The road traffic crash data system in kenya

The transport sector is key to Kenya’s log term development ambitions. It is therefore no coincidence that Vision 2030 has determined that the overall long term goal for the transport sector is to establish Kenya as the pre-eminent transport and logistics hub for the East and Central African region. Some of the key parameters in this effort include the imperative of ensuring a fast, efficient, safe and secure transport system. Some of the key reasons for the importance of the transport sector include, but are not limited to:

- facilitating mobility of people and goods and is key to safe and cost effective access to jobs and public services/facilities
- opening up regions for development and is key to regional and city competitiveness
- speed, cost, and capabilities of available transport have a significant economic impact
- significant tool for nation building efforts
- key to energy efficiency and technology acquisition efforts and is essential to facilitating other industries to develop
- dependence of petrol based transport can adversely impact national safety and security

Available data shows that the road transport sector is playing an increasingly important role (see Figure 1-1). The data shows that the road transport sector output as a share of total transport sector output has been increasing from 36. 9% in 1997 to a high of 65. 3% in 2009.

The significant role of the road transport sector is a consequence of not only improved performance of the road sector, including investment and improved economic prospects but also a consequence of the failure in the

functioning of other key transport modes, especially the railway network. Suffice it to say at this point that as the economy improves, the intensity of the utilization of our road network will increase. Therefore, it will be critical for all key transport sector stakeholders to understand how well the road transport sector is performing. They will especially need to know the extent to which the road sector is mitigating safety externalities as these reduce the net output of the road transport sector and adversely affects other sectors such health and insurance. The magnitude of this externality is reflected in the costs of doing business in the country and adversely affects the ability of households to improve their social well being by taking advantage of opportunities in the economy. A key component of this effort is the availability of accurate and objective data and information.

1. 1Purpose of theREPORT

In this regard, the key public policy question in this regard, is what is the extent of underreporting or misreporting that characterizes Kenya’s road crash data system? How significant is it? What are the implications for Kenya’s road safety measures?

The main purpose of this report therefore is to describe Kenya’s crash data surveillance system, document the challenges that the system faces, compare it with global best practices and make recommendations on the strategic way forward. The key questions were:

1. What are the key elements of Kenya’s road crash data system?
2. What is the policy, legal, regulatory and institutional framework governing the system? How is it organized and how does it work?

3. Does it provide an accurate assessment of Kenya’s road crash situation? If not why?
4. What challenges does the system face?
5. How does it compare with global best practice?
6. What short, medium and long term measures need to be implemented to rectify the situation?

The study focused on the traffic police system, the insurance system and the health data surveillance system.

2 ROAD CRASH DATA SYSTEMS: THE STATE OF THE ART

2. 1Assessing the Insurance Road Crash Surveillance System

Road traffic crashes in the country can be reduced by introducing for further interventions to reduce road traffic crashes in the country. A study carried out by Perez and Garcia (2006) in Barcelona found that the total costs of road traffic crashes in 2003 were €367 million. Direct costs equaled €329 million (89. 8% of total costs), including property damage costs, insurance administration costs and hospital costs. Police, emergency costs and transportation costs had a minimum effect on total direct costs. Indirect costs were €37 million, including lost productivity due to hospitalization and mortality. The results of the sensitivity analysis showed the upper limit of total economic cost of road traffic crashes in Barcelona to be €782 million.

Data systems are important for road safety practice. Road safety related data are used by a variety of stakeholders – the police, transport departments, health facilities, insurance companies – as well as policymakers and practitioners. Reliable data for a country are important in persuading political leaders that road traffic injuries are a priority issue.

These data can also be used in the media to make the general public more aware of legislation and changes in behavior that will improve their safety. Road traffic crash data are key to identifying risks, developing strategies and interventions to address those risks, and evaluating the impact of interventions.

2. 2Quality of Road Crash Data Systems

Basic information on road traffic crashes and injuries is collected every day in most countries. Police officers write reports on reported crashes. Insurance companies document client crashes. Health workers keep medical records on road traffic injuries they have treated. The main purpose of documenting this information is usually to assist an agency in carrying out its specific function – investigation, law enforcement, provision of health care. While such information may be useful to individual agencies, it cannot be used for identifying risks, selecting interventions, or measuring outcomes at an aggregate level unless is it properly coded, entered in a computerized database system, processed, analyzed and disseminated. The term road crash data system refers to the people, processes, hardware and software involved in collecting and managing information related to road traffic crashes. Road crash data systems should process information in a way that allows for analysis at an aggregate level and facilitates data-driven action (WHO, 2010). At a minimum, good road crash data systems should:

- capture nearly all crashes that result in death and a significant proportion of those that result in serious injuries;
- provide adequate detail on the vehicle, the road user and the road/environment to

- assist with identification of causes, and selection of countermeasures;
- include accurate crash location information;
- provide reliable output in a timely manner to facilitate evidence-based decisions.

