Remarks for Jeffrey W. Runge, MD
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Saving Lives Through Data
Grand Rounds Singapore General Hospital
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What is NHTSA

- Thank you, Dr. Lim, for that introduction. I am honored to be here in Singapore this week to help in your observation of World Health Day.

- In my current job I lead the National Highway Traffic Safety Administration, the agency in the U.S. government that is responsible for reducing deaths and injuries on our country's roadways.

- During my 20 years as an emergency physician, traffic safety has become my priority. It is part of the reason I took this job.

- As NHTSA Administrator I have become even more aware of the value of data and how it can be used to reduce motor vehicle injury.

- To mitigate the burden of injury we must begin and end with data. And in between we must use the data to make meaningful change.

Statement of the Global Problem

- First, data help us identify, qualify, and quantify the problem.

- Worldwide there are 5 million injury deaths each year.

- Road traffic collision is the leading cause of those injury worldwide.

- Globally in 1998 there were 1.2 million people killed in car crashes.

- This was 20% of the total for all injury deaths.

- The yearly global cost of these crashes is estimated to be $518 billion (USD).

- This is a problem that every nation must seek to solve.

- By the year 2020, road traffic injuries will jump to become the third leading cause of the global burden of disease from the number nine leading cause in 1998.

Challenges Injury Control Faces in Public Policy

- Public policy seeks a cure for the disease of injury.

- As with all cures, finding a solution is challenging. As is often the case, the solution requires a coordinated multi-disciplinary approach.

- One of the first steps in finding the solution is confronting our misconceptions. The first thing we must recognize is that crashes are not accidents.

- Our search for a solution is also stymied because we suffer from a lack of awareness of the enormity of this issue. Injuries and deaths from crashes are so common, they're no longer news.

- The result is weak public support, and weak political will to take decisive action to reduce injuries and deaths on our roadways.

- This lack of support and political will translates into low funding - and ultimately, no prevention.

Approach – as with any other Public Health Problem

- We must approach this public health epidemic as we would any other disease. That multi-faceted approach includes:
  - Epidemiology
  - Research
  - Prevention
  - Evaluation
  - Policy
  - Services
  - Advocacy

- The first steps in this public health model involve data. The model is based on data collection, utilization, and evaluation.

- You cannot prevent what you cannot count.

- Reliable data are essential to understand the magnitude and consequences of the problem, to target interventions precisely, and to evaluate the impact of those interventions.

- Once we know what works, we need widespread implementation of the interventions and broad-based efforts to mobilize all parties in support of those interventions that prove effective in reducing road traffic injuries.

Kinds of Data Collected by NHTSA

- Nations that have a longer history of being heavily motorized have the responsibility to be good neighbors, to share experiences and good practices.

- NHTSA has a variety of data collection systems in place.

- Traffic safety initiatives in the United States are based on data, on solid science.

- We rely on data for everything we do.

- These systems must be timely, reliable, accurate, complete and accessible.

- Several of these systems combine medical data with crash data, to get a complete picture of the injury problem and to help inform our motor vehicle injury prevention efforts.

- **FARS**, our Fatality Analysis Reporting System, is a census of all fatal traffic crashes in the United States. It has become the gold standard worldwide.

- Our data are compiled from a variety of sources:
  - Police crash reports
  - State vehicle registration files
  - State driver license files
  - State highway department data
  - Vital stats
  - Death certificates
  - Coroner/medical examiner reports
  - Hospital records
  - EMS reports

- **NASS**, the National Automotive Sampling System, is actually a composite of 2 separate systems:
  - CDS (Crashworthiness Data System); and
  - GES (General Estimates System).

- NASS uses a nationally representative sample design, and data collection is supervised with built-in quality controls.
- The system allows monitoring of national trends.
- NASS provides information on police reported crashes.
- It also allows us to perform selected, detailed crash investigations.
- **SDS**, our State Data System, computerizes state crash data from 27 states.
- It includes police reported crashes only – the minor collisions aren't counted.
- This data system has provided a basis for a number of important Federal actions, including the recall of some vehicles:
  - Nissan Altima
  - Ford Explorer
  - Kia Sportage
  - Ford Focus
- Motor vehicle injuries can be prevented, or reduced, but only if we understand the severity of these crashes, and the associated health care costs.
- Crash data alone do not describe the injury problem in terms of the medical and financial consequences.
- By linking crash, vehicle, and behavior characteristics to their specific medical and financial outcomes, we can identify prevention factors.
- This combination of information comprises our Crash Outcome Data Evaluation System, or CODES.
- In CODES, crash and medical data are collected at the crash scene, en route to the emergency department, at the hospital or trauma center, and after discharge.
- The type of injuries, their severity, and the costs incurred by persons injured in motor vehicle crashes are described and computerized.
- These statewide data are linked so that persons involved and injured in a motor vehicle crash can be tracked from the scene through the health care system.
- Linkage also makes it possible to evaluate the medical and financial outcome for specific event, vehicle and person characteristics.

