PAKISTAN ROAD CRASH DATA REVIEW AND REPORTING

STATUS AND RECOMMENDATIONS

MARCH 2025

CAREC
Central Asia Regional Economic Cooperation Program

PAKISTAN ROAD CRASH DATA REVIEW AND REPORTING

STATUS AND RECOMMENDATIONS

MARCH 2025

CAREC
Central Asia Regional Economic Cooperation Program

Cover photos (left to right): Fishermen return from their day of shing at KhuttiKun New Island, Taluka Mirpur Sakro, Thatta District, Sindh province. Construction of the roads as part of the wind energy project has made the sea more accessible for them to sh and make a better living.

Cover design by Josef Ilumin.

Contents

Tables, Figures, and Boxes

Tables

Figures

Boxes

Abbreviations

AASHTO	American Association of State Highway Transportation Officials
AIS	Abbreviated Injury Scale
ADaMS	Accident Data Management System
ADB	Asian Development Bank
APRSO	Asia Pacific Road Safety Observatory
BAAC	Bulletin d'Analyse des Accidents Corporels de la Circulation
CADaS	Common Crash Data Set
CARE	community database on road accidents
CAREC	Central Asia Regional Economic Cooperation
DHIS	District Health Information System
DIG	Deputy Inspector Generals
DPA	District Police Authorities
ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
ETSC	European Transport Safety Commission
FIA	Fédération Internationale de l'Automobile
FIR	First Information Report
GIS	geographic information system
GRSF	Global Road Safety Facility
ISF	Internal Security Forces
ITF	International Transport Forum
MAIS	Maximum Abbreviated Injury Scale
MOC	Ministry of Communication
MOEA	Ministry of Economic Affairs
NADRA	National Database and Registration Authority
NHA	National Highway Authority
NHMP	National Highways & Motorway Police
NRSC	National Road Safety Secretariat
NTRC	National Transport Research Centre
ONISR	Interministerial Observatory for Road Safety
PBS	Pakistan Bureau of Statistics
RTI	road traffic injury
SPI	safety performance indicator
STBA	Federal Statistics Office
TCH	tertiary care hospital
VRD	vital registration data
WHO	World Health Organization

1 Introduction

This report presents an overview of the current road crash data management situation in **Pakistan**, offering strategic recommendations for improvement based on the best globally recognized practices. The report is prepared as part of the consultancy Enhancing Road Safety for Central Asia Regional Economic Cooperation Member Countries (Phase 2) - IC7 Road Crash Data Review and Reporting, funded by the Asian Development Bank (ADB).

The consultancy aims to assess road crash data management practices for 10 countries of the Central Asia Regional Economic Cooperation (CAREC)[1] and develop guidance and tools in an effort to improve road crash data management and move toward greater harmonization of crash data across the region.

The consultancy is part of the effort from ADB and other international stakeholders[2] to develop the **Asia Pacific Road Safety Observatory** (APRSO); i.e., the regional forum on road safety data, policies, and practices to ensure the protection of human life on the roads across Asia and the Pacific.

Reliable safety and traffic data are essential to assess the full nature of the road safety problem, measure the real economic costs associated with road crashes, and design the most cost-effective road safety interventions. As well, the establishment of road safety observatories (e.g., at national and/or regional level) helps to strategically deal with high quality road crash data.

A road safety observatory can be seen as a formal network of government representatives sharing and exchanging road safety data and experience to reduce traffic injuries across the country or within a region. Moreover, an observatory can provide reliable and comparable data on road crashes, in-depth analysis and information on road safety practices and policies. An observatory typically provides **evidence base on road safety**, composed, for instance, of statistical reports, country/region profiles, thematic analysis and key performance indicators. In other terms an observatory can help to:

- measure progress toward reducing deaths and serious injuries on national roads,
- identify and quantify road safety problems,
- develop and evaluate the effectiveness of road safety measure,
- facilitate the exchange of experience between regions or countries.

Since a road safety observatory strongly depends on safety and traffic data, a prerequisite is thus to design and implement of a reliable **road crash data management system**, which is the strategic objective of this consultancy.

[1] Afghanistan, Azerbaijan, the People's Republic of China, Georgia, Kazakhstan, the Kyrgyz Republic, Mongolia, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan. https://www.carecprogram.org/. ADB placed its regular assistance to Afghanistan on hold effective 15 August 2021.

[2] World Bank Group, Fédération Internationale de l'Automobile (FIA), International Transport Forum (ITF), United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), WHO, Global Road Safety Facility (GRSF).

To assess road crash data management practices, and to recommend improvements in view of **country-wide systems for road crash data management**, strategic guidelines issued by World Health Organization (WHO), by World Bank[3] and by European Commission, such as the community database on road accidents (CARE),[4] have been considered.

Accordingly, within this report, recommendations for the improvement of the current road crash data collection process are provided, and main data sources and collection procedures are assessed and considered to define a specific and tailored **road crash data management framework for Pakistan**.

[3] Martensen H., G. Duchamp, V. Feypell, V. I. Raffo, F. A. Burlacu, B. Turner, and M. Paala. 2021. *Guidelines for Conducting Road Safety Data Reviews.* World Bank.

[4] CARE database.

2 Reference Standards

The importance of road safety data and information and of **data-driven approaches to road safety** improvement is widely recognized at international level.

According to the European Transport Safety Commission (ETSC, 2001), the emphasis of a road safety information system has shifted from a single focus on road crash data recording to the collection of data and information required to support different levels of the road safety management system, as visualized in the pyramid in Figure 1.

Figure 1: Essential Elements of a Road Safety Information System

Source: Wegman, 2001

According to World Bank Guidelines for Conducting Road Safety Data Reviews (footnote 3),

> *Road safety data are not just about crash data (or outcome data – the observed crashes and injuries), but also about the safety performance of the road traffic system, and about interventions to improve road safety. These data are best used when combined with other information, such as traffic volumes and distances travelled, or split between different transport modalities. For an evidence-based approach to the management of road safety, these data can be used by policy makers, traffic engineers, police, the health sector, the research community, insurance companies, prosecutors, vehicle manufacturers, and others.*

The rationale is that data at all levels of the pyramid is necessary to describe and understand the process leading to crashes. This knowledge then serves as the basis for evidence-based road safety management. The road safety information framework according to this philosophy is visualized in Figure 2.

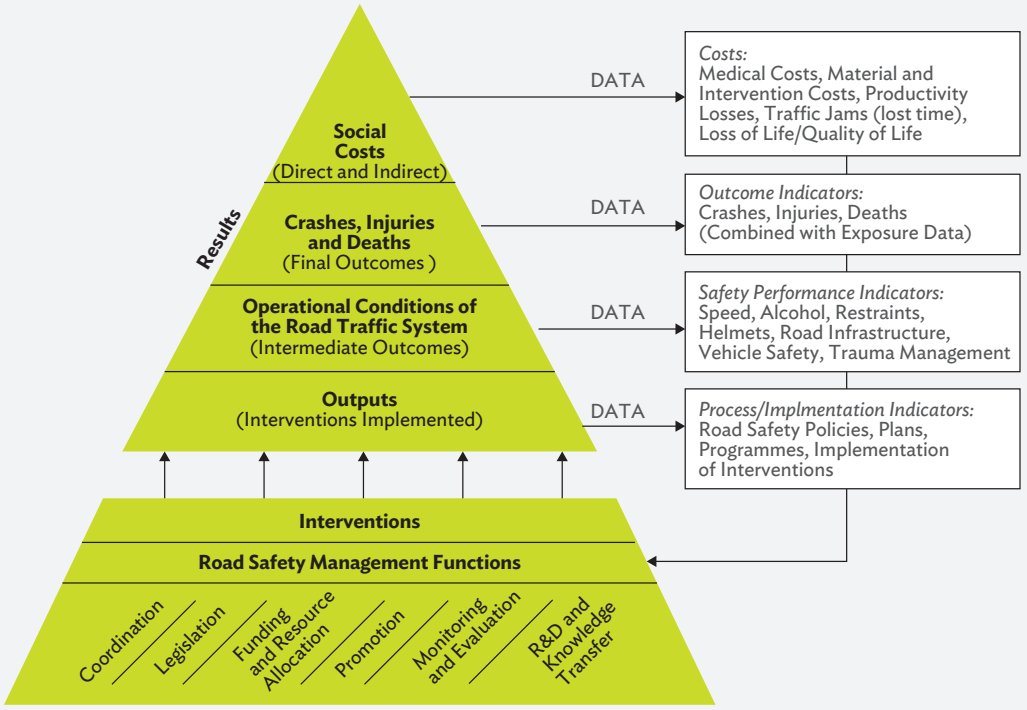
The pyramid has four levels. In the bottom level, road safety interventions can be found (policy, programs, and initiatives). If implemented effectively, and at scale, improved government road safety policy delivery should result in certain changes in road traffic (the next level). For example: a lower percentage of drivers and passengers traveling without wearing a helmet or seatbelt, a higher proportion of vehicles obeying speed limits, a shorter time interval that medically qualified personnel need to reach a crash location, etc. These are known as **safety performance indicators (SPIs)**. These are parameters that have a causal relationship with crashes and casualties/victims. They are not used instead of crash and injury data, but in addition to them. The purpose is to be able to assess the effectiveness (and risk-reduction effectiveness) of specific programs and to understand better the impact of policy interventions.

The next level contains the features of crashes and victims; possibly related to exposure quantities to calculate road safety risks. These contain the (national) crash registration data, that, nearly everywhere in the world, is based on the police crash data. This data is then processed into national road crash statistics.

The top level of the pyramid contains data that express the social cost of crashes. This concerns the damage that society judges to be negative (hospitalization cost, loss of earnings etc.), and to be prevented.

When data at all four levels are available and actively used, the process leading to crashes can be described, analyzed, and understood. This knowledge can then serve as a basis for a rational road safety management system to lower the social costs.

Figure 2: Outcomes of Road Safety Management



Source: WHO. 2010.

A road crash data collection system is usually characterized by three main elements: (i) a data collection process (i.e., a set of operations or phases carried out for the purpose of data collection), (ii) the data collection techniques and tools, and (iii) the actors who carry out the operations foreseen within the process.

The ultimate purpose of road crash data should be to support the process of improving road safety. As such, a safety-oriented data collection system should:

- make the data accessible to road safety managers, in particular road management bodies and territorial administrative bodies,
- provide relevant information, in particular to:
  - locate road crashes on the road network,
  - understanding crash patterns and contributory factors,
  - understand the outcomes of crashes,
- provide complete and reliable information in a timely manner, and
- allow linkage between different data sources (e.g., police, health services, insurance, etc.).

A road crash data management framework should be organized according to some basic topics to which some standards are connected to ensure reliability and completeness of information:

- Road crash data collection.
- Storage, processing, and use of road crash data.
- Other road safety data.

Road crash data collection is the basic function to be ensured since it provides information about the final outcomes' indicators (crashes, injuries, deaths). The collection of crash data concerns mainly the police bodies attending the scenes of crashes with victims. However, other actors can provide important complementary data. Health services (mainly hospitals) can provide data used for statistics on road traffic casualties and victims follow up. Insurance companies can complement police data with information about history of vehicles and drivers, as well as road crashes without victims.

A reliable road crash data collection can be ensured when:

- A common nationwide notification system is in place, ensuring that police bodies and emergency services are rapidly informed about the crash. The use of a central emergency number is usually a good practice.
- Police bodies and emergency services have sufficient resources to attend all scenes of road crash with victims.
- A unique and comprehensive road crash registration system is in place, allowing for collection of at least a minimum set of crash attributes and variables, preferably by using IT devices rather than paper-based forms.
- Procedures for almost immediately storing the road crash data into a jurisdiction-wide (e.g., provincial, national) database exist and allow for an easy retrieval of data. This feature should be made via a centralized information system (e.g., road crash data management system).
- The persons in charge of road crash data collection and storage are adequately trained about the importance of road crash data and about the practices to be followed.

All these aspects can greatly influence the amount and quality of data collected and can lead to important under-reporting of data.

When it comes to the specific road crash attributes and variables to be collected, it is important to ensure that data are complete, of good quality, and collected uniformly throughout the country.

World Bank Guidelines for Conducting Road Safety Data Reviews recommend to:

- Attend at least every crash scene resulting in serious or fatal injuries.
- When possible, record causation and aggravation factors such as speeding, driving under the influence, seatbelt use, and other violations.
- Report the severity of the victims' injuries since the initial data collection at the scene and update the initial assessment based on medical records.
- Ensure the road crash fatality count includes the victims who die in hospital.
- Record a minimum set of information on eventual road crashes not investigated by police (e.g., those without victims).

The **minimum set of crash attributes and variables** should include information about the location, the road infrastructure, road users, and vehicles involved as well as variables characterizing the maneuvers and the consequences of the crash. For instance, the World Bank Guidelines for Conducting Road Safety Data Reviews refer to a set of 28 road crash attributes derived from the Common Accident Data Set (CADaS) of the European Commission (Table 1).

