

November 15<sup>th</sup>, 2024

# ROAD ACCIDENTS

Preliminary estimates. January-June 2024

■ According to the preliminary estimates, in the period January–June 2024, there is an increase, compared to the same period in 2023, in the number of road accidents resulting in death or injury (80,057; +0.9%), injured (107,643; +0.5%), and fatalities within 30 days (1,429; +4.0%).

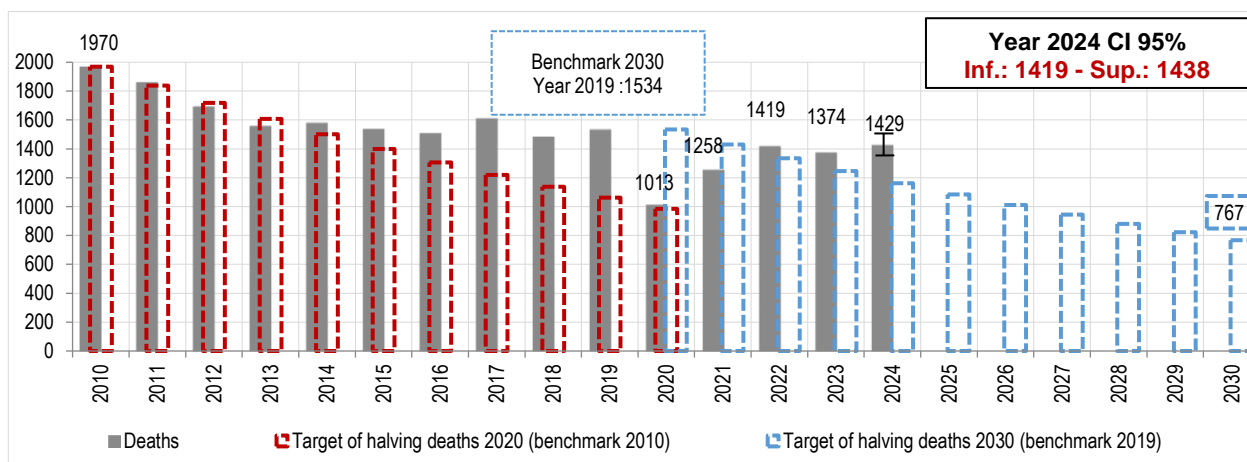
■ Comparing the data with the first six months of 2019, which was chosen as a reference year for the European Commission's "Road Safety Policy Framework 2021-2030" (aiming for a 50% reduction in the number of fatalities and serious injuries by 2030), there is still a decrease in road accidents (-4.3%), injuries (-8.0%), and deaths (-6.8%). Nevertheless, the increase in road fatalities in the first six months of 2024 moves Italy further away from the European targets (see Figure 1 and Table 1).

■ Compared to the first half of 2023, fatalities decreased on motorways (-13.9%) but increased on urban roads (+7.9%) and rural roads (+1.0%). When comparing the data to the period January-June 2019, fatalities in the first six months of 2024 show a significant decrease on motorways (-31.9%) and a more moderate decrease on rural roads (-4.2%); while, urban roads have seen an estimated increase of 1.1%.

■ The automotive market grew in the first six months of 2024 compared to the same period in 2023, with a 5.1% increase in new passenger's car registrations and a 5.8% increase in motorcycles. On the other hand, compared to 2019, new car registrations show a decline (-16.5%), while motorcycles record a strong increase (+47.5%). The use of shared mobility services, such as electric scooters, shows variable trends across cities (e.g., growing in Rome and significantly declining in Milan).

■ In the first four months of 2024, cumulative motorway travel data shows a 3.1% increase in vehicle kilometres travelled compared to the same period last year, mainly due to the increase in heavy vehicle travel (+4% compared to 2023); light vehicle traffic also shows an increase (+2.7%). For the main extra-urban road network, there is a slight increase in light and heavy vehicles traffic in the first half of 2024 (+1.4%), with an average increase of about 1% for light vehicles and 1.9% for heavy vehicles.

**CHART 1. EUROPEAN TARGET FOR 2020 AND 2030: NUMBER OF ROAD ACCIDENT DEATHS, JANUARY–JUNE PERIODS, FROM 2010 TO 2023**, preliminary estimate for January–June 2024, and target for reduction in fatalities for 2020 and 2030. Absolute values (lower and upper limit of the 95% confidence interval)



Source: Istat - Survey on Road accidents resulting in death or injury – Years 2011-2023. Preliminary estimates 2024 (Ref. Data and Methods).

