



Setting up road safety reliable, harmonized and comparable data systems and sharing at regional level

## Final Report

**On existing best practices, methods and tools for collection and processing reliable data, Diagnosis of the current situation in EuroMed Partner countries and Recommendations on the way forward**

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## LIST OF ABBREVIATIONS

CADaS	Common Accident Data Set
CARE	Community Road Accident Database
EC	European Commission
EKAB	National Center of Emergency Help - Greece
ELSTAT	Hellenic Statistical Authority
ERSO	European Road Safety Observatory
EU	European Union
EuroMed RRU	EuroMed Road Rail Urban Transport
EuroMed TSP	EuroMed Transport Supports Project
FIA	Federation Internationale de l'Automobile
ICD	International Classification of Diseases
IRTAD	International Traffic Safety Data and Analysis Group
IRF	International Road Federation
ITF	International Transport Forum
NTUA	National Technical University of Athens
OECD	Organization for Economic Co-operation and Development
RTAP	Regional Transport Action Plan
SSATP	Sub-Saharan Africa Transport Policy Program
TEN-T	Trans-European Transport Network
TMN-T	Trans-Mediterranean Transport Network
UfM	Union for Mediterranean
UNECE	United Nations Economic Commission for Europe
UNESCWA	United Nations Economic and Social Commission for Western Asia
VRD	Vital Registration Data
WHO	World Health Organization
WP.6	Working Party on Transport Statistics of the UNECE



## EXECUTIVE SUMMARY

Road Safety is acknowledged as a priority issue in the EuroMed partner countries, however, the **collection of credible road safety data is a major challenge**. Moreover, there are serious **discrepancies between the official data of 2013 of most EuroMed Partner Countries, with the respective WHO assessment** included in its Global Status Report of Road Safety 2015, concerning the same year.

In this context, the present EuroMed TSP Activity 1A.2.6. b consists of provision of **TA on setting up road safety reliable, harmonized and comparable data collection system to EuroMed Partner Countries and sharing at regional level**. Among the major objectives of this activity are:

- to identify the methods of road safety data collection in the concerned Partner Countries (diagnosis);
- to report on the existing best practices, methods and tools at national, European and international, including those of the European Road Safety Observatory (ERSO), the Community Road Accident Database (CARE), WHO, International Traffic Safety Data and Analysis Group (IRTAD) of ITF-OECD, UNECE and UN SafeFits project;
- to understand the differences of the gaps between WHO and national statistics of the concerned EuroMed Partner Countries and bridge them;
- while at the same time promote collection and processing of harmonized, credible and comparable road safety data in the region.

The implementation of this activity includes TA missions, organization of national Ad-hoc seminars and working meetings with experts from the competent authorities and key stakeholders, recommendations and reporting as well as provision of advice and support.

In addition, the interest expressed by the UfM and FIA in developing Road Safety Observatories in Mediterranean, as well that of the UNESCWA in the same direction, was considered as important initiative that could build on the results of the present activity providing for their sustainability, thus possible synergies are explored.

The activity started with a review of international good practice and the establishment of cooperation with International Organisations with important knowledge and experience regarding the improvement and harmonisation of road crash data. Particular emphasis was placed in the European experience, namely the CARE database with comparable and harmonised road crash data, on the basis of the specially developed European CADaS protocol, as well as the European Road Safety Observatory. Moreover, WHO methodologies and recommendations for road crash data systems were extensively analysed, particularly as regards the methodologies used for the Global Status Report on Road Safety. In this context, the importance of collecting, in addition to Police data, also Health Sector / Vital Registration Data was highlighted, as the latter constitute the source of WHO estimated fatalities. Moreover, if a country VRD are unavailable or of insufficient quality, a model-based estimate is used.



Additional experiences and good practices are also drawn from the UNECE, namely through the Glossary for Transport statistics, as well as other International Organisations and relevant initiatives (e.g. FIA, IRTAD, IRF, World Bank, SaferAfrica Project, etc.).

The methodology of this activity for the analysis of road crash data systems in the EuroMed region was complemented with a '**diagnosis' questionnaire**', developed on the basis of international good practice criteria. The questionnaire formed the backbone of the consultations carried out with road safety stakeholders in the EuroMed partner countries, during missions in the countries. International cooperation was further strengthened through **multi-disciplinary national workshops, an inter-agency meeting bringing together international players, and a regional workshop on road safety data**.

Following the country responses to the questionnaire, and the additional detailed information and data collected during the consultations, a **country 'diagnosis'** was carried out. For each country, a detailed description and assessment of the reliability, comparability and robustness of the existing road crash data systems is presented, covering both Police and Health / VRD sectors data. Moreover, data analysis, publication and sharing practices are described and evaluated. Focus was placed on the identifications of the reasons for the discrepancy between country reported fatalities and WHO estimated fatalities for the EuroMed countries, as well as the specific ways to bridge the discrepancies. Main findings for each country are outlined below.

In **Algeria**, there is a dual data collection flow by the Police and the Gendarmerie, however the two agencies have not fully harmonised their means and procedures (for instance, electronic means for data collection and GPS are used only by Gendarmerie). A system is under development, namely a central database that will be powered and operated in real time by all the police services. The definition of person killed at 30-days is applied in the country, but it is not clear whether full follow-up is made. The road crash statistics on the country are regularly published on-line, and it is reported that the data is used by several stakeholders for policy making and user education. Regarding VRD, there is lack of completeness in the related records: only 40% of deaths are collected by the cause of death registry from all causes, the main reasons being the lack of training and skills.

A unique context exists in **Egypt**, as road safety data collection is fragmented between three different key stakeholders, each one managing crash casualties within a different time frame

- The Traffic Police is responsible for recording only fatalities 'on the spot';
- The Egyptian Ambulances Organisation (EOA) records any fatalities that occur during the transfer (pre-hospital);
- The Ministry of Health, through Hospitals, records fatalities once admitted to a hospital and thereafter, without a time limit;

However, unlike most countries, the Ministry of Health (Hospitals) are responsible for the follow-up of crash casualties for the 30-day period and the related update to the Police. Moreover, in practice this is done to a very small extent. The VRD of Egypt are already



sufficiently complete for the country to be classified in WHO Group 1. Nevertheless, there may be potential for further improvement, as for instance there are concerns in the country that after a few weeks following the crash, the initial cause of injury may not be assigned to the related death. In addition, follow-up is needed in a future mission in order to promote the strengthening of cooperation between Police, Health and VRD sectors, which is currently limited.

In **Jordan**, a new system is in place in the recent years (achieved national coverage on 2015) with electronic data recording and on-line transmission to the central database. Extensive training procedures are in place for implementing the procedures. Police data are in accordance with the 30 days definition and a systematic follow-up is made. Some under-reporting may be mostly due to heavy workload / limited capacity of the Police - but this is estimated to be low. Regarding the Health Sector / VRD information, in Jordan there is a satisfactory quality of VRD and regular publication of mortality statistics, and it is considered that the country is currently relatively close to meeting the WHO data quality thresholds. Most importantly, there are known reasons for the under-estimation of cause of death due to traffic accidents and stakeholders in the country are engaged to their further investigation.

In **Lebanon**, there is currently no limit (e.g. 30 days) assigned to road fatalities recording by the Police, as the process is closely linked to the court investigation. A proposition for an updated Data Collection Form was been made, with the explicit purpose to allow better analyses of the causes of the crash and remove the focus of data recording from the purpose of assigning the blame for the court (expected within 2018-2019); this is an important and much needed step. In addition, under-reporting is recognised as an important issue in the country, and it is considered due mostly due to heavy workload / limited capacity of the Police. Regarding the Health sector / VRD, the published country data are very incomplete, and further investigations are required to identify reasons and actions needed to initiate improvements.

**Morocco** has a systematic multi-sectoral framework for road safety data collection, validation and sharing. There is systematic cooperation between the Police, Health and Transport sector with respect to the validation and publication of road crash statistics; however, the VRD sector is not involved. The country uses the 30-days definition for road fatalities as well as a concrete definition of serious injury (hospitalized more than 6 days). Although no electronic means are used, the National Data Collection Form and database are very complete. A considerably "open" data culture exists in the country, with systematic publication of crash statistics, data exchange between some stakeholders etc. On the other hand, there is a serious concern regarding the VRD in Morocco.

In **Tunisia**, the Garde nationale and the National Observatory host the national database and are the key stakeholders dealing with road crash data. Although a regular publication of road safety statistics is made through the Observatory, together with several important awareness raising and education initiatives, there are several challenges to be addressed. Most importantly, although a data collection form exists, it is currently not used at the crash site; Police officers draft a report with no predefined format, and the information there-in is subsequently used to fill the data collection form in the Office. The 30 days definition is used,



however there is some uncertainty about the completeness of the data. Under-reporting is openly recognised as an issue. Regarding VRD data, it was reported that not all causes of death and types of injury are properly defined, and there is a significant delay in the publication of complete statistics (hence the country data do not meet WHO standards).

Several **recommendations to the EuroMed partner countries** are made in this report for the improvement of their road crash data systems based on the international good practice, also taking into account the country-specific elements. There are important past and ongoing efforts in all countries to improve their data systems, and several good practice elements for each country to demonstrate. Consequently, there are **considerable opportunities for transfer of knowledge between countries in the EuroMed region**. However, at the same time there are important challenges remaining to be addressed and elements needing improvement in all countries, namely:

- The adoption of the definition of **person killed in 30 days** is still pending in some countries;
- Achieving a **systematic follow-up** on crash casualties for 30 days, as a responsibility of the Police;
- Establishment or upgrade of a **formal National Data Collection form** for road crashes;
- Adoption of **international definitions and protocols for road crash data** (in addition to fatality, also accident, injury severity, and main crash / driver / vehicle characteristics);
- Strengthening of **cooperation and exchange of knowledge and data between Police, Transport and Health Sectors** (and possibly also Insurance Sector), through the establishment of a formal multi-sectoral committee or body.
- Estimation of road crash casualty **under-reporting** through the linkage and cross-checking of Police and Health Sector (and possibly also Insurance Sector);
- Improvement of the **quality of VRD to meet the WHO criteria**;
- Promotion of “open” data culture through systematic data publication and sharing between all relevant stakeholders and the general public at national level;
- Establishment of a **national observatory**;
- Pursuing of cooperation and data / knowledge sharing in the region with the ultimate objective of establishing a **regional observatory** with harmonised and comparable road crash data for the EuroMed region.

A **road map on the way forward** is presented, with concrete actions for all parties involved during the next stages of the project. This road map was drafted and adopted during the EuroMed TSP regional workshop in Athens, Greece, on May 2018. In this framework, the next steps of the present activity can be outlined as follows:



- The EuroMed project will provide a **recommendation for a common dataset with harmonized definitions** in the region, in accordance with other relevant initiatives internationally.
- The project will issue a **joint EuroMed / WHO leaflet on understanding and bridging the difference between country reported and WHO estimated fatalities**.
- The EuroMed TSP will provide **continuous technical assistance to the EuroMed partner countries** on improving their data, applying international definitions and standards, as well as on bridging the difference between WHO and country statistics
- The EuroMed TSP will continuously update countries about international developments on road safety data systems and **facilitate countries contact and cooperation with international organizations** (EC-DGMOVE, WHO, UNECE etc.)

For the **implementation of the road map**, the EuroMed partners countries have confirmed their readiness to proceed to several activities:

- To **provide to the EuroMed TSP any necessary additional information** on their data collections systems;
- To **establish inter-sectoral cooperation**, for the implementation of linking and cross-checking data from different sectors. Furthermore, to define their targets as regards the WHO and national data discrepancy and implement the necessary steps for bridging it.
- To **exploit forthcoming EuroMed publications** for implementing concrete actions for the improvement and harmonisation of road crash data.
- To pursue the **setup of national road safety observatories**.



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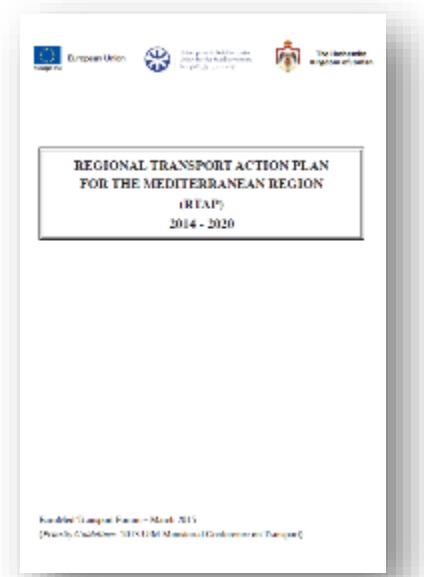
# 1. BACKGROUND AND OBJECTIVES

## 1.1. The EuroMed Transport Support Project

The Ministers responsible for Transport of the Union for the Mediterranean (UfM) have agreed on the importance of Euro-Mediterranean transport cooperation founded on the two complementary pillars: (i) regulatory reform and convergence in all relevant different transport sectors (maritime, civil aviation, road, railway and urban transport); and (ii) establishment of the future Trans-Mediterranean Transport Network (TMN-T), to be connected with the Trans-European Transport Network (TEN-T). To this end, two Regional Transport Action Plans (RTAPs) have been elaborated by the Euro-Mediterranean Transport Forum for the Mediterranean Region, the first RTAP concerning 2007-2013 and the new one for the period 2014-2020.

To complement the work of the EuroMed Transport programme in the land transport sector and assist the implementation of the RTAPs, the European Union has launched two EuroMed Regional Transport Projects:

- The “**Road, Rail and Urban Transport**” (**EuroMed RRU**) that lasted 5 years (2012-2016), aimed at supporting the implementation of the Trans Mediterranean Transport Network (TMT-N) by developing appropriate regulatory framework and operational conditions to facilitate cross-border transport, to enhance land transport safety and to promote sustainable and efficient urban transport.
- The “**EuroMed Transport Support Project**” (**EuroMed TSP**), started in January 2017 and will last 4 years, aiming to increase the sustainability and performance of transport operations in the Mediterranean region through increased safety in transport operations; increased efficiency / lower costs of transport; lower environmental impact of transport, thus contributing to regional economic integration, economic well-being and job creation. The project covers Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, State of Palestine and Tunisia.



**Action 10 of the 2014-2020 RTAP for the Mediterranean Region**, inter alia, calls upon the EuroMed Partner Countries pursue efforts for setting-up a reliable data collection system on road fatalities and serious road accidents, including where possible on their causes, to facilitate data comparison. It also encourages them to share their national data at regional level, similarly to the practice of the European Road Safety Observatory and the Community Road Accident Database (CARE).



## 1.2. Road safety data in the EuroMed partner countries

Road safety related data are used by the police, transport authorities, health facilities, insurance companies and policymakers. Reliable road traffic crash data are key to identifying risks, developing strategies and interventions to address those risks, and evaluating the impact of interventions. Road traffic data are also important in persuading political leaders that road traffic injuries are a priority issue. These data can also be used in the media to make the public more aware of legislation and changes in behaviour that will improve their safety.

Following a first round of EuroMed country visits and discussions with the MOT and key stakeholders aimed at identifying country priorities in which TA from the EuroMed TSP would be required, during the inception period (Jan-March2017), it has become evident that for Tunisia and Morocco, Road Safety is priority, while for Jordan, Egypt and Lebanon it is also among the main issues to be addressed under EuroMed TSP. However, for all these countries **collection of credible road safety data is a major challenge**.

Moreover, as reflected in the below table, there are serious **discrepancies between the official data of 2013 of most EuroMed Partner Countries, with the respective WHO assessment** included in its Global Status Report of Road Safety 2015, concerning the same year.

Table 1.1. Country official fatality data and WHO estimated fatalities (GSRRS, 2015)

Country	Official Data	WHO Report	Difference in %
<b>Egypt</b>	6.700	10.466	56
<b>Lebanon</b>	649	1.088	68
<b>Tunisia</b>	1.505	2.679	78
<b>Morocco</b>	3.832	6.870	79
<b>Algeria</b>	4.540	9.337	105
<b>Jordan</b>	768	1.913	149

## 1.3. The Road Safety Data Activity

Activity 1A.2.6. b consists of provision of **TA on setting up road safety reliable, harmonized and comparable data collection system to EuroMed Partner Countries and sharing at regional level**. Among the major objectives of this activity are:

- to identify the methods of road safety data collection in the concerned Partner Countries (diagnosis);
- to report on the existing best practices, methods and tools at national, European and international, including those of the European Road Safety Observatory (ERSO), the



Community Road Accident Database (CARE), WHO, International Traffic Safety Data and Analysis Group (IRTAD) of ITF-OECD, UNECE and UN SafeFits project;

- to understand the differences of the gaps between WHO and national statistics of the concerned EuroMed Partner Countries and bridge them;
- while at the same time promote collection and processing of harmonized, credible and comparable road safety data in the region.

The implementation of this activity includes TA missions, organization of national Ad-hoc seminars and working meetings with experts from the competent authorities and key stakeholders, desk work, recommendations and reporting as well as provision of advice and support.

In addition, the interest expressed by the UfM and FIA in developing Road Safety Observatories in Mediterranean, as well that of the UNESCWA in the same direction, was considered as important initiative that could build on the results of the present activity providing for their sustainability, thus possible synergies will be explored.

## 1.4. Objectives

The objective of this report is **the analysis of road safety data in the EuroMed Partner Countries (diagnosis), in order to identify strengths, weaknesses, priorities in road safety data improvement and opportunities for transfer of knowledge between countries** in the region. More specifically, the analysis aims to:

- assess the methods for collection, processing, storage and analysis of road crash statistics, as well as the definitions and other properties of road crash data collected.
- assess the level of data sharing, through publication, exchange of knowledge and experiences and intersectoral cooperation, both at national and international level.
- place emphasis on the discrepancy between country reported and WHO estimated fatalities in each country, the identification of main causes and the potential for bridging the difference.

## 1.5. Structure of the report

The present report is structured as follows:

**Chapter 2** presents a review of international good practice for the establishment of reliable, comparable and harmonised road safety data and sharing at international level. First, a summary of current data quality challenges is provided. Moreover, key international experiences and recommendations are presented, with emphasis on the European experience with the CARE road crash database and the European Road Safety Observatory, as well as other relevant initiatives. Main WHO methodologies and recommendations are also outlined.



**Chapter 3** presents the methodology of this activity for the analysis of road crash data systems in the EuroMed region. The developed 'diagnosis' questionnaire is described. Moreover, the missions carried out are outlined. Finally, the international cooperation established with key international players is described, as well as the main international workshops and meeting held within the project activity.

**Chapter 4** presents the results of the country 'diagnosis' based on the analysis of the questionnaire responses as well as the additional information collected during the country missions and project workshops. For each country, a detailed description and assessment of the reliability, comparability and robustness of the existing road crash data systems is presented, covering both Police and Health / VRD sectors data. Moreover, data analysis, publication and sharing practices are described and evaluated.

**Chapter 5** focuses on the detailed analysis of the discrepancy between country reported fatalities and WHO estimated fatalities for the EuroMed countries. Following on the presentation of WHO methodologies in Chapter 3, the EuroMed countries data sent to WHO are analysed in order to derive the causes of the discrepancy in each case. Furthermore, specific ways to bridge the discrepancies are suggested.

**Chapter 6** concerns a synthesis of the activity results, presented as a comprehensive 2-page 'diagnosis' for each country, including a summary of main country characteristics and challenges, as well as a concrete outline of good practice elements, and elements needing improvement.

**Chapter 7** summarises the recommendations to the EuroMed partner countries for the improvement of their road crash data systems based on the international good practice, also considering the country-specific elements. A road map on the way forward is presented, with concrete actions for all parties involved during the next stages of the project.



## 2. REVIEW OF INTERNATIONAL GOOD PRACTICE

### 2.1. Road safety data challenges

It is increasingly acknowledged that an effective road safety management system has to be based on evidence. Road safety policy makers require quantitative assessments of the likely impacts of their policies, in order to measure and characterise the road safety problem, to support the development of measures, to form the basis of demanding but achievable targets or to measure outcomes. More specifically, in an effective road safety policy implementation process several stages are involved, and the use of road safety data is involved in each one of these stages (ITF, 2012; Bliss & Breen, 2009; Papadimitriou & Yannis, 2013):

- Vision and strategy;
- Problem identification;
- Target Setting and priority setting;
- Development of measures to address the road safety problems;
- Establishing and implementing the programme;
- Monitoring of progress and evaluation of outcomes

Crash and casualty data are gathered as part of the routine Police procedures when investigating a road crash. A first issue to be considered is whether a noteworthy number of crashes is not recorded by the Police, either because the Police is not notified, or because the registration procedure is not properly followed. Additionally, several typical problems in the data quality domain commonly emerge. First of all, **international definitions of key road safety indicators (e.g. accident, fatality as a person killed within 30 days from the crash)** are not adopted or not properly implemented.

