ROAD CRASHES AND INJURIES

This document has been prepared by a group of experts under the "European Urban Mobility Observatory and Support" contract. It does not reflect or anticipate the position of the Commission. It does not constitute a legal proposal. The purpose of this document is to outline the indicators and the data required to calculate them, which the experts consider to be most appropriate for urban nodes to measure in the respective area. This document is intended to serve as a basis for reflection and further work on relevant indicators required by the TEN-T Regulation.

Data requirements

All data requirements are for the urban area: one dataset for the city only and one dataset for the whole FUA.

#	Indicator	Dataset	Owner	(Possible) collection methods	Timing & frequency of collection	Comments on data availability
D1	I1. Total urban population *[# inhabitants]*	Data on the size of the total urban population on January 1st	City, Offices for national or local statistics	Registration by the city	Data collected every year	**Survey:** • 93 city, 4 FUA, 113 both city and FUA • 210 total at city and/or FUA level (98% of respondents)
D2	I2. Total road network *[# km]*	Length of all roads in the urban area to be used by cars, bicycles, and public transport.	City, Offices for national or local statistics	GIS calculation Data from the INSPIRE and MTIS databases	Data updated every year	**Survey:** <u>total road length mixed traffic:</u> 116 city, 1 FUA, 47 both city and FUA 164 total at city and/or FUA level (76% of respondents) <u>usage of GIS:</u> 112 city, 3 FUA, 67 both city and FUA 182 total at city and/or FUA level (85% of respondents) The INSPIRE and MTIS databases also provide data on the total network length of the road network.
D3	I3. Number of walking trips per year in the	Total number of walking trips [# 1 000 000 trips] in the city/FUA per year	Local statistics	Survey of inhabitants and commuters/visit	Every 3 to 5 years	**Survey:** <u># of walking trips:</u> 47 city, 3 FUA, 25 both city and FUA

#	Indicator	Dataset	Owner	(Possible) collection methods	Timing & frequency of collection	Comments on data availability
	city/FUA *[# 1 000 000 trips]*			ors increased to the total trips in the urban area		75 total at city and/or FUA level (35% of respondents) mobility survey done**:** 99 city, 5 FUA, 64 both city and FUA 168 total at city and/or FUA level (78% of respondents)
	I4. Number of cycling trips per year in the city/FUA [*# 1 000 000 trips]*	Total number of cycling trips [# 1 000 000 trips] in the city/FUA per year				**Survey:** # of cycling trips: 56 city, 3 FUA, 21 both city and FUA 80 total at city and/or FUA level (37% of respondents) mobility survey done: idem I3/D3
	I5. Number of trips by e-micromobility per year in the city/FUA *[# 1 000 000 trips]*	Total number of e-micromobility trips [# 1 000 000 trips] in the city/FUA per year				
	I6. Number of trips by moped per year in the city/FUA *[# 1 000 000 trips]*	Total number of trips by moped [# 1 000 000 trips] in the city/FUA per year				
	I7. Number of trips by motorcycle per year in the city/FUA *[# 1 000 000 trips]*	Total number of trips by motorcycle [# 1 000 000 trips] in the city/FUA per year				
	I8. Number of trips by car per year in the city/FUA *[# 1 000 000 trips]*	Total number of trips by car [# 1 000 000 trips] in the city/FUA per year				

#	Indicator	Dataset	Owner	(Possible) collection methods	Timing & frequency of collection	Comments on data availability
	I9. Number of trips by light commercial vehicle per year in the city/FUA *[# 1 000 000 trips]*	Total number of trips by light commercial vehicle [# 1 000 000 trips] in the city/FUA per year				
	I10. Number of trips by heavy goods vehicle per year in the city/FUA *[# 1 000 000 trips]*	Total number of trips by heavy goods vehicle [# 1 000 000 trips] in the city/FUA per year				
D4	I11. Distance walked per year in the city/FUA *[# 1 000 000 km]*	Multi-modal traffic model calculation of the distance travelled by walking	City mobility department For shared vehicles extra data from operators	Usually a multi-modal traffic modal results also in an estimation of distances travelled with the car and public transport and sometimes for cycling. For the other modes other data sources need to be used e.g. shared mobility providers, logistic	Updated every 3 to 5 years calibrated with new measurements of the traffic flows per mode and socio-economical data for the city and FUA	**Survey:** km walked: 35 city, 3 FUA, 25 both city and FUA 63 total at city and/or FUA level (29% of respondents) traffic model used: 91 city, 7 FUA, 57 both city and FUA 155 total at city and/or FUA level (72% of respondents)
	I12. Distance cycled per year in the city/FUA *[# 1 000 000 km]*	Multi-modal traffic model calculation of the distance travelled by bicycle				**Survey:** vkm by bicycle: 33 city, 3 FUA, 20 both city and FUA 56 total at city and/or FUA level (26% of respondents) traffic model used: 91 city, 7 FUA, 57 both city and FUA 155 total at city and/or FUA level (72% of respondents)

#	Indicator	Dataset	Owner	(Possible) collection methods	Timing & frequency of collection	Comments on data availability
	I13. Distance travelled by e-micromobility per year *[# 1 000 000 km]*	Multi-modal traffic model calculation of the distance travelled by e-micromobility.		statistics and mobility surveys.		**Survey:** vkm by e-scooter (e-micromobility): 32 city, 3 FUA, 10 both city and FUA 45 total at city and/or FUA level (21% of respondents) traffic model used: 91 city, 7 FUA, 57 both city and FUA 155 total at city and/or FUA level (72% of respondents)
	I14. Distance driven by moped in the city/FUA per year *[# 1 000 000 km]*	Multi-modal traffic model calculation of the distance travelled with moped				**Survey**: No direct info from survey traffic model used: 91 city, 7 FUA, 57 both city and FUA 155 total at city and/or FUA level (72% of respondents)
	I15. Distance driven by motorcycle in the city/FUA per year *[# 1 000 000 km]*	Multi-modal traffic model calculation of the distance travelled with motorcycle				
	I16. Distance driven by car in the city/FUA per year *[# 1 000 000 km]*	Multi-modal traffic model calculation of the distance travelled by car				**Survey**: vkm driven by car: 38 city, 4 FUA, 27 both city and FUA 69 total at city and/or FUA level (32% of respondents) traffic model used: 91 city, 7 FUA, 57 both city and FUA 155 total at city and/or FUA level (72% of respondents)
	I17. Distance driven by light commercial vehicle in the city/FUA	Multi-modal traffic model calculation of the distance				

