

**SURVEILLANCE AND
INFORMATION SYSTEM
IMPROVEMENT
FOR ROAD TRAFFIC INJURIES (NCD 2)**



Department of Disease Control,
Ministry of Public Health, Thailand



Centers for Disease Control and Prevention (CDC),
United States of America

**SURVEILLANCE AND INFORMATION SYTEMIMPROVEMENT
FOR ROAD TRAFFIC INJURIES (NCD 2)**

**Department of Disease Control,
Ministry of Public Health, Thailand**

**Centers for Disease Control and Prevention (CDC),
United States of America**

SURVEILLANCE AND INFORMATION SYTEMIMPROVEMENT FOR ROAD TRAFFIC INJURIES (NCD 2)

Project Consultants :

Director of Department of Disease Control

Dr. Nopporn Chunklin, Deputy Director of Department of Disease Control

Dr. Chaisri Supornsilachai, Senior Expert, Department of Disease Control

Project Team Members :

1. Dr. Panuwat Panket	Bureau of Non-communicable Disease
2. Dr. Sophon Iamsirithawon	Bureau of Epidemiology
3. Dr. Pimpa Techakamolsuk	Bureau of Epidemiology
4. Dr. Phathai Singkham	Bureau of Epidemiology
5. Dr. Patcharin Tantiworrawit	Bureau of Epidemiology
6. Dr. Aratha Rungpeung	Bureau of Epidemiology
7. Ms. Nongnuch Tantidhama	Bureau of Non-communicable disease
8. Dr. Anuchar Sethasatein	Udon Thani Hospital
9. Ms. Downrueng Khommeungpak	Udon Thani Hospital
10. Dr. Torpong Krongtriwet	Nakhon Si Thammarat Hospital
11. Ms. Wannee Meekhewd	Nakhon Si Thammarat Hospital
12. Mr. Khajornsak Janpanich	Bureau of Non-communicable Disease
13. Ms. Pasinee Amrod	Bureau of Non-communicable Disease

Sponsored by :

1. Bureau of Policy and Strategy, Office of the Permanent Secretary, Ministry of Public Health, Thailand
2. Department of Disease Control, Ministry of Public Health, Thailand
3. Centers for Disease Control and Prevention (CDC), United States of America
4. Thailand Ministry of Public Health-U.S. Centers for Disease Control and Prevention Collaboration (TUC)

**Surveillance and Information System Improvement for Road Traffic Injuries
was first published in 2013.**

PREFACE

Road traffic accidents are a significant problem that causes immense economic and social losses to Thailand. They are considered one of the top three public health problems in the country. There are sadly over 13,000 deaths and more than one million injuries as the result of road traffic accidents each year, with several ten thousand people disabled. Department of Disease Control, Ministry of Public Health has received technical and financial support from the U.S. Centers for Disease Control and Prevention (CDC) to implement the project entitled "Surveillance and Information System Improvement for Road Traffic Injuries: (NCD2)" under the Public Health Non-research Cooperative Agreement, Phase III (2012-2016). The project aims to improve surveillance and information systems on road traffic injuries which can be used to monitor and evaluate provincial road safety efforts and establish an information system on road traffic accidents at the provincial level.

In the first year of the project (2012), the project studied information systems on road traffic injuries at the provincial level as operated by Maharaj Nakhon Si Thammarat Hospital, UdonThani Hospital, Ministry of Public Health, Road Accident Victims Protection Co., Ltd. and the Royal Thai Police. It was found that each information system was mainly designed for specific purposes for the internal use of its organization. Thus, all the information systems have different strengths which can serve their own particular purposes. In such a circumstance, integrating data from all the information systems can generate data that can cover all aspects along the course of road traffic accidents and can be of more use. The project team is convinced that the findings of this project can be used as the baseline data to plan for further development of new information systems at the provincial and national level.

Project Team

2013

EXECUTIVE SUMMARY

Department of Disease Control has received technical and financial support from the U.S. Centers for Disease Control and Prevention (CDC) to implement the project entitled "Surveillance and Information System Improvement for Road Traffic Injuries: NCD2" under the Public Health Non-research Cooperative Agreement Phase III (2012-2016). A key objective of the project is to improve surveillance and information systems on road traffic injuries which can be used to monitor and evaluate road safety efforts and establish an information system on road traffic accidents at the provincial level.