Second, there is still lack of several key data elements required to support policy making, and it has been noted that the most useful data are often the least available (e.g. crash location, alcohol impairment, use of seat belt or helmet). Moreover, in some cases, **the level of disaggregation of data is insufficient**, not allowing to analyse the data jointly per different road, vehicle or user characteristics. In other cases, **data may be inaccessible** or lacking the necessary meta-data (e.g. description of definitions and protocols used) (Thomas et al. 2005).

Another typical problem of road safety data analysis is that **data is often not comparable / transferable**; this is the case when working with numerous road safety data systems in the same country or with data from different countries - in both cases due to differences in definitions, data collection methods, and the level of data quality control used in the different systems.

International experiences in Europe and beyond suggest that the task of addressing gaps and limitations of an existing national data system can be very demanding by itself, requiring



significant workload and coordination among the numerous stakeholders typically involved in road safety data management in the country (WHO, 2011).

At the same time, **the issue of under-reporting** warrants special attention, as it not only masks the true extent of the problem, thereby undermining the efforts for improvement, but also it poses questions regarding the reliability of the data collection system in international organizations. For instance, it is due to the importance of under-reporting at global level, that the World Health Organisation provides, in addition to the 'country reported' fatalities, another 'WHO estimate' of fatalities, inevitably based on a mathematical formula for many countries with substandard data collection systems, especially as regards health sector and Civil Registration systems (WHO, 2015).

Under-reporting of road traffic fatalities represents a real challenge on the quality data collection in all countries, and there are several reasons for it.

For example, known difficulties with Police reported data in most countries are:

- The non-use of the 30 days definition;
- The insufficient follow-up of traffic casualties up to 30 days;
- Some road crashes are just not reported to the Police ('real' under-reporting);
- Some crashes are reported, but the Police cannot go to the crash scene and follow them due to non-adequate human resources;
- While the Police goes to the crash, does not properly register the incident due to lack of competence, insufficient training or skills.

Similarly, known difficulties with the Health Sector VRD reported data in most countries are:

- The non-use of international protocols for the classification of causes of death;
- Lack of knowledge of health sector practitioners in properly assigning cause of death (especially outside public hospitals);
- Lack of skills in drafting death certificates according to WHO standards;
- Poor coordination between central and local authorities in the collection and processing of VRD.

Therefore, the cooperation between different sectors and the cross-validation of data from different sources, is an important step towards understanding and addressing the challenges leading to improved quality of the data of all sectors.

However, there are **several common misunderstandings regarding the sources of under-reporting and the possible solutions**, and a key issue for improving national data in any country is the understanding of the problem and the resulting discrepancies between WHO estimates and country estimates, as well as the implementation of WHO and other international recommendations.

The project will build on the **international experience** on setting up complete, reliable and exhaustive road crash data systems, by addressing the gaps and limitations of existing data systems. In this framework, the project exploits knowledge and experiences from key international systems and protocols, in which the project team had strong involvement, namely:



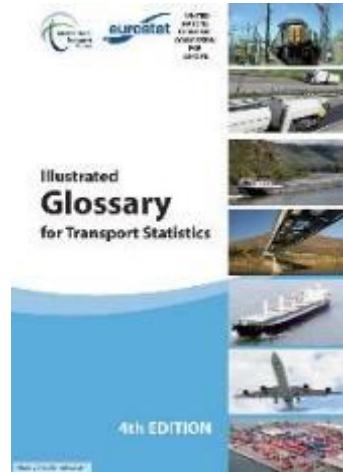
- The integration of European Member States road crash data in the common CARE database;
- The development and progressive adoption at European level of the European CADaS protocol for road crash database record layout (European Commission, 2016);
- The WHO recommendations for the development of road safety data systems (WHO, 2011);
- The OECD / IRTAD database experience, namely the data validation for country accession protocols (IRTAD, 2016).

Other international experiences and initiatives, as well as relevant stakeholders, were taken account as well. In the following sections, a summary of key experiences and relevant recommendations is provided, on which the present activity builds upon.

## 2.2. The UNECE Glossary for Transport Statistics

The UNECE Working Party on Transport Statistics (WP.6) is an intergovernmental body dealing with the development of appropriate methodologies and terminology for the harmonization of statistics as well as the collection of data from member States and the dissemination of these data:

- Development of appropriate and common methodologies and terminology for the harmonization of statistics. This includes: methodologies for the collection and compilation of statistics on road, rail, inland waterway, pipeline and combined transport as well as on road traffic accidents, in cooperation and coordination with other UNECE bodies, related international organizations, in order to promote the availability of comprehensive and reliable statistics for sustainable transport planning and analysis and to improve international comparability of transport statistics.
- Collection and compilation of transport statistics, including data on motor traffic, road traffic accidents and rail traffic.
- Dissemination of transport statistics through publications and also through the development and maintenance of the on-line UNECE Transport Statistics Database in order to maintain good quality, relevant, user friendly and timely transport statistics.



The Glossary for Transport Statistics is a joint publication since 1994 of the UNECE, ITF, and Eurostat ([http://www.unece.org/trans/main/wp6/publications/stats\\_glossary.html](http://www.unece.org/trans/main/wp6/publications/stats_glossary.html)). It comprises 735 definitions and represents a point of reference for all those involved in transport statistics. By following the guidance contained within these definitions, a considerable contribution will be given to the improvement in both the quality and comparability of transport statistics data.



## 2.3. The European CARE database and the European Road Safety Observatory

### 2.3.1. THE CARE DATABASE

At European level, road accident data are available since 1991 in disaggregate level in CARE, the Community database on road accidents resulting in death or injury. CARE comprises detailed data on individual accidents **as collected by the Member States**, using a structure which allows for maximum flexibility and potential regarding analysing the information contained in the system.

The purpose of CARE system is to provide a powerful tool which would make it possible to identify and quantify road safety problems throughout the European roads, evaluate the efficiency of road safety measures, determine the relevance of Community actions and facilitate the exchange of experience in this field.

The CARE database was developed in several stages:

- The first phase (1988-1993) included a feasibility study, which led to a positive result and consequently to the decision of the European Council of December 1993 on the creation of a database of disaggregate road accident data
- The second phase (1993-1996) concerned the pilot operation of the system. The positive results of this evaluation have paved the way for the further development of CARE to an integrated information system.
- The third phase (1996-1999) concerned the harmonization of the data entered in the database in order to allow for international comparisons. In this context, the compatibility of various variables and values was examined in detail and it was proposed to produce a set of 38 variables with 488 values to uniform definitions (CAREPLUS I and II protocols).
- The fourth phase (1999-2002) concerned the full operation of the system and its transfer to a modern and efficient operating environment (Oracle). Today, CARE users can use a user-friendly interface to produce detailed multidimensional statistics.
- The fifth phase (from 2002 onwards) concerns the full operation of the system and the progressive expansion in the new Member States.

More specifically as regards the harmonisation of the data, initially parts of the national data sets were integrated into the CARE database **in their original national structure and definitions**, however, as existing national accident data collection systems were not always compatible and comparable among the countries, the European Commission (EC) provided and applied a framework of **transformation rules to the national data sets, allowing CARE to have compatible data** (these transformation rules are also referred to as CAREPLUS variables). Previous versions of the CARE database contained 55 harmonised and common road accident variables (see Table 2.1).



Table 2.1. Harmonised variables in the CARE database (CAREPLUS 1 & 2 projects)

CAREPLUS 1	CAREPLUS 2
month	registration country
hour	nationality
day of month	vehicle age
day of week	driving licence age
person class	road surface condition
injury severity (person)	region/province
sex (person)	speed limit
age (person)	alcohol test
lighting	psychophysical circumstances
natural light	alcohol level
street light	movement (pedestrian)
accident severity	carriageway type
person type	number of lanes
area type	manoeuvre (driver)
vehicle type	manoeuvre (vehicle)
motorway	junction control
collision type	security equipment
junction	road markings
junction type	hit and run
weather	

However, it has been acknowledged that more variables and values are necessary to better describe and analyse the road accident phenomenon at EU level. Due to differences in the collected data variables and values, their definitions, the differences of the accident data collection forms structures and the relevant data formats among the existing national databases, both accident data quality and availability were affected.

Under this perspective, the Common Accident Data Set (CADaS) protocol has been developed consisting of a minimum set of standardised data elements, which will allow for comparable road accident data to be available in Europe.

### 2.3.2. THE CADaS (COMMON ACCIDENT DATA SET) PROTOCOL



**CADaS consists of a minimum set of standardised data elements**, which allow for comparable road accident data to be available in Europe. CADaS can be implemented on a voluntary basis in the national accident collection systems and be gradually adopted by the EU countries. Thus, progressively, more and more common road accident data from the various countries can be available in a uniform format.

CADaS refers to the set of data to be voluntarily transmitted by each country to the EC, which should be derived from the national road accident data collection system. This means, that the EU countries are not legally obliged to adopt CADaS and can continue using their national systems.



However, they are encouraged to do so, so that they can in the meantime enhance their own database. In addition, the EC recommends the use of the CADaS model for data provided after 2010. In case the countries do not wish to adopt CADaS they should continue transmitting national road accident data to the EU in the current format.

At Figure 2.1, the CARE & CADaS processes of the national road accident data files are presented. Between both approaches, the compatibility of the accident data among EU countries is ensured. The main difference of the two approaches is related to the degree of involvement of the country in the process. According to the CADaS process, transformation of the national accident data will be performed at the national level and the derived CADaS variables and values will be transmitted to the EC, where they will be included in a more automatic way into the CARE database. This process allows for more common variables and values but also for higher quality, given that the national authorities better perceive any particularities related to national data collection. Therefore, they can better identify the interrelation between the collected and the CADaS variables.

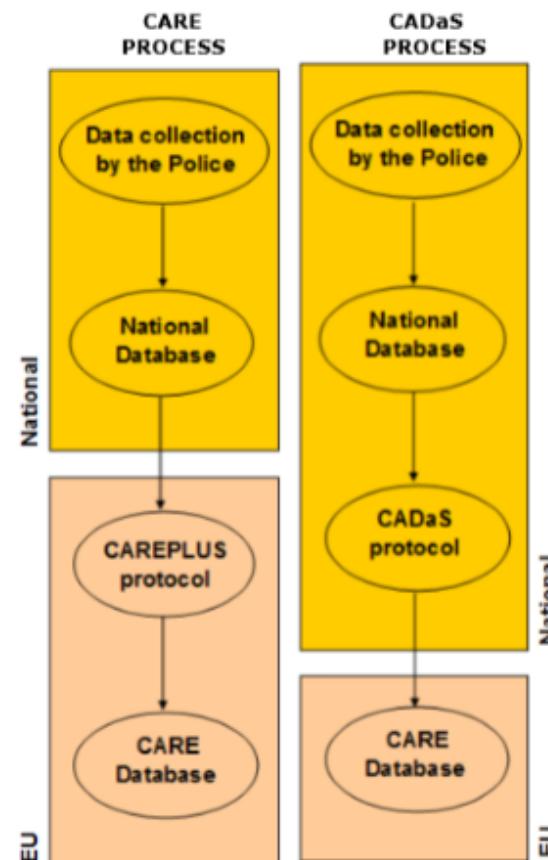


Figure 2.1. Transition from CARE to CADaS process

The CADaS variables are divided into four basic categories. The category in which each variable is included can be identified by a unique letter (code) at the beginning of the name of the respective variable. The categories and the relevant codes used to describe each category are the following:

- **A**, for Accident related variables,
- **R**, for Road related variables,
- **U**, for Traffic Unit (vehicle and pedestrian) related variables,
- **P**, for Person related variables.

In Figure 2.2 the interrelation among the four basic categories is presented, clearly indicating the links of the various road accident variables included in CADaS.

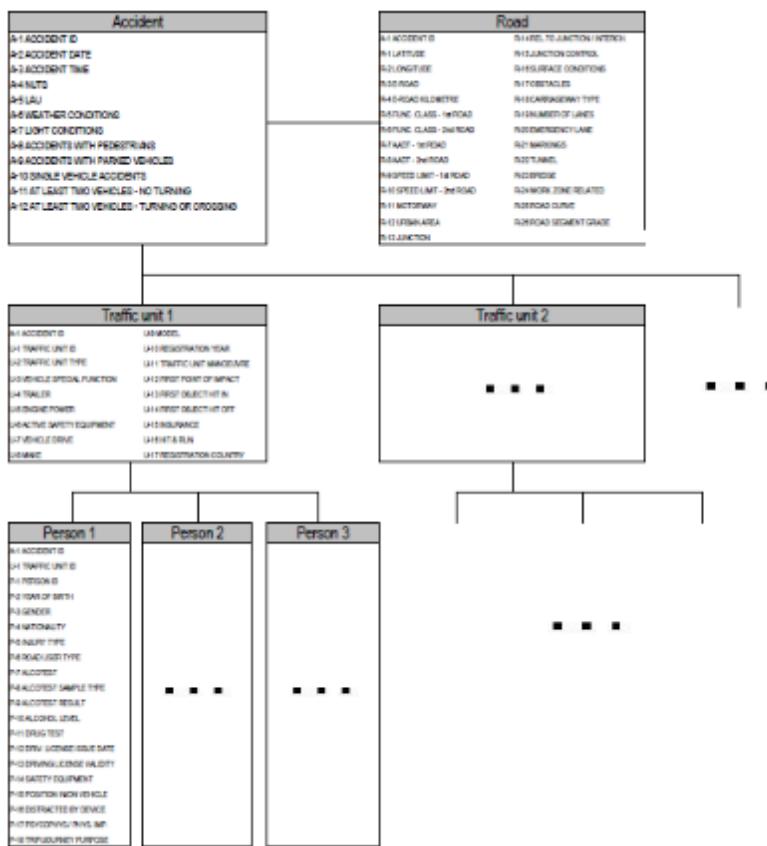


Figure 2.2. CADaS recommended layout of road crash data (accident, road, vehicle, person)

Several variables include two distinct types of values, referring to different level of detail:

- Detailed values: concern information at the highest level of detail.
- Alternative values: concern information at a more aggregate level of detail, when more detailed values are not available.

Alternative values do not differ from detailed values apart from their level of detail. These values are complementary and can be used when more detailed data are not available (for example concerning the "Traffic Unit type" variable, if a country does not collect the values "car" and "taxi" separately, it can provide this information through the "car or taxi" alternative value). An example of CADaS variable, values and definitions is shown in Figure 2.3 on Light Conditions, a high priority variable denoted with (H), where the Alternative Value A-7.07 is proposed when the detailed values A-7.03 to A-7.06 cannot be provided.



#### A-7 LIGHT CONDITIONS (H)

##### *Variable definition and scope*

Defines the level of light at the accident location, at the time of the accident. Values related to natural lighting are included, indicating the level of light in each period of the day. Additionally values concerning artificial lighting, indicate the existence of light by street lights. Information about the presence of lighting is important element in analysis of spot location or in network analysis. Additionally, important for determining the effects of road illumination on night-time accidents to guide relevant future measures.

##### *Values*

A-7.01	Daylight
A-7.02	Twilight
A-7.03	Darkness street lights lit
A-7.04	Darkness street lights unlit
A-7.05	Darkness no street lights
A-7.06	Darkness street lights unknown
<b>A-7.07</b>	<b>Darkness no street lights or street lights unlit</b>
A-7.99	Unknown

##### *Value definitions*

- A-7.01:** **Daylight**  
The natural lighting during daytime.
- A-7.02:** **Twilight**  
The natural lighting during dusk or dawn. Periods of half-light.
- A-7.03:** **Darkness street lights lit**  
Includes the period of the day when there is no natural lighting, street lights exist at the accident location and are lit.
- A-7.04:** **Darkness street lights unlit**  
Includes the period of the day when there is no natural lighting, street lights exist at the accident location but are unlit.
- A-7.05:** **Darkness no street lights**  
Includes the period of the day when there is no natural lighting, and there are no street lights at the accident location.
- A-7.06:** **Darkness street lights unknown**  
Includes the period of the day when there is no natural lighting, and information about street light is unknown.
- A-7.07:** **Darkness no street lights or street lights unlit**  
Includes the period of the day when there is no natural lighting, and there are no street lights at the accident location, street lights exist at the accident location but are unlit. This alternative value when we cannot differentiate between A-7.04 and A-7.05
- A-7.99:** **Unknown**  
The light conditions at the time of the accident were not stated.

Figure 2.3. Example of CADaS variable and value definitions

Due to the fact that the recommendation of CADaS is designed to be adopted gradually and on a voluntary basis by the EU countries, the recommended variables were separated into two broad categories, according to their importance for road accident analysis: variables of high importance (H) and variables of lower importance (L). Apart from their importance for road safety analysis, CADaS variables are separated according to the current reliability the collected data and the related collection feasibility. It should be clear that all EU countries continue using their national systems and collect accident data in any way they find most appropriate. However, the European Commission is recommending countries to plan, e.g. when upgrading their national systems, the necessary adjustments allowing to provide the CADaS data to the EC.

### 2.3.3. THE EUROPEAN ROAD SAFETY OBSERVATORY

The European Road Safety Observatory (ERSO - gathers harmonised specialist information on road safety practices and policy in European countries. Evidence-based approaches lie at the heart of the most successful road safety policies – backed up by accident and other road safety data.

[https://ec.europa.eu/transport/road\\_safety/specialist/erso\\_en](https://ec.europa.eu/transport/road_safety/specialist/erso_en))

ERSO collects a range of information types. These include a series of data protocols and collection methodologies, national and in-depth accident data, exposure data and safety performance indicators.



This website's content was developed by the SafetyNet project (Thomas et al., 2005) and is constantly updated. Current updates are managed by the EU's Directorate-General for Mobility and Transport.

The screenshot shows the homepage of the European Road Safety Observatory (ERSO). At the top, there is a navigation bar with links for 'Legal notice', 'Cookies', 'Contact', and 'Search'. Below this is a banner with the European Commission logo and the text 'MOBILITY AND TRANSPORT' and 'Road Safety'. A breadcrumb menu indicates the current location: 'European Commission > Transport > Road Safety > For the specialist > European Road Safety Observatory'. The main content area has five tabs: 'Home', 'What We Do', 'Road Users', 'Policy Areas', and 'Specialist (English Only)', with 'Specialist (English Only)' being the active tab. Below these tabs are two rows of three boxes each, labeled 'safety issues', 'country profiles', 'analytics', 'accident information', 'Important links', and 'Index'. In the bottom left corner, there is a logo for 'European Road Safety Observatory' and a brief description of its purpose: 'The European Road Safety Observatory (ERSO) gathers harmonised specialist information on road safety practices and policy in European countries. Evidence-based approaches lie at the heart of the most successful road safety policies - backed up by accident and other road safety data. ERSO reflects a range of information types. These include a series of data products and collection methodologies, national and in-depth accident data, exposure data and safety performance indicators.' At the very bottom, there is a note about the website's history: 'This website's content was developed by the SafetyNet project and was later updated and expanded by the DaCoTA project. Current updates are managed by the EU's Directorate General for Mobility and Transport.' There is also a link to 'Submit any queries about ERSO here.'