#	Indicator	Dataset	Owner	(Possible) collection methods	Timing & frequency of collection	Comments on data availability
	per year *[# 1 000 000 km]*	travelled by light commercial vehicle				
	I18. Distance driven by heavy goods vehicle in the city/FUA per year *[# 1 000 000 km]*	Multi-modal traffic model calculation of the distance travelled by heavy goods vehicle				
D5	I19 Length of roads with a speed limit of 30 km/h or lower in the city/FUA *[# km]*	Database of roads ○ roads with a speed limit of maximum 30km/h	City	To be inventoried by the city and processed by GIS	Data updated every 2 years	**Survey:** Road length with a speed limit of 30 km/h with mixed traffic: 103 city, 0 FUA, 41 both city and FUA 144 total at city and/or FUA level (67% of respondents) usage of GIS: 112 city, 3 FUA, 67 both city and FUA 182 total at city and/or FUA level (85% of respondents)
D6	I20 Length of roads with a speed limit higher than 30km/h and dedicated cycle tracks in the city/FUA *[# km]*	Database of roads ○ a road with a dedicated cycling tracks (without access for public transport or any other vehicles) with a minimum width of 1.5 m one way or 2.2 m two-way if the speed limit is over 30 km/h If another minimum width for the cycle tracks is used, the different widths must be reported.	City	To be inventoried by the city and processed by GIS	Data updated every 2 years	**Survey:** Total length of dedicated cycling paths: 124 city, 0 FUA, 47 both city and FUA 171 total at city and/or FUA level (80% of respondents) Usage of GIS: 112 city, 3 FUA, 67 both city and FUA 182 total at city and/or FUA level (85% of respondents)

#	Indicator	Dataset	Owner	(Possible) collection methods	Timing & frequency of collection	Comments on data availability
D7	I21 Length of roads reserved for cycling or for walking and cycling in the city/FUA *[# km]*	Database of roads ○ for cycling or for walking and cycling.	City	To be inventoried by the city and processed by GIS	Data updated every 2 years	**Survey:** <u>Total length of roads reserved for cyclists:</u> 115 city, 0 FUA, 42 both city and FUA 157 total at city and/or FUA level (73% of respondents) <u>usage of GIS:</u> 112 city, 3 FUA, 67 both city and FUA 182 total at city and/or FUA level (85% of respondents)
D8	O1. Number of road crashes per year in the city/FUA *[# crashes]*	Database of road crashes: ○ injury road crashes	Police Local, regional, national statistical agencies.	Registration by police and healthcare services	Yearly	**Survey**: <u>total number of road traffic crashes:</u> 112 city, 5 FUA, 65 both city and FUA 182 total at city and/or FUA level (85% of respondents)
D9	O2. Number of road crashes per year in the city/FUA resulting in persons seriously or fatally injured *[# crashes]*	Database of road crashes: ○ road crashes with persons seriously or fatally injured	Police Local, regional, national statistical agencies.	Registration by police and healthcare services	Yearly	**Survey**: No info from survey
D10	O3, O4 Number of persons fatally or seriously injured in road crashes per year in the city/FUA by gender, age category, type of vehicle used by the person fatally or seriously injured and by other 'main vehicle'	Database of crashes with the persons fatally or seriously injured disaggregated by: **Gender** ○ Male ○ Female ○ Unknown **Age category** ○ children (<14) ○ teenager (14-18)	Police Local, regional, national statistical agencies.	Registration by police and healthcare services	Yearly	**Survey**: <u>total number of fatally injured persons in road traffic crashes:</u> 108 city, 5 FUA, 59 both city and FUA 172 total at city and/or FUA level (80% of respondents) **Survey**: <u>total number of seriously injured persons in road traffic crashes:</u> 104 city, 5 FUA, 65 both city and FUA

#	Indicator	Dataset	Owner	(Possible) collection methods	Timing & frequency of collection	Comments on data availability
	involved in the crash *[# persons]*	○ young adults (19-25) ○ adults (26-64) ○ seniors (>64) **Type of vehicle used** ○ None (walking) ○ Bicycle (including pedelec) ○ E-micromobility ○ Moped (including speed-pedelec) ○ Motorcycle ○ Car ○ Light commercial vehicle ○ Heavy goods vehicle ○ Bus or coach **Other 'main vehicle' involved in the accident** ○ None (walking) ○ Bicycle (including pedelec) ○ E-micromobility ○ Moped (including speed-pedelec) ○ Motorcycle ○ Car ○ Light commercial vehicle ○ Heavy goods vehicle ○ Bus or coach ○ Other vehicle type ○ No other vehicle				174 total at city and/or FUA level (81% of respondents) **Survey**: <u>"the above data broken down by…"</u> <u>gender:</u> 57 city, 2 FUA, 33 both city and FUA 92 total at city and/or FUA level (43% of respondents) <u>age:</u> 62 city, 2 FUA, 35 both city and FUA 99 total at city and/or FUA level (46% of respondents) <u>type injured person:</u> 84 city, 4 FUA, 53 both city and FUA 141 total at city and/or FUA level (66% of respondents) <u>type vehicle involved in the crash:</u> 89 city, 5 FUA, 49 both city and FUA 143 total at city and/or FUA level (67% of respondents)

#	Indicator	Dataset	Owner	(Possible) collection methods	Timing & frequency of collection	Comments on data availability
D11	O5, O6 Number of persons fatally or seriously injured in road traffic crashes on roads with a speed limit of 30 km/h or lower in the city/FUA per year *[# persons]*	Database of crashes ○ fatally or seriously injured persons	Police Local, regional, national statistical agencies.	Registration by police and healthcare services	Yearly	**Survey**: <u>Total number of fatally injured persons in road traffic crashes on roads with a speed limit of 30 km/h:</u> 59 city, 2 FUA, 34 both city and FUA 95 total at city and/or FUA level (44% of respondents) <u>Total number of seriously injured persons in road traffic crashes on roads with 30 km/h speed limit:</u> 60 city, 2 FUA, 36 both city and FUA 98 total at city and/or FUA level (46% of respondents)

Overview and analysis of data availability

Based on the analysis of responses to the urban mobility data and indicators survey, which was carried out in August-October 2023 and which collected responses from 215 urban nodes out of 430, the following considerations have been drawn for each dataset required for the indicators described above.

