Automobile Club d'Italia

Istat
Istituto Nazionale di Statistica

June 18, 2015

Road accidents

Preliminary estimates. Year 2014

During 2014, on the basis of a preliminary estimate, 174,400 road accidents resulting in death or injury were counted. The number of deaths within thirty days is 3,330, while the injured persons are 248,200.

Compared to 2013, a decrease of road accidents resulting in death or injury (-3.77%) and the number of deaths (-1.62%), a decrease of injuries has been registered too (-3.58%) (Table 1).

The mortality index, calculated as the percentage ratio between the number of deaths and the number of accidents resulting in death or injury, reaches, in 2014, the value 1.91. This value is slightly higher than the same index in 2013 (1,87).

The percentage change of the number of deaths for 2014 is -53.1% (compared to 2001) (Chart 1). Between 2013 and 2014 the variation is equal to -1.6%, while between 2010 and 2014 it is -19.1%. The limited decrease in the number of victims in the last year is in line with the trend in European average.

The most significant contribution to the decrease in the number of victims in road accidents is due, in 2014, to the decline of mortality on highways (-11.5%). The decrease is lower on urban (-1.0%) and extra urban roads (-0.3%).

For the year 2014, according to preliminary estimates, it would occur 3.06 victims per 100 accidents on motorways and 4.78 on extra urban roads. The mortality rate decreases to 1.08 for urban roads and minor extra urban roads.

The European program of Actions for Road Safety 2011-2020 has the *target* of halving the number of road deaths by 2020 and to reduce serious injuries, according to the harmonized definition of severity of injury, internationally established, that the EU countries agreed to implement.

With reference to the international context, the preliminary estimates of mortality rates, calculated as the ratio between the number of deaths in road accidents and the resident population (rates per 1,000,000 inhabitants), recorded in 2014 among the countries of the Eu28, vary in a range from 26 for Malta, 28 for Sweden and 106 and 91 respectively for Latvia and Romania. The value for Italy is equal to 55, compared with a European average of 51 deaths per million inhabitants (Chart 2).

The average percentage change in Europe (Eu28) of the number of deaths in road accidents, between 2013 and 2014, amounts to -0.6% (Chart 3). Between 2010 and 2014, this variation, among Eu28 Countries, is equal to -18.2%.

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

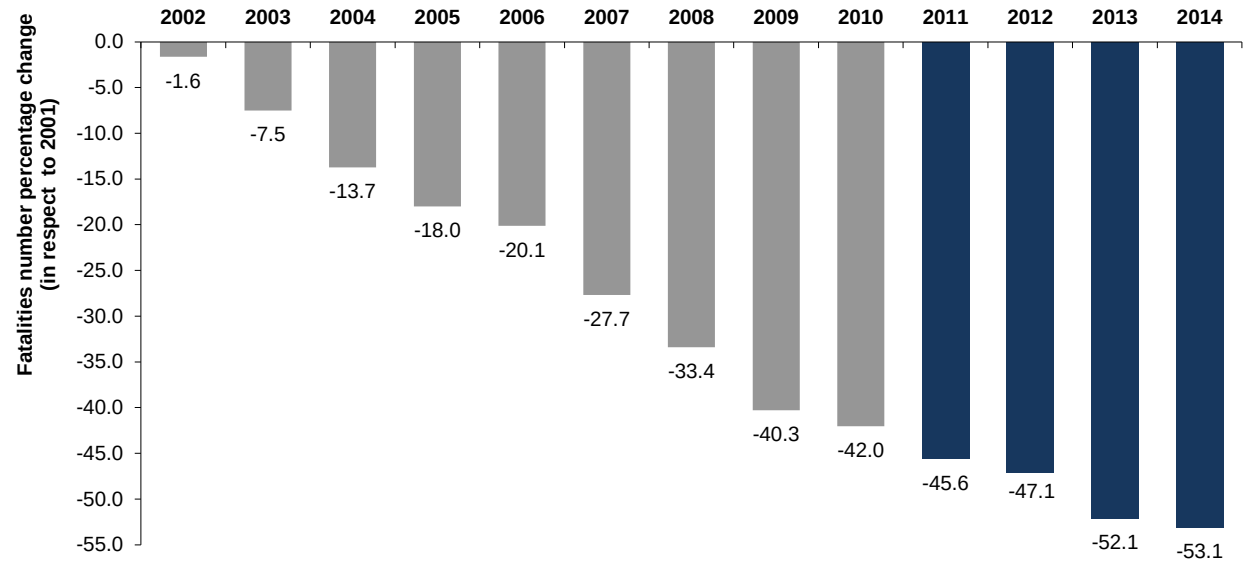
Years 2013 and 2014 absolute numbers and percentage change year 2014 (compared to 2013)

