



December 19, 2016

Road accidents

Preliminary estimates. January-June 2016

To provide more timely and useful information to assess road safety actions, a preliminary estimate of road accidents, referred to the first six months in 2016, is provided this year as well. The figures, although provisional, allow to outline the national trends for road accident events.

It is estimated that, during the first semester of the current year, the road accidents resulting in death or injury were 83,549. The number of deaths, within thirty days, was estimated at 1,466, while the injured persons were 118,349.

Compared with the final data, for the same period in 2015, the preliminary estimates showed a 0.8% decrease of road accidents resulting in death or injury, 4.7% for the victims and 0.5% for the injured persons (Table 1 and Chart 2).

During the first six months of the year the number of victims decreased by 25.6%, in respect of the first semester 2010 and by 55.4%, with reference to the same period of 2001 (Charts 1 and 2).

Although the clear recovery of mortality, over of the period January-June 2015, the level was still high and not in line with the European target 2020 (halving of number of victims counted in 2010) (Table 3).

The mortality index (percentage ratio between the number of deaths and the number of accidents resulting in death or injury) was equal to 1.75 from 1.88 recorded during the first semester 2015.

Based on data provided by "Polizia Stradale", during the first semester 2016 the number of deaths on motorways decreased of about 15%¹, compared with the same period of 2015. For the inside urban area and rural roads the reduction was instead between 2 and 5%.

The year 2016 reveals as a mobility recovery. From the preliminary data available², the new registrations of vehicles, during the period January-June 2016 increased by 19% over the same period of the previous year while the motorway journeys increased by 3.7%³.

During the first semester of the year, the contraventions registered by "Polizia Stradale"⁴ for the use of mobile phone while driving and for speeding increased respectively by 25% and 22%.

TABLE 1. ROAD ACCIDENTS RESULTING IN DEATHS OR INJURIES, KILLED AND INJURED PERSONS IN ITALY

First and second semester 2015 and first semester 2016. Absolute values and percentage changes 2016/2015 (first semesters).

ROAD ACCIDENTS RESULTING IN DEATHS OR INJURIES, FATALITIES AND INJURED PERSONS (a)	Absolute values			Percentage change January-June 2016/2015
	January-June 2015 (a)	July-December 2015(a)	January-June 2016 (b)	
Road accidents resulting in deaths or injuries	84,228	90,311	83,549	- 0.8
Fatalities (within 30 days)	1,539	1,889	1,466	- 4.7
Injured persons	118,985	127,935	118,349	- 0.5

(a) Source: Istat – Survey on Road accidents resulting in death or injury – Years 2015.

(b) Preliminary estimates – first semester 2016 (Data and Methods).

¹ On the basis of Polizia Stradale data, already available and referred to the period July-September 2016, a peak in July and August, for victims number, is observed, with a slight increase in August if compared with 2015.

² Source: Automobile Club of Italy - Public Register of Motor-vehicles (PRA). Preliminary data 2015.

³ Source: Aiscat - Associazione Italiana Società Concessionarie Autostrade e Trafiori. January-August 2016.

⁴ Polizia di Stato Archive available to the link: <https://www.poliziadistato.it/pds/stradale/archivio/>

CHART 1. NUMBER OF DEATHS IN ROAD ACCIDENTS. Percentage change. January-June 2002-2016 (in respect of year 2001 and 2010)

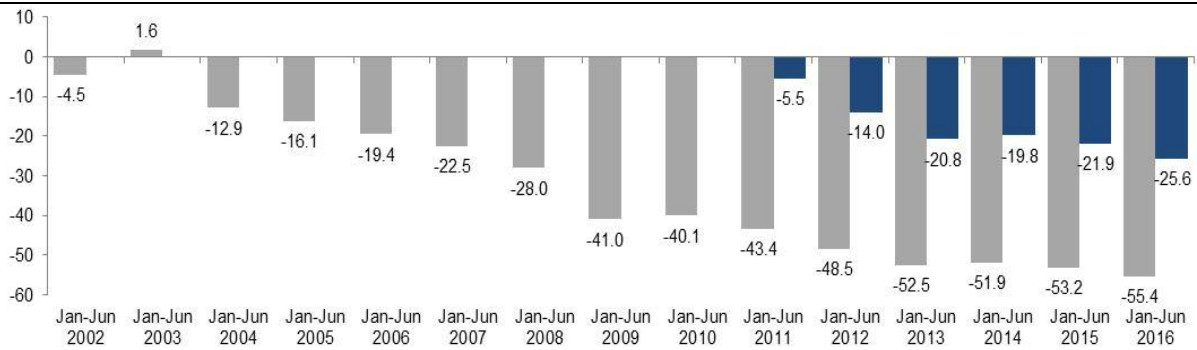


CHART 2. NUMBER OF FATALITIES AND INJURIES IN ROAD ACCIDENTS. Percentage change. January-June 2016/2014, 2016/2010 and 2016/2001

