

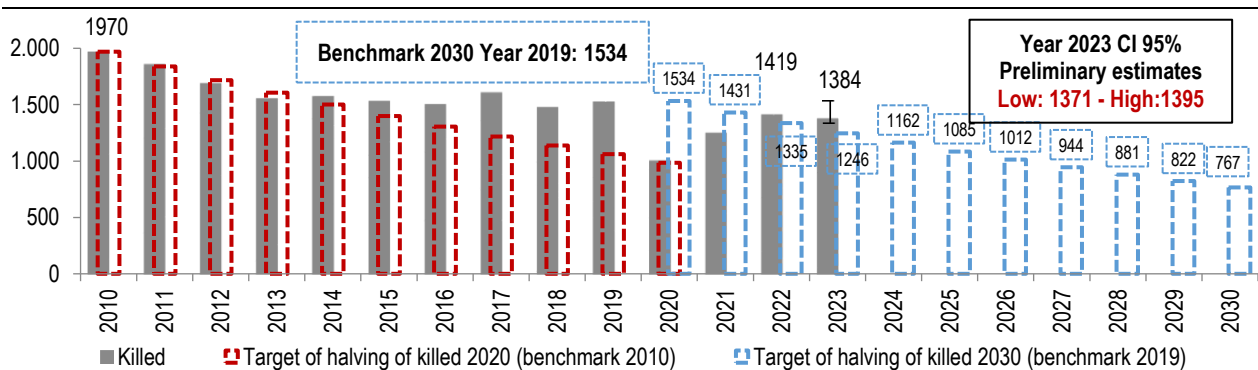


ROAD ACCIDENTS

Preliminary estimates. January-June 2023

- According to the preliminary estimates January-June 2023, in respect of the same period of 2022, a slight decrease for road accidents resulting in death or injury¹ is recorded (79,124; -1.0%), for injured (106,493; -0.9%) and killed within 30 days (1,384; -2.5%).
- The comparison with the first six months of 2019, the reference year for the decade 2021-2030 for road safety, shows still a decrease in road accidents -5.4%, injuries -9.0% and deaths - 9.8% (Chart 1; Table1).
- In comparison with the first semester of 2022, killed decreases, especially on motorways (-9.7%), followed by the rural roads (-3.3%) and built up areas (-0.1%). Compared to the first six months in 2019, during the first semester of 2023, deaths sharply decrease in fatalities on motorways (-24.1%), while on urban and rural roads the decrease is estimated equal to about 7% and 9%.
- For the decade 2021-2030, the European road safety targets expect the halving of the number of fatalities and serious injuries by 2030, compared to the benchmark year (set in 2019). Although the decrease for road deaths in the first six months of 2023, a new increase is estimated, using the first data collected, in the second part of the year. The path towards achieving road safety objectives therefore still presents many obstacles.
- The car market² shows some sufferings during the first six months of the 2023, is recovering compared to the same period of 2022: +22.2% new passengers cars registrations and +19.3% for motorcycles, but compared to 2019, new cars registration show a decline (-20.6%) and an increase for motorcycles, +39.5%. Inside the cities, the use of sharing services is still growing, including e-scooters, which have a high share of rentals.
- As regard the motorway journeys, the data, of the first six months in 2023, shows an increase of +5.4% of *vehicles per km* on the roads, compared with the same period of the last year. This result is mainly linked to the increase of the light vehicles traffic, for which an increase, in respect of 2022, is equal to +7.1%, while for heavy vehicles, the volume of traffic recorded only a slight increase (+0.6%). As regards traffic on the main extra-urban network³, increasing values were recorded for light and heavy vehicles, especially in the first quarter. On average, traffic increased by approximately 4% for light vehicles and 1% for heavy vehicles.

CHART 1. EUORPEAN UNION TARGET 2020 AND 2030: NUMBER OF KILLED IN ROAD ACCIDENTS. Periods January-June years 2010-2022, preliminary estimates January-June 2023 low and high limits (Confidence Interval 95%) and hypothesis of halving with constant speed goals 2020 and 2030, first semesters years 2010-2023. *Absolute values*



Source: Istat - Survey on Road accidents resulting in death or injury – Years 2011-2022. Preliminary estimates 2023 (Ref. Data and Methods).

¹ Road accidents, killed and injured definitions (Vienna Convention 1968, Unece, ITF, Eurostat 2019).

² Source: Public Register of Motor-vehicles (PRA), Automobile Club of Italy; Sharing Mobility Observatory; Aiscat and Anas.

