



## *Pennsylvania Trauma Systems Foundation*

# **The Impact of Including Level III Trauma Centers in Pennsylvania**

September 5, 2012  
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## Introduction

In 2004, Act 15 of 2004 was passed mandating that the Pennsylvania Trauma Systems Foundation create standards of accreditation for Level III trauma centers. This legislation also provided funding to accredited trauma centers and to those hospitals pursuing Level III accreditation. This was the first time in Pennsylvania history that funding was approved for hospitals pursuing accreditation. The purpose of this report is to describe Level III trauma center development from both a state and hospital perspective highlighting how those experiences have helped shape trauma system development in Pennsylvania and pave the way to a more inclusive system of care reaching into rural underserved areas of Pennsylvania.

## Historical Background

The Pennsylvania Trauma Systems Foundation (PTSF) became the accrediting body for trauma centers in Pennsylvania through the passage of the EMS Act of 1985. Pennsylvania was the eighth state in the country to develop a trauma system but continues to be the only state that gives the authority to a nonprofit foundation to perform this function. Within the legislation PTSF was given the authority to establish Standards of Accreditation for trauma centers that, at a minimum, were based on those of the American College of Surgeons Committee on Trauma. The system continues to be a voluntary one whereby hospitals apply to be trauma centers and are accredited based on their compliance with PTSF Standards. The development of trauma centers and trauma systems has been proven nationally to decrease mortality and morbidity. This has been true in Pennsylvania as well with a 3% decrease in mortality over a 10 year period.<sup>1</sup>

The accreditation of various levels of trauma centers happened in three different time periods.

1. **1985:** PTSF was created and standards of Accreditation were developed for Level I and II Adult Trauma Centers and Level I Pediatric Centers. In 1986 eleven trauma centers were accredited and more trauma centers were added to the system annually reaching 28 in 2012.
2. **1992:** Level II pediatric standards were developed. In 1993, three Level II Pediatric trauma centers entered the system. As of 2012 there are two pediatric Level II trauma centers. One of the previous Level II centers is now a Level I Pediatric Trauma Center.
3. **2004:** Governor Rendell signed legislation mandating that PTSF develop standards of accreditation for Level III trauma centers. With that legislation also came funding to hospitals pursuing that accreditation. This decision was based in large part on the efforts of Representative Curt Schroder whose constituents in Chester County wanted the return of trauma centers services to that region after Brandywine Hospital withdrew its trauma center accreditation. The primary reason for the withdrawal cited by administrators was the prohibitive cost of physician resources. Creation of Level III trauma centers that did not require as many resources was hoped to be the solution. The first Level III trauma center was accredited in 2007 and three more were added to the mix within the next three years. Currently there is just one remaining Level III trauma center. (See Appendix A for Trauma Center Level differences.)

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<sup>1</sup> Source: Pennsylvania Trauma Outcomes Study database.

In 2004 when Level III legislation was passed (Act 15 of 2004) 12 trauma centers applied for funding to pursue Level III trauma center accreditation. Of those twelve, eleven were approved for funding based on the requirements dictated in the legislation including:

- Location > 25 miles from the closest trauma center
- Not located in the same county as a Level I/II trauma center
- > 4000 patients admitted through the emergency department
- Provision of “comprehensive emergency services” as defined in the legislation

Initial funding for pursuing hospitals continued for three years and was stopped due to the language in the legislation dictating that funding be stopped once the first Level III trauma center was accredited. In 2009 new legislation (HB 978) was passed offering funding again and deleting the requirement that a Level III could not be located in the same county as a Level I or II trauma center. Accreditation of Level III trauma centers during the same period varied. (See table 1.)

**TABLE 1: Level III Accreditation History**

Year	Total # of accredited Level III trauma centers in system	Comments
2007	1	First Level III trauma center accredited.
2008	2	
2009	4	
2010	2	Two Level III trauma centers withdrew from system this year citing financial difficulties including costs of physician on-call pay. Both hospitals were part of the same health system.
2011	2	Level III pursuit funding restored.
2012	1	One Level III trauma center withdrew accreditation as a result of a decision by the senior administration of the health system. This level III was one of 5 trauma centers within the health system.