<u>Summary and conclusions</u>

A high share of respondents (76%) have data on the "total road length mixed traffic" at city and/or FUA level available, probably they also have the general total length of the road network. This supports the conclusion to keep the definition and calculation method of the related Result indicator 'Share of roads safe for cycling *[% of km of roads]* in the city/FUA *[%]'.* One remaining concern is the use of the 'Total length of dedicated cycling paths' as cities can count a one-way dedicated cycle path at each side of the road as 2 paths, doubling the length of this type of Roads safe for cycling. This motivates an extra explanation on the data needed to cities together with the request for these data.

A low percentage of respondents (35%-37%) reports collecting data on the number of walking trips and cycling trips at city and/or FUA level. However, since a high number of respondents (78%) organise mobility surveys, a question on the "number of walking and cycling trips" can be added, if not already done. Mobility surveys tend to be done every 3 to 5 years but it seems acceptable to use this indicator to calculate the exposure of the road safety figures.

A low percentage of respondents collect the number of km travelled per mode (21% to 32%), but a high number of respondents (72%) use a traffic model. Since a high number of cities don't have direct access to data on km travelled per mode but can calculate it with a multi-modal traffic model, travel distance indicators can still be used to calculate the exposure of the road safety figures. However, most traffic models include only cycling, public transport and car traffic as modes and don't produce data on walking, micro-mobility, mopeds, and motorcycles. For these modes, other data sources need to be used.

A high percentage of respondents (80-85%) collect data on crashes and on fatal and serious injuries resulting from them. A medium number of respondents collects data on the "injured person" & "type of vehicle involved in crash" (66% and 67% of the respondents respectively). A low number of respondents collects data on the "gender" and "age" (43% and 46% of the respondents respectively). Extra effort by some cities seems necessary to access the crash and injury data and to complete the figures with healthcare data. The digital availability of crash data and the level of georeferencing of locations are quite high, which is positive for the ability of cities to process the crash data in an efficient way and to provide the data for the different indicators in the best way.

Detailed analysis

Please note that the figures provided do not always add up across questions, for example, in some cases respondents have replied only to the first of two related questions, or only to the second of two questions.

D1. **(I1) Total urban population** [# inhabitants]

Survey results

- 210 respondents reported collection of/access to data on "total number of inhabitants":
  - 98% of respondents
  - 93 at city level only, 4 at FUA level only, 113 at both city and FUA level

D2. **(I2) Total road network** [# km]

Survey results

- 164 respondents reported collection of/access to data on "total road length mixed traffic":
  - 76% of respondents
  - 116 at city level only, 1 at FUA level only, 47 at both city and FUA level
- 182 respondents reported that they use GIS:

- 85% of respondents
- 112 at city level only, 3 at FUA level only, 67 at both city and FUA level

Comments

- The INSPIRE and MTIS databases also provide data on the total network length of the road network.
- The survey did not ask about the general total length of the road network, only about roads with "mixed traffic", which means that motorways and probably also roads with separated cycle tracks are excluded in the understanding of the respondents.

D3. **(I3,I4) Number of walking/cycling trips per year in the city/FUA** [# 1 000 000 trips]
(I5,I6,I7,I8,I9,I10) Number of trips by e-micromobility/moped/motorcycle/car/light commercial vehicle/heavy goods vehicle per year in the city/FUA [# 1 000 000 trips]

Survey results

- 75 respondents reported collection of/access to data on "number of walking trips":
  - 35% of respondents
  - 47 at city level only, 3 at FUA level only, 25 at both city and FUA level
- 80 respondents reported collection of/access to data on "number of cycling trips":
  - 37% of respondents
  - 56 at city level only, 3 at FUA level only, 21 at both city and FUA level
- 168 respondents reported collection of/access to data on "mobility survey done":
  - 78% of respondents
  - 99 at city level only, 5 at FUA level only, 64 at both city and FUA level

Survey: open-ended feedback

- Limited cities have these data available because it is too expensive and time-consuming. Most of them who have the data collect the data using a local, regional or national travel or household survey mainly every 3-5 years
- One city indicates they don't have the number of trips yet but plan to incorporate in the next city-wide household survey in 2025

D4. **(I11,I12) Distance walked/cycled per year in the city/FUA** [# 1 000 000 km]
(I13,I14,I15,I16,I7,I18) Distance travelled by e-micro-mobility/moped/motorcycle/car/light commercial vehicle/heavy goods vehicles per year in the city/FUA [# 1 000 000 km]

Survey results

- 63 respondents reported collection of/access to data on "number of km walked":
  - 29% of respondents

- 35 at city level only, 3 at FUA level only, 25 at both city and FUA level
- 56 respondents reported collection of/access to data on “number of vehicle-km travelled by bicycle”:
  - 26% of respondents
  - 33 at city level only, 3 at FUA level only, 20 at both city and FUA level
- 45 respondents reported collection of/access to data on “number of vehicle-km travelled by e-scooter (e-micromobility)”:
  - 21% of respondents
  - 32 at city level only, 3 at FUA level only, 10 at both city and FUA level
- The indicator “km driven with PTW&3-wheelers “ was not addressed in the survey
- 69 respondents reported collection of/access to data on “number of vehicle-km travelled by car”:
  - 32% of respondents
  - 38 at city level only, 4 at FUA level only, 27 at both city and FUA level
- 155 respondents reported collection of/access to data on “traffic model used”:
  - 72% of respondents
  - 91 at city level only, 7 at FUA level only, 57 at both city and FUA level

Survey: open-ended feedback

- A limited number of cities reports the availability of # km of shared vehicles from operators
- Some cities report the availability of a traffic model but which is only updated every 5 years

D5. (I19) Length of roads with a speed limit of 30 km/h or lower in the city/FUA [# km]