In the first year of the project 1 (2011), six information systems were examined in each of two pilot provinces, i.e. Nakhon Si Thammarat and UdonThani, as following:

- 1) The Injury Surveillance (IS) Systems by Maharaj Nakhon Si Thammarat Hospital and UdonThani Hospital
- 2) The 19 External Causes of Injury System by Public Health Offices of Nakhon Si Thammarat and UdonThani
- 3) The Information Technology for Emergency Medical System (ITEMS) by the National Institute for Emergency Medicine, Ministry of Public Health
- 4) The Death Registration System by Bureau of Policy and Strategy, Office of Permanent Secretary, Ministry of Public Health / Department of Provincial Administration, Ministry of Interior
- 5) The E-Claim System by Road Accident Victims Protection Co., Ltd. (RVP)
- 6) The Police Information System (POLIS) by the Royal Thai Police

In collaboration with the U.S. CDC, Bureau of Non-Communicable Disease, Department of Disease Control, Ministry of Public Health started the project in 2011 by examining information systems on road traffic injuries in two provinces, i.e., Nakhon Si Thammarat and UdonThani. The project has also involved Maharaj Nakhon Si Thammarat Hospital and UdonThani Hospital as key partners. The research methods included questionnaires and interviews of individuals involved with the information systems and data users, field observations at agencies where particular information systems were operated and at meetings of road safety working groups at the provincial level.

Results of the Project

The study shows that the six information systems have been designed for different specific purposes. They differ in terms of geographical and population coverage and, therefore, present different sets of the numbers of fatalities and injuries caused by road traffic accidents.

The difference in terms of variables of each system results in the fact that the data having been collected can be used for the work on road safety in several aspects, from prevention of road traffic accidents to care and treatment of the injured. However, quality of the data has remained unclear.

A challenge to these information systems is that data transmission tends to occur in only one direction. Data are collected by implementing agencies and are then sent to the central database of the country. The submitted raw data would then be processed and analyzed and a summary would be sent back to the coordinating authorities at the provincial level, regularly with undue delay. Moreover, it is found that, for most of the information systems, an in-depth analysis of raw data cannot be carried out at the provincial level province. It is only for the IS system that such an analysis is possible because comprehensive raw data are stored by a responsible agency at the provincial level and can thus be accessed readily by other related agencies.

Recommendations

Based on the preliminary findings of the study, the research team has some recommendations about the appropriate use of some types of data for the purpose of surveillance of road traffic accidents as following:

- 1) Data on the number of fatalities due to road traffic accidents be taken from the death registration system.
- 2) Data on the number of road traffic injuries be taken from the 19 External Causes of Injury System because of its comprehensiveness.
- 3) Data on the number of head injuries be taken from the Injury Surveillance.
- 4) Data on risk behaviors leading to road traffic accidents be taken from the IS System
- 5) Data on scenes of road traffic accidents to be taken from the ITEMS
- 6) Data on a proportion of disabilities resulting from road traffic accidents to be taken from the E-Claim System

Also, the team recommends that quality of the data collected in each information system be assessed before any in-depth analysis or any use of the data will be made.

Things that should be implemented

- 1) Quality of the data in each information system should be assessed by using appropriate assessment procedures.
- 2) Guidelines for data analysis should be developed by means of brainstorming opinions from data users in the provinces and an team of experts who have experiences on analyzing data on road accidents.

- 3) There should be capacity building for related personnel at the provincial level so that they can help analyze data and develop a plan on prevention of road traffic accidents in response to the actual needs of the specific areas.

The Plan of Project Implementation during 2013-2016

- **Year 2013:** Quality of the data in each information system will be assessed and a plan will be developed for the data analysis of the information systems at the provincial level under collaboration with the RTIIS Project.

- **Year 2014:** A manual on quality assessment, management and analysis of the data on road traffic injuries at the provincial level will be developed and a data analysis of the information systems will be conducted in the pilot provinces. Also, there will be capacity building organized to create a group of experts on data analysis together with the RTIIS team.

- **Year 2015:** The approach to quality assessment, management and analysis of the data on road traffic injuries will be replicated in 3-5 provinces.

- **Year 2016:** The implementation of the plan on data analysis of the information systems will be evaluated.