³ Detected Mobility Index: calculated by Anas on the basis of the monthly daily average traffic by vehicle class.

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

Periods January-June 2019, 2022 and preliminary estimates 2023 (a), lower and higher limits (Confidence Interval 95%). Absolute values and percentage changes 2023/2022 and 2023/2019.

ROAD ACCIDENTS RESULTING IN DEATH OR INJURY	Road accidents	Killed (within 30 days)	Injured
	Absolute values		
January-June 2023 (a)	79,124	1,384	106,493
Lower limit (CI 95%) (b)	78,134	1,371	105,312
Higher limit (CI 95%) (b)	79,896	1,395	107,408
January-June 2023/2022 (a)	-1.0	-2.5	-0.9
Lower limit (CI 95%) (b)	-2.2	-3.4	-2.0
Higher limit (CI 95%) (b)	0.0	-1.7	-0.1
January-June 2023/2019 (a)	-5.4	-9.8	-9.0
Lower limit (CI 95%) (b)	-6.6	-10.6	-10.0
Higher limit (CI 95%) (b)	-4.5	-9.1	-8.2
January-June 2022 (c)	79,930	1,419	107,514
January-June 2019 (c)	83,629	1,534	116,992

(a) Preliminary estimate 2023, based on microdata and summary data provided to Istat within November 31st October 2023 (Ref. Data and Methods).

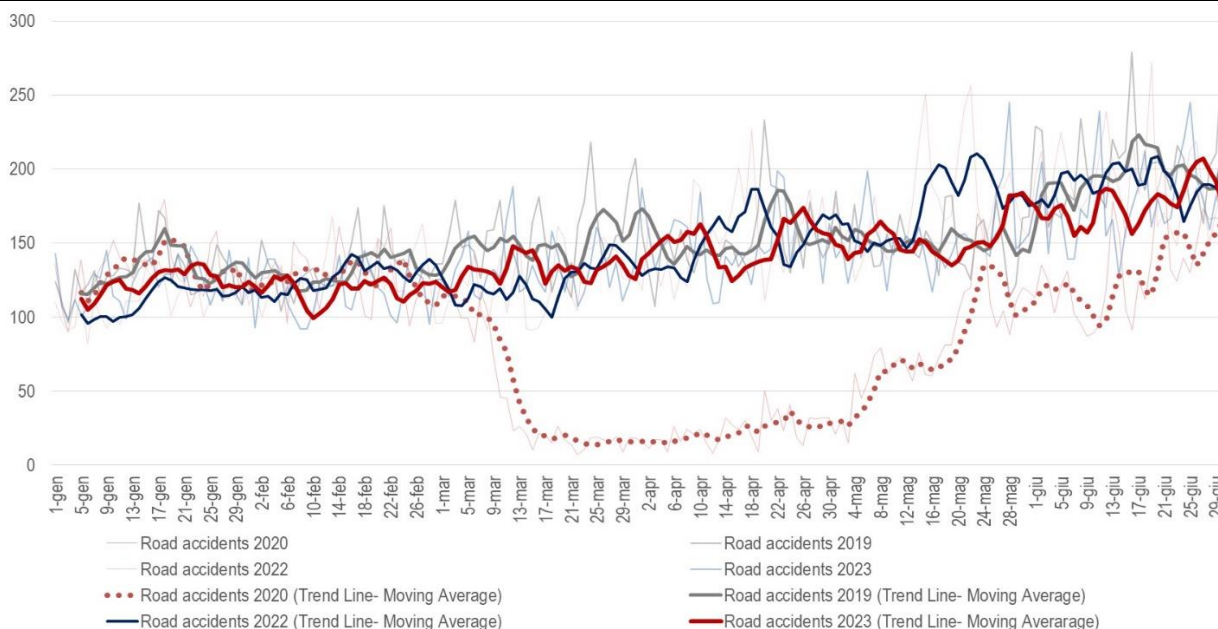
(b) To provide a "range" of values within the estimated number is expected, a Confidence Interval (95%) and lower and higher limits of the confidence intervals for preliminary estimate of accidents, deaths and injuries, were provided.

(c) Source: Istat - Survey on Road accidents resulting in death or injury – Year 2019, 2022 and preliminary estimate 2023.

To accurately represent the events during the period January-June 2023, graphs were prepared with the daily and weekly data provided to Istat by the Traffic Police and Carabinieri.

