appropriate to utilize an air medical resource based on time to definitive trauma care. The point of entry plan is *the* most important function of the regional trauma plan and it is vital that EMS providers and community hospitals understand its rational.

Typically, point of entry plans are developed in a basic decision tree model such as the "Field Triage Decision Scheme" from the Centers for Disease Control and Prevention, which has also been adopted by the ACS/COT and the National Highway Traffic Safety Administration, where the Federal Office of Emergency Medical Services resides. When reviewing the 11 Regional Trauma Triage Plans the only required section that directs EMS providers where they should transport trauma patients to is the "point of entry" section. Of the 11 regional plans that were reviewed, four (36.6%) make some mention

of point of entry and one of the plans essentially directs the EMS provider to contact a medical control physician for instructions. None have adopted a nationally recognized point of entry decision scheme.

To further evaluate the level of participation that exists through the regionalized trauma process by EMS agencies; community hospitals, and designated trauma centers involvement in regional trauma committees (trauma performance improvement and/or trauma triage committees) was reviewed. The level of participation of each of these groups was evaluated by reviewing all regional trauma committee meeting minutes for FY08 using VDH/OEMS deliverables data and regional council websites as a secondary source.

What was found; 34.9 % of Virginia localities had some type of EMS agency representative at regional trauma committees. Additionally, EMS agency attendance at regional trauma meetings averaged only 6.9 % of licensed EMS agencies in Virginia. To assist in developing, monitoring, and improving trauma care in Virginia, the trauma triage plans are required to involve "inter-hospital" trauma triage or the flow of trauma patients from community hospitals to designated trauma centers. The same review of quarterly trauma meetings in FY08 demonstrated that 11.3 % of community hospitals participated in this process and 55.2 % of designated trauma center participation was noted. Each designated trauma center is required to perform outreach to EMS agencies in its catchment area. EMS outreach should include EMS education, performance improvement, and provide a method of feedback on trauma patients they received by EMS agencies as outlined in section VII.D of the *Virginia Trauma Center Designation Manual*[21]. Trauma Centers are not required to do this through the regional councils.

Each regional council by contract is required to maintain a trauma performance improvement committee that meets quarterly. Of the 11 regions, seven have identified through their minutes and agendas an independent trauma PI committee and of those seven, four run their trauma performance improvement committee consecutively with their general EMS PI committee and in most cases have identical attendees on both sets of meeting minutes. A review of how much time each region dedicated to regional trauma meetings was attempted, but not enough data existed in the committee minutes. Of those with a call to order and adjourn time, the length of quarterly meetings varied from 30 minutes to 140 minutes.

Contracts between the State and the 11 regional councils no longer contain line item costs. The last year that line item costs were noted in the State contracts was in the 2005 Fiscal Year (FY05), and the total cost annually for developing and maintaining Trauma Triage Plans was $66,000, and the cost associated with having a distinct regional trauma PI committee was $91,000, for a total of $157,000 per year. In FY05 most regions were not conducting these meetings and the performance noted supra for FY08 came after significant contention between the State and regions to provide the services being funded.

In an effort to have the original 1999 vision of the regional trauma triage plans and the regional trauma performance improvement committees receive all possibility of

succeeding, increasing contract language has been steadily added to the State's Regional Council Contracts since 2004. Ultimately this resulted in language that defined what "regional representation" shall be. Table 6 shows the rate of compliance with quarterly trauma performance improvement committee meetings.

Table 6

**Percentage of Required Attendance of Regional Performance Improvement (non-trauma)**

| Fiscal Year 2008 | NVEMS | LFEMS | REMS | PEMS | CSEMS | TJEMS | ODEMSA | TEMS | BREMS | WVEMS | SWVEMS | Average Statewide Percentile Compliant |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1st Qtr | 86% | X | 58% | 67% | X | 75% | 45% | 50% | 53% | 26% | 22% | 43.8% |
| 2nd Qtr. | 93% | 56% | 33% | 33% | 63% | 58% | X | 43% | 100% | 26% | 28% | 48.6% |
| 3rd Qtr. | 64% | 67% | 33% | 56% | 50% | 50% | 30% | 36% | 73% | 35% | 17% | 46.6% |
| 4th Qtr. | 71% | 44% | 42% | 28% | 50% | 50% | 65% | 36% | 60% | X | 11% | 41.5% |

(X=no meeting held)

**Conclusion**

The OEMS, as an agent of the State Board of Health (BOH), is required by § 32.1-111.3 to have programs in place that assist in reducing the time period between the recognition of an acutely ill or injured patient and these patients receiving definitive care. This responsibility includes designating specialty care centers such as trauma centers, as well as stroke centers and it is likely that STEMI centers will be added in the coming months, and that these programs are developed based on "applicable national evaluation systems". The COV also states that OEMS shall promote and ensure a process of performance improvement for emergency care provided on scene, in transit, and within emergency departments and in-patient hospital environments.