CONTENTS

	Page
Preface	i
Executive Summary	ii
Chapter 1 Introduction	1
Chapter 2 Methodology	3
Chapter 3 Results of the Study on the Road Traffic Injury Information Systems	
- Nakhon Si Thammarat Province	4
- Udon Thani Province	23
Chapter 4 Conclusion	46
Chapter 5 Comments on the Results and Recommendations	48
Appendix	
- Strengths and Weaknesses of the Six Information Systems	55

FIGURES

Figure		Page
1	Structure and Working Process of the Working Group on Road Traffic Accident Prevention	5
2	Data Flow of the IS System	7
3	Data Flow of the 19 External Causes of Injury System	9
4	Data Flow of the ITEMS	13
5	Data Flow of the Death Registration (Death Certification) System	16
6	Data Flow of the E-Claim System	19
7	Data Flow of the POLIS	21
8	Transmission of Information on Road Traffic Accidents in UdonThani	25
9	Data Flow of the IS System	27
10	Data Flow of the 19 External Causes of Injury System	29
11	Data Flow of the ITEMS	31
12	Data Flow of the Death Registration (Death Certification) System	34
13	Data Flow of the E-Claim System	36
14	Data Flow of the POLIS	38

TABLES

Table		Page
1	Variables for data collection included in the six information systems of Nakhon Si Thammarat and Udon Thani	40
2	Steps in the data collection process and information management of the six information systems at the provincial level	40
3	Attributes of the six information systems	41-45

**Report of the Study on Road Traffic Injury Information System
at the Provincial Level
In Search of Opportunitiesto Develop the Project
"Surveillance and Information System Improvement for Road Traffic Injuries: NCD 2"**

Rationale

Road traffic accidents are a significant problem that causes immense economic and social losses to Thailand. They are considered one of the top three public health problems in the country. Despite the Government's best efforts, there are sadly over 13,000 deaths and more than one million injuries as the result of road traffic accidents each year, with several ten thousand people disabled. High incidence of road traffic accidents is often seen during some festivals which comprise several consecutive official days off such as the New Year Festival and the Songkran Festival.

The Thai Government regards the problem and its effects to be of great importance and has strong political will to resolve it. The government has accorded reduction of road traffic accidents high priority in the national agenda and established the Road Safety Directing Center in 2003 to deal with this problem specifically. A Deputy Prime Minister and Director-General of Department of Disaster Prevention and Mitigation have been appointed as its Director and Secretary, respectively. The center serves to supervise all concerned agencies, both governmental and non-governmental, to implement a national strategic plan on five areas of road safety operation as following: 1) education and public relations, 2) law enforcement, 3) engineering, 4) emergency medical services and 5) evaluation and information.

Information system is considered key for mobilizing the prevention of road traffic accidents and the implementation of the strategic plan on the five areas of road safety operation at the national level. Thailand has made use of databases of injury surveillance systems from several sources - e.g. the Royal Thai Police, Ministry of Transport, Road Accident Victims Protection Co., Ltd.(RVP) and Ministry of Public Health (MoPH) - to tackle the problem of road traffic injuries.

On June 29, 2010, Thailand by the Cabinet approved a resolution to announce 2011-2020 as "the Decade of Action Road Safety" and assigned the Road Safety Directing Center to develop a plan for action which integrates efforts from all concerned sectors, with a goal of reducing the level of national road traffic fatalities to less than 10 per 100,000 population in 2020. The Cabinet also assigned Ministry of Public Health to serve as Coordinator for all parties concerned to improve their collection of data and their production of statistics on road traffic accidentsto be more



reliable, systematized and harmonized so that the data can be used for reference purposes and for making informed decisions on related matters in the future. The solution of the Cabinet is in line with the Moscow Declaration that designates all member states to improve data collection and comparability at the national level, including by adopting the standard definition of a road traffic death as any person killed immediately or dying within 30 days as a result of road traffic collision, and facilitating international cooperation to develop reliable data systems.

As Secretariat of Committee on Injury Prevention, Department of Disease Control under Ministry of Public Health has a key responsibility for coordinating the efforts all concerned agencies working for the prevention and control of on road traffic accidents, be they under the supervision of Ministry, particularly in developing accurate and harmonized information systems on road traffic injuries to be used for monitoring and evaluating the government's preventive interventions. It is believed that the success of such interventions require accurate and complete data of high quality to be used for mitigating the problem at the local level as well as advocating related policies at the national level.

