

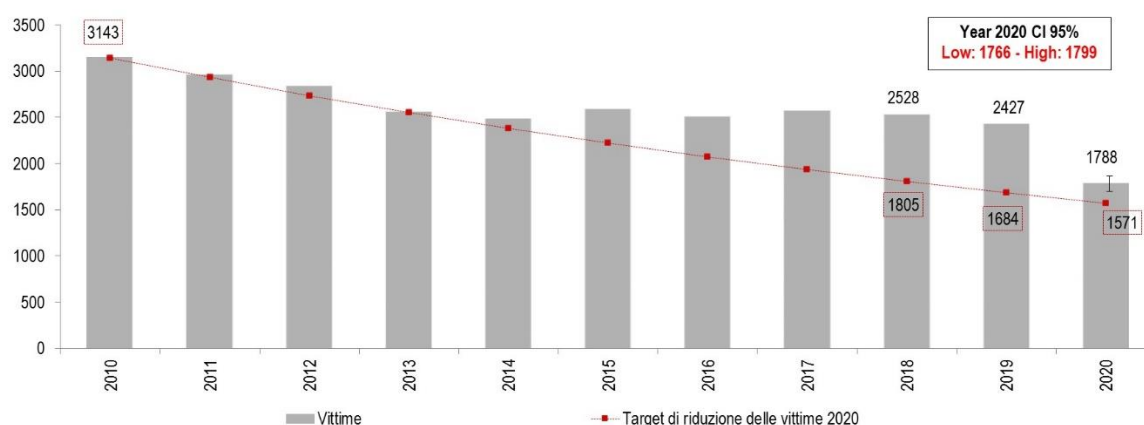
December 16, 2020

ROAD ACCIDENTS

Preliminary estimate. January-September 2020

- The health and economic crisis broken out in 2020 accounted for major changes in mobility and road accidents, with possible effects also in the near future.
- As expected, during the period January-September 2020 there was an unprecedented decrease in road accidents and injuries involved. The lockdown measures enacted by the Government to contain the spread of the infection, almost halted mobility and circulation from March to late May, significantly affecting the road accident trend.
- According to preliminary estimates, in the period January-September 2020 there was a strong reduction in road accidents resulting in death or injury (90,821, equal to -29.5%), in injuries (123,061, -32.0%), and in the total number of victims within thirty days (1,788, -26.3%). Limiting the observation to the period January-June 2020, the decreases were wider, equal to about 34% for fatalities and almost 40% for accidents and injuries. In the third quarter 2020, the accident rate started recovering, with smaller decreases compared to the same period in 2019 (Chart 1 and Table 1).
- The decrease in fatalities affected all road types: in the first nine months of 2020, it is estimated at approximately 50% on motorways, at 40-44% on urban and extra-urban roads.
- With reference to the 2010-2020 European target for road safety, although the drastic decrease in fatalities in 2020 brings Italy closer to the aim of -50%, the result does not allow a positive interpretation of the goals achieved. The drastic decline in mortality during the lockdown of the population and the traffic block, was due to a forced decrease in accidents and victims, and not to virtuous behaviours or the improvement of road safety. In the first nine months of 2020 the number of deaths dropped by 43.1% compared to 2010, and by 66.4% in comparison with the same period in 2001 (Charts 2, 3 and 4).
- In the first six months of 2020, the average kilometres driven decreased on licenced motorways by 37% compared to the same period in 2019, and by 32% on major roads outside built-up areas, while first registrations of passenger cars fell by 43%. During the summer months there was a recovery in both mobility and the car market supported by incentives. Extending the observation period to September, the average kilometres driven on main extra-urban roads fell down by 23%, while registrations of brand new passenger cars declined by 33% (Chart 5).
- As observed in Italy, restrictive measures and total closing of activities were also adopted in most European countries during 2020. According to data released by the European Transport Safety Council (ETSC) referred to fatalities registered in April 2020 in 24 Eu countries at the peak of the first pandemic wave, there was an average decrease in mortality by 36%, which is unprecedented given that deaths in the Eu 28 fell by 24% in the decade 2010-2019. According to the first available data, the highest reduction in road deaths in April 2020 was recorded in Italy, followed by Belgium, Spain, France and Greece, all with a percentage decrease greater than 55%.