Figure 2.4. The European Road Safety Observatory

The ERSO includes (see Figure 2.4):

- **Safety issues:** More than 25 state-of-the-art web-texts on road safety issues, summarising current knowledge and future challenges. The topics include:
  - Advanced driver assistance systems
  - Alcohol
  - Cell phone use while driving
  - Children
  - Cost Benefit Analysis
  - Driver Distraction
  - Fatigue
  - Integration of Road Safety in Other Policy Areas: Synergies and Conflicts
  - Novice Drivers
  - Older Drivers
  - Pedestrians and Cyclists
  - Post-impact care
  - Power two wheelers
  - Quantitative Road Safety Targets
  - Roads
  - Road Safety Management
  - Safety Ratings
  - Serious Injuries



- Speed and Speed Management
  - Speed Enforcement
  - Vehicle Safety
  - Work-related safety
- **Country profiles**, where for each country three fact-sheets are available:
    - **Country overview**: with detailed data and information on all aspects of road safety, from structure and culture, to programmes and measures, to safety performance indicators, road crash statistics and estimates of the social cost of crashes.
    - **Country forecasts**: road safety forecasts on the basis of different scenarios (regarding mobility developments) for the period 2008-2020 by means of time series models developed for each country.
    - **Road safety management**: a detailed assessment of road safety management structure in the country at the strategic and at the operational level.
  - **Analytics: A comprehensive set of statistics and tools**, namely:
    - **Annual statistical report** of the ERSO
    - **Basic fact sheets and Infographics** with statistics and country comparisons based on the CARE data on key road safety issues, including:
      - Children
      - Car Occupants
      - Motorcycles and Mopeds
      - Motorways
      - Pedestrians
      - Youngsters
      - Young people
      - The Elderly
      - Junctions
      - Bicycles
      - Heavy Goods Vehicles and Busses
      - Urban Areas
      - Roads outside urban areas
      - Gender
      - Single vehicle accidents
      - Seasonality
      - Main figures
    - **A map viewer**
    - Available **exposure data** in the EU (on the basis of the Eurostat statistical pocketbook)
    - Selected data on **Safety Performance Indicators** in the EU



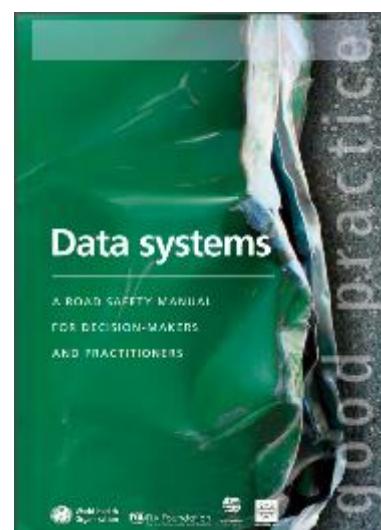
- Statistics from surveys on **road user attitudes, perceptions and self-reported behaviours** in the EU.
- **Accident information:** including methodological guidelines, meta-data and information of the methodologies used in the ERSO outputs, as well as guidelines for in-depth crash investigations in the EU.
- **Links** to other relevant information.

## 2.4. The WHO methodology and data

### 2.4.1. WHO RECOMMENDATIONS FOR ROAD CRASH DATA SYSTEMS AND A COMMON DATASET

WHO has issued a Data Manual with recommendations on the development of national crash data systems (WHO, 2011), outlining the specific steps needed in order to strengthen an existing road crash system or design and implement a new one. The basic targets are considered similar when designing a common data collection system based on the currently existing ones. These steps are the following:

- Establishing a working group, which will review and discuss the road safety goals set already by the national lead agency in terms of data requirements for monitoring and achieving each one.
- Choosing a course of action, which is a range of strategies aiming to strengthen road safety systems depending on the different needs and characteristics of each region or country. The main strategies concern:
  - ✓ the improvement of data quality and system performance of road crash systems coming from police data,
  - ✓ the improvement of health facility-based data on road injuries,
  - ✓ the improvement of the vital registration system and particularly the death registration system,
  - ✓ the combination of existing data sources in order to obtain more accurate estimates on the magnitude and effects of road injuries.
- Defining the recommended minimum data elements and definitions, based on specific selection criteria.



The WHO data manual includes a proposed common dataset with variables, values and definitions. This dataset is in full accordance with CADaS.



## 2.4.2. THE WHO GLOBAL STATUS REPORT METHODOLOGY

### **WHO data sources and definitions**

WHO, as a global public health organisation, publishes Health Sector VRD on all causes of mortality. In its Global Status Report on Road Safety, acknowledging the key role of the Police and other sectors in the collection of detailed data on road crashes, WHO publishes the data reported both from the Police and from the Health Sector in each country, as well as from other sectors, where relevant.

As also shown in Table 2.1 each country's profile of the Global Status Report on Road Safety, contains two figures:

- i. The road traffic fatalities, which correspond to the national figures as reported by the countries (in most cases based on Police data sources) and using the 30-days definition of fatality.
- ii. The WHO estimated road traffic fatalities, which correspond to the number of fatalities reported in the country's VRD. Countries are expected to submit data using the International Classification of diseases ICD-10<sup>1</sup> protocol.

### GLOBAL STATUS REPORT ON ROAD SAFETY 2015



Table 2.1. Comparison of country reported fatalities and WHO estimates for countries with eligible VRD  
(Source: WHO, 2015)

Country	Country reported fatalities*	WHO estimated fatalities**	Difference in %
Belgium	724	1014	40.1
Chile	1623	2116	30.4
Italy	3385	4192	23.8
Japan	4373	5971	36.5
Netherlands	570	650	14.0
Republic of Korea	5092	6374	25.2
Spain	1680	1915	13.9

<sup>1</sup> International Classification of Diseases (ICD) is an international protocol developed collaboratively by the World Health Organization (WHO) and 10 international centers to ensure that medical terms reported on death certificates are internationally comparable, on the basis of standardized digit codes. It is currently available for the 10th revision of the ICD codes (ICD-10). In most of countries, the Health Sector is very familiar with this protocol.



\* on the basis of Police data, \*\* on the basis of VRD

Therefore, a different definition is often one reason of observed discrepancies. While Police data are based on the international definition of "fatalities occurring within 30 days from the crash", the Health Sector data also include fatalities occurring beyond that period. The Health Sector data are the main source of Vital Registration statistics, which are based on the death certificates issued by the hospitals, individual practitioners, etc. - from now on referred to as "vital registration data" (VRD) - and which are the source of WHO estimated road fatalities.

Even for countries with good data systems, a difference may occur between their reported fatalities and WHO estimates, due to the different definitions. Table 5.1 shows the difference between the country reported fatalities and the WHO estimates for a number of countries with good quality VRD.

Obviously, if one or both data sources used are not of good quality, a larger difference is expected. In several cases, there is insufficient quality or complete lack of VRD, leading to the use of alternative (statistical) methods for the WHO estimated fatalities, as will be described in the next section.

### **The WHO methodology**

There are two sources and "flows" of road crash fatalities to WHO:

- I. Vital Registration Data (VDR): these are collected by the *WHO Mortality and Health Department*, through a related National Focal Point, typically from the Ministry of Health. The data concern the number of fatalities classified by all causes of death on the basis of death certificates. The countries should send data using the International Classification of diseases ICD<sup>2</sup>.
- II. Police road fatality data: these are collected by the *WHO Violence and Injury Prevention Department*, through a related National Focal Point, typically not the same as the VRD data Focal Point. A questionnaire is filled-in by experts in the country, under the coordination of the National Focal Point, and a "consensus" meeting takes place for synthesis of responses and sending a commonly accepted national estimate. The countries should send data using the 30-days definition of fatality.

Depending on the quality of the VRD data reported by each country, the WHO estimated road traffic fatalities is based on one of the following:

- a. The actual reported VRD statistics (for countries with good quality VRD referred to as "Group 1" countries).

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<sup>2</sup> International Classification of Diseases (ICD) is an international protocol developed collaboratively by the World Health Organization (WHO) and 10 international centres to ensure that medical terms reported on death certificates are internationally comparable, on the basis of standardized digit codes. It is currently available for the 10th revision of the ICD codes (ICD-10). In the vast majority of countries, the Health Sector is very familiar with this protocol.



- b. An estimate of fatalities on the basis of recent information or studies linking data of different sectors (for countries that do not have good quality VRD - referred to as "Group 2" countries)
- c. A statistical model-based estimate (for countries that do not have good quality VRD - referred to as "Group 4" countries)

More specifically, on the basis of the quality of the reported VRD, WHO classifies countries in 4 groups:

- **Group 1:** Countries with good VRD statistics (completeness for the year estimated at 80% or more, average completeness for the decade including the country-year was 80% or more).
- **Group 2:** Countries with other sources of information on causes of death (including recent studies submitted to WHO).
- **Group 3:** Countries with population less than 150,000.
- **Group 4:** Countries without eligible VRD.

The detailed classification of countries per group is provided in Appendix 3 of the present report. Countries reporting VRD of insufficient quality, are classified in Group 4, and WHO estimates their traffic fatalities based on a statistical model.

The WHO statistical model is applied for Group 4 countries to estimate traffic fatalities based on variables such as GDP, road network density, vehicle ownership, health system characteristics, and other sociodemographic and transport indicators. The WHO estimated road traffic fatalities are provided together with their confidence interval (denoted as CI), i.e. the range within which the estimated value lies, expressing the uncertainty of the statistical estimation. The details on the model formulation and variables are provided in Appendix 3 of this report.

A detailed analysis of the differences in the EuroMed region and their reasons is presented in Chapter 5 of this report.

## 2.5. Other relevant initiatives

A number of international organisations and other initiatives (including research projects) are dealing with road safety data quality at international level. In the following, key players and their work relevant to EuroMed TSP are outlined.

### 2.5.1. THE IRTAD GROUP

**The IRTAD Group of the OECD International Transport Forum** (<https://www.itf-oecd.org/IRTAD>): With 80 members and observers from more than 40 countries, IRTAD has become a central force in the promotion of international co-operation on road crash data and its analysis. The basis for this work is the International Road Traffic and Accident Database, created in 1988. The IRTAD database collects and aggregates international data on road



crashes; it thereby provides an empirical basis for international comparisons and more effective road safety policies. The database includes validated data for 32 countries. Most of IRTAD data can be found in IRTAD's Road Safety Annual Reports. Online access to the full IRTAD database is available for subscribers via the OECD statistics portal.

Over the years, IRTAD has come to stand not only for the database, but also for the International Traffic Safety Data and Analysis Group (or IRTAD group, for short). The IRTAD group brings together road safety experts from national road administrations, road safety research institutes, International Organisations, automobile associations, insurance companies, car manufacturers and others.

### **2.5.2. THE SAFERAfrica PROJECT**

The objective of the **European Commission SaferAfrica project** (<http://saferafrica.eu/>) is to create favourable conditions and opportunities for the effective implementation of actions for road safety and traffic management in African countries by setting up a Dialogue Platform between Africa and Europe. An additional project objective is to increase the awareness of African stakeholders and end users on road safety by means of an African Road Safety Observatory.

Through the Dialogue Platform, policy recommendations are provided to support the implementation of the African Road Safety Action Plan, as well as fostering the adoption of specific road safety initiatives. It will also be used as a network framework for activating Twinning Programs on specific issues.

The SaferAfrica project recently launched the **African Road Safety Observatory** (<http://www.africanroadsafetyobservatory.org/>) which includes statistics on road safety issues in Africa, based on data from international databases (e.g. WHO, IRF) and additional information collected during the project. It also includes a knowledge section, with road safety management capacity reviews, capacity building material (webinars, training material etc.) and good practice guidelines. Finally, it includes a Dialogue Platform for stakeholders consultation.

### **2.5.3. THE IRF**

The **International Road Federation (IRF)** is a global, independent, not-for-profit organization, with headquarters in Geneva, Switzerland. Active since 1948, IRF (Geneva) is a membership-based organization, representing leading corporate and institutional players drawn from the road and mobility sectors worldwide. Its mission is to promote the development of roads and road networks that enable access and sustainable mobility for all. Its approach is centred on key strategic components of knowledge transfer & information sharing, connecting people, businesses and organisations and policy & advocacy. As a not-for-profit organisation, based in Switzerland and with a presence and network over five continents, IRF provides a neutral and global platform for the road and mobility sectors



IRF has an extensive experience in convening, leading and thriving high-level multi-stakeholders groups towards results. It is reputed in the sector for its untiring efforts to build capacity in the countries and for being a hub of knowledge, expertise and contacts.

IRF has been working on Road safety for the past 70 years and has 55 years of experience in data collection and capacity building all over the world. Since 1964, the IRF World Road Statistics (WRS) have been an invaluable reference tool for anyone wanting to analyse, understand and report on worldwide, regional and national trends and developments. WRS data is collected yearly from primary official sources and the definitions used in the questionnaire are based on the ITF/EUROSTAT/UNECE Glossary of Transport Statistics and those of the World Bank. WRSR data covers more than 205 countries.

IRF's contribution to road safety has been recognised with the Prince Michael International Award in 2017. [WWW.IRFNET.CH](http://WWW.IRFNET.CH)



### 3. METHODOLOGY

Following the review of international experiences and good practice for the establishment of reliable, harmonised and comparable data systems, a methodology was developed for the purpose of this activity. This includes the development of a 'diagnosis' questionnaire, the establishment of cooperation with key international players, the implementation of diagnosis missions in the EuroMed partners countries, and the organisation of a regional workshop for the exchange of experiences.

#### 3.1. Development of a questionnaire

The '**diagnosis**' **questionnaire** was developed as a tool to guide consultations with stakeholders in the countries and collect information on all the key features of road safety data systems according to international good practice.

The questionnaire topics covered both the institutional framework and the current reporting procedures, and can be outlined as follows:

- General context of road safety data management in the country.
- Agencies and other stakeholders involved in road safety data collection, objectives of the data collection by each agency.
- The data systems in place in the country (regional and local databases).
- The data elements available in each system (variables, values, indicators etc.).
- Data quality issues (definitions used, missing values, known sources under-reporting of casualties etc.).
- Resources and capacity for data collection.
- Publication and use of the data.

More specifically, on the basis of international experience (European Commission, 2017; WHO, 2011; IRTAD, 2016), a number of **specific criteria can be outlined for the review and assessment of the completeness, accuracy and compliance with international standards of each data system in each country**. Initially, in parallel with the existing data systems review and assessment (Police-based data), an assessment of the health sector data should take place. Assessment criteria on the basis of WHO and other international good practice elements are presented in Tables 3.1 and 3.2.



Table 3.1. Assessment criteria for crash data systems in the country - Police data

Area	Assessment criteria
Objectives of the data collection	<ul style="list-style-type: none"> <li>▪ What are the activities and roles of each agency involved in data collection?</li> <li>▪ What is the purpose of collecting the data?</li> <li>▪ How are the data used within the area of responsibility of each sector?</li> </ul>
Data systems in place	<ul style="list-style-type: none"> <li>▪ What are the data systems in place?</li> <li>▪ Who is the host of each database and who has access?</li> <li>▪ Are there other sources of road safety data e.g. ad hoc surveys, specific projects etc?</li> <li>▪ Are there any intersectoral databases? For instance, links between Police files and other registration files (e.g. vehicle fleet? Driver register? Road register?)</li> </ul>
Data collection methods	<ul style="list-style-type: none"> <li>▪ How is data collected? What information is collected at the crash scene and what information is collected through a follow-up?</li> <li>▪ Are any digital means (computers/notebooks/telephones) used for data collection and transmission?</li> <li>▪ Are procedures uniform over the entire area of coverage (e.g. in all provinces, municipalities, police districts) and during all months of the year? Day and night and independent of the weather? Can this be checked with data?</li> </ul>
Data elements captured	<ul style="list-style-type: none"> <li>▪ Is there a formal data collection form? Is there supporting documentation and guidelines?</li> <li>▪ What events are captured (i.e. fatalities, non-fatal injuries, damage-only crashes)?</li> <li>▪ Which variables are included in the database? Road layout, design and environment? Vehicle? User? Accident?</li> <li>▪ What is the level of disaggregation? Are unique records stored (person id, crash id)?</li> <li>▪ How is data protection and anonymization implemented?</li> </ul>
Data processing and storage	<ul style="list-style-type: none"> <li>▪ Are the data available in electronic form?</li> <li>▪ Are the data structured in the form of a relational database with separate Tables for Road-User-Vehicle?</li> <li>▪ How is the data processed (manually or electronically)?</li> </ul>



Data quality	<p><u>Basic definitions</u></p> <ul style="list-style-type: none"> <li>▪ What basic definitions are used? Are these documented and checked with? Is any international set of definitions used?</li> <li>▪ How is a crash defined? Are non-motorised users included? Are private roads included? Are unpaved roads included?</li> <li>▪ Is the 30-days definition of fatality applied? How is the follow-up done?</li> <li>▪ How is injury severity defined in crash records? Are Police officers responsible for assigning injury severity? Is this done at the scene or through a follow up? How is the follow-up done?</li> <li>▪ Is there a definition of a serious and a slight injury? Can it be easily understood and applied by the Police?</li> <li>▪ Is there any information on the degree of under-reporting of fatalities by the Police?</li> </ul> <p><u>Data accuracy</u></p> <ul style="list-style-type: none"> <li>▪ Is GIS information used to determine the crash location?</li> <li>▪ Are photos / videos used to capture or validate crash information?</li> <li>▪ What quality assurance and evaluation procedures are used to validate the data?</li> </ul> <p><u>Data completeness</u></p> <ul style="list-style-type: none"> <li>▪ What is the degree of completeness of the other data elements?</li> <li>▪ There are key variables which are known to be poorly recorded in several countries e.g. BAC of the driver, seat belt and helmet use, accident location. Is there a systematic bias resulting in specific variables being less completely recorded?</li> <li>▪ Other known weaknesses of the data or measurement / reporting errors?</li> </ul>
Resources and capacity for data collection	<ul style="list-style-type: none"> <li>▪ How is each data system funded? Is it sustainable?</li> <li>▪ Are there formal guidelines for data collection? (National Data Collection form)</li> <li>▪ Are officers specially trained to properly collect the data?</li> </ul>
Publication and use of the data	<ul style="list-style-type: none"> <li>▪ Who publishes the data?</li> <li>▪ Who uses the data? Decision makers? Practitioners? Researchers?</li> <li>▪ To what extent is the data used to support decision making, i.e. diagnose road safety problems, determine appropriate</li> </ul>



	<p>interventions, evaluate the effectiveness of interventions, monitor progress in achieving road safety objectives?</p> <ul style="list-style-type: none"> <li>▪ Is the data sent to international organisations (WHO, IRTAD, IRF, Other)?</li> <li>▪ Is there a regional road safety observatory, or equivalent?</li> </ul>
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Table 3.2. Assessment criteria for crash casualties data systems in the country - Health sector and Vital Registration data

Area	Assessment criteria
Data systems in place	<ul style="list-style-type: none"> <li>▪ What are the data systems in place?</li> <li>▪ Is there a central trauma registry?</li> </ul>
Data collection methods	<ul style="list-style-type: none"> <li>▪ How is data collected?</li> <li>▪ Is the WHO Death certificate model used?</li> <li>▪ Are procedures uniform over the entire area of coverage (e.g. in all provinces, municipalities, police districts) and during all months of the year? Day and night and independent of the weather? Can this be checked with data?</li> </ul>
Data elements captured	<ul style="list-style-type: none"> <li>▪ Are vital registration data available?</li> <li>▪ What non-fatal injury data are available in the Health sector? <ul style="list-style-type: none"> <li>- Injury surveillance systems in accident and emergency departments,</li> <li>- trauma registries,</li> <li>- hospital in-patient records or discharge data,</li> <li>- ambulance records,</li> <li>- other</li> </ul> </li> </ul>
Data processing and storage	<ul style="list-style-type: none"> <li>▪ Are the data available in electronic form?</li> <li>▪ How is the data processed (manually or electronically)?</li> </ul>
Data quality	<ul style="list-style-type: none"> <li>▪ What protocol is used for cause of death classification in the country (e.g. ICD)?</li> <li>▪ How is injury severity / cause of death typically defined in Health sector crash records?</li> <li>▪ Is there any information on the degree of under-reporting of fatalities/injuries by the Health sector?</li> <li>▪ What would be the main reasons for under-reporting?</li> </ul>



- Is the EU MAIS3+ definition of serious injury applied at any stage / by any sector?
- What is the coverage of the population?
- Are all deaths assigned a medically certified cause?

The full questionnaire is presented in Appendix 1. During the consultation with stakeholders, detailed discussions on all the above criteria took place. Subsequently to the consultation missions, stakeholders were asked to fill in and return the questionnaire. Four countries have returned a filled questionnaire and relevant supporting documentation (Algeria, Morocco, Tunisia, Jordan), while for the other two countries (Lebanon, Egypt) the questionnaire topics were only discussed during the missions.

## 3.2. Establishment of cooperation

### 3.2.1. INTERNATIONAL COOPERATION

The EuroMed project established cooperation, through the exchange of experiences and the discussion of common objectives with the following key international organisations and relevant initiatives:

- **DG-MOVE**, the European Road Safety Observatory (ERSO)
- the **World Health Organisation** (WHO),
- the **IRTAD group** of ITF-OECD,
- the **UNECE, Sustainable Transport Division**
- The European Commission **SaferAfrica Project**
- The **IRF**
- The **SSATP / World Bank**

The aim of these cooperation was the exploitation of **synergies** while ensuring the coordination of efforts and the avoidance of duplication of efforts, so that benefits for both the countries and the international organisations can be maximised. A series of physical meetings with the officers responsible for road safety data in the above organisations, led to the identification of the need and potential added value of an Inter-Agency meeting regarding road safety data in the EuroMed region.