D6. (I20) Length of roads with a speed limit higher than 30km/h and dedicated cycle tracks in the city/FUA [# km]

D7. (I21) Length of roads reserved for cycling or for walking and cycling in the city/FUA [# km]

Survey results

- 144 respondents reported collection of/access to data on “road length with a speed limit of 30 km/h with mixed traffic”:
  - 67% of respondents
  - 103 at city level only, 0 at FUA level only, 41 at both city and FUA level
- 171 respondents reported collection of/access to data on “total length of dedicated cycling paths”:
  - 80% of respondents
  - 124 at city level only, 0 at FUA level only, 47 at both city and FUA level
- 157 respondents reported collection of/access to data on “total length of roads reserved for cyclists”:
  - 73% of respondents
  - 115 at city level only, 0 at FUA level only, 42 at both city and FUA level
- 182 respondents reported that they use GIS:

- 85% of respondents
- 112 at city level only, 3 at FUA level only, 67 at both city and FUA level

Comments

- A high number of respondents collects data on the types of roads that can be safely used for cycling. The high use of GIS by respondents also facilitates provision of the data needed to calculate this indicator.

D8 to D11: Overall availability of crash and injury data

Survey results

- 139 respondents reported collection of/access to data on "georeferencing of road traffic crashes (e.g. by coordinates)":
  - 65% of respondents
  - 84 at city level only, 5 at FUA level only, 50 at both city and FUA level
- 138 respondents reported collection of/access to "data on road traffic crashes available in digital format":
  - 64% of respondents
  - 84 at city level only, 3 at FUA level only, 51 at both city and FUA level

Survey: open-ended feedback

- In most cities, local police collect these data but for some cities, data is collected at regional police level and is not available to the city.
- Only a limited number of cities also collect healthcare data, resulting in an underreporting of the crash and injury figures.
- Some cities only have data on crashes, not victims (including persons fatally and seriously injured).
- Some cities don't have direct access to the data and would need to request it from the regional or national agencies that collect and process the data.

D8. (O1) Number of road crashes per year in the city/FUA [# crashes]

Survey results

- 182 respondents reported collection of/access to data on "total number of road traffic crashes":
  - 85% of respondents
  - 112 at city level only, 5 at FUA level only, 65 at both city and FUA level

Comments

- A high number of respondents (85%) collects this data.

D9. (O2) Number of road crashes per year in the city/FUA resulting in persons seriously or fatally injured [# crashes]

Survey results

- This indicator was not addressed in the survey.

Comments

- This indicator uses the crash data collected for crashes according to the CARE database.

D10. (O3,O4) Number of persons fatally or seriously injured in road crashes per year in the city/FUA by gender, age category, type of vehicle used by the person fatally or seriously injured and by other 'main vehicle' involved in the crash [# persons]

Persons fatally injured

Survey results

- 172 respondents reported collection of/access to data on "total number of fatally injured persons in road traffic crashes":
    - 80% of respondents
    - 108 at city level only, 5 at FUA level only, 59 at both city and FUA level

Survey: open-ended feedback

- In most cities, local police collect these data but for some cities, data is collected at regional police level and is not available to the city.
- Only a limited cities also collect healthcare data resulting in an underreporting of the crash and injury figures.
- Some cities only have crashes data, no victims data.
- Some cities don't have direct access to the data and to ask data to regional or national agencies that collect and process the data

Comments

- A high number of respondents (80%) have these data available.
- Extra effort by some cities seems necessary to access the crash and injury data and to complete the figures with healthcare data.

Persons seriously injured

Survey results

- 174 respondents reported collection of/access to data on "total number of seriously injured persons in road traffic crashes":
    - 81% of respondents
    - 104 at city level only, 5 at FUA level only, 65 at both city and FUA level

Comments

- A high number of respondents (81%) collects this data.

Breakdowns by gender, age category, type of vehicle used by the person fatally or seriously injured and by other 'main vehicle' involved in the crash

Survey result

- the (total number of road crashes, seriously injured persons, etc.) broken down by:
    - 92 respondents reported collection of/access to data on "gender":
        - 43% of respondents

        - 57 at city level only, 2 at FUA level only, 33 at both city and FUA level
    - 99 respondents reported collection of/access to data on “age”:
        - 46% of respondents
        - 62 at city level only, 2 at FUA level only, 35 at both city and FUA level
    - 141 respondents reported collection of/access to data on “injured person involved in crash”:
        - 66% of respondents
        - 84 at city level only, 4 at FUA level only, 53 at both city and FUA level
    - 143 respondents reported collection of/access to data on “type of vehicle involved in crash”:
        - 67% of respondents
        - 89 at city level only, 5 at FUA level only, 49 at both city and FUA level
    - ‘Other main vehicle’ data was not addressed in the survey.

Comments

- ‘Other main vehicle’ data enables presentation and analysis of the road safety data through a collision matrix as recently produced for road traffic fatalities in the EU by the EC Mobility and Transport based on the CARE database of road crashes (see https://transport.ec.europa.eu/background/road-safety-statistics-2022-more-detail_en). The indicator uses the crash data collected for crashes according to the CARE database.

D11 (O5,O6) Number of persons fatally/seriously injured in road traffic crashes on roads with a speed limit of 30 km/h or lower in the city/FUA per year [# persons]

Survey results

- 95 respondents reported collection of/access to data on “total number of fatally injured persons in road traffic crashes roads max 30 km/h”:
    - 44% of respondents
    - 59 at city level only, 2 at FUA level only, 34 at both city and FUA level
- 98 respondents reported collection of/access to data on “total number of seriously injured persons in road traffic crashes roads max 30 km/h”:
    - 46% of respondents
    - 60 at city level only, 2 at FUA level only, 36 at both city and FUA level

Comments

- Currently a low number of respondents collects data on the number of fatally or seriously injured people on roads with a speed limit of 30 km/h or lower (44% and 46% of the respondents respectively).

