WHITE PAPER ON NEEDS ASSESSMENT FOR NEW TRAUMA CENTER DEVELOPMENT IN THE COMMONWEALTH OF PENNSYLVANIA 2014

Purpose

Currently new trauma center development in Pennsylvania—with limited exception—is driven by competitive financial and hospital/healthcare system imperatives. The Pennsylvania Trauma Systems Foundation strongly recommends that going forward, new trauma center applications be based on a needs assessment process so as to optimize distribution of trauma centers in the trauma system and thereby provide optimal trauma care for the citizens of the Commonwealth of Pennsylvania.

A guide for such a needs assessment is provided in this paper.

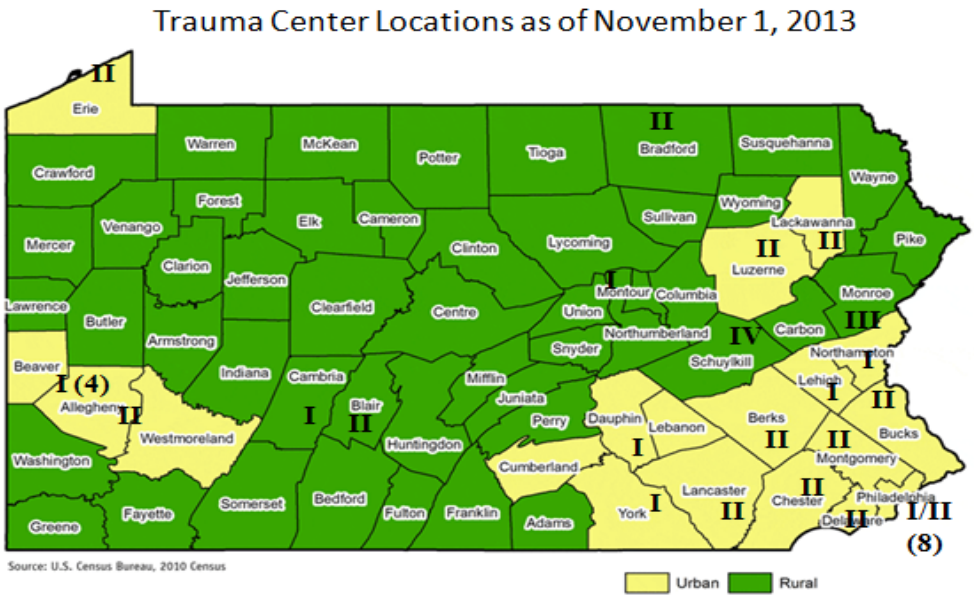
Introduction

Trauma systems have developed based on the sole precept that optimal recovery from traumatic injury is best achieved through the organization of prehospital and hospital preparedness and capability into a codified continuum of care. A codified continuum of care that is designated/accredited on a regular basis by qualified organizations such as the Pennsylvania Trauma Systems Foundation (PTSF).

It is undisputed that trauma centers in states such as Pennsylvania have significantly improved the public health for citizens of the Commonwealth. Trauma is the fifth leading cause of death in Pennsylvania. A Pa. Department of Health study demonstrated a 30% reduced chance of death for severely injured patients treated in an accredited trauma center. In 2012, 95.6% of the 40,479 trauma qualifying patients treated at a trauma center survived.

Currently, there are a total of 32 trauma centers in PA as noted below.

Figure 1



Source: http://www.rural.palegislature.us/demographics_rural_urban_counties.html

As is readily appreciated, the majority of trauma centers are in the most populated counties (Philadelphia and Allegheny) with large areas of the state seemingly having little or no ready access to organized trauma care.

During the last 10 years there exists differing views on the ideal configuration of a trauma system and the benefits of being “inclusive” and “exclusive”. An “inclusive” system is one in which most acute care facilities participate to the extent their resources allow as opposed to an “exclusive” system whereby only specialized centers provide trauma care. (9) Pennsylvania has traditionally embraced the concept of a voluntary trauma system that is more exclusive. In Pennsylvania any hospital that applies for and meets the PTSF accreditation standards may be accredited as a trauma center as opposed to a system whereby the accrediting/designating body determines if there is a need for additional trauma services to address threats to public health and safety.

In the past exclusive systems were touted as being the ideal configuration and the West Criteria which was established in 1988 (3) was promoted as being the gold standard for a mature comprehensive trauma system if the following criteria were met:

1. Authority to designate, certify, identify, or categorize trauma centers.
2. Existence of a formal process to designate or otherwise identify trauma centers.
3. Use of American College of Surgeons' standards to designate/identify trauma centers.
4. Inclusion of onsite verification during the designation/identification process and use of out of area surveyors.
5. Authority to limit the number of trauma centers based on the need for trauma services.
6. Existence of prehospital triage protocols for trauma patients.
7. Existence of a process for monitoring trauma center performance.
8. Adequacy of statewide coverage of the trauma system.

In only eight states in the country are all eight West criteria adhered to. (1) Those states have certificate of need processes that are not evidence based. Furthermore within the American College of Surgeons Committee on Trauma (ACSCOT) Resources for Optimal Care of the Injured Patient: 2006 the authors suggest that all hospitals should participate at some level of trauma center designation within a system ranging from Level 1 to 5 trauma centers. Limited data indicate that mortality is significantly lower in the most inclusive systems. (2)

The trauma system in Pennsylvania meets all of the West criteria with the exception that the PTSF does not by legislation have the authority to limit the number of trauma centers based on the need for trauma services in a region.

While the PTSF is not seeking the authority to direct this process, it does feel the responsibility of informing stakeholders and policy makers of the implications of adding additional trauma centers without fully considering the need for these services in a given region. Considerations include the impact on patient care, healthcare providers and healthcare expenditures. This needs assessment process is recommended by the American College of Surgeons as being one of the key factors in trauma system development in a state. (9) As will become apparent throughout this white paper, best practices to guide the decision to establish new trauma centers should be collaboratively considered locally or regionally with as wide an input by affected stakeholders as possible.

