EXECUTIVE SUMMARY
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 pre-hospital and hospital preparedness and capability into a codified continuum of care that is designated/accredited on a regular basis by qualified organizations such as the Pennsylvania Trauma Systems Foundation (PTSF).

The trauma system in Pennsylvania has always been exclusive whereby specialized trauma centers are the providers of acute trauma care focused on the severely injured instead of embracing all hospitals to function in some manner for care of the injured based on their capabilities. As PTSF moves forward its aim is to be more inclusive by promoting trauma center accreditation in rural facilities and facilitating partnerships between trauma centers and nontrauma centers. As more hospitals are considering accreditation PTSF's goal is to promote accreditation based on need in the region instead of competition.
This white paper attempts to provide a framework for the creation of an "ideal trauma system" in the Commonwealth of Pennsylvania based on best practices. The PTSF strongly believes that the development of new trauma centers requires a planning process inclusive of local/regional citizen stakeholders, pre-hospital care providers, political leaders, all potentially affected hospitals and others before seeking accreditation.

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 an inclusive trauma system and proposing issues for careful consideration when development of new trauma centers are being considered, given potential patient care, healthcare provider and healthcare expenditure impacts. As will become apparent throughout this document, 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.

As trauma centers require considerable commitment of resources in manpower, technology, facilities, training and research (level I), all of which have significant implications in an increasingly constrained healthcare financial environment, the PTSF proposes that the following 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 godfathers of modern trauma care. The current 2006 American College of Surgeons 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 in a maximum of 30 minutes from time of EMS notification."

In a recent study from the University of Pennsylvania, 88.5% (45 minutes) and 99.3% (60 minutes) of the state's population respectively had such access.

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, 45-60 minute proximity by ground or air has been adopted by all trauma system planners. At the present time, in spite of its highly rural nature, it appears that less than 10% of the population in Pennsylvania does not have such access. The development of Level IV trauma centers—a continued priority of PTSF—will further narrow this gap. The first Level IV trauma center in Pennsylvania was accredited November 1, 2013 and five additional Level IV centers are in the accreditation process. Such centers will help 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.

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

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.

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 ($P < 0.05$) 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."

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 into 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).

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 in Erie (approximately 50-60 miles from the border of Forrest County)).

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

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 during which time only one new trauma center has been accredited. Four of the 30 accredited trauma centers during that time experienced a decrease in volume ranging from 0.2% to 6.3% (n=4 -119 patients); 24 had an increase in volume ranging from 0.3% to

385.8% (n=3 -960 patients). The center with the largest increase first received trauma center accreditation in 2010.

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.

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. 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.

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

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.

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 case. 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.

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 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."

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 2009, HAP estimated that the average trauma center spends $1.25M/yr on trauma-specific physicians, technology, training and education to maintain compliance with PTSF accreditation requirements. (http://www.haponline.org/resourcecenter/factsheets/)

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 and that Pa trauma centers in 2007 were responsible for 53% of all uncompensated care provided by all Pa hospitals.

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.

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

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.

CONCLUSION

Dr. Earnest More 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."

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.

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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We are grateful to the following organizations who submitted suggestions for inclusion in the white paper:
Hospital and Healthsystem Association of Pennsylvania
Pennsylvania Chapter, American College of Emergency Physicians
Pennsylvania Chapter, American College of Surgeons Committee on Trauma
Pennsylvania Emergency Health Services Council
Pennsylvania Orthopedic Society
Pennsylvania Trauma Systems Foundation Board of Directors
Pennsylvania Trauma Nurse Advisory Council