
Measuring road safety performance within Europe: first lessons from the Baseline project

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Abstract

The European Commission has put forward a new approach to EU road safety policy for the decade 2021-2030, highlighting the need for a range of key performance indicators (KPIs) for road safety at national and European level. These indicators are directly related to the prevention of road accident fatalities and serious injuries. Funding has been provided by the European Commission to support EU Member States in collecting and analysing data needed to obtain values for indicators related to infrastructure safety, vehicle safety, safe road use including speed, alcohol, distraction and the use of protective equipment, and emergency response. A common methodology has been developed. The presentation will discuss the methodological and practical challenges involved in the data collection and analysis. First results from the project will be presented, allowing to analyse differences in road safety performance across European countries.

Keywords

Key Performance Indicators; Road Safety, European Commission

Introduction

The European Commission has the long-term goal to achieve Vision Zero: 50% less fatalities and serious injuries by 2030 and zero fatalities and serious injuries by 2050 (European Commission, 2018). However, over the past decade (2010 – 2020), the number of road deaths were reduced by only 36%, which means that the EU did not reach the estimated 50% for that decade (European Commission, 2021). It is thus essential that road crashes are continuously investigated and monitored in order to better understand the characteristics of road fatalities and the implementation of the appropriate mitigation measures.

Basic indicators such as the number of road crash deaths or serious injuries do not explain the relative importance of the different causes of the crashes and to what extent remedial actions and countermeasures have been successful. In order to gain a better understanding of the different factors that influence overall safety performance, the European Commission has developed a list of European road safety performance indicators (Key Performance Indicators, or KPIs). The list of the KPIs is given in Table 1. These indicators are directly related to the prevention of road accident fatalities and serious injuries. The minimum requirements for these KPIs are described in a document of the European Commission (European Commission, 2019).

Table 1. List of European KPIs for road safety

KPI area	KPI definition
Speed	Percentage of vehicles travelling within the speed limit
Safety belt	Percentage of vehicle occupants using the safety belt or child restraint system correctly
Protective equipment	Percentage of riders and passengers of PTWs and bicycles wearing a protective helmet
Alcohol	Percentage of drivers driving within the legal limit for blood alcohol content (BAC)
Distraction	Percentage of drivers not using a handheld mobile device
Vehicle safety	Percentage of passenger cars with a Euro NCAP safety rating equal or above a threshold
Infrastructure	Percentage of distance driven over roads with a rating above an agreed threshold
Post-crash care	Time elapsed between the emergency call following a collision resulting in personal injury and the arrival at the scene of the collision of the emergency services

In order to collect and report these road safety indicators in a harmonized way across all Member States, and to contribute to building the capacity of those Member States which have not yet collected the relevant data for the KPIs, the European Commission started the project 'Baseline'. Eighteen EU Member States are participating in the project: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Finland, Germany, Greece, Ireland, Latvia, Lithuania, Luxembourg, Malta, The Netherlands, Poland, Portugal, Spain, and Sweden. Member States who are participating in the project are required to deliver at least 5 of the 8 KPIs in order to receive a grant.

Table 2 shows the KPI values that will be delivered by the participating EU Member States. These KPI values, and their different breakdowns, will be integrated in a common database. The data collection will be finalised in September 2022.

Table 2. Provision list of KPIs that will be included in the European database

Country	Speed	Safety belt	Protective equipment	Alcohol	Distraction	Vehicle safety	Infrastructure	Post-crash care
Austria	x	x	x	x	x	x		x
Belgium	x	x	x	x	x	x		x
Bulgaria	x	x	x	x	x	x		
Cyprus	x	x	x	x	x	x	x	x
Czech Republic	x	x	x	x	x	x		x
Finland	x			x	x	x	x	x
Germany		x	x	x	x	x		x
Greece	x	x	x	x	x	x		x
Ireland	x	x	x	x	x	x		
Latvia	x	x	x	x	x	x	x	x
Lithuania	x	x			x	x	x	x
Luxembourg				x				
Malta	x	x	x	x	x	x		x
Poland	x	x	x	x	x			
Portugal	x	x	x	x	x	x	x	x
Spain	x	x	x	x	x	x		
Sweden	x	x	x	x	x	x	x	x
The Netherlands	x	x		x	x	x		x
	16	16	14	17	17	15	6	13

Methodology

Organisation of the project

Figure 1 gives a schematic overview of the organization of the project. Vias institute from Belgium is the project coordinator, supported by SWOV from The Netherlands and NTUA from Greece.