The data in this report demonstrates that the intent of regionalized trauma triage plans is to ensure that trauma patients receive definitive trauma care within designated trauma centers, which is essential, is occurring as evidenced by the rapid drop in trauma patients receiving surgery in community hospitals which has been proven to have a higher mortality rate. The analysis supra demonstrates this rapid downward trend is more likely to have occurred as a result of the laws that were changed and the willingness of hospitals to "do the right thing" combined with complying with the new State laws. This position is taken as a result of the high volume of hospitals involved in the development of the State level trauma triage plan, therefore having a known awareness of the new laws, and that the downward trend seen in Figure 5 began to occur prior to the regional plans being finalized and then being poorly distributed, especially to hospitals.

The data from the VSTR also demonstrates that trauma care is currently being provided in appropriate hospitals and a closer look at the slight increase in the trend of patients being admitted to the OR in community hospitals in Figure 5 can be deemed appropriate with the exception of a total of 10 patients (three in WVEMS, three in ODEMSA, two in SWEMS, and two in PEMS regions). With little interaction occurring with community hospitals the assumption can be made that the referral of trauma patients to trauma centers by community hospitals is now a normal standard of care within the medical community and with State level monitoring any hospital which becomes an outlier can be managed on an as needed basis.

Hospitals adopting the rapid stabilization and transfer of trauma patients as a standard of care is not likely a result of regional trauma plans as evidenced by the minimal level of community hospital involvement in the regionalized process. Regional interaction related to the movement of patients is likely only needed on the hospital level and not the EMS system level. Since the regional trauma triage plans have offered little support to inter-hospital transfer in the past, it is not likely that continued State funded support is needed to assure that these transfers occur. Current medical practice is already centered on patient transfer patterns from smaller hospitals to “referral centers” that are typically capable of providing a broader range of patient care.

EMS level regional trauma triage plans are noticeably not how EMT’s and paramedics have gained their knowledge and understanding of where and when to transport patients to trauma centers. Clearly EMS providers receive this understanding through initial training and ongoing continuing medical education. As the data shows, use of regional trauma plans varies greatly from 20.6% to 70.7%. These percentage rates are not indicative of a successful statewide program, and ample efforts and opportunities have already been provided for the improvement of the current regional EMS council trauma triage program.

Furthermore, regionalized trauma triage plans are not likely to benefit EMS units as they typically deal with one patient at a time, perhaps up to four or five at incidents such as motor vehicle crash scenes. With this volume of patients, adequate resources (one ambulance for each one or two patients) are likely to be available and can function within their normal operating procedures which are guided by standard operating procedures or standing medical orders. Every EMS provider within the State operates under standing medical orders. If an incident requires regional level coordination there are adequate mass casualty, surge, and disaster plans in existence, especially post 9/11, that would manage the regional coordination originally envisioned in the pre-9/11 established trauma triage plans.

An example of how regional coordination of a mass casualty incident (MCI) would currently be managed is that there are five “regional coordination centers (RCC),” coincidentally the RCCs are our five Level I designated trauma centers, which have been identified to serve as “medical command” during an MCI. The RCC for the particular region that the incident was occurring in would connect all EMS units with all other hospitals via a dedicated radio frequency. The RCC would communicate to the EMS

units at the scene of the incident where its patients will be transported to. By directing EMS units on scene, distribution of a high number of patients is evenly dispersed to all hospitals in the region and the most acutely injured transported to the designated trauma center. Consequently, regionalized trauma triage is actually being managed via a completely different process that has a proven history of success.

The existence of the current trauma triage process distracts from the development of, or support to, more efficient methods of assuring that the standards of trauma care are being followed by hospitals and EMS agencies. This assurance can only be managed by an agency that has the proper authority to intervene when needed, which is not frequently needed at this point. The current process also misuses State resources by providing over $157,000[22] in funding to a system that no data supports. In addition the manpower and resources being utilized to negotiate and manage the current process most likely exceeds the manpower that could be used to manage the isolated incidents that occur either in hospitals or with EMS providers in the field.