HISTORY OF TRAUMA CENTER DEVELOPMENT

The concept of trauma centers and trauma systems evolved from wartime experiences in Korea and Vietnam where the development of MASH units with rapid transport of the injured soldier and the presence of highly skilled surgical teams significantly improved survival. Since then, various studies have shown that adoption of similar principles and procedures in civilian hospitals could reduce trauma mortality by up to 60%. Specifically, panel studies demonstrate a reduction in the number of preventable deaths with increasing commitment to trauma care resources and expertise. The best evidence resulting from panel studies (published in the 1980s) suggest a 50% reduction in the preventable death rate with implementation of trauma centers, the bulk of this reduction being associated with inappropriate or suboptimal hospital care before trauma center implementation. (4) Trauma registry data originating from designated trauma centers uniformly demonstrate a 15% reduction in mortality when compared with Multiple Trauma Outcomes Study (MTOS) norms (5). Population based studies demonstrate a 15% to 20% reduction in the risk of death after a trauma center/system is in place (6, 7)

In 1971, the state of Illinois was the first to pass legislation codifying a “system approach to statewide emergency medical care.” In the first year of its operation with 20 “accredited” trauma centers, 12,000 patients were admitted with an overall mortality of 2%. Compared to historical data, even though the total number of motor vehicle crashes increased by 8%, mortality decreased by 15% with a 38% decrease in scene deaths. (8) A decade later, the trauma death rate fell by 55% in San Diego County in the first year after implementation of a coordinated countywide trauma system (9)

The American College of Surgery Committee on Trauma (ACSCOT) has been instrumental in codifying essential requirements for trauma centers and more recently, trauma systems. In 1976, the ACSCOT published the first “Optimal Hospital Resources for Care of the Seriously Injured” describing what ultimately would become the accreditation requirements for level I, level II, and level III trauma centers. Through its verification review committee, the ACSCOT has verified thousands of trauma centers and its standards have formed the basis for states that have developed their own designation criteria. (10)

In 1999, the optimal resources document began codifying the recommended components of the “ideal” trauma system.

The most recent review of trauma center development in the United States was published in 2005. Mann et al. surveyed state EMS directors in 50 states and the District of Columbia. Only 8 states indicated that authority had been granted to limit the number of trauma centers based on need. (1)

One such state - New York, using manpower and volume standards, however, appears to have no mechanism to assess the impact of new trauma centers on nearby established centers. (See below)

The PTSF has recently consulted with two other states with the "authority" to limit trauma centers in the trauma system. Maryland utilizes the following criteria for denial of an application for designation:

1. Would add unnecessary duplication of services to a geographic service area where there is insufficient need for additional trauma or specialty services.
2. Is unable to meet the requirements for the level of designation sought
3. Makes a false statement or omits a material fact in the hospital records, documentation, or materials required to be submitted that pertain to the documentation process.
4. Is less qualified than another applicant hospital in the same geographic service area
5. Is applying for designation as a specialty center that requires a certificate of need from the Maryland Health Care Commission but does not have the required certificate of need: or
6. Should not be designated for any other relevant reason"

However, as there has been no application for a new trauma center in Maryland since the development of these guidelines, their appropriateness or lack there of are untested.

In 2012 the Maryland Health Care Commission in collaboration with the Maryland Institute for Emergency Medical Services System (MIEMSS) undertook a study of whether new Level III trauma centers should be introduced in the state and if there should be a reduction in the current number of trauma centers. There is currently in Maryland one Primary Adult Resource Center, one Level 1 center, four Level II centers and three Level III centers. It was estimated that new Level III trauma centers in the geographical areas studied would evaluate on average one new patient a day and would not justify their cost. It was also concluded there was no justification for reducing the overall number of existing trauma centers as all were well above minimum patient volume requirements .

Washington developed an elaborate algorithm to address this issue; but found it too cumbersome to apply and as of late 2009, had "gone back to the drawing board."

The American College of Surgeons Committee on Trauma (ACSCOT) initiated a trauma system evaluation program in 1996 based on the following fundamental concepts:

1. Trauma systems should be inclusive
2. This program would be a consultation program and not a verification program…designed to assist any region desirous of developing or improving any existing trauma system
3. The process and consultation would be multidisciplinary, reflecting the multidisciplinary nature of a trauma system
4. Regions requesting a consultation visit would be able to customize the consultation.
5. All site visit work sessions would be inclusive and thereby include all participants who represented the various components of the system (such as surgeons, nurses, hospital administrators, emergency medical services agency, fire chiefs, and paramedics and emergency medical technicians). Therefore all discussions regarding the trauma system would take place with input from all key participants.

The Pennsylvania Trauma Systems Foundation had a trauma system consultation performed by the American College of Surgeons Trauma System Consultation Committee in 2007 called a BIS Self-Assessment. This is based on the Health Resources and Services Administration (HRSA) *Model Trauma System Planning and Evaluation tool* developed in 2006. The document was developed around the framework of a public health model and includes a self-assessment tool built around the public health core functions of assessment, policy development, and assurance. Each of the core functions is stratified further into the 10 essential services of public health. This self-assessment tool is designed to allow trauma care systems at local, regional, or state levels establish baseline indicators across a broad range of activities, to identify areas for enhancement or improvement, and to measure progress toward the attainment of various benchmarks over time.

As a result of the BIS Assessment the following observations were made with recommendations for three priorities in the future:

1. Educating constituent groups, consumers, legislators, and others who could benefit from information about the trauma system.
2. Short and long range planning for system improvements including:
    a. Completion of the EMS plan and the Trauma system plan, and
    b. Integration of the EMS and trauma system plans with the Emergency Management and Public Health plans.
3. Integrating the management information system currently in place while developing upgrades to the system (data linkages with EMS, trauma registry, Public Health and other databases).

A needs assessment issue came to the forefront in Pennsylvania with the introduction of House Bill 978 in 2009 which would allow the development of a level III trauma center in the same county as a Level I and II trauma center. HB 100 which was the original legislation creating Level III trauma centers did not allow this. The DPW sought the support of PTSF in reviewing this legislation and providing recommendations. The PTSF Board of Directors approved additional language that further supported some distance between two existing level III trauma centers, while maintaining the original restriction of 25miles between a Level III and already existing level I or II centers. House Bill 100 was passed in 2004.

Recently there has been a proliferation of new trauma centers- >200 since 2009. The largest increases have been seen in:

Texas-55
Alabama-53
South Dakota-44
Arizona-16
Ohio-15

Source: http://www.kaiserhealthnews.org/stories/2012/september/25/trauma-centers.aspx?referrer=search

While there continues to be a significant need in most states for Level III-V trauma centers, over 40% of these centers were Level I or II, most of which were opened by for-profit organizations.

