



Social Costs of Road Accidents in Italy

7th IRTAD Conference

BETTER ROAD SAFETY DATA FOR BETTER SAFETY OUTCOMES

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Social Costs of Road Accidents in Italy

The methodology applied → Human Capital or Loss of Production Capacity - already used in Italy in previous studies

Usually the willingness to pay method returns values higher.

Parameters to be evaluated:

- Statistical value of life –Cost for one death
- Social cost for each injured person
 - Slight Injured
 - Serious Injured
- Other Costs for accident (administrative costs, insurance, material damages)

The cost components considered are :

- Loss of production capacity :
 - For fatality
 - For Injuries:
 - Permanent disability
 - Temporary disability both for Slight Injuries and Serious Injuries
- Human Costs:
 - moral damage to be recognized to survivors
 - biological damage to be recognized to the injured
- Health Care Costs:
 - For Hospitalization
 - Emergency Room
- Other Costs:
 - Material damages
 - Administrative Costs

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- **Loss of production capacity :**
 - For fatality
 - For Injuries:
 - Permanent disability
 - Temporary disability both for Slight Injuries and Serious Injuries

The estimate of the loss of production capacity is based on the Gross Domestic Product (GDP) detailed as Regional GDP both for employee and for inhabitant divided by age groups, the probability that a person is employed or not, in a given band of age and in a specific geographic Region.

The calculation is performed by discounting for each age group the estimate of the incomes that would have been received for the **number of years of the average expected active life** of that age group in the case of deceased persons;

The estimate of the loss of production capacity must be calculated for the deceased (years of life lost) for the **injured (partial or total lack of productivity for a period of time) and for those who suffer disabilities** such as to compromise future production activity



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Serious Injured

MAIS 3+ from Hospital Discharge Data 2018 → 8% of road accident injured people

25% of serious injured has a permanent disability (ETSC, 2007; IRTAD, 2011).

75% of serious injured has a temporary disability

Average number of days for inability to work is 232 → (INAIL – National Institute for Work Insurance)

Slight Injured

92% of road accident injured people

17% of slight injured has a temporary disability with 88 days of inability to work.

75% of slight injured has a temporary disability with 17 days of inability to work

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Human Costs

To calculate the value of non-pecuniary damage and biological damage, some parameters pre-established by the Italian Courts are used; in particular, the reference is the Court of Milan.

The "tabular method" is used, based on the system of the value of the point of disability, which varies according to the age of the injured party and the degree of disability ascertained in the medical - legal context, but not dependent on the income received by the person.

The maximum number of disability points (100) is attributed to the event of death.

define the average percentage point of disability to be applied separately to minor and serious injuries:

Slight Injured (92%)

Serious Injured (8%) were divided into two different groups

| | |
|-------------------------------------|-----------|
| 75% - up to 20 points of disability | 20 points |
|-------------------------------------|-----------|

| | |
|---|-----------|
| 25% - more than 20 points of disability | 40 points |
|---|-----------|

(Source of data INAIL)



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Health Care Costs

From the Hospital Discharge Data it is possible to identify the number of serious injuries classified with the MAIS3 + (Maximum Abbreviated Injury Scale) following a road accident;

The classification of seriously injured is carried out through the use of the rules for the reclassification of ICD-9-CM codes into AIS codes. The abbreviated AIS classification provides for the attribution of a code 1 for cases in which the severity of the injury is ascertained (AIS score ≥ 3), a code 0 for non-seriously injured (AIS score < 3) and a code 9 for cases for which it is not possible to define the severity.

Using the Hospital Discharge Data 2018 it is possible to distinguish:

seriously injured hospitalized MAIS3 + score (Source SDO)

slightly injured hospitalized not MAIS3 + score (Source SDO)

minor injured not hospitalized, not present in the SDO flow (Source Istat)

In 2018, the cost of hospital admissions following a road accident was € 294 million. About 61,000 people were hospitalized.