In 2011 PTSF sent a questionnaire to eligible hospitals that received pursuit funding and those eligible hospitals that elected not to pursue accreditation in order to describe:

1. Reasons for pursuing or not pursuing Level III accreditation
2. Barriers preventing a hospital from pursuing accreditation
3. Barriers to becoming accredited for those that received funding
4. Resources that would have helped with pursuit
5. Factors that would be necessary before pursuing accreditation in the future.
6. Outcomes as a result of pursuit effort

Eight of the twelve hospitals that received funding responded. Two of the seventeen hospitals that could have received funding to pursue L3 accreditation responded. Response rates may have been impacted by personnel changes and/or a lack of organizational history since seven years had passed from the time the legislative was enacted to the time the questionnaire was

completed. The following areas of discussion are based on hospital responses to that questionnaire as well as the personal experience of PTSF staff that worked with the hospitals.

### **Reasons for Pursuing Accreditation**

Results listed in order of highest priority to lowest priority were:

1. Enhanced quality of care
2. Increased marketing of hospitals
3. Receipt of grant funding

### **Positive Outcomes as a Result of Pursuing Accreditation**

Positive outcomes cited from the respondents included:

1. Enhanced level of care of injured patients
2. Improved care of all patients within hospital
3. Implementing standardized protocols and policies for care of injured patients
4. Energized nursing and physician staff in the care of injured patients
5. Improved Performance Improvement efforts

Respondents stated that improved patient care resulted from PTSF standards which mandated a standardized evidence based team approach to care of the trauma patient. That approach coupled with aggressive performance improvement efforts created a ripple effect beyond care of the injured patient to all patients within the walls of the hospital.

One example cited by a nurse in a hospital pursuing Level III accreditation for 4 years concerned care of her 10 year old son who sustained a fractured skull and intracerebral bleeding after being hit with a baseball. Due to trauma alert activation protocols that were developed, the patient was transported to radiology within 10 minutes of arrival and within 50 minutes of arrival was en route to a Pediatric Trauma Center. She credited her hospital's trauma center pursuit efforts with saving her son's life and providing the necessary post-discharge level of care for traumatic brain injury. Furthermore injury mortality<sup>2</sup> decreased from 5.6% in 2008 to 3.8% in 2010 in her hospital's county where she also resides.

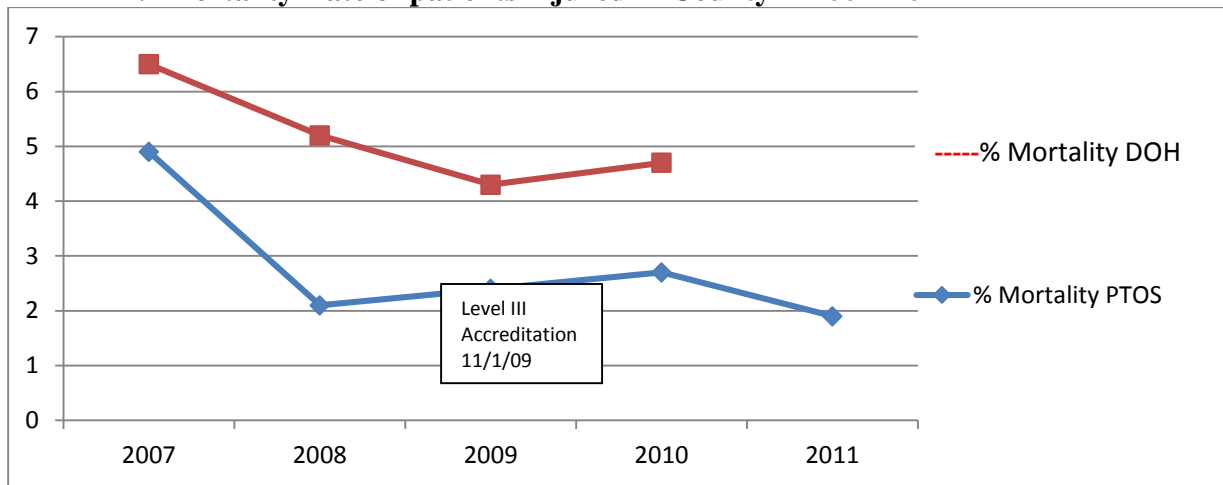
Analysis of the PTOS and DOH databases revealed mortality rates for two counties (County A and County B) with accredited Level III trauma centers decreased significantly after accreditation.

