International Traffic Safety

Data Systems Improvement

Appendix • Case Study

Data System Foundations

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Facilitator Preparation

About Boldonia

Boldonia is a middle-income country with a population of approximately six million, with 70% of the population concentrated in urban areas.

✓ Official statistics indicate that Boldonia has 1,200 road traffic deaths per year, a rate of 20 per 100,000 population, which is significantly higher than the average regional rate.

✓ Road traffic injuries are the second leading cause of death among Boldonians aged 15 to 44.

Various road safety policies enacted in the past two decades have not improved the road safety situation. After the launch of the UN Decade of Action for Road Safety, the President created a National Road Safety Council (NRSC), a multisectoral body chaired by the Ministry of Transport, and charged the NRSC with the task of reducing the road traffic fatality rate by 20% by 2020.

The first action item of the NRSC has been to conduct a situational assessment of Boldonia's traffic safety data systems to identify gaps and deficiencies. The ultimate goal is to build road safety policy based on reliable, accurate data. A consultant was paid 7,000 Boldonian Francs to conduct the assessment.

The Big Picture

Boldonia's official traffic safety statistics come from the police. Under the **Ministry of Justice**, police services are structured into six districts according to the country's six provinces. District Headquarters is responsible for compiling basic statistics on:

✓ crash occurrence and severity
✓ date/time
✓ victim age and sex
✓ vehicle type involved
✓ location (town, province)

This information is based on crash data collection forms received monthly from the precincts in the district. Once per quarter the Ministry of Justice collects these statistics from the District

Headquarters and issues a two-page summary of national crash statistics. The Ministry of Justice also oversees production of an annual report of crash statistics, which is circulated to other government ministries. The Ministry of Justice reports 1,200 road traffic deaths in 2011.

National Road Traffic Police are responsible for policing national highways, including investigation of crashes that occur on these roads. They use their own crash data collection form and have a separate database for crash statistics, which they analyze and use to adjust their law enforcement strategies. There is little interaction between district/local police and national road traffic police. The Ministry of Justice incorporates the National Road Traffic Police crash statistics into its quarterly and annual reports.

The **Ministry of Transport** is responsible for registering all motor vehicles and drivers. They keep two separate databases of these records, and also have some information on the road network. They track the age and make/model of motor vehicles most often involved in crashes, through a data-sharing arrangement with the Ministry of Justice. The Ministry of Transport has traditionally been viewed as the lead agency for road safety.

The **Ministry of Health** is exploring the possibility for a national injury surveillance system, but exploration is at a very early stage in development. A data collection form is being pilot-tested in two hospitals. An annual behavioral risk factor survey provides some data on self-reported road user behaviors. The Ministry of Health publishes an annual road traffic injury report compiling data from public hospitals to compute injury statistics and the relevant results from the behavioral risk factor survey.

Boldonia's vital registration system covers about 75% of the general population, with the cause of death coded according to ICD-10. Road traffic deaths by sex and age are enumerated in an annual vital statistics report published by **National Statistics Bureau**. According to vital statistics there were 1,500 road traffic deaths in 2010.

In summary, significant amounts of crash and injury data are collected each day in various sectors. However there are large gaps in the scope of data collected. Current and potential end users noted concerns over data quality, and current data systems and outputs remain under-utilized, particularly in road safety planning.

Stakeholder Analysis • Step 1

Stakeholder/ stakeholder group	Potential impact	Interest	Notes	Stakeholder engagement strategy
National Road Safety Council (NRSC) members	High		Some crossover with list below	Active engagement. Representation in working group.
Director, National Statistics Office	Moderate	Low		Passive
Manager, Vital Statistics Registry	Moderate	Low		Passive?
MINISTRY OF JUSTICE				
Minister of Justice	High	Low	Doesn't want to spend resources on data collection/ processing	Passive—keep informed
Director, Dept of Statistics	High	Moderate	In favor of improving CrashStats, but doesn't want to cross the Minister	Active
Database Administrator, CrashStats	Moderate	High	Excited about data linkage possibilities, but little decision-making power	Active

Stakeholder/ stakeholder group	Potential impact	Interest	Notes	Stakeholder engagement strategy
National Police Commissioner	High	Low	Not convinced about utility of crash data collection	Active, need to win her to the cause
National Road Traffic Police Commissioner	High	High	Enthusiastic	Active
District Chief Superintendents	High	Varies by province		Active engagement, with 2 representatives if not all 6
Police Officers responsible for traffic law enforcement and crash investigation	High	Varies	Essential stakeholder group to convince; involve in any improvement efforts	Active, through representative committee?
MINISTRY OF HEALTH				
Minister of Health	High	High	Road safety is one of her priorities	Active engagement
Director, Dept of Non-Communicable Disease Surveillance	High	Moderate	Hospital Information System (HIS) and BRFS (Behavioral Risk Factor Surveillance System) under his management, as is pilot test of injury surveillance. very busy man	Active
Manager, Hospital Information System (HIS)	Unknown	Low	Not interested in exploring linkage possibilities. Uncooperative with data requests outside health sector.	?