2. 3Data Requirements for Comprehensive Assessment of Road Safety Performance

Crash statistics do not provide a complete picture of the road safety situation. Crash data must be interpreted in light of other information that cannot usually be derived from police records, such as population size, or the number of vehicles on the road. Crash data do not capture information on risk factors such as helmet use or speeding among the general population, and therefore other road safety related data are important for monitoring performance and achieving results.

A true understanding of road safety performance requires information for each of these outcomes. A comprehensive road safety data system would therefore encompass data collection and analysis mechanisms that cover:

- final outcomes – including at least deaths and serious injuries to road users, and characteristics of the crashes that result in them;
- exposure measures – e. g. demographic data, number of licensed drivers, traffic volume data, infrastructure factors, to help interpret of crash data and measure indicators;
- intermediate outcomes – e. g. mean traffic speeds, seat-belt and helmet wearing
- rates, drink-driving, and vehicle and infrastructure safety ratings;
- socio-economic costs associated with road traffic injuries;

- outputs – including various enforcement efforts.

The work of the transport, law enforcement and health sectors directly influences the risk and outcomes of road traffic crashes, whether or not that work is consciously considered to be ‘ road safety work’, (WHO, 2010). These sectors require a variety of road safety related data for their day-to-day functioning. As background to conducting a situational assessment on road safety data systems, it is helpful to understand the function of these sectors, what data they require and what data they may have.

2. 3. 1 Law enforcement

The role of the police is to ensure the personal safety of citizens in all aspects of daily life and in all places, which includes when travelling on the roadway. This protection is provided through the enactment and enforcement of legislation governing safe and appropriate use of the roadway. In many countries there is a legal requirement to report a road crash to the police if it involves personal injury, and for the police to document key information about the crash. It is therefore the police who most often maintain databases on the number and characteristics of road traffic crashes at both a national level and in local or regional jurisdictions. In addition, the police are charged with the responsibility of investigating all road traffic crashes to determine if laws have been broken, and to identify culpability. As a result they generally collect information on the vehicles and drivers involved, the vehicles’ movements prior to the collision, on road users involved and also on environmental conditions, such as the weather or road surface.

Police officers may be responsible for follow up with crash victims admitted to hospital. In many jurisdictions, attending road traffic crashes is just one aspect of a police officer’s multifaceted job, alongside responsibilities for crime, violence, and public safety. There are therefore usually competing priorities for a police officer’s time and attention. A critical strategy for ensuring reliable road traffic crash data is working with the police to demonstrate how aggregate data can be useful for their own enforcement work, and how careful and complete data collection can lead to reductions in road traffic injuries.

The police need data in order to:

- monitor the occurrence of traffic law infringements;
- keep track of legal proceedings such as court appearances, and outcomes such as fines and sentences;
- enable an intelligence-led approach to enforcement, such as identifying where
- speed traps and cameras should be located, and when and where alcohol testing should occur for maximum effect.

2. 3. 2 Health

The health sector’s aim in relation to road traffic crashes is to prevent injuries, and where they occur, to minimize the severity of the injury and its consequences. The health sector usually keeps data on most types of injuries, covering the whole spectrum of injury from exposure to death. Data on fatal road traffic injuries may be extracted from ‘ vital registration’ data (derived from death certificates completed by medical doctors, which state the cause and underlying cause of death) or where these do not exist, from

verbal autopsy surveys. Information on non-fatal road traffic injuries is kept in hospital in-patient records, trauma registries, and may be collected by ambulance services or other emergency services. Minor injuries, which usually don’t present to hospitals or health facilities, are the most difficult to quantify and these are usually captured through community-based surveys.

The health sector and its partners also conduct research on prevention and management of injuries, including studies to evaluate the impact of interventions. These data are useful to all sectors to advocate for more attention to be given to road safety, and to provide input into an evidence-based Safe System approach to road safety, which includes post-crash care. The health sector therefore requires data in order to:

- estimate the magnitude of fatal and non-fatal road traffic injuries;
- identify the risk factors involved so that health promotion programmes can target them;
- evaluate the effectiveness of injury management and treatment;
- ascertain current trends and the impact of prevention programmes;
- plan effectively for trauma care and rehabilitation services;
- plan and advocate for appropriate policies and legislation.