## *Inter-agency meeting*

The **Inter-Agency meeting took place in Marrakech, Morocco (October 12, 2017)** and brought together the key European and international players with valuable experience on international road safety data quality issues, with objective to:

- exchange experiences on road safety data collection methods and quality issues in the EuroMed partner countries and beyond;
- enhance common understanding of data quality issues and the differences between WHO and national statistics;
- identify possible synergy with EuroMed TSP and the areas where cooperation may be developed.

The organisations that participated were: IRTAD, UNECE, EC, SaferAfrica, WHO and World Bank.

EuroMed experts presented the project experience, activities to date and next steps and moderated discussions on other Agencies' experiences with road safety data in the region and the way forward. All Agencies present expressed **readiness to support EuroMed TSP** following steps including the successful organization of the planned regional road safety event as well as the national events to follow as required.

The second part of the meeting was dedicated to further discussion of the discrepancies between WHO and national statistics, and the way forward. A clear gap in communication was identified, as several countries are not aware or do not fully understand the WHO methods and their particularities, as well as the reasons of the existing discrepancies between the official national data and WHO estimates contained in the WHO Global Status Report.

The general meeting conclusions are summarized below:



- There was general agreement on the need and the importance of **strengthening cooperation among Agencies** on road safety data comparability and reliability and readiness to support EuroMed TSP following activities at regional and national level as required;
- Several **key common recommendations** to be made to countries wishing to improve their Police data would be:
  - the adoption of the 30-days definition for fatality;
  - the adoption of the data definitions of the Eurostat/ITF/UNECE Glossary for Transport Statistics, and the CARE Glossary on road safety data, as well as the CADaS protocol for road safety database layout;
- countries should be assisted to properly understand the WHO methodology and the related estimates, and encouraged to improve their vital registration data, with the aim of being shifted from "Group 4" to "Group 1";
- There is a **scope for the publication of a common EuroMed /WHO "leaflet"** outlining the key points of WHO methods and particularities, as well as the reasons of the existing discrepancies between the official national data and WHO estimates and propose ways to bridge them.

### 3.2.2. DIAGNOSIS MISSIONS

A critical step in this activity was the establishment of close cooperation with the regional road safety data services, in order to collect information on existing data collection methods and systems in the country that will allow the assessment of their strengths and weaknesses. In particular, close **cooperation with Traffic Police, Road Safety Authorities and Experts** involved in the management of each data system is envisaged. At the same time, the involvement of the **Health Sector** is of importance (as well as other sectors e.g. insurance, transport operators).

The following '**diagnosis' missions**' were implemented on that purpose:

- Beirut, 13-15 September 2017
- Cairo, 2-5 October 2017
- Marrakech, 10-13 October 2017
- Algiers, 19-20 November 2017
- Tunis 21 – 22 November
- Amman, 22-25 April 2018



### 3.2.3. REGIONAL WORKSHOP

A three-day Regional Workshop, held in Athens on 8-10 May 2018, was the first time that Road Safety data experts from the Ministry of Transport, Police and the Health Sector from the EuroMed region met.

Twenty five (25) experts from six (6) EuroMed Partner Countries, notably Algeria, Egypt, Jordan, Morocco, Palestine and Tunisia, together with distinguished speakers from several international and European Organizations (UNECE, UNESCWA, WHO, FIA, IRF, the EU-funded "SaferAfrica"), Greek relevant institutions ad Authorities (NTUA, EKAB, ELSTAT) and EuroMed Experts, participated in the **Regional Workshop on setting up road safety reliable, harmonized and comparable data collection system and sharing at regional level, held in Athens, on 8 – 10 May 2018.**

This workshop offered a unique opportunity to share national, European and international experiences and best practices on road safety data and allow a regional exchange on setting up a EuroMed TSP road map for the follow up actions.



Issues discussed included:

- existing best practices, methods and tools of road safety data collection in the EuroMed Partner Countries, Europe and internationally;
- reasons of existing discrepancies between the official national data and WHO estimates and suggestion on ways to bridge them (see also Chapter 5 of this report);
- common definitions and international good practice on road safety data in the region;
- vital registration data (VRD) that are considered by WHO in its Global reports;
- related experience in Greece;
- preliminary results of the 'diagnosis' on road safety data in the EuroMed region (these are presented in Chapters 4 & 6 of this report)
- setting up a road map on the way ahead (this is presented in Chapter 7 of this report).

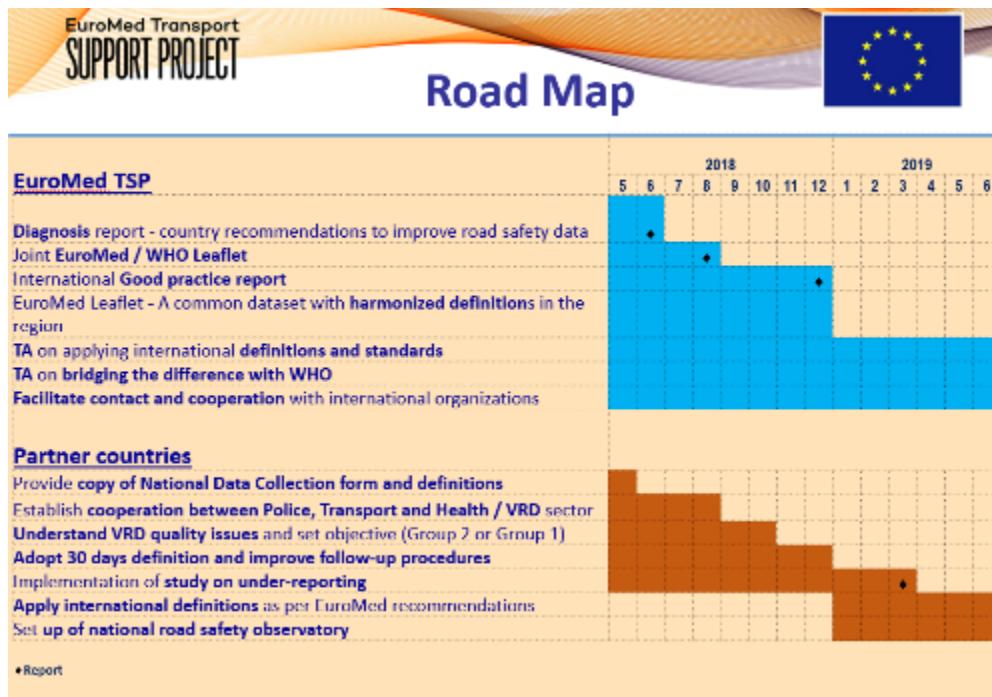


In his video message to the participants, H.E. Mr. Jean TODT, UN Secretary General's Special Envoy for Road Safety, welcomed the EuroMed Partner Country efforts to improve road safety data management and its comparability across Mediterranean and reiterated his support to the EuroMed TSP and to the South Mediterranean countries efforts to improve road safety data.





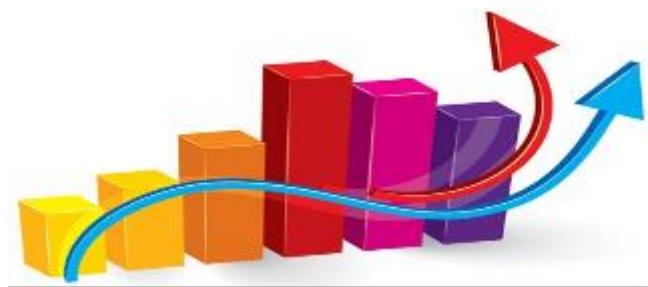
During a round table discussion structured around three parts, Part one: Issues and priorities for road safety data in the region. Part two: Areas for transfer of knowledge and expertise. Part three: The way forward, the participants agreed in several issues which are contained in a list of recommended actions and the road map that was agreed by the participants (see Chapter 7 for details).





## 4. ANALYSIS OF ROAD SAFETY DATA IN THE EUROMED PARTNER COUNTRIES

In this Chapter, a detailed presentation is made on the current situation and the main challenges identified as regards road safety reliable, comparable and harmonised data in the EuroMed partner countries. The analysis is based on the country responses to the 'diagnosis' questionnaire, as well as the consultations held during the missions in the countries. The results reflect the situation at the time of consultation (September – April 2018) and the reader should keep in mind that developments may have taken place thereafter.



### 4.1. Algeria



#### 4.1.1. ROAD SAFETY DATA MANAGEMENT IN THE COUNTRY

Currently, the lead entity for road safety in the country is **the National Centre for Prevention and Road Safety**. It is an entity that depends on the Ministry of the Interior, Local Authorities and Territorial Planning. Soon, a National Road Safety Delegation will be set up (Law No. 17-05 of 16 February 2017).

There is cooperation between the agencies / stakeholders involved in road safety management, through the various interministerial committees.

In its action plan, the National Gendarmerie sets itself as its **objectives a permanent strategy to fight road safety**. The targets concern various categories of road users:

- drivers of public transport.
- drivers of goods transport.
- motorcyclists.
- school children and pedestrians.

Road safety data are recognized as a key element of an evidence-based road safety policy, as analyses on the accidentology occurring in the areas of its competence, are carried out periodically by the National Gendarmerie and communicated to the ministerial departments competent in the matter.



#### 4.1.2. POLICE DATA

##### ***Data collection process***

The Police is responsible for crashes inside urban areas, whereas the Gendarmerie is responsible for crashes in rural areas. The Gendarmerie is responsible for the execution of missions and road safety action plans, accident findings, awareness campaigns, fight against road safety and road crime. The traffic police is responsible for crash investigations, data collection, exploitation and analysis.

An automatic "signal" is recorded in a central application centre upon crash occurrence, with basic crash information, including the number of killed and injured persons. This information is updated at a later stage in case of health status change.

More detailed information, other than the "signals", is registered by the Police and Gendarmerie in their own electronic database using other data collection forms.

In most of cases, the Police is called at the accident scene, otherwise is notified by the Hospital receiving the casualties. It is considered highly unlikely that a fatal/severe casualty is not recorded by the Police/Gendarmerie, as no juridical / insurance compensation can be claimed by the victims / families without a Police report.

**Only the Gendarmerie has electronic means for data collection, while the Police uses paper form. A common national data collection form** for both Police and Gendarmerie is under development.

The issue of injury under-reporting is recognized as an important issue but is considered to concern only slight injuries.

##### ***Definitions***



The **30 days definition** is assigned to road fatalities recording, but data on fatalities beyond the 30 days are available through follow-ups for juridical purposes.

Regarding non-fatal injury severity, a distinct definition is lacking, and no differentiation is currently made between serious and slight injuries; the general appearance of the victims at the crash scene and days of hospitalisation are taken into account to roughly assign severity.



Regarding the other definitions of variables and values used in road accident statistics, it was reported that it is "a mixture of WHO and national definitions".

Key information such as a driver blood test and a vehicle technical report are included in the crash investigation, although it is not entirely clear whether this information is also processed in the database.

### ***Data processing and storage***

There are currently **two systems in place**:

- National Gendarmerie: a computerized application specific to road safety and a RMS system (Record Management System)
- Police: currently an injury statistics system is being deployed for road safety prevention (SSPR) for real-time feeding and operation.

The data is consolidated by the Ministry of Transport and the WHO National Focal Point at the National Road Safety Prevention Centre (CNPSR), following the submission of the periodic crash and casualty reports from Police and Gendarmerie. Currently the DGSN has a central database dedicated to statistics and its feeding is based on predefined patterns related to data of road accidents.

Another system is under development, namely a central database that will be powered and operated in real time by all the police services responsible for the mission.

**Quality control** is mostly done at the technical level (electronic cross-check of information).

Current activities and considerable steps for the improvement of road safety data in the country were described, as follows:



- GPS information on crash location is under implementation, and the use of tablets for the electronic recording of the information of crash location (expected in 2018);
- There is ongoing work on the unification of Police and Gendarmerie databases, as currently only Gendarmerie has electronic data.
- A "Big Data" project is initiated (for 2018), aiming to link crash data with traffic violations data, road inventory etc.



#### 4.1.3. HEALTH SECTOR DATA

VRD are available in the country and the WHO model of death certificate is used. All deaths need to be assigned a certified cause. It is unknown whether after a long time after the crash the cause of death will still be traffic accident.

Moreover, the data is not exhaustive. **Only 40% of deaths are gathered by the cause of death registry.** A question of skills and training may be the reason. The coverage is global, but the reporting is problematic.

Hospital records are available but no further information is available at this stage.

#### 4.1.4. INTERSECTORAL COOPERATION

There are several interministerial committees on road safety issues but no systematic intersectoral cooperation.

#### 4.1.5. DATA ANALYSIS AND PUBLICATION

Police and Gendarmerie publish the data on their websites ([algeriepolice.dz](http://algeriepolice.dz)).

Policy makers use the data to identify risk factors, prevent crashes and cooperate with relevant authorities, make interventions (including awareness raising). The data are also used to evaluate interventions and monitor progress.

A **national observatory exists, namely the National Road Safety Prevention Centre (CNPSR)** – however not in the form of a web portal or other accessible information resource.

### 4.2. Egypt



#### 4.2.1. ROAD SAFETY DATA MANAGEMENT IN THE COUNTRY

The **National Road Safety Council** is chaired by the Deputy Minister of Interior and includes representatives from ministries of Health, Education, Information Technology, as well as regional authorities, universities and the media.

A general road safety coordination problem was highlighted by stakeholders in Egypt, as the existing National Road Safety Council acts more like a stakeholder consultation and general policy formulation body.

A **new Traffic Law** was under validation by the Parliament at the time of consultation.

Concerns were expressed that the reform foreseen in the new Traffic Law, with the establishment of a special entity for Traffic & Transport will not be helpful, as no operational capacity and no dedicated funding is foreseen. Some stakeholders stressed the need for the



management of road safety data to be placed under a strong lead entity on road safety in Egypt.

**A National Road Safety Strategy and Action Plan were drafted on 2010 but have not been implemented in practice.**



#### 4.2.2. POLICE DATA

##### *Data collection process*

A unique context exists in Egypt, as that road safety data collection is fragmented between **three different key stakeholders, each one managing crash casualties within a different time frame:**

- The Traffic Police is responsible for recording only fatalities 'on the spot';
- The Egyptian Ambulances Organisation (EAO) records any fatalities that occur during the transfer (pre-hospital);
- The Ministry of Health, through Hospitals, records fatalities once admitted to a hospital and thereafter, without a time limit;

Concerns were expressed whether, although Police authorisation is needed for the transfer of a fatality, some fatalities may still be transferred directly to the morgue by private means, and therefore remain unidentified in the above registration system.

Police data recording is currently made on paper form. On 2010, within an EU twinning programme, the creation of an **inter-sectoral centralised database, with electronic data transmission through portable devices** was designed. It remains inactive due to lack of portable devices for the entire manpower.

Training for road safety data collection by Police officers is considered to warrant further enhancement, as the current practice is mostly based on informal transfer of knowledge from one officer to another.



### ***Definitions***

Due to the situation in the country, **the 30 days definition of fatality is not applied.**

**Injury severities** are roughly assessed as follows:

- Severe: involving skin penetration, or head / chest injury
- Middle: arms and legs injuries
- Simple: other

The variables collected cover all main aspects of the crash, the drivers and the vehicles involved.

The definitions of variables and values have been harmonised between the key stakeholders involved in the development of the intersectoral database. The stakeholders showed strong interest in road crash data harmonization with international protocols, namely EU standards, and expressed their willingness to further discuss and work on these aspects within the activity.

Known difficulties with variables and values concern the precision in the accident location, the alcohol testing (which is much less frequent than drugs testing)

### ***Data processing and storage***

A detailed demonstration of the, inter-sectoral database and application was made. The application aims to allow:

- (i) data entry by three key parties involved, with a unique identifier so that follow up can be made, and
- (ii) data retrieval for analysis purposes by all parties, including the Ministry of Transport - albeit with different access rights. It also allows data retrieval for fully disaggregate analysis.

Beyond the infrastructure and technical issues that need to be addressed, the ultimate challenge would be to engage all stakeholders to use the application (especially Hospitals).



The EuroMed team strongly recommended, given the constraints for the full operation of the application, to work at the same time on a "plan B", namely the improvement of the current data and the strengthening of the coordination between the three key players collecting the data, in order to improve the accuracy and quality of the current system.

#### 4.2.3. HEALTH SECTOR DATA

Unlike most countries, the Ministry of Health (Hospitals) are responsible for the follow-up of crash casualties for the 30-day period and the related update to the Police. However, in practice this is done to a very small extent. Moreover, after a few weeks following the crash, the initial cause of injury will not be assigned to the related death.

Since all fatalities are reported to the Ministry of Health, and to the Statistical Authorities thereafter, the vital registration data in Egypt are very complete and highly reliable - hence the acceptance of the figures by WHO and **the classification of the country in 'group 1'**. Consequently, the large discrepancy between the Police reported fatalities and the WHO estimates can be fully understood.

During the meeting with the EAO, additional useful details were provided as regards the road safety data collected and the related procedures for processing, storage and validation, as well as the terms of data sharing. The EAO is the 1<sup>st</sup> respondent in 95% of road crashes. More than 40% of cases are automatically recorded after the radio signal, while the remaining 60% are manually processed at a later stage.



Moreover, it was described how the data is used to support decision-making within the organization, namely as regard the monitoring of the efficiency of the EMS. A high level of confidence over the credibility and completeness of the data was reported (>85% completeness). However, it was noted that private hospitals (and ambulances) do not systematically notify on fatalities.

The current efforts to coordinate data collection and estimate a global figure for fatalities in Egypt mostly occur within the WHO joint data validation group formed to validate the total number of fatalities from all three sources; however, figures are not yet published due to pending security clearances.

The EOA also highlighted that, as in most LMI countries, there is a **large share of fatalities occurring beyond the 30 days**, due to the weaknesses of the health care system, and this clearly makes the necessary follow-up of casualties more demanding.

It was also pointed out that minor injuries not needing medical treatment may be missed by the recording system.



#### 4.2.4. INTERSECTORAL COOPERATION

All stakeholders met with, acknowledged the serious limitations posed by the fragmentary data collection in Egypt and shared the need for more coordinated efforts. In this respect, the inter-sectoral database and application, developed by the Ministry of Interior within a recent twinning project, but currently inactive, appears to be the most pertinent way forward.

#### 4.2.5. DATA ANALYSIS AND PUBLICATION

There is currently no information about the data analysis and publication procedures.

### 4.3. Jordan



#### 4.3.1. ROAD SAFETY DATA MANAGEMENT IN THE COUNTRY



The PSD (Public Security Directorate) is the leading agency for road safety data management, under the Ministry of Interior.

In Jordan there is a **national road safety strategy**, with the main target being to reduce number of fatalities by 10% within 3 years.

#### 4.3.2. POLICE DATA

##### *Data collection process*

The Joint Command Control Centre receives all the emergency calls in the country through 911 number. It is the first actor to be notified for a traffic crash, and after dispatching the appropriate Police or other emergency units, the record is closed. The operations call centre and the control centre include 700 CCTV cameras used both to identify and to investigate incidents.

It was reported that all accidents with casualties are considered very serious incidents, subject to a Police investigation, so under-reporting is considered "non-existing". Moreover, property damage only accidents are also considered to be fully reported.

A **new electronic data collection system** is in place since 2014. Detailed data on each road crash, including GPS information, is entered through an application installed in a tablet notebook, and transmitted on-line to the central database, which is hosted at the Licensing Department of the Public Security Directorate.

A related **training course of 11 weeks** (including 3 weeks field work) is given to Police officers.



A medical report is sent by the Hospitals to the Police (Traffic Department) to update the records at 30-days after the crash. The follow up is also done by police stations who have police officers in most hospitals. There is strong confidence that the procedures are followed, because the regulation is very strict and there are consequences for omitting to perform these duties.

However, a small scale "real" under-reporting cannot be excluded.

### **Definitions**

Basic definitions used are documented on traffic law and related legislations, and most of them are reported as "taken from international definitions" (although this cannot be fully confirmed). The following Table 4.1 shows the main definitions (accident, fatality, serious / slight injury) as shown in the official documents.