In Florida three trauma centers sued to prevent the opening of a two adddional trauma centers in close proximity. In 2012, the First District Court of Appeals ruled in their favor.

Since trauma centers require considerable commitment of resources, the PTSF proposes that the following factors be carefully considered in any new trauma center discussions

I. ACCESS

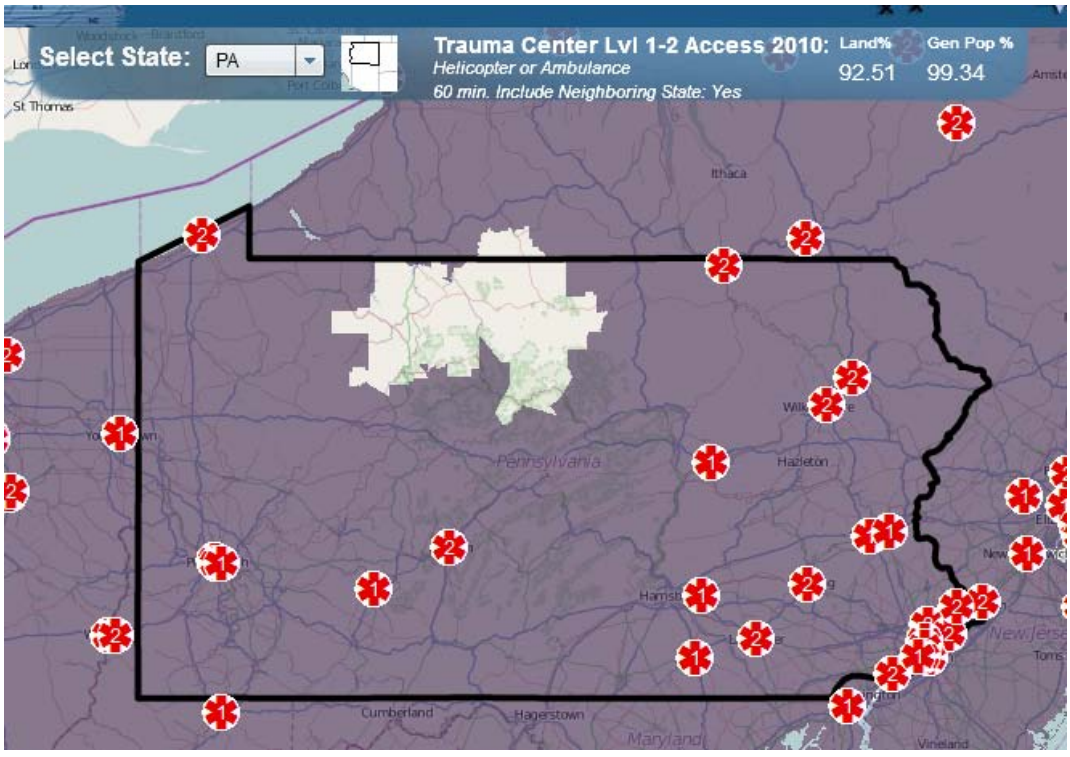
The “golden hour” has been the holy grail of trauma care. The concept that trauma patients have better outcomes if definitive care is initiated within 60 minutes of the time of injury has been attributed to Robert Cowley (1976) and Donald Trunkey (1993) - both pioneers of modern trauma care. (11)

The current 2006 ACSCOT optimal resources document states that the goal of an organized trauma system is to “provide broad coverage based on the golden hour concept” and goes on to add “in urban communities, an injured patient should be at a trauma center within a maximum of 30 minutes from time of EMS notification.” It is acknowledged, however, that there is no definitive scientific evidence to support this concept. Nevertheless, it is intuitive that with the exception of a few near-instantaneously fatal injury types, the sooner a trauma victim receives appropriate care, the more likely they are to survive and return to society.

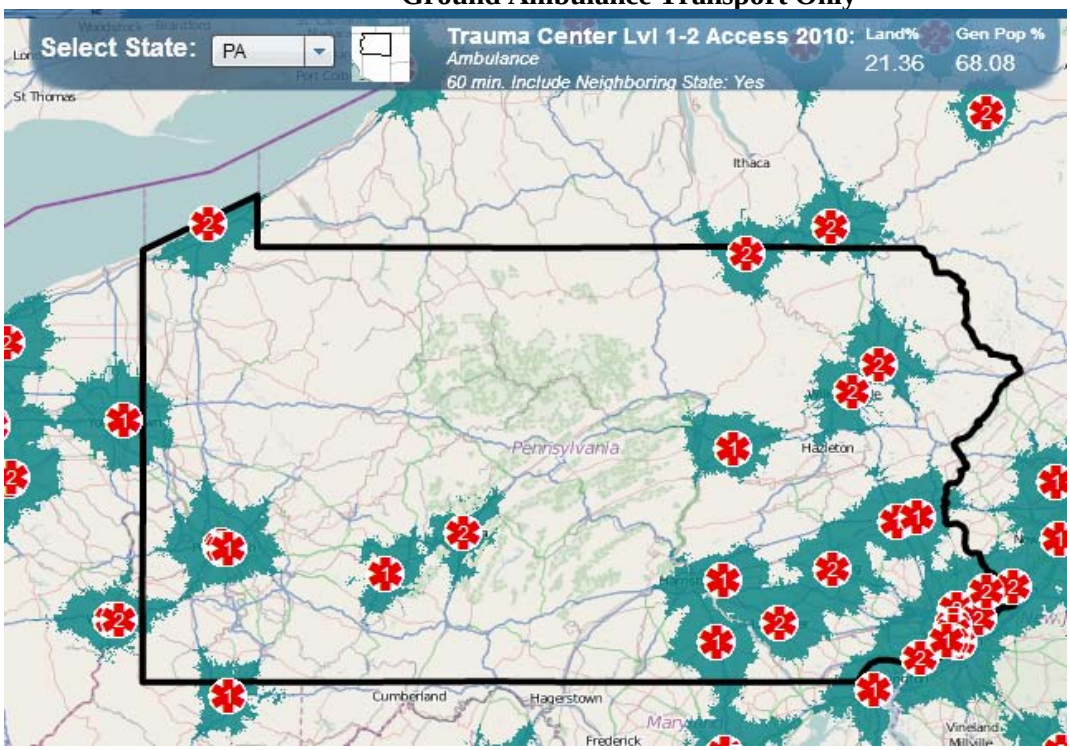
In 2005, Branas et al. from the University of Pennsylvania published a seminal article on trauma center access in the United States. (12) In a well-designed study, they reliably estimated that 69.2% of the US population had access to a Level I or II trauma center within 45 minutes and 84% had access within 60 minutes (the golden hour). Specifically for Pennsylvania, 88.5% and 99.3% of the state’s population respectively had such access.