Objectives :

- 1) To examine information systems on road traffic injuries at the provincial level in order to identify opportunities to improve the systems
- 2) To prepare a report of the study and propose recommendations for the best use of the information systems on road traffic injuries as well as the improvement of the systems

Methodology :

Study Design : A descriptive study

Study Procedures : The research team decided to study the operations of the information systems on road traffic injuries in Nakhon Si Thammarat and Udon Thani because the two provinces are eligible to serve as the models for other provinces in many areas of road safety operations and because they have provided good cooperation to the research team during its field visits.

The research team assessed six information systems at the provincial level as following:

- 1) The Injury Surveillance (IS) System by Bureau of Epidemiology, Ministry of Public Health
- 2) The 19 External Causes of Injury System by Ministry of Public Health
- 3) The Information Technology for Emergency Medical System (ITEMS) by the National Institute for Emergency Medicine, Ministry of Public Health
- 4) The Death Registration System by Department of Provincial Administration, Ministry of Interior



- 5) The E-Claim System by Road Accident Victims Protection Co., Ltd. (RVP)
- 6) The Police Information System (POLIS) by the Royal Thai Police

Research Methods :

1) Officers who were responsible for the operation of each system were asked to complete questionnaires comprising questions on following topics :

- 1.1) System definition
- 1.2) System objectives
- 1.3) Responsible units and officers
- 1.4) Population coverage
- 1.5) Data collection
- 1.6) Data flow
- 1.7) Data analysis
- 1.8) Reporting and information dissemination
- 1.9) Use of data in the system

2) The research team visited Nakhon Si Thammarat and Udon Thaniin order to conduct interviews and observe the operations of the information systems. The interviews were carried out during small group meetings, involving all officers who were responsible for the information systems and data users from all concerned agencies. Then, the field observations were arranged at the following agencies :

- 2.1) The IS System: Provincial hospitals
- 2.2) The 19 External Causes of Injury System: Provincial hospitals and Provincial Public Health Offices (PPHOs)
- 2.3) The ITEMS: The provincial hospitals
- 2.4) The Death Registration System: The provincial hospitals and PPHOs
- 2.5) The E-Claim System: The RVP provincial branch offices and provincial hospitals
- 2.6) The POLIS: District police stations and provincial police offices

3) The research team aggregated all data from the questionnaires, the interviews, the small group meetings and the observations to analyze strengths and weaknesses of the systems by following guidelines of the U.S. Centers for Disease Control and Prevention (CDC), taking into the account appropriate use of data for prevention and mitigation of road traffic injuries at the provincial level.



Results of the Study on the Road Traffic Injury Information Systems of Nakhon Si Thammarat Province

Performance on Road Traffic Injury Prevention and Mitigation of Nakhon Si Thammarat

In Nakhon Si Thammarat, there has been the Working Group on Road Traffic Accident Prevention set up since 2008. The group comprises Governor of Nakhon Si Thammarat as Chairperson, Deputy Commander of Provincial Police (Traffic) as Head of Provincial Helmet Section and other members including representatives from the Provincial Land Transport Office, the Provincial Highway District, the Provincial Office of Disaster Prevention and Mitigation, the PPHO, hospitals, municipalities, local administrative organizations and academic including universities and schools.

Official meetings among members of the working group are usually organized on a monthly basis by the Provincial Office of Disaster Prevention and Mitigation, presided over by Governor or Vice Governor. The working group brings in the data that are assembled from unofficial small groups meetings having been organized once every 1-2 week(s) to discuss and exchange relevant information among concerned agencies. Such information may include, for instance, road traffic accident statistics, the numbers of road traffic accidents, the numbers of deaths due to road traffic accidents, high-risk crash sites and scenes of road traffic accidents. The official meetings serve as a platform of cooperation where the working group seeks solutions to the problem together. Also, some organizations and/or individuals having outstanding performance in tackling the problem and working towards road safety may be invited to join the meetings so as to share their working experiences with the members.

Apart from the meetings as mentioned above, other activities operated by the Working Group on Road Traffic Accident Prevention include investigations of road traffic accidents, reviews and applications of academic works on many aspects of road safety, etc. To sum up, the process of integrated road safety management of Nakhon Si Thammarat involve three key constituents: formulating strategic plans, developing and implementing interventions, and monitoring and evaluating the interventions.