Table 4.1. Definitions of basic crash variables in Jordan

<b>Traffic Accident</b>	Any incident caused by at least one vehicle resulted in injuries or fatalities or property damages only.
<b>Fatal injury (Fatality)</b>	Is the infection that usually lead to death, either directly or because of complications during one month of the incidence
<b>Slight Injury</b>	Any injury resulting from a traffic accident, including superficial wounds and bruises, as well as entries to the hospital for a period not exceeding (24 hours). Definition does not include scratches and bruises and enter the hospital for surveillance.
<b>Serious Injury</b>	Is the infection that needs specialized medical interventions, both within hospitals or outside, such as surgery or treating bone fractures, or deal with cases that nerves and other; includes cases of head injuries and loss of consciousness according to (Glasgow coma scale) : (0-15 ) infection is severe if the measurement at least (10)..

The formal data collection form is very comprehensive and detailed and include information about the drivers, vehicles, road, causalities, damages, weather, road conditions etc.

The injury severity is defined by medical reports that delivered to police officers.

The data are largely complete, as the on-line application does not allow to proceed to the next field if there is missing information.

However, there are some known difficulties: the tablets use sim cards and some accident locations may have poor net coverage. Seat belts and helmets may not be accurately reported by traffic accident investigators. BAC and driving under the influence drugs may be hard to be revealed by traffic accident investigators.



### **Data processing and storage**

PSD is the host of the database and the Jordan Traffic Institute has access.

Crash information entered is detailed and comprehensive, including an electronic sketch and photos of the crash scene. Moreover, **vehicle and driver information are automatically retrieved from the Licensing Department databases, which are linked with the system**, once a driver or vehicle #id is entered in the application.

Crash records are updated at the end of each month with medical records (30-days definition) and forwarded to Court, Insurance etc.

The current system is modern and robust, and clearly includes many good practice elements. Pending challenges mentioned include a lack of man-power which may occasionally result in incomplete records, as well as some issues with GPS network coverage which may in few cases result in inaccurate accident location information.

The Studies Unit of the Licensing Department is responsible for retrieving data for analysis purposes. Within the team, there is **an “Audit Office” responsible for the quality control** of accident records in the database - when an error is identified, the Police Officer responsible is contacted for clarification.

Two members of the Unit have access to the central database, through a desktop computer application which allow to retrieve 80 predefined Tables. In case more detailed information is needed, it can still be provided by the Licensing Department.

The Department hosts all the transport related databases: driver licenses, vehicles, accidents, traffic violations. The Traffic System Unit in particular, is the IT department serving as administrator of the central accidents database system. An accident mapping tool is also available within the Unit.

Access rights are regulated by respective legislation. In principle, data are available to all requesting parties, provided that the query complies with the respective legislation. Monthly statistics are systematically communicated to the Ministry of Transport.

#### **4.3.3. HEALTH SECTOR DATA**

Jordan mortality data are in accordance with WHO guidelines for the classification of diseases and causes of death (i.e. the WHO death certificate model and the ICD-10 protocol).

The Ministry of Health systematically publishes the annual VRD statistics on the basis of death certificates data, which are considered very complete. The published VRD figures on traffic fatalities are only slightly lower than the Police figures, suggesting that the country may be very close to bridging the difference.

Moreover, there are **two known concrete reasons for the discrepancy** (see Figure below):

- The published VRD statistics concern only Jordan nationals, while the Police data concern accidents on the territory for all nationalities. Non-Jordan nationals are



currently estimated at more than 35% of the population. The Ministry of Health has the VRD of non-Jordan nationals who died in the country, but do not include them in the published statistics.

- There is a large share of VRD causes of death registered as "multiple injuries from event of undetermined intent" and there is strong indication that a large share of these causes of death are due to traffic accidents - erroneously registered as such by hospital doctors.

#### 4.3.4. INTERSECTORAL COOPERATION

There is currently little intersectoral cooperation in the country as regards road safety data, but main stakeholders expressed their readiness to strengthen cooperation and exchange of information.

The Ministry of Health and the Police representatives agreed to start a joint pilot study to cross-check the death certificates of "multiple injuries from event of undetermined intent" based on the unique victim identifier, which is available in both Police and MOH files, in order to determine the share of traffic fatalities erroneously classified under this cause.

#### 4.3.5. DATA ANALYSIS AND PUBLICATION

The Jordan Traffic Institute is responsible for issuing **the Annual Report on road safety**, which is available for download at their website. The Institute receives detailed road safety data from the Traffic Department or the Licensing Department upon request.

Data are reported to be sent to WHO and IRTAD.

### 4.4. Lebanon



#### 4.4.1. ROAD SAFETY DATA MANAGEMENT IN THE COUNTRY

The structure of road safety management in the country is based on the **Higher Council for Road Safety** (HCRS) chaired by the Prime Minister, and the National Committee on Road Safety (NCRS) chaired by the Minister of Interior, which is the main consultation body.

A budget for the HCRS is approved by the Parliament, but it is mostly devoted to micro scale projects at regional and local level (e.g. municipalities, schools).

A **new Traffic Law** was introduced in the country on 2012, establishing the role of the NCRS, however responsibilities with respect to road crashes reporting and data handling were not defined, and this is considered a major pending issue for the improvement of the quality of road safety data in the country.

A National Strategy for Road Safety remains to be developed. Relevant priorities are the improvement of speed enforcement through better training and deployment of the ISF (Internal Security Forces).



There have been several existing recent project and activities at national and international level dealing with road safety data in the country, namely:

- A recent diagnosis on road safety data made in the country (SSP project)
- A Study on Road Safety in Arab countries, of the UN Decade of Action
- A Report on Transport and Sustainable Development Goals in Arab countries
- A Global Road Safety Partnership project on road safety.

#### 4.4.2. POLICE DATA

##### ***Data collection process***

Injuries are only recorded by the Police when there is an investigation of responsibility (formally notified by hospitals). However, there are discrepancies in the way procedures are followed by different hospitals. Moreover, if the injured person does not wish for a complaint, the Police will not further pursue the investigation. Another example is single vehicle accidents, where often an investigation is not applicable. A Red Cross representative is now in the Traffic Management Centre of the ISF to improve coordination.



The current Data Collection Form structure and content, variables and values and procedures for following up on the crash described during the consultations appear satisfactory in terms of both data completeness and country coverage. However, a copy of the Data Collection Form should be made available to the EuroMed TSP for a more thorough assessment of the quality of the data collected.

A proposition of updated Data Collection Form has been made, with the explicit purpose to allow better analyses of the causes of the crash and remove the focus of data recording from the purpose of assigning the blame for the court. The proposed template is to be further discussed and validated within 2018-2019.

Training procedures for Police officers are in place for filling in the data collection form.

##### ***Definitions, variables and values***

Currently **no limit (e.g. 30 days) is assigned to road fatalities recording**, as the process is closely linked to the court investigation, which typically exceeds 30 days and may even last over a year – consequently, a small share of fatalities may be registered on the subsequent year than that of the crash.

The variables recorded include:

- Date, time, place of the crash
- Crash type



- Road type and geometric design (layout, number of directions, separation, bridge / tunnel etc.)
- Cause(s) of the crash: violations (speeding, priority etc), lighting or weather conditions, traffic signs, distraction or fatigue, alcohol or drugs, criminal act, road design, pavement conditions, etc.
- Vehicle type, model, registration year
- Driver age and gender

A sketch of the crash configuration is included.

Known problems with the completeness or accuracy of variables mainly concern alcohol and seat belt use. The key variables ("1<sup>st</sup> page of the form") are very complete.

The issue of injury **under-reporting is fully recognized** as an important issue requiring substantial efforts for improvement. Stakeholders feel that only small part of it is "real" under-reporting (e.g. crashes not reported to the Police), and mostly it is due to heavy workload / limited capacity of the Police. To a small extent, the Police investigating the crash may omit to fill a Data Collection Form or may omit to transfer the data to the database.

#### ***Data processing and storage***

Crash data are forwarded to two destinations: the IT department of the ISF, and the TMC – however a common server is used.

**Data are entered in the database only when the juridical investigation is completed.** The crash entry is reported to be created on the day of the crash, and the data are completed at the end of the investigation.

Small coding errors may occur, as there is no formal data quality control procedure.

The crash database was recently updated to Oracle but there are administrative and technical issues pending that do not allow full exploitation of the data.





#### 4.4.3. HEALTH SECTOR DATA

##### **Hospital data**

In Lebanon the Red Cross has a key role in crash casualty intervention, however other emergency services exist, but are much less thorough in reporting crash injuries.

##### ***Under-reporting***

No formal follow-up of injuries is foreseen after the crash from the ISF, however as the process is closely linked to juridical investigation, it is expected that the Police is notified when fatalities occur in the hospital (Hospitals are obliged by Law to inform the Police for all crash casualties).

In general, Hospitals may not always participate in crash casualty reporting procedures, as this is considered a 'medical' issue. However, it is believed that Hospitals have every interest to declare serious and fatal injuries to the Police, and therefore under-reporting should mainly concern slight injuries.

On 2015, a project was initiated aiming to develop a hospital sheet for casualty recording by the Ministry of Health, however the progress is currently unknown.

A MoU is established with the American University of Beirut in order to work on the question of cross-checking crash injury reports.

##### **Vital Registration Data**

Regarding Vital Registration Data (VRD), information is recorded and exists, however it has never been published / used by road safety stakeholders.

#### 4.4.4. INTERSECTORAL COOPERATION

Cooperation between Police, Health, Transport and Insurance sectors is limited.

#### 4.4.5. DATA ANALYSIS AND PUBLICATION

There is currently **lack of a national publication** of detailed road safety statistics; some bulletins are issued on occasional basis.

The ISF transfers basic information (e.g. fatalities per gender, vehicle type, crash type) to the NCRS. The National Statistical Office also requests for road crash statistics, which are included in their publications. Moreover, data are supplied for research or other purposes (e.g. consultants, NGOs) on a request basis.

The creation of an **Observatory of Mobility and Road Safety has been approved by the HCRS**, however no concrete progress has been reported.

A contact with IRTAD is made in order to harmonize national data with the IRTAD protocol with the aim to proceed with accession within 2018 – however no concrete action has been made thus far.



## 4.5. Morocco



### 4.5.1. ROAD SAFETY DATA MANAGEMENT IN THE COUNTRY

The structure of road safety management in Morocco, the data collection and processing procedures as well as recent upgrades and future visions for the data collection and analysis systems were described in detail during the mission.

The Lead entity for road safety management in the country is the Directorate for Road Transport and Road Safety (**Direction des Transports Routiers et de la Sécurité Routière - DTRSR**) of the Ministry of Infrastructure, Transport Logistics and Water. Ongoing developments to establish a multisectoral lead entity were reported.



The first national road safety strategy of the country covered the period 2004-2013. The **new National Road Safety Strategy 2017-2026 sets the following quantitative targets**, namely: the reduction, by 2026, of road mortality by 50% compared to its current level (less than 1900 killed on roads in 2026), with an intermediate target of 25% (not to exceed 2800 killed in 2021).

The targets set by the 2017-2021 National Road Safety Strategy and validated by the Head of Government on 18 May 2017 are the result of a detailed analysis of road safety data. This analysis identified five strategic issues, namely:

- Pedestrians
- Powered Two- and Three-Wheelers
- Single vehicle accidents
- Children under 14
- Professional transportation

An evidence-base culture spans the road safety management processes in the country ("if you cannot measure it you can not improve it").

### 4.5.2. POLICE DATA

#### *Data collection process*

The Police is responsible for filling in the forms for data collection of road traffic accidents. The Police is notified by a signal with basic information on the crash.

The data are collected by the officers and investigators at the place of the accident under the aegis of the competent public prosecutor. The information is sent from the field to the central level, which checks the forms before they are sent to the Roads Directorate.



The information collected on the spot is: date, time, place of accident, circumstances, responsibilities, apparent condition of vehicles, hearing of witnesses and victims according to their state of health, weather conditions. Further information is collected as part of the crash follow-up on the health status of the victims (serious injuries and minor injuries).

The **Data Collection Form** is in paper form; no electronic means are used for the data collection (including photos or videos), and no GIS information is available.

A **monthly validation** is made by a signals committee (provisional vs. final data), through the cross-checking of final data with the initial signal information, before transmitting the data to the Roads Directorate.

The national data collection form and the related training procedures were revised on 2012.

### **Definitions**



**The 30-days definition for fatalities is rigorously applied, and 6-days hospitalization is used to characterise to serious injuries;** on that purpose, the legal medical certificates issued by the hospitals. The determination is made during the follow-up.

The accident is defined as a traffic incident resulting in bodily injury, occurring on a lane open to public traffic and involving at least one vehicle. Non-motorized users are included. Private roads and unpaved roads are also included.

The basic variables and values concerning road layout, crash, vehicle and driver characteristics are collected.

There are known problems with determining crash location. Also, some incomplete fields are observer (i.e. a tendency to code "other" rather than one of the fixed values). The cause of the crash is not adequately identified through the existing procedures.

### **Data processing and storage**

The data are processed and stored by the Roads Directorate, who is the agency responsible for the collection of the forms, the verification and correction of data, and the exploitation of data for the preparation of provisional and final reports for dissemination.

The Roads Directorate also hosts the national database, which is a relational database consisting of four Tables:

- Accident
- Vehicle
- Passenger
- Pedestrian



A **rigorous quality control procedure** is implemented for checking the consistency of data, by a Temporary Traffic Accident Data Review Board.

**Under-reporting** is considered minor as an authorisation is needed to issue a death certificate for a killed person without any investigation or autopsy.

Small issue from people trying to profit by insurance, they deserve a large compensation so have every interest to report the crash. Moreover, the hospitals are obliged to alert the Police when there is an injury.

#### 4.5.3. HEALTH SECTOR DATA

Both ambulances and hospitals records exist on road crash victims. Hospitals patient admission record contains information about the identity, age, gender, reason for admission and address of the victim.

Certain fatalities which occur "on the spot" may escape the hospitals, but in principle these should be available in the Police records – also private hospitals may be less rigorous in reporting.

All deaths are associated with a medical cause, however there is a considerable issue with **VRD in the country, as these are very incomplete and not published.**

#### 4.5.4. INTERSECTORAL COOPERATION

Morocco has **various road safety management bodies where the different stakeholders sit**, namely:

- The Interministerial Committee for Road Safety: chaired by the Head of Government.
- The Standing Committee on Road Safety: chaired by the Minister of Transport.
- Central Commission for monitoring control actions and the application of sanctions.
- Regional Road Safety Committees:
- National Committee for the Examination of Statistical Data on Road Traffic Accidents.
- National Committee for the Prevention of Traffic Accidents – mainly responsible for the measurement of behavioural indicators

An **intersectoral database** is also available, namely a GIS application for the road network, which is linked to the crash location determination and traffic counts data.

#### 4.5.5. DATA ANALYSIS AND PUBLICATION

Both the Police and the Ministry of Health regularly publish data (also on serious road injuries), The national statistics also publish crash fatality figures.

Regional authorities have access to the national database, as well as all main stakeholders. The data are regularly used in decision making, for targets definition, high risk sites identification etc. An observatory is under development; this is planned at the level of the project for the creation of the Lead Agency for road safety.



Road safety data are regularly sent to WHO and to IRF. Morocco is under accession to IRTAD, pending the data review which is in progress.

## 4.6. Tunisia



### 4.6.1. ROAD SAFETY DATA MANAGEMENT IN THE COUNTRY

There is no real road safety lead entity in the country with sufficient authority over all relevant ministries. No national strategy or action plan on road safety has been formed.

The stakeholders expressed concerns about the quality of road safety data in the country, as they consider Tunisian road safety performance very poor and that till now the country has not succeeded to adequately address the problem and identify the most effective ways to do so. However, they are convinced that the availability of accurate road accident data is a key first step, while additional data (exposure, performance, etc.) is equally important.

### 4.6.2. POLICE DATA

#### *Data collection process*

The Traffic police and the Garde Nationale (depending on the accident location) oversee collecting and exploiting all traffic accidents data with bodily injury. The **National Observatory of Road Safety** collects data, indications and documents from all origins, maintains a digital and geographical database on road safety, and works for integration into national and global



networks for the exchange of traffic data and information.

When an accident occurs, law enforcement officials intervene to gather information, to investigate and to draw up a report describing the circumstances of the accident.

Data collection is done without following any standard form. At the police or national guard traffic station, the information collected in the field is transcribed on four types of documents:

- The flash (signal)
- The telegram



- Body Accident Analysis Bulletin (BAAC) – the national data collection form
- The minutes to be used for the verbal process

Electronic means are used but only for data transmission.

The stakeholders consulted expressed concerns about the **non-utilization by the competent authorities since several years of the “national data collection form” on the spot**, and the crash details being recorded in a qualitative / descriptive way (“blank page”) i.e. a report without a pre-existing format. The data is filled in the electronic system based on this report and / or the verbal process report.

The follow-up of casualties is made at local level, and the respective officer (notified by the Hospitals) informs the Observatory to update the victim status; The procedure is regarded as incomplete and inducing under-reporting.

More specifically, under-reporting is possible both due to crashes not being reported to the Police, and due to the police not going to the crash due to proximity priorities, or not record the crash because it is minor (not worth the administrative burden).

### **Definitions**

An accident is defined as any accidental event, occurring on the road, involving at least one vehicle and causing injury or damage. Non-motorized users are included. Unpaved roads are included, but private roads are not included.

The **30 days definition** is applied for fatalities. The information comes from the health sector (public and private) via the death certificate which is transmitted to the Police and the National Guard. There is a systematic follow-up of all the accidents thanks to the data contained in the reports of the accidents of the road which are the final official documents adopted by the administrative and judicial authorities

Injury severity is not defined in the road crash database.

Moreover, in contrast with common practice, **road layout variables are not recorded** in the data collection procedure.

The accident cause is not properly defined, and the completeness of the data is not satisfactory.

### **Data processing and storage**

The national database is hosted within the Observatory and it is a relational one, structured according to the typical structure adopted by most countries. The data is disaggregated by Accident ID, User ID, Vehicle ID. The Garde Nationale also hosts a database.

The Garde Nationale and the Observatory regularly **cross-check their statistics**.

Personal data are not stored in any of the databases.

The current national project on "National Geographic Information Infrastructure: INIG" and the associated Geo-portal) is considered as a very useful option for managing and sharing related



data to road safety in the future, for instance by making road safety data a thematic layer of the target system (digital and geographical data, decision support, etc.).

The stakeholders in the country reported their ambitious vision to further upgrade their systems, by using Big Data technologies and related techniques (data mining, deep learning) to meet the requirements of management, processing, storage and especially analysis of data that are unstructured and coming from very diverse sources such as connected objects. The Ministry of Communication Technologies and Digital Economy has developed a National Strategic Plan to position Tunisia as an international reference for digital development for socio-economic development and provide Tunisia with a technological infrastructure in phase with a modern economy, and the road safety stakeholders are eager to exploit the opportunities that can be created.

#### **4.6.3. HEALTH SECTOR DATA**

The Health sector collects data at the level of the emergency services, which is the first destination of victims of road accidents. The data available is considered quite reliable and comprehensive and are used to better manage road accidents that are recognised as a public health problem.



However, as in most countries, the Ministry of Health does not dispose digitalized medical records. A related project is starting but it may take up to 10 years before it is fully operational.

Although the right protocols (e.g. ICD-10) are used for injury classification in the Hospitals, they are not used to assign crash injury severity, and no formal definition of serious injury exists in the country.

Within a Ministry effort to improve accidentology and emergency data as regards major road accidents, an instantaneous reporting system for Emergency Rooms has been established (the related data collection form was shared), transmitting data from (public) Hospitals to the Ministry. The system is considered to cover 90% of serious crashes. However, fatalities are often taken directly to the morgue, so there is known under-reporting of fatalities in this system. Recent comparisons with the National Observatory Police data reveal a 60% under-reporting of fatalities by this system.



**Under-reporting of health sector data** is due to a number of reasons: private hospitals may not report data, cause of injury may be misreported by the patient, lack of skills and training of the personnel too.

Death register / vital registration data is responsibility of the Institute of Public Health (Ministry of Health), which is however fed by different sources:

- Hospital data;
- Municipal vital registration data.

both provided through departmental services directly to the Institute (municipal authorities are supposed to send a copy of all death certificates but often omit).

**Completeness of vital registration data through death certificates is assessed at ~80%.** Sometimes these certificates are informal, provided by individual doctors, without standardized and proper way of stating the cause of death. Sometimes the cause is not accurate (e.g. "violent death"). A major concern is the fact that the cause of death from road crash is not adequately individualised.

A death certificated based on WHO international model is developed to properly record cause of death, but it includes many pieces of information and is not systematically used. Not all doctors are able to fill it in, due to lack of training.