2. 3. 3 Insurance

The insurance sector offers financial security against the costs of damages and medical treatment incurred either by, or levied against, clients involved in road crashes. Except where no-fault insurance is the practice, insurance companies must determine who is primarily responsible for the incident and therefore whose insurance is liable for covering the damages. The reality in many countries is that the insurance companies do not conduct independent

investigations, but rely on the findings of police, which usually involves the purchase of a copy of the case file, or part of it. The information actively maintained by the insurance companies relates primarily to its clients – their age, sex, the type of vehicle, location of the crash and the damage to persons and property.

Insurance companies offer third party injury insurance and motor vehicle insurance. Data collected by third party injury insurance schemes is influenced by its scope and availability. The data consists of records which entail:

- The time and allocation of the accident
- Vehicle involved in the accident
- People involved, including:
    - Drivers of vehicles in the accident
    - Passengers in vehicles
    - Claimants (injured parties)
    - Witnesses
    - Pedestrians if involved in some way

An ideal method to improve data collection for causality crashed involving motor vehicles would be establishment of a national third party compulsory injury insurance scheme. Such a scheme would require police reports with each claim and would record the accident report numbers to facilitate matching of data.

Motor vehicle insurance is offered by a range of government and private-owned insurance companies. Not all claims are crash-related. Many relate to

theft or damage, broken windscreens or fire. In general private insurance companies collect data for profitability reason which is rarely in a form directly useful for injury prevention. RACV limited conducted a study (Sanderson and Hoque, 1987) which showed the need for considerable recoding of their data if it were to be useful for road safety purposes. The study concluded that a number of changes to their data recording would be needed to allow useful analysis of crashes. The included:

- Improve location information, particularly for mid-block crashes
- More detailed sketch and narrative, showing vehicle movements
- Additional information on injuries incurred by occupants of insured vehicle
- Introduction of information on part of vehicle damaged
- Introduction of items such as days of the week, road conditions and light condition
- Cost of damage to all vehicles involved (not just the insured vehicle)

2. 4Case Studies ofRoad Crash Data Systems

2. 4. 1 Strengthening Road Traffic Injury Data Collection by Police, Ethiopia

The Traffic Police Department of Addis Ababa city has been working since 2002 to strengthen its road traffic injury data management capacity. The activities include:

- developing an easy-to-use data collection form;
- setting up a computer-based data analysis system;
- training the traffic police officers on data management;
- developing a small resource centre;
- promoting collaboration among key stakeholders in road traffic safety.

At the beginning of the project, the traffic police did not have a standard form to use to record data at the scene of a crash. Information was collected on a piece of paper which would be transferred to a logbook that was manually filed. Developing a standard data collection form and training traffic police officers on how to use it were key activities of this project. A draft form was developed, based on the logbook used by police, as well as examples from other countries (Kenya, India and South Africa) and Injury Surveillance Guidelines published by WHO. The draft form was piloted, revised and adopted. Amharic, Ethiopia’s national language was used. The data collected covers:

- site and location of collision;
- weather conditions at time of crash;
- vehicles and other road users involved;
- insurance status of vehicle;
- vehicle inspection status;
- number of persons injured or killed at the scene;
- demographic data of casualties (name, age, sex, occupation);
- whether first aid was given.

In addition, manual data entry, processing and analysis were computerized. A database was developed in Amharic for data entry and analysis. Based on the experience of the Addis Ababa Traffic Police Department, the traffic data management system has been scaled-up to six major regions in the country and 22 traffic police officers (10 from Addis Ababa and 12 from the other regions) have been trained on computer-based data entry, processing, analysis and report writing

2. 4. 2 Injury Surveillance System, Argentina

In 2003, Argentina’s Ministry of Health established the ‘ injury sentinel surveillance system’. The system gathers data on injuries presenting at hospital emergency departments (the ‘ sentinel sites’), using a standard data collection form completed by the doctor or nurse treating the injury. Data are transmitted electronically to the Ministry of Health. Hospital participation is voluntary, and so the data cannot provide a complete national picture. However, participating hospitals are comparable with each other, and over time, data gathered by the system can offer a useful profile of injuries. The system can also be tailored to address local situations needing specific attention, and hospital staff can access the data and analysis, which are updated automatically. An analysis of Argentina’s non-fatal road traffic injuries was made using the sentinel system during 2007 and 2008. The system records data relating to sex, age, type of vehicle, helmet use, seat-belt use and blood alcohol levels. A total of 12 844 road traffic injuries were collected in 2007 in 33 ‘ sentinel units’, and in 2008 the total was 11 564 in 25 sentinel units. Young people were the most affected, and 67% were male. Motorcyclists and cyclists accounted for 70% of the injuries – only 5% of these were using a helmet. Fewer than 1% of the injured people used a seat-belt, and 11% had evidence of alcohol consumption.