**TABLE 1. ROAD ACCIDENTS RESULTING IN DEATHS OR INJURIES, DEATHS AND INJURIES IN ITALY.**

Periods January-June 2019, 2023 and preliminary estimates 2024 (a), lower and higher limits (Confidence Interval 95%). Absolute values and percentage changes 2024/2023 and 2024/2019.

ROAD ACCIDENTS RESULTING IN DEATH OR INJURY	Road accidents	Deaths (within 30 days)	Injuries
<b>Absolute values</b>			
<b>January-June 2024 (a)</b>	<b>80,057</b>	<b>1,429</b>	<b>107,643</b>
<i>Lower limit (CI 95%) (b)</i>	78,955	1,419	106,239
<i>Higher limit (CI 95%) (b)</i>	80,804	1,438	108,607
<b>Percentage values</b>			
<b>January-June 2024/2023 (a)</b>	<b>+0.9</b>	<b>+4.0</b>	<b>+0.5</b>
<i>Lower limit (CI 95%) (b)</i>	-0.5	+3.2	-0.8
<i>Higher limit (CI 95%) (b)</i>	+1.9	+4.6	+1.4
<b>January-June 2024/2019 (a)</b>	<b>-4.3</b>	<b>-6.8</b>	<b>-8.0</b>
<i>Lower limit (CI 95%) (b)</i>	-5.6	-7.5	-9.2
<i>Higher limit (CI 95%) (b)</i>	-3.4	-6.3	-7.2
<b>Absolute values</b>			
<b>January-June 2023 (c)</b>	<b>79.317</b>	<b>1.374</b>	<b>107.060</b>
<b>January-June 2019 (c)</b>	<b>83.629</b>	<b>1.534</b>	<b>116.992</b>

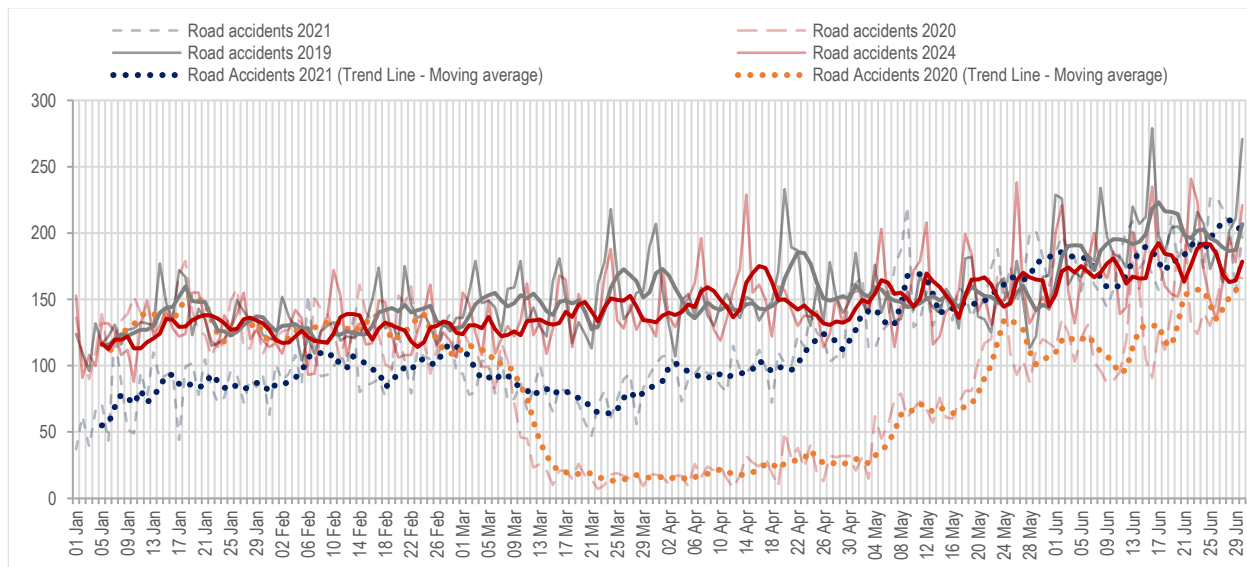
(a) Preliminary estimate 2024, based on microdata and summary data provided to Istat within 31<sup>st</sup> October 2024 (Ref. Data and Methods).