**Vital statistics have not been published since 2014**, due to Institute's lack of capacity. Consequently, it is not clear what data are sent to WHO and when, and why WHO rejected this data in the latest Global Status Report on Road Safety.

#### 4.6.4. INTERSECTORAL COOPERATION

The cooperation between stakeholders needs to be substantially improved. The Ministry of Health and the Ministry of the Interior are currently considering how to set up a system for exchanging information in the field of road accident data.

#### 4.6.5. DATA ANALYSIS AND PUBLICATION

The National Observatory of Road Safety ([www.onsr.nat.tn](http://www.onsr.nat.tn)):

- Conducts research and evaluation and forecasting studies.
- Publishes periodic reviews (including daily reports accessible to all users).
- Cooperates with the various stakeholders.
- Designs programs and policies for the development of the road safety sector and proposes appropriate preventive measures and develops communication and awareness strategies

Despite important efforts, the Observatory is still considered to have weaknesses. The reporting is considered satisfactory for fatalities but less so for injuries. Stakeholders expressed their uncertainty about the completeness and quality of the data.



In addition to WHO, some data are sent to the United Nations Economic and Social Commission for Western Asia (ESCWA) as part of the Integrated Transport System between the Arab States (ITSAS) project.



## 5. ANALYSIS OF THE DISCREPANCIES BETWEEN WHO AND COUNTRY REPORTED DATA IN THE EUROMED REGION

In the previous Chapters, a detailed analysis of road safety data collection methods, quality and compatibility with international definitions was presented, regarding both the Police data and the Health sector / Civil registration data. In this chapter, a focus is placed on the question of road crash casualty under-reporting and the resulting differences between country reported and WHO estimated road traffic fatalities<sup>3</sup>.

The difference observed between the countries reported data on road traffic fatalities with the respective WHO estimated fatalities included in the Global Status Report of Road Safety (WHO, 2015), is a matter of concern for many countries who are interested in the reliability and accuracy of their data systems and raises the need to better understand the data properties and quality issues behind these differences.

As shown in Table 5.1, **in the EuroMed region these differences range from 55% to up to 150%** and their reduction is a major challenge for the EuroMed Partner countries.

Table 5.1. Comparison of reported fatalities and WHO estimated fatalities for the EuroMed partner countries

	National reported Fatalities*	WHO estimated fatalities	Difference	Difference in %
<b>Egypt</b>	6700	10466	3766	56%
<b>Lebanon</b>	649	1088	439	68%
<b>Tunisia</b>	1505	2679	1174	78%
<b>Morocco</b>	3832	6870	3038	79%
<b>Algeria</b>	4540	9337	4797	106%
<b>Jordan</b>	768	1913	1145	149%

\* All countries use the definition of fatalities killed at 30 days from the crash, except Egypt (killed at the accident scene) and Lebanon (killed in unlimited period following crash)

<sup>3</sup> This Chapter is a summary of the joint EuroMed/WHO publication “Understanding and bridging the differences between country reported data and WHO estimated road traffic fatality data” (2018).



## 5.1. Understanding the differences in the EuroMed region

Table 5.2 shows the country reported data and the VRD on road traffic fatalities received by WHO, as well as the respective country classification regarding the EuroMed Partner countries. It is observed that the only EuroMed country for which VRD meet the WHO quality criteria is Egypt, while all other EuroMed countries are classified in Group 4, and the WHO statistical model is used to estimate their fatalities.

For instance, Lebanon and Algeria do not report VRD, while the completeness of reported VRD by Tunisia and Morocco is very low.

It is worth highlighting, however, that **there is no single reason for the observed discrepancies** between country reported fatalities and WHO estimates; while the difference is largely due to the poor quality of VRD, there are also considerable gaps and limitations in the country reported fatalities. For example, Egypt and Lebanon do not use the 30 days definition, while Tunisia has reported difficulties in the complete reporting of its fatalities.

Table 5.2. Analysis of country reported fatalities, reported VRD and model-based WHO estimated fatalities for the EuroMed partner countries

	Global statistics	Status Report	VRD statistics**				
	National reported fatalities*	WHO estimated fatalities	Reported VRD	Year	Completeness	Country classification Group	
<b>Egypt</b>	6700	10466	11000	2014	>80%	1	
<b>Lebanon</b>	649	1088	-	1999	-	4	
<b>Tunisia</b>	1505	2679	298	2013	22%	4	
<b>Morocco</b>	3832	6870	781	2012	12%	4	
<b>Algeria</b>	4540	9337	-	-	-	4	
<b>Jordan</b>	768	1913	669	2012	60%	4	

\* All countries use 30-days definition except Egypt (killed at the accident scene) and Lebanon (killed in unlimited period following crash) \*\* Figures of latest year available

The only EuroMed partner country classified in Group 1 based on the completeness of its VRD is **Egypt**. Thus, WHO estimated number of fatalities for Egypt is based on the actual VRD reported. However, there is a challenging situation as regards road fatalities data collection in the country, as explained in section 4.2, with different stakeholders recording fatalities on different time periods after the crash. Therefore, in the case of Egypt, the national reported fatalities based on the Police data, are clearly an underestimation of the actual fatalities.

On the other hand, **Morocco** has several good practice elements in road safety data collection: engagement and systematic cooperation among key stakeholders, compliance to international



definitions and standards, and several steps of data cross-checking and validation before the publication of country reported fatalities. However, the VRD reported in Morocco show a very low number of fatalities (5 times lower than those reported by the country), leading to the classification of the country in Group 4.

In **Jordan**, although the difference between country reported fatalities and WHO estimates is the largest in the region, there seems to be good potential for improvement, as the VRD reported are relatively close to the required level of completeness (~60%). Moreover, there are known reasons for road fatality related VRD under-reporting in the country, such as the non-inclusion of VRD of foreigners, and a misclassification of the cause of death for a part of the traffic victims.

In **Lebanon**, the 30 days definition of fatality is not used in the country reported data. Moreover, the country does not report any VRD to WHO. Further consultation with Health / VRD sector stakeholders will be pursued during the next stages of the project, in order to further clarify this question.

**Algeria** also does not report any VRD to WHO. Stakeholders in the country reported that VRD are available and to a fair level of completeness, however follow-up is needed in order to identify the reasons for not reporting VRD.

Finally, **Tunisia** reports very low number of fatalities on the basis of VRD, which cannot be considered eligible by WHO. Stakeholders reported difficulties in the country for drafting death certificates as per WHO standards (especially by private practitioners), and delays in processing the death certificates by the responsible authorities due to workload.

## 5.2. Ways to bridge the difference

First, it is underlined that **the perfect matching of country reported data and WHO estimates is by no means the ultimate objective, and a small difference is reasonable**, as there is a known difference in fatality definition (unlimited time for the VRD versus 30 days for the police-based data).

The EuroMed TSP and WHO are engaged in assisting countries understand the WHO methodology and the related estimates and provide technical assistance to the countries wishing to improve their data systems. Recent experiences confirm that countries that have worked closely with the WHO improved their understanding of the discrepancies and eventually their data quality. WHO recognizes the limitations of a model-based estimate, which has uncertainty as any model estimate, and strongly encourages the countries to strengthen cooperation amongst stakeholders, to improve their data and eventually be shifted from Group 4 to Group 1.

### 5.2.1. ESTABLISHMENT OF INTERSECTORAL COOPERATION

The first step is the **identification of the problem, and the establishment of cooperation between the Police, the Transport Sector and the Health / VRD Sector**. The mobilization



of all relevant authorities is an important prerequisite in ensuring the engagement of the pertinent agencies to the common objective of improving road fatalities data.

At the same time, countries are strongly encouraged to **establish cooperation with the WHO Violence and Injury Prevention Department** for the detailed discussion of the country-specific challenges, and the request for tailored advice and assistance.

### 5.2.2. REGIONAL STUDIES ON UNDER-REPORTING

Given the several administrative steps, time and resources involved in improving VRD to meet the WHO criteria and be shifted to Group 1, **an intermediate and perhaps more realistic objective would be targeting the shift to Group 2.**

This can be achieved through the cooperation of the Police and the Health Sector to implement **one or more regional studies aimed at estimating the level of under-reporting of road traffic fatalities**. Such studies are based on the **linkage and matching of records in Police and Hospital databases over a given area**, with coverage by specific Police departments and Hospitals. There are different methods to perform this linkage, and their description is beyond the scope of this report. However, such studies can be implemented with relatively low resources, and the cooperation with Universities or Research Institutes may open opportunities.

There are numerous relevant experiences from European countries (e.g. France, Greece, the Netherlands, and the UK) (Amoros et al. 2006; Petridou et al. 2009; Broughton et al. 2010). The added value of such studies, although not contributing directly to the improvement of VRD, is that they allow to better understand the degree and the sources of road fatality under-reporting in the country, and to identify specific gaps and issues that warrant further attention (e.g. geographic areas, specific populations etc.).

**The results of such studies allow the estimation of correction coefficients for the number of fatalities found in each data file.** The results may be examined by WHO to determine whether they can be exploited to **replace the model-based WHO estimate**, and shift the Country from Group 4 to Group 2.

### 5.2.3. IMPROVEMENT OF VRD

A prerequisite for a country's VRD to be considered eligible is the **adoption and use of the ICD-10 protocol of classification of diseases**. Moreover, the adoption and use of the **WHO death certificate model** is an important step in the improvement of VRD.

Acknowledging that this death certificate model is often found to be complicated, especially for private practitioners in the countries, **WHO offers the option to prepare a 'simplified' death certificate model** which is more usable especially at the first steps of implementation. Subsequently, **a pilot project** can be implemented with the assistance of WHO. Following optimization, a formal adoption and full-scale implementation can then be tested for e.g. six months, and this is expected to demonstrate a major improvement in data quality.

Countries are strongly encouraged to **establish cooperation with WHO** in order to investigate the potential of such assistance and the country-specific details.



## 6. SYNTHESIS AND DIAGNOSIS

This Chapter includes a synthesis of the state of the art regarding road crash data in the EuroMed partner countries and a country 'diagnosis' with respect to international good practice.

### 6.1. Algeria



A clear road safety data management structure exists in Algeria, with the Centre National de Prévention et de Sécurité Routières (Lead Entity under the Ministry of Interior) acting as a national Observatory.

There is a dual data collection flow by the Police and the Gendarmerie, and the two agencies have not fully harmonised their means and procedures. For instance, electronic means for data collection and GPS are used only by Gendarmerie. The national database is currently hosted by the Police, but another system is under development, namely a central database that will be powered and operated in real time by all the police services.

The definition of person killed at 30-days is applied in the country, but it is not clear whether full follow-up is made. Moreover, there seems to be currently no differentiation between serious and slight injuries (which are distinguished "based on the estimation of the investigator").

The road crash statistics on the country are regularly published on-line, and it is reported that the data is used by several stakeholders for policy making and user education.

Regarding VRD, the ICD-10 protocol is used for causes of death, as well as the WHO death certificate. However, there is lack of completeness in the related records: only 40% of deaths are collected by the cause of death registry from all causes, the main reasons being the lack of training and skills.

*Further discussion with Health Sector and VRD stakeholders will be pursued in a future mission.*

Table 6.1. Road safety data 'diagnosis' for Algeria

#### Good practice elements

- ✓ Lead agency and clear road safety management structure
- ✓ Project for centralizing crash records for all police services
- ✓ National Road Safety Observatory and publication of data

#### Elements needing improvement

- ? Strengthening efforts for 30-days follow-up
- ? Harmonise equipment and procedures between Police and Gendarmerie



- ? Cross-checking of Police and Hospital data to estimate under-reporting
- ? Update National Data Collection form to include international definitions of crash characteristics

## 6.2. Egypt



A unique context exists in Egypt, as road safety data collection is fragmented between three different key stakeholders, each one managing crash casualties within a different time frame

- The Traffic Police is responsible for recording only fatalities 'on the spot';
- The Egyptian Ambulances Organisation (EOA) records any fatalities that occur during the transfer (pre-hospital);
- The Ministry of Health, through Hospitals, records fatalities once admitted to a hospital and thereafter, without a time limit;

Data structure and content, variables and values and country coverage are considered satisfactory.

However, unlike most countries, the Ministry of Health (Hospitals) are responsible for the follow-up of crash casualties for the 30-day period and the related update to the Police. Moreover, in practice this is done to a very small extent.

A full assessment of the Health Sector data and VRD is pending, however it is considered to be less critical compared to other countries, and the VRD of Egypt are already sufficiently complete for the country to be classified in WHO Group 1. Nevertheless, there may be potential for further improvement, as for instance there are concerns in the country that after a few weeks following the crash, the initial cause of injury may not be assigned to the related death. In addition, follow-up is needed in a future mission in order to promote the strengthening of cooperation between Police, Health and VRD sectors, which is currently limited.

Finally, further efforts are recommended regarding data publication and sharing in the country.

Table 6.2. Road safety data 'diagnosis' for Egypt

### Good practice elements

- ✓ Vital Registration Data meet the WHO quality criteria, country is in Group 1
- ✓ Inter-sectoral database and application developed to allow (i) data entry by three key parties involved, with a unique identifier so that follow up can be made, and (ii) data retrieval for analysis purposes by all parties.



## **Elements needing improvement**

- ? Adoption of 30-days definition and proper follow-up of fatalities
- ? A "silo" effect between stakeholders, recent initiatives for cooperation are pending security clearances for data sharing
- ? The inter-sectoral database is inactive due to lack of equipment
- ? A "plan B" needed for the improvement of the current data and the strengthening of the coordination between the three key players
- ? Update National Data Collection form to include international definitions of crash characteristics

### **| 6.3. Jordan**



In Jordan there is a modern and comprehensive road crash data collection system. A new system is in place in the recent years (achieved national coverage on 2015) with electronic data recording and on-line transmission to the central database. Extensive training procedures are in place for implementing the procedures.

Only minor issues were reported as regards data reliability and completeness, e.g. some difficulties with the recording of crash location due to GPS coverage, the recording of drugs and alcohol involvement, seat belt use recording etc.

Police data are in accordance with the 30 days definition and a systematic follow-up is made. Some under-reporting may be mostly due to heavy workload / limited capacity of the Police - but this is estimated to be low.

There is access of all relevant stakeholders to central database and the automatic retrieval of 80 predefined Tables for selected users; however additional and more detailed data can be provided upon request.

Regarding the Health Sector / VRD information, in Jordan there is a satisfactory quality of VRD and regular publication of mortality statistics. It is considered that the country is currently relatively close to meeting the WHO data quality thresholds. Most importantly, there are known reasons for the under-estimation of cause of death due to traffic accidents:

- i. the non-inclusion in the published statistics of fatalities of non-Jordan nationals, and
- ii. The mis-classification of some road crash fatalities as "event of undetermined intent"

Consequently, there are concrete areas for cooperation of Police / Health Sector and potential for quick improvement.

Regular data sharing and publication takes place. An annual national publication of detailed road safety statistics exists in the country; other bulletins are issued on occasional basis.



Table 6.3. Road safety data 'diagnosis' for Jordan

### Good practice elements

- ✓ Robust set-up and smooth operation of the data collection system
- ✓ Electronic data recording and transmission, GPS location
- ✓ Regular data publication and "open" data culture
- ✓ VRD quality close to WHO standards, potential for improvement in the short-term

### Elements needing improvement

- ? Cross-checking of Police data and VRD to estimate the level of under-reporting
- ? Update National Data Collection form to include international definitions of crash characteristics
- ? Establishment of National Road Safety Observatory

## 6.4. Lebanon



A clear picture of key issues was obtained, and considerable efforts were identified for the improvement of road safety data in the country. However, these efforts are to date somewhat fragmentary. Moreover, some discrepancies in the information reported were identified, further suggesting the need for better coordination and more systematic consultation and sharing of data and information between the key actors involved.

As regards the Police data, it should be underlined that no limit (e.g. 30 days) is assigned to road fatalities recording in the country, as the process is closely linked to the court investigation. Although the current Data Collection Form structure and content, variables and values and procedures for following up on the crash, as well as the country coverage are considered satisfactory, the adoption of the 30-days definition is considered critical for the international comparability of Lebanon road crash statistics.

In this framework, a proposition for an updated Data Collection Form was made, with the explicit purpose to allow better analyses of the causes of the crash and remove the focus of data recording from the purpose of assigning the blame for the court (expected within 2018-2019); this is an important and much needed step.

In addition, under-reporting is recognised as an important issue in the country, and it is considered due mostly due to heavy workload / limited capacity of the Police.



Further efforts are recommended regarding data publication and sharing, as there is currently lack of a national publication of detailed road safety statistics; some bulletins are issued on occasional basis. A contact with IRTAD is made in order to harmonize national data with the IRTAD protocol – however no action has been done thus far.

Regarding the Health sector data and VRD, the consultations carried out suggest a key role of the Red Cross in crash casualty intervention; although other emergency services exist, these are much less thorough in reporting. The country reported a recent MoU with the American University of Beirut to work on the question of injury reports.

*However, further discussion with Health / VRD Sector stakeholders in the country are needed in order to properly analyse the relevant data aspects; this will be pursued in a future mission.*

Table 6.4. Road safety data ‘diagnosis’ for Lebanon

#### **Good practice elements**

- ✓ Existence of intersectoral high level body for road safety management
- ✓ Intended update of National Data Collection form to better identify accident causes and characteristics
- ✓ Under-reporting fully recognized as an important issue requiring substantial efforts for improvement.

#### **Elements needing improvement**

- ? Adoption of 30-days definition
- ? Follow-up of fatalities for 30 days
- ? Update National Data Collection form to include international definitions of crash characteristics
- ? Establishment of systematic cooperation between Police, Transport and Health
- ? Publication of road crash statistics and data sharing

## **6.5. Morocco**



Morocco has a very comprehensive and efficient multi-sectoral structure for road safety data collection, validation and sharing. There is systematic cooperation between the Police, Health and Transport sector with respect to the validation and publication of road crash statistics. In general, road safety management in the country is very close to the European standards, with the presence of a National Strategy and Action Plan, the adoption of concrete targets for casualty reduction, and the use of crash, exposure and contextual data to monitor road safety progress.



The country uses the 30-days definition for road fatalities, with systematic follow-up and several steps of data cross-checking and validation. The country also uses a concrete definition of serious injury (hospitalized more than 6 days). Road crash statistics collected are very complete, based on a thorough and regularly updated data collection form. There are a few known difficulties e.g. the recording of the accident location (as no GPS is used) and the incomplete recording of some variables.

However, there is a serious concern regarding the VRD in Morocco. Although the ICD-10 protocol is used for causes of death, the current VRD are very incomplete leading to the country being classified in WHO Group 4. Although there is a systematic cooperation of the Health sector dealing with data from EMS / Ambulances, Hospital admissions records etc., the participation of the VRD sector is lacking.

A considerably "open" data culture exists in the country, with systematic publication of crash statistics, data exchange between some stakeholders etc. Moreover, the country is under accession to IRTAD. Finally, the country hosts several important international events on road safety data. However, a National Observatory remains to be established.

Table 6.5. Road safety data 'diagnosis' for Morocco

#### **Good practice elements**

- ✓ Multi-sectoral road safety management structure, systematic cooperation between MOT, Police, health sector
- ✓ Data are used for identifying targets and monitoring the road safety strategy
- ✓ In addition to crash data, exposure (vehicle kilometres) and Safety Performance Indicators systematically collected

#### **Elements needing improvement**

- ? Use of electronic means and GPS for data recording
- ? Establishment of National Observatory pending
- ? Cross-checking and validation of Police and Hospital data to estimate the level of under-reporting
- ? Update National Data Collection form to include international definitions of crash characteristics

## **| 6.6. Tunisia**



In Tunisia, the Garde nationale and the National Observatory host the national database and are the key stakeholders dealing with road crash data. Although a regular publication of road safety statistics is made through the Observatory, together with several important awareness raising and education initiatives, there are several challenges to be addressed.



Currently, although a data collection form exists, it is not used at the crash site; Police officers draft a report with no predefined format, and the information there-in is subsequently used to fill the data collection form in the Office.

The 30 days definition is used, and the follow-up is made through death certificates, however there is some uncertainty about the completeness of the data. Under-reporting is openly recognised as an issue (i.e. accidents not reported, or police cannot go to the crash due to lack of manpower).

There is no formal definition of injury severity. Most importantly, the crash data collected do not include any information on road design and environment, in contrast to the international common practice. The overall level of detail of the crash data is not considered satisfactory by the stakeholders in the country.