CHART 1. EUROPEAN UNION TARGET 2020: NUMBER OF DEATHS IN ROAD ACCIDENTS. January-September years 2010-2019, preliminary estimates January-September 2020 low and high limits (Confidence Interval 95%) and hypothesis of halving with constant speed, first semesters years 2011-2020. *Absolute values.*



Source: Istat - Survey on Road accidents resulting in death or injury – Years 2011-2020. Preliminary estimates 2020 (Ref. Data and Methods).

TABLE 1. ROAD ACCIDENTS RESULTING IN DEATH OR INJURY, FATALITIES AND INJURIES IN ITALY January-June, July-September and January-September year 2019 and preliminary estimates 2020 (a), lower and higher limits (Confidence Interval 95%). Absolute values and percentage changes 2020/2019.

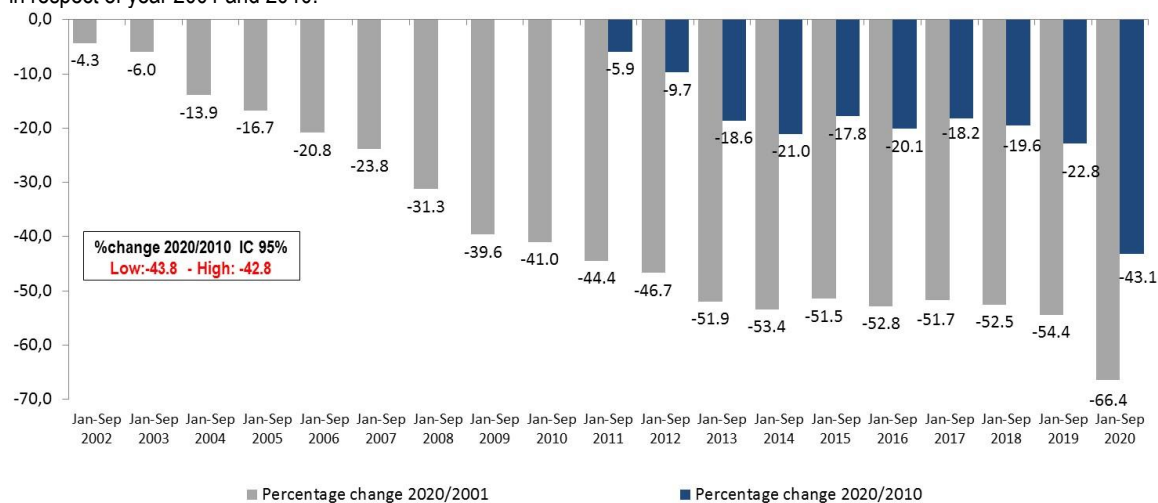
ROAD ACCIDENTS RESULTING IN DEATH OR INJURY, FATALITIES AND INJURIES	Road accidents	Deaths (within 30 days)	INJURED
	Absolute values		
January-September 2020 (a)	91,624	1,788	124,041
Lower limit (CI 95%) (b)	89,494	1,766	121,337
Higher limit (CI 95%) (b)	93,160	1,799	126,094
January-June 2020 (a)	50,840	1,006	68,465
Lower limit (CI 95%) (b)	49,570	991	66,474
Higher limit (CI 95%) (b)	52,241	1,017	70,373
July-September 2020 (a)	40,784	782	55,576
Lower limit (CI 95%) (b)	37,972	763	52,143
Higher limit (CI 95%) (b)	43,646	795	58,966
	Percentage change 2020/2019		
January-September 2020/2019 (a)	-28.9	-26.3	-31.4
Lower limit (CI 95%) (b)	-30.5	-27.2	-32.9
Higher limit (CI 95%) (b)	-27.7	-25.9	-30.3
January-June 2020/2019 (a)	-39.2	-34.4	-41.5
Lower limit (CI 95%) (b)	-40.7	-35.4	-43.2
Higher limit (CI 95%) (b)	-37.5	-33.7	-39.8
July-September 2020/2019 (a)	-9.7	-12.4	-13.0
Lower limit (CI 95%) (b)	-16.0	-14.5	-18.4
Higher limit (CI 95%) (b)	-3.4	-11.0	-7.7
January-September 2019 (c)	128,815	2,427	180,900
January-June 2019 (c)	83,629	1,534	116,992
July-September 2019 (c)	45,186	893	63,908

(a) Preliminary estimate 2020, based on microdata and summary data provided to Istat within 4 December 2020 (Ref. Data and Methods).

