

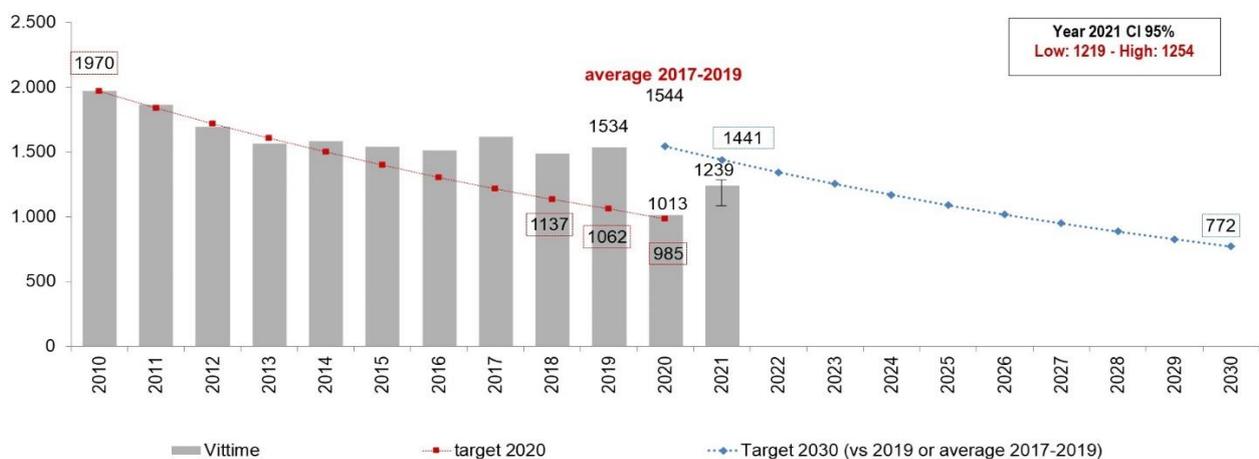


# ROAD ACCIDENTS

Preliminary estimates. January-June 2021

- According to the preliminary estimates January-June 2021, in respect of the same period of 2020, is recorded an increase of the road accidents resulting in death or injury number (65,116, + 31.3%), of the injured (85,647, + 28.1%) and of the victims within 30 days (1,239, + 22.3%).
- Compared to the 2017-2019 average, road accidents decreased of -22.5%; injured of -27.6% and deaths -19.8% (Chart 1 e Table1).
- The first semester of 2021 is characterized by a varied trend in road accidents through the different months. Compared to 2020, road accidents and injured decreased in January and February and increased significantly in the period March-June 2021. Overall, for the whole semester January-June 2021, the values are always below the 2017-2019 average, with the exception of the victims recorded in May (+ 5.4%).
- Compared to 2020, the most significant increase in victims (approximately +50%) occurred on motorways while on urban and rural roads it is between 17 and 20%. Compared to the 2017-2019 average, the first six-months of 2021 register the most significant decline in fatalities on rural roads (-29%) while in built-up areas and motorways the decrease is estimated between 11 and 13%.
- Concerning the European target for road safety, the decade 2010-2020 just concluded, for Italy, with a decline for victims, equal to -42% (EU target -50%). Nevertheless, a positive interpretation of the goals achieved is not possible. The data for the first half of 2021, in fact, reveals a new upward trend in the months March-June. If compared to the 2017-2019 average, benchmark for the European 2030 target, road accidents, injuries and deaths, show a decrease in the period considered.
- As regards the car market, after the heavy braking in 2020, in the first half of 2021, registrations increased by 51.9% for cars, by 58.7% for motorcycles and by 53.5% for all vehicles in total.
- Average distances, measured on the motorway network in the period January-June 2021, show a sharp decrease in the first two months of the year, compared to the same period of the previous year and a progressive increase starting from March, however still below the level of March 2019 (-34%). Overall, motorway mileage grew by 24% compared to 2020 and decreased by 23% compared to 2019.