This study found that the contribution of helicopters was necessary to reach these goals in 26.7% (45 minutes) and 27.7% (60 minutes) - specifically in Pennsylvania, 42.4% and 36.9% respectively - highlighting the primarily rural nature of the state of Pennsylvania. The grey and white sections of the map below represent areas of Pennsylvania that do not have ground or air access to a trauma center within 60 minutes:

Figure 2 **Trauma Center Access within 60 min**
Helicopter or Ambulance Transport



Ground Ambulance Transport Only



Source: Trauma Information Exchange Program website of the American Trauma Society

While not specifically studied, an online analysis of maps (www.traumamaps.org) shows that trauma center access times for Pennsylvanians within 25 miles of Allegheny and Philadelphia Counties are very close to 100% of achieving these goals.

Pennsylvania has 13 critical access hospitals (CAH). These 25 bed hospitals are the "last line of defense" in the most rural areas of the Commonwealth. During 2012 there were 342 trauma transfers of varying severity (average ISS 8.87) from these institutions to level I or II trauma centers with an average transfer time of 272 minutes - over 4 times that of the widely promulgated golden hour concept. This is to be compared to the overall average transport time (helicopter or ambulance) of 36 minutes to level one/two trauma centers in/or around Allegheny and Philadelphia counties and 51 minutes to rural level one/two trauma centers. As noted in the previous map, access to trauma centers within the "golden hour" is limited in several counties in the northern tier of Pennsylvania. In this area are located 3 critical access hospitals that remain the sole source of care for citizens in that region. With this in mind the PTSF approved the development of standards of accreditation for Level IV trauma centers. Development of Level IV trauma centers in rural areas is being supported on a national level by the American College of Surgeons, Committee on Trauma. The ACSCOT has facilitated federal funding of critical access hospitals to achieve trauma center accreditation through the federal rural flex grant program. The first Level IV center in Pennsylvania was accredited November 1, 2013, and an additional five hospitals are pursuing level IV accreditation.

SUMMARY

It is critical that in any needs assessment process that the accessibility of the affected population to trauma center care be of utmost importance. While there is minimal supporting scientific evidence, a 45-60 minute proximity by ground or air has been adopted by all trauma system planners including the American College of Surgeons Committee on Trauma. At the present time, in spite of its highly rural nature, it appears that <10% of the population in Pennsylvania does not have such access. The development of Level III and Level IV trauma centers may further narrow this gap.

II. VOLUMES/OUTCOMES

There is ongoing debate over whether higher volume trauma centers have better patient outcomes. It has been well shown for various surgical procedures that there are various volume thresholds for individual surgeons and/or hospitals below which outcomes are compromised. (13)

Indeed, one of the ACSCOT standards for level I trauma centers is 1200 trauma patients per year or 240 patients with Injury Severity Score (ISS) greater than 15 (most severely injured) or 35 patients per year with ISS greater than 15, cared for by each trauma surgeon.(10)

Nathens et al. studied the volume/outcome issue in 84 academic trauma centers, focusing on two patient cohorts, both with ISS greater than 15 - penetrating abdominal trauma (PAI) and multi-system blunt trauma (MSBT - head injury plus at least one orthopedic injury).

The odds of dying at a “high” volume (greater than 650 total cases per year) center were very significantly reduced in patients in shock and in coma (14).

In a more recent study, Tepas, et al looked at the effect of volume on severe traumatic brain injury (TBI) outcomes over a 10-year period. High volume was considered >40 severe TBI patients per quarter; low volume <40 per quarter. Highest volume centers had 9% lower mortality ($p<0.001$). Lower volume centers discharged a significantly greater number to skilled nursing facilities.
To the contrary, London et al. found, in reviewing 98,000 trauma center admissions; severely injured patients had a slightly higher mortality rate and a longer length of stay at the highest volume trauma centers (approximately 1200 per year). These authors postulated that one reasonable explanation for their findings was that demand on hospital resources at the busiest trauma centers, at times, may exceed available resources. (14)

Specifically in Pennsylvania, Pasquale et al. studied the impact of patient volumes and level of trauma center accreditation on patient outcomes. Data on 88,000 seriously injured patients from 24 Pennsylvania trauma centers was retrospectively analyzed (56,000 patients from level I centers; 32,000 from level II centers).

High volume centers were considered those admitting a mean of 920 plus/minus 330 patients per year (range 627-1714) and low volume centers a mean of 437 plus/minus 140 per year (range 228-608). Low volume of trauma admissions was a significant risk factor for mortality in patients with head, chest, brain and/or lung injury. Both high volume level I and II trauma centers showed a similar survival benefit resulting in the conclusion that “meeting the standards for accreditation should be recognized as having a favorable impact on outcome in seriously injured patients.”(15)

Recently, a paper was presented at the Region 3 American College of Surgeons' Committee on Trauma resident paper competition. Drs. Logan et al. reviewed the National Trauma Data Bank records for approximately 470,000 patients treated at 101 level I trauma centers between 2002 and 2006. They found

that trauma center volume was a highly statistically significant predictor of mortality. Mortality risk was significantly lower in low volume centers compared to the highest volume center. Interestingly, however, the lowest mortality risk occurred in centers with mid range levels of volume. Patients in the three highest volume centers had between 3.4 and 3.9 times the adjusted odds of death observed for patients in the lowest volume centers. (16)

This paper would appear to recognize what others have begun to assert, that outcomes improve as volume increases. However, there appears to be some critical level of volume above which the likelihood of survival declines. Of vital importance in undertaking needs assessment for additional trauma centers is to understand the potential impact on patient volume with respect to preexisting surrounding centers - so as to ensure that this does not drop below a critical threshold.