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<sup>2</sup> PTOS mortality rates are for injured patients taken to PA accredited trauma centers from this county. DOH mortality rates are based on number of deaths in a county divided by total number of injured patients in a county. Note: DOH data was provided by the Bureau of Health Statistics and Research, Pennsylvania Department of Health. The Department specifically disclaims responsibility for any analyses, interpretations or conclusions."

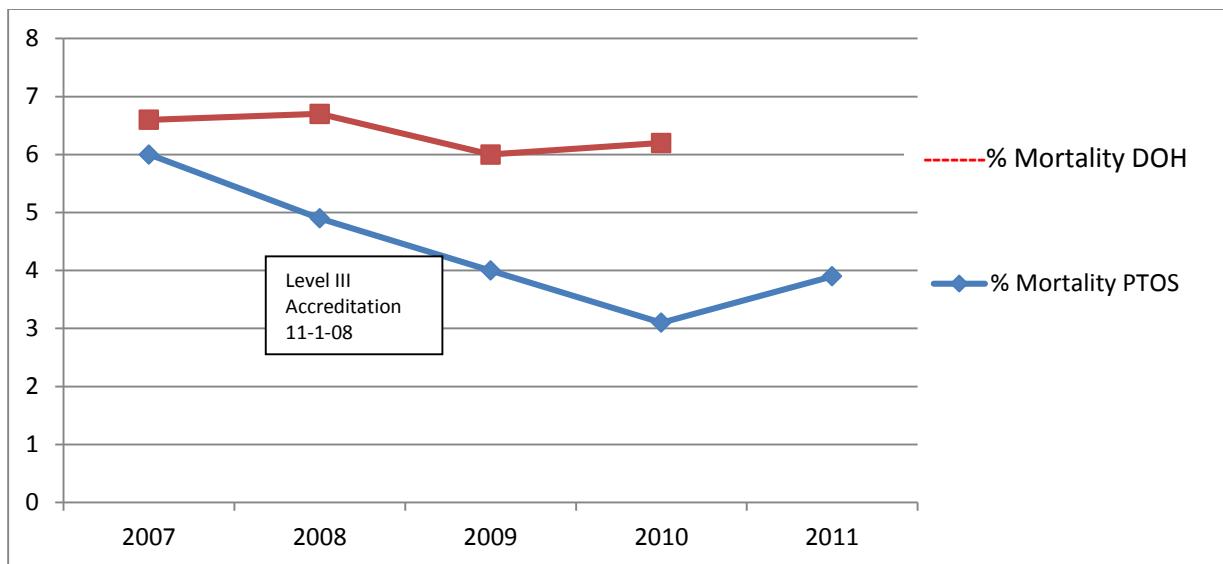
County A's injury mortality decreased from 6% prior to accreditation to 3.9% two years post accreditation.<sup>3</sup> (See TABLE 2)

**TABLE 2: Mortality Rate of patients injured in County A 2007–2011**



County B's injury mortality decreased from 4.9% prior to accreditation to 1.9% post accreditation.<sup>4</sup> (See TABLE 3).