Table 1: Minimum Set of Crash Attributes

Crash	Traffic unit	Person
Crash ID		Person ID
Date	Traffic unit type (e.g., pedestrian, cyclist, passenger car)	Date of birth
Time	Special function vehicle	Gender
Weather conditions	Registration year	Road user type (pedestrian, driver, passenger)
Lighting conditions (daylight, dark, with/without lighting, dusk/dawn)	Country of registration (e.g., foreign, national)	Injury severity (slight, more than 24 hours in hospital, fatal)
Crash type (e.g., with pedestrian, single, two vehicles turning, two vehicles no turning)	Vehicle maneuver (e.g., turning, overtaking, etc.)	Alcohol test (not tested, not applicable, positive, negative, unknown)
Location: X coordinate (latitude) and Y coordinate (longitude)		Drug use
Road type (e.g., motorway, expressway, national road, local road)		Safety equipment
Section type (e.g., bridge, tunnel, bend, gradient, straight)		Nationality (national, foreigner – possibly by relevant country grouping)
Junction type (not at junction, crossroad, roundabout)		MAIS injury severity
Speed limit		
Surface conditions (dry, snow/ice, wet, slippery)		
Crash severity		

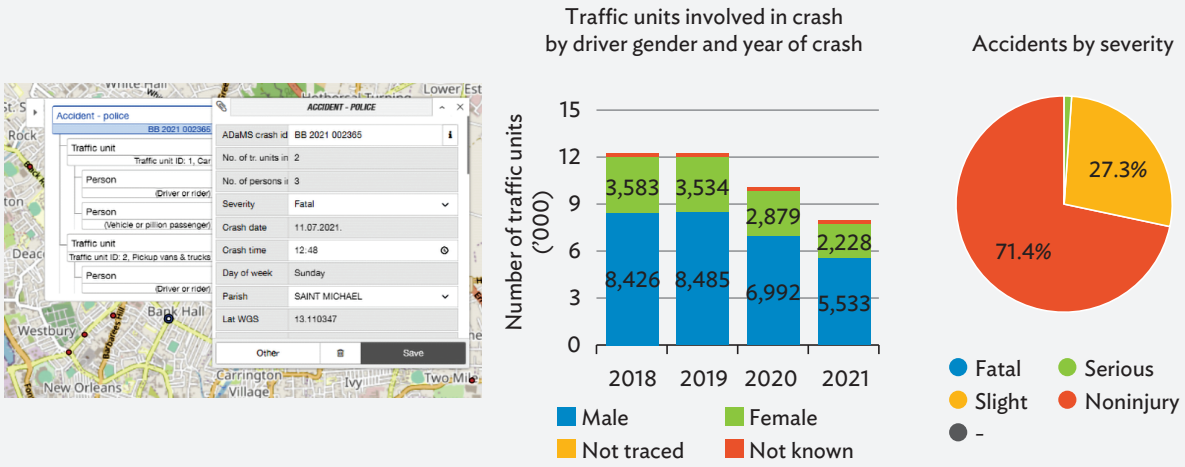
Source: World Bank Guidelines for conducting road safety data reviews.

The international standards give specific attention to the **crash location** due to its importance for identifying road safety interventions. Knowing the location of road crashes on Geographic Information System (GIS) allows for identification of high-risk sites and road sections and, consequently, for selection of road safety interventions.

Storage, processing and use of road crash data into a national database is also highly important to ensure that a reliable process is established a national level, involving all the stakeholders having a role on road safety. The following aspects should be considered to ensure that data are properly stored and can be used for road safety analysis:

- The data should be recorded in a **common system** (directly from the crash scene or from office by transferring paper-based forms into the database).
- The data should be regularly transferred to a central data repository where all crash data are consolidated (**national road crash database**).
- The national database and the common system should be accessible both by actors charged of data collection (e.g., police, health services) and by actors charged of selecting road safety interventions or developing road safety policies. This is highly important for **data-driven decision-making**.
- The database should feed into **analysis tools**. The data per se are useless if they cannot be analyzed and used to inform decision-makers. A **road crash data management system** should be in place allowing for a number of analyses: querying of data (by combining different crash variables), mapping the data, assessing the single crash data, obtaining graphics and reports, etc. (Figure 3).

Figure 3: Screenshot of ADaMS - Accident Data Management System



Source: FRED Engineering.

Other road safety data should be included in the process and, when possible, embedded in a road crash data management system. Main additional data (possibly to be added into a road crash data management system) refer to:

- Risk exposure data, usually measured in terms of number of crashes or victims by population, number of vehicles, road length, distance traveled, etc. The specific measurements of risk exposure depend on the availability of specific mobility data in the country (for instance, data on traffic volumes may not

always be available). In some cases, using surrogate measures to compensate missing information is also possible.

- Safety Performance Indicators (SPIs) causally linked to road safety. SPIs can be linked to conditions of road infrastructure, vehicle used, road user behavior, post-crash care. The selection of SPIs to be considered (and when possible, added to a road crash data management system) depends on country road safety policies and on the main risks of crashes. Some examples are:
  - Road infrastructure: level of risk related to road attributes (e.g., iRAP star rating).[5]
  - Road users: percentage of vehicles' occupants wearing a seatbelt, percentage of motorcycles' riders wearing a helmet, percentage of drivers using mobile phone while driving, etc.
  - Vehicles: percentage of vehicles equipped with active safety features such as the Anti-Lock Braking System (ABS) and the Electronic Stability Control (ESC).

It is to note that other road safety data can be difficult to collect on a regular basis. When available in a country they can lack a full national coverage or in some cases being outdated. These data should thus be treated carefully and coherently with the road crash data available to avoid misleading interpretations of road crash contributory factors. That said, these data can be valuable for deeper road safety considerations, especially for planning purposes.

Table 2 synthesizes the reference standards described above, that will be considered when assessing the existing road crash data framework of Pakistan.

Table 2: Synthesis of Reference Standards for a Road Crash Data Framework

Topic	#	Reference Standard
Road crash data collection	A.1	Common/unique crash notification system
	A.2	Road crash and injury definitions compliant with international standards.
	A.3	All road crash scenes with victims attended by police and emergency services
	A.4	Unique and comprehensive road crash registration system
	A.5	Collected road crash attributes and variables allows for data analysis
	A.6	System allowing for precise location of road crashes on map
Storage, processing and use of road crash data	B.1	Data registered by all actors in a common information system
	B.2	Data regularly transferred to a national road crash database
	B.3	Data accessible by all actors involved in data collection and analysis
	B.4	Road crash data management system available including analysis tools
Other road safety data	C.1	Risk exposure data included in data collection and storage (minimum data: population, traffic volumes)
	C.2	SPIs included in data collection and storage (minimum data: road risk assessment, use of mobile phone while driving, use of seatbelts, use of helmets, driving over speed limit)
Data analysis	D.1	Comprehensive analysis of road crash data and other road safety data oriented to planning and decision-making

Source: FRED Engineering

[5] The International Road Assessment Programme (iRAP) is a registered charity dedicated to saving lives by eliminating high risk roads throughout the world. iRAP Star Ratings are used for road safety inspections and road safety impact assessments. They provide a measure of the risk to which vehicle occupants, motorcyclists, cyclists and pedestrians are exposed. Risk is rated on a scale of 1 to 5; 1-Star roads have the highest risk and 5-Star roads the lowest risk.

3 Background

Pakistan, with a total area of 796,100 square kilometers (km^2), is located in South Asia (Figure 4). It borders India to the east, the People's Republic of China to the northeast, Afghanistan to the north and northwest, the Islamic Republic of Iran to the southwest and the Arabian Sea to the south. Pakistan comprises four provinces (Punjab, Sindh, Khyber Pakhtunkhwa, and Balochistan) and one federal territory (Islamabad Capital Territory).

Population

According to Worldometer's elaboration of the latest United Nations data, Pakistan's current population accounts for 243,702,914 inhabitants.[6] Figure 5 shows the distribution of population by gender and age in 2023, with the median age being 20.6 years. The population density is about 312 persons per km2. About 34.7% of the population lives in urban areas.

Road Network[7]

Pakistan's road network has a total extension of approximately 500,000 kilometers (km). Currently, there is no nationally recognized road classification system. Most of the road development authorities follow their own classification system developed according to their needs over time. A distinction can be made between:

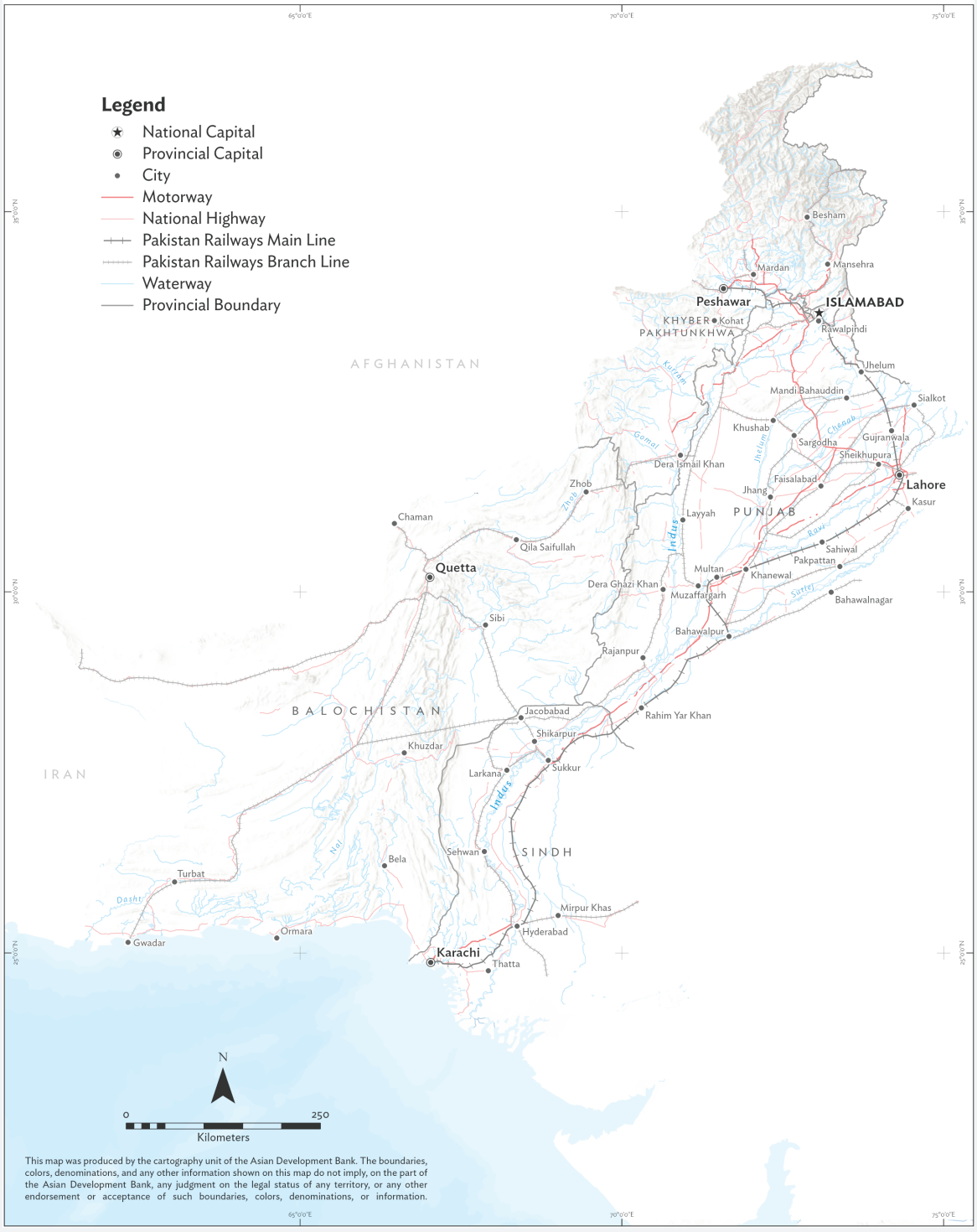
- Federal Roads
- Provincial and Territorial Roads
- Municipal Roads

Federal roads are controlled by the Government of Pakistan and maintained by the National Highway Authority (NHA). They are divided into three classes:

- Motorways
- Expressways
- National Highways

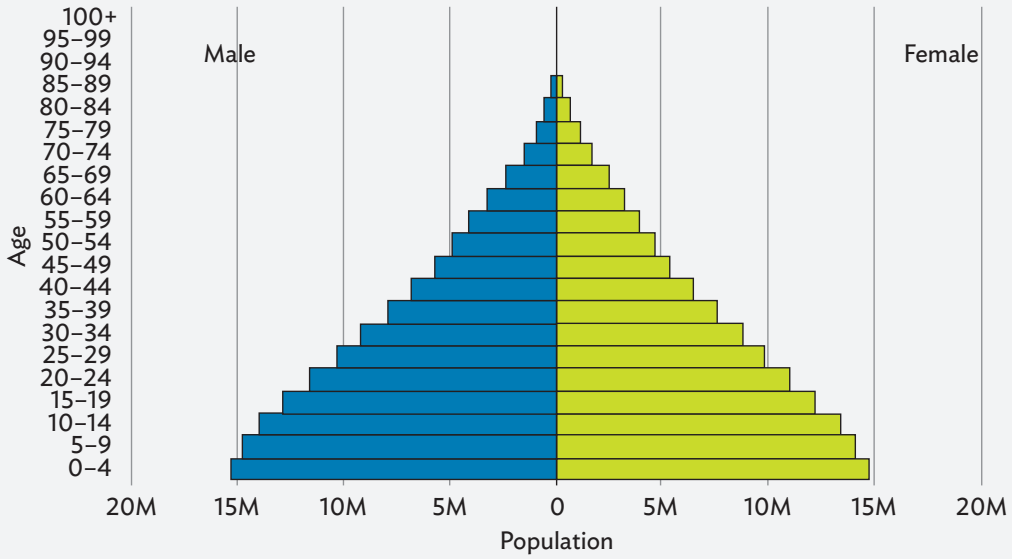
6 Worldometer. Pakistan Population.
7 Digitalization of Roads Directory in the Country, National Transport Research Centre (NTRC)

Figure 4: Map of Pakistan



Source: Asian Development Bank.