(b) To provide a "range" of values within the estimated number, within which the change in estimated numbers is expected, a Confidence Interval (95%) and lower and higher limits of the confidence intervals for preliminary estimate of accidents, deaths and injuries were provided.

(c) Source: Istat - Survey on Road accidents resulting in death or injury – Year 2019

CHART 2. NUMBER OF DEATHS IN ROAD ACCIDENTS PERCENTAGE CHANGE. January-September 2002-2019, preliminary estimates January-September 2020, preliminary estimates lower and higher limits (Confidence Interval 95%). Change in respect of year 2001 and 2010.

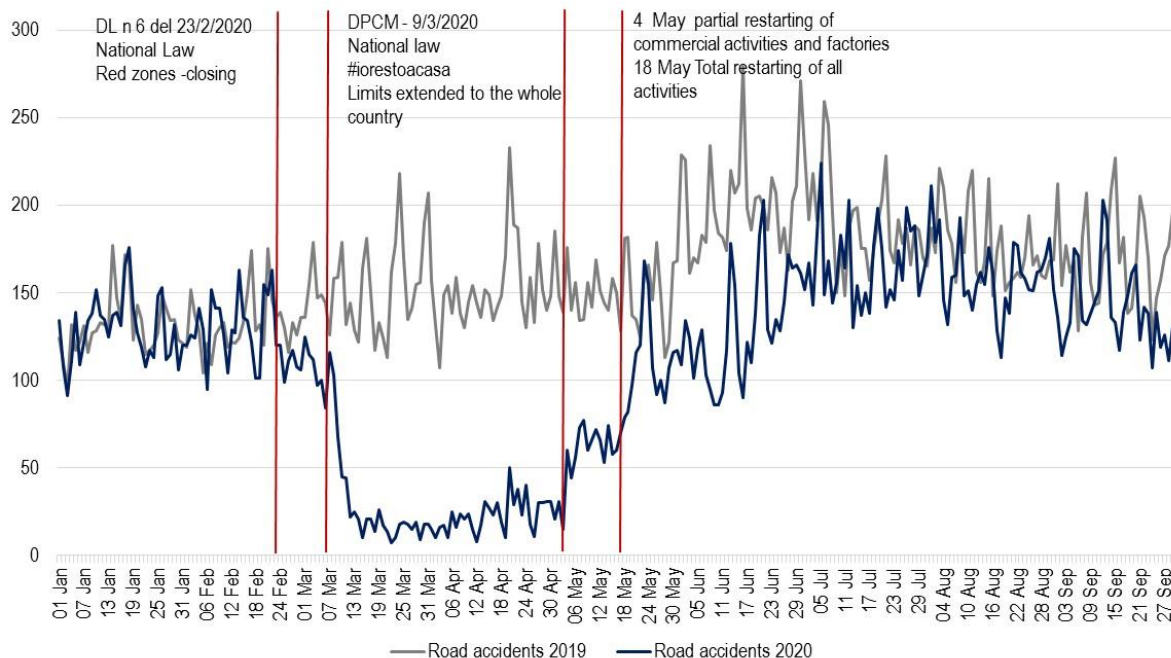


Source: Istat - Survey on Road accidents resulting in death or injury – Years 2002-2020. Preliminary estimates 2020 (Ref. Data and Methods).

To accurately represent the events that took place in the first nine months of 2020, graphs were built with daily and weekly data provided to Istat by the Municipal Police and Carabinieri.