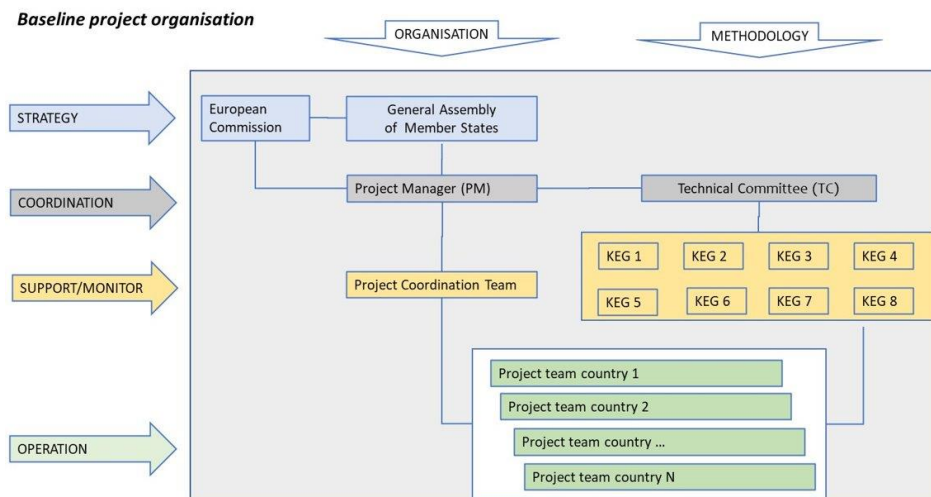


Figure 1: organisation of the Baseline project

In order to protect the methodology of Baseline and to discuss case studies from Member States, two types of teams were developed: the Technical Committee and the KPI Expert Groups.

The Technical Committee (TC) consists of experts from the participating Member States. These experts' combined expertise covers all 8 KPIs. They are familiar with the different processes and methods that are needed for road safety KPIs. The main role of the TC is to:

- Ensure consistency in the development of methodological guidelines and guidance to participating Member States
- Monitor the methods used for data collection and processing in the Member States
- Ensure consistency in the interpretation of the KPI data provided by Member States

Besides the Technical Committee, each KPI is also assisted by a 'KPI Expert Group' (KEG). Each KEG consists of a few experts and is coordinated by a staff member of Vias institute. The role of the KEG is to

- Develop methodological guidelines (sample size, observation locations, observation methods, other data collection methods, data processing, data weighting and aggregation, types of indicators, ...)
- Give advice to Member States on scientific, technical and practical issues that may arise in relation to the design and implementation of the data collection processes, on the data processing and its interpretation

Development process for the common methodology

Several EU Member States have already considerable experience in collecting road safety performance indicators for their national policies, in order to measure progress and to assess the effectiveness of road safety initiatives. Such indicators contribute to the understanding of the different issues that influence overall road safety performances and they help to underpin road safety policies. However, for other EU Member States the systematic collection and analysis of data for such safety performance indicators had not yet started. In order to understand the level of expertise available in each Member State as well as their need for methodological support, a survey was conducted to get insights in the existing data collection methods already used for the estimation of KPIs. The results of this survey, alongside with international guidelines and methodologies available in the literature, led to the preparation of the methodological guidelines for each KPI for the Member States.