Figure 5: Population Distribution by Age and Gender in Pakistan (2023)



Source: The World Factbook.

The 1,973 km of motorways in Pakistan consist of multiple high-speed lanes with limited or controlled access. Approximately 1,763 km of motorways are being designed or constructed in different parts of the country. Most of these motorway projects have been completed by 2022.

Expressways, which also consist of multiple high-speed lanes, are usually upgraded versions of national highways, but differ from motorways in that they have fewer restrictions. The total length of expressways in Pakistan is 260 km.

National highways consist of all public highways maintained by NHA. They have a total length of over 9,500 km and provide access to the major population centers.

Provincial and **territorial roads** are controlled by the respective provincial and territorial governments and maintained by the respective provincial highway authority. Each province uses its own road classification system, which is based on the type of road material used and the ownership of the road, without reference to any global functional classification system.

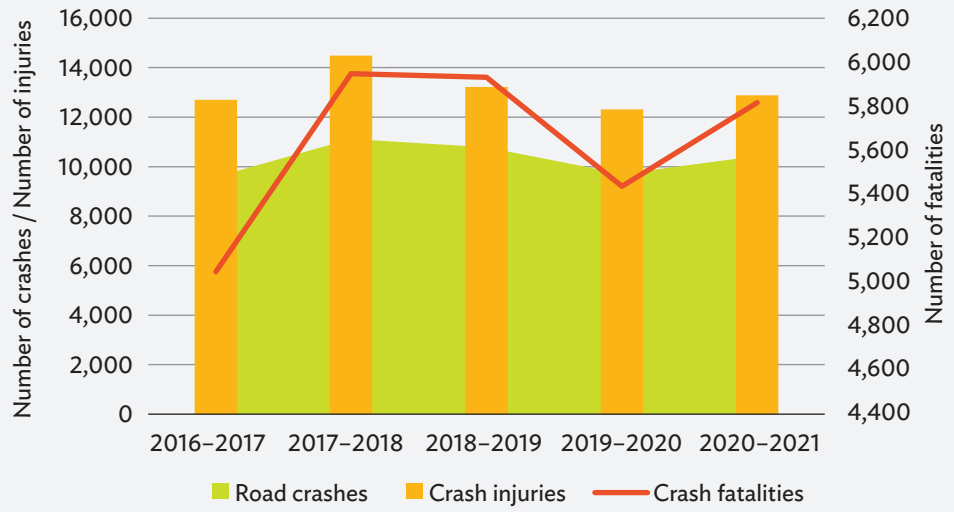
Municipal roads are controlled by the respective district or city governments.

Road Crashes

The crash analysis reported below have been carried out based on data provided by Pakistan Bureau of Statistics (PBS). This agency reports the number of road crashes and crash casualties per fiscal year.

From 2016 to 2017 and 2020 to 2021, the number of road crashes, as well as that of injuries and fatalities, followed a nonlinear trend (Figure 6). In particular, the numbers increased until 2018–2019 and dropped significantly in the following year; this can probably be attributed to the coronavirus disease (COVID-19) pandemic, which substantially limited vehicular traffic and thus the number of road crashes. From 2019–2020 onward, the numbers increased. The last recorded figures date back to 2020–2021 and amount to 10,429 crashes, 12,886 injuries, and 5,816 fatalities.

Figure 6: Trend of Road Crashes, Injuries, and Fatalities in Pakistan (2016-2021)



Source: Pakistan Bureau of Statistics

During 2016–2017 to 2020–2021 (Table 3), there where:

- A total of 51,612 road crashes, 22,867 of which (44,3% of all crashes) were fatal and 28,745 (55,7% of all crashes) non-fatal.
- A total of 65,607 injuries and 28,179 fatalities.
- An average of 10,322 road crashes per year (4,573 fatal and 5,749 non-fatal).
- An average of 13,121 injuries and 5,636 fatalities per year.

Table 3: Number of Crashes, Injuries, and Fatalities in Pakistan (2016–2021)

Year	No. of crashes:			No. of injuries	No. of fatalities
	Total	Fatal	Non-fatal		
2016-2017	9,582	4,036	5,546	12,696	5,047
2017-2018	11,121	4,829	6,292	14,489	5,948
2018-2019	10,779	4,878	5,901	13,219	5,932
2019-2020	9,701	4,403	5,298	12,317	5,436
2020-2021	10,429	4,721	5,708	12,886	5,816
Average	**10,322**	**4,573**	**5,749**	**13,121**	**5,636**
Total	**51,612**	**22,867**	**28,745**	**65,607**	**28,179**

Source: Pakistan Bureau of Statistics

Table 4 shows the trend in the number of crashes over the reporting period. The increase in the number of road crashes and crash casualties highlights the need for greater commitment in dealing with road safety issues.

Table 4: Trend in the Number of Crashes

From 2016-2017 up to 2020-2021
Number of crashes increased by **8,8%**.
Number of fatalities increased by **15,2%**.
Number of injuries increased by **1,5%**.

Source: Elaboration on Pakistan Bureau of Statistics

4 Assessment of the Existing Road Crash Data Management Framework

Currently no reliable database on road crashes is established in Pakistan. The only data available refer to generic statistics provided by the PBS. They provide little information on total number of road crashes, number of fatal and non-fatal crashes, number of persons killed and injured and the total number of vehicles involved. These data come from police authorities, even if it is not clear who send the data, with what frequency (e.g., annual) and how.

The main institutional sources of information on road crashes are:

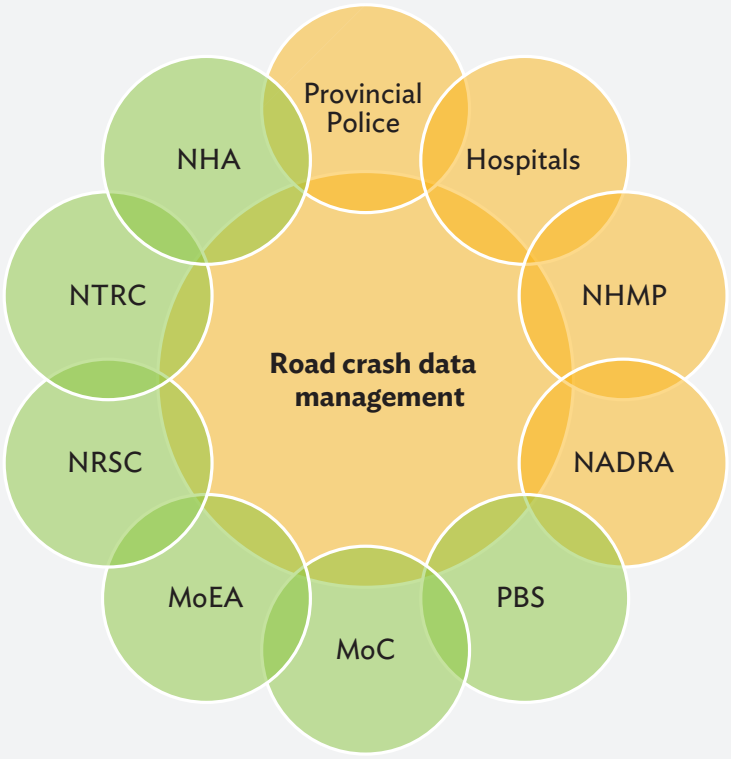
- National Highways and Motorway Police (NHMP), for data collection on motorways and national roads.
- Provincial police, for data collection in urban areas and on roads different from motorways and national roads.
- Ministry of National Health Services, Regulations and Coordination, for information collection on injured persons (through hospitals).
- National Database and Registration Authority (NADRA), responsible for collecting Vital Registration Data (VRD) in the country.

Other institutional actors involved in the management of road safety data (thus that should benefit of data on road crashes) are:

- Ministry of Communications (MOC), responsible for setting mobility and infrastructures policies and conducting research studies and surveys to collect road safety data, i.e., risk Eeposure Ddta, such as distance traveled by vehicles, number of registered vehicles and length of roads in the country.
- Ministry of Economic Affairs (MOEA), for which monitoring activities on the regularity and completeness of data collected by the police and health services are planned in the future.
- NHA, in charge of highways and motorways maintenance.
- National Transport Research Center (NTRC), supporting planning and appraisal of transport sector projects/plans.
- National Road Safety Secretariat (NRSC), in charge of developing and undertaking multi-sectoral road safety projects and of implementing initiatives established by the high level constituted National Road Safety Council.
- PBS, in charge of publishing statistics on road crashes.

The actors involved in the road crash data collection process in Pakistan are shown in the Figure 7, where the yellow circles indicate the actors being mainly sources of data and the green circles indicate the other actors involved mainly in the road safety data management process.

Figure 7: Agencies Involved in Road Crash Data Management Process in Pakistan



MOC=Ministry of Communications, MOEA=Ministry of Economic Affairs, NADRA= National Database and Registration Authority, NHA= National Highway Authority, NHMP= National Highways and Motorway Police, NRSC=National Road Safety Secretariat, NTRC=National Transport Research Center, PBS= Pakistan Bureau of Statistics.

Source: FRED Engineering. Consultations conducted with local stakeholders

An overview of current procedures adopted in Pakistan for road crash data collection and management is described below by taking into consideration the reference standards described in Chapter 2.

4.1 Road Crash Data Collection

A.1 – Is a common/unique crash notification system in place?

A unique notification system for emergencies has been launched in the whole Pakistan during 2022. In the event of a road crash, the 911 helpline can be called. An operator will connect the citizen to the relevant department.

Other emergency numbers are also active in Pakistan, referring mainly to ambulance services. The main one is 1122 operated by the emergency ambulance service Rescue 1122 (a government-run emergency service serving Punjab Province, KPK Province, Balochistan Province, and Sindh Province).

Box 1: Emergency Number - Best Practice Example

Several countries use a unique emergency number to manage all emergency calls flow, which are then transferred to the body in charge of managing the specific emergency (e.g., police, fire brigade, health emergency).

In Saudi Arabia, for instance, the police is notified about the occurrence of a road crash through a call to a unique emergency number: 911. Moreover, the Government of Saudi Arabia has set a specific performance indicator concerning the dispatch time of an emergency from notification to 911.

Source: World Health Organization (WHO)

The absence of a common notification system is a possible source of underreporting since some crashes could not be reported to traffic police. Typically, a unique notification system allows to reduce the notification times and thereby the probability of serious injuries to become incapacitating or fatal. Intervening on the crash scene in timely manner is also beneficial for road crash data collection since the scene is likely to be less influenced by external factors that could "pollute" the scene.

A.2 – Are road crash and injury definitions compliant with international standards?

Every country must have a clear definition of a road traffic crash including information on the crash location, the road user types involved, and the nature of injuries sustained by the casualties and the damage sustained by vehicles and property.

Similarly, road traffic crash injury severity also needs to be defined. Ideally, the definitions should be based on injury scaling techniques, such as Abbreviated Injury Scale (AIS). When injury scaling techniques are not carried out the following definitions for road traffic injuries can be considered:

- Fatal – death due to injuries sustained during the crash, and the date and time of death is within 30 days of the crash occurrence.
- Serious – hospitalized for more than 24 hours.
- Minor – given first aid at scene or treated in a medical facility as outpatient or discharged from hospital within 24 hours.
- No Injury – no visible injuries sustained.

The definitions adopted by the Provincial Polices and by NHMP concerning road crashes are to some extent different. Both these agencies refer to fatal crashes as those where a death occurred on the spot or where a victim passed away later. Non-fatal crashes refer to those where no person was killed, and one or more persons were injured, or property was damaged.

Provincial police do not refer to a precise number of days for the follow up of crash victims. As such, it is not clear up to when a crash can be considered fatal. NHMP instead refers to fatal crashes as those where the death occurred on the spot or where the victim succumbed to injuries within 15 days after the crash. After this date, no follow-up of the victim is done.

Based on these definitions, differences with international best practices appear in the definition of road crash fatalities. Especially, a lower time limitation compared to international practices (i.e., up to 30 days after the crash)

is currently applied. When it comes to road crash injuries, it seems that no specific system is in place to distinguish between serious and minor injury. The rules adopted to separate serious and minor injuries is not clear.

A.3 – Are all road crash scenes with victims attended by police and emergency services?

When receiving a notice about a road crash, a police officer (provincial police or NHMP depending on the crash location) should attend the crash scene and record a set of information.

The capability to attend all crash scenes varies depending on the agency involved and on the location. NHMP has sufficient capabilities to deal with all crashes occurring on highways or motorways. On the contrary, provincial police are less effective, with performance differing based on the province (e.g., Punjab Provincial Police can be considered more effective than others).

All road crashes with involving injuries or fatalities are attended by the emergency services; injured persons receive first aid treatment and are then transported to the nearest hospital.

The crash scene attendance by emergency services also varies depending on the province and on the specific agency. Rescue 1122 seems to be the more reliable agency across the country (with some differences depending on the province).

A reliable service has been developed by Rescue 1122 for Punjab, entailing different kind of operations and including road crash intervention and collection. It conducts both Hazard Mapping and identification of black spots, with reports being brought to the District Emergency Board for recommendations and interventions.

A.4 – Is there a unique and comprehensive road crash registration system?