Setting Strategies of Nakhon Si Thammarat

Nakhon Si Thammarat implements a livable city policy that seeks to ensure people's security in life and property. However, no policies on road safety have been made explicitly, simply a target of reducing deaths due to motor vehicle traffic collisions by 5% in comparison with the average death rate during the last three years.



Figure 1

Structure and Working Process of the Working Group on Road Traffic Accident Prevention



The INJURY SURVEILLANCE (IS) SYSTEM

System Definition :

The Injury Surveillance (IS) System is a sentinel surveillance system that counts on general and regional hospitals which serve as centers of medical care and referral services to be data sources for surveillance of moderate to severe injuries occurring in the province. It aims to provide information about vulnerable groups of populations, contributing risk factors, determinants of sizes and trends of the problems, quality and coverage of first aid and transport services so as to monitor, audit and evaluate services provided to the injured. Also, the system



is meant to be used for improvement of the hospitals' internal management and to provide a database for injury surveillance at the national level.

System Objectives :

- 1) To develop a database which is necessary for improvement of medical care and referral services for the injured/patients
- 2) To develop an appropriate injury surveillance system to be used for improvement of medical care and referral services for the injured/patients in general and regional hospitals
- 3) To develop a surveillance system that can be used for prevention and mitigation of road traffic accidents and injuries at the provincial and national levels

Target Population :

The IS System targets any persons who are injured within 7 days or die within 30 days as a result of a road traffic collision and obtain medical services at the emergency room of a hospital where the system is operated.

Data Collection Units :

Data collection is conducted by the Accident and Emergency Section and the Medical Statistics Section of the Maharaj Nakhon Si Thammarat Hospital.

Data Collection Officers :

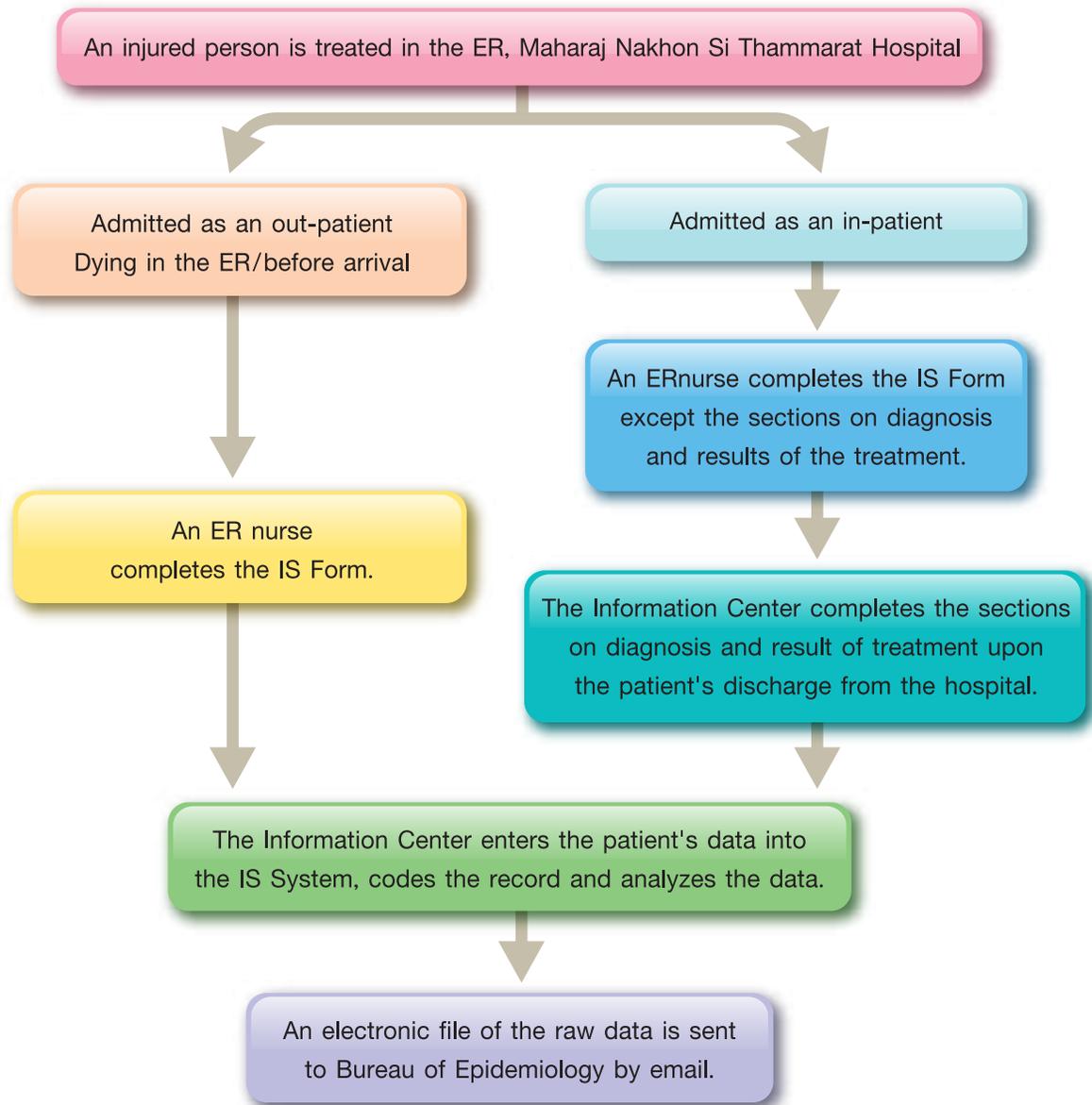
Personnel of Maharaj Nakhon Si Thammarat Hospital who enters data on the Injury Surveillance Form includes registered nurses from the ER Department and the Medical Record Department as well as medical statistics officers.