Stakeholder/ stakeholder group	Potential impact	Interest	Notes	Stakeholder engagement strategy
MINISTRY OF TRANSPORT				
Minister of Transport	High	High	Mainly interested because NRSC has taken such an interest	Active
Head, Driver and Vehicle Licensing Agency	Unknown	Low		Passive
Database Administrator Vehicles and Database Administrator Drivers	Moderate	High		Active
Head, Road Transport Division	Unknown	Moderate	Her engineers have been asking for better data linkage with police records	Active
Directors, Traffic Planning (at province level)	Moderate	High	Wanting better and more timely data for their planning	Active (representative)
MINISTRY OF PUBLIC WORKS				
Minister of Public Works	Unknown	Low	Fond of large road infrastructure projects funded by international aid. Not yet fully engaged in road safety initiatives. Resists efforts to incorporate road safety audits into new infrastructure projects.	Passive

Stakeholder/ stakeholder group	Potential impact	Interest	Notes	Stakeholder engagement strategy
Head, Boldonia Roads Agency	Low	Low	Appears neutral but uninterested in data systems improvement	Passive
Data Manager, Boldonia Roads Agency	Low	High	Very interested in exploring opportunities for data linkages	Active

Data Type Mapped to Source, System, and End-User

DATA TYPE	SOURCE	SYSTEMS	CURRENT END USERS (road safety related)
Road traffic deaths	a. Death certificates b. Police records c. Hospital records	a. Vital registration database b. District Headquarters (HQ) databases, national Ministry of Justice CrashStats database c. Ministry of Health Hospital Information System (HIS) database	a. Ministry of Health, National Stats Bureau b. Ministry of Justice senior managers, District HQ chiefs c. Ministry of Health, hospitals
Non-fatal road traffic injuries	a. Police records b. Hospital records	a. District HQ databases, national Ministry of Justice CrashStats database b. Ministry of Health HIS database	a. Ministry of Justice senior managers, District HQ chiefs b. Ministry of Health, hospitals

DATA TYPE	SOURCE	SYSTEMS	CURRENT END USERS (road safety related)
Crash location	Police records (Linear Referencing System)	District HQ databases, national Ministry of Justice CrashStats database (town name only). Also stored in municipal traffic department databases.	District HQ chiefs, police officers, municipal traffic depts
Safety performance indicators (helmet use, speeding, drink/driving)	a. Self-reported data in BRFS b. Police records c. Observational studies (2 helmet use, 1 speed, all in capitol city—Jones et al 2002; Jones et al 2008; Lanvers and Bart 2010)	a. Ministry of Health BRFS database. b. Data exists in police records but currently not entered in district or national databases. c. None	a. Dept of Public Health (Ministry of Health) b. Unknown c. Unknown
Purpose of journey	Data not collected No studies		
Traffic volumes	Municipal traffic departments	Each municipal dept has its own	Municipal traffic dept
Registered motorized vehicle fleet	Ministry of Transport records	Ministry of Transport 's TranStat database	Ministry of Transport
Licensed drivers	Ministry of Transport records	Ministry of Transport's TranStat database	Ministry of Transport
Cost of road traffic injuries	National Injury Prevention Council 2008 report	N/A	Unknown

Data Sources, System and Quality • Step 2

DEFINITIONAL ISSUES

Road traffic death is defined as death at the scene of the crash. Injury severity is defined differently across various districts. Crash location is recorded using a Linear Referencing System.

DATA QUALITY/COLLECTION TOOL ISSUES

Across the six districts, five different crash data collection forms are currently used. There is great variety in number of variables, length of forms, and the layout of forms. Comparison of crash data collection forms currently in use showed 19 variables in common:

1. Crash ID
2. Crash date
3. Crash time
4. Crash municipality
5. Crash location
6. Crash type
7. Crash severity
8. Road type
9. Junction type
10. Vehicle type
11. Vehicle make/model
12. Vehicle year of manufacture
13. Vehicle maneuver
14. Person identifier
15. Person's DOB
16. Sex
17. Driver/other
18. Injury severity
19. Alcohol use

Crash data collection forms and corresponding crash reports for January 1 to June 30, 2012 were collected. Crash data collection forms were compared against the relevant crash report for accuracy and completeness.

- ✓ Common variables from the crash data collection forms were entered into an electronic database established for quality assessment and data were assessed for completeness.
- ✓ Statistical tests revealed significant gaps in data: 60% of crash data collection forms were not complete. The most common missing variables were:
  1. crash location
  2. vehicle year of manufacture
  3. vehicle maneuver and road type
- ✓ Crash severity was incorrect in 18% of crashes, based on comparison to injury severity and notes in the crash report. No assessment was made of the accuracy of injury severity classification, but it was noted that involved persons who did not die on the scene often had injury severity coded as "don't know."
- ✓ In general, crash data collection forms were not well-completed. Forty percent of the crash data collection forms lacked information that was present in the crash report. Discussions with several District Chiefs revealed issues that may be responsible for this gap:
  1. the volume of paperwork required, in combination with short-staffing
  2. structure of the crash data collection forms
  3. lack of training on crash investigation and data collection/recording for police officers called out to a crash scene
  4. deficiencies in the Linear Referencing System markings on roads that are not highways or principal arterial roads

DATA QUALITY / UNDER-REPORTING ISSUES

Under-reporting compared to hospital records or vital statistics has not yet been assessed, but it was noted that the vital registration consistently reports more road traffic deaths each year than Ministry of Justice statistics, even after adjusting for definition (on the scene vs. no time limit).