Survey: open-ended feedback

- One city reports that they also collect data on subjective safety based on a survey.
- Some cities also analyse and report information on the cause of the accident: road characteristics, weather conditions, fault of intoxicated persons

- Some cities also collect the KPIs commonly promoted in the EU such as the percentage of use of seatbelts/helmets, number of deaths/seriously injured etc., with an emphasis on alcohol and mobile phone usage.
- One city also reports the use of an indicator “road accidents involving children”.
- All police services collect detailed information on the crashes (see police reports) covering the data used in the CARE database; however these data are not generally statistically processed and are not available
- Some cities process their road safety data to identify ‘black spots’ (i.e. locations of frequent crashes/injuries/deaths) in their road network.

Indicators

Number	Indicator	To be calculated by:
	Input indicators	
I1	Total population of the city/FUA *[# inhabitants]*	Urban node
I2	Total road network *[# km]*	Urban node
I3	Number of walking trips per year in the city/FUA *[# 1 000 000 trips]*	Urban node
I4	Number of cycling trips per year in the city/FUA *[# 1 000 000 trips]*	Urban node
I5	Number of trips by e-micromobility per year in the city/FUA *[# 1 000 000 trips]*	Urban node
I6	Number of trips by moped per year in the city/FUA *[# 1 000 000 trips]*	Urban node
I7	Number of trips by motorcycle per year in the city/FUA *[# 1 000 000 trips]*	Urban node
I8	Number of trips by car per year in the city/FUA *[# 1 000 000 trips]*	Urban node
I9	Number of trips by light commercial vehicle per year in the city/FUA *[# 1 000 000 trips]*	Urban node
I10	Number of trips by heavy goods vehicle per year in the city/FUA *[# 1 000 000 trips]*	Urban node
I11	Distance walked per year in the city/FUA *[# 1 000 000 km]*	Urban node
I12	Distance cycled per year in the city/FUA *[# 1 000 000 km]*	Urban node
I13	Distance travelled by e-micromobility per year in the city/FUA *[# 1 000 000 km]*	Urban node
I14	Distance driven by moped per year in the city/FUA *[# 1 000 000 km]*	Urban node
I15	Distance driven by motorcycle per year in the city/FUA *[# 1 000 000 km]*	Urban node
I16	Distance driven by car per year in the city/FUA *[# 1 000 000 km]*	Urban node
I17	Distance driven by light commercial vehicle per year in the city/FUA *[# 1 000 000 km]*	Urban node
I18	Distance driven by heavy goods vehicle per year in the city/FUA *[# 1 000 000 km]*	Urban node
I19	Length of roads with a speed limit of 30 km/h or lower in the city/FUA *[# km]*	Urban node

I20	Length of roads with a speed limit higher than 30km/h and dedicated cycle tracks in the city/FUA *[# km]*	Urban node
I21	Length of roads reserved for cycling or for walking and cycling in the city/FUA *[# km]*	Urban node
	Output indicators	
O1	Number of road crashes per year in the city/FUA *[# crashes]*	Urban node
O2	Number of road crashes resulting in persons seriously or fatally injured per year in the city/FUA *[# crashes]*	Urban node
O3	Number of persons fatally injured in road crashes per year in the city/FUA, broken down by gender, age category, type of vehicle used by the person fatally injured and by the other 'main vehicle' involved in the crash *[# persons]*	Urban node
O4	Number of persons seriously injured in road crashes per year in the city/FUA, broken down by gender, age category, type of vehicle used by the person seriously injured and by other 'main vehicle' involved in the accident *[# persons]*	Urban node
O5	Number of persons fatally injured in road traffic crashes on roads with a speed limit of 30 km/h or lower in the city/FUA per year *[# persons]*	Urban node
O6	Number of persons seriously injured in road traffic crashes on roads with a speed limit of 30 km/h or lower in the city/FUA per year *[# persons]*	Urban node
	Result indicators	
R1	Number of persons fatally injured in road crashes while walking or cycling in the city/FUA *[# persons]*	EC
R2	Number of persons seriously injured in road crashes while walking or cycling in the city/FUA *[# persons]*	EC
R3	Number of persons fatally injured in road crashes while walking or cycling in the city/FUA per million walking and cycling trips per year *[# persons per million trips]*	EC
R4	Number of persons seriously injured in road crashes while walking or cycling in the city/FUA per million walking and cycling trips per year *[# persons per million trips*]	EC
R5	Number of persons fatally injured in road crashes in the city/FUA per 100 000 inhabitants per year *[# persons per 100 thousand inhabitants]*	EC
R6	Number of persons fatally injured in road crashes in the city/FUA per 100 000 inhabitants per year, broken down by gender, age category, and type of vehicle used by the person fatally injured *[# persons per 100 thousand inhabitants]*	EC
R7	Number of persons fatally injured in road crashes in the city/FUA, broken down by gender, age category, and type of vehicle used by the person fatally injured, per million trips with that type of vehicle per year *[# persons per million trips]*	EC
R8	Number of persons fatally injured in road crashes in the city/FUA, broken down by gender, age category, and type of vehicle used by the person fatally injured, per 1 000 000 km driven with that type of vehicle per year *[# persons per million km]*	EC

R9	Number of persons seriously injured in road crashes in the city/FUA per 100 000 inhabitants per year *[# persons per 100 thousand inhabitants]*	EC
R10	Number of persons seriously injured in road crashes in the city/FUA per 100 000 inhabitants per year, broken down by gender, age category, and type of vehicle used by the person seriously injured *[# persons per 100 thousand inhabitants]*	EC
R11	Number of persons seriously injured in road crashes in the city/FUA, broken down by gender, age category, and type of vehicle used by the person seriously injured, per million trips with that type of vehicle per year *[# persons per million trips]*	EC
R12	Number of persons seriously injured in road crashes in the city/FUA, broken down by gender, age category, and type of vehicle used by the person seriously injured, per 1 000 000 km driven with that type of vehicle per year *[# persons per million km]*	EC
R13	Length of roads safe for cycling in the city/FUA *[# km]*	EC
R14	Share of roads safe for cycling in the city/FUA *[% of km of roads]*	EC
R15	Number of fatally injured persons on roads with a speed limit of 30 km/h or lower in the city/FUA per 100 000 inhabitants per year *[# persons per 100 thousand inhabitants]*	EC
R16	Number of seriously injured persons on roads with a speed limit of 30 km/h or lower in the city/FUA per 100 000 inhabitants per year *[# persons per 100 thousand inhabitants]*	EC

Methods of calculation of result indicators

Please note that the equations below could be applied centrally at European level to calculate the values of the result indicators based on input and output data provided by the urban nodes under the input and output indicators.