Data Collection Tools, Methods and Procedures :

When an injured person is being treated in the hospital, an ER nurse would complete the patient's information on the Injury Surveillance Form manually and then record it into a computer at the ER Department. In case where the injured person is admitted to the hospital as an in-patient, his or her data on the sections on diagnosis and result of treatment would later be filled out by a medical statistics officer. After this, a hospital officer from Division of Academic Affairs and Report Dissemination would code the record and carry out data analysis.

A key data collection tool used in this process is the IS Form which is adapted from a Trauma Registry Form so as to be able to accommodate all 19 external causes of injury.



Figure 2**Data Flow of the IS System****Use of Data :**

- In-patients' data are used for improvement of ER management (in relation to issues such as workload, workforce and quality of treatment and referral services).
- Some other data such as accident blackspots are used for the purpose of the coordination on the situations of road traffic injuries among related agencies in the province.

Data Users :

People who can make use of the IS data include members of the hospital's EMS team, nurses, head nurses from in-patient wards, orthopedic surgeons, and executive members as well as executive administrators of the province.



Data Quality Control and Verification :

The quality of the information is controlled by a nurse on duty during a particular shift. The nurse would make certain that all variables in the system are completed. (Please be noted that all novice nurses are trained to serve this function from the beginning.) Following this, a medical statistics officer would check the entered data for accuracy and completeness. In case where there are some discrepancies, the data would be sent back to the responsible nurse for further corrections and/or completion.

THE 19 EXTERNAL CAUSES OF INJURY SYSTEM

System Definition :

The system provides information about the number of injuries and deaths as a result of external causes that are classified under a series of alpha numeric codes, V01-Y36, (according to the framework of the 10th Revision of the International Statistical Classification of Diseases and Related Health Problems- ICD-10). It contains only data of those who have been admitted as in-patients in public hospitals operated by Ministry of Public Health (which can be categorized into 3 types: community hospitals, general hospitals and regional hospitals).

System objectives :

To assemble, organize and analyze data on road traffic injuries for predicting road traffic injury trends as well as developing implementation plans

Target Population :

The system targets any persons who have been injured or died as a result of external causes classified under a set of codes, V01-V36, and have obtained medical services at public hospitals under Ministry of Public Health.

Data Collection Units :

Data are collected in ER Departments of public hospitals under Ministry of Public Health including Maharaj Nakhon Si Thammarat Hospital and all 19 community hospitals in the province.