(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, 2023 and preliminary estimate 2024.

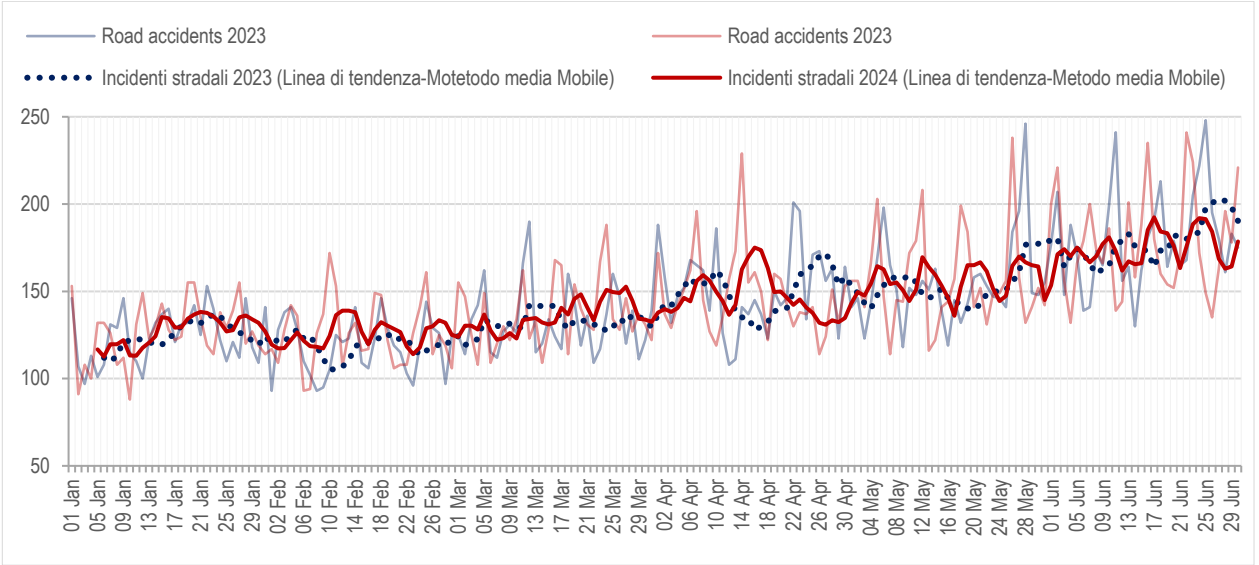
To accurately represent the events during the period January-June 2024, graphs were prepared with the daily and weekly data provided to Istat by the Traffic Police and Carabinieri.

Road accidents are presented in a daily series with trend lines added to smooth out fluctuations. The trend clearly shows the impact of regulatory measures, full and partial closures of activities, and the subsequent reopening on road accident rates in 2020 and 2021. By contrast, 2024 aligns closely with 2019, the last pre-pandemic year. (Chart 2 and 3).

**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, 2021 AND 2024 (absolute values)**

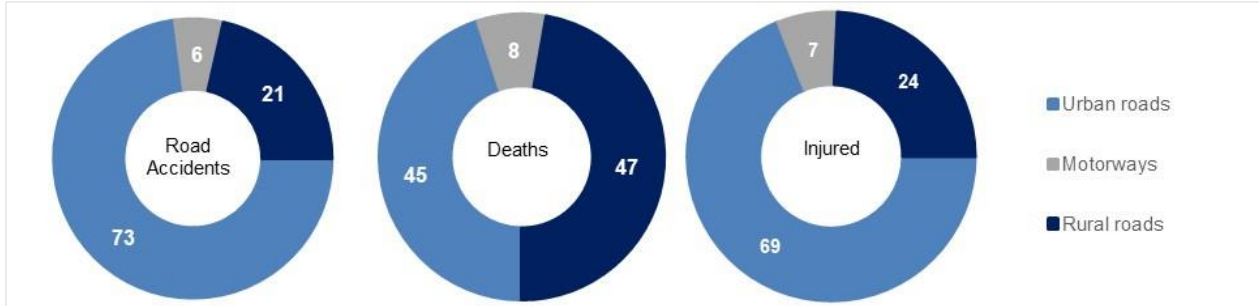
Source: Final data 2019, 2020, 2021 and provisional 2024 – Servizio di Polizia Stradale e Comando Generale dell'Arma dei Carabinieri

**CHART 3. ROAD ACCIDENTS RESULTING IN DEATHS AND INJURY COLLECTED BY POLIZIA STRADALE AND CARABINIERI, BY DAY AND MONTH. PERIOD: JANUARY–JUNE 2023 AND 2024 (absolute values)**



The percentage distribution shows that accidents occur most frequently on urban roads (72.9%), while the highest number of fatalities is concentrated on non-urban roads (47.2%). Highways account for 5.6% of accidents and 7.8% of fatalities (Chart 4).