The process of collecting road crash data does not follow a standardized approach nationwide. On the contrary, each police agency adopts its own approach.

Provincial Police

Crash data are collected by using a so-called First Information Report (FIR). It is not a specific form for road crash data collection. It is generically used for any kind of crime. It includes a section where the crime (or the road crash) can be described by writing (for instance, the report does not include tick boxes for specific and standardized information).

Overall, it should allow for extraction from text of about 25 variables (see Table 5). However, the scope of the form is limited and not coherent with international practices.

Table 5: Crash Variables Included in Provincial Police First Information Report

Category	Variables
General details	Date/Time Location Classification of crash/Severity Road type Road condition Weather condition Other details
Vehicle details	Registration number Vehicle type Age of vehicle Speed Vehicle/s driver Other details
Road user's details	Age Gender Injury Use of alcohol/other drugs Driving license Use of safety equipment Other details
Other details	Road conditions Vehicle conditions Driver's negligence

Source: FRED Engineering. Consultations conducted with local stakeholders.

NHMP

NHMP makes use of a standardized data collection form, specifically designed for road crashes. The form includes different variables related with general details on road conditions, date/time of the crash, etc., vehicles details, persons involved and location. The location is set through the distance to the nearest km marker. The form also includes the following sections:

- Draw sketch.
- Crash maps.
- Investigation outcomes.

These sections allow for an effective reconstruction of the crash dynamics to be conducted.

A template of the form can be found in Annex 1.

The paper-based form is used for collection of data at the crash scene. The information is recorded into a web-based information system at each "Beat Headquarter" (i.e., NHMP office in charge for a specific zone) and then transferred to the central Computer Bureau of NHMP based in Islamabad. A copy of the form is also sent to the higher-level offices (sectors, DIGs[8]) and to the local police Offices. External agencies (such as government or nongovernment organizations) can receive the data or the reports produced by NHMP only on request.

[8] Deputy Inspectors Generals of Police

The victims' follow-up at hospitals is done by NHMP for up to 15 days after the crash. If victims pass away after this time, the crash is considered not to be fatal. Follow-up reports are generated and sent to higher officials on a regular basis. The follow-up report is also matched with the form recorded at crash scene and the information system is updated regularly.

Box 2: Crash Data Management - Best Practice Example

In France, the national database of road crashes is managed by the Interministerial Observatory for Road Safety (ONISR).

The data are collected by the various police forces operating in the different areas (urban, suburban, motorway). The information collected is based on the common Bulletin d'Analyse des Accidents Corporels de la Circulation (BAAC) form . The BAAC form is filled in digitally.

ONISR is responsible for validating the data, checking their consistency, and for publishing and disseminating the road crash information.

Source: International Transport Forum (ITF).

Table 6 shows the road crash variables collected at crash scenes by NHMP and compares them with the European Union standards (the common field are highlighted). Especially, the Common CADaS is used for comparison (Table 6 shows both the full CADaS variables and the simplified ones).

Table 6: Road Crash Variables Collected in Pakistan by National Highways and Motorways Police Compared to CADaS

Variable	CADaS	MINI-CADaS	Pakistan (NHMP)
CRASH			
Crash ID	✓	✓	✓
Crash date	✓	✓	✓
Crash time	✓	✓	✓
Nomenclature of Territorial Units for Statistics	✓	✓	
Local Administrative Units	✓		
Weather conditions	✓	✓	✓
Light conditions	✓	✓	✓
Traffic crash type / category	✓	✓	✓
Cause	✓	✓	
ROAD			
Latitude	✓	✓	
Longitude	✓	✓	
Road name	✓	✓	✓
Road kilometer	✓		✓
Functional class – 1st road	✓	✓	
Functional class – 2nd road	✓	✓	
AADT – 1st road	✓		
AADT – 2nd road	✓		

continued on next page

Table 6 *continued*

Variable	CADaS	MINI-CADaS	Pakistan (NHMP)
Speed limit – 1st road	✓	✓	
Speed limit – 2nd road	✓	✓	
Motorway	✓	✓	
Urban area	✓	✓	✓
Junction	✓	✓	✓
Rel.to junction/interchange	✓		
Junction control	✓		✓
Road surface conditions	✓	✓	✓
Obstacles	✓	✓	
Carriageway type	✓	✓	✓
Number of lanes	✓	✓	
Emergency lane	✓		
Markings	✓		
Tunnel	✓		
Bridge	✓		
Work zone related	✓	✓	✓
Road curve	✓		✓
Road segment grade	✓		
TRAFFIC UNIT			
Traffic unit ID	✓	✓	✓
Traffic unit type	✓	✓	✓
Vehicle special function	✓		
Trailer	✓	✓	
Engine power	✓		
Active safety equipment	✓		
Vehicle drive	✓		
Make	✓		✓
Model	✓		✓
Registration year	✓	✓	✓
Traffic unit maneuver	✓	✓	✓
First point of impact	✓		✓
First object hit in	✓		
First object hit off	✓		
Insurance	✓		
Hit & Run	✓	✓	✓
Registration country	✓	✓	
PERSON			
Person ID	✓	✓	✓
Year of birth	✓	✓	✓

continued on next page

Table 6 *continued*

Variable	CADaS	MINI-CADaS	Pakistan (NHMP)
Gender	✓	✓	✓
Nationality	✓	✓	
Injury severity as reported	✓	✓	✓
Road user type	✓	✓	✓
Alcotest	✓		
Alcotest sample type	✓	✓	
Alcotest result	✓	✓	
Drug test	✓		
Driving license issue date	✓	✓	
Driving license validity	✓		
Safety equipment	✓	✓	
Seating position in/on vehicle	✓	✓	✓
Distracted by device	✓		
Psychophysical / physical impairment or condition	✓		
Trip/Journey purpose	✓		
Injury MAIS Scale	✓		

CADas = Common Accident Data Set, MAIS = Maximum Abbreviated Injury Scale, NHMP = National Highways and Motorways Police.

Source: Mobility and Transport Department, European Commission

Even if the current data collection form is quite comprehensive, it lacks the possibility of precisely locating the road crash based on GPS coordinates. The location given via the road kilometer can be sufficiently effective on highways and motorways but not on other type of roads or in urban areas. This lack makes difficult identifying high-risk sites and planning specific interventions.

Health agencies

According to an evaluation of road traffic injuries (RTIs) Surveillance Systems in District Lahore, at present the following entities report RTIs:

- District Health Information System (DHIS), based in Lahore.
- Emergency Rescue 1122 system.
- Tertiary Care Hospitals (TCHs), based in Lahore.
- District Police Authorities (DPA).

A comparative analysis of these systems showed that these surveillance systems have their own limitations and lack some aspects of data. However, Rescue 1122 and TCHs seem to be good data sources. Main issues are related with:

- Surveillance efforts of various health programs are not linked.
- Private sector never report data to any system.
- There is no legislative framework to bind private sector to support the initiatives for disease surveillance.
- There is need to develop an integrated and multidisciplinary surveillance system.

Other studies have analyzed the current situation of RTIs data collection and reporting in Pakistan and have proposed new data collection methodologies based on the Injury Surveillance Guidelines of WHO.

All injured victims seen at the medical facilities in Pakistan are required to be evaluated by a medico-legal officer to help with court proceedings expected in RTI cases. A medico-legal officer is a doctor acting as a liaison with the legal system and is trained in forensic medicine. The evaluation takes place in parallel with treatment/management of the patient by emergency department staff. The medical examiners collect demographic and injury related information on each patient and enter them into a logbook. Similarly, all patients who are brought dead to the hospital are checked by a medical examiner. Information about these victims, including any findings from a postmortem, is recorded in a separate "postmortem log."

Rescue 1122 has established a reliable service for Punjab Province, entailing different types of operations and including road crash intervention and collection. This service is also operational in other Provinces with eventually some differences.

In Punjab, Rescue 1122 conducts both Hazard Mapping and identification of high-risk sites, with reports being brought to the District Emergency Board for recommendations and interventions. The data are collected through the Trauma Registry Program of Rescue 1122 which has a base in all the public hospitals in Punjab, allowing for constant coordination.

Based on information collected at Rescue 1122 Headquarters in Lahore, the hospitals in Punjab do not possess record on crash data. The Rescue 1122 desks in the hospitals are the only source for crash-related data.

Rescue 1122 has also established a Citizen Feedback System, which is operated through text messages and post-crash calls and allows to collect satisfaction levels of the victims and their families toward Rescue 1122 operations. This information is used for internal monitoring and evaluation purposes.

Currently the services provided by Rescue 1122 in Punjab are the most advanced of the country. Their operations and organization appear to be highly reliable and comparable with international standards.

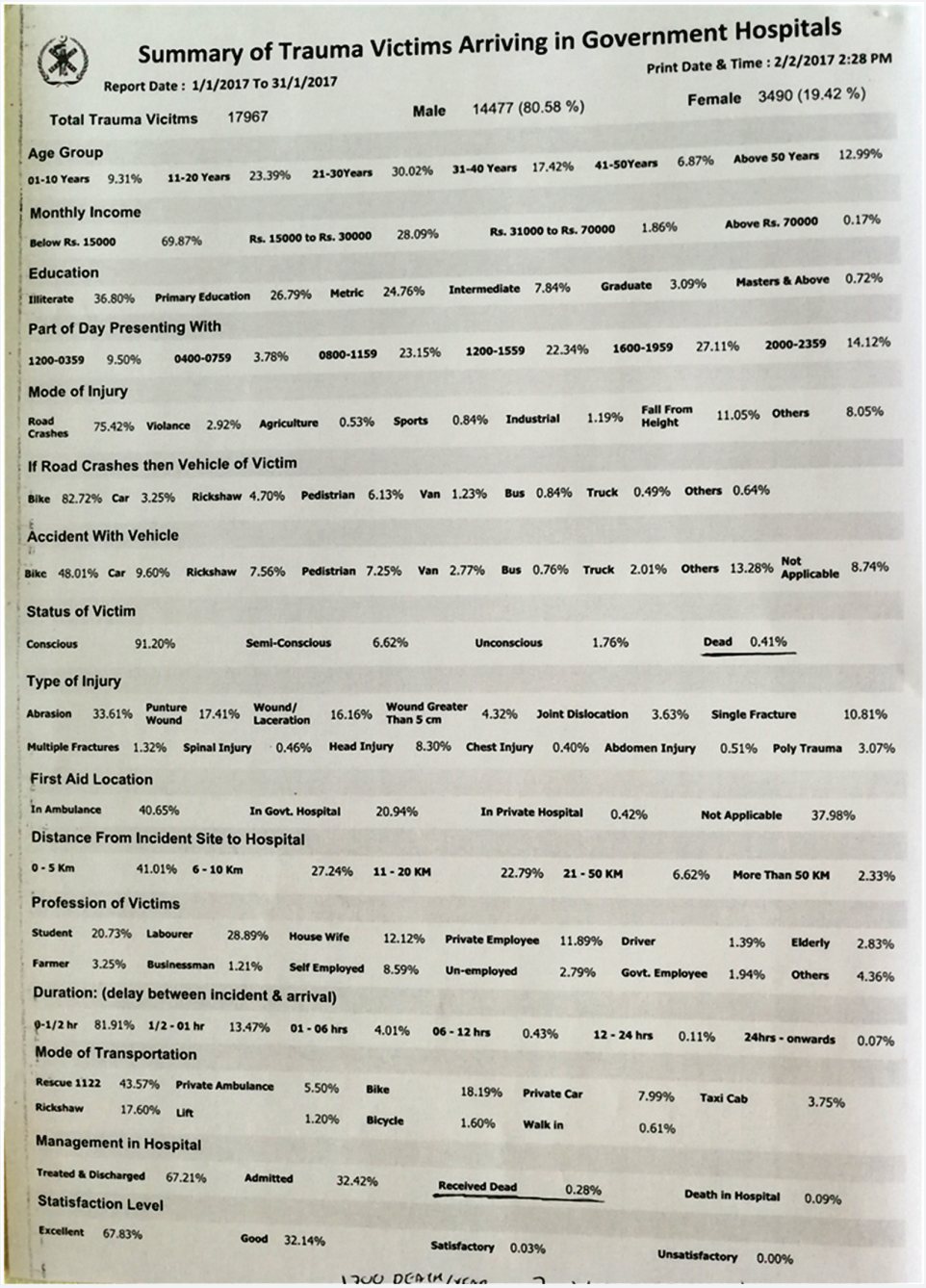
A summary of the trauma victims arriving in government hospitals, provided by the representatives of Rescue 1122 Headquarters in Lahore, is shown in Figure 8, highlighting various factors such as type of injury, type of vehicle, status of victim at the time of crash, etc. The summary includes percentages of trauma victims (not only road crashes) divided per age, monthly income, education, time of the day, mode of injury and specific information in case of trauma due to road crash. The summary of trauma victims also allows to collect information on status of victims (including how many persons died). Other information refers to the type of injury, how victims were treated, what service was used to transport persons to hospitals, etc.

A.5 – Does the collected road crash attributes and variables allow for data analysis?

The data collected by the different agencies in Pakistan allow for various data analysis.

The NHMP information system allows for a number of data analysis (graphs, tables, maps) and for the preparation of reports on road crashes. The results of analysis are directly used by NHMP to decide on road safety interventions to be adopted in specific locations (i.e., enforcement or education measures). On request, results of data analysis are provided to other agencies to support their decision-making process about road safety interventions.