**TABLE 3: Mortality Rate of patients injured in County B 2007–2011**



Another effect of Level III pursuits has been the strengthening of inter-hospital partnerships and collaboration between higher level trauma centers and transferring hospitals. When Level III trauma center accreditation was first introduced, higher level trauma centers feared that trauma patient volumes would plummet in their facilities as well as the severity of injury which could

<sup>3</sup> Ibid

<sup>4</sup> Ibid

diminish their level of expertise. This has not been the case. Trauma center volumes have continued to increase overall in all trauma centers of the state and injury severity has remained constant.<sup>5</sup>

### Barriers to Pursuing Accreditation

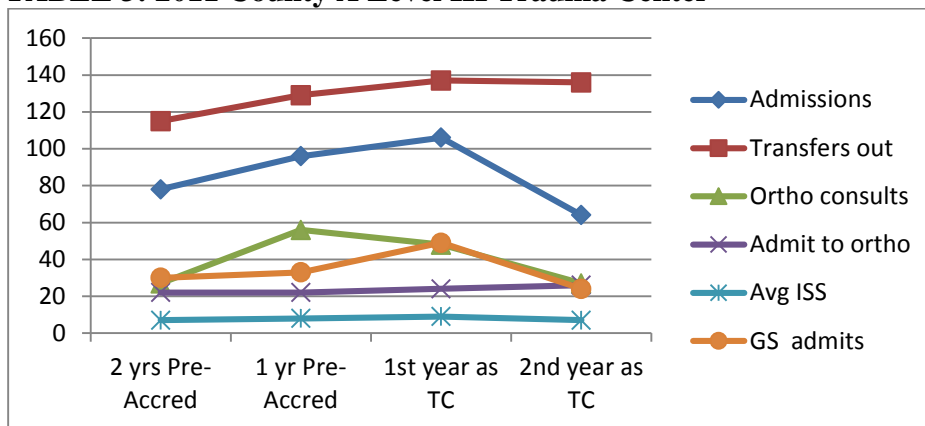
#### Physician support

The most common barrier experienced by hospitals that pursued accreditation or elected not to, was a lack of surgeon support—primarily from general surgeons but also orthopedic surgeons as well. Hospitals that fit criteria for Level III pursuit tended to be rural and had private practice physician groups that did not want to change their practice schedules by being on-call. Another concern expressed from surgeons was the potential for medical malpractice litigation as a result of caring for more acutely injured patients that they feared may be beyond their capabilities. Although the medical staff was educated that the kinds of patients arriving by EMS to trauma centers would not significantly change, there were still fears that both patient volume and injury severity would increase.

In order to investigate the surgical burden on physicians related to volume of patients and injury severity as a result of Level III accreditation, the PTOS statewide trauma registry was analyzed for two counties that contained Level III trauma centers in 2011.

County A: The Level III trauma center in that county was also the only hospital in that county. County population decreased 5.5% from 2000–2008 with a total population of 54,423 residents. Analysis of the PTSF statewide trauma registry database (PTOS) showed that the number of patients requiring orthopedic surgeon and general surgeon involvement remained stable before and after accreditation as did the injury severity (ISS)<sup>6</sup> of patients. (See Table 3).

**TABLE 3: 2011 County A Level III Trauma Center**



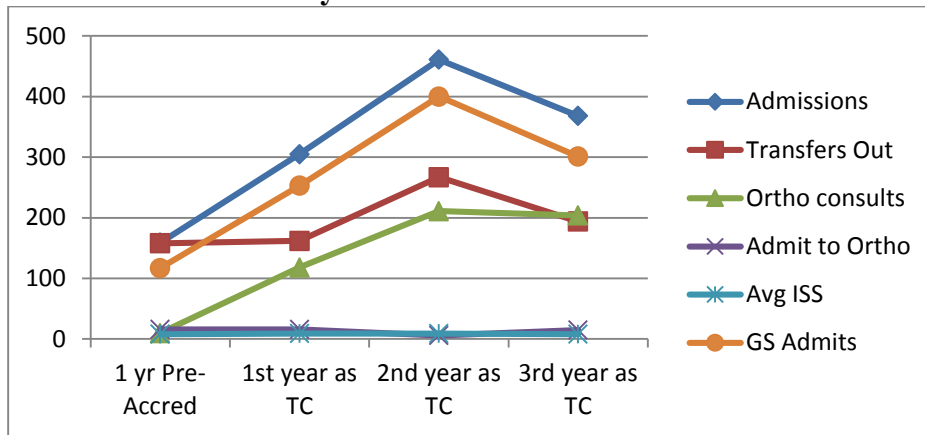
Note: the data for 2<sup>nd</sup> year as a trauma center contains 11 months of 2011.