A recent controversial paper by Simon et al. addressed this issue by looking at data from their institution 12 months before and 12 months after designation of a level I trauma center 2.5 miles from a preexisting level I center. (17) The preexisting center saw a drop in overall trauma admissions from 625 to 439 (30%). With respect to patients with ISS greater than 15, there was a 14% total drop. Overall, there was a 38% reduction in penetrating and a 29% reduction in blunt injuries. For patients with ISS greater than 24, there was an increase in absolute mortality from 23.9% to 31.7% which trend continued the following year with an absolute mortality rate of 54.3%.

The authors of this paper felt that "significant reductions in the volume of severely injured patients had a negative impact on factors not routinely measured such as resident education, staff competency, and research." They advocated that the impact of these factors should be taken into consideration when assessing the potential impact of a new trauma center within the trauma system. (18)

Postulating that the proximity of a Level I trauma center might have a positive effect on outcomes at Level two centers, Haas, et al used the National Trauma Databank to determine risk-adjusted mortality in 55,650 patients treated at isolated Level II centers (ITC- >30 miles from the closest Level I; n=84) and neighbored Level II centers (NTC- < 30 miles from closest Level I; n=77). Patients treated at ITC's had a 12% lower risk of death. These findings suggest mileage restrictions between Level I and II centers may be appropriate- as is the case with Level III centers in Pennsylvania. (21)

Carr, et al recently presented a poster at the Society for Academic Emergency Medicine(2013)- an interrupted time series study to evaluate the impact of adding level II and level III trauma centers on volume and severity of disease at a nearby level I facility. Over a 10 year period, with the addition of one Level I and three Level III's (one of which lost accreditation after 11 months) the Level I center saw a 12% drop in trauma volume, however mortality decreased. Nevertheless these authors stated, "strategic planning of statewide trauma systems can help balance rapid access to care with maintenance of adequate annual patient volumes of critically injured patients including recognizing when a system is at capacity"

SUMMARY

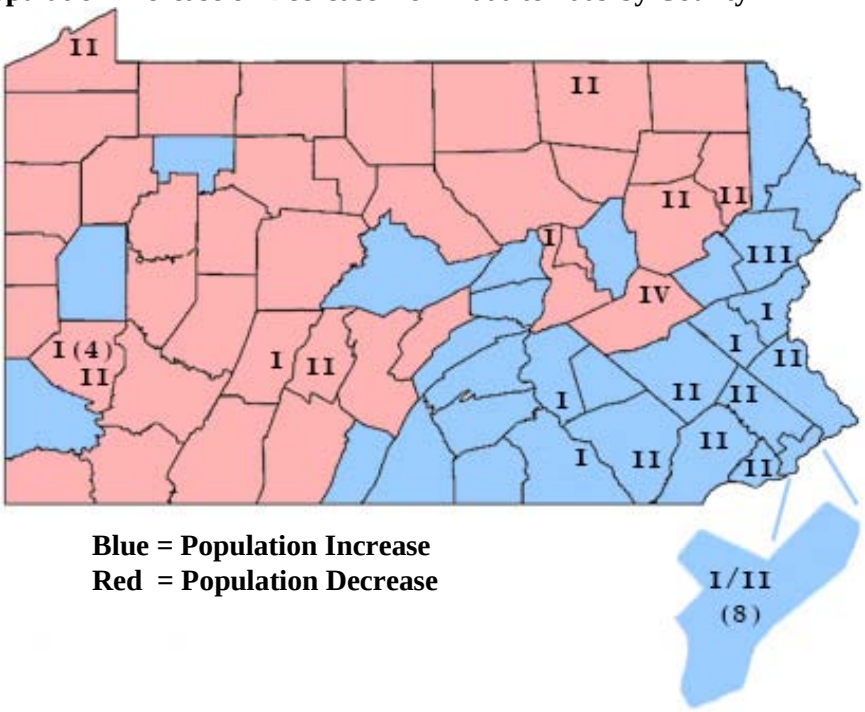
In needs assessment planning a critical threshold of trauma center volume must be taken into consideration to optimize patient outcomes. There are volume thresholds above and below which optimal outcomes suffer. This specific threshold must be considered on a regional and hospital-by-hospital basis. The potential impact on the experience of trauma team members at affected institutions must be factored into any decision making process when considering new trauma center development.

III. POPULATION DENSITY/INJURY RATES

The need for additional trauma centers and/or existing trauma center capacity must be taken in consideration with respect to population density and injury rates.

Between 2000 and 2009, the total population of the State of Pennsylvania has grown by only 323,696 (http://quickfacts.census.gov). Of the 67 counties within the state, 29 increased in population; 38 decreased in population. Population gains varied from 1% to 37%. The three counties with the largest gains were Monroe at 19.9% (n=27,665), Pike 30.7% (n=14,226), and Forest 37% (n=1,800).

Figure 3 **Population Increase or Decrease from 2000 to 2009 by County**



Blue = Population Increase
Red = Population Decrease

Monroe County currently has a designated level III trauma center. The closest trauma centers to Pike County are in neighboring Monroe and Lackawanna counties (approximately 15 miles from the border of Pike County); the closest trauma center to Forest County is a Level II center in Erie (approximately 50-60 miles from the border of Forrest County). (Figure 3)

Of the counties with currently accredited trauma centers, ten had population decreases from 2000 to 2009; eleven had population increases ranging from 1% to 19.9%. In most of the counties with population increases there was at least one adjacent county with an accredited trauma center. (Figure 3)

In addition to significant population density changes, one has to consider injury rates to put into perspective the potential need for additional trauma centers.

With respect to the latter, while the PTSF blinds all information regarding specific individual trauma centers, it is interesting to review Pennsylvania trauma center volume numbers across the state from 2008 to 2012 (figure 4) during which time two new trauma centers have been accredited. Five of the 29 Level I or II accredited trauma centers during that time experienced a decrease in volume ranging from 0.2% to 10% (n=6 -119 patients); 24 had an increase in volume ranging from 0.3% to 58.6% (n=22- 490 patients).