Figure 8: Example of Trauma Victim Data Summary – Rescue 1122



Summary of Trauma Victims Arriving in Government Hospitals

Report Date : 1/1/2017 To 31/1/2017

Print Date & Time : 2/2/2017 2:28 PM

Total Trauma Vicitms 17967 | Male 14477 (80.58 %) | Female 3490 (19.42 %)

Age Group

01-10 Years 9.31% | 11-20 Years 23.39% | 21-30Years 30.02% | 31-40 Years 17.42% | 41-50Years 6.87% | Above 50 Years 12.99%

Monthly Income

Below Rs. 15000 69.87% | Rs. 15000 to Rs. 30000 28.09% | Rs. 31000 to Rs. 70000 1.86% | Above Rs. 70000 0.17%

Education

Illiterate 36.80% | Primary Education 26.79% | Metric 24.76% | Intermediate 7.84% | Graduate 3.09% | Masters & Above 0.72%

Part of Day Presenting With

1200-0359 9.50% | 0400-0759 3.78% | 0800-1159 23.15% | 1200-1559 22.34% | 1600-1959 27.11% | 2000-2359 14.12%

Mode of Injury

Road Crashes 75.42% | Violance 2.92% | Agriculture 0.53% | Sports 0.84% | Industrial 1.19% | Fall From Height 11.05% | Others 8.05%

If Road Crashes then Vehicle of Victim

Bike 82.72% | Car 3.25% | Rickshaw 4.70% | Pedistrian 6.13% | Van 1.23% | Bus 0.84% | Truck 0.49% | Others 0.64%

Accident With Vehicle

Bike 48.01% | Car 9.60% | Rickshaw 7.56% | Pedistrian 7.25% | Van 2.77% | Bus 0.76% | Truck 2.01% | Others 13.28% | Not Applicable 8.74%

Status of Victim

Conscious 91.20% | Semi-Conscious 6.62% | Unconscious 1.76% | Dead 0.41%

Type of Injury

Abrasion 33.61% | Punture Wound 17.41% | Wound/ Laceration 16.16% | Wound Greater Than 5 cm 4.32% | Joint Dislocation 3.63% | Single Fracture 10.81%

Multiple Fractures 1.32% | Spinal Injury 0.46% | Head Injury 8.30% | Chest Injury 0.40% | Abdomen Injury 0.51% | Poly Trauma 3.07%

First Aid Location

In Ambulance 40.65% | In Govt. Hospital 20.94% | In Private Hospital 0.42% | Not Applicable 37.98%

Distance From Incident Site to Hospital

0 - 5 Km 41.01% | 6 - 10 Km 27.24% | 11 - 20 KM 22.79% | 21 - 50 KM 6.62% | More Than 50 KM 2.33%

Profession of Victims

Student 20.73% | Labourer 28.89% | House Wife 12.12% | Private Employee 11.89% | Driver 1.39% | Elderly 2.83%

Farmer 3.25% | Businessman 1.21% | Self Employed 8.59% | Un-employed 2.79% | Govt. Employee 1.94% | Others 4.36%

Duration: (delay between incident & arrival)

0-1/2 hr 81.91% | 1/2 - 01 hr 13.47% | 01 - 06 hrs 4.01% | 06 - 12 hrs 0.43% | 12 - 24 hrs 0.11% | 24hrs - onwards 0.07%

Mode of Transportation

Rescue 1122 43.57% | Private Ambulance 5.50% | Bike 18.19% | Private Car 7.99% | Taxi Cab 3.75%

Rickshaw 17.60% | Lift 1.20% | Bicycle 1.60% | Walk in 0.61%

Management in Hospital

Treated & Discharged 67.21% | Admitted 32.42% | Received Dead 0.28% | Death in Hospital 0.09%

Statisfaction Level

Excellent 67.83% | Good 32.14% | Satisfactory 0.03% | Unsatisfactory 0.00%

Source: Representatives of Rescue 1122 Headquarters in Lahore

Similarly, also Rescue 1122 performs analysis of the data they collect, especially for Hazard Mapping and identification of high-risk sites.

The PBS and the NTRC perform statistical analyses based on trends in the number of:

- Fatal and non-fatal crashes.
- Injuries and fatalities.
- Vehicles involved in road crashes.

No precise information on the type of data analysis from other agencies is available, which could indicate a lack of capability. Moreover, the fact that data from NHMP and Provincial Police are not integrated does not allow for a comprehensive analysis of road safety challenges.

It is also unclear if standard crash configurations are currently adopted across Pakistan.

A.6 – Does the system allow for precise location of road crashes on map?

Currently the procedures adopted by NHMP and by other Provincial Police to collect road crash data does not allow for precise identification of their location. The crash location is mainly given via information (e.g., road kilometer, area, close location) written by the officer in charge of collection.

GPS coordinates cannot be currently recorded.

4.2 Storage, Processing, and Use of Road Crash Data

B.1 – Are the data by all actors registered in a common information system?

NHMP and Provincial Police collect road crash data via paper-based forms (different among them).

The FIR used by Provincial Police is not stored in an information system. On the contrary, NHMP records each crash data into an information system hosted at its central Computer Bureau.

The hospitals maintain a logbook for all the patients treated (including road crash victims). However, the logbook is not necessarily transferred to a central database. Rescue 1122 has also its own information system to store collected data.

Currently, the most reliable information system for road crash data is the one maintained by NHMP. It is an "in-house" software developed with the specific purpose of managing road crash data and information on fines, as well as for analyzing data. The system has been developed by the *Punjab Information Technology Board* and it provides a quite powerful and modern tool for analyzing data on road crashes and supporting decision-making on road safety interventions. The system has been implemented for the first time in August 2015 in few beats and gradually expanded to cover all the NHMP beats (about 60). The system is used for the collection, management and analysis of data on the whole Motorway and Highway network. The NHMP intends to gradually stop the "paper-based" collection of data on the spot in favor of a computerized data collection (using tablets).

The transfer of data through the system is realized via a normal internet connection. The data are transferred to the Central Bureau the same day of the crash and eventually successively updated (e.g., based on information coming from hospitals regarding the victims of road crashes).

The information system is also connected with the database on driver licenses and on vehicles, allowing for automatic verification of the data on drivers and vehicles involved in road crashes.

The police officers are regularly trained to the use of the information system. It is an integral part of the training activities.

B.2 – Are data regularly transferred to a national road crash database?

While all the data collected by NHMP are regularly recorded into the central database, it cannot be considered as a proper **national road crash database**.

The system allows to store the data collected by NHMP. It is not set up to include crash data collected by other sources (e.g., health services, insurance) as well as other road safety data (e.g., risk exposure data, SPIs). On the other hand, the NHMP system allows for connection with other databases about driving licenses and vehicles' registration.

B.3 – Are data accessible by all actors involved in data collection and analysis?

The various database in place in Pakistan (NHMP, Rescue 1122, etc.) are currently not open to external users. Data can be shared with other stakeholders based on requests.

At the moment, data accessibility is limited. Road crash data and statistics can be obtained by some agencies (for instance NTRC) on request, which makes it difficult to conduct a systematic and in-depth analysis of road crashes.

Box 3: Crash Data Flow – Best Practice Example

In Germany, the road crash national database management body is the Federal Statistics Office (STBA). The data source is constituted by the data collected by police.

STBA is also responsible for verifying the data quality, consolidating the data and for publishing and disseminating road crash information.

The police officers survey road crashes and fill in a standard form at the Regional Statistical Office (Lander). In turn, the regional statistical offices are responsible for sending the data to the Federal Statistical Office.

Source: European Road Safety Observatory.

B.4 – Is a road crash data management system available including analysis tools?

The central crash database at the NHMP central Computer Bureau can be used both for storage of road crash data and to perform road crash analysis. The information system allows for a number of data analysis (graphs,

tables, maps) and for the preparation of reports on road crashes. The results of analysis are directly used by NHMP to decide on road safety interventions to be adopted in specific locations (i.e., enforcement or education measures). On request, results of data analysis are provided to other agencies to support their decision-making process about road safety interventions.

Similarly, the Rescue 1122 system also allows for some data analysis (for instance, Hazard Mapping and identification of high-risk sites).

4.3 Other Road Safety Data

C.1 – Are risk exposure data included in data collection and storage?

The MOC periodically collects risk exposure data such as the distance traveled by vehicles, the number of registered vehicles and the length of the country's road network. It is not clear, however, whether this data is analyzed in a systemic manner and correlated with crash and casualty numbers.

C.2 – Are SPIs included in data collection and storage?

Similar to risk exposure data, SPIs are not systematically collected in Pakistan.

4.4 Data Analysis

D.1 – Are data on road crashes and other road safety data systematically analyzed for planning and decision-making?

Periodic reports about road crashes are prepared independently by various agencies involved in road safety (NHMP, Rescue 1122, NTRC). At the moment no specific maps of road crashes are prepared. However, some high-risk sites are being identified and specific interventions are taken.

The road crash data are also provided to the Pakistan Bureau of Statistics which publishes data regarding annual number of crashes (fatal and non-fatal), number of persons killed and injured and number of vehicles. These data are available at country level, at provincial level and for the city of Islamabad. Monthly data are also available for the last year.

The MOEA does not currently carry out concrete activities on road safety. However, it is envisaged that it will carry out monitoring activities on the regularity and completeness of data collected by NHMP, Provincial Police, Rescue 1122 and Health Services. Based on the data analysis, reports will be developed to inform policy interventions.

The MOEA supports the creation of a national road crash database and a national crash observatory. The establishment of this observatory will enable the improvement of data reliability and transparency, as well as the overall picture of road safety in the country.

5 Recommendations to Improve Road Crash Data Management

Evidence-based approaches, supported by road crash data and other road safety data, are at the heart of the most effective road safety policies. The availability of good quality road safety data makes it possible to accurately identify problems and assess the effectiveness of potential road safety measures.

The assessment of the road crash data collection in Pakistan makes clear that important differences exist between the ways the agencies in charge of data collection operate. This leads to significant differences in data quality and reliability and also to high levels of under-reporting.

A study conducted in 2011 on Karachi-Hala road[9] has assessed differences in RTI reporting across police, ambulance and hospital emergency department datasets. The study showed that crash and injury reports by police (on one road section in a one-year period) were several times less than ambulance and hospital data. Very probably this applies to the whole country, since according to the information collected, no matching of data or common practices exist between the actors involved.

Currently in Pakistan there is a lack of road crash data and of tools supporting decision-makers (Police forces, Ministries, etc.) in executing their tasks. Some good practices are already in place, such as the road crash data collection process of NHMP or the procedures adopted by Rescue 1122 in Punjab Province. However, there is no national database on road crashes and no standardized road crash data collection procedures (e.g., a unique data collection form for all actors involved in data collection is missing).

To improve the whole road crash data management system, some recommendations can be adopted:

- The establishment of standardized procedures for data collection, processing, analysis, storage and sharing, which should be directly linked to the creation of **legal frameworks** that clearly define the roles of the various stakeholders involved.
- The data on road crashes should be preferably collected through **electronic means** when the traffic crash occurs. This procedure would allow to reduce the data collection errors.
- The use of GPS tools or of maps based on GIS would increase the precision of the road crash localization.
- A standardized, homogeneous **road crash data collection form** should be adopted. It should also include procedures to identify crash contributing factors (for instance using a Haddon Matrix as described in Chapter 5.1, section A.5).

[9] J. A Bhatti, J. A Razzak, E. Lagarde, L. R. Salmi. 2011. Differences in police, ambulance, and emergency department reporting of traffic injuries on Karachi-Hala road, Pakistan. *BMC Research Notes.* 4(75). http://www.biomedcentral.com/1756-0500/4/75

- Police officers (Provincial Polices and NHMP) should be able to utilize a database on road crashes so that they can prepare their own statistics and take oriented decisions (e.g., for enforcement). This is already the case for NHMP which has developed its reliable database and decision support system.
- **Training activities** should be organized for Police officers during which they can improve their awareness about the importance of collecting data on road crashes and their competences in making this activity on the field.
- Since the Police officers must prepare reports, included statistical forms, an **information system** (or decision support system) should be developed allowing to fill in these forms / reports. The information system developed by NHMP could be used to this aim (e.g., providing it to all Police forces in Pakistan).
- A data collection process for RTIs (i.e., follow-up of persons injured in road crashes) should be introduce at national level by involving the health system (hospitals, rescue services, etc.). The procedures already established by Rescue 1122 in Punjab Province could be completed and extended.
- The road crash data collected from different sources (NHMP, Provincial Polices, hospitals, rescue service, insurances) should be integrated between them.
- Control procedures should be introduced to verify the quality of road crash data collected.

A description of the recommended process for collecting and managing road crash data is provided in the following chapters by taking into consideration the reference standards described in Chapter 2.

5.1 Road Crash Data Collection

A.1 – Common/unique crash notification system

The best international practices entail the availability of a unique point of access (i.e., a phone number) to contact emergency services. Pakistan already has a unique helpline for any emergency (911). Ideally, this should be the only number available for citizens to call for emergency.

A.2 – Road crash and injury definitions compliant with international standards

The definitions currently used in Pakistan for road crashes and injuries are not completely in line with the international standards.

A revision of the current national standards should be implemented according to the following definitions (Table 7). In case the AIS system is not in place in the whole Pakistan, a gradual approach is recommended to distinguish between serious and minor injuries. The use of MAIS should be started only after the system is fully operational across all the country.