<sup>5</sup> Source: Pennsylvania Trauma Outcomes Study database.

<sup>6</sup> ISS refers to injury severity score. An ISS > 15 is considered a seriously injured patient generally requiring the services of a trauma center.

County B: The Level III trauma center was also the only hospital in that county. County population increased 19% from 2000–2008 with a total population of 165,058 residents. Analysis of the PTSF PTOS database showed that the injury severity (ISS) of trauma patients remained the same pre and post accreditation. The number of injured patients brought to the trauma center increased 67% the first year of accreditation and another 64% the following year. Surgical involvement rose as well for both orthopedic and general surgeons.

**TABLE 4: 2011 County B Level III trauma center**



*Note: the data for 3rd year as a trauma center contains 11 months of 2011.*

In summary, the impact of Level III accreditation on the **volume** of injured patients did indeed change based on several factors including population growth in the area, geographic location and proximity to a neighboring trauma center. It is important to note however that the **injury severity** of the patients transferred by EMS to these hospitals did not change significantly. This data also suggests that EMS appropriately triaged patients according to established statewide ground and air protocols.

### Physician Leadership

Another barrier encountered by hospitals was the willingness of a surgeon to take on a leadership role in the trauma program which involved development and ongoing oversight. In Level I, II and III trauma centers the Trauma Medical Director must be a surgeon and coordinate the survey process, performance improvement program, and trauma staff credentialing in collaboration with the Trauma Program Manager who is a nurse. He/she must also be the physician champion engaging colleagues in the trauma center accreditation process. For these reasons recruiting for this position is difficult. It is viewed as burdensome by some physicians to spend extra time on administrative areas in addition to engaging their colleagues (that may be part of a competing practice group) in discussing cases where care was not optimal. In one hospital that has been pursuing trauma center accreditation since 2006, two surgeons have occupied and left the trauma medical director position with a third physician just now being hired.

### Funding

Even though Level III funding was available to pursuing and accredited trauma centers there was still a concern among hospital administrators that the amount of funding would not be enough or

that the legislature would not approve funding for a given year. This in fact was the case from 2007–2010 when pursuit funding was terminated.<sup>7</sup> In 2010 two Level III trauma centers that were part of the same health system voluntarily withdrew accreditation. The CEO cited a delay in receiving trauma center funding from the Department of Public Welfare as a primary reason.<sup>8</sup> This funding was used by this hospital in large part for surgeon on-call pay.

## **Educational Support**

Respondents stated that educational support from PTSF and their higher level trauma center counterparts could have been better. Trauma center support was also limited in part because there was a fear among higher level trauma centers that volume would be taken away from their centers. Furthermore trauma centers also lacked the expertise to teach rural hospitals how to implement a trauma program in a smaller rural hospital whose culture differed from their own with different accreditation requirements.

## **Discussion**

Although there were many positive outcomes among those hospitals that pursued accreditation the challenges encountered by hospitals was also numerous. Pennsylvania currently has one Level III trauma center and two hospitals pursuing Level III accreditation. What have we learned from our experience that can benefit our hospitals pursuing accreditation? How can we meet our goal in supporting trauma center development in underserved and remote areas of the state?

One goal is to reeducate hospitals regarding the value of Level III trauma centers and how PTSF standards of accreditation have changed. In 2011 PTSF formed a Level III workgroup which sought to ease the burden with regard to the kinds of patients requiring transfer out. Clarifications were also made through other multiple standards to reduce required equipment and responsibilities of the Trauma Medical Director to name a few. Targeting education toward non-trauma hospitals meeting the legislative requirements for Level III accreditation will be important. Additionally PTSF staff will continue to take a more aggressive approach to trauma center education via webinars and more frequent educational venues.