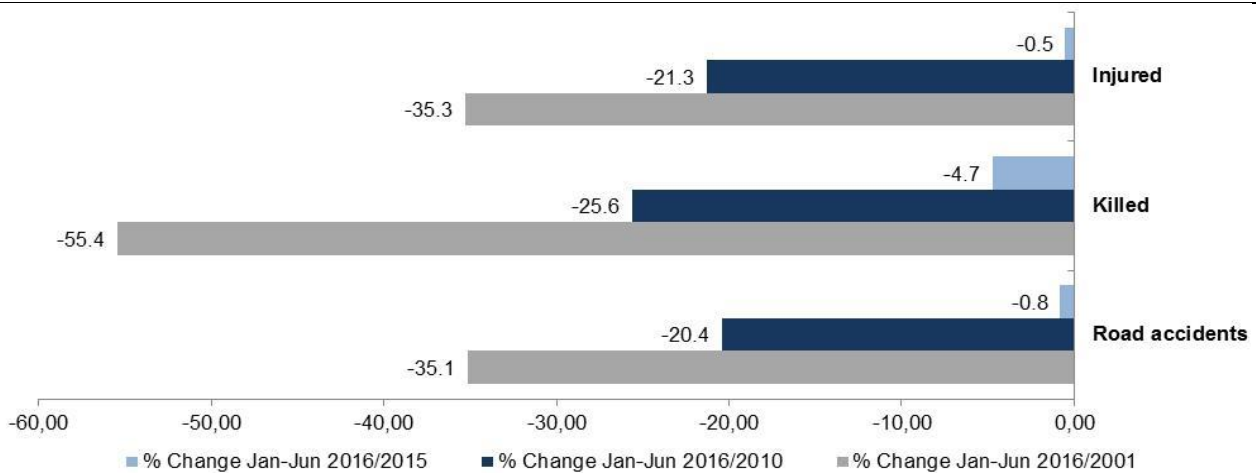
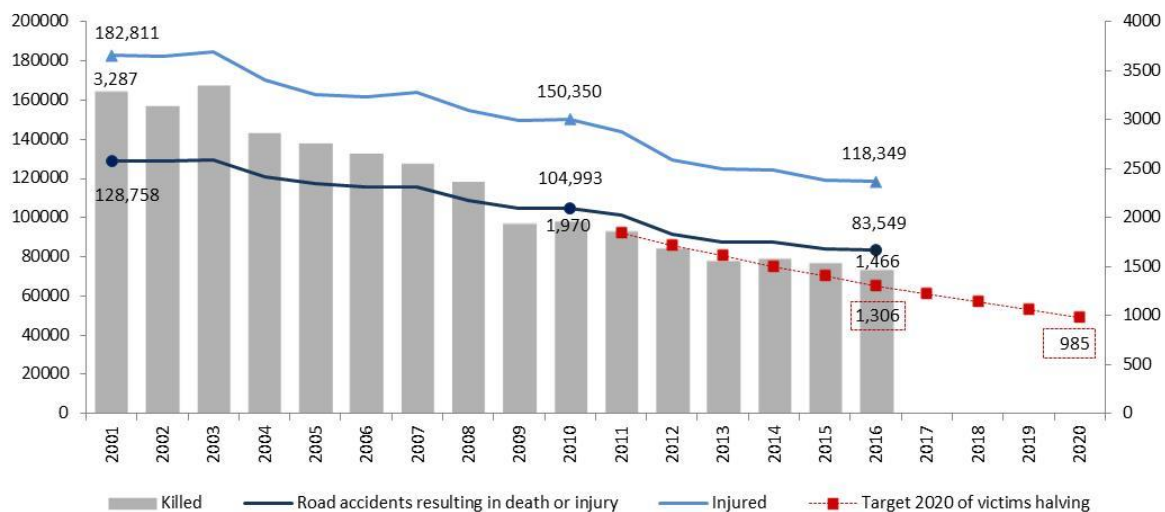


CHART 3. EUROPEAN UNION TARGET 2020: NUMBER OF DEATHS IN ROAD ACCIDENTS. Absolute values. First semesters years 2010-2016 and hypothesis of halving with constant speed, first semesters years 2010-2020



Source: Istat - Survey on Road accidents resulting in death or injury – Years 2001-2015. Preliminary estimates – first semester 2016 (Data and Methods).

Definitions

Road accidents resulting in death or injury

All road accidents involving at least one moving vehicle and one person injured or killed as a consequence of this accident. Not injured participants within an injury accident can optionally be recorded. Material damage-only accidents are not considered.

Injured⁵

The road user was seriously or slightly injured (but not killed within 30 days) in the road accident.

Killed or Fatally injured persons

Death within 30 days of the road accident, confirmed suicide and natural death are not included.

Percentage change: The percentage change is calculated by means the difference between data at **t** time and data **t-1** (or **t-x**) time, divided by data at **t-1**(or **t-x**) time, per 100.