A.3 – All road crash scenes with victims attended by police and emergency services

Currently all road crashes should be attended by Provincial Police or NHMP, as well as by health services (when there is a victim). However, the capability to attend all crash scenes varies depending on the agency involved and on the location. NHMP has sufficient capabilities to deal with all crashes occurring on highways or motorways. On the contrary, Provincial Polices are less effective, with performance differing based on the province.

Table 7: Definitions of Road Crash and Injury

Category	Internationally agreed definition
Fatalities	People who die immediately or within 30 days as a result of a road crash.
Serious injuries	People with a Maximum Abbreviated Injury Scale (MAIS) equal or higher than three. If MAIS is not available: people hospitalized for more than 24 hours.
Minor injuries	People with a Maximum Abbreviated Injury Scale (MAIS) lower than three. If MAIS is not available: people given first aid at scene or treated in a medical facility as outpatient or discharged from hospital within 24 hours.

Source: Mobility and Transport Department, European Commission.

Some actions may be taken to further improve the current situation by:

- Ensuring that the actors involved in road crash data collection always share information about occurrence of crashes, their main outcomes, the need to assess and follow up. This includes for instance the fact that hospitals systematically inform Police forces about the arrival at the hospital of crash victims.
- Ensuring that the data collection procedures are commonly adopted independently of the road crash location.

A.4 – Unique and comprehensive road crash registration system

A structure for road crash data collection recommended for Pakistan is shown in Figure 9. It refers to collection of information by various entities and their merging into a single national road traffic crash database, as well as to monitoring of injured persons established in a semi-automatic manner.

Eight key actors could be involved in the road crash data collection process in Pakistan.

PROVINCIAL POLICE. Responsible for collecting crash data throughout the province, with limited access to the national road network, which covers about 13,000 of the country's approximately 500,000 km. For each crash (injury) analyzed by the Provincial Police, a form (based on the form currently used by NHMP and on the best international practices) for data collection on paper or through electronic support (computer or tablet) has to be filled in by Police officers. The electronic forms are automatically recorded in the database of the Provincial Police. The paper-based forms are transferred into an information system at the police station and then sent to the database of the Provincial Police. The collected data are managed by provincial governments for statistical purposes. The change for Provincial Polices should be gradual since not all of them have currently the same technical and financial means. Specific improvement paths should be designed for each Province.

NHMP. Responsible for collection of road crashes on national highways and on motorways. For each crash (injury) analyzed by the NHMP, a form (based on the form currently used by NHMP and on the best international practices) for data collection on paper or through electronic support (computer or tablet) has to be filled in by Police officers. The electronic forms are automatically recorded in the database of the Computer

Bureau. The paper-based forms are transferred into an information system at the Beat Headquarter and then sent to the database of NHMP.

HEALTH SERVICES. Hospitals, Rescue 1122 and other health services collect data on persons injured in road crashes and transported to a hospital. Data are collected on paper or through electronic means by using a form designed to collect also information on costs of treatments (useful for estimation of social costs of road crashes). Data are collected periodically until dismission or death of injured persons (with a maximum time period of 30 days after the road crash occurrence).

MINISTRY OF COMMUNICATIONS. In charge of preparing official reports on road safety situation and of defining road safety interventions at national level (e.g., by updating the National Road Safety Plan). MOC is also a source of complementary data that can be merged with road crash data for more detailed analysis and decision-making (e.g., characteristics of road infrastructures, traffic flow, vehicle fleet).

NATIONAL TRANSPORT RESEARCH CENTRE. The NTRC is already in charge of performing road safety analysis and of advising MOC in decision-making on the national road safety strategy. NTRC should be also empowered with tasks relating to analysis and reports on road safety, maintenance of a national road crash database, maintenance of a National Road Safety Observatory. The center is also in charge of performing research on road safety and specific analysis when requested by MOC.

PAKISTAN BUREAU OF STATISTICS. In charge of preparing official statistics on road crashes. It receives data periodically from the MOC or from the analysis center.

NADRA. In charge of collecting VRD, which is one of the most reliable sources of fatality data globally, as it is based on death certificates issued by hospitals or private doctors.

Insurance companies should provide to NTRC with data on material road crashes (without persons injured). This is mainly useful as complementarity data and for comparisons.

The final objective of the whole establishment of a national process for road crash data collection and management should be to abandon the use of data collection methods based on paper in favor of use of electronic means (computers, tablets). However, this will not be possible immediately. A gradual extension of the new process has to be entailed following training activities and dissemination of data collection tools.

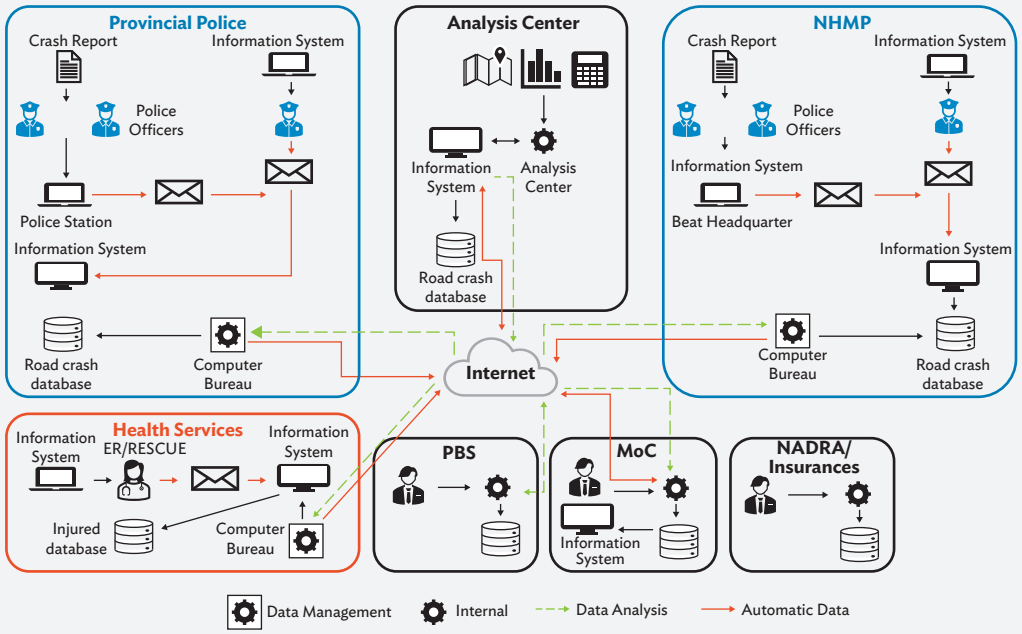
A.5 – Collect road crash attributes and variables allowing for data analysis

The current data collection process in Pakistan has some limitations concerning the reliability of data and the analysis capabilities. The main challenge is related to the differences in the crash attributes and variables collected by police forces.

A comprehensive and reliable road crash data collection process should allow for:

- The collection of a sufficient set of crash data elements necessary for analysis.
- The use of a single, standardized format for data collection by all entities involved in this task.
- The establishment of reliable and agreed links between stakeholders involved in road safety issues (Police forces, health services, insurance companies, etc.).

Figure 9: Recommended Road Crash Data Management Framework



ER= emergency response, MOC=Ministry of Communications, NADRA= National Database and Registration Authority, NHMP= National Highways and Motorway Police, PBS= Pakistan Bureau of Statistics
Source: FRED Engineering.

A. Police Forces

The "Police form" should be based on the form currently used by NHMP and on the best international practices. In particular, the minimum set of standardized data elements of the CADaS recommended by European Commission could be used.

The recommended data collection form should initially conform to a minimum dataset consistent with both the updated version of the Internal Security Forces (ISF) data collection form and CADaS. Further improvements and updates could be implemented in the future.

Table 8 shows the road crash attributes included in the updated version of the ISF data collection form and those that are recommended to be added.

The recommended form should include some important information that allows not only to perform road crash statistics but also to identify crash contributing factors, thus supporting the selection of reactive and preventive interventions. In addition to the attributes listed in Table 8, the following aspects should be considered:

- Crash configuration, which allows the type of crash to be described in terms of parties involved, type of collision, vehicle / pedestrian maneuver immediately before the crash and hit and run crash.
- Crash diagrams, which allow visualization of the configuration after the crash, including the position of vehicles, description of the road environment, any tracks on the road, etc.
- Description of crash contributing factors using the Haddon Matrix (see below for specific example).

Table 8: Recommended Dataset for ISF Compared with Current Dataset

Attributes	Notes
Police Department	
Report/Crash ID	
Officer name	
Report date	
Crash-related variables	
Date	
Time	
Region	
City	
Street	
Road name or code	
GPS coordinate	
Crash and impact type	Specific variables to describe a specific crash type, while more than one type can be applicable in the same crash. In such crashes (e.g., collision between two vehicles, one of which finally hits a pedestrian) more than one variable can be selected; each one describing the respective crash type.
Crash severity	
Weather conditions	
Light conditions	
Road-related variables	
Functional class – 1st road	
Functional class – 2nd road (if intersection)	
Carriageway type	
Number of lanes	
Surface conditions and status	
Street lighting	
Road type	
Speed limit – 1st road	
Speed limit – 2nd road (if intersection)	
Type of intersection	
Type of intersection management	
Work zone related	
Urban area	

continued on next page

Table 8 *continued*

Attributes	Notes
Traffic-unit related variables	
Traffic Unit ID	
Vehicle class	
Vehicle brand	
Vehicle model	
Manufacturing year	
Registration year	
Vehicle type	
Vehicle special function	
Vehicle maneuver	
Vehicle runaway	
N° passengers allowed	
N° passengers on board	
Vehicle load allowed	
Overloading	
Person attributes	
Name	
Person ID	
Traffic unit linked to the person	
Date of birth	
Gender	
Nationality	
Road user type	
Seating position in/on vehicle	
Pedestrian maneuver (if pedestrian)	
Driving license data	
Injury severity at the time of crash	
Hospital transfer to	
Time of death	Informed by hospital
Days of stay in hospital	Informed by hospital
Alcohol use	
Drug use	
Safety equipment use	
Communication devices use	

Source: Mobility and Transport Department, European Commission.

The possibility of major crash reconstruction should also be considered for future developments, after the data collection process is adopted in a standardized manner throughout the country. Crash reconstruction should involve the training of dedicated teams (with possibly different skills) in in-depth investigation techniques.

To identify the factors contributing to the occurrence of the crashes, it is recommended to use the Haddon Matrix (or similar procedure), which allows the human, vehicle, and infrastructure factors to be divided into three-time phases: pre-crash, crash, and post-crash (Table 9).

Based on the factors contributing to the occurrence of each crash in each phase, solutions to the problem can be determined.

Some solutions may be specific to a particular crash site and can be implemented immediately such as road signs, markings, removal of obstructions to vision, and basic enforcement activities. Other solutions, such as making two-wheelers more stable or safer, require more data for research and development and may take more time, effort, and resources for implementation.

Table 9: Haddon Matrix

PHASES		FACTORS		
		HUMAN	VEHICLE	INFRASTRACTURE
PRE-CRASH	Crash prevention	- Information - Attitudes - Impairment - Police enforcement	- Roadworthiness - Working lights - Good brakes - Handling - Speed control	- Road design and layout - Speed limits - Pedestrian facilities
CRASH	Injury prevention during the crash	- Use of safety systems	- Crash worthiness - Crash protective design - Occupant restraints - Other safety devices	- Crash protective roadside objects
POST-CRASH	Life sustaining	- First aid skill - Access to medics	- Ease of access - Fire risk	- Rescue facilities - Congestion

Source: 1st Highway Safety Manual – American Association of State Transportation Officials (AASHTO).

B. Health Services

A standardized, structured form is currently not used in Pakistan for collecting information on persons injured in road crashes. Some data are collected by Rescue 1122 in Punjab Province regarding the trauma victims, allowing to report useful information.

In addition to the information already collected by Rescue 1122, health services should provide information allowing for the follow-up of persons injured during their permanence in a hospital and for the estimation of costs of medical treatments (useful for assessing the social costs of road crashes).

It is recommended to not dismiss the procedures currently applied by Rescue 1122 for data collection. On the contrary, the proposed data collection form should be added to the current form for trauma victims.

The data collection form for health services should allow the cross-referencing of hospital information with that collected by Traffic Police, and thus to monitor the status of victims of road crashes. This is useful to identify the level of injury of persons involved in road crashes. The proposed form especially adopts the MAIS3+ standard (even if the use of other standards to identify serious injuries are still allowed).

Figure 10 shows the recommended attributes and variables for health services when treating injured people. It is to note that most of the data will be collected at hospital. The form can be filled in by extracting data from existing information systems of hospitals, when available.

Figure 10: Recommended Dataset for Health Services

HEALTH SERVICE DATA FORM			
Hospital name			
P0 - Name		**P2 - Birth date**	
P1 - Person ID		**P3 - Gender**	
P5 - Crash date		1	Male
P6 - Crash time		2	Female
P7 - Admission date		3	Unknown
P8 - Admission time		**P4 - Nationality**	
P9 - Type of injury		**P10 - Injury severity**	
1	Injury to the spine	1	Fatally injured
2	Head injury	2	Seriously injured
3	Leg fracture	3	Slightly injured
4	Multiple fracture	**P11 - First responders**	
5	Minor injury other than previous	1	Red cross
6	Other	2	Civil defense
99	Unknown	3	Police
P12 - Date of exit		4	Doctor
P13 - Time of exit		5	Nurse
		6	Other

Source: Mobility and Transport Department, European Commission

C. Insurance Companies

Like for health agencies, the data collection form proposed for insurance companies should allow the cross-referencing of information with that collected by Police forces. The objective in this case is to complement the police data with information about vehicles and persons involved in crashes, as well as to collect a minimum set of data for crashes without victims.