It is important to note that after the accreditation of hospital Y in 2010, the closest neighboring accredited trauma center, hospital P, had a decrease in volume of 115 patients within the first 2 years, but the volume does appear to be increasing. In addition after the accreditation of hospital X in 2008 the closest neighboring accredited trauma center, hospital S, had a decrease in volume, but subsequently returned to 2008 patient volumes.

Figure 4
Level I and Level II Pennsylvania Trauma Center Volumes 2008-2012

Level I and Level II Trauma Centers	2008	2009	2010	2011	2012	% Change
A	1381	1384	1544	1598	1797	30.1%
B	3185	3202	2895	3089	3242	1.8%
BB	656	574	670	740	708	7.9%
C	1067	1190	1208	1382	1401	31.3%
D	2284	2214	2306	2309	2491	9.1%
DD	1191	1070	1033	1033	1072	-10.0%
E	915	908	859	857	963	5.2%
EE	951	983	997	934	954	0.3%
F	1039	1192	1161	1270	1208	16.3%
FF	624	619	627	622	629	0.8%
G	1035	1230	1352	1338	1501	45.0%
H	3358	3378	3966	4227	4318	28.6%
I	1705	1601	1598	1558	1597	-6.3%
J	1342	1448	1428	1412	1478	10.1%
K	1556	1626	1597	1555	1602	3.0%
L	438	469	558	623	689	57.3%
M	836	940	1094	1063	1326	58.6%
N	1002	1055	989	1044	1001	-0.1%
O	1261	1322	1204	1244	1209	-4.1%
P	1456	1590	1567	1441	1452	-0.3%
Q	578	673	677	700	687	18.9%
R	956	876	895	936	1023	7.0%
S	698	676	644	646	698	0.0%
T	1128	1024	1201	1146	1309	16.0%
U	1250	1288	1386	1333	1424	13.9%
V	881	850	854	857	970	10.1%
W	1212	1231	1297	1399	1325	9.3%
X	204	716	672	630	800	11.7% *
Y			204	992	991	-0.1% **

**The percent change for hospital X was calculated using 2012 and 2009 data, because the 2008 data was not a full years worth of data.*
***The percent change for hospital Y was calculated using 2012 and 2011 data, because the 2010 data was not a full years worth of data.*

Source: Pennsylvania Trauma Outcome Study

In 2012, there were 16 trauma centers in Pennsylvania which exceeded patient volumes of 1200 - range 1208- 4318. There were no trauma centers with volumes below 608 - the critical volume for improved outcomes as identified by Pasquale specific to Pennsylvania trauma centers.

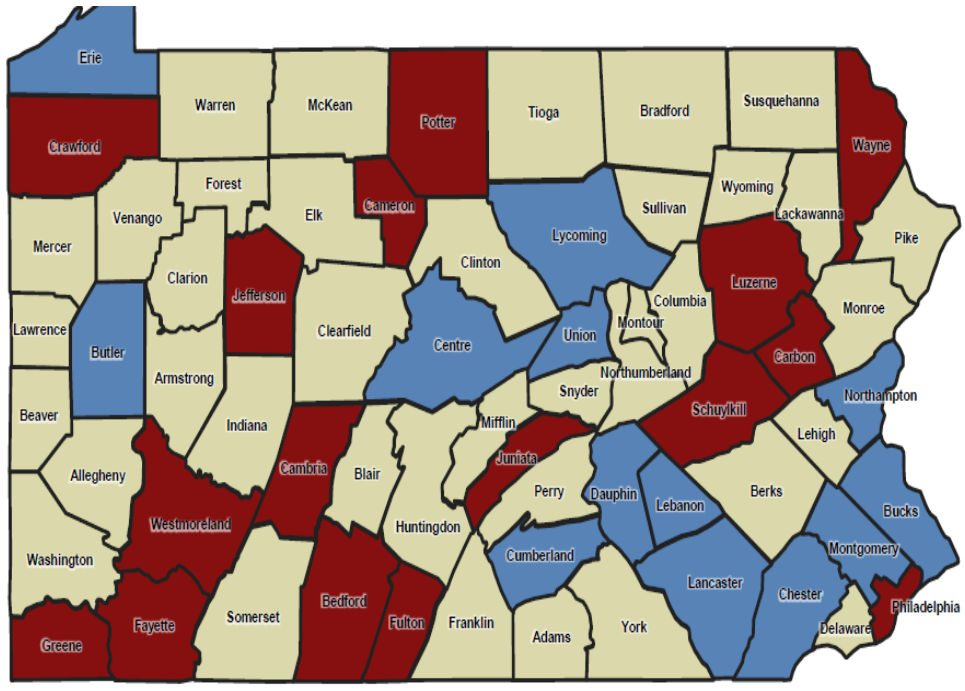
The injury rate in Pennsylvania is more difficult to quantify. The Pennsylvania Department of Health's Combined Injury Report shows the following statewide age-adjusted injury rates per 100,000. (Fig. 5)

Figure 5 **Age Adjusted Injury Rates 2006-2010**

	Fatal Injuries	All Injuries
2010	58.4	975.1
2009	57.7	1009.8
2008	60.9	1053.8
2007	59.7	1066.2
2006	57.6	1045.7

Source: Injury Deaths and Hospitalizations in Pennsylvania 2006-2010, Pennsylvania Department of Health
The Pennsylvania Department of Health published county by county PHC4 data on all injuries admitted to hospitals with an ICD 9-CM code of 800-955 during the period of 2006 through 2010 with an injury death rate averaging 58.8 per 100,000 population.

Figure 6: Age-Adjusted Death Rates by County, with Significant Difference Versus the State Pennsylvania Residents, 2006-2010



LEGEND

Rate Significantly Higher than PA

Rate Significantly Lower than PA

No Significant Difference from PA

Source: *Injury Deaths and Hospitalizations in Pennsylvania 2006-2010, PA Department of Health;*

When superimposed on the location of trauma centers, twelve counties with trauma centers or with a trauma center in a neighboring county had a lower overall injury death rate; nine counties with a trauma center or a trauma center in a neighboring county had a higher rate, while seven counties with no immediate proximity to a trauma center had a death rate higher than the overall state rate.

Thus, population increases are occurring at a very low rate in Pennsylvania- approximately 30,000 per year; the fatal and All injury rates have remained relatively stable; and the overall numbers of patients treated in existing trauma centers has increased by 16.6% in the past four years.

