

Trauma MedEd

A Cool Way To Look At Injury Data

Governmental agencies everywhere collect trauma related data. The US federal government maintains a number of databases, such as the Fatal Accident Reporting System (FARS), the Census of Fatal Occupational Injuries (CFOI) and many others. States collect similar but smaller datasets. Even towns and municipalities collate injury information in the form of prehospital run sheets.

But reams of data are of no use unless you can learn something from it. Unfortunately, most of this data is tucked away in database management systems, or in some cases just stacks of paper forms locked up somewhere. In order for humans to make sense of it and do useful things with it, we need to transform it into forms that we can easily interpret and make sense of.

Fortunately, there are lots of visual, electronic tools available to help us do just that. One of the most helpful tools is the programmable geographic information system (GIS). An example of this is Google Maps. Most of us have used this or a similar tool in some form, usually to get directions from here to there. But you may not be aware that Google provides a programming interface so a savvy user can place any type of geography-related data on the map, creating what is

TRAUMA CALENDAR OF EVENTS

AMERICAN COLLEGE OF SURGEONS CLINICAL CONGRESS

LOCATION: VARIOUS HOTELS, WASHINGTON DC

DATE: OCTOBER 6-10, 2013

TRAUMA CENTER ASSOCIATION OF AMERICA

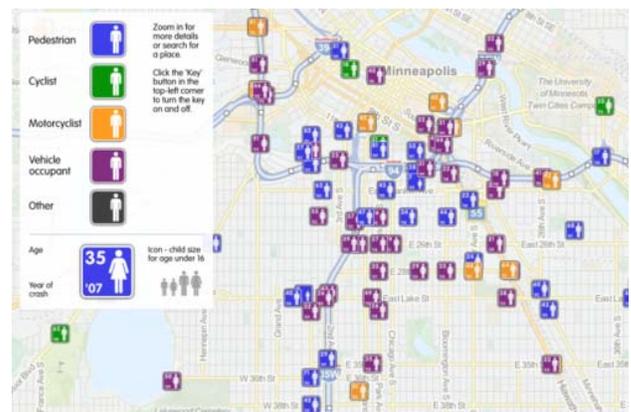
TRAUMA MEDICAL DIRECTOR COURSE

LOCATION: PEPPERMILL RESORT, CASINO & SPA, RENO, NV

DATE: NOVEMBER 5-8, 2013

called a mashup.

Imagine crossing the FARS database, which contains extensive data points on every fatal road accident in the US, with a mapping system. This would allow creation of a map showing where every person lost their life in a road accident, along with additional pertinent information about the event. A great example of this is demonstrated below. It was created by ITO World Ltd., based in the UK. They crossed fatality information with geographic map data in both the US and the UK.



This map shows fatal road events around Minneapolis from 2001 to 2009. The type of event (pedestrian struck, motor vehicle crash, etc.) is displayed along with age, year and sex. It is movable

INSIDE THIS ISSUE

- 1 **A Cool Way To Look At Injury Data**
- 2 **Myth: Motorcycle Helmets and Cervical Spine Injury**
- 2 **The Cost Of The Personal Freedom Of No Helmet Use**
- 3 **Drug Use And Car Crashes**
- 4 **Consequences Of Falls In The Elderly**
- 4 **Binge Drinking In The US**

and zoomable so it can be viewed in great detail. Click on the map above to open a new window to the full map.

Bottom line: Using trauma data / map mashups is a great way to visualize complex information. It also allows us to plan meaningful prevention activities based on local information (a requirement for ACS trauma center verification). Imagine looking over such a map of your city, and identifying a cluster of pedestrian fatalities. Then you notice that this cluster is 2 blocks away from an elementary school. This could prompt you to work with the school to implement automobile awareness programs for the children, have the city review signage and obstructions to view in the area, and optimize the number and placement of crossing guards. Then redo the map afterwards to judge the impact. Wow!

Website: <http://map.itoworld.com/road-casualties-usa#fullscreen>

Myth: Motorcycle Helmets And Cervical Spine Injury

The number of motorcyclists has been increasing over the past decade. At the same time, the number of states repealing their helmet laws is increasing. The evidence is convincing that the number and severity of brain injuries is decreased with helmet use. **But what about spine injury?**

Many arguments against wearing helmets given by riders are derived from a report in 1986 by Goldstein*. One of the issues cited in this paper is the potential increase in cervical spine injuries due to the weight of the helmet. A recently published study using the National Trauma Data Bank (NTDB) corroborates several smaller studies which show that this just isn't so.