ROAD ACCIDENTS RESULTING IN DEATHS OR INJURIES, FATALITIES AND INJURED PERSONS (a)	Absolute values		Percentage change 2014/2013
	2013 (a,b)	2014 (b,c)	
Road accidents resulting in deaths or injuries	181,227	174,400	-3.77
Fatalities (within 30 days)	3,385	3,330	-1.62
Injured persons	257,421	248,200	-3.58

(a) Any road accident involving at least one vehicle in motion on public road, resulting in at least one killed (within 30 days) or injured person.
(b) Source: Istat – Survey on Road accidents resulting in death or injury. Years 2013 – 2014.
(c) Values based on preliminary estimates - year 2014.

CHART 1. NUMBER OF DEATHS IN ROAD ACCIDENTS PERCENTAGE CHANGE

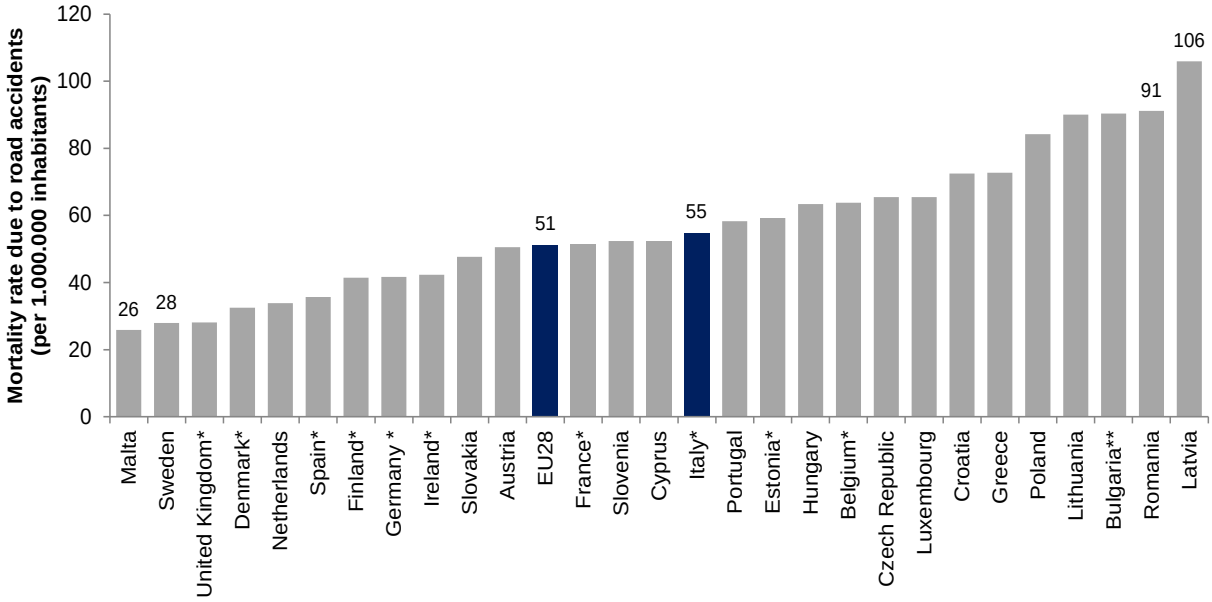
Years 2002-2014 (compared to 2001)



Source: Istat – Survey on Road accidents resulting in death or injury. Years 2001-2014.
Values based on preliminary estimates - year 2014

[1] Data on Road accidents resulting in death or injury could be revised after the official dissemination.