Road accidents are presented in a daily series, including the trend lines to smooth the fluctuations effects. The tendency of accidents shows, for 2020. the effects on road accidents of measures, business closures and recovery. The 2023 accidents line is located, instead, almost for all the period, except for some weeks, on line with 2022 and 2019, the last pre-pandemic year too, especially for March and June (Chart 2).

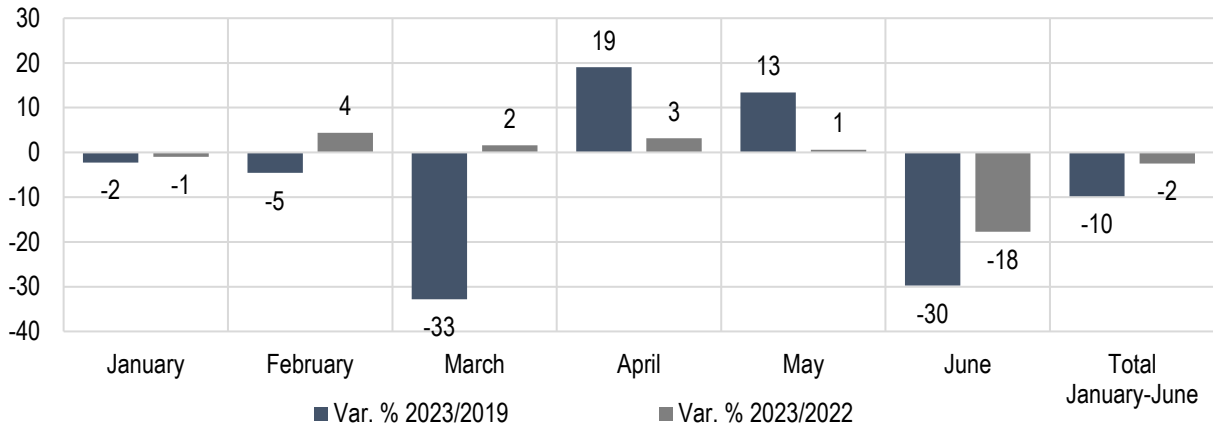
CHART 2. ROAD ACCIDENTS RESULTING IN DEATHS AND INJURY COLLECTED BY POLIZIA STRADALE AND CARABINIERI, BY DAY AND MONTH, DURING THE PERIOD JANUARY-JUNE 2019, 2020, 2022 AND 2023 (absolute values)



Source: Final data 2019, 2020, 2022 and provisional 2023 – Servizio di Polizia Stradale e Comando Generale dell'Arma dei Carabinieri

The percentage change in the number of deaths shows a variable trend during the first six months of 2023, compared to the same period of the previous years and 2019. The differences, recorded month by month, highlight a relevant increase, even if not so relevant, especially compared to the period February-May 2022 and a sharply decrease in June (-17.7%), also in January a decrease is recorded (-1.0%). Compared to 2019, March and June showed very significant decreases, while April and May recorded an increase (Chart 3).

CHART 3. PERCENTAGE CHANGE IN THE NUMBER OF KILLED BY MONTH. JANUARY-JUNE 2022, 2021, AND 2019.
Percentage change January-June 2023 vs 2019 and 2022.