There is currently little inter-sectoral cooperation, but also willingness to strengthen the cooperation. For instance, there is an important recent initiative to cross-check Police and Health data through the Ministry of Health SHOCROOM (database of emergency incidents).

Regarding VRD data, it was reported that not all causes of death and types of injury are properly defined, and there is a significant delay in the publication of complete statistics (hence the country is classified in WHO Group 4).

Table 6.6. Road safety data ‘diagnosis’ for Tunisia

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### **Good practice elements**

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- ✓ National Road Safety Observatory strong role in publication of statistics, awareness raising and information
  - ✓ The MOH and MOI in the process of thinking about setting up a system for exchanging information on road accident data.
  - ✓ A national project aiming to link major databases and systems in the country (under development)
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### **Elements needing improvement**

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- ? No lead agency - no national strategy
  - ? Data Collection Form not used on the spot
  - ? Strengthening efforts for 30-days follow-up
  - ? Cross-checking Police & Hospital data to estimate under-reporting
  - ? Update and activate National Data Collection form to include int. definitions of crash characteristics
-



## 7. RECOMMENDATIONS

### 7.1. Main challenges in the EuroMed region

The need for collection of road safety reliable, harmonized and comparable data is fully recognized by all EuroMed Partner countries.

Moreover, there are important past and ongoing efforts in all countries to improve their data systems, and several good practice elements for each country to demonstrate. However, at the same time there are important challenges remaining to be addressed and elements needing improvement in all countries. Table 7 summarises the current state of road crash data collection systems in the region. The main challenges can be summarised as follows:

- The adoption of the definition of **person killed in 30 days** is still pending in some countries;
- Achieving a **systematic follow-up** on crash casualties for 30 days, as a responsibility of the Police;
- Establishment or upgrade of a **formal National Data Collection form** for road crashes;
- Implementation of procedures for **electronic recording and on-line transmission** of road crash data;
- Adoption of **international definitions and protocols for road crash data** (in addition to fatality, also accident, injury severity, and main crash / driver / vehicle characteristics);
- Strengthening of **cooperation and exchange of knowledge and data between Police, Transport and Health Sectors** (and possibly also Insurance Sector), through the establishment of a formal multi-sectoral committee or body.
- Estimation of road crash casualty **under-reporting** through the linkage and cross-checking of Police and Health Sector (and possibly also Insurance Sector) data within the framework of one or more regional pilot studies;
- Promotion of "open" data culture through systematic data publication and sharing between all relevant stakeholders and the general public at national level;
- Establishment of a **national observatory**, preferably including a web portal with information and data on road safety in the country;
- Establishment / strengthening of **cooperation with international organisations** active in the field of road safety, for capacity building and knowledge transfer regarding reliable and usable road crash data systems;
- Pursuing of cooperation and data / knowledge sharing in the region with the ultimate objective of establishing a **regional observatory** with harmonised and comparable road crash data for the EuroMed region.



Table 7.1. Summary of road crash data collection key features in the EuroMed region

	Algeria	Egypt	Jordan	Lebanon	Morocco	Tunisia
Definition of fatality at 30-days	✓	?	✓	?	✓	✓
Follow-up for 30 days	?	?	✓	?	✓	?
Concrete definition of a serious injury	?	?	✓	?	✓	?
Relational national database with disaggregate data	✓	✓	✓	✓	✓	✓
Accident variables recorded	✓	✓	✓	✓	✓	✓
Road layout variables recorded	✓	✓	✓	✓	✓	?
Driver / passenger / pedestrian variables recorded	✓	✓	✓	✓	✓	✓
Use of international definitions for variables and values	?	?	?	?	?	?
Existence of national data collection form	✓	?	✓	✓	✓	?
Updated national data collection form	?	?	?	✓	✓	?
Formal training procedures for data collection	?	?	✓	?	✓	?
Electronic means for data collection	...	...	✓	?	?	?
Formal data validation and quality control procedures	?	?	✓	?	✓	?
Data sharing and publication	✓	?	✓	?	✓	✓
National Observatory	✓	?	?	...	?	✓
Inter-sectoral cooperation	?	?	?	?	✓	?
Databases linkage	...	...	✓	?	✓	?
Health sector VRD data quality meets WHO standards	?	✓	...	?	?	?
Cooperation with international organisations	?	?	✓	✓	✓	?



Table 7.1 demonstrates that there are **different strengths and weaknesses in each country**, with respect to the international good practice criteria. This also implies that there are considerable opportunities for transfer of knowledge between countries in order to share good practice and strengthen cooperation to address the common challenges. These opportunities are more specifically described in the following section 7.2.

## 7.2. Recommendations and next steps

On the basis of the country 'diagnosis' made in the present activity in light of the international good practice, the following recommendations are made for the EuroMed partner countries wishing to improve their data systems and establish reliable, credible and harmonised road crash data, as well as sharing their data at regional level.

### 7.2.1. RELIABLE AND ACCURATE ROAD SAFETY DATA

The following recommendations are made for the improvement of Police data:

- Countries should adopt the international definition of **person killed in 30 days** and strengthen their efforts for **systematic follow-up of crash casualties for 30 days**. It is underlined that, according to international good practice, this follow up should be assigned as a responsibility of the Police initially recording the crash, and not to the EMS / Hospital administration.
- Countries should establish / upgrade a formal **National Data Collection form** including all the key characteristics of the crash, the roads, the vehicles and the drivers involved.
- Furthermore, countries should adopt **international definitions and protocols for variables and values** and draft a formal accompanying document to the National Data Collection form describing these definitions. The accompanying document should include clear **guidelines and procedures** for data collection and casualty follow up for 30 days. In this respect, countries should establish formal training sessions for Police Officers for road crash data collection.
- The **electronic recording and on-line transmission** of data is recommended, but not considered a critical element for crash data system quality. In many countries around the world, crash data systems are highly reliable and accurate, although based on paper form data collection. Nevertheless, the global trend is to upgrade to electronic data collection, therefore countries wishing to implement upgrades of their system should consider including this aspect.
- Countries should fully acknowledge under-reporting as a very real issue, which is present to a larger or smaller extent in all countries around the globe and initiate efforts to understand the problem and identify its extent in the country. This can be achieved through the **establishment of inter-sectoral cooperation**, namely between Police, Health/VRD, Transport and Insurance sectors.



- The quantitative **estimation of the degree of under-reporting** can be made through the linkage and cross-checking of Police and Health Sector records within a pilot regional study. In many developed countries, such studies have been implemented with support of / cooperation with Universities or research Institutes (e.g. within students' projects, diploma theses, or PhD studies). Countries are encouraged to implement such studies. There are numerous examples and different relevant methods (ranging from simple to advanced methods); their detailed description is beyond the scope of this report; however, the EuroMed TSP is ready to provide more detailed information and guidance to the countries wishing to proceed with such studies.
- It is also recommended that **under-reporting studies are eventually submitted to WHO**, in order to examine the shifting of the country to WHO Group 2 (in which the study results can be used for the calculation of WHO estimated fatalities, instead of the Group 4 statistical model). For that purpose, cooperation and guidance from WHO should be sought from the early stages, in order to ensure that WHO knowledge on the topic is exploited, and the relevant methodological requirements will be met.

In this context, the following additional specific recommendations are made for the improvement of Health / VRD sector data:

- Countries should pursue the **improvement of the quality of VRD to meet the WHO criteria** (and shift to Group 1: countries with eligible VRD). This implies the adoption and use of the ICD-10 protocol of classification of diseases, the adoption and use of the WHO death certificate model and a coverage of >80% of the population.
- Countries are encouraged to **seek assistance from WHO** in implementing the WHO death certificate model. More specifically, WHO disposes tools and procedures for a 'simplified' death certificate model and electronic cause of death registration, which can be made available to the countries interested, together with relevant training and guidance.

### 7.2.2. HARMONISED AND COMPARABLE ROAD SAFETY DATA

The following recommendations are made for the establishment of harmonised and comparable data:

- In addition to the definition of person killed in 30 days and the systematic follow-up, the adoption of **international definitions of accident and serious injury** are critical for the comparability of the data, in order to ensure that the basic attributes of crashes are common (e.g. including unpaved roads, non-motorised road users etc.). For these basic definitions, the countries are referred to the **UN Glossary for Transport statistics**.
- Furthermore, **harmonised definitions of variables and values** are key for international benchmarking and monitoring of road safety progress. Road, vehicle and person characteristics should also comply to common definitions and protocols. The countries are referred to the **CAdaS protocol of the European Commission**, as well as the **WHO**



**protocol** included in the respective data manual (WHO, 2011) – it is noted that the two protocols are in full accordance between them as regards the definitions of variables and values.

- A **stepwise adoption of international protocols** is recommended, starting from a small subset of basic variables (e.g. vehicle types, driver characteristics, day / night, weather etc.), and gradually proceeding to more detailed variables (e.g. roads classification). In the EU CADaS protocol, a set of priority variables are recommended. Nevertheless, the **EuroMed TSP will draft a concrete recommendation for an initial set of harmonised variables** tailored to the current potential in the EuroMed region.

### 7.2.3. DATA SHARING

The following recommendations are made with respect to data publication and sharing:

- Countries are encouraged to strengthen cooperation and **exchange of knowledge and data between Police, Transport and Health /VRD Sectors**. All sectors should regularly publish their road crash statistics. In best practice countries, a formal annual statistical report is published by the Lead road safety data agency, and all relevant stakeholders publish monthly, weekly or even daily bulletins.
- The **access of all key stakeholders to the national road crash database** is strongly recommended.
- Countries should pursue the establishment of a **national road safety observatory**, preferably including a web portal with updated road safety statistics and information (including e.g. road safety legislation, awareness raising, news and events), accessible not only to road safety stakeholders, but also to professionals, researchers and the general public.
- Countries should pursue the harmonisation of their road crash data with the eventual objective of sharing them within a **regional road safety observatory**.

### 7.2.4. OPPORTUNITIES FOR INTERNATIONAL COOPERATION

Considerable opportunities exist **for transfer of knowledge between EuroMed partner countries** in order to share good practice:

- For the efficient definition of person killed in 30 days and the systematic follow-up as a responsibility of the Police, useful experiences in Algeria, Morocco, Jordan, and Tunisia can be exploited by other countries.
- Exhaustive National Data Collection forms exist in Morocco and Jordan.
- The experience of Jordan with the establishment and use of an electronic data collection and transmission system can be very useful to the other countries. Moreover, the experience from setting up an inter-sectoral database and electronic data recording



and transmission system (Police – EMS – Hospitals) in Egypt can be useful to other countries (even though the system is not yet operational)

- The only country meeting the WHO criteria for VRD and therefore classified in Group 1 is Egypt, therefore it can serve as the good practice example for the whole region.
- The open data culture in data publication and sharing between relevant stakeholders at national level in Morocco and Jordan should be considered by the other EuroMed countries. Specifically, in Morocco, the systematic inter-sectoral cooperation (only missing the VRD sector) and the joint quality control of Police data should be pursued by other countries.
- Algeria and Tunisia have established National Observatories for road safety that, despite some weaknesses, can serve as examples for the other EuroMed countries.

Overall, it is recommended that the **EuroMed countries strengthen their cooperation to address the critical common challenges**, namely the estimation of under-reporting of fatalities through matching Police and Health Sector data, and the adoption of international definitions and protocols (for accident, fatality and injury, and beyond to other variables as well).

Moreover, the following recommendations are made for **strengthening cooperation with key international organisations** with important activity and experience on road safety data:

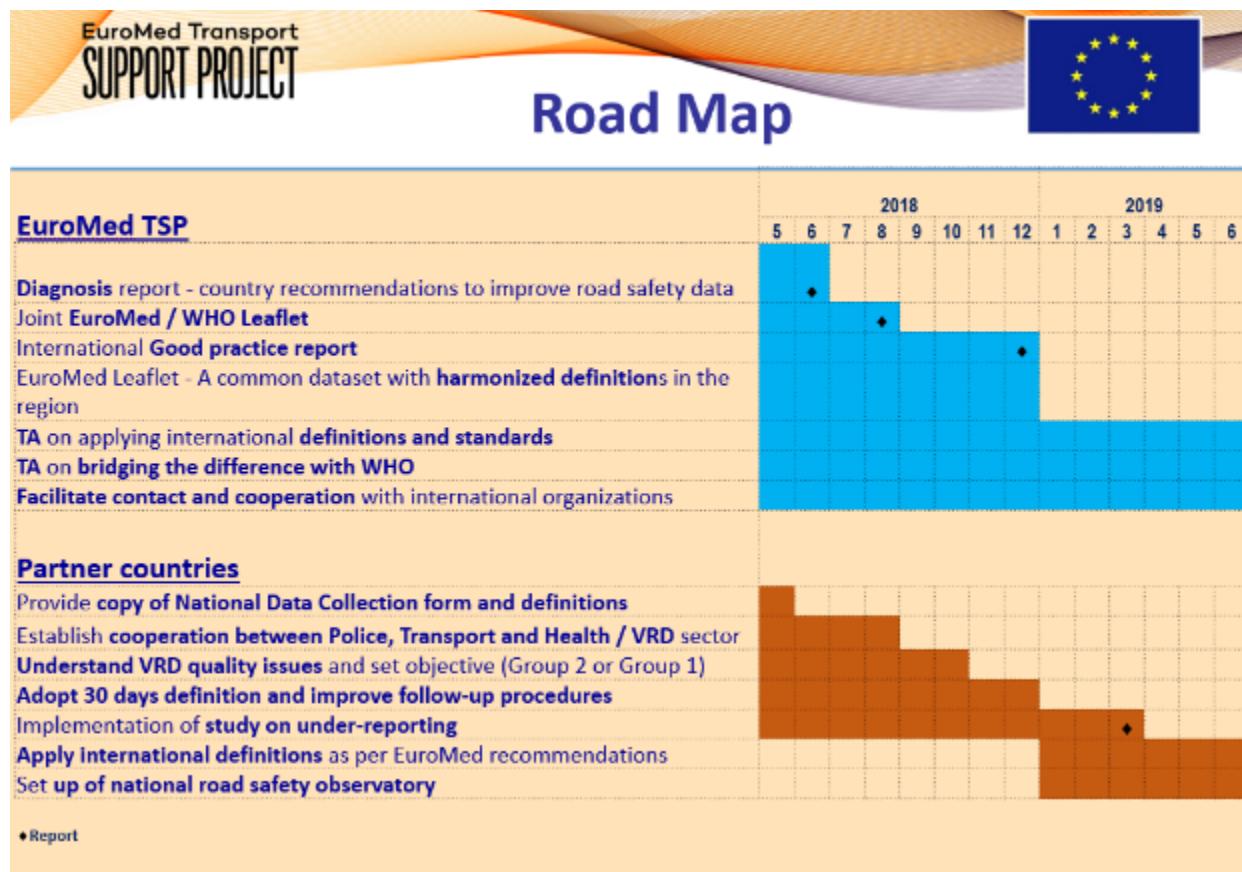
- Cooperation with WHO on data definitions and VRD quality, with the aim for countries to be shifted from Group 4 to Group 2 or Group 1.
- Cooperation with UNECE and EC-DGMOVE on the establishment of common definitions and adopting the good practices of the European Road Safety Observatory
- Cooperation with UFM, FIA and UNESCWA at exploring possible synergies in view of their interest in developing Road Safety Observatories in Mediterranean.
- Cooperation with IRTAD - International Road Traffic Accidents Database.

### **7.3. A road map on the way forward**

In Table 7.2 a **road map for the establishment of reliable, comparable and harmonised data systems in the EuroMed region** is presented, including concrete actions for the project team and the partner countries respectively. This road map has been adopted by the project team and the countries during the EuroMed regional workshop in Athens, on May 2018. The objective of the road map is the achievement of a number of concrete outcomes and milestones by June 2019.



Table 7.2. A road map for road safety data improvement in the EuroMed region



The next steps of the present activity can be outlined as follows:

- The activity will provide a **EuroMed recommendation for a common dataset with harmonized definitions** in the region, which will be in accordance with other relevant initiatives internationally.
- The activity will provide a **joint EuroMed / WHO leaflet on understanding and bridging the difference between country reported and WHO estimated fatalities**. The leaflet will include detailed and country specific information (a summary of the contents is provided in Chapter 5 of this report).
- The EuroMed TSP will provide **continuous technical assistance to the EuroMed partner countries** on improving their data collection, processing, analysis and publication procedures, applying international definitions and standards, as well as on bridging the difference between WHO and country statistics
- The EuroMed TSP will continuously update countries about international developments on road safety data systems and **facilitate countries contact and cooperation with international organizations** (EC-DGMOVE, WHO, UNECE etc.)



For the **implementation of the road map**, the EuroMed partners countries have confirmed their readiness to proceed to a number of activities:

- The countries will **provide to the EuroMed TSP any necessary additional information on their data collections systems**, with emphasis on the detailed description of their national data elements and definitions (through their national data collection form or other document)
- The countries will **establish inter-sectoral cooperation**, in particular for the implementation of linking and cross-checking data from different sectors. Furthermore, countries will define their targets as regards the WHO and national data discrepancy and define and implement the necessary steps for bridging it.
- The countries will **exploit forthcoming EuroMed publications** for implementing concrete actions for the improvement and harmonisation of road crash data.
- The countries will pursue the **setup of national road safety observatories**.



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## APPENDIX 1- QUESTIONNAIRE

### Questionnaire

<b>Country concerned</b>	
<b>Name of person filling in the questionnaire</b>	
<b>Organisation</b>	
<b>Position</b>	
<b>Tel</b>	
<b>Email</b>	

<b>0</b>	<b>General context</b>	
	<b>0.1 Is there a Lead Agency responsible for road safety in the country? If yes please indicate its name</b>	YES - NO (please circle the correct)  <i>Please describe</i>
	<b>0.2 Is it a multi-sectoral body, a Ministry/Agency department, an independent entity?</b>	<i>Please describe</i>
	<b>0.3 Is there cooperation between agencies / stakeholders involved in road safety management?</b>	YES - NO (please circle the correct)  <i>Please describe</i>
	<b>0.4 Is there a road safety strategy in the country? Are there quantitative targets?</b>	YES - NO (please circle the correct)  <i>Please describe</i>
	<b>0.5 Are road safety data acknowledged as a key component of evidence-based road safety policy?</b>	YES - NO (please circle the correct)  <i>Please describe</i>

<b>1</b>	<b>Agencies and other stakeholders involved in data collection</b>	
	<b>1.1 Who are the main stakeholders involved in road safety data collection in the country? (Please provide the names of organizations and contact persons)</b>	<i>Traffic Police</i> <i>Contact details:</i>  <i>Health Sector (Ministry of Health)?</i> <i>Contact details</i>
	<b>1.2 Other stakeholders possibly involved in road safety data collection: (Please provide the names of organizations and contact persons)</b>	<i>Transport sector: YES - NO</i> <i>Contact details</i>  <i>Insurance companies: YES - NO</i> <i>Contact details</i>  <i>Road operators: YES - NO</i>



	<p><i>Contact detail</i></p> <p><i>Research institutes: YES - NO</i></p> <p><i>Contact detail</i></p> <p><i>NGOs and other interest groups: YES - NO</i></p> <p><i>Contact detail</i></p>
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<b>2</b>	<b>Objectives of the data collection by each sector</b>
	<p><b>2.1 What are the activities and roles of each sector involved in data collection?</b></p> <p><i>Traffic Police (please describe)</i></p>
	<p><i>Health sector (please describe)</i></p>
	<p><i>Other sectors (please describe)</i></p>
	<p><b>2.2 What is the purpose of collecting the data?</b></p> <p><i>Traffic Police (please describe)</i></p>
	<p><i>Health sector (please describe)</i></p>
	<p><i>Other sectors (please describe)</i></p>
	<p><b>2.3 How are the data used within the area of responsibility of each sector?</b></p> <p><i>Traffic Police (please describe)</i></p>
	<p><i>Health sector (please describe)</i></p>
	<p><i>Other sectors (please describe)</i></p>

<b>3</b>	<b>Data systems in place</b>
	<p><b>3.1 What are the data systems in place?</b></p> <p><i>Traffic Police?: YES - NO (please circle the correct)</i></p> <p><i>Contact details:</i></p>
	<p><i>Health Sector (Ministry of Health)? YES - NO</i></p> <p><i>Contact details</i></p>
	<p><i>Other sector(s)?: YES - NO (please circle the correct)</i></p>