**CHART 1. EUORPEAN UNION TARGET 2020 AND 2030: NUMBER OF DEATHS IN ROAD ACCIDENTS.** Periods January-June years 2010-2020, preliminary estimates January-June 2021 low and high limits (Confidence Interval 95%) and hypothesis of halving with constant speed goals 2020-2030, first semesters years 2010-2021. *Absolute values.*



Source: Istat - Survey on Road accidents resulting in death or injury – Years 2011-202. Preliminary estimates 2020 (Ref. Data and Methods).

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

Periods January-June average 2017-2019, 2020 and preliminary estimates 2021 (a), lower and higher limits (Confidence Interval 95%). Absolute values and percentage changes 2021/2020 and 2021/average 2017-2019.

ROAD ACCIDENTS RESULTING IN DEATH OR INJURY	Road accidents	Killed (within 30 days)	Injured
	Absolute values		
January-June 2021 (a)	65,116	1,239	85,647
Lower limit (CI 95%) (b)	63,759	1,219	83,986
Higher limit (CI 95%) (b)	66,338	1,254	87,370
Percentage change 2021/2020 e 2021/average 2017-2019			
January-June 2021/2020 (a)	+31.3	+22.3	+28.1
Lower limit (CI 95%) (b)	+28.6	+20.3	+25.6
Higher limit (CI 95%) (b)	+25.6	+23.8	+30.7
January-June 2021/average 2017-2019 (a)	-22.5	-19.7	-27.6
Lower limit (CI 95%) (b)	-24.2	-21.1	-29.0
Higher limit (CI 95%) (b)	-29.0	-18.8	-26.1
January-June 2020 (c)	49,577	1,013	66,872
January-June average 2017-2019 (c)	84,065	1,544	118,233

(a) Preliminary estimate 2020, based on microdata and summary data provided to Istat within November 4<sup>th</sup> 2021 (Ref. Data and Methods).

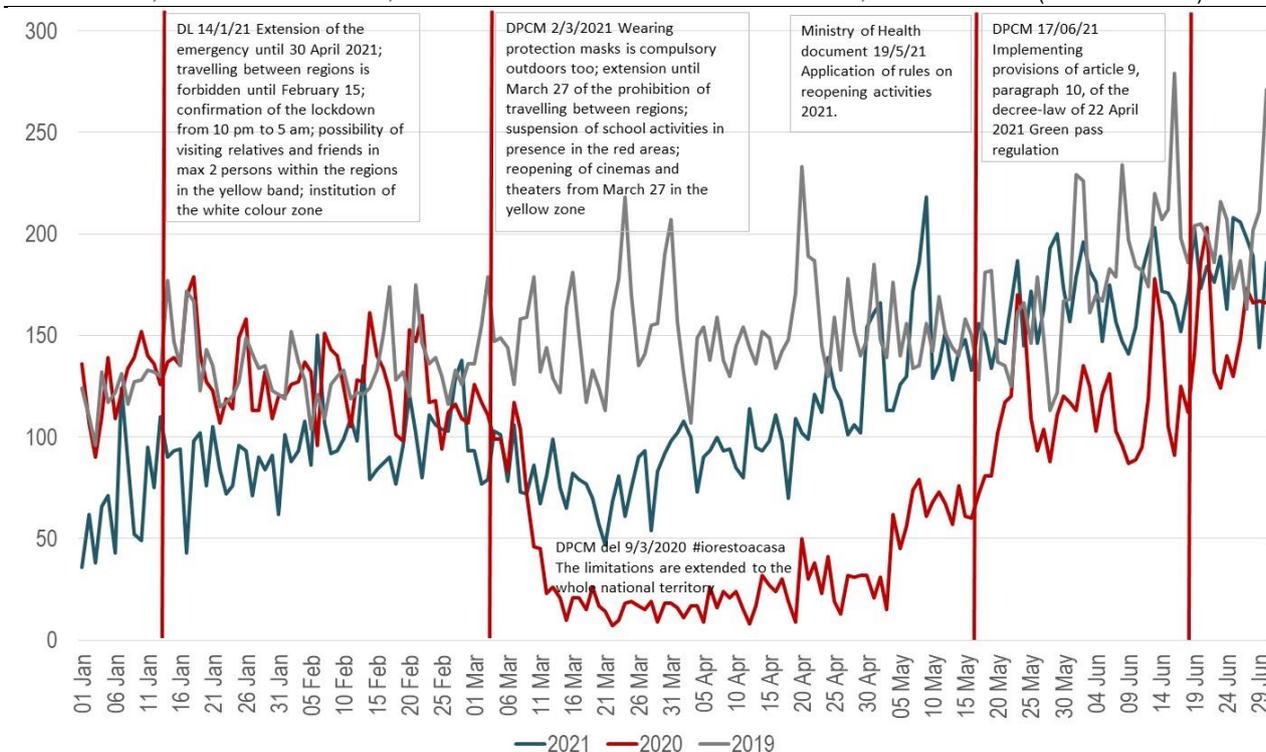
(b) To provide a "range" of values within the estimated number is expected, a Confidence Interval (95%) and lower and higher limits of the confidence intervals for preliminary estimate of accidents, deaths and injuries, were provided.