In addition to reviewing our own experience we have also learned much from the experiences of other states. Ohio for example has 40 trauma centers. Of the forty, nineteen are Level III trauma centers. What can we learn from Ohio's experience? Part of the answer may be in how we foster the value of rural trauma centers among our higher level trauma centers. Kathy Haley RN, who is part of the Ohio trauma system visionary committee and a PTSF site surveyor, stated in a phone interview that Ohio's hospitals embraced rural trauma center development from the start. Trauma centers from every region of the state have made a concerted effort to develop their neighboring rural hospitals into lower level trauma centers. Without a doubt successful accreditation is contingent upon the help of another trauma center above and beyond PTSF. Our goal will need to be to consider fostering these relationships and educating trauma centers on

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<sup>7</sup> During 2007, 2008, 2009 and 2010 there was no pursuit funding based on the initial Level III legislation requirements (Act 15 Of 2004 ). In 2011 new legislation (HB 978) reinstated ongoing funding for hospitals pursuing L3 accreditation.

<sup>8</sup> In 2009 West Virginia University Hospital engaged the Commonwealth in a lawsuit to acquire Pennsylvania trauma center funding. Payments were delayed close to 2 years.



how to develop their nontrauma counterparts. The success of this type of partnership can't be denied in Pennsylvania since the only remaining Level III trauma center had the unique characteristic of partnering with a Level I trauma center that provided trauma surgeon leadership and staffing.

Other states that have Level III trauma centers also have shared that their success in part may be due to implementing Level III trauma centers at the start of their trauma system development.<sup>9</sup> By including all levels there was a greater degree of hospital acceptance and system wide education that occurred as standards and EMS protocols were developed. Obviously PTSF can't reverse what has been done but it at least explains why we have had our struggles.

## **Conclusion**

As PTSF continues to support the enhancement of trauma care throughout Pennsylvania, it will draw upon its Level III experience and those of other states. A multi-pronged effort will be needed from a variety of constituents. PTSF's task will be to:

1. Foster relationship building between higher level trauma centers and their rural colleagues.
2. Enhance care of injured patients in hospitals who do not wish to be trauma centers through support of trauma center sponsored courses such as the Rural Trauma Team Development Course. ©
3. Enhance PTSF's educational approach by continuing to implement frequent web-based education forums in addition to in-person visits and educating non trauma hospitals on the value of accreditation.
4. Perform trauma system research geared toward measuring the value of trauma centers and the trauma system.
5. Embark on an education campaign to teach the public, EMS and all stakeholders how trauma centers and the trauma system increase quality and reduce costs of care provided to injured patients.
6. Continue to advocate for state and federal funding of trauma centers.

It is only through this collaborative approach that trauma system access and quality of care for all trauma patients in Pennsylvania can be optimized.

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<sup>9</sup> NASEMSO listserv query of 16 states.

## APPENDIX A<sup>10</sup>

### **DEFINING CHARACTERISTICS OF PENNSYLVANIA TRAUMA CENTERS BY LEVEL**

- Level I trauma centers provide multidisciplinary treatment and specialized resources for trauma patients and require trauma research, a surgical residency program and an annual volume of 600 major trauma patients per year.
- Level II trauma centers provide similar experienced medical services and resources but do not require the research and residency components. Volume requirements are 350 major trauma patients per year.
- Level III trauma centers are smaller community hospitals that have services to care for patients with moderate injuries and the ability to stabilize the severe trauma patient in preparation for transport to a higher level trauma center. Level III trauma centers do not require neurosurgical resources. They do not need neurosurgeons. The Trauma Program Medical Director must be a physician who is a surgeon. There are no volume requirements.

Level I and II trauma centers can also be categorized as either Adult Trauma Centers or Pediatric Trauma Centers.

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<sup>10</sup> PTSF website: [www.ptsf.org](http://www.ptsf.org)