Two major events that drew the attention of the entire nation and were centered on traumatic incidents that should have been examples of regional trauma triage plans in action included the flying of a commercial jet airliner into the Pentagon on September 11, 2001 and the Virginia Tech shootings on April 16, 2007. Evidence of regional trauma triage plans being legitimate functional documents may include post incident reviews occurring after these two incidents. A request by OEMS for any post incident review of trauma triage after the Pentagon incident was answered by being told that Arlington Fire Department, who handled the incident, most likely reviewed the incident. Also, the regional council reported that no patients were taken to the local Level I trauma center and that all patients were transported to a nearby community hospital (personal communication 11/05/08)

With the Virginia Tech shootings the local regional council was asked by the OEMS for any post incident review of the regional trauma triage plan performed by the regional EMS council. The council referred only to a State level review which was performed under the direction of the State (personal communication 11/05/08). A review of this regional EMS council's trauma committee meeting minutes reveals that the Virginia Tech shooting incident was not discussed during the regional trauma meetings after the incident. To be precise this incident was reviewed, but not by the program being evaluated through this document.

**Recommendations**

**Recommendation (1) – COV § 32.1-11.3 should be amended to remove the requirement of formalized regional trauma triage plans and instead require each EMS agency as part of its patient care standing medical orders to include the statewide decision scheme that identifies where patients should be transported to. The statewide protocol should give consideration to areas that do not have immediate access to trauma centers and the use of air medical resources (Medevac).**

Amending the COV language related to trauma triage and specialty care hospitals to include statewide protocols on point of entry was the original recommendation of the 1995 JCHC study on trauma triage. Additionally, the original triage language placed in COV § 32.1-111.3 in the 1997 GA Session required the BOH to promulgate regulations requiring standards and criteria for the rapid access of trauma care to injured patients.

In 1998 the COV was amended to include "formalized regional trauma triage plans developed by the Regional EMS Councils". Ultimately, in the 2007 GA session the requirement that these plans be developed by the regional councils was removed. Essentially by the COV the State is required to develop regionalized trauma plans which have been demonstrated to have a low value and near 100% success could be achieved by adding the most valuable information in these plans to existing patient care protocols. This would decrease administrative processes for both the agencies and the State and provide ongoing reinforcement to health care providers of the need to transport specialty patients to specialty centers within state approved parameters.

By only requiring the point of entry decision scheme portion of the patient care protocols it allows individual agencies and their operational medical directors with the autonomy to continue developing the treatment portion of these protocols and therefore maintaining their autonomy. The science and data are conclusive on the subject of rapidly transporting/transferring trauma patients directly to trauma centers. Should an incident with a bad outcome occur it would be judged against these standards.

**Recommendation (2) - OEMS should include as part of the proposed revised EMS Regulations revised language to 12VAC5-31-390 that requires EMS agencies to follow regional trauma triage plans. 12VAC5-31-390 should instead direct EMS agencies to include the triage of acutely ill or injured patients to the appropriate specialty care hospital i.e. trauma patient to trauma centers, stroke patients to stroke centers.**

> 12VAC5-31-390. ~~Destination/trauma triage~~ Destination to specialty care hospitals.
>
> ~~An EMS agency shall participate in the regional Trauma Triage Plan established in accordance with § 32.1-111.3 of the Code of Virginia.~~
>
> An EMS agency shall follow Specialty Care Hospital Triage Plans (Trauma, Stroke, and others as recognized by OEMS) established in accordance with § 32.1-111.3 of the Code of Virginia. EMS agencies shall have a component of their OMD approved patient care protocols; a triage component consistent with Code of Virginia mandated state specialty care hospital triage plans.

(Source: excerpted from the draft EMS Regulations currently being introduced into the Notice of Intended Regulatory Action process[23]).

It was clearly intended through the 1997 GA that the State should assure compliance with trauma triage (and now stroke triage since the 2008 GA) both in the pre-hospital and inter-hospital environment. Attempts were made to regionalize this process from its inception and then significant energy was again expelled in 2005 to encourage meeting the expectations of regional programs with little documented proof of its success.

Trauma Center Designation criteria in Virginia are developed based on accepted national standards such as the guidelines distributed by ACS/COT in their *Resources for the Optimal Care of the Injured Patient 2006*. Within this document is a triage scheme that has also been adopted by the CDC and NHTSA. OEMS should utilize this document as it has the rest of the ACS/COT book and develop a statewide trauma triage scheme that will be incorporated into all EMS agencies patient care protocols in the applicable sections. This should in fact already be occurring.

Neighboring states such as Pennsylvania[24], Maryland[25], and North Carolina have adopted statewide triage protocols that mirror the ACS/COT triage scheme and provide clear guidelines of when bypassing community hospitals or use of air medical resources is appropriate. By placing such items in statewide protocols the wide gap in treatment protocols can become consistent, which will benefit patients by using science that has been proven to decrease morbidity and mortality. Many EMS providers also practice at more than one EMS agency and may have a variety of protocols to follow, furthering the gap.