Figure 11 shows the recommended attributes and variables for insurance companies. The form can be filled in by extracting data from existing information systems, when available.

Figure 11: Recommended Dataset for Insurance Companies

INFORMATION COLLECTED FROM INSURANCES			
P0 - Name		**P2 - Birth date**	
P1 - Person ID		**P3 - Gender**	
P4 - Nationality		1	Male
P5- Crash date		2	Female
P6 - Crash time		3	Unknown
V1 - Type of vehicle		**V2 - Insurance details**	
1	Motorcycle < 125cc	1	Against others - Material
2	Motorcycle > 125cc	2	Against others - Compulsory
3	Car	3	Comprehensive
4	4 x 4	4	All risk
5	Mini-bus	5	No insurance
6	Bus	**V3 - Registration year**	
7	Truck	**V4 - Registration country**	
8	Pick-up	**V5 - Vehicle make**	
9	Tractor	**V6 - Vehicle model**	
10	Trailer truck	**V7 - Manufacturing year**	
V8 - Chassis		**V9 - Engine power**	
P7 - Driving license (if driver or rider)		**P8 - Injury severity**	
Number		1	Fatally injured
Category: private		2	Seriously injured
Category: public transportation		3	Slightly injured
Category: military		4	Injured (unknown level)
Category: international		5	Not injured
Category: foreign		99	Unknown
Issue date		**P9 - Hospital for transfer (if any)**	
Expiry date			

Source: Mobility and Transport Department, European Commission.

A.6 – System allowing for precise location of road crashes on map

The current data collection procedures adopted by police forces do not allow for a precise location of road crashes. It is thus highly recommended to include in the future data collection forms geographical coordinates of the road crashes.

To increase the precision of road crashes' location, it is also recommended to collect the data at the crash scene by using a specifically designed information system.

5.2 Storage, Processing, and Use of Road Crash Data

B.1 – Data by all actors registered in a common information system

An important aspect of the road crash data collection process is related to the information system supporting this task. The information system should be used not only for road crash data collection, but also for the analysis and management of collected data.

A good practice in this domain already exists in Pakistan, represented by the information system developed and used by NHMP. It allows for collection of data on the field, automatic transmission of data to the Computer Bureau in Islamabad and the analysis of data with several features.

It is recommended that the NHMP information system is adapted and extended to the other agencies involved in the road crash data collection and management process (e.g., Provincial Police, Health Services, NTRC, etc.). This will probably entail integrating new functions in the current information system, since currently it has been built uniquely for the NHMP activities.

In the following, the recommended features of information systems for road crash data collection, analysis and management are described, so that they can be used as a starting point for extension of the NHMP system. The features are explained separately for entities dealing with collection of data (Police forces, Health Services) and for entities dealing with data analysis and definition of road safety strategies and policies (MOC, NTRC). These features can thus be integrated into a unique information system or in two systems able to communicate among them.

Information system for Police Forces and Health Services

The main features for entities in charge of data collection are:

- Collection of road crash data directly on the field (e.g., computer, tablet).
- Management and treatment of data and their recording (when data are collected through forms manually).
- Analysis of data recorded into a database to perform statistics, create reports, etc.
- Transfer of data to the national road crash database.
- Geo-coding of data on map to localize the data on the road network and to be able to perform more detailed analysis.

The information system should be a web application allowing for the rapid recording of information, coherently with the road crash data collection forms recommended for Pakistan (i.e., form for Police Forces and for Health Services).

By means of automated control procedures, the information system should be able to verify the completeness of the information collected. When recording the data, the system could give warnings when some fields are not completed or when some information is not coherent between them. This allows the person in charge of data recording to easily identify issues and take corrective measures. This feature is important to increase the quality of data collected.

The information system should also include functions to perform data analysis supporting the preparation of periodic reports and road crash studies.

Information system for NTRC and MOC

The information system supporting the activities of MOC and of NTRC should be able to manage the national road crash database. Several features should be considered, coherently with the activities of these entities. Ideally, the information system could also host a web portal of a national road safety observatory.

The main functions of the information systems should be:

1. **Data acquisition and management**, for instance to create new road crash files to export and import data from different sources (Police Forces, Health Services, ...).
2. **Databases management**, for the archives updates.
3. **Road safety studies**, definition of sub-groups of data, graphical elaborations (maps), reports preparation, descriptive analysis of road crashes.
4. **Selection of road safety interventions,** creation of projects for selection of interventions, identification of critical road network elements, identification and classification of road crashes, identification and selection of road crashes causes, identification and selection of solutions, economic assessment of solutions.

When dealing with the features related with the national road safety observatory (i.e., the tool for road crash data and road safety results communication), several elements should be considered:

- Provision of statistics on road crashes in Pakistan, including maps, diagrams on road crash trends, thematic analysis.
- Participation of citizens, allowing them to give opinion on preferred interventions or to identify specific road safety issues.
- Information on several road safety aspects, for instance policies, projects, technical documents, communication and training tools, etc.

B.2 – Data regularly transferred to a national road crash database

The systematic storage of data and transfer to the national road crash database is crucial to perform evidence-based and updated road safety analysis. The use of a road crash data management system for collection of data is highly recommended since it would ensure the regularity of data transfer.

As explained previously, it is also recommended that the system being adopted include an App for mobile devices and that the actors in charge of data collection uses it directly at the crash scene. An interim period can be foreseen before full usage of mobile devices for data collection, during which police officers could continue using paper-based forms. During this period, the data should be transferred from paper to an information system.

B.3 – Data accessible by all actors involved in data collection and analysis

The use of a common (web-based) road crash data management system would greatly facilitate the accessibility of data by all actors. The system should allow for setting authorizations to different actors based on their roles and functions.

B.4 – Road crash data management system including analysis tools

Using an information system to manage the national road crash database also allows to use the data directly in that system. Assessing road safety conditions and adopting a data-driven approach to road safety interventions means performing a number of analyses by merging information about the road crashes (final outcomes) with other road safety data.

It is recommended to adopt a framework for road crash data analysis based on the best international practices. Reference can be made, for instance, to the annual report on road casualties from United Kingdom (Department of Transport, 2017) and to the CARE reports included in the European Road Safety Observatory (European Commission, 2018).

5.3 Other Road Safety Data

C.1 – Risk exposure data included in data collection and storage

Risk exposure data are important to explain road safety outcomes. The most relevant indicator is usually the annual distance traveled. As data of distance traveled (by travel mode, by age) are usually difficult to collect, approximations can be used, such as vehicle fleet size or road length.

Risk exposure data can be divided into three categories: the first one is related to road user, the second one is related to vehicles and the third one is related to the road infrastructure.

Road User

It is recommended to include in the road crash data management system information related to traffic and multimodal traffic, such as:

- **Vehicle distance traveled** (expressed in km) in total and by transport mode. The indicator should be "Vehicle-kilometer," i.e., a unit of measurement representing the movement of a vehicle over one kilometer.
- **Person distance traveled** (expressed in km) in total, by transport mode and by road user's age and gender. Unit of measurement representing the transport of one passenger by road over one kilometer. The distance to be taken into consideration is the distance actually traveled by the passenger.

These data could not be necessarily available and updated. The main source for these data should be the MOC and NTRC.

If available, data on traffic flow from counting campaigns should be included as well, possibly as a geographical information system (e.g., a layer in a GIS map).

Vehicle

It is recommended to include in the road crash data management system information to the vehicle fleet size (number of vehicles) in total and stratified by type of vehicle.

These data should be easily available based on vehicle registers. A link between vehicle registers and the information system of NHMP already exists.

Road Infrastructure

Data concerning the characteristics of the road network are also important to complete road safety analysis. The road infrastructure length in total and stratified by type of road should be considered for inclusion in the road crash data management system.

The main source for these data should be the MOC and NTRC. It is also recommended to include road network data as a geographical information system (e.g., a layer in a GIS map).

C.2 – SPIs included in data collection and storage

Data on **SPIs** can explain a lot about the contributory factors of road crashes.

These data make it possible to assess the risks to which road users are exposed, for example the average speed of vehicles, the rate of use of protective devices (seat belts, helmets, child restraint systems, etc.), the rate of alcohol use while driving, etc. These data can be collected through field surveys.

The following indicators should be considered for inclusion in the road crash data management system (Table 10).

Table 10: Recommended SPIs and Sources of Information

SPI
Seatbelt use rate total and stratified by vehicle occupant
Helmet use rate total and stratified by vehicle occupant
Rate of driving under the influence of alcohol
Rate of driving under the influence of drugs
Rat of driving while using a mobile device
Rate of driving over speed limits
Driving time and rest periods for professional drivers
Risk levels associated to road infrastructures
Average response time to emergencies

Source: Mobility and Transport Department, European Commission.

5.4 Data Analysis

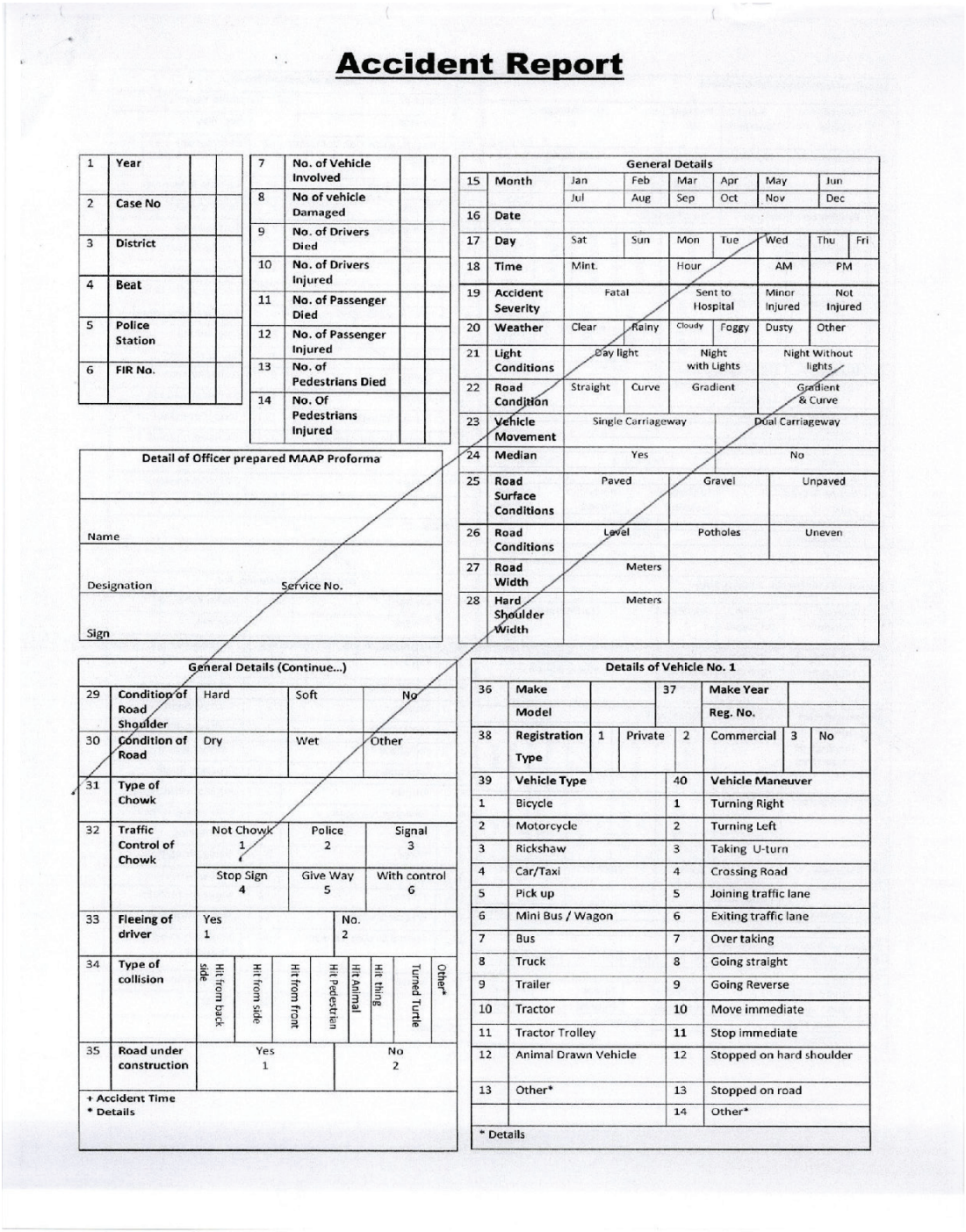
D.1 – Systematic analysis of road crash and road safety data for planning and decision-making

Currently stakeholders perform analysis using data on road crashes they collect, mainly as part of their daily activities. However, road crash and other road safety data are not systematically analyzed by all stakeholders involved in road safety.

The implementation of the new road crash data system and the consequent establishment of a systematic sharing of data among stakeholders will certainly facilitate a systematic analysis of road crash and other road safety data.

It is recommended to develop data analysis frameworks specific for each stakeholder coherently with their mandated activities and roles. Training activities should be implemented as well to ensure that the persons working with data in the different institutions involved in road safety perform reliable, explanatory analysis.