- CODES evolved from a Congressional mandate in 1991 called ISTEA –the Intermodal Surface Transportation Efficiency Act.

- The Act requires reports on the benefits of safety belts and motorcycle helmets.

- The CODES helmet results show the unquestionable benefits of motorcycle helmets. We know that helmets are 35% effective in preventing fatalities, and 67% effective in preventing brain injury.

- Motorcycle helmets save money; about $15,000 is saved during the first year alone if helmets prevent brain injury.

- We use these findings to drive changes in practice and policy. Let me give you a few examples.

Data Systems - Micro Example – CIREN

- CIREN is a collaboration of engineers, medical clinicians, and others with crash data (e.g., EMS, police, auto manufacturers) providing in-depth study of car crashes to improve car design and to improve care of trauma patients.

- The CIREN Network includes 10 Level-I trauma centers that pool data to identify injury trends.

- There are about 50 cases a year for each center: crash data includes 650 data elements, and medical data includes 250 data elements.

- To be included in the CIREN data set, crashes must involve:
  - Late model year vehicle
  - Frontal (full or offset), restrained occupant
  - Side impact, unrestrained occupant
  - Rollover, if fewer than 2 1/4 turns
  - All children, both restrained and unrestrained
  - AIS severity of 3 or greater

- The CIREN research program combines medical data with crash data.

- Data can be used to anticipate specific injuries associated with specific mechanisms, facilitate triage and transport, and decrease time to diagnose injuries.

- The bottom line is that saved time leads to saved lives.

- Two case studies from our NASS and SCI data sets help illustrate these points.

- In the first case study, the data show a moderate crash, with right front damage and the occupant using a 2-point safety belt.

- The occupant in this vehicle, a 1990 Nissan Sentra, was wearing only a lap belt, and there was no intrusion in the crash.

- At the crash scene, the occupant reported he was "OK." Nonetheless, he was taken to the nearby hospital for a blood alcohol content check, and was subsequently taken to jail.

- Although hospital staff did not note an obvious indication of severe injury to the occupant, the occupant complained of extreme abdominal pain 12 hours after the crash.

- In fact, the occupant was suffering from a severe liver laceration – AIS 4.

- The ability to connect the type of safety belt used with the increased likelihood of injury suffered may have prevented a misdiagnosis.

- If you are working at a trauma center and get a patient from a moderate crash where only the lap belt was worn and where the vehicle sustained front damage, you will know that there is an increased risk of liver damage, and you will look for it.

- In the second case from our NASS data, an 82-year-old woman driver was involved in a driver side impact crash in which there was side intrusion of up to 15 inches.

- Although the 138-pound, 5'6" woman was restrained by a lap and shoulder belt, the crash factors are indicative of the potential for a severe outcome.

- In fact, the woman suffered multiple, severe injuries including:
  - AIS 4 Aortic laceration
  - AIS 3 Ruptured lung
  - AIS 2 Pubis fracture
  - AIS 2 Rib fracture

- Aortic injuries are difficult to recognize. They are frequently fatal if not recognized and treated. However, if they are recognized and surgically repaired in time for the patient to survive, there is no long-term impairment after rehabilitation.

- But again, connecting specific mechanisms to the increased likelihood for specific injuries can improve patient care.

- Such information can enable first responders to realize the connection between specific mechanisms involved and the likelihood of specific injuries.

- Better-informed clinicians hone the search for occupant injuries and reduce the time to diagnosis and definitive treatment.

- In short, the car tells a story. Injury patterns are predictable based on crash configuration.

- Injury severity can be predicted based on the data, including factors such as crash severity, configuration, occupant characteristics, and restraint usage.

- We can use CIREN data to anticipate specific injuries associated with specific crashes, for appropriate triage in the field, and to decrease time to find injuries.