All motorcycle collisions in the NTDB involving adults were analyzed by logistic regression. Missing data was compensated for using standard statistical techniques. Nearly 41,000 cases had complete records for analysis. About 77% of riders were wearing helmets, and the overall mortality was 4%.

Here are the factoids regarding **nonhelmeted** riders:

- Higher proportion of severe head injury (19%

vs 9% with helmets)

- Higher incidence of shock on admission (6% vs 5% with helmets)
- Higher injury severity score (ISS) (14.7 vs 13.4 with helmets)
- Higher crude mortality (6.2% vs 3.5% with helmets)
- Higher incidence of cervical spine injury (5.4% vs 3.5% with helmets)

Bottom line: Motorcyclists wearing helmets had a 22% reduction in the likelihood they would sustain a cervical spine injury in a crash. This is in addition to decreases in shock, injury severity and death. These data need to be considered when the future of helmet laws is considered in any state looking at repealing them.

References:

Motorcycle helmets associated with lower risk of cervical spine injury: debunking the myth. J Amer Col Surgeons 212(3):295-300, 2011.

**The effect of motorcycle helmet use on the probability of fatality and the severity of head and neck injury. Evaluation Rev 10:355-375, 1986.*

The Cost Of The "Personal Freedom" Not To Wear A Motorcycle Helmet

The Highway Safety Act of 1966 led to a mandate that all states adopt universal helmet laws for all motorcycle riders or risk the loss of federal highway funds. By 1975, all but 3 states had enacted these laws. However, Congress then did an about-face and eliminated the helmet law requirement for receiving the funds. Many states then revisited their laws, and some repealed them. As of now, 20 states (and D.C.) have inclusive helmet laws, 27 have conditional laws, and 3 (IL, IA, NH) have no helmet requirements.

Croce and his group in Memphis looked at the impact of helmet use in motorcyclists using the National Trauma Data Bank from 2002-2007. They found the following factoids:

- **Helmet use was higher in states with helmet laws (90%), vs conditional laws (61%), vs no laws (53%)**

- **Helmeted riders had less severe injuries in nearly all brain and skull trauma.** Glasgow Coma Scale and Injury Severity Scores were significantly lower.
- **Cervical spine fractures were less frequent in helmeted patients** (3.9% vs 5.9%)
- **Hospital and ICU stays were shorter for riders who wore helmets**
- **Mortality was significantly lower in helmeted motorcyclists** (3.8% vs 6.7%)
- **Significantly more helmeted riders were insured**

Advocacy groups continue to try to repeal or weaken helmet laws, generally based on a 1986 report (ref 2) which stated that helmets decrease peripheral vision and hearing, increase the number of cervical injuries, and have no impact on mortality. Frequently, proponents of helmet law repeal also claim that the laws infringe on personal freedom.

Helmets do decrease peripheral vision by 20 degrees, but research and a DOT report have shown that this has **no impact on motorcycle safety** or impact rates (refs 3,4). Helmets have been shown to have **no impact on hearing** at low speeds, and all riders (with or without helmets) have decreased hearing at higher speeds. Helmets do not diminish or enhance hearing at any given speed (ref 4). A number of studies, including this one, have shown that cervical injuries are less frequent in riders who survive the crash.

The insurance and hospital utilization information in this paper is most interesting. **Unhelmeted riders have more significant injuries, are more likely to stay in the hospital and ICU longer, and are much less likely to have insurance to pay for it.** And this is for the survivors! Deaths create an even greater societal burden, with lost lifetime earnings, tax revenues and other adverse economic effects.

Courts have repeatedly upheld mandatory helmet laws under the Constitution when challenged. A federal court once responded to one of these challenges with this quote:

"From the moment of injury, society picks the person up off the highway, delivers him to a municipal hospital and municipal doctors;

provides him with unemployment compensation if, after recovery, he cannot replace his lost job; and, if the injury causes permanent disability, may assume responsibility for his and his family's subsistence. We do not understand a state of mind that permits plaintiff to think that only he himself is concerned."

References:

Impact of motorcycle helmets and state laws on society's burden. J Trauma 250(3):390-394, 2009.

The effect of motorcycle helmet use on the probability of fatality and the severity of head and neck injuries: a latent variable framework. Evaluation Review 10:335-375, 1986.

