Introduction

Trauma centers and trauma systems have been around in a formalized way for more than 30 years. And some of the “grand-daddy” trauma centers in the US date back decades beyond that. One of the goals of all trauma centers has been to “put themselves out of business” by enlightening the public about injury through prevention programs.

Sadly, it hasn’t worked as well as we would like. Year after year, injury actually is the most common cause of death in the US from age 1 to 44. Sure, you hear that statistic thrown around all the time. But look at the figure at the top of page 2, and you can see it for yourself. And for all age groups combined, it sits at #4, after heart disease, cancer, and COPD.

This issue will look at what is required of trauma professionals as it pertains to trauma, and what specific problems they are trying to address. It will also examine the state of research on those programs, and what can be done to improve them. Let’s dig in!

Prevention And The American College of Surgeons

Since the earliest editions of the “Resources for the Optimal Care of the Injured Patient,” the American College of Surgeons (ACS) has mandated that trauma centers of all levels engage in prevention activities. As with previous editions, the new “Orange Book” devotes an entire chapter to prevention. Unfortunately, this chapter is only five pages long, and one of them is the bibliography! Obviously, a lot is not being said there. And if not executed properly, there are four possible deficiencies that your prevention program can be flagged with.

The Orange Book requires that trauma centers of any level have an organized and effective approach to injury prevention. This is not new, but the ACS has now emphasized that these efforts must be prioritized based on your trauma registry and epidemiologic data.

In general, any time the word must is used in the Orange Book, a deficiency will be levied if that specific item is not met. And this certainly holds true if you review the deficiency list for prevention activities. Both items in the previous paragraph are included in deficiency 18-1. It is worded vaguely enough that if your prevention appears to be haphazard or the activities randomly chosen, it can and will fail.

All levels of trauma center must also have someone “in a leadership position” whose job description includes injury prevention (deficiency 18-2). In many Level II-IV centers, this becomes one of the duties of the trauma program manager (TPM). It can also be a part of the responsibilities for an overall hospital pre-
vention position, but a significant portion of their time should be devoted to trauma and injury prevention. Level I centers are treated differently, and must have a separate prevention coordinator that is not the TPM. This person must also have a job description and specific salary support (deficiency 18-3). For programs that are both adult and pediatric centers, one prevention coordinator can service both programs.

The biggest change in the Orange Book is that it now requires Level I and II centers to have at least two programs that address one of the major causes of injury in the community (deficiency 18-5). This requirement is somewhat flexible; you can have two programs that both address one issue, or they can each address two separate issues. But you must be able to show that they will have a local impact. This may preclude some centers from just “buying in” to a national prevention program. The exception to this rule is to offer the Stop The Bleed program, introduced by the Hartford Consensus. More information can be obtained at BleedingControl.org. This meets one half the requirement of deficiency 18-5.

Finally, the ACS wants Level I and II trauma centers to partner with community organizations to address local issues. Failure to do so results in deficiency 18-6.

The “Most Common” Causes Of Trauma Deaths In The US

Prevention program planning demands that we understand the incidence of both injuries and mortality so we can develop appropriate programs. Overall, the US has good statistics on this, courtesy of the CDC. Just look at the national mortality data above. The colored blocks are considered “trauma” and are a potential focus for prevention. Unfortunately, suicide (green) is a very significant cause of death, but I have only seen one trauma center address this with a prevention program.

The figure on the next page is very important because it breaks down the blue unintentional injury blocks in the figure above. This allows us to identify the top contenders for prevention activities. Of course, they vary by age, so pediatric and adult centers should focus on problems appropriate to their typical age range.

Motor vehicle injury and drowning are the top causes of unintentional injury deaths for ages 1-14. This includes pedestrian safety, car seats, and seat belt use.
Drowning, however, is a surprise. Unfortunately, very few trauma centers offer swimming safety prevention activities. Firearm deaths begin to creep in at age 5, and continue through old age.