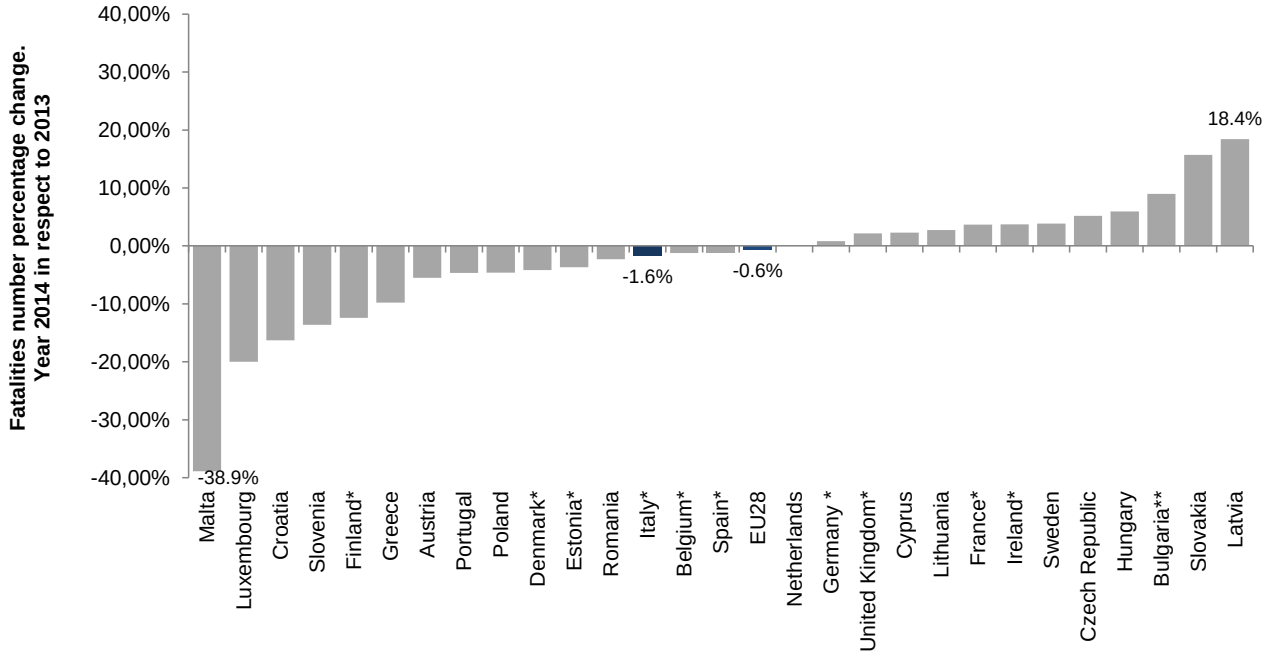
CHART 2. MORTALITY RATES DUE TO ROAD ACCIDENTS IN EUROPE (EU28). Year 2014
(Rates per 1,000,000 of inhabitants) (a) (b)



(a) Provisional data referred to 2014.
(b) ETSC 2014 data estimates, based on EC CARE Quick indicator.

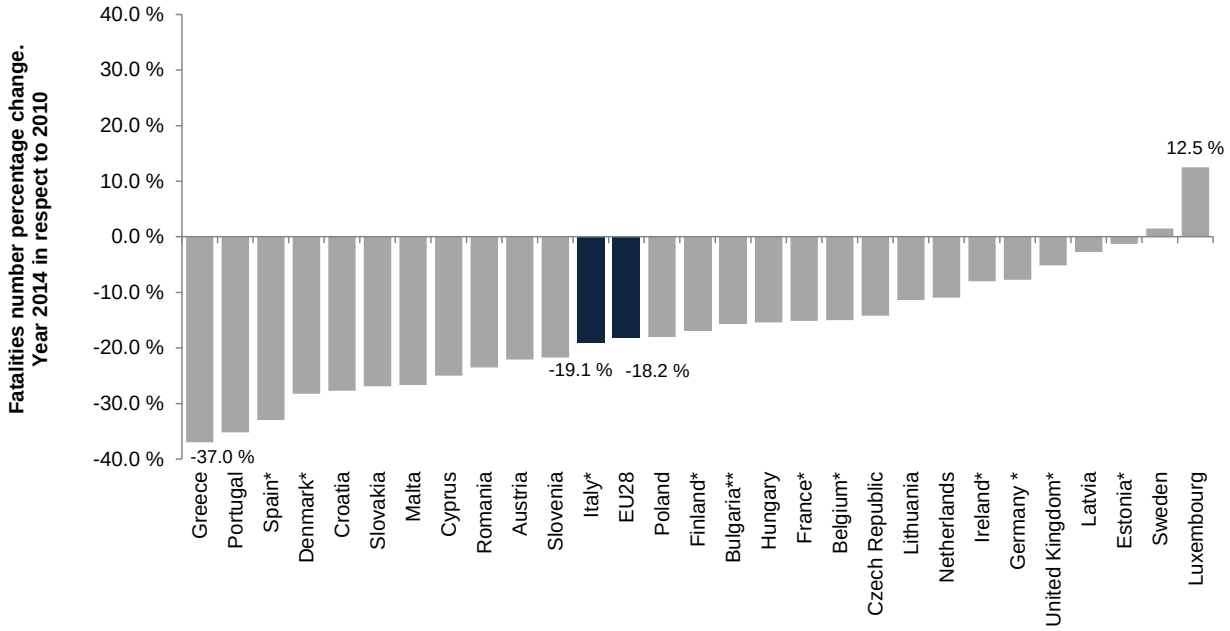
Source : ETSC - European Transport Safety Council - Performance Index (PIN) Project. Year 2015.
Population on 1 January-Eurostat Database – Eurostat (Last update 23.04.2015).