To improve the quality and utilization of road safety data, the Ministry of Health will conduct a national workshop with relevant partners, including the Ministry of Health, the National Road Safety Agency and delegates from all provinces (epidemiology, health services and police). The workshop will focus on integration of vital statistics, hospital and police data for road traffic

injury surveillance, and on using data captured by the existing sentinel surveillance system to plan road safety interventions. A new web based information system integrating all information systems into one coherent system with common identifiers and definitions is being piloted and will be launched, along with a standard operations procedure manual, in this workshop. The 2007 analysis has been published on the Ministry of Health website and shared with transport institutions and organizations working in road traffic injury prevention.

3 GOOD PRACTICES IN ROAD CRASH DATA SYSTEMS

3. 1France

In France, a Rhône road trauma register was created in the Rhône region in 1995 to estimate the real number of non fatal casualties and obtain more information about injury severity and long term impact. 96 first line hospital services, 160 follow up services and 11 rehabilitation centres are involved, represented by a central network . The register is based on data from all health care facilities in the Rhône region where a standard form has to be completed each victim. The register which has been qualified by the French National Committee of Registers and is periodically evaluated and an extension of the register is planned to include a wider variety of road traffic conditions which should be set up in other parts of France. By 2005, overt 10, 000 cases had been recorded. Data management is performed by the UMRESTTE Research Department of INRETS and the database is protected by privacy laws, but is made available for research purposes when confidentiality rules are observed. Regular data analysis and research is performed, focusing on specific themes. The operating costs are approximately 310, 000 Euro per year, which is funded by the Ministry of

Transport, the Institute for Health Surveillance and the Institute for Epidemiology and Medical Research.

3. 2Fiji

In Fiji there is a crash database which has lead to an improvement of the road design with a positive consequence in reduction of crashes and casualties. According to the Fiji police crash data base, the packages for database management and Analysis should be simple to use, with easy data entry, full editing and back-up facilities, and logical internal checking routines to ensure that the data is as accurate as possible when entered. Validation of data should be done as close to the data entry as possible, to enable rapid follow up and correction of errors in the data records. There is need for the police to strike the right balance between the amount of detail required by all stakeholders and the ease with which they can collect the data according to their expertise and the tools and support available.

The data base should answer the following questions: where did crashes occur; when did crashes occur; who was involved and who was injured; what was result of the crashes; what environmental conditions; and how or why did the crashes occur. The exact details to be collected for the database are usually decided by a multisectoral committee to ensure that all stakeholders are consulted and that a reasonable spread of data are collected within the capacity of the police. The required information should be completed at the scene on a user-friendly form, or booklet. This form should be easy to use and be acceptable as evidence in the courts and is usually structured for easy data entry where information can be grouped general details, vehicle and driver details, casualty details, location information and sketch map, and

simple summary description. However, since the whole system depends on the quality of data input by the police who have other priorities, periodic checks on quality, accuracy and time gaps are needed.

3. 3Netherlands

In Netherlands, Central Bureau for Statistics (CBS) is responsible for overall data management and for collecting and linking the court and municipality data. Dutch CBS compares three data sources: crash registration by the police; court files on unnatural deaths; and files on causes of death from municipal population records. The three data sources are compared by linking date of birth, date of death, type of unnatural death (suicide, traffic crash, etc.), municipality of death, and gender. The data can be disaggregated to age group, gender, region, modality, day of the week and month. The Transport Research Centre of the Ministry of Transport (AVV) is responsible for collecting the police records. CBS and AVV work together to arrive at the final database. The reporting rate of the real number of traffic fatalities, based on the combined three data sources, is very high: 99. 4% for 2004. The individual reporting rates were 90% (police records), 88% (court data) and 95% (municipality records). However, the costs are not exactly known, but assumed to be rather low because existing databases can be used.