Data Collection Officers :

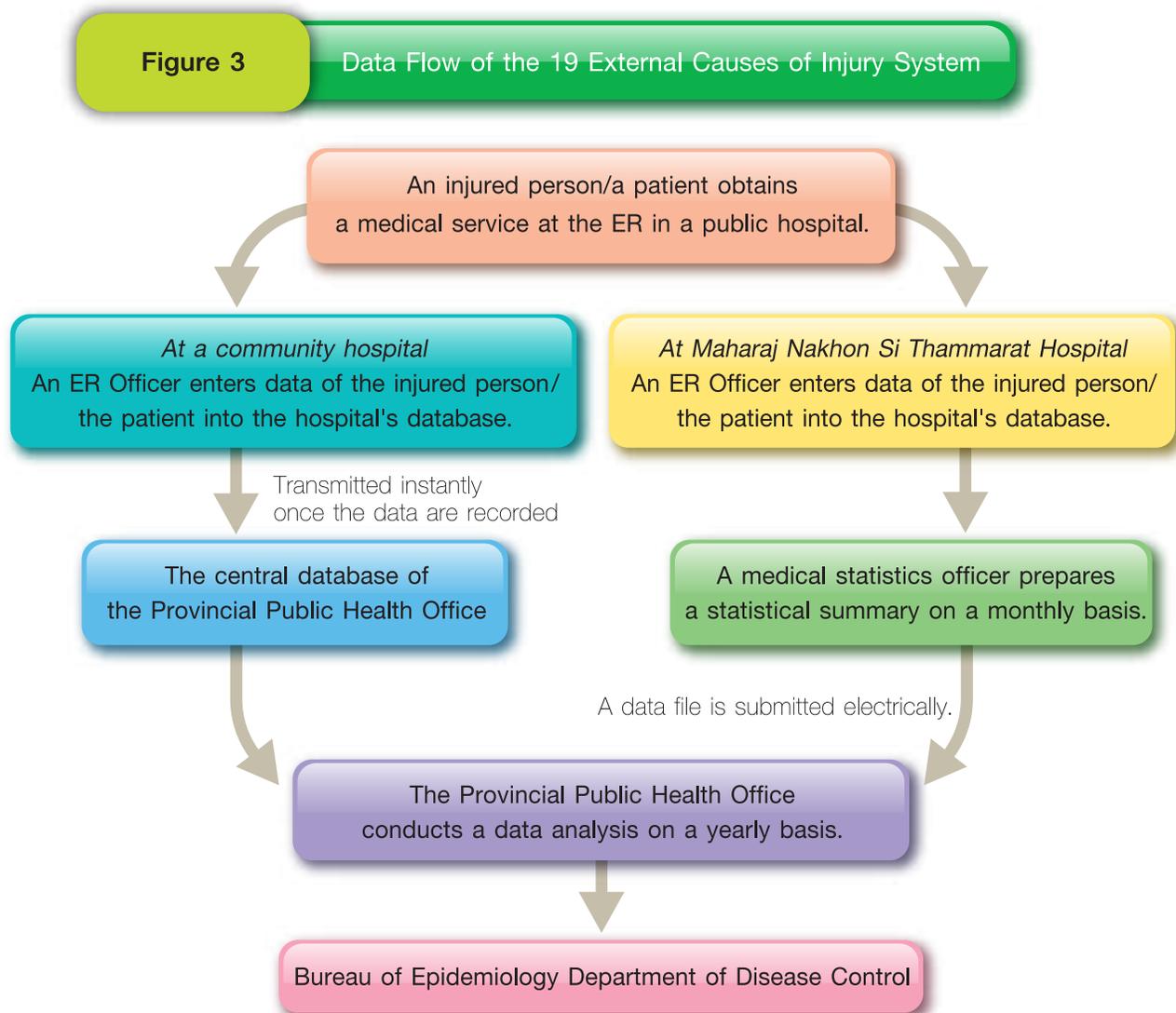
Data on the number of the injured and the deceased are reextracted from patients' medical records by a medical record officer of each hospital and are sent to the Nakhon Si Thammarat Public Health Office. Recently, the Provincial Public Health Office has developed a central database to be linked with the database of every community hospital in the province. This allows the Provincial Public Health Office to have instant, direct access to the databases of these hospitals. Contrary to this, development of a similar linkage between the Provincial Public Health



Office and Maharaj Nakhon Si Thammarat Hospital is on-going and submission of data from the latter to the former still needs to be done electronically. (Please be noted that a set of data on 19 external causes of injury submitted by the hospital is the same as the set of data on IS.)

Data Collection Tools, Methods and Procedures :

At the emergency room in a hospital where an injured person or a patient is being treated, a hospital officer would conduct an interview and observation to collect data of the injured person or the patient on a medical record and then she or he would enter the same set of data into a database of the hospital that is directly linked with the central one of the Provincial Public Health Office. After that, the Provincial Public Health Office would sort out the number of the injured or the deceased by cause of injury and submit the information to Bureau of Epidemiology further. In case of Maharaj Nakhon Si Thammarat Hospital, extraction of such data would be carried out by the hospital itself. Then, the sorted data would be submitted to the Provincial Public Health Office electronically.



