Epidemiology & Control of Trauma (Injuries)

What is the difference between trauma and accident?

- Trauma previously called "Accident".
- Accident is inevitable & not preventable. Accidents, for example, imply randomness or an element of being in the wrong place at the wrong time.
- While trauma (Injury) is definable, correctable event, with specific risks for occurrence, implies something amenable to intervention, predictable and can be prevented.

Importance of Trauma

- In the *industrial countries*, trauma ranks 3rd as a cause of total deaths, particularly before age of 65 years.
- In the *developing countries*, the incidence of injuries (during wars & civil instability) is rising.
- When trauma does not cause death, it may leave a permanent disability, the rehabilitation of that is costly, added to the human suffering.
- The majority of those killed or disabled are in their productive life.
- Trauma is a public health problem for which solutions are possible.

Extent of trauma in Iraq

Iraqi Ministry of Health routine prospective injury surveillance collects information on all fatal traffic injuries in eight governorates of Iraq (2010-2013). The survey showed the following results:

- Analysis included 7,976 road traffic fatalities
- Overall, 6,238 (78.2 %) fatalities were males and 2,272 (28.5 %) were children under 18 years of age.
- The highest numbers of road traffic fatalities were among males 15 to 34 years of age and children of both sexes under 5 years of age
- 49.2 % of fatalities occurred among pedestrians.
- Rates of road traffic fatalities ranged from 8.6 to 10.7 per 100,000 population.
- WHO (2014): Road traffic injuries (RTI) Deaths in Iraq form 6.68% of total deaths

Is there any difference between developed & developing countries in extent of occupational injuries?

There may be higher rates of occupational injuries in developing economies because:

1. Fewer integrated injury control efforts in these areas
2. The priority is given to employment rather than health
3. Economic development in its initial stages may lead to higher rates of occupational injuries.

Causation of trauma

Trauma is caused by energy in its various forms: Mechanical, Thermal, Electrical, and ionizing at concentrations beyond the resilience of the human body.

Types of injuries

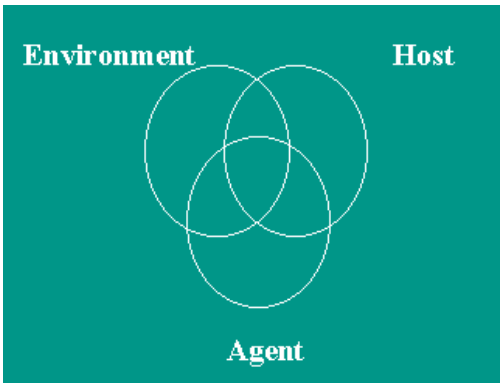
There are several different types of injuries, though, which may occur from abnormal energy transfer. The leading categories of injuries are shown here. Often, the epidemiologic characteristics of the categories are different.

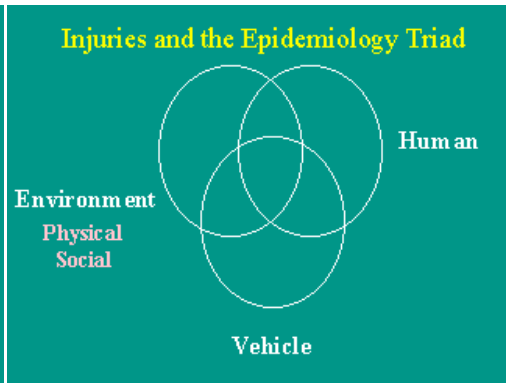
- Motor Vehicle Crashes
- Homicide
- Suicide
- Sports and Recreation
- Drownings
- Poisonings
- Falls
- Occupational Injuries
- Burns
- Asphyxiation

Factors and Phases of injuries

William Haddon, an epidemiologist, suggested that injuries could be examined from an epidemiologic framework, and most often injuries from motor vehicles.

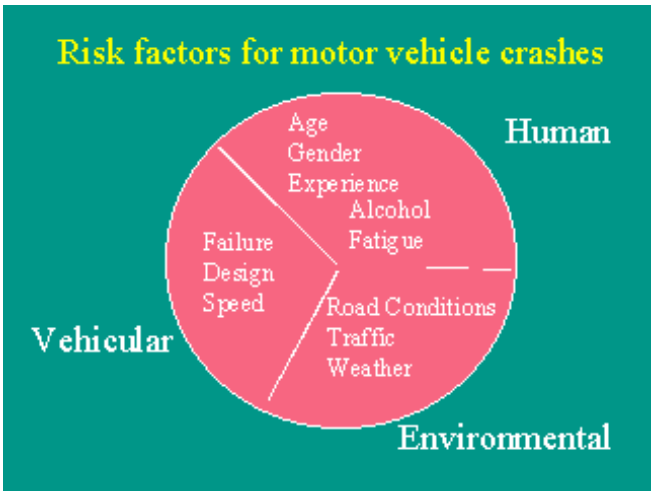
The triad of ecology of any disease includes agent, host, and environmental factors. Haddon suggested that the ecology of injuries could be also classified in the same manner i.e. the agent that is represented by the vehicle; host is the human, and the environmental factors





Risk factors of injuries

An example of the risk factors identified for motor vehicle injuries within the framework of the epidemiologic triad is shown in the following diagram



Haddon recognized that human, vehicle, and environmental factors play roles before, during and after trauma event and influence the ultimate results. Therefore, he designed what is called "The Haddon factor-Phase Matrix" which is shown in the following diagram:

	Human	Vehicle	Environment
Ante-event	Alcohol	Defects Breaks	Night Rain
During event	- young - Disease	No airbag	Roadside objects
Post event	Extent of damage	Fuel leakage	Medical system
Results	Disability	Cost of repair	Social results

Injury control

In its simplest form, injury prevention and control represents a reduction in the incidence and/or prevalence of an injury.

The best approach is the public health approach of prevention, which includes five steps:

1. Surveillance: What is the problem?
2. Risk identification: What is the cause?
3. Intervention: What works?
4. Implementation: How do you do it?
5. Outcome measurement: Did it work?

Intervention strategies

1. Prevent the creation of hazard, e.g. prohibiting the manufacture or the use of the especially hazardous vehicles such as motorcycles.
2. Reduce the extent of the hazard. Decrease Mass or speed of the vehicle.
3. Prevent the energy or hazard release.
   - Increase Skid resistance of road surfaces.

- Improved visibility of vehicle.
- Easy handling & braking characteristics
- Improved drivers' skills.
- Prohibit driving by high-risk drivers.

4. Alter the rate of energy release from its source or its spatial distribution, e.g. use of seat belts.
5. Separate the structures from the energy release by time and space.
   - Use of over & under passes.
   - Assigning different paths for large vehicles.
   - Removal of trees from roadsides.
6. Protect the susceptible host by materials barriers, e.g. Helmet, materials in the median of roads.
7. Change the basic qualities of hazard, e.g. elimination of pointed knobs or sharp edges in the interior of vehicles.
8. Strengthen the structures susceptible to damage from energy release. Such as fuel tanks.
9. Prevent the extension of existing damage by rapid response to counteract the damage when it has begun.
   - Training people for stopping hemorrhage & spinal cord injuries management.
   - Provision of roadside telephone.
   - Trained personnel ready to respond quickly.
10. Carry out repair and long-term rehabilitation.