A survey on road crash data collection and analysis in four state in United States was done data on five components of crash data system which includes; collection, data storage, analysis and reporting, accessibility, and overall system efficiency. According to the survey, Kentucky, Iowa, and Illinois offer the best practices in terms of data collection.

3. 4Key Observations

3. 4. 1 Data collection

Kentucky uses a custom-developed field system for electronic data entry and collection. Kentucky State Police and 151 agencies in the state have deployed field units into patrol and response vehicles which are quipped with barcode scanners and GPS units to help auto-populate electronic forms from incidents to violations. The system is live-linked to an enterprise database system that contains vehicle and driver data that is automatically transferred to the electronic form, reducing the time needed for data entry and eliminating data-entry errors. The system employs business rules for data validation that enforce data consistency. The GPS system automatically inputs the positional location of the incident, allowing spatial display and query downstream. Iowa has developed and utilizes the TraCS field data-collection system. The system is field deployed with an array of barcode scanners, swipe-card readers, digital cameras, GPS units, and touch pads to facilitate automatic and digital data entry. TraCS has the additional components of a GIS viewer that helps locate intersections and additional area information, a photo-imaging system to directly attach digital photos to an incident report, and electronic diagramming to sketch incident specifics directly at the scene. Illinois on the other side uses a combination of Iowa’s TraCS and a custom-developed, field-based data entry system that is deployed in vehicles and is equipped with GPS units to determine incident locations and is accompanied by a diagramming tool that electronically details the events with graphic representation. The electronic forms have embedded business rules to ensure data consistency and accuracy in

entered data elements and completed records are transmitted electronically to a centralized data warehouse for retrieval by any authorized user.

3. 4. 2 Data storage

Kentucky utilizes a custom data base, Collision Report Analysis for Safer Highways (CRASH), for its incident records which accepts electronically transferred incident records from collection agencies and automatically populates the database tables. The system can support advanced analysis using different information sources through the relationships established among the different data components. Illinois uses a Microsoft SQL Server database that stores data in a central repository for users to access. The data base has several additional systems that form a one-stop interface for users to access incident and other related information. Massachusetts employs an Oracle database named CODES that help to maximize development resources, enforce data consistency, and create data-sharing opportunities. The system uses an enterprising approach that links other databases such as EMS, hospital, death, and insurance records to form an integrated data solution. Iowa uses a combination of Oracle, SQL Server, DB2, and Access databases. The system accepts electronic field reports and populates the necessary data elements without user intervention and automatically replicates data elements to other databases for use by other agencies

The advantages of the different approaches in data storage include: time saving by receiving reports and records electronically with minimal user intervention; advanced data analysis through linkages with other

enterprises; and efficient and cost effective data sharing and transfers to other systems and users.

3. 4. 3 Data analysis and reporting

Data analysis and reporting capabilities vary widely from state to state. Some have connected their enterprise systems to the World Wide Web to allow 24/7 access and others allow data access only to desktop users. While some systems can generate custom, ad-hoc reports, others only allow predetermined reporting functionality. According to the survey, most states are using or plan to use GIS in future to expand their analytical capabilities. Kentucky’s system features a Web portal with GIS functionality that allows Web users to connect directly to the enterprise database system to query locations for analyses, including high-accident locations and alcohol-related incidents. It allows the retrieval of individual incident reports or custom summarized reports for data elements and extraction of data that allows users to bring raw data into their own systems for further analysis. Iowa Department of Transportation has a custom desktop interface that link users to its wide array of system databases. The interface contains limited GIS mapping of incidents and a data-export module to help users bring incident reports into their own applications for further analysis. However, the system has an advanced statistical analysis, charting capabilities and a portal to Intersection Magic for diagramming of incidents at specific intersections. Illinois has a heavy GIS component which allows for general mapping and visualization of incidents and integrates facility and infrastructure data into the analytical capabilities. It also maintains internet access to summarized quarterly reports for download.

3. 4. 4 Accessibility

According to the survey, Kentucky has a Web-based system allows users: 24/7 access to its information resources; GIS mapping; summarized database query and export, and individual incident-report lookup. Iowa on the other hand also has a progressive accessibility innovation, but it requires users to have licensed GIS software to direct access to the enterprise system from their desktops for data export, spatial query, and mapping. The system interface allows all users access to the custom analytical tools and database queries directly from their desktops.

The TraCS system in Iowa maximizes readily available data in the data-collection stage, reducing data-entry time and duplicate data entry while business rules mitigate the need for additional staff intervention to validate and do quality control on incident records. The use