#	**Method name** (component of indicator)	**Indicator(s)**	**Equation**	**Variables**
M1	Casualties while walking and cycling *[# persons]*	R1 R2	$R1 = O3_{none\ (walking)} + O3_{cycling}$ $R2 = O4_{none\ (walking)} + O4_{cycling}$	- R1 = number of persons fatally injured while walking and cycling per year - R2 = number of persons seriously injured while walking and cycling per year - $O3_{none\ (walking)}$ or $O4_{none\ (walking)}$= number of persons fatally or seriously injured while walking per year

				- $O3_{cycling}$ or $O4_{cycling}$ =number of persons fatally or seriously injured while and cycling per year
M2	Casualties while walking and cycling per million walking and cycling trips *[# persons per million trips]*	R3 R4	$R3 = (O3_{none\ (walking)} + O3_{cycling}) / (I3+I4) * 1\ 000\ 000$ $R4 = (O4_{none\ (walking)} + O4_{cycling}) / (I3+I4) * 1\ 000\ 000$	- R3 = number of persons fatally injured while walking and cycling per million trips - R4 = number of persons seriously injured while walking and cycling per million trips - $O3_{none\ (walking)} + O3_{cyclng}$ = number of persons fatally injured while walking and cycling - $O4_{none\ (walking)} + O4_{cyclng}$ = number of persons seriously injured while walking and cycling - I3 + I4 = number of [1 000 000 trips] while walking and cycling
M3	Casualties per 100 000 inhabitants *[# persons per 100 thousand inhabitants]*	R5 R9	$R5 = O3_{SUM\ all\ vehicle\ types} / I1 * 100\ 000$ $R9 = O4_{SUM\ all\ vehicle\ types} / I1 * 100\ 000$	- R5 = number of persons fatally injured per year per 100 000 inhabitants - R9 = number of persons seriously injured per year per 100 000 inhabitants - $O3_{SUM\ all\ vehicle\ types}$ = number of persons fatally injured per year for all vehicle types - $O4_{SUM\ all\ vehicle\ types}$ = number of persons fatally injured per year for all vehicle types - I1 = number of inhabitants
M4	Casualties by type of vehicle and per 100 000 inhabitants *[#*	R6 R10	$R6_{type\ of\ vehicle} = O3_{type\ of\ vehicle} / I1 * 100\ 000$ $R10_{type\ of\ vehicle} = O4_{type\ of\ vehicle} / I1 * 100\ 000$	- $R6_{type\ of\ vehicle}$ = number of persons fatally injured per year per 100 000 inhabitants by vehicle type

	persons per 100 thousand inhabitants]			- $R10_{type\ of\ vehicle}$ = number of persons seriously injured per year per 100 000 inhabitants by vehicle type - $O3_{type\ of\ vehicle}$ = number of persons fatally injured per year by vehicle type - $O4_{type\ of\ vehicle}$ = number of persons seriously injured per year by vehicle type - I1 = number of inhabitants
M5	Casualties by type of vehicle and per million trips with that type of vehicle *[# persons per million trips]*	R7 R11	$R7_{none\ (walking)} = O3_{none\ (walking)} / I3 * 1\ 000\ 000$ $R7_{cycling} = O3_{cycling} / I4 * 1\ 000\ 000$ $R7_{e\text{-}micromobility} = O3_{e\text{-}micromobility} / I5 * 1\ 000\ 000$ $R7_{moped} = O3_{moped} / I6 * 1\ 000\ 000$ $R7_{motorcycle} = O3_{motorcycle} / I7 * 1\ 000\ 000$ $R7_{car} = O3_{car} / I8 * 1\ 000\ 000$ $R7_{light\ commercial\ vehicle} = O3_{light\ commercial\ vehicle} / I9 * 1\ 000\ 000$ $R7_{heavy\ goods\ vehicle} = O3_{heavy\ goods\ vehicle} / I10 * 1\ 000\ 000$ $R11_{none\ (walking)} = O4_{none\ (walking)} / I3 * 1\ 000\ 000$ $R11_{cycling} = O4_{cycling} / I4 * 1\ 000\ 000$ $R11_{e\text{-}micromobility} = O4_{e\text{-}micromobility} / I5 * 1\ 000\ 000$ $R11_{moped} = O4_{moped} / I6 * 1\ 000\ 000$ $R11_{motorcycle} = O4_{motorcycle} / I7 * 1\ 000\ 000$ $R11_{car} = O4_{car} / I8 * 1\ 000\ 000$ $R11_{light\ commercial\ vehicle} = O4_{light\ commercial\ vehicle} / I9 * 1\ 000\ 000$ $R11_{heavy\ goods\ vehicle} = O4_{heavy\ goods\ vehicle} / I10 * 1\ 000\ 000$	- $R7_x$ = number of persons fatally injured per year per million trips for vehicle type "x" - $R10_x$ = number of persons seriously injured per year per million trips for vehicle type "x" - $O3_x$ = number of persons fatally injured per year for vehicle type "x" - $O4_x$ = number of persons seriously injured per year for vehicle type "x" - I3 to I10 = number of trips with that type of vehicle "x"
M6	Casualties by type of vehicle and per 1 000 000 km driven with that type of vehicle *[# persons per million km]*	R8 R12	$R8_{none\ (walking)} = O3_{none\ (walking)} / I11 * 1\ 000\ 000$ $R8_{cycling} = O3_{cycling} / I12 * 1\ 000\ 000$ $R8_{e\text{-}micromobility} = O3_{e\text{-}micromobility} / I13 * 1\ 000\ 000$	- $R8_x$ = number of persons fatally injured per year per 100 000 km driven for vehicle type "x"