Motorcycle helmets - medical costs and the law. J Trauma 30:1189-1199, 1990.

The effects of motorcycle helmets upon seeing and hearing. NHTSA Report number DOT HS 808-399, 1994.

Drug Use And Car Crashes

All trauma professionals are keenly aware of how often alcohol is involved in automobile crashes. Something you may not know is that **one third of drug tests for other substances are positive in drivers involved in car crashes!**

There has been a 5 percent increase in the number of positive drug screens in drivers over the past 4 years. The drugs range from hallucinogens to prescription pain medications.

Seventeen states have enacted legislation making it illegal to drive while on various types of legal and illegal drugs. However, these laws are difficult to enforce because:

- They are more difficult to detect, both by law enforcement at the scene and in the hospital
- We don't know a lot about the impact of these drugs on driving performance
- A positive drug screen does not tell us when the substance was taken and if it is at a significant level

Drug screens are typically obtained in the ED in seriously injured drivers. It's a good idea to order one in any patient with a significant head injury. This allows the clinician to guess (and it's just a guess) that the medications may be impairing the mental status exam.

Any patients who have a positive screen should have a documented chemical dependency evaluation and be provided with referral information to get further help.

Reference: National Highway Traffic Safety Administration

Consequences Of Falls In The Elderly

Falls among the elderly are a huge problem. Our trauma service typically has 6-12 elders who have sustained significant injuries on it at any given time. About a third of people living at home over the age of 65 fall in a given year. At 80 years and up, half fall every year.

Because of this, falls are the leading cause of ED visits due to an injury for those over 65. What exactly are the societal consequences of all these falls? A yet to be published study from the Netherlands looked at injuries, costs and quality of life after falls in the elderly.

The top 5 most common injuries included simple wounds, wrist and hip fractures, and brain injuries. Although hip fracture typically was #5 in the 65-74 age groups, it was uniformly #1 in the 85+ group. Patterns were similar in both men and women. Interestingly, hip fractures were by far the most expensive, making up 43% of the cost of all injuries (total €200M). The next closest injuries by total cost, superficial injuries and femur fracture, made up only 7% of the total each!

As you can imagine, quality of life suffered after falls as well. A utility score based on the EQ-5D, a validated quality of life score, was lower in fall victims. Even after 9 months, this score did not return to baseline. About 70% of elders who were admitted after their falls described mobility problems and 64% had problems with their usual activities. Over a quarter expressed problems with anxiety or depression.

Bottom line: An array of falls prevention programs are available. They need to be more aggressively implemented to reduce costs and improve the quality of life of our elders.

Reference: Social consequences of falls in the older population: injuries, healthcare costs, and long-term reduced quality of life. J Trauma 71(3):748-753, 2011.

Binge Drinking In The US

The Centers for Disease Control (CDC) released a report on binge drinking in the US last week that is quite alarming. It provides a host of facts that should alarm any trauma professional. And I'm fairly certain that these statistics apply to just about any other country as well.

The study indicated that 1 in 6 adults in the USA is a binge drinker! My understanding of the term binge is that 5 or more alcoholic beverages are consumed at one sitting. Obviously, this behavior puts one at risk for trauma, including interpersonal violence, car crashes, and injuries due to falls. About 80,000 people per year die due to this, and it costs our economy over \$200B per year.

Here are some of the factoids that were uncovered:

- The highest number of binge drinkers was in the 18-34 year age group
- The 65+ year age group drank the most during a binge (!!)
- Most alcohol-impaired drivers were binge drinking (!!!)
- The average highest number of drinks consumed during a binge was 8. In an average drinker, the resulting blood alcohol concentration would be about 0.24 mg/dl, or 3 times the legal limit.
- The northern tier states tended to have the most binge drinkers (18-25%)

What can trauma professionals do? In the US, all Level I and II trauma centers verified by the American College of Surgeons are required to screen all patients for problems with alcohol. This requirement should be adopted at all centers, regardless of country or level. Additionally, specific prevention programs should be developed, and existing community programs should be supported.

Reference: CDC Vital Signs -Jan 2012



www.TheTraumaPro.com



[@regionstrauma](https://twitter.com/@regionstrauma)



www.Linkedin.com/in/MichaelMcGonigal



[Michael.D.McGonigal](https://www.skype.com/people/Michael.D.McGonigal)