Since the survey noted supra clearly demonstrates that education is the primary source of providers' knowledge and comfort with triage, adding the decision scheme to patient care protocols will ensure reinforcement during the EMS provider's orientation to their agency and while learning their scope of practice within that agency. Also, adding triage decision schemes to patient care protocols is likely to increase EMS provider exposure to triage closer to 100% rather than the varied 20% - 70% seen in the data analysis for this document.

Adequate resources exist on the State level to work with the trauma advisory committee to develop State level resource materials to assist EMS agencies and/or community hospitals with the information needed to develop patient care protocols (EMS) or transfer guidelines (hospitals). OEMS should request the Trauma System Oversight and Management Committee establish a trauma performance improvement committee to assist in blinded reviews of miss-triaged incidents. Responsibility for communicating cases deemed inappropriate should be between the State and the agency or hospital involved as needed. This should be a performance improvement based program to the extent possible.

**Recommendation (3) – The OEMS should institute measures to monitor and ensure that trauma and other forms of time sensitive illnesses or injuries that are covered by the Code of Virginia and/or EMS Regulations are being transported to specialty resource centers as originally envisioned in § 32.1-111.3 and 12VAC5-31-390. § 32.116.1 allows the collection of data from hospitals and EMS agencies for this purpose. Deviations from the State standard of triage should be managed directly between the State and the specific hospital or EMS agency.**

With the current system of non-profit entities being contracted with to provide assurance of proper triage there can be no guarantee of intervention for an incidence of improper

triage by a hospital or EMS agency. This responsibility should be provided by the OEMS who has authority to act upon such events. Matters that can be better managed on a local level through established agency performance improvement programs, agency leadership, or operational medical directors should be handled within those processes. Incidents that rise above the level of being handle as a quality issue must be managed in accordance with the Administrative Process Act of Virginia § 2.2-4000[26].

**Recommendation (4) - OEMS should continue to ensure that triage of patients to appropriate specialty resource centers remains part of EMS provider initial and ongoing education.**

The statistically significant random survey of EMS providers understanding of trauma triage strongly identifies EMS education as a primary source of understanding the rational of triage

**Recommendation (5) – OEMS should assure that the emerging Stroke Triage program and the potentially developing STEMI Triage program are developed in a similar fashion to Trauma Triage.**

This "all hazards" approach to time sensitive illnesses and injury will result in a higher level of success for each program as educational opportunities will help to reinforce one another. Also, utilizing a similar basic scheme of identifying specialty patients and utilizing similar criteria of getting them to the appropriate specialty center will decrease the burden of implementing several different triage programs.

Developing multiple plans can lead to confusion for the frontline providers and burdens the leadership that has to develop the processes. By adopting more of an all hazards approach, Stroke Triage and likely soon to follow is STEMI Triage should be easily transitioned into the system with little use of limited resources. Similar methods can also be used to monitor areas that need improvement with any time sensitive illnesses or injuries.

**Recommendation (6) – The FY10 Regional EMS Council Contracts should not include trauma triage or trauma specific performance improvement requirements. The section dedicated to the development of patient care protocols should be enhanced to include nationally accepted trauma and stroke decision schemes to assist the approximately 50% of EMS agencies that utilize regionally developed patient care protocols.**

Clearly the data shows that that the success of regional trauma triage process and regional trauma performance improvement has an overall level of minimal success. As with other common EMS response types trauma care has an established standard of care that no longer requires regional monitoring above other medical conditions, it is clearly understood by EMS providers that severely injured persons are "trauma patients" and they need to be entered into the "trauma system", which includes community hospitals,

bypassing community hospitals for trauma centers, use of air medical resources, or direct transfer to a trauma center.

With the recommended removal of these programs designated trauma centers will still be required to perform outreach, including performance improvement and education, to EMS agencies. This requirement is closely monitored through the Trauma Center Designation process. For EMS agencies they are required by 12VAC5-31-570 to have a quality monitoring program in place. OEMS should place an emphasis on assuring that each agency has this quality monitoring in place and functioning and if a process of accrediting EMS agencies comes to fruition this should be a major focus of those efforts.

Additionally the draft EMS Regulations currently in the NOIRA process include expanding 12VAC5-31-570 to include that each EMS agency maintain a Quality/Data Officer to ensure that Code mandated and regulatory required quality and data submission programs are occurring within their agency. This will also allow the State to have a direct contact to pass on information related to items that need to be communicated to enhance quality.

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