HART 3. FATALITIES NUMBER PERCENTAGE CHANGE IN EUROPE (EU28). Year 2014 (compared to 2013)[2]



[2] The EU28 Countries with a low number of deaths in road accidents have a fluctuant time trend .

CHART 4. FATALITIES NUMBER PERCENTAGE CHANGE IN EUROPE (EU28). Year 2014 (compared to 2010)



* Provisional data referred to 2014.
** ETSC 2014 data estimate, based on EC CARE Quick indicator.

Source : ETSC - European Transport Safety Council - Performance Index (PIN) Project. Year 2015.
Population on 1 January-Eurostat Database - Eurostat, the statistical office of the European Union (Last update 23.04.2015).

Contact person:
Silvia Bruzzone (bruzzone@istat.it)
Socio-demographic and environmental statistics directorate
Istat – National Institute of Statistics
Viale Liegi, 14 – Rome 00198 Italy
phone +39 06 4673.7384

Data and Methods

The preliminary estimate for 2014 of road accidents resulting in death or injury data has been calculated on the basis of:

1) the final data provided by the Ministry of the Interior (Servizio di Polizia Stradale);
2) the provisional figures 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 2014, provisional, and for 2013, final data, in the same set of municipalities, was used. The 2009-2013 time series for road accidents was also took 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*[3] 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 12 municipalities, 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 160 Municipalities were randomly chosen in each sample.
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 ACCEDENTS RESULTING IN DETAHS OR INJURIES, KILLED AND INJURED PERSONS IN ITALY
Year 2014 Preliminary estimates absolute numbers, standard deviation, lower and higher limits for Confidence Intervals (95%)

ROAD ACCIDENTS RESULTING IN DEATHS OR INJURIES, FATALITIES AND INJURED PERSONS	Preliminary estimates Year 2014 Absolute numbers (a)	Standard deviation (b)	Confidence Intervals - 95% (c)	
			Lower limit	Higher limit
Road accidents resulting in deaths or injuries	174.400	2861,04	172.156	175.835
Fatalities (within 30 days)	3.330	25,79	3.313	3.345
Injured persons	248.200	3823,36	245.252	250.062

(a) The 2014 data preliminary estimate was obtained by the sum of : 1) weighted data from 172 Municipalities Local Police an final data form Polizia Stradale and Carabinieri.
(b) The standard deviation of a parameter estimation (σ), is a measure of the absolute variability of the estimate, in this case the frequency of road accidents resulting in deaths or injuries, killed and injured. The standard deviation was calculated with reference only to the share of accidents, deaths and injuries from the quarterly survey of road accidents in urban areas (172 Local police data), applying the *Bootstrap* method.
(c) The confidence interval is the range of values within is estimated the value of the unknown parameter of the population is included, with a confidence level fixed (95 % in our case). The lower and higher level interval estimate are calculated with reference to the share of accidents, killed
(d) 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.

[3] 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.

The figures on the preliminary estimate of deaths in road accidents, referred to year 2014, was communicated, in agreement among Istat, Ministry of Infrastructure and Transport and ACI, to the European Transport Safety Council (ETSC) for the Italian data inclusion in the "Annual Road Safety Performance Index (PIN) Report. Year 2015 ". The source for European countries (EU28) data included is the cited report too. The Istat-ACI dissemination has been planned simultaneously with the presentation of the "Annual Road Safety Performance Index (PIN) Report. Year 2015 " in Brussels.

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.

Injured[4]
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.

[4] 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).