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Health Care Costs

Using both sources - hospital discharge forms and traffic accident statistics - we have:

| | |
|---------------------------------|------|
| Serious Injured hospitalized | 8 % |
| Slight Injured hospitalized | 17 % |
| Slight Injured not hospitalized | 75 % |

In order to calculate hospital healthcare costs, the DRG (Diagnosis Related Group) assigned to each discharge is used. The **DRG** considered is the one assigned **based on the days of hospitalization**, paying attention to the values outside the threshold.

The average DRG value for seriously injured is 7,011€

The average DRG value for slight hospitalized injured is 3,735€ (minor and undefined injured were considered)

The healthcare cost for deaths in hospital following a road accident finally amounts to € 12,727 and was applied to fatalities after 24hours and within 30 days

Costs of Emergency Room for traffic accidents are based on a study of Regione Lombardia:

The average cost is 182,67 € for year 2015 and was estimated 194 € for year 2018 applying an average annual increase of 2% as shown by the series of previous values 2013-2017



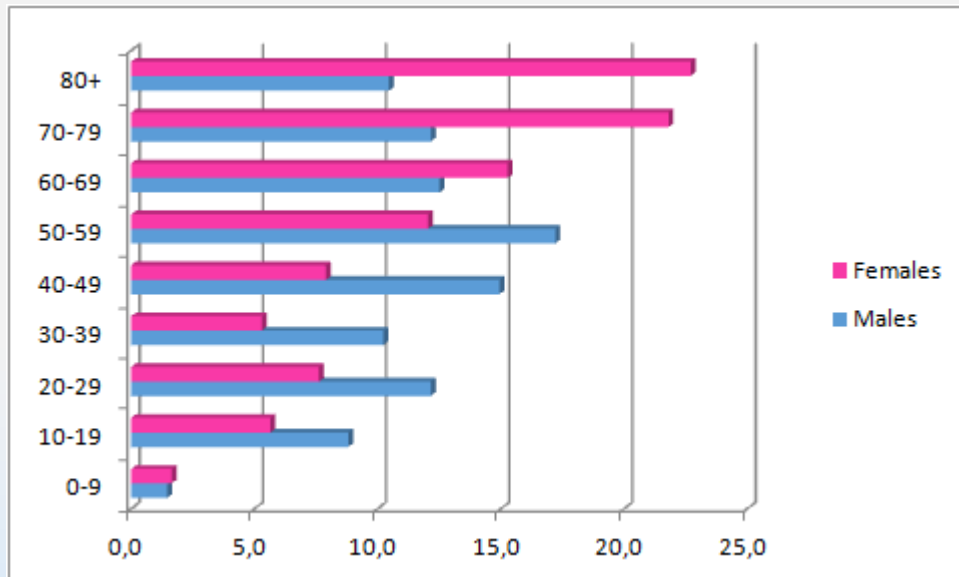
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Serious Injured MAIS3+

Males 68,3%

Females 31,7%

| Gender | 0-9 | 10-19 | 20-29 | 30-39 | 40-49 | 50-59 | 60-69 | 70-79 | 80+ | Total |
|---------|-----|-------|-------|-------|-------|-------|-------|-------|------|-------|
| Males | 1,5 | 8,8 | 12,2 | 10,2 | 14,9 | 17,2 | 12,5 | 12,2 | 10,5 | 100,0 |
| Females | 1,6 | 5,7 | 7,6 | 5,3 | 7,9 | 12,0 | 15,3 | 21,8 | 22,7 | 100,0 |
| Total | 1,5 | 7,8 | 10,7 | 8,7 | 12,7 | 15,6 | 13,4 | 15,2 | 14,3 | 100,0 |



More frequent pathologies

Fracture

of vault of skull and face bones

of rib(s), sternum, larynx, and trachea

of pelvis and neck of femur

of tibia and fibula

Cerebral laceration and contusion

Subarachnoid, subdural, and extradural hemorrhage,
following injury

Traumatic pneumothorax and hemothorax

Injury to heart, lung and spleen



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Other Costs – Cost per accident

Material Damage – Estimated from traffic insurance data (amount of compensation for damage to property) taking into account that:

The average number of vehicles involved per accident is 1,8

In 28,3% of traffic crashes a vehicle only is involved

Total amount of material damage is 6,294 mld €.