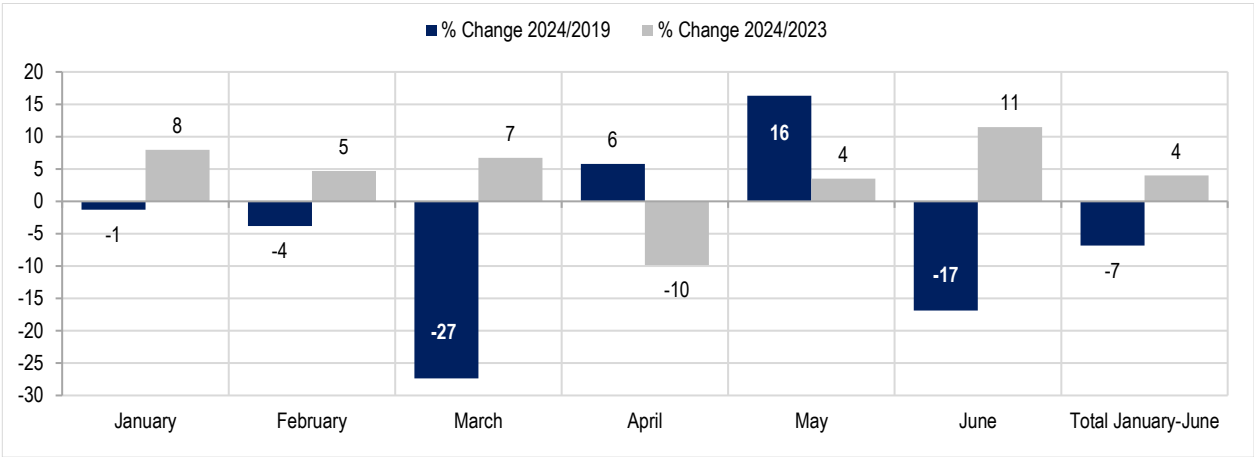
**CHART 4. ROAD ACCIDENTS RESULTING IN DEATH OR INJURY, DEATHS AND INJURIES BY ROAD CATEGORY.**  
Period: January–June 2024. Preliminary estimates, percentage values (a).



(a) Urban Roads include roads Provinciali, Statali and Regionali within built-up areas. Rural roads include roads Statali, Regionali e Provinciali out of built-up area and Comunali extraurbane.

The percentage change in the number of fatalities shows a variable trend during the first half of 2024 compared to the same period in the previous year and in 2019. Monthly differences indicate a significant increase throughout the semester, in 2024, except in April, which shows a 9.8% decrease compared to the same month in 2023. Compared to 2019, March and June show significant decreases, while April and May record increases (Chart 5).

