

Injury Prevention Outcomes

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Mini Quiz

- 1. How many road traffic deaths around the world?
- 2. How many road traffic deaths in India?
- 3. What is the SDG3.6 target?
- 4. What is the Health-Adjusted Life Expectancy of an Indian citizen?
- 5. What percent of AIS3+ non-fatally injured individuals in road crashes were there in Spain in 2015?
- 6. How do road traffic injuries and death rank in comparison with other causes of health burden? (e.g., top ten, fifth, etc.)

Outline ... on measuring outcomes

Objetive: Not bother you with a “soup of letters”

Outline: How, whom, why

- Deaths
 - As per whom
 - Whether to dilute them
- Remaining Life Expectancy
- Severity
- Disability
- Costs

Counting deaths

Police counts

- E.g., India 137 572 (in 2013)
- In the world 622 273
- Time definitions: On the spot, 24 hrs, up to 30 days, ever
- Vehicle definition: motorized or not
- Road definition: public, paved or not
 - Despite there being international standards

• Morgue, vital registration systems....

- E.g, India 207551 (in 2013)
- In the world 1 207 622
- 78 countries in the world with no vital registration system at all
- A handful of countries with systems other than vital registration systems (i.e., India)
- Thus, WHO differences in accounting methods

Country	UN Economy	Reported Number of	WHO Point	Number	%
China	Developing	62945	261367	198422	315%
India	Developing	137572	207551	69979	51%
Nigeria	Developing	6450	35641	29191	453%
Democratic Republic of the Congo	Developing	498	22419	21921	4402%
Ethiopia	Developing	3362	23837	20475	609%
Bangladesh	Developing	3296	21316	18020	547%
Pakistan	Developing	9917	25781	15864	160%
Viet Nam	Developing	9845	22419	12574	128%
United Republic of Tanzania	Developing	3885	16211	12326	317%
Indonesia	Developing	26416	38279	11863	45%

Magnitude of differences

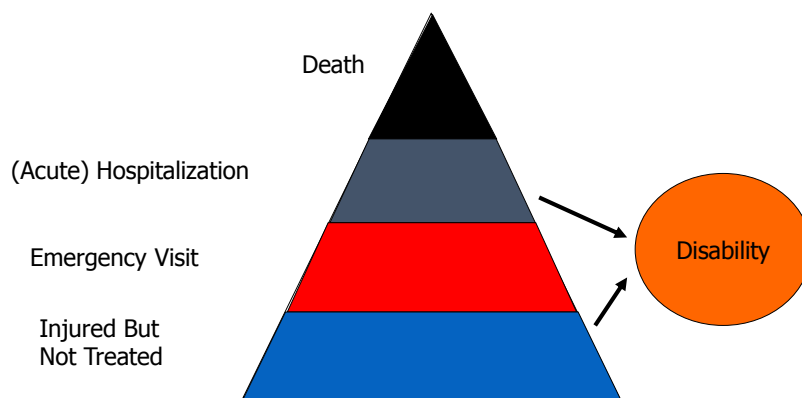
Dilluting counts into rates

- Population rates (Sweden 2.6 per 100 000, Spain 3.6 per 100 000, India 16.6 per 100.000)
- Per vehicle
- Per kilometer driven
- ...

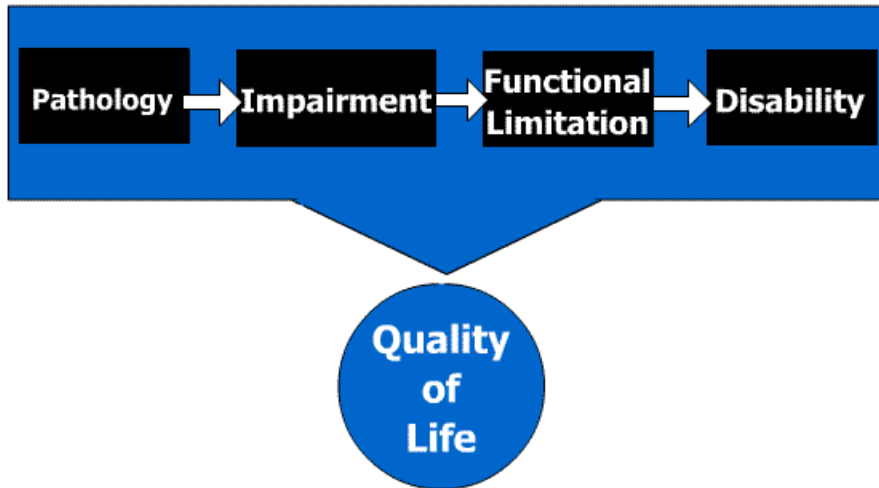
Highlightening the younger age of victims

- Years of Potential Life Lost (YPLL)
 - Whose potential? India 68,3, Spain 83,6, productive years? (65?), 75....