	<i>Contact details:</i>
3.2 Is there a national road crash database? Who is the host and who has access?	YES - NO (please circle the correct)  <i>Please describe</i>
3.3 Is there a central trauma registry?	YES - NO (please circle the correct)  <i>Please describe</i>
3.4 Are there other sources of road safety data e.g. ad hoc surveys, specific projects etc?	YES - NO (please circle the correct)  <i>Please describe</i>
3.5 Are there any intersectoral databases? For instance, links between Police files and other registration files (e.g. vehicle fleet? Driver register? Road register?)	YES - NO (please circle the correct)  <i>Please describe</i>

4	<b>Data elements available</b>
<b>Police data</b>	
4.1 How is data collected? What information is collected at the crash scene and what information is collected through a follow-up?	(Please describe)
4.2 Are any digital means (computers/notebooks/telephones) used for data collection and transmission?	YES - NO (please circle the correct)  <i>Please describe</i>
4.3 Are procedures uniform over the entire country (in all provinces, states, municipalities, police districts, hospitals) and during all months of the year? Day and night and independent of the weather? Can this be checked with data?	YES - NO (please circle the correct)  <i>Please describe</i>
4.4 Is there a formal data collection form? Is there supporting documentation and guidelines?	YES - NO (please circle the correct)  <i>Please provide an copy of the related documents</i>
4.5 What is the level of disaggregation? Are unique records stored (person id, crash id)? If yes, how is data protection and anonymization implemented?	YES - NO (please circle the correct)  <i>Please describe</i>
4.6 Are the data available in electronic form?	YES - NO (please circle the correct)



	<b>4.7 Are the data structured in the form of a relational database with separate Tables for Road-User-Vehicle?</b>	YES - NO (please circle the correct)
	<b>4.8 What events are captured (i.e. fatalities, non-fatal injuries, damage-only crashes)?</b>	(Please describe)
	<b>4.9 Which variables are included in the database?</b>	
	<b>Road layout, design and environment?</b>	YES - NO (please circle the correct)
	<b>Vehicle?</b>	YES - NO (please circle the correct)
	<b>Road User (Driver, Passenger, Pedestrian)?</b>	YES - NO (please circle the correct)
	<b>Accident?</b>	YES - NO (please circle the correct)
	<b>4.10 How is the data processed (manually or electronically)?</b>	(Please describe)
	<b>Health Sector data</b>	
	<b>4.11 Are vital registration data available?</b>	YES - NO (please circle the correct) (Please describe)
	<b>4.12 What non-fatal injury data are available in the Health sector?</b>	
	<b>Injury surveillance systems in accident and emergency departments?</b>	YES - NO (please circle the correct)
	<b>Trauma registries?</b>	YES - NO (please circle the correct)
	<b>Hospital in-patient records or discharge data?</b>	YES - NO (please circle the correct)
	<b>Ambulance records?</b>	YES - NO (please circle the correct)
	<b>Other?</b>	YES - NO (please circle the correct)
	<b>4.13 Is the data available per person age, gender, per geographical area?</b>	YES - NO (please circle the correct) (Please describe)
	<b>Additional data to support road safety analysis</b>	



	<b>4.14 Are there exposure-related data such as passenger travel modes, vehicle-kilometres travelled, passenger-kilometres travelled, vehicle fleet, driving licenses?</b>	(Please describe)
	<b>4.15 Are there data on the operational level of road safety, i.e. Safety Performance Indicators on seat-belt, helmet use, roads condition, age of the vehicle fleet etc.</b>	(Please describe)

<b>5</b>	<b>Data quality</b>	
	<b>Police data</b>	
	<b>5.1 How is a crash defined? Are non-motorised users included? Are private roads included? Are unpaved roads included?</b>	(Please describe)
	<b>5.2 Is the 30-days definition of fatality applied? How is the follow-up done?</b>	YES - NO (please circle the correct)  (Please describe)
	<b>5.3 Is there any information on the degree of under-reporting of <u>fatalities</u> by the Police?</b>	YES - NO (please circle the correct)  (Please provide a source if available)
	<b>5.4 How is injury severity defined in Police crash records? Are Police officers responsible for assigning injury severity? Is this done at the scene or through a follow up? How is the follow-up done?</b>	(Please describe)
	<b>5.5 Is there a definition of a serious and a slight injury? Can it be easily understood and applied by the Police?</b>	YES - NO (please circle the correct)  (Please describe)
	<b>5.6 Is there any information on the degree of under-reporting of <u>injuries</u> by the Police?</b>	YES - NO (please circle the correct)  (Please provide a source if available)
	<b>5.7 What would be the main reasons for under-reporting?</b>	
	<b>Some injury crashes are not reported to the police ('real' under-reporting)</b>	YES - NO (please circle the correct)



	<b>Police does not go to the accident scene because of availability or proximity priorities</b>	YES - NO (please circle the correct)
	<b>The Police may go to the crash but not formally register it (e.g. minor crash 'not worth the administrative burden')</b>	YES - NO (please circle the correct)
	<b>The crash data may not be completely registered due to lack of training or skills</b>	YES - NO (please circle the correct)
	<b>Crash data registered may not be entered in the database</b>	YES - NO (please circle the correct)
	<b>Crash data may be entered in the database with errors</b>	YES - NO (please circle the correct)
5.8	<b>Is GIS information used to determine the crash location?</b>	YES - NO (please circle the correct)
5.9	<b>Are photos / videos used to capture or validate crash information?</b>	YES - NO (please circle the correct)
5.10	<b>What quality assurance and evaluation procedures are used to validate the data?</b>	(Please describe)
5.11	<b>What basic definitions are used? Are these documented and checked with? Is any international set of definitions used?</b>	(Please describe)
5.12	<b>What is the degree of completeness of the other data elements?</b>	(Please describe)
5.13	<b>Are there key variables which are known to be poorly recorded e.g. BAC of the driver, seat belt and helmet use, accident location.</b>	YES - NO (please circle the correct) (Please describe)
5.14	<b>Is there a systematic bias resulting in specific variables being less completely recorded?</b>	YES - NO (please circle the correct) (Please describe)
5.15	<b>Other known weaknesses of the data or measurement / reporting errors?</b>	(Please describe)



<b>Health Sector data</b>	
<b>5.16 What protocol is used for cause of death classification in the country (e.g. ICD<sup>4</sup>)?</b>	(Please describe)
<b>5.17 How is injury severity / cause of death typically defined in Health sector crash records?</b>	(Please describe)
<b>5.18 Is there any information on the degree of under-reporting of fatalities/injuries by the Health sector?</b>	YES - NO (please circle the correct)  (Please provide a source if available)
<b>5.19 What would be the main reasons for under-reporting:</b>	
<b>Minor injuries not receiving medical care?</b>	YES - NO (please circle the correct)
<b>Access to health facilities?</b>	YES - NO (please circle the correct)
<b>Injuries treated by private hospitals?</b>	YES - NO (please circle the correct)
<b>Cause of injury not identifiable or properly reported by the patient?</b>	YES - NO (please circle the correct)
<b>The injury data may not be completely registered due to lack of staff training or skills</b>	YES - NO (please circle the correct)
<b>5.20 Is the EU MAIS3+<sup>5</sup> definition of serious injury applied at any stage / by any sector?</b>	YES - NO (please circle the correct)  (Please describe)
<b>5.21 What is the coverage of the population?</b>	(Please describe)
<b>5.22 Are all deaths assigned a medically certified cause?</b>	YES - NO (please circle the correct)  (Please describe)
<b>Cross-checking or Linking of Police and Health Sector data</b>	

<sup>4</sup> ICD: International Classification of Diseases

<sup>5</sup> MAIS3+: Maximum Abbreviated Injury Scale higher than "3"



	<b>5.23 Are there procedures for cross-checking Police and Health sector fatality data?</b>	YES - NO (please circle the correct)  (Please describe)
	<b>5.24 Is there a system of linking Police and Hospital records to correct for under-reporting?</b>	YES - NO (please circle the correct)  (Please describe)
	<b>5.25 Are capture re-capture methods used?</b>	YES - NO (please circle the correct)  (Please describe)
	<b>5.26 If data matching is carried out, is this to avoid double counting or to enable capture recapture estimates of the actual number of casualties? What key is used for matching, and can it be trusted (sufficient correctness and uniqueness).</b>	(Please describe)

<b>6</b>	<b>Resources and capacity for data collection</b>	
<b>6.1 How is each data system funded? Is it sustainable</b>	Traffic Police (please describe)	
	Health sector (please describe)	
<b>6.2 Are there formal guidelines for data collection? (National Data Collection form?)</b>	Traffic Police (please describe)	
	Health sector (please describe)	
<b>6.3 Are officers specially trained to properly collect the data?</b>	Traffic Police (please describe)	
	Health sector (please describe)	

<b>7</b>	<b>Publication and use of the data</b>	
<b>7.1 Who publishes the data?</b>	Traffic Police (please describe)	
	Health sector (please describe)	
<b>7.2 What are the main National Statistics Services publishing road safety statistics?</b>	(Please describe)	
<b>7.3 Who uses the data?</b>	<b>Decision makers?</b> YES - NO (please circle the correct)	



	<b>Practitioners?</b>	YES - NO (please circle the correct)
	<b>Researchers?</b>	YES - NO (please circle the correct)
<b>7.4 Is the data used to:</b>		
<b>Identify risk factors and risk areas (i.e. diagnose road safety problems)?</b>	YES - NO (please circle the correct)	
<b>Determine appropriate interventions?</b>	YES - NO (please circle the correct)	
<b>Evaluate the effectiveness of interventions?</b>	YES - NO (please circle the correct)	
<b>Monitor progress in achieving road safety objectives?</b>	YES - NO (please circle the correct)	
<b>7.5 Is the data sent to international organisations?</b>		
<b>WHO?</b>	YES - NO (please circle the correct)	
<b>IRTAD?</b>	YES - NO (please circle the correct)	
<b>IRF?</b>	YES - NO (please circle the correct)	
<b>Other?</b>	YES - NO (please circle the correct) <i>(Please describe)</i>	
<b>7.6 Is there a national road safety observatory, or equivalent?</b>	YES - NO (please circle the correct) <i>(Please provide a source if available)</i>	

<b>8</b>	<b>Additional information</b>
<i>Please provide any comments or additional information which may be useful for the purposes of this activity</i>	



## APPENDIX 2 - LIST OF STAKEHOLDERS

### Algeria

- Abdelghani Hamani, SDCR, DTTU
- Souhila Lacheheb, DTTU
- Melourji Bourad, DTTU
- Mohamed Hafsi, DG Civil Protection
- Selmani Nawel, DG Civil Protection
- Brahimi Wahiba, MSPRH
- Mouloubi Guemaf, Gendarmerie Nationale
- Merouche Mounir,
- Ali Meghaoui,
- Behlouli Hocine, National Road Safety Prevention Centre (CNPSR), WHO National Focal Point
- Meradji Abderrohmane, DGSN
- Bouaoune Chaoufri, DGSN

### Egypt

- Ahmed El-Ansary, Chairman EAO
- Amr Rashid, Assistant Chairman EAO
- Emad el din Abdelmmotaal, Activity National Focal Point
- General Khaled Aly, Deputy Minister of Interior
- Ayman Sameer Eldabaa, General, Secretary Road Safety Council
- Mourid Albent, Colonel Traffic Police
- El Morsey Elhelw, Chairman LTRA
- Hanan Abdel Wahed, Manager LTRA
- Haytan Khamis, L. Colonel Traffic Police
- Ahmed Ghazy,L. Colonel Ttraffic Police

### Jordan

- Eng. Sharihan Abu-Haswah, Ministry of Transport
- Eng. Majde Abu Hammoudeh, Ministry of Transport
- Brigadier Eng. Ahmad Salem Al-Warawra, Director of Jordan Traffic institute
- Eng.Fuad Almaaytah, Jordan Traffic institute
- Colonel Emad Shwoman, Joint command and control center
- Colonel Firas Aqueel Al-Dweiri, Joint command and control center
- Lt. Colonel Amer Nweelaty, Joint command and control center
- Colonel Yaser Alhababbeh, Head of Traffic Accident Investigation, Traffic Department



- Captain Eng. Suha Albalawneh, Head of Studies Unit, Traffic Department
- Dr.Mohmmad Salah Mahmud Salah, Ministry of Health
- Dr. Ahlam Abu Diab, Ministry of Health
- H.E. Hesham Khasawneh, Head of the Licenses Department
- Major Sudeq Al-Suhemat, Head of Traffic System, Licenses Department
- Eng. Omar Khilifat, Traffic System, Licenses Department
- Eng.Omar Alquran, Licenses Department

### **Lebanon**

- Yarob Badr, Regional Advisor on Transport and Logistics, ESCWA
- Ramzi Salame, Sec.Gen NRSC
- Boulos Tanios, MoTPW
- Khalid A.Shmait, Head of Execution Department, MoTPW
- Abdel Hafiz El Kaissi, DG of Land and Maritime Transport, MoTPW
- Ilham El Khabbaz, DG of Land and Maritime Transport, MoTPW
- Ali Al Masri, DG of Land and Maritime Transport, MoTPW
- Rami Seeman, Managing Partner TMS Consulting
- Rayane Wehbe, TMS Consulting
- Zahira Abounohs, ESCWA
- General Antoine Zakra, ISF / Head of TMC

### **Morocco**

- Brahim Baamal, Direction du Transport Routier et de la Sécurité Routière (DTRSR) Ministère de l'Equipement, du Transport, de la Logistique et de l'Eau (METLE)
- Benacer Boulaajoul, Comité National de Prévention des Accidents de la Circulation (CNPAC)
- Ilhame Bachisse, Ministry of Health
- Saida Charkaoui, CNPAC
- Halima Lessiq Direction de la Stratégie, des programmes et de la Coordination des Transports (DSPCT), METLE
- Zahraa Ouacifi, DSPCT/METLE
- Mohamed Afechkar, DTRSR/METLE
- M. Amman, DTRSR/METLE
- Dries Salek, Direction Générale de la Sûreté Nationale (DGSN)
- Azeddine Chahidi, DTRSR/METLE
- Naima Taoudi, DTRSR/METLE
- Zakia Lhanfouri, DTRSR/METLE
- Houria Machrouki, DTRSR/METLE
- Fatiha Oraiche, Centre National d'études et de Recherches Routières (CNER)
- Soumia Jannan, DSPCT/METLE
- Noureddine Didi, CNGR/DR
- Eljarkouri Said, DTRSR/METLE



**Tunisia**

- Ali Fraj, General Director, DGTT
- Sayadi Nourreddine, DGTT, Traffic Director
- Hassani Montassar, General Director DGTT
- Amel Dhaoui, ATTT Director
- Ridha Bouneb, ATTT Director
- Barhoumi Ibtissem, DGSEEP
- Kemali Abdelkader, DGSEEP Director
- Ben Kheder Foued, DGTT Vice Director Safety
- Toukabri Heni, DGTT
- Abdelkader Mensi, DGTT
- Anis Ben Hassoun, ATTT
- Sana Haouari, Vice Director, Ministry of Information Technologies
- Henda Chebbi, Ministry of Health Shocroom
- Naoufel Somrani, Ministry of Health SHOC ROOM
- Ayadi Madiha FTUSA
- Bejaoui Ines, Garde Nationale de Circulation
- Baklouti Ikbel, Garde Nationale de Circulation
- Bilel Ounifi, ATPR Director
- Mohamed Amine Souguir, Vice Director, Observatory ONSR
- Ben Hammouda Ali, Ministry of Equipment
- Sami Rachikou, Police Traffic Directorate
- Cherni Sofien, Police Traffic Directorate
- Mouez Souiri, DGTT
- Foued Hanen, DGTT
- Baba Hamdi, DGTT
- Ben Hamouda Iotfi, Ministry of Health
- Barhoumi Ibtissem, DGSEEP
- Arjoun Ridha, Director, Ministry of Transport



## APPENDIX 3 – WHO METHODOLOGY

### WHO classification of countries

Estimation method	Country
<b>GROUP 1</b> Countries with good death registration data	Argentina, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Barbados, Belarus, Belgium, Belize, Brazil, Bulgaria, Canada, Chile, China (14, 15), Colombia, Costa Rica, Croatia, Cuba, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Fiji, Finland, France, Georgia, Germany, Greece, Guatemala, Guyana, Hungary, Iceland, Ireland, Israel, Italy, Jamaica, Japan, Kazakhstan, Kuwait, Kyrgyzstan, Latvia, Lithuania, Luxembourg, Maldives, Malta, Mauritius, Mexico, Montenegro, Netherlands, New Zealand, Norway, Oman, Panama, Paraguay, Philippines, Poland, Portugal, Qatar, Republic of Korea, Republic of Moldova, Romania, Russian Federation, Saint Lucia, Serbia, Singapore, Slovakia, Slovenia, South Africa, Spain, Suriname, Sweden, Switzerland, The former Yugoslav Republic of Macedonia, Trinidad and Tobago, Turkey, United Kingdom, United States of America, Uruguay, Uzbekistan, West Bank and Gaza Strip
<b>GROUP 2</b> Countries with other sources of cause of death information	India (16), Iran, Thailand, Viet Nam
<b>GROUP 3</b> Countries with populations less than 150 000	Andorra, Antigua and Barbuda, Cook Islands, Dominica, Kiribati, Marshall Islands, Micronesia (Federated States of), Monaco, Palau, Saint Vincent and the Grenadines, San Marino, Seychelles, Tonga
<b>GROUP 4</b> Countries without eligible death registration data	Afghanistan, Albania, Algeria, Angola, Armenia, Bangladesh, Benin, Bhutan, Bolivia (Plurinational State of), Bosnia and Herzegovina, Botswana, Burkina Faso, Cabo Verde, Cambodia, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Djibouti, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Honduras, Indonesia, Iraq, Jordan, Kenya, Lao People's Democratic Republic, Lebanon, Lesotho, Liberia, Libya, Madagascar, Malawi, Malaysia, Mali, Mauritania, Mongolia, Morocco, Mozambique, Myanmar, Namibia, Nepal, Nicaragua, Niger, Nigeria, Pakistan, Papua New Guinea, Peru, Rwanda, Samoa, São Tome and Principe, Saudi Arabia, Senegal, Sierra Leone, Solomon Islands, Somalia, Sri Lanka, Sudan, Swaziland, Tajikistan, Timor-Leste, Togo, Tunisia, Turkmenistan, Uganda, United Arab Emirates, United Republic of Tanzania, Vanuatu, Yemen, Zambia, Zimbabwe

### The WHO statistical model

A negative binomial regression model formulated as follows:

$$\ln N = C + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \ln Pop + \varepsilon$$

Where N is the total road traffic deaths (for a country-year), C is a constant term,  $X_i$  are a set of explanatory covariates, Pop is the population for the country-year, and  $\varepsilon$  is the negative binomial error term.

Three models (Models A, B and C) that had good in-sample- and out-of-sample fit, and for which all the covariates were statistically significant were chosen for each country. The final estimates were derived as the average of the predictions from these three models.

The table below describes the covariates used for the three models:



**Covariates used in the model**

Independent variables	Description	Source of information	Included in models
In(GDP)	WHO estimates of Gross Domestic Product (GDP) per capita (international dollars or purchasing power parity dollars, 2011 base)	WHO database	Models A, B, C
In(vehicles per capita)	Total vehicles per 1000 persons	GSRRS surveys and WHO database	Models A, B, C
Road density	Total roads (km) per 1000 hectares	International Futures database (11)	Models A, B, C
National speed limits on rural roads	The maximum national speed limits on rural roads (km/h) from WHO questionnaire	GSRRS survey	Models A, B, C
National speed limits on urban roads	The maximum national speed limits on urban roads (km/h) from WHO questionnaire	GSRRS survey	Models A, B, C
Health system access	Health system access variable (principal component score based on a set of coverage indicators for each country)	Institute for Health Metrics and Evaluation dataset (12)	Models A, B, C
Alcohol apparent consumption	Liters of alcohol (recorded plus unrecorded) per adult aged 15+	WHO database	Models A, B, C
Population working	Proportion of population aged 15–64 years	World Population Prospects 2012 revision (UNDESA)	Models A, B, C
Percentage motorbikes	Per cent of total vehicles that are motorbikes	GSRRS survey	Model B
Corruption index	Control of corruption index (units range from about -2.5 to +2.5 with higher values corresponding to better control of corruption)	World Bank (13), International Futures database (11)	Model B
National policies for walking / cycling	Existence of national policies that encourage walking and / or cycling	GSRRS survey	Model C
Population	Total population (used as offset in negative binomial regression)	World Population Prospects 2012 revision (UNDESA) (6)	Models A, B, C