SUMMARY

Population density and injury rates are important to assess when considering the addition of new trauma centers within the current system. There should be a clear population density increase and injury rate occurrence increase to justify addition of new trauma centers. Such should not only be based on current data but on future projections of population growth or loss.

IV. MANPOWER

The physician manpower crisis in healthcare is the omnipresent issue in medicine - and nowhere more so than in Pennsylvania. This crisis is expected to further worsen with the recently passed federal healthcare reform legislation. While the American Association of Medical Colleges is likely to achieve its goal of increasing US medical school admissions by 30% by 2015, such would do nothing to address the issue of physician shortages as the Center for Medicare and Medicaid Services reimbursement for residency training is not likely to be increased (and was not even addressed in the recently passed healthcare legislation). As reimbursement for residency training, slots are and have been kept capped for decades, the increasing number of US medical school graduates will simply displace foreign medical graduates in residency training with the end resulting in a zero net gain. In 2013 two bills were introduced in the US House and one in the Senate, proposing significant increases in residency training positions, however the mechanism of funding was not addressed.

While this affects primary care and medical/surgical specialties across the board, it particularly impacts on trauma care, which requires constant readiness and availability.

Increasingly few are willing to commit themselves to in-house coverage (which is the norm in level one trauma centers) or availability within 30 minutes of notification (required for all surgical sub-specialties).

In Pennsylvania, the problem is compounded by lack of tort reform for malpractice and near the lowest reimbursement rates for physician services in United States. The Pennsylvania Medical Society published a position paper in 2007 addressing significant physician manpower issues in Pennsylvania with the following salient summary:

"Increasing demand for health care services is a certainty in the US during the next few decades, due in large part to the aging baby boomer generation, an increased use of technology, and changes in the way people perceive, access and use health care.

The report examines population growth and aging, trends in physician office and emergency visits, and demand for physician services in connection with hospital services.

This analysis also includes aspects of the medical practice environment that are most directly impacted by increased demand and compares Pennsylvania's experience to the rest of the nation. The report

considers the physician work force and issues surrounding physician efficiency, productivity, and supply."

Source: http://www.pamedsoc.org/MainMenuCategories/Government/SOM/SOMoverview.aspx

Perhaps one the most actionable findings of "The State of Medicine in Pennsylvania" are trends surrounding the need for recruitment and retention of existing and future physicians.

The Pennsylvania Orthopedic Society (POS) points out, that at trauma centers, orthopedic surgical treatment, including wound care and bone reconstruction, predominates as the most commonly performed surgical cases. This high volume of care places a unique demand on orthopedists that must be understood and factored into designing a system to deliver optimal trauma care. The POS recommends that reliance on locum's tenens or non-staff surgeons should be strongly discouraged in the interest of consistent patient care

SUMMARY

The limited availability of health care providers interested and willing to provide trauma services in "new" trauma centers must be taken into careful consideration in any needs assessment process.

V. HEALTHCARE FINANCES

The financial impact of opening a new trauma center is difficult to quantify. It is however well known that the expense of maintaining a trauma center is substantial. In the early 1990s, a "crisis" in trauma injury care was declared by the General Accounting Office (GAO) of the Federal Government after the closure of over 60 trauma centers because of financial hardship, concluding that "such jeopardized the lives of many severely injured Americans." Indeed in Pennsylvania two Level III trauma centers just announced that they would not seek reaccreditation as "the burden of carrying the major excess cost to be trauma centers is too great for rural community hospitals"

The General Accounting Office (GAO) recognized that many trauma patients had no health insurance and limited access to Medicaid resulting in the "crisis." Few would argue that today the lack of health care coverage for the population at large, much less those unfortunate victims of traumatic injury is much worse than in early 1990s.

In a 2003 report of the Hospital and HealthSystem Association of Pennsylvania (HAP) reported a mean "readiness" cost of $33M among the 26 trauma centers surveyed. In 2012, HAP estimated that the average trauma center spends $1.35M/yr on trauma-specific physicians, technology, training and education to maintain compliance with PTSF accreditation requirements. (http://www.haponline.org/reports-data/factsheets/)

In 2005, the State of Tennessee estimated that every level I trauma center incurs a "readiness cost" of $14 million per year on top of usual operating expenses. (http://www.tntrauma.org)

The cost of new trauma center development and readiness costs must be weighed against the fact that over 50% of trauma cases are reimbursed by Medicare or Medicaid. According to HAP, Pennsylvania trauma centers in 2010 were responsible for 53% of all uncompensated care provided by all Pennsylvania hospitals. In 2012 the Pennsylvania Trauma Systems Foundation PTOS database showed that 7.2% of patients had no insurance at all.

Given the proprietary nature of hospital operations, it is extremely difficult to obtain actual cost estimates for opening a new trauma center.

In 2011, the Pennsylvania Department of Health, using Hospital Discharge Data compiled by PHCA, estimated the total hospital charges for all injuries in the Commonwealth totaled $8.4 billion. 68.5% of this were paid by government sources such as Medicaid or Medicare.

As more and more uninsured individuals become insured under the new healthcare reform legislation the disproportionate share (DSH) payments to hospitals will be phased out. Traditionally the federal Medicaid program has provided supplemental payments to those hospitals that serve a significantly disproportionate number of low income patients. This amounts to >$25M/yr to some Pennsylvania trauma centers.

Additionally, the Pennsylvania House of Representatives recently passed HB 2279 budget plan that includes a $25.7M cut in state Medicaid spending ($66M when including federal matching grants)

The Pennsylvania DPW has processed payments to West Virginia University Hospital since fiscal year (FY) 2007-2008 as follows:

- FY 2007-2008 $820,709.17
- FY 2008-2009 $701,863.45
- FY 2009-2010 $702,009.68
- FY 2010-2011 $997,889.86
- FY 2011-2012 $610,063.57
- FY 2012-2013 $740,099.34

With the stated goal of reducing overall Medicare spending by $500B over the next decade, hospitals will see a reduction in payments of the current 87% of costs to <80% of operating costs.

Finance is the top category cited by all as the major threat to continued viability of trauma care delivery. The difficulty recruiting and retraining physicians and nurses was identified by 90% of centers as the number one obstacle to ongoing operations (1)

SUMMARY

Costs associated with trauma center development and ongoing readiness and their potential effect on other needed local/regional healthcare services in context with the impact on hospital economic viability Medicaid, Medicare and DSH payment reductions/elimination must be considered in any new trauma center needs assessment.