At age 15, motor vehicle trauma continues its run as the top trauma mechanism leading to death. But by this age, other factors also begin to creep in. These include drug and alcohol use, distracted driving, and failure to use restraints.

However, these mortality statistics only paint part of the picture. For every person who dies from trauma, many more survive their injuries. And this is why it is so critically important that each trauma center review how people in their catchment area are injured. Regular reports from the trauma registry can identify the most common causes of injury. And with a little more analysis, age and geographic information may surface that suggest potential prevention programs.

**Common Trauma Center Prevention Activities**

I’ve compiled a list of the most common prevention activities based on a personal, informal survey. Many of these reflect the requirements of the previous Resource Document (Green Book), but I think they paint a good picture of current activities. They are arranged in decreasing order of frequency, and most are home-grown. The highlighted ones are extremely common, and are present 3 to 4 times more often than the others.

- Fall prevention
- Driver safety
- Car seat clinics
- Drinking & driving activities
- Distracted driving programs
- Helmet safety
- Bike safety
- Injury prevention fairs
- Swimming safety
- Concussion prevention
- Substance abuse programs

The most common national programs provided were:

- Safe Kids Coalition activities
- Think First
- Matter of Balance
- Step On
- Every 15 Minutes
In general, trauma centers are paying attention to the most common killers. But what about injuries that don’t quite kill? National information is not as good. That’s why the ACS is looking to trauma centers to identify injury patterns that are specific to the communities they serve.

Do Prevention Programs Work?

This is the real question. All trauma centers are required to provide prevention activities. But there is no requirement to prove the effectiveness of those programs. And, as usual, the quality of published research varies significantly. For example, one paper concluded that hands-on car seat educational intervention for parents made a significant difference in the proper use of the car seat. But if you read the details (always recommended!), you see that overall proper seat installation was only 22%! Broken down, parents who received training did it right 32% of the time compared to the untrained at 11%. I don’t consider this a successful program at all.

As usual, the published literature is fragmented, and littered with small, poorly designed and underpowered studies. We do know a few things, though. Falls programs that address multiple factors are better than those that address only one or two. Vitamin D doesn’t prevent falls. Exercise programs do.

Bottom line: Hit the literature before you embark on a brand new prevention program. Look for practice guidelines (EAST, Cochrane Collaboration). See if anyone has already figured out what works, and copy them. If no one has, consider including a research component in your program. If it works, you want to let everyone know about it!

Tips For Trauma Center-Based Prevention Programs

In my experience, the majority of injury prevention coordinators (IPC) at trauma centers around the country are very dedicated and hard working. However, they frequently don’t have much prior experience with prevention activities, and are only rarely provided with education and resources to help them excel. Most of the time, they are flying by the seat of their pants, with insufficient support from the hospital. But they really love what they are doing!

To help out, I’ve assembled a list of tips to help create meaningful prevention activities for your center:

- **Get some education!** There are very few courses for IPCs out there. The best known is produced by the American Trauma Society (amtrauma.org) and costs about $500. This two-day course is very instructive, and I recommend it.
- **Pick your problems.** Use your trauma registry to identify local issues to work on. Remember, you must have two programs that address one or two issues that are significant to your center. Located near several nursing homes and/or skilled nursing facilities? Elderly falls is probably a good bet. In the inner city? Youth violence programs may be helpful.
- **Look at what others have done.** Don’t reinvent the wheel! See what programs already exist, and what has already been published that is known to be effective. Reach out to centers that have similar demographics and geography to see what they are doing.
- **Engage.** Make sure your hospital and trauma program leadership are behind the program. It is likely that some community members, governmental agencies, and businesses will want to be involved. Secure their time and financial commitment. Your trauma medical director is the perfect person to push for this.
- **Show me the money!** It’s difficult to run a good prevention program on a shoestring budget. Your hospital, charitable foundation, and/or local resources must contribute to your success.
- **Make it a research project.** If your program is novel, it’s essential that you prove its effectiveness. Otherwise, why throw time and money at it? It’s great feedback for your sponsors, good PR for your community, and helps satisfy your Level I research requirements.