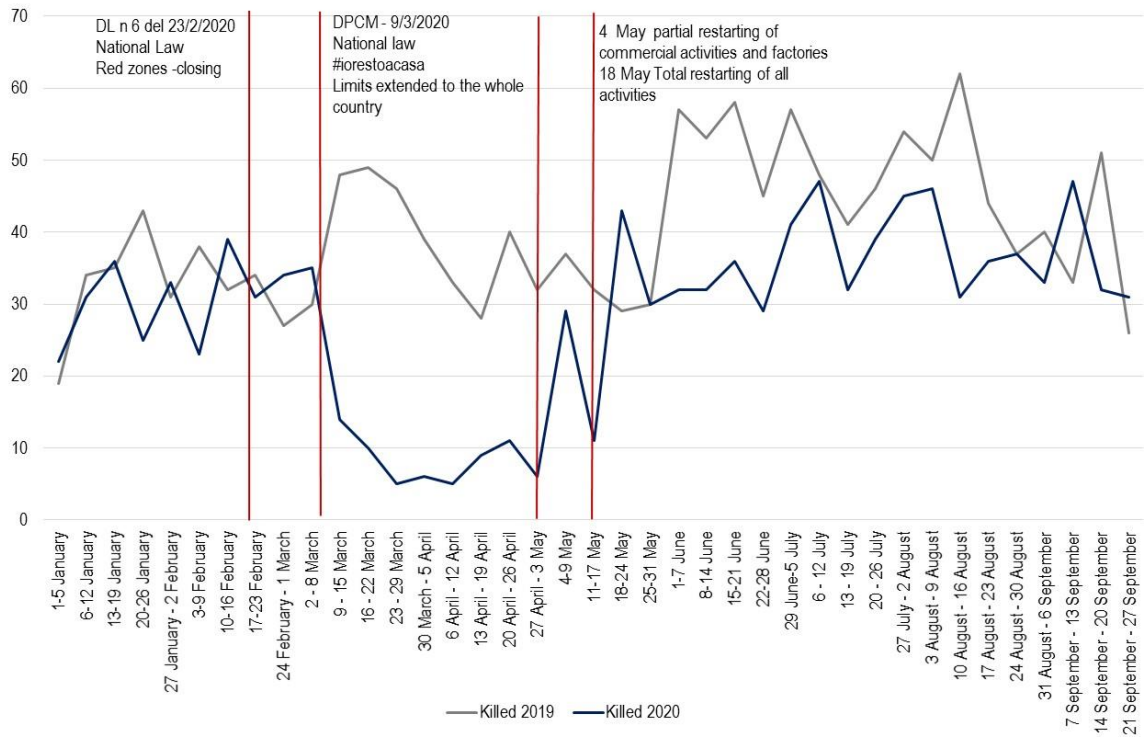
Road accidents are represented as daily time series, while fatalities are shown as weekly time series in order to reduce the effect of fluctuations. The trend in accidents and fatalities shows in detail the effects on road accidents of Government measures, closures and holiday periods (Charts 3 and 4).

CHART 3. ROAD ACCIDENTS RESULTING IN DEATH AND INJURY REPORTED BY THE MUNICIPAL POLICE AND CARABINIERI DURING THE PERIOD JANUARY-SEPTEMBER 2019 AND 2020 BY DAY AND MONTH (absolute values)