The methodological guidelines for each KPI include recommendations concerning the data collection (sample size, observation locations, observation methods, use of existing data sources, etc.), as well as the statistical analysis of the data for the calculation of the KPIs (data processing, weighting, aggregation, types of indicators, etc.). The definitions and the minimum data requirements set by the European Commission for the calculation of the KPIs, as described in a Commission Staff Working Document (European Commission, 2019) have been taken as basis for the development of the methodological guidelines. The best national practices observed in the EU and existing documents (e.g. Hakkert, A.S. & Gitelman, 2007, Schulze, H. et al., 2012, European Commission, 2017, Vollrath, M. et al., 2019, Van den Berghe, W. et al., 2020) were considered when drafting the guidelines. Specific guidelines and templates have been developed for data reporting, weighting of observations and data quality assurance. Draft versions of the guidelines were submitted to the participating Member States for feedback, in particular in relation to clarity and feasibility; this feedback has been incorporated in the final version of the guidelines. The methodological guidelines for each KPI are available on the Baseline website (baseline.vias.be) and are listed under the References. The guidelines will be updated at the end of the project, reflecting practices adopted by Member States during the project.

Example: methodological requirements for the KPI “Driving under the influence of alcohol”

The KPI for driving under the influence (DUI) of alcohol (Boets et al., 2021b) is defined as the “percentage of drivers driving within the legal limit for blood alcohol content (BAC)”. For the data collection, three possible types of measurement method are considered:

- Random breath testing, i.e. roadside breath testing of randomly selected drivers
- Breath testing results from enforcement actions (even if not random)
- Self-reported behaviour through anonymous surveys

The EC expresses a clear preference for a KPI based on random breath testing, as this is generally considered to deliver an accurate picture of the situation. However, as random testing is not allowed in some Member States, breath testing results from enforcement actions is considered the second best option. If neither of these two options is feasible, data from self-reported behaviour based on anonymous surveys is also accepted by the EC.

Information of random breath testing is gathered by means of roadside surveys in cooperation with the police. During a roadside survey, drivers are randomly selected and stopped. The alcohol level of each of these stopped drivers is assessed by means of alcohol breath testing. Some basic information about the driver (e.g. age, gender) and the trip (e.g. length, motive) can optionally be observed or asked. Drivers need to be sampled randomly, meaning that the selection of drivers is irrespective of possible suspicion for DUI. The minimum requirement for vehicle types is the inclusion of passenger cars. Goods vehicles, buses and motorcycles are optional supplementary vehicle categories.

The roadside survey should provide a representative sample of all traffic in the study region. This covers in most countries three main road types: motorways, rural non-motorway roads (defined as roads outside built-up area) and urban roads (defined as roads inside built-up areas). The selection of locations should be as random as possible, covering the geographical area of the country. Separate results are also required for night hours and day time hours as well as for weekdays and weekend days. Data collection should also be carried out during late spring or early autumn.

The national KPIs on alcohol are expected to be estimated separately according to the following minimally required parameters:

- Road type (3 levels: motorways (only for motorcycles), rural roads, urban roads)
- Time Period (4 levels: night/day x week/weekend).

Results

Mainly because of the COVID-pandemic, data collection for the KPIs was delayed in most Member States. Most roadside surveys and other data collection process for the KPIs took place in autumn 2021 and spring and summer 2022. The first results will be made public during the General Assembly on the 19th of October.

Conclusions and next steps

Continuous and systematic monitoring of road safety performance will allow for a better understanding of road crash causes and the implementation of the proper measures and policies in order to prevent these causes. To measure progress, the most basic and important indicators are the numbers of road crash deaths and serious injuries. However, in order to gain a better understanding of the different factors that contribute to overall road safety performance, KPIs which refer to main road safety challenges are crucial. The Baseline project allows the collection of representative and comparable KPIs among EU countries, which will constitute the basis for monitoring and evaluating the road safety progress at national and EU level over the decade 2021-2030, will facilitate the formulation of targets at European and national level, and will support decision makers in deciding on the most appropriate measures to be taken to improve road safety. Several EU countries (e.g. Austria, Belgium, Greece, Latvia, Sweden, ...) have integrated the monitoring of the KPIs in their road safety strategy; for some of them this was a direct result of the involvement in the Baseline project. The scope of Baseline 1 did not include the evaluation of the impact of each KPI on the percentage of deaths and serious injuries. These evaluations would require individual studies which could not be combined with the difficult task to develop and execute a common methodology across the different Member States for 8 KPIs.

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