			$R8_{moped} = O3_{moped} / I14 * 1\,000\,000$ $R8_{motorcycle} = O3_{motorcycle} / I15 * 1\,000\,000$ $R8_{car} = O3_{car} / I16 * 1\,000\,000$ $R8_{light\ commercial\ vehicle} = O3_{light\ commercial\ vehicle} / I17 * 1\,000\,000$ $R8_{heavy\ goods\ vehicle} = O3_{heavy\ goods\ vehicle} / I18 * 1\,000\,000$ $R12_{none\ (walking)} = O4_{none\ (walking)} / I11 * 1\,000\,000$ $R12_{cycling} = O4_{cycling} / I12 * 1\,000\,000$ $R12_{e\text{-}micromobility} = O4_{e\text{-}micromobility} / I13 * 1\,000\,000$ $R12_{moped} = O4_{moped} / I14 * 1\,000\,000$ $R12_{motorcycle} = O4_{motorcycle} / I15 * 1\,000\,000$ $R12_{car} = O4_{car} / I16 * 1\,000\,000$ $R12_{light\ commercial\ vehicle} = O4_{light\ commercial\ vehicle} / I17 * 1\,000\,000$ $R12_{heavy\ goods\ vehicle} = O4_{heavy\ goods\ vehicle} / I18 * 1\,000\,000$	- $R12_x$ = number of persons seriously injured per year per 100 000 km driven for vehicle type "x" - $O3_x$ = number of persons fatally injured per year for vehicle type "x" - $O4_x$ = number of persons seriously injured per year for vehicle type "x" - I11 to I18 = number of km driven with that type of vehicle "x"
M7	Length of roads safe for cycling in the city/FUA *[# km]*	R13	R13 = I19 + I20 + I21	- R13= length of roads safe for cycling - I19= length of roads with a speed limit of 30 km/h or lower - I20= length of roads with a speed limit higher than 30km/h and dedicated cycle tracks - I21= length of roads reserved for cycling or for walking and cycling
M8	Share of roads safe for cycling in the city/FUA *[%]*	R14	R14 =(I19 + I20 + I21) / I2 *100	- R13 = share of roads safe for cycling - I19= length of roads with a speed limit of 30 km/h or lower - I20= length of roads with a speed limit higher than 30km/h and dedicated cycle tracks - I21= length of roads reserved for cycling or for walking and cycling

				- I2 = road network *[# km]*
M9	Casualties on roads with a speed limit of 30 km/h or lower per 100 000 inhabitants *[# persons per 100 thousand inhabitants]*	R15 R16	R15 = O5 / I1 * 100 000 R16 = O6 / I1 * 100 000	- R15 = number of persons fatally injured per year on roads with a speed limit of 30 km/h or lower per 100 000 inhabitants - R16 = number of persons seriously injured per year on roads with a speed limit of 30 km/h or lower per 100 000 inhabitants - O5 = number of fatally injured per year on roads with a speed limit of 30 km/h or lower - O6 = number of seriously injured per year on roads with a speed limit of 30 km/h or lower - I1 = number of inhabitants

Definitions of terms and acronyms used

Term	Definition	Source(s)
Bicycle	A road vehicle which has two or more wheels and is generally propelled by the muscular energy of the persons on that vehicle, in particular by means of a pedal system, lever or handle (e.g. bicycles, tricycles, quadricycles and invalid carriages). Included are bicycles with electric pedal assistance (pedelecs).	- Eurostat Glossary for transport statistics, page 37 (5th edition, 2019): https://ec.europa.eu/eurostat/documents/3859598/10013293/KS-GQ-19-004-EN-N.pdf/b89e58d3-72ca-49e0-a353-b4ea0dc8988f
Car	A vehicle used for carriage of passengers, comprising not more than eight seats in addition to the driver's (UNECE category M1).	- UNECE Consolidated Resolution on the Construction of Vehicles (R.E.3), Rev. 6, page 6: https://www.unece.org/fileadmin/DAM/trans/main/wp29/wp29resolutions/ECE-TRANS-WP.29-78r6e.pdf

Casualty	Any person fatally injured or seriously injured as a result of an injury accident	- Eurostat Glossary for transport statistics (5th edition, 2019): https://ec.europa.eu/eurostat/documents/3859598/10013293/KS-GQ-19-004-EN-N.pdf/b89e58d3-72ca-49e0-a353-b4ea0dc8988f
City	A city is a local administrative unit where at least 50 % of the population lives in one or more urban centres (i.e., a cluster of contiguous grid cells of 1 km² - excluding diagonals - with a population density of at least 1,500 inhabitants per km² and collectively a minimum population of 50,000 inhabitants after gap-filling).	- Eurostat glossary (webpage): https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Category:Regions_and_cities_glossary
Cycle track	Independent road or part of a road designated for use by cyclists and sign-posted as such. A cycle track is separated from other roads or other parts of the same road by structural means.	- Eurostat Glossary for transport statistics, page 36 (5th edition, 2019): https://ec.europa.eu/eurostat/documents/3859598/10013293/KS-GQ-19-004-EN-N.pdf/b89e58d3-72ca-49e0-a353-b4ea0dc8988f?t=1568383761000
Cycling	The act of riding a bicycle, i.e., a road vehicle which has two or more wheels and generally propelled by the muscular energy of the persons on that vehicle, in particular by means of a pedal system, lever or handle (e.g. bicycles, tricycles, quadricycles and invalid carriages). Included are bicycles with electric pedal assistance up to 25km/h (pedelecs).	- Eurostat Glossary for transport statistics (5th edition, 2019): https://ec.europa.eu/eurostat/documents/3859598/10013293/KS-GQ-19-004-EN-N.pdf/b89e58d3-72ca-49e0-a353-b4ea0dc8988f
E-micromobility	A motorised, micro-mobility device such as an e-micro-scooter, a segway, a monorail, self-balancing unicycle. The device should have at least one wheel, be designed for one person, and have an electric motor that can achieve a maximum speed of up to 25 km/h.	- CARE DATABASE – CaDaS Common Accident Data Set, page 68/133 (Version 3.8.1, September 2021): https://road-safety.transport.ec.europa.eu/system/files/2023-09/CADaS%20Glossary_v%203_8_1.pdf
Fatal injury	See “person fatally injured”	
Functional urban area (FUA)	A functional urban area consists of a densely inhabited city and a less densely populated commuting zone whose labour market is highly integrated with the city (OECD, 2012).	- Eurostat glossary (webpage): https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Category:Regions_and_cities_glossary
Heavy goods vehicle	A vehicle used for the carriage of goods and having a maximum mass exceeding 3.5 tonnes (UNECE categories N2 and N3).	- UNECE Consolidated Resolution on the Construction of Vehicles (R.E.3), Point 2.3.2. and 2.3.3, page 8:

		https://www.unece.org/fileadmin/DAM/trans/main/wp29/wp29resolutions/ECE-TRANS-WP.29-78r6e.pdf
Injury crash	Any crash (accident) involving at least one road vehicle in motion on a public road or private road to which the public has right of access and resulting in at least one injured or killed person. *A suicide or an attempted suicide is not an accident but an incident caused by a deliberate act to injure oneself fatally (and is therefore not considered an injury crash). However, if a suicide or an attempted suicide causes injury to another road user, then the incident is regarded as an injury crash. Included are collisions: between road vehicles; between road vehicles and pedestrians; between road vehicles and animals or fixed obstacles and with one road vehicle alone. Included are collisions between road and rail vehicles. Multivehicle collisions are counted as only one crash provided that any successive collisions happen within a very short time period. Injury crashes exclude crashes incurring only material damage. Excluded are terrorist acts.*	- Eurostat Glossary for transport statistics (5th edition, 2019): https://ec.europa.eu/eurostat/documents/3859598/10013293/KS-GQ-19-004-EN-N.pdf/b89e58d3-72ca-49e0-a353-b4ea0dc8988f
Light commercial vehicle	A vehicle used for the carriage of goods and having a maximum mass not exceeding 3.5 tonnes (UNECE category N1).	- UNECE Consolidated Resolution on the Construction of Vehicles (R.E.3), Rev. 6, page 8: https://www.unece.org/fileadmin/DAM/trans/main/wp29/wp29resolutions/ECE-TRANS-WP.29-78r6e.pdf
Moped	A two-, three- or four-wheeled road motor vehicle which is fitted with an engine having a cylinder capacity of less than 50cc and a maximum authorized design speed in accordance with national regulations. Where limitations concerning the engine displacement are not applicable a restriction in terms of motor power may be in force. Refers to categories L1 and L2 of the UN Consolidated Resolution on the Construction of Vehicles (R.E.3).	- Eurostat Glossary for transport statistics, page 37 (5th edition, 2019): https://ec.europa.eu/eurostat/documents/3859598/10013293/KS-GQ-19-004-EN-N.pdf/b89e58d3-72ca-49e0-a353-b4ea0dc8988f?t=1568383761000

Motorcycle	A two-, three- or four-wheeled road motor vehicle not exceeding 400 kg of unladen weight. All such vehicles with a cylinder capacity of 50 cc or over are included, as are those under 50 cc which do not meet the definition of moped. Refers to categories L3, L4, L5 , L6 and L7 of the UN Consolidated Resolution on the Construction of Vehicles (R.E.3).	- Eurostat Glossary for transport statistics, page 38 (5th edition, 2019): https://ec.europa.eu/eurostat/documents/3859598/10013293/KS-GQ-19-004-EN-N.pdf/b89e58d3-72ca-49e0-a353-b4ea0dc8988f?t=1568383761000
Pedelec	A type of pedal-assisted bicycle where the electric assistance cuts off when the vehicle reaches approximately 25 km/h (exact limit depends on local regulations). A pedalec only provides assistance when the user is pedalling. Speed-pedelecs are considered separately.	- International Transport Forum (ITF) - Measuring New Mobility Definitions, Indicators, Data Collection, page 20: https://www.itf-oecd.org/sites/default/files/docs/measuring-new-mobility-definitions-indicators-data.pdf
Person fatally injured	Any person killed immediately or dying within 30 days as a result of an injury crash, excluding suicides. Also referred to as 'road deaths' or 'road fatalities'. A killed person is excluded if the competent authority declares the cause of death to be suicide, i.e. a deliberate act to injure oneself resulting in death. For countries that do not apply the threshold of 30 days, conversion coefficients are estimated so that comparisons on the basis of the 30 day-definition can be made.	- Eurostat Glossary for transport statistics, page 73 (5th edition, 2019): https://ec.europa.eu/eurostat/documents/3859598/10013293/KS-GQ-19-004-EN-N.pdf/b89e58d3-72ca-49e0-a353-b4ea0dc8988f?t=1568383761000
Person seriously injured	Any person injured who was hospitalised for a period of more than 24 hours as a result of a road crash.	- Eurostat Glossary for transport statistics, page 73 (5th edition, 2019): https://ec.europa.eu/eurostat/documents/3859598/10013293/KS-GQ-19-004-EN-N.pdf/b89e58d3-72ca-49e0-a353-b4ea0dc8988f?t=1568383761000
Road crash	Any crash (accident) involving at least one road vehicle in motion on a public road or private road to which the public has right of access. Included are: collisions between road vehicles; between road vehicles and pedestrians; between road vehicles and animals or fixed obstacles and with one road vehicle alone. Included are collisions between road and rail vehicles. Multi-vehicle collisions are counted as only one crash provided that any successive collisions happen within a very short time period.	- Eurostat Glossary for transport statistics (5th edition, 2019): https://ec.europa.eu/eurostat/documents/3859598/10013293/KS-GQ-19-004-EN-N.pdf/b89e58d3-72ca-49e0-a353-b4ea0dc8988f

	(Road) crashes include crashes incurring only material damage.	
Serious injury	See “person seriously injured”	
Speed-pedelec	A type of pedal-assisted bicycle where the electric assistance cuts off when the vehicle reaches approximately 45 km/h (exact limit depends on local regulations). A speed-pedelec only provides assistance when the user is pedalling.	- International Transport Forum (ITF) - Measuring New Mobility Definitions, Indicators, Data Collection, page 20: https://www.itf-oecd.org/sites/default/files/docs/measuring-new-mobility-definitions-indicators-data.pdf
Total population	The total number of inhabitants (usual resident population) of a given area (Functional Urban Area or city): the number of inhabitants on 1st January of the year in question (or, in some cases, on 31st December of the previous year).	- Eurostat glossary (webpage): https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Population_figure
Walking	The act of moving on foot using muscular energy. For the purposes of this document, it includes the use of a wheelchair or mobility aid.	