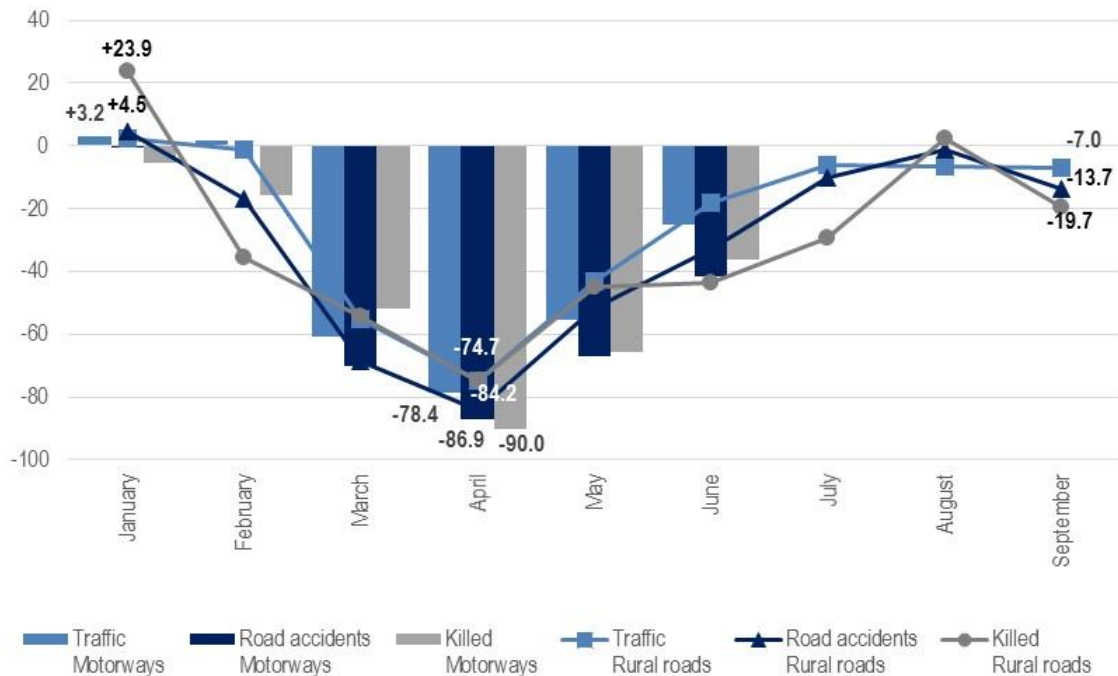
Source: Final data 2019 and provisional 2020- Municipal Police Service and General Command of the Carabinieri

CHART 4. DEATHS IN ROAD ACCIDENTS REPORTED BY THE MUNICIPAL POLICE AND CARABINIERI, BY WEEK AND MONTH, DURING THE PERIOD JANUARY-SEPTEMBER 2019 AND 2020 (absolute values)



Source: Final data 2019 and provisional 2020 – Municipal Police Service and General Command of the Carabinieri

CHART 5. TRAFFIC, ROAD ACCIDENTS AND DEATHS ON MOTORWAYS AND ROADS OUTSIDE BUILT-UP AREAS BY MONTHS DURING THE PERIOD JANUARY-SEPTEMBER 2020 (percentage change 2020/2019)



Source: Provisional data on Road Accidents and deaths 2020: Municipal Police Service and General Command of the Carabinieri
Traffic Data: Aiscat (Motorways – January-June 2020) and Anas (Roads outside built-up areas – January-September 2020).

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 (Vienna Agreement 1968 – Unece, ITF ed Eurostat 2019).

Injured¹: 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 traditional survey of road accidents resulting in death or injury and the quarterly survey, in urban selected areas, are 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.

The preliminary estimate for the first semester 2019 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 (Municipal Police Service);
- 2) the provisional data provided by the Ministry of the Defence (Carabinieri);
- 3) data from the quarterly survey of road accidents in urban areas (main municipalities).

Data in urban areas is collected from 172 municipalities. The units selection was done using the technique of *Cut Off* (with a threshold of 50%). The subgroup contains 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.

The reduced availability of direct observations at infra-annual intervals compared to total aggregates requires the use of estimation methods based on indicators. These methods consist of dividing certain quantities, specifically, in relation to the performance of some selected indicators or benchmark rates.

To calculate the preliminary estimate of road accidents resulting in death or injury, victims and injured persons in urban areas, the trend of data for the municipalities subgroup in the period January-September 2020, and 2019 final data was used.

The technique estimates the nine or six months period values, with reference to not available municipalities set, using the rates calculated on the resident population, in the previous year or in a series of previous years.

For the calculation of the preliminary estimate for road accidents with injuries, deaths and injured persons, detected by the Local Police, road accidents, mortality and injury rates were processed. Rates were calculated on the basis of final data, referred to the subset of 172 municipalities in 2020 and final and complete 2019 data.