(c) Source: Istat - Survey on Road accidents resulting in death or injury – Year 2017-2020 and preliminary estimate 2021.

To accurately represent the events during the period January-June 2021, graphs were prepared with the daily and weekly data provided to Istat by the Traffic Police and Carabinieri.

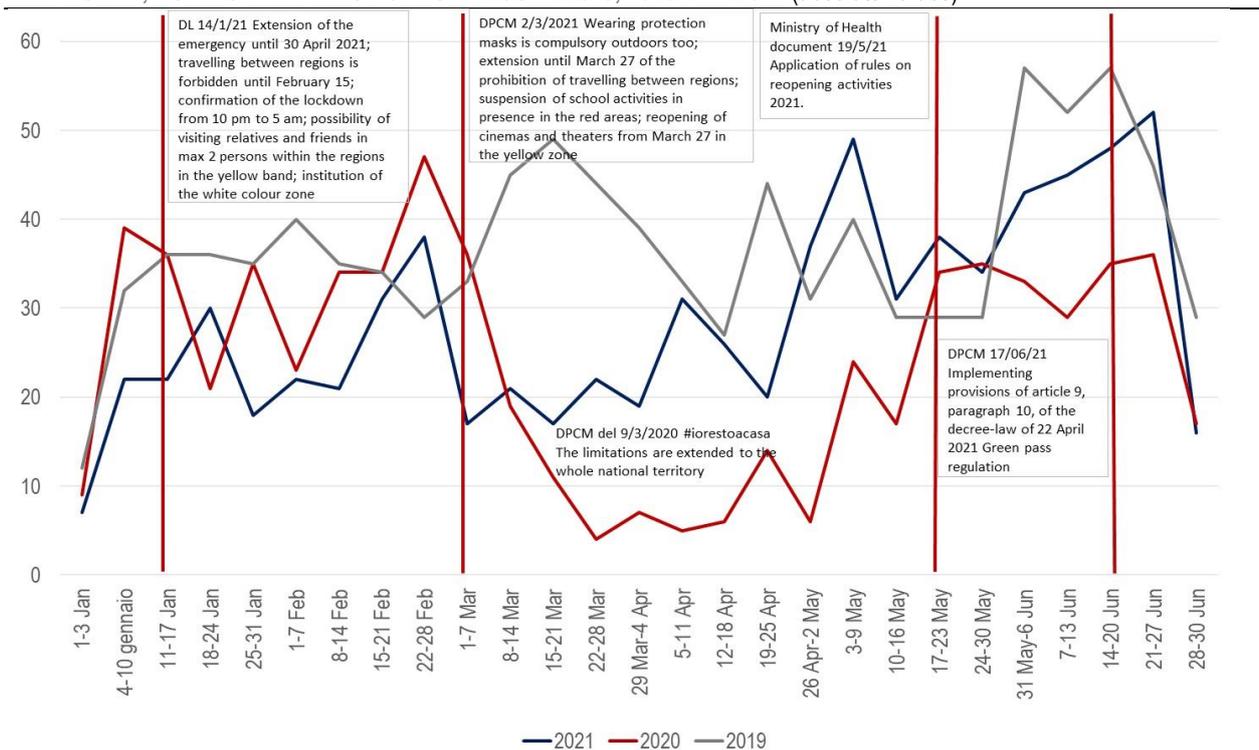
Road accidents are presented in a daily series, while the deaths, to smooth the effect of the oscillations, are described in weekly series. The trend of accidents and victims shows the effects on road accidents of governing measures, business closures and summer recovery (Charts 2 and 3).