DATA SYSTEMS / HEALTH DATA

Several hospitals are not using the *10th International Classification of Diseases* (ICD-10) even though they are supposed to under official Ministry of Health policy. Inconsistencies in coding impacts the number of traffic injuries recorded and their proper classification, i.e., a negative impact on the accuracy of road traffic injury stats compiled in Health Information System (HIS).

The legacy HIS uses complicated proprietary software that is difficult to modify. The Ministry of Health has serious concerns about patient privacy being compromised by any data linkage or sharing.

DATA SYSTEMS / POLICE DATA

When a crash is reported, the investigating officer collects data at the scene and is responsible for follow-up to obtain all required information. Each district uses its own crash data collection form, although two districts have coordinated implementation of a standardized form. The investigating officer completes his/her crash report and crash data collection form and submits them to the precinct, which forwards the crash data collection forms to District Headquarters after performing some validation and quality checks. Officers can choose to submit the reports and crash data collection forms in either hard copy or electronic form. Hard copy data are entered into the database at District Headquarters by data entry clerks. CrashStats is a very basic database with basic search and report functions. Mapping is possible only at town level.

End Users • Step 3

While people in road safety management positions in various agencies readily agree that road safety requires multisectoral cooperation, in practice there is little cross-over in use of existing data systems. That is, in most cases, the end users of current systems come from the same agency that generates the data and runs the system.

A critical finding is that three important stakeholder groups expressed disappointment in the data and systems currently available to them. These groups are responsible for planning and implementing actions to improve road safety, and they currently carry out this responsibility without the quantity and quality of data they would like to inform effective practice.

Province-level traffic planning departments (under Ministry of Transport) expressed interest in using road traffic crash data to inform their decisions about remedial measures and engineering treatments to influence traffic flow and safety, as well as an interest in tracking characteristics of vehicles and drivers involved in injury crashes. These departments are concerned about the rapid growth in registered motor vehicles, particularly motorcycles, and they want to monitor the situation carefully so they can adjust transport policies as necessary. To do this they need timely, accurate information on exact crash location, crash severity and type, mode of transport, date/time, road users, vehicle make/model, and driver experience or age. They would like the data in electronic form, with ability to run a variety of reports such as grid analysis and corridor analysis, and they really want interactive maps.

The Promotion and Prevention Unit of the Ministry of Health is responsible for running national mass media campaigns on road safety topics. The assessment was not able to determine any link between the planning of these campaigns and existing health or police data systems. It seems the campaigns are planned mostly based on the behavioral risk factor surveillance system results, which are not timely and have significant limitations. It is likely that the effectiveness of the Promotion and Prevention Unit could be enhanced by supplying them timely and accurate crash data that includes injury severity, date/time, use of safety equipment, transport mode, road user involvement, and general information on trends in safety performance indicators. It is worth noting, however, that the current head of Promotion and Prevention Unit expressed complete satisfaction with her current data sources, and was not interested in participating in development of a new road safety data system.

Finally, all six District Headquarter Police Chiefs noted that their police officers spent a huge amount of time collecting and processing crash data, but it never got reported back to them. The District Headquarter systems don't allow for any analyses that can be used for ongoing planning for policing strategies. Several of the variables included on the crash data collection forms that are currently excluded from CrashStats would be extremely useful to help districts and precincts plan for staffing and targeted enforcement efforts, but there are neither the human nor financial resources to process these data.

Environmental Analysis • Step 4

✓ Boldonia has received funding for technical support from the Health Metrics Network to assess and strengthen its health information systems. This will include a detailed assessment of the vital registration system and support for necessary improvements.

✓ An international development bank has expressed interest in Boldonia as a possible candidate for their road safety data system twinning program, in which low or middle income countries are paired with high-income countries for data mentoring, and receive funding and technical support for improving road safety data systems.

✓ Road traffic crashes have received significant media attention in the past year, with negative press on government action to prevent them.

✓ NRSC, the lead agency, is new and still defining its role and responsibility, working with a very small budget. The Ministry of Transport is used to being in charge and personality clashes mean harmonious multisectoral decision-making is going to be a challenge. The Minister of Health is very proud of her Hospital Information System and is pushing the NRSC to focus on hospital-based road safety information systems. Meanwhile economic crisis has led to a dramatic reduction in the budget of the Ministry of Justice, which has played out in a reduction of the police force. Police officers are working longer hours and taking on more responsibility.