Specifically, in a first step, the rates for the first nine months of 2019, already disseminated indicators, were processed, separately for the 172 municipalities (quarterly survey) and for the rest of the Italian municipalities. The calculation of the absolute values for road accidents, injured and victims, for the first nine months in 2020, was obtained by setting a relationship between the rates calculated for 2019 (t-1) in the two subsets of municipalities (172 quarterly survey municipalities and the rest of municipalities) and 2020 rates (t).

¹ The harmonized definition of severity of lesions, established at the international level, involves the use of MAIS 3 + score, for serious injuries, 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: head, face, neck, chest, abdomen, spine, upper limbs, lower limbs, other. The degree of injury varies from 1 (minor injury) to 6 (fatal injury).

To provide a "range" for the estimated values, confidence intervals (CI 95%) have been calculated. Considering the specific data set characteristics, the application of *Bootstrap method*² 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 7 municipalities (January-September 2020), 4 municipalities (January-June 2020) and 5 municipalities (July-September 2020)³, 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 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 ACCIDENTS RESULTING IN DEATHS OR INJURIES, KILLED AND INJURED PERSONS IN ITALY. January-September 2020, Bootstrap t parameters, preliminary estimates and Lower and Higher limit (absolute values; Confidence Interval – CI 95%)

ROAD ACCIDENTS, FATALITIES AND INJURED PERSONS	Theta	Theta_var	T_lo	T_hi	Estimated value (a)	CI 95% (b)	
						Lower Limit	Higher Limit
January-September 2020							
Road accidents resulting in death or injury	37064.75	1886.11	0.62635	-0.56793	37192	35883.39	38135.93
Fatalities (within 30 days)	328.42	174.586	0.55808	-0.51762	331	318.677	337.457
Injured persons	47001.78	2350.42	0.61776	-0.60182	47179	45549.79	48416.31
January-June 2020							
Road accidents resulting in death or injury	21367.36	1359.79	0.55776	-0.65778	21394	20608.92	22261.81
Fatalities (within 30 days)	196.44	119.777	0.51556	-0.66573	198	190.65	204.414
Injured persons	27134.16	1754.70	0.65713	-0.69374	27191	25981.09	28351.46
July-September 2020							
Road accidents resulting in death or injury	15686.92	1.583.00	100.929	-116,960	15798	14089.22	17538.39
Fatalities (within 30 days)	133.91	106.996	101.587	-0,64791	133	123.041	140.842
Injured persons	19858.41	1959.87	0.97785	-109.686	19988	17941.96	22008.11

(a) The 2020 preliminary estimate was obtained by the sum: 1) weighted data from 172 Municipalities Local Police and provisional data from the Municipal Police and Carabinieri.

(b) The lower and higher IC values are calculated with reference to the share of accidents, deaths and injuries from the quarterly survey in urban areas (172 Local police data). The values shown in the table were extended to the total of road accidents, deaths and injuries. The Theta, Theta_var, T_lo and T_hi quantities were calculated by means of *Bootstrap T* method. The values shown in the table for the lower and upper limits were extended to the total number of road accidents, deaths and injuries, including also given data from the Municipal Police and Carabinieri.

² 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.

³ Self-representative units: Roma, Milano, Palermo, Genova, Bologna, Napoli, Torino (January-September 2020), Roma, Milano, Genova, Palermo (January-June 2020) e Roma, Palermo, Bologna, Napoli e Torino (July-September 2020).

Coverage and territorial detail

National data dissemination.

Timeliness and dissemination data

Preliminary estimates referred to the first semester (year t) disseminated in December of the same year (year t).

Links

European Commission, European Commission's policy orientations on road safety 2011-2020, Brussels, 19,3,2013, SWD (2013) 94 final, http://ec.europa.eu/commission_2010-2014/kallas/headlines/news/2013/03/doc/swd%282013%2994.pdf

European Commission CARE (Community Data Base on Road Accidents) - 11/06/2020
https://ec.europa.eu/transport/media/news/2020-06-11-road-safety-statistics-2019_en

European Transport Safety Council, Annual PIN report, Year 2020 –

<https://etsc.eu/14th-annual-road-safety-performance-index-pin-report/>

Istat ACI– Incidenti stradali in Italia <https://www.istat.it/it/archivio/incidenti+stradali>