**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 AND 2021 (absolute values)**



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

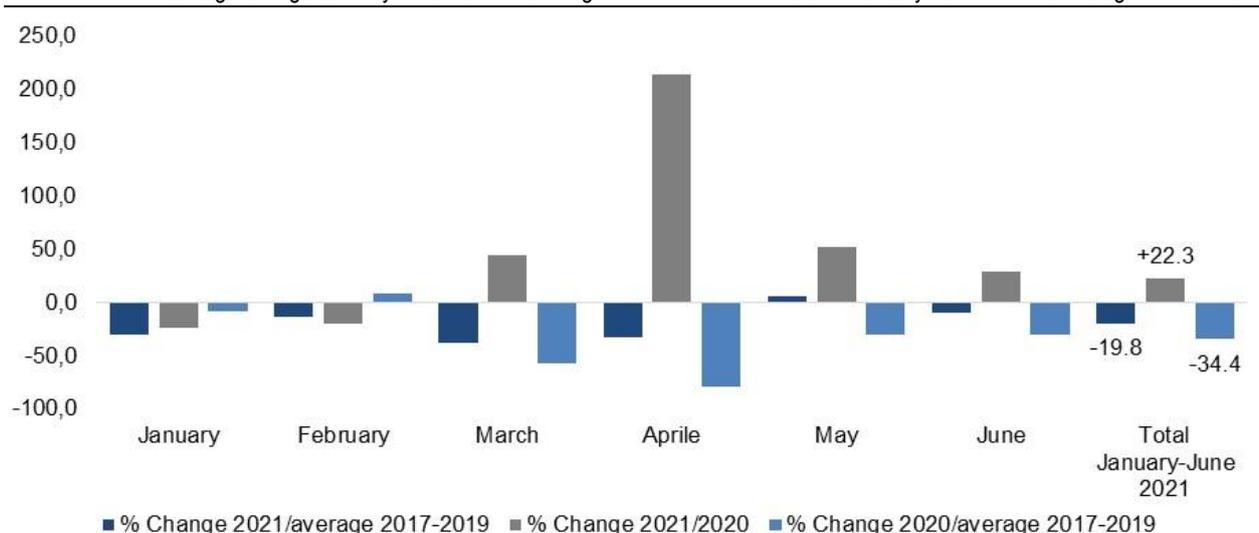
**CHART 3. KILLED IN ROAD ACCIDENTS RESULTING COLLECTED BY POLIZIA STRADALE AND CARABINIERI, BY WEEK AND MONTH, DURING THE PERIOD JANUARY-JUNE 2019, 2020 AND 2021 (absolute values)**



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

The percentage change in the number of victims shows a variable trend during the first six months of 2021, compared to the previous year and to the 2017-2019 average. The differences detected, month by month, are linked to the succession of activities closing and the regulatory measures implemented to contain the Covid19 pandemic, followed by periods of recovery (Chart 4).