VI. CONCLUSION

Dr. Earnest Moore in his 1994 American Association for the Surgery of Trauma Presidential address stated “trauma center designation should be determined on the basis of regional system needs to avoid duplication of services and dilution of experience.”(19)

The commitment of resources - human, technology, facilities, finances - to develop a trauma center within the context of an organized trauma system definitely requires careful consideration of the following

criteria:

1. Access
2. Volume/outcome
3. Population density/injury rates
4. Manpower
5. Healthcare finances

While additional factors may need to be taken into consideration or those presently proposed be modified, it is critically important that this is a community based process and not simply a hospital or health system based initiative. It is likewise equally important that this process not be driven by a state organization or mandated by legislature.

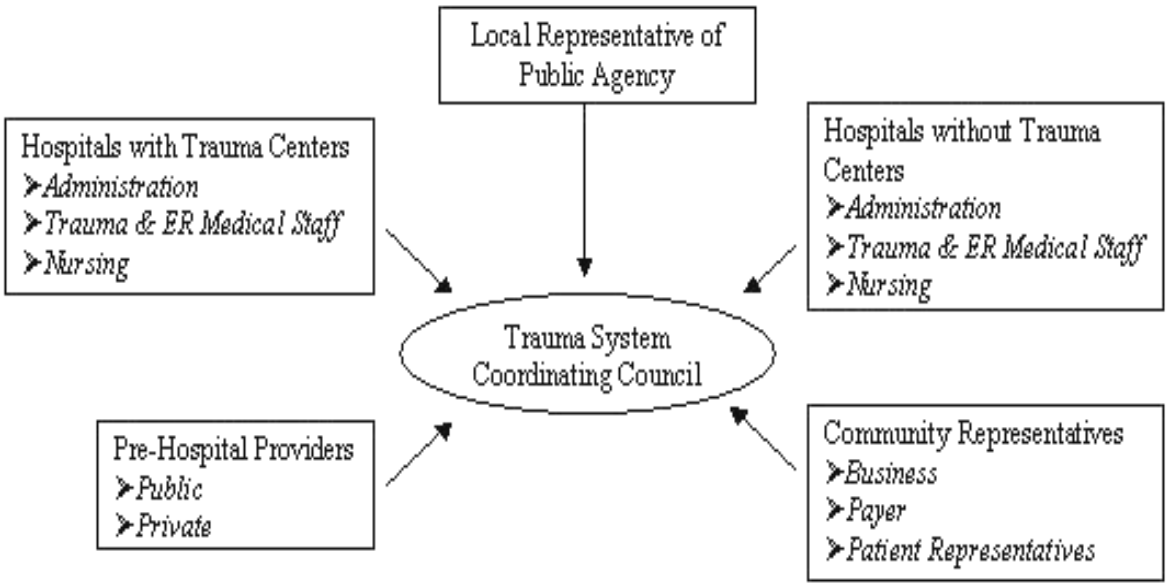
In 2012 the Louisiana Emergency Response Network produced a white paper on Development of a System of State-Designated Trauma Centers in Louisiana. . There are only two designated trauma centers in a state with the 8th highest rate of injury-related deaths.

Interestingly they came to almost the exact conclusion as noted above. Developing trauma centers within a trauma system requires:

1. Access to definitive care
2. Patient Volume
3. Population density and injury rates
4. Human capital
5. Healthcare financing.

Source: http://lern.la.gov/index.php/download_file/view/225/1/

The community-based algorithm proposed at the 1999 Skamania conference is a model for needs assessment which appears reasonable and appropriate for the Commonwealth of Pennsylvania (19)



Such an exercise was recently conducted in Montgomery County, Texas. Key stakeholders were interviewed including hospitals, EMS providers, air medical providers, the trauma regional advisory council, the chamber of commerce and concerned citizens, among others); current hospital capabilities and the interest in designation of a new trauma center were assessed; community input on the need for a new trauma center was gathered; data on current volume and severity of trauma cases in the county was obtained; projections for future trauma needs were based on population and injury rate demographics, EMS and ED volumes and air ambulance activity. Additionally a detailed financial analysis was performed.

Utilizing such a community-based, collaborative approach, the following conclusions were reached:

1. There is sufficient trauma volume to justify one new level III trauma center
2. By 2013, projected population growth will justify upgrading of the new center to level II
3. By 2031 there will be a need for both a level II and level III trauma center.

In 2012 the American College of surgeons undertook a Trauma Systems review in Arizona and made the following recommendations:
Place a moratorium on further trauma center development in the most populous counties
"Require a regional or statewide needs assessment prior to any new provisional trauma centers that addresses geography, availability and proximity of Level I centers as criteria for designation."

While Pennsylvania does not have bodies such as a "Trauma System Coordinating Council" to assist in such efforts, various consultant groups do have expertise in this area and the American College of Surgeons Committee on Trauma may serve as a resource through its trauma system evaluation program. Certainly the PTSF can serve as an information resource for the type of data referenced throughout this paper.

Pennsylvania has been fortunate to have highly committed trauma leadership and the vision to establish the PTSF as a private nonprofit trauma center accrediting entity to protect and improve the health of its citizens. During PTSF's 2012 strategic planning session it committed itself to a new vision for the future:

"The Pennsylvania Trauma Systems Foundation will become the premier organization in Pennsylvania for assuring optimal outcomes for all trauma patients."

This vision of improving outcomes for ALL trauma patients situates PTSF in the best position possible to lend its accumulated expertise to help establish the optimal trauma system for the Commonwealth by supporting community based planning and implementation of new trauma centers.

PTSF strongly encourages the use of this document across the spectrum of citizens, professional societies, hospitals and health systems, prehospital care providers, and local/regional/statewide legislators who have an interest in best serving the Commonwealth continuing to lead the nation through a thoughtfully planned system of trauma care whereby the right patient, gets to the right place at the right time with the right outcome.

As the gaps to access to trauma care continue to narrow in Pennsylvania due to the addition of Level III and IV trauma centers a carefully undertaken needs assessment based on the criteria presented in this white paper is critical to the process of considering a new Level I or II center.

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