Annex 1: NHMP Road Crash Data Collection Form



Accident Report

1	Year		
2	Case No		
3	District		
4	Beat		
5	Police Station		
6	FIR No.		

7	No. of Vehicle Involved		
8	No of vehicle Damaged		
9	No. of Drivers Died		
10	No. of Drivers Injured		
11	No. of Passenger Died		
12	No. of Passenger Injured		
13	No. of Pedestrians Died		
14	No. Of Pedestrians Injured		

Detail of Officer prepared MAAP Proforma

Name

Designation Service No.

Sign

General Details

15	Month	Jan	Feb	Mar	Apr	May	Jun	
		Jul	Aug	Sep	Oct	Nov	Dec	
16	Date							
17	Day	Sat	Sun	Mon	Tue	Wed	Thu	Fri
18	Time	Mint.		Hour		AM	PM	
19	Accident Severity	Fatal		Sent to Hospital		Minor Injured	Not Injured	
20	Weather	Clear	Rainy	Cloudy	Foggy	Dusty	Other	
21	Light Conditions	Day light		Night with Lights		Night Without lights		
22	Road Condition	Straight	Curve	Gradient		Gradient & Curve		
23	Vehicle Movement	Single Carriageway		Dual Carriageway				
24	Median	Yes		No				
25	Road Surface Conditions	Paved		Gravel		Unpaved		
26	Road Conditions	Level		Potholes		Uneven		
27	Road Width	Meters						
28	Hard Shoulder Width	Meters						

General Details (Continue...)

29	Condition of Road Shoulder	Hard		Soft		No					
30	Condition of Road	Dry		Wet		Other					
31	Type of Chowk										
32	Traffic Control of Chowk	Not Chowk 1		Police 2		Signal 3					
		Stop Sign 4		Give Way 5		With control 6					
33	Fleeing of driver	Yes 1		No. 2							
34	Type of collision	Hit from back side	Hit from side	Hit from front	Hit Pedestrian	Hit Animal	Hit thing	Turned Turtle	Other*		
35	Road under construction	Yes 1		No 2							

+ Accident Time
* Details

Details of Vehicle No. 1

36	Make		37	Make Year	
	Model			Reg. No.	
38	Registration Type	1	Private 2	Commercial 3	No

39	Vehicle Type	40	Vehicle Maneuver
1	Bicycle	1	Turning Right
2	Motorcycle	2	Turning Left
3	Rickshaw	3	Taking U-turn
4	Car/Taxi	4	Crossing Road
5	Pick up	5	Joining traffic lane
6	Mini Bus / Wagon	6	Exiting traffic lane
7	Bus	7	Over taking
8	Truck	8	Going straight
9	Trailer	9	Going Reverse
10	Tractor	10	Move immediate
11	Tractor Trolley	11	Stop immediate
12	Animal Drawn Vehicle	12	Stopped on hard shoulder
13	Other*	13	Stopped on road
		14	Other*

* Details

Details of Vehicle No. 1 (Continue)								
41	Loss of Vehicle	Fully Damaged 1	Partially 2	No Damage 3				
42	Hit from rare side	Not hit from rare side 1	Hit to Vehicle Ahead 2	Not hit to Vehicle Ahead 3				
43	Weight on vehicle (luggage or passenger)	Within limit	Out of limit	From front	From rare	From side	From top	From inside
44	Tyre burst	No Burst 1	Right front 2	Left front 3	Right rare 4	Left rare 5	Others 6	
45	Vehicle lights	Either lights out of order, or caused of accident	No * 1	Yes * 2				
46	Length of skid marker	meters						
	Detail*							
Details of driver of vehicle No. 1								
47	Gender	1	Male	2	Female			
48	Age	Years						
49	Injury type	Died	Shifted to Hospital	Minor Injured	Major Injured			
50	Licence No.	Name						
	Profession							

Details of Vehicle No. 2			
36	Make	37	Make Year
	Model		Reg. No.
38	Registration Type	1 Private	2 Commercial 3 No
39	Vehicle Type	40	Vehicle Maneuver
1	Bicycle	1	Turning Right
2	Motorcycle	2	Turning Left
3	Rickshaw	3	Taking U-turn
4	Car/Taxi	4	Crossing Road
5	Pick up	5	Joining traffic lane
6	Mini Bus / Wagon	6	Exiting traffic lane
7	Bus	7	Over taking
8	Truck	8	Going straight
9	Trailer	9	Going Reverse
10	Tractor	10	Move immediate
11	Tractor Trolley	11	Stop immediate
12	Animal Drawn Vehicle	12	Stopped on hard shoulder
13	Other*	13	Stopped on road
		14	Other*
* Details			

Details of Vehicle No. 2 (Continue)								
41	Loss of Vehicle	Fully Damaged 1	Partially 2	No Damage 3				
42	Hit from rare side	Not hit from rare side 1	Hit to Vehicle Ahead 2	Not hit to Vehicle Ahead 3				
43	Weight on vehicle (luggage or passenger)	Within limit	Out of limit	From front	From rare	From side	From top	From inside
44	Tyre burst	No Burst 1	Right front 2	Left front 3	Right rare 4	Left rare 5	Others 6	
45	Vehicle lights	Either lights out of order, or caused of accident	No * 1	Yes * 2				
46	Length of skid marker	meters						
	Detail*							
Details of driver of vehicle No. 2								
47	Gender	1	Male	2	Female			
48	Age	Years						
49	Injury type	Died	Shifted to Hospital	Minor Injured	Major Injured			
50	Licence No.	Name						
	Profession							

Details of Vehicle No. 3			
36	Make	37	Make Year
	Model		Reg. No.
38	Registration Type	1 Private	2 Commercial 3 No
39	Vehicle Type	40	Vehicle Maneuver
1	Bicycle	1	Turning Right
2	Motorcycle	2	Turning Left
3	Rickshaw	3	Taking U-turn
4	Car/Taxi	4	Crossing Road
5	Pick up	5	Joining traffic lane
6	Mini Bus / Wagon	6	Exiting traffic lane
7	Bus	7	Over taking
8	Truck	8	Going straight
9	Trailer	9	Going Reverse
10	Tractor	10	Move immediate
11	Tractor Trolley	11	Stop immediate
12	Animal Drawn Vehicle	12	Stopped on hard shoulder
13	Other*	13	Stopped on road
		14	Other*
* Details			

Details of Vehicle No. 3 (Continue)							
41	Loss of Vehicle	Fully Damaged 1	Partially 2	No Damage 3			
42	Hit from rare side	Not hit from rare side 1	Hit to Vehicle Ahead 2	Not hit to Vehicle Ahead 3			
43	Weight on vehicle (luggage or passenger)	Within limit	Out of limit				
			From front	From rare	From side	From top	From inside
44	Tyre burst	No Burst 1	Right front 2	Left front 3	Right rare 4	Left rare 5	Others 6
45	Vehicle lights	Either lights out of order, or caused of accident	No * 1	Yes * 2			
46	Length of skid marker	meters					
	Detail*						

Details of driver of vehicle No. 3					
47	Gender	1	Male	2	Female
48	Age	Years			
49	Injury type: Died	Shifted to Hospital	Minor Injured	Major Injured	
50	Licence No.	Name			
	Profession				

Details of Injured Pedestrians								
56	Gender	Pedestrian No. 1				Pedestrian No. 2			
		1	M	2	F	1	M	2	F
57	Age								
	DoB								
	Name								
	Address								
58	Injury type	Died	Sent to Hospital	Minor Injured		Died	Sent to Hospital	Minor Injured	
59	Maneuver	On Road	Crossing road	Playing on road	Off Road / Others*	On Road	Crossing road	Playing on road	Off Road / Others*
60	Place of road crossing	Zebra Crossing	Zebra Crossing within 50 m	Zebra crossing was not within 50		Zebra Crossing	Zebra Crossing within 50 m	Zebra crossing was not within 50	
61	Students of School	Not Students	School going /coming students	Students not going/coming school		Not Students	School going /coming students	Students not going/coming school	
	Details*								

Details of Injured Passengers													
51	Vehicle No.	Passenger No. 1						Passenger No. 2					
		1		2		3		1		2		3	
52	Gender	1	M	2	F			1	M	2	F		
53	Age												
	DoB												
54	Injury type	Died	Sent to Hospital	Minor Injured				Died	Sent to Hospital	Minor Injured			
55	Sitting Position in vehicle	1	On seat	2	On roof	3	Standing in vehicle / 4 Hanging	1	On seat	2	On roof	3	Standing in vehicle / 4 Hanging
	Name												
	Profession												
	Address												

51	Vehicle No.	Passenger No. 1						Passenger No. 2					
		1		2		3		1		2		3	
52	Gender	1	M	2	F			1	M	2	F		
53	Age												
	DoB												
54	Injury type	Died	Sent to Hospital	Minor Injured				Died	Sent to Hospital	Minor Injured			
55	Sitting Position in vehicle	1	On seat	2	On roof	3	Standing in vehicle / 4 Hanging	1	On seat	2	On roof	3	Standing in vehicle / 4 Hanging
	Name												
	Profession												
	Address												

Location of Accident							
62	1 Rural Area	2 Village	3 City	Type Location			
63	City / Village Name						
64	Kilo meter marker	Near By	65	Distance of Accident point to KM Marker			
Distance from nearby police station		Where no KM Marker exist					
Detail of accident location (For all accidents)							
Draw sketch							

OFFICE USE ONLY			
66 Map Series		67 Map Code	
68 1st Survey Location		69 2nd Survey Location	
70 Main Road		71 Minor Road	
72 Node 1		73 Node 2	
74 Sector		75 Sub-sector	
76 Direction of travel of vehicle at fault	North 1	East 2	South 3 / West 4

Driver Statement	Accident Map
Drivers Statement of Vehicle 1	
Drivers Statement of Vehicle 2	
Drivers Statement of Vehicle 3	

Police Investigation	Witness Statement
77. **Accident proceedings by Police officers** (including identification of accident cause and officers opinion)	Name Address
	Name Address
	Name Address
Investigation Outcomes	

References

American Association of State Highway Transportation Officials (AASHTO). *Highway Safety Manual – 1st edition.* https://highways.dot.gov/safety/data-analysis-tools/highway-safety-manual

European Road Safety Observatory. National Road Safety Profile – Germany. https://road-safety.transport.ec.europa.eu/document/download/adbd19af-b384-4fb7-a7dc-2ae199aa8453_en?filename=erso-country-overview-2023-germany_0.pdf

EuroStat. https://ec.europa.eu/eurostat/data/database

Global Road Safety Facility. 2013. *Road Safety Management Capacity Reviews and Safe System Projects Guidelines.* https://www.globalroadsafetyfacility.org/sites/default/files/2023-10/Road%20Safety%20Management%20Capacity%20Reviews%20and%20Safe%20System%20Projects%20Guidelines.pdf

International Transport Forum. 2022. *Road Safety Data Analysis in France.* https://www.itf-oecd.org/sites/default/files/repositories/road_safety_data_analysis.pdf

Martensen H., G. Duchamp, V. Feypell, V. I. Raffo, F. A. Burlacu, B. Turner, and M. Paala. 2021. *Guidelines for Conducting Road Safety Data Reviews*. World Bank. https://documents1.worldbank.org/curated/en/099140001132222667/pdf/P17217904895f706d0a3d50134491fe8699.pdf

Mobility and Transport Department, European Commission. 2023. CARE Database. Common Accident Data Set, version 3.8.1 https://road-safety.transport.ec.europa.eu/document/download/7f8e38c2-87cf-4426-afc4-277ae4c24591_en?filename=CADaS%20Glossary_v%203_8_1.pdf

Mobility and Transport Department, European Commission. Road Crashes and Injuries. https://transport.ec.europa.eu/document/download/28a94107-9f58-4a9b-b0df-79a251f3f45d_en?filename=UMI_fiche_Road_Crashes_and_Injuries.pdf&prefLang=fr

Mobility and Transport Department, European Commission. Data on Serious injuries. https://road-safety.transport.ec.europa.eu/european-road-safety-observatory/data-and-analysis/serious-injuries_en

National Transport Research Centre. 2020. Digitalization of Road Directory in the country. Final Report. Journal of Development and Social Sciences. April-June, 2022 Volume 3, Issue 2. https://jdss.org.pk/issues/v3/2/the-economic-geography-of-road-infrastructure-in-pakistan-exploratory-spatial-data-analysis-esda.pdf

World Health Organization (WHO) 2023. *Reducing Road Crash Deaths in the Kingdom of Saudi Arabia. 20 June.* https://www.who.int/news/item/20-06-2023-reducing-road-crash-deaths-in-the-kingdom-of-saudi-arabia

Pakistan Road Crash Data Review and Reporting

Status and Recommendations

This report presents an overview of the current road crash data management situation in Pakistan offering strategic recommendations for improvement based on the best globally recognized practices. The report develops guidance and tools in an effort to improve road crash data management and move toward greater harmonization of crash data across the region.

About the Central Asia Regional Economic Cooperation Program

The Central Asia Regional Economic Cooperation (CAREC) Program is a partnership of 11 member countries and development partners working together to promote development through cooperation, leading to accelerated economic growth and poverty reduction. It is guided by the overarching vision of "Good Neighbors, Good Partners, and Good Prospects." CAREC countries include Afghanistan, Azerbaijan, the People's Republic of China, Georgia, Kazakhstan, the Kyrgyz Republic, Mongolia, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan.

CAREC

ASIAN DEVELOPMENT BANK
6 ADB Avenue, Mandaluyong City
1550 Metro Manila, Philippines
www.adb.org