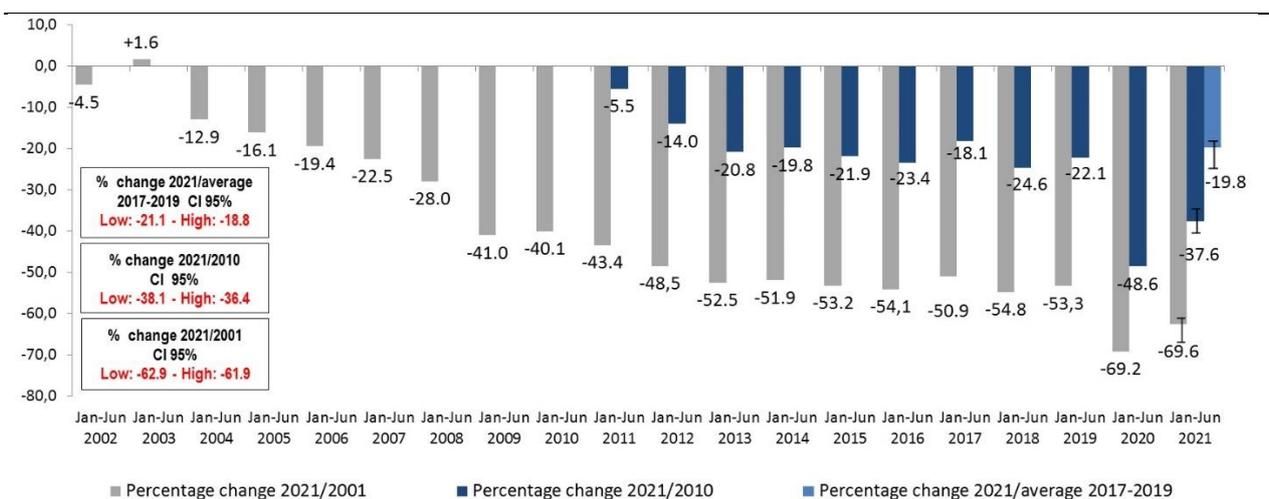
**CHART 4. PERCENTAGE CHANGE IN THE NUMBER OF VICTIMS BY MONTH. JANUARY-JUNE 2021, 2020 AND AVERAGE 2017-2019. Percentage change January-June 2021 vs average 2017-2019 and 2020 and January-June 2020 vs average 2017-2019**



Source: Istat - Survey on Road accidents resulting in death or injury – Years 2017-2021. Preliminary estimates 2021 (Ref. Data and Methods).

The time series of the percentage changes in the number of victims for the January-June periods 2002-2020 and for the preliminary estimate January-June 2021 (compared to the benchmark years for the road safety decades) show an almost constant decrease in the number of deaths over the last twenty years. For the new decade 2021-2030 the percentage change in victims, in 2021, is equal to -19.8% compared to the reference value 2017-2019 average (Chart 5).

**CHART 5. NUMBER OF DEATHS IN ROAD ACCIDENTS PERCENTAGE CHANGE.** Periods January-June 2002-2020, preliminary estimates January-June 2021, preliminary estimates lower and higher limits (Confidence Interval 95%). Change in respect of year 2001 and 2010 and average 2017-2019.



Source: Istat - Survey on Road accidents resulting in death or injury – Years 2002-2021. Preliminary estimates 2021 (Ref. Data and Methods).

## The context of mobility

The pandemic situation and the measures to contain it continue to affect volumes and traffic trends also in 2021, especially with regard to light vehicles.

On the main extra-urban network managed by Anas, in the first two months of 2021 there were significant decreases in traffic volumes (with peaks of -35%) compared to the previous year, when no restrictions had yet been implemented. Concomitance with the new total closure of the country for containment measures, the Detected Mobility Index (DMI), shows positive changes compared to 2020 and also in comparison with June 2019. On average the value of the index is stable on an increase by 5% during the summer months of the current year, compared to the same period in 2020.

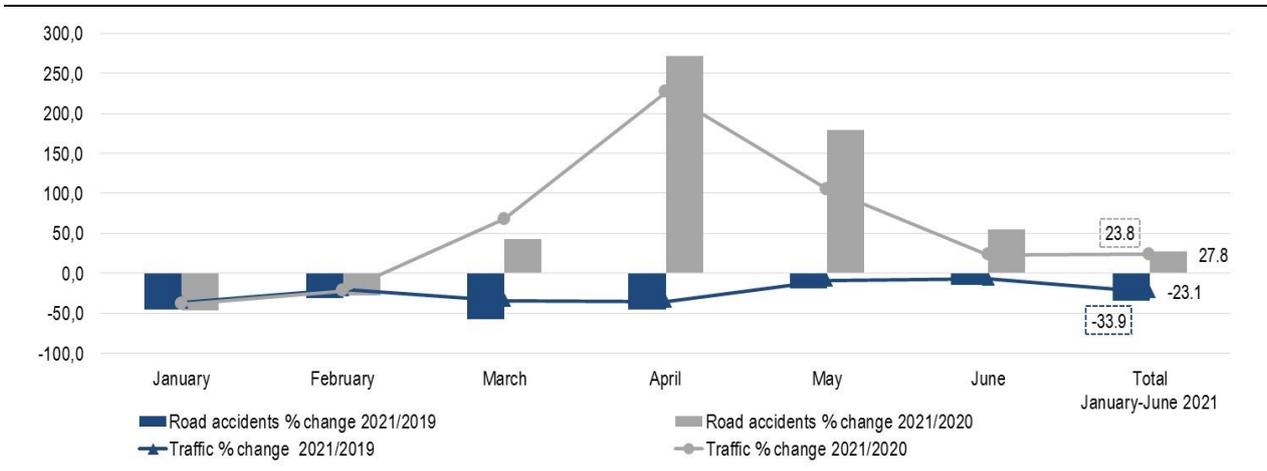
As regards the motorway network, based on the data released by Aiscat on distances driven, there was a significant decrease in traffic in the months of January and February 2021, compared to the same period of 2019 and 2020 and a progressive increase, starting from March, even if still 33.9% lower than 2019 values. The positive trend continues in the following months, mainly for light vehicles, given that the freight mobility was not interrupted during 2020. Motorways traffic increased by 23.8%, in the first half of 2021, compared to the same period of 2020 and decreased by 23.1% out of 2019 (-29.7% for light traffic) (Chart 6).