The Injury Pyramid



The Disability Model



Adapted from: IOM (Power and Tarlov), 1991

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Selected Morbidity Codes

- Coding the injuries
 - International Classification of Diseases
- Coding their severity
 - KABCOU
 - Abbreviated Injury Severity Score (AIS), Injury Severity Score (ISS)
 - Revised Injury Trauma Score (RTS), Trauma Revised Injury Severity Score (TRISS)

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Continued

Selected Morbidity Codes

- Coding how they happened: ICD, ICECI, NOMESCO
- Coding their mid- and long-term consequences: DALYs, QALYs, HALYs, HeaLYs, ICIDH, ADLS
- See mortality session and web appendix to this session: Morbidity Codes

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Coding System

- In general coding system should be:
 - Exhaustive and exclusive
 - Simple to use and reliable
 - Flexible yet consistent

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International Classification of Diseases (ICD-CM)

- World Health Organization but country specific
- Period revisions, currently 9th version (10th version under development)
- Coding follows strict rules outlined in documentation
 - Great level of detail
 - Requires training
- Codes injury information and cause of injury (chapters XVII and supplement E, respectively on ICD9-CM)

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ICD-9-CM Examples

Diagnostic (800-999):

- Closed fracture of the base of the skull with cerebral laceration and contusion and less than one hour loss of consciousness: 801.11
- Major laceration of liver: 864.4

External Causes (E800-E999):

- Driver in motor vehicle traffic accident involving collision with another vehicle: E813.0
- Burn caused by ignition of clothing in private dwelling: E893.0

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International Classification of External Causes of Injury (ICECI)

- Long version / short version
- Short version: Designed for ED settings
- Collects information on:
 - Where injury happened
 - Activity when injury happened
 - Intent of injury (if intentional, by whom)
 - Detailed mechanisms of injury
 - Safety equipment used
 - Narrative

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Police Reports

Police Reports

- KABCOU:
 - Killed, incapacitating injury, non-incapacitating injury, possible injury, no injury, unknown if injured
- Others:
 - Death, hospital admission, medical attention, other, none
- Poor validity when hospital records are checked (misclassification issues)

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Threat to Life Measures

Abbreviated Injury Severity (AIS):

- Anatomical severity descriptor plus locates injury body region, type, and specific anatomic structure involved, level of injury
- E.g., 751030.2 shoulder dislocation
- Offsprings: ISS, NISS, RTS

And, Trauma and Injury Severity Score (TRISS):

- Adds physiological parameters to AIS scores in three most severe body regions
- $TRISS = f\{AIS, \text{Glasgow coma scale, systolic blood pressure, respiratory rate}\}$
- Can compute probabilities of survival

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Selected Consequences

International Classification of Functioning and Disability (ICIDH):

- Codes information on the impact at the:
 - Body level, individual level, and societal level
 - And also the impact of environmental factors
- Does not indicate source of disability

Health outcomes:

- Functional independence measure (FIM)
- Activity Daily Living (ADL), IADL
- Short Form-36 (SF-36)

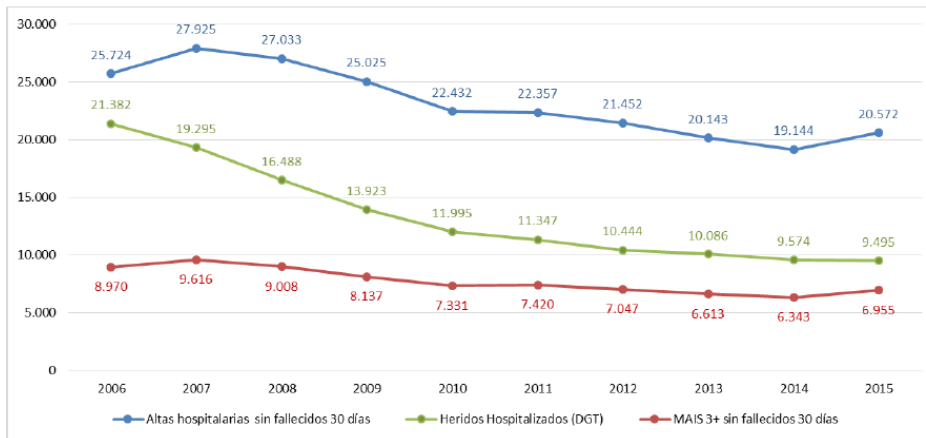
Health outcomes that are preference-based (Quality-of-life compatible or QALYs):

- Quality of well-being
- HALYs
- DALYs

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Let's step one sept back.... On non fatal injuries, Spain 2006-2015

Figura 77.- Evolución de los lesionados graves por tráfico (MAIS 3+), altas hospitalarias y heridos hospitalizados de los registros policiales. España, 2006-2015



Measuring non fatal injuries...

- Anatomical severity
 - AIS (Abbreviated Injury Scale) establish in 1950s.... ONE CODE PER INJURY
 - How to synthesize this per subjects?
 - ISS: the sum of the squares of the 3 highest in separate body regions
 - NISS: the sum of the squares of the 3 highest regardless of body region
 - TRISS: ISS with physiological information....
- Physiological severity
 - GCS
 -

Relevance of Injury Morbidity Data

- Beyond the acute consequences: Hospitalizations, ED visits
 - Counts; rates
- Effects on quality of life
 - (Age at injury—fixed age*) x quality of life** = quality-adjusted life years (QALYs)
 - *HEALTHY Adjusted life years (remember the 68.3 life expectancy in India? It is 59.5 if one controls for non fatal illness...*

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**Fixed age: 65, 75, life expectancy at birth, life expectancy at time of event*

*** Quality-, disability-, health-adjustment and other variations*

Mini Quiz

- 1. How many road traffic deaths around the world?
 - It depends on how you count them
- 2. How many road traffic deaths in India?
 - The second most in the world, but anywhere between 137 000 and 207 000
- 3. What is the SDG3.6 target?
 - To halve the absolute number of deaths by 2020 (from 2010)
- 4. What is the Health-Adjusted Life Expectancy of an Indian citizen?
 - 59,5 years
- 5. What percent of AIS3+ non-fatally injured individuals in road crashes were there in Spain in 2015?
 - 34%
- 6. How do road traffic injuries and death rank in comparison with other causes of health burden? (e.g., top ten, fifth, etc.)