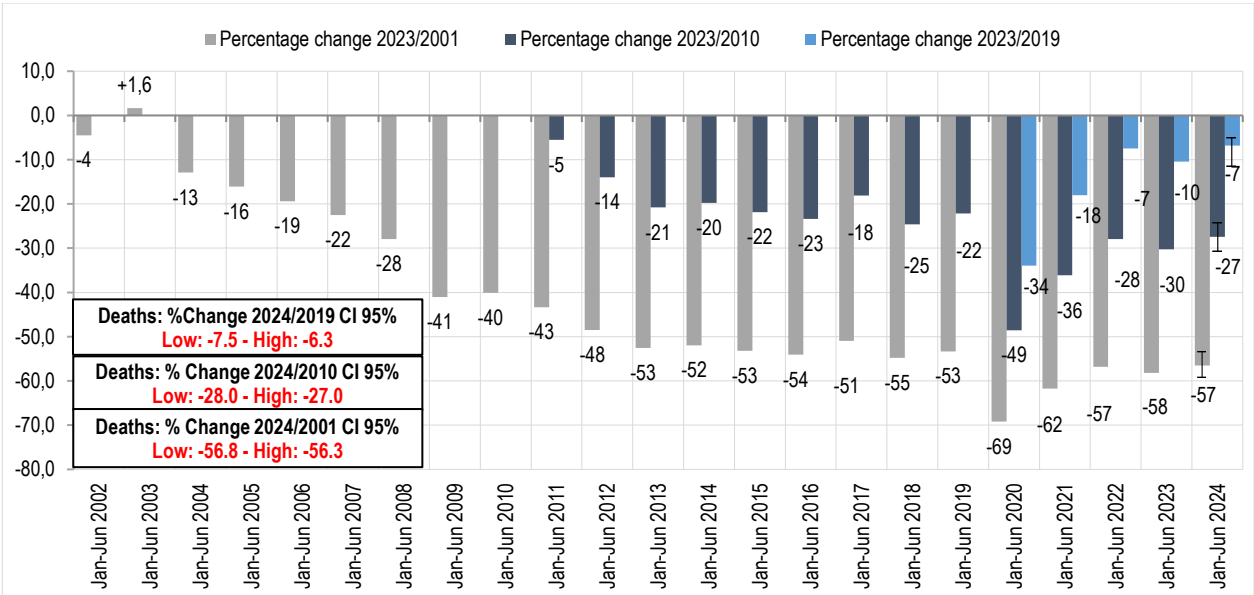
CHART 5. PERCENTAGE CHANGE OF DEATHS NUMBER BY MONTH. JANUARY-JUNE 2024, 2023, AND 2019. Percentage change January-June 2024 vs 2019 and 2023.



Source: Istat - Survey on Road accidents resulting in death or injury – Years 2019, 2023. Preliminary estimates 2024 (Ref. Data and Methods).

Chart 6 shows the percentage changes recorded in the first half of each year from 2001 to 2024 compared to the reference years for the road safety decades: 2001, 2010, and 2019. Comparing the values for each semester with those from 2001, a steady decline is observed over more than 20 years, with a 56.5% reduction in fatalities compared to 2001. The second decade (2011–2020) shows more fluctuation over time, with alternating increases and decreases. For the new decade (2021–2030), the path appears challenging, with the percentage change in fatalities in 2024 at only -6.8% compared to the 2019 reference level, while the target is to halve fatalities by 2030 (see Chart 6).

CHART 6. NUMBER OF DEATHS IN ROAD ACCIDENTS PERCENTAGE CHANGE. Periods January-September 2002-2023, preliminary estimates January-June 2024, 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 2019-2023. Preliminary estimates 2024 (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).

**Injured:** 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.

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).

**Percentage change:** the percentage change between  $X_t$  and  $X_{t-k}$  respectively at  $t$  and  $t-k$  time is calculated as  $(X_t / X_{t-k} - 1) * 100$

## 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 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 198 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 list of the municipalities included in the survey has been updated, since 2023. The number of municipalities, in fact, passed from 172 to 198.

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 2024, and 2023 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 198 municipalities in 2023 and final and complete 2022 data.

Specifically, in a first step, the rates for the first six months of 2023, already disseminated indicators, were processed, separately for the 198 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 2024, was obtained by setting a relationship between the rates calculated for 2023 ( $t-1$ ) in the two subsets of municipalities (198 quarterly survey municipalities and the rest of municipalities) and 2024 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*<sup>1</sup> to derive reliable estimates of standard deviation and confidence intervals of parameters, was planned.

<sup>1</sup> 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;

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 198 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 15 municipalities (January-June 2024)<sup>2</sup>, 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-June 2024, 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 2024							
Road accidents resulting in deaths or injuries	38,384.79	1,669.244	0.43179	-0.36725	38,459	37,664	38,998
Fatalities (within 30 days)	338.01	148.024	0.39069	-0.44656	339	332	345
Injured persons	48,273.73	2,120.65	0.44204	-0.36399	48,339	47,336	49,046

(a) The 2024 preliminary estimate was obtained by the sum: 1) weighted data from 198 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 (198 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](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 \(europa.eu\)](http://ec.europa.eu/road_safety/press_room/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](https://www.etsc.eu/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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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.

<sup>2</sup> Self-representative units in the samples: Roma, Napoli, Milano, Palermo, Torino, Verona, Ravenna, Firenze, Prato, Perugia, Crotone, Cagliari, Padova, Genova, Reggio nell'Emilia.