The data related to the violations ascertained by the Traffic Police also show an increase of 13%, compared to the same period of 2020 and a decrease of 14% compared to 2019, as a result of the level of traffic, still low, on Italian roads.

Also in the first half of 2021, the car market recorded increases in registrations of 51.9% for cars, 58.7% for motorcycles and 53.5% for vehicles overall, in comparison with the same period of the last year.

An element of novelty is given by the increase in soft mobility in Italian cities, also encouraged by the measures in the National Recovery and Resilience Plan which plans the construction, in the coming years, of 570 km of urban cycle paths and 1,250 km of tracks. Tourist cycle paths, the sharing services for scooters are now numerous, 7 in Milan and 6 in Rome, with at least 7,500 and 5,000 rentals per day.

**CHART 6. TRAFFIC AND ROAD ACCIDENTS ON MOTORWAYS BY MONTH DURING THE PERIOD JANUARY-JUNE 2021.**  
 Percentage changes 2021/2020 e 2021/2019. Percentage changes of Billions vehicles-km



Source: Traffic Data and Road Accidents: Aiscat (Motorways – January-June 2021).

## 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<sup>1</sup>:** 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 2021 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 2021, and 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 2021 and final and complete 2019 and 2020 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 2021, was obtained by setting a relationship between the rates calculated for 2020 or 2019 (t-1) in the two subsets of municipalities (172 quarterly survey municipalities and the rest of municipalities) and 2021 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>2</sup> to derive reliable estimates of standard deviation and confidence intervals of parameters, was planned.

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<sup>1</sup> 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).

<sup>2</sup> Di Ciccio T.J., Efron B. "Bootstrap Confidence Intervals" in Statistical Science 1996, Vol. 11, No. 3, 189-228;

Bonomi 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 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 10 municipalities (January-June 2021)<sup>3</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 ACCEDENTS RESULTING IN DETAHS OR INJURIES, KILLED AND INJURED PERSONS IN ITALY**, January-June 2021, 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
<b>January-June 2021</b>							
Road accidents resulting in deaths or injuries	28274,39	1545,57	0,60455	-0,46976	<b>65,116</b>	63,70,,6	66,287,7
Fatalities (within 30 days)	247,17	148,695	0,68451	-0,59487	<b>1,239</b>	1,209,9	1,244,8
Injured persons	35124,97	1898,48	0,63275	-0,49862	<b>85,647</b>	83,911,2	87,294,7

(a) The 2021 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](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) – 20/04/2021 [https://ec.europa.eu/commission/presscorner/detail/en/IP\\_21\\_1767](https://ec.europa.eu/commission/presscorner/detail/en/IP_21_1767)  
 European Transport Safety Council, Annual PIN report, Year 2021 – <https://etsc.eu/15th-annual-road-safety-performance-index-pin-report/>  
 Istat ACI– Incidenti stradali in Italia <https://www.istat.it/it/archivio/incidenti+stradali>

<sup>3</sup> Self-representative units in the samples: Roma, Milano, Palermo, Torino, Genova, Napoli, Bologna, Pisa, Bari e Catania.