- The importance of data is also underscored when we look at vehicles and fatalities by collision type.

- Although only about 2 - 2 ½ % of passenger vehicles were involved in rollover collisions in 2002, such rollover events produced 1/3 of all passenger vehicle occupant fatalities.

Data Systems - Macro Example – Frontal Crashes

- A third case study shows how data have been used to change public policy.

- Remember a time before seat belts, when we had no restraint systems, no safety glass, and no energy absorbing steering column?

- This case study examines injuries sustained in a 1990 Honda CRX before air bags. This vehicle was in a crash with a Delta V of approximately 21 miles per hour.

- In this case, the driver was critically injured and died six days after the crash. The passenger died 30 minutes after the crash.

- This crash occurred in a vehicle that was manufactured before the widespread introduction of air bags in the vehicle fleet. At a later date, the first generation of air bags was introduced.

- But over time some minor crashes in vehicles equippred with air bags resulted in severe/fatal injuries.

- Our data showed that even at low speeds and under specific circumstances, air bag deployment could lead to high injury severity. For unbelted or out-of-position occupants, the air bag could pose an occupant risk.

- As a result of those findings, air bags were redesigned to be less forceful and less likely to produce serious/fatal injuries for occupants.

- Data from our Special Crash Investigation unit show a reduction in fatalities among passengers and drivers in frontal crashes.

Data is Basis for Solution to Injury Control Challenge

- The data we collect provide a strong foundation for crafting solutions and allow us to take actions that make a difference.

- Although we collect a wide variety of data about crashes and vehicle occupant behaviors, in some areas we still confront a problem of insufficient surveillance data and significant underreporting of problems.

- We need even more timely, accurate and complete data. In that way, we can create ownership of problems, educate our key audiences, and raise awareness of what needs to be done.

- In turn, those efforts will result in increased political will and interest in taking the steps, such as increased funding, that are necessary to address this public health problem.

- The heightened attention paid to this issue also will result in cooperation among key players.

- In the United States, we have used a five-part formula to make progress.

- Our highway safety formula includes establishing a central Federal agency to coordinate and spearhead road safety efforts, dedicating resources to allow the agency to fulfill its mission, collecting and evaluating relevant, timely and accurate data, taking a systematic approach to this public health crisis, and promoting vehicle remedies, where appropriate.

- Lessons can be learned from the U.S. experience.

- In 1966 when the United States first started to address this problem, the fatality rate was 5.5 deaths per 100 million vehicle miles traveled (VMT).

- The problem seemed overwhelming, the solutions unimaginable.

- But the United States undertook a major campaign to address the problem.

- The three-pronged approach involved making cars safer, improving the environment by making roads safer, and changing driver behavior.

- That approach has yielded positive results.

- Although the U.S. population has grown significantly since 1966 and we've seen substantial increases in the numbers of cars and drivers, we have cut the death rate on the nation's roads by 72%.

- The 2003 fatality rate was 1.5 deaths per 100 million VMT.

- We learned progress reflects commitment and participation by many.

- But, most important is *a refusal to accept mistaken belief that traffic deaths are natural consequence of increasing development, motorization.*

- We have learned that through a program of applied research, program implementation, and enforced regulations, we can create a successful solution to a public health problem. As a result, if we measure back to 1975 we estimate that about 736,000 more people are alive today than if we had not taken these actions.

- Despite this progress, nearly 43,000 people were killed on America roadways in 2002. We have much to do to cure this epidemic.

- And there is even more to do on a global level.

Adapting Strategies and Realizing their Potential

- We need to adapt and apply approaches that work. What is effective in developed countries may not be what is needed in developing countries.

- There is a need for more research. We should learn as we go and not wait.

- The potential for saving lives is enormous.

- Worldwide if we reduce the current rate of fatalities by 10%, we can save 125,000 lives per year. Globally we can save a minimum of 2.5 million lives over the next 20 years.

- Worldwide if we reduce the current rate of nonfatal injuries by 10%, we can prevent 3.75 million injuries per year, and we can reduce the impact of injury on a minimum of 750 million lives over the next 20 years.

- I cannot overstate the importance of the medical community being actively involved.

- As Dr. Barlow from Harlem has stated, “it’s almost immoral” if we as doctors don’t take action to develop programs to reduce the number of preventable injuries.

- Thank you for your attention and the opportunity to be with you today.