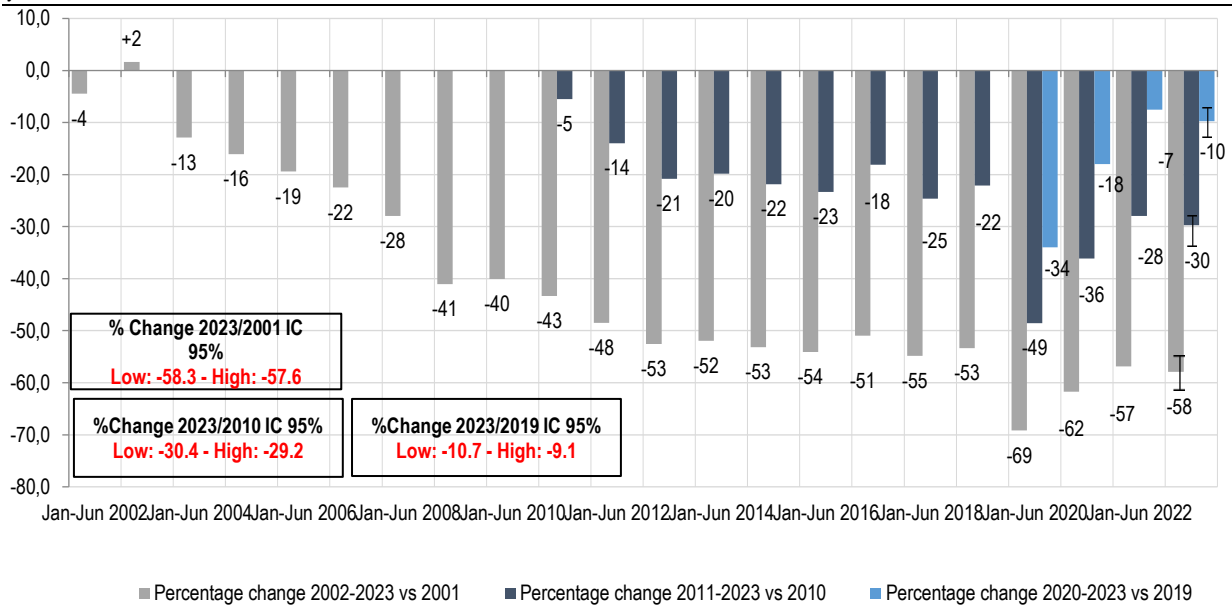
Source: Istat - Survey on Road accidents resulting in death or injury – Years 2019, 2022. Preliminary estimates 2023 (Ref. Data and Methods).

Chart 4 shows the percentage changes values, recorded in the first semesters of the years 2001-2023, compared to the reference years for the decades of road safety 2001, 2010 and 2019.

From the comparison of the values recorded for each semester, compared to 2001, a constant decrease is observed, through the twenty years. In the first half of 2023 there was a decrease for killed equal to 57.9% compared to 2001.

The second decade 2011-2020 presents more fluctuating values over time, with alternating increases and decreases. With reference to the new decade 2021-2030, the path started with difficulty, the percentage change for killed in 2023 is equal to -9.8%, compared to the reference value of 2019, the target is to reach the halving of victims by 2030 (Chart 4).

CHART 4. NUMBER OF DEATHS IN ROAD ACCIDENTS PERCENTAGE CHANGE. Periods January-September 2002-2022, preliminary estimates January-June 2023, preliminary estimates lower and higher limits (Confidence Interval 95%). Change in respect of year 2001 and 2010 and 2019.



Source: Istat - Survey on Road accidents resulting in death or injury – Years 2019-2022. Preliminary estimates 2023 (Ref. 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 (Vienna Agreement 1968 – Unece, ITF ed Eurostat 2019).

Injured⁴: 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.

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 2023 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).

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-June 2023, and 2022 final data was used. The technique estimates the 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 2023 and final and complete 2022 data.

Specifically, in a first step, the rates for the first six months of 2022, 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 six months in 2023, was obtained by setting a relationship between the rates calculated for 2022 (t-1)) in the two subsets of municipalities (172 quarterly survey municipalities and the rest of municipalities) and 2023 rates (t). 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*⁵ 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

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).

⁵ 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.

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 (January-June 2023)⁶, 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 ACCEDENTS RESULTING IN DETAHS OR INJURIES, KILLED AND INJURED PERSONS IN ITALY, January-June 2023, 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-June 2023							
Road accidents resulting in deaths or injuries	35,069.59	1,436.94	0.39887	-0.41075	35,146	34,496	35,660
Fatalities (within 30 days)	284.76	14.9044	0.43514	-0.47853	286	278	292
Injured persons	43,725.35	1,718.28	0.38147	-0.40716	43,839	43,070	44,425

(a) The 2022 preliminary estimate was obtained by the sum: 1) weighted data from 172 Municipalities Local Police and provisional data from Polizia Stradale and Carabinieri,

(b) The lower and higher IC values are calculated with reference to the share of accidents, killed and injured 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 Polizia Stradale and Carabinieri,

Timeliness and dissemination data

Preliminary estimates referred to the first semester (year *t*) disseminated in November/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) – 21/02/2023

[Road safety in the EU: fatalities below pre-pandemic levels but progress remains too slow \(europa.eu\)](#)

European Transport Safety Council, Annual PIN report, Year 2023 –

[17th Annual Road Safety Performance Index \(PIN Report\) – ETSC](#)

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

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⁶ Self-representative units in the samples: Roma, Milano, Torino, Napoli, Palermo, Firenze, Catania, Verona, Genova, Padova, Arezzo, Bologna.