Data and Methods

The preliminary estimate for the first semester 2016 of road accidents resulting in death or injury data has been calculated on the basis of:

- 1) the provisional data provided by the Ministry of the Interior (Servizio di Polizia Stradale);
- 2) the provisional data provided by the Ministry of the Defence (Arma dei Carabinieri);
- 3) data from the quarterly survey of road accidents in urban areas (main municipalities).

The quarterly survey of road accidents in urban areas is carried out by Istat with the cooperation of ACI (Automobile Club of Italy) and Regions and Provinces participating to a National Agreement with Istat, aimed to a decentralization of collection and monitoring for road accidents statistics.

To calculate the preliminary estimate of road accidents resulting in death or injury in urban areas, the quarterly trend for the municipalities subgroup in the period January-June 2016, provisional, and for 2015, final data, in the same set of municipalities, detailed by region, was used. The 2010-2015 time series for road accidents was also taken into account.

Data is collected from 172 municipalities; the units selection was done using the technique of *Cut Off* (with a threshold of 50%), including all main municipalities in the provinces and some municipalities for which a significant share of the total number of accidents in the Province was recorded (just in case the percentage of accidents occurred in a main municipality is less than 50% of the amount in province). The share of accidents in the municipalities collected through the quarterly accounts for over 65 % of accidents with injuries recorded by the Local Police in Italy.

To provide a "range" for the estimated values, confidence intervals have been calculated.

Considering the specific data set characteristics, the application of *Bootstrap method*⁶ to derive reliable estimates of standard deviation and confidence intervals of parameters, was planned.

The use of Bootstrap resampling techniques allows to build confidence intervals statistically accurate, with optimal efficiency, without the need to formulate the assumption of normal distribution for the population, basic hypothesis for the calculation of confidence intervals with traditional methods.

In particular, the confidence interval estimation was performed using the alternative method called *Bootstrap-t*, based on the selection of 100 random samples for the first level and 100 samples extracted for each of the previous ones, for the second level (over 10,000 in total). The samples, each one with size equal to 172 units, identical to the original set of data, were selected with the units replacement.

Some "self-representative" units were included in all first level samples.

The self-representative units consist in 9 municipalities⁷, for which was recorded a high number of deaths and accidents (the number of road accidents detected in the self-representative units is over 50% out of the total), while the remaining 163 Municipalities were randomly chosen in each sample.

⁵ The harmonized definition of severity of lesions, established at the international level, involves the use, for serious injuries of MAIS 3 + score, i.e., the maximum AIS value equal to or greater than 3. AIS (Abbreviated Injuries Scale) is a classification which describes the severity of the trauma, reported for each of the nine regions in which the human body is divided: the head, face, neck, chest, abdomen, spine, upper limbs, lower limbs, other. The degree of injury varies from 1 (minor injury) to 6 (fatal injury).

⁶ Di Ciccio T.J., Efron B. "Bootstrap Confidence Intervals" in *Statistical Science* 1996, Vol. 11, No. 3, 189-228;

Bonanomi A. "Intervalli di confidenza "Bootstrap: una veduta d'insieme e una proposta per un indice di cograduazione" – in Working papers - Dipartimento di Scienze Statistiche Università Cattolica S.C., Milano, 2007;

Morana M.T., Porcu M. "Il Bootstrap. Un'applicazione informatica per un problema di ricampionamento" - Dipartimento di Ricerche Economiche e Sociali - Università di Cagliari, 2002;

Efron B., Le Page R. "Introduction to bootstrap" in "Exploring the limits of Bootstrap" edited by Le Page R., Billard L., Wiley, New York, 1992.

⁷ The self-representative units included in all first level samples are: Roma, Milano, Palermo, Torino, Catania, Bologna, Firenze, Padova, Arezzo.

The Table 2 includes the values for standard deviation and lower and upper limit of the confidence intervals of the estimated values.

TABLE 2. ROAD ACCIDENTS RESULTING IN DEATHS OR INJURIES, KILLED AND INJURED PERSONS IN ITALY.
January-June 2016, preliminary estimates absolute values, Lower and Higher limit of the Confidence Interval 95%

ROAD ACCIDENTS RESULTING IN DEATHS OR INJURIES, FATALITIES AND INJURED PERSONS	Preliminary estimates January-June 2016 Absolute numbers (a)	Confidence Intervals - 95% (b)	
		Lower limit	Higher limit
Road accidents resulting in deaths or injuries	83,549	80,155	86,081
Fatalities (within 30 days)	1,466	1,444	1,486
Injured persons	118,349	114,264	121,641

- (a) The 2016 data preliminary estimate was obtained by the sum of : 1) weighted data from 172 Municipalities Local Police and provisional data from Polizia Stradale and Carabinieri.
- (b) The lower and higher level interval estimate are calculated with reference to the share of accidents, killed and injured from the quarterly survey of road accidents in urban areas (172 Local police data). The values shown in the table have been extended to the total of road accidents, deaths and injuries.

For more details please refer to the Italian version

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