Administrative Costs

The amount of Management fees for RCA is 2.805 mln € (ANIA)

The costs of the Police Bodies, were estimated using data available and considering that the commitment of the three Corps (Traffic Police, Carabinieri and Local Police) is almost the same:

Traffic Police budget item for “prevention services, territorial control and road safety” is equal to 305.85 million €

From a survey conducted on the activities of the Local Police of the provincial capital municipalities we know that the staff dedicated to accident-related activities is approximately 8.1%

Based on these elements the estimated cost for each (Traffic Police, Carabinieri and Local Police) is

$305.850.000,00 * 0,081 = 24.786.742,20 \text{ €}$

while the average cost of detecting an accident is 431,87 €.



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Other Costs – Cost per accident

Expenses of the judicial administration related to traffic crashes were estimated on the basis of the costs for "civil and criminal justice" and "administrative management services for judicial activity" and the percentage of civil proceedings handled each year for "road traffic damage compensation" plus criminal proceedings for road homicide.

Considering both claims of the current year and those still pending proceedings would be approximately 375,000 per year it is estimated that the share of "work" of the judicial offices is equal to approximately 9.2%.

The total cost for judicial administration equal to € 417,332,192.77 or € 1,118.36 per event (Budget of the Ministry of Justice for 2018 - Istat judicial statistics)

The total of other costs is 12.393,91 € per accident.



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| Parameters for calculation | | | % of fatality cost | Old Parameters | % of fatality cost |
|----------------------------|-------------|------|--------------------|----------------|--------------------|
| Cost for fatality | 1,812,989 € | | | 1,503,990 € | |
| Cost for serious injured | 467,159 € | 25,8 | | 197,228 € | 13,1 |
| Cost for slight injured | 8,519 € | 0,5 | | 16,985 € | 1,1 |
| Average Cost for injured | 45,210 € | 2,5 | | 42,219 € | 2,8 |
| Cost for accident | 12,394 € | 0,7 | | 10,986 € | 0,7 |

Overall, the new parameters lead to an average increase of 11-12% (11.6%) compared to the calculation made according to the 2010 parameters.

The estimate of the social costs of road accidents in 2019, the year chosen as the basis for the road safety decade 2021-2030, is equal to 18,015,061,374 if the separate costs for serious and light injured are applied and to 18,799,666,618 if the average cost per injured is applied. This is because in 2019 the seriously injured were a lower than average share of 7.3%.

The old parameters were based on the Cost per fatality and other costs were calculated as a % of it according to different studies (ECMT(1998) UNITE (2001), HEATCO (2006), IMPACT (2008))

Now, different percentage regarding costs for injured may depend on different definition of serious injured (admission to hospital (15%) vs. MAIS3+ (8%))



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TEN Network

Social Costs of road crashes occurred in 2019 on Italian TEN Network (comprehensive) 2020 represent about 8,5 % of overall costs of road accidents (1,589,436,311/18,799,666,618)

| Numeri e costi | Autostrade e simili | Strade statali | Totale |
|--------------------------------|----------------------|--------------------|----------------------|
| Incidenti | 8.035 | 1.987 | 10.022 |
| Morti | 285 | 102 | 387 |
| Feriti | 13.379 | 3.511 | 16.890 |
| Costo sociale incidenti | 99.585.790 | 24.626.878 | 124.212.668 |
| Costo sociale morti | 516.701.865 | 184.924.878 | 701.626.743 |
| Costo sociale feriti | 604.864.590 | 158.732.310 | 763.596.900 |
| Costo totale | 1.221.152.245 | 368.284.066 | 1.589.436.311 |
| Estesa | 6.826,81 | 3.015,76 | 9.842,57 |
| Costo sociale per km | 178.875,97 | 122.119,82 | 161.485,90 |