Use of Data :

- The database provides some common rates related to road traffic injuries and fatalities such as the number of the injured and that of the deceased.

- The data can be used as references in development of an action plan to solve the problem. However, it should be noted that reports on road traffic accidents that have been produced so far are of limited use because such reports can provide only the number of incidents or the size of the problem, but not a comprehensive picture of it. It is suggested that if the data are to be used for some specific purposes, more variables should be added as appropriately.

Data Users :

- Public health personnel make use of the data on the numbers and trends of injuries as references in their development of project proposals.

- Bureau of Epidemiology uses the data to analyze an overall picture of the injury problem at the country level.

- The Provincial Office of Commercial Affairs and the Provincial Statistical Office use the information in their annual reports.

- The general public who are interested in the issue (e.g. students and academics) use the data for references in their research.

Data Quality Control and Verification :

- Committee of each community hospital conducts an audit of the hospital's emergency trauma registry by following a related protocol of the National Health Security Office (NHSO) as provided in the HosXP software program.

- As Mahajraj Nakhon Si Thammarat Hospital has not applied the software program yet, its database on 19 external causes of injury is usually checked by a medical statistics officer of the hospital through the IS System.

- As the Provincial Public Health Office is not able to check the data, which have been submitted electronically, in a reversal order back to the source of origin, submission of a hard copy of the data are also required from the hospitals for a purpose of evaluation of data transfer quality.



THE INFORMATION TECHNOLOGY FOR EMERGENCY MEDICAL SYSTEM (ITEMS)

System Definition :

ITEMS = IT + EMS is computer program for online recording of emergency medical services, including pre-hospital care and treatment, via a web-based interface of the National Institute for Emergency Medicine which serve as a Dispatch Center. Such emergency medical services are delivered to injured persons or critically ill patients in both disaster and non-disaster environments. Upon receipt of a call for a service, a dispatcher would be guided by the program to record data into the system and ask key questions to caller in order to triage the injured person or the patient according to his or her symptom acuity and thus his or her level of emergency. Information about the scene of the accident is acquired by the dispatcher to identify accurate geographical coordinates and make a decision in terms of which EMS unit is the closest and should be sent to the scene. The dispatcher is supposed to keep track of the EMS activities until the injured person or the patient is brought to the hospital of destination or survives the critical conditions.

System Objectives :

1) To accommodate and support the operation of the Emergency Medical Services System (EMSS) in all aspects, i.e. handling calls, triaging injured persons or patients in critical conditions, dispatching EMS units, giving instructions for pre-arrival care and transport of the injured or the patients to hospitals, tracking the progress of the EMS activities through the process and reimbursing EMS operations expenses, with an aim to assist those in immediate life-threatening conditions in a timely manner in compliance with the standard guidelines as set by the National Institute for Emergency Medicine

2) To provide information for internal management of agencies concerned such as for efficient resource management

Target Population :

The system target injured persons or emergency patients as a result of any causes who call for services from the Emergency Medical Service System and are sent to private or public hospitals

Data Collection Units :

Data are collected from the information systems of 117 organizations as following:

- 26 private and public hospitals
- 83 local administrative organizations
- 6 independent non-profit organizations
- 2 Sub-District Health Promoting Hospitals



An agency responsible for entering data into the ITEMS is the Emergency Medical Services Section of the Provincial Public Health Office.

Data Collection Officers :

- EMS Team - EMS volunteers, emergency medical technicians (EMT), nurses and physicians
- Hospitals - emergency medical technicians, nurses and physicians
- Dispatch Centers - communication officers, emergency medical technicians, nurses and physicians
- The Office of Emergency Medical Services System - EMS officers

Data Collection Tools, Methods and Procedures :

A dispatcher would enter related data on the EMS Dispatch Form. The data to be entered are supposed to be obtained from one of the following means: Emergency Services Telephone Number 1669; Radio Channel 11 on 154.925 MHz; direct phone calls to the hospitals; interviews with injured persons or critically ill patients, their relatives, witnesses or onlookers by EMS Units; observations of injured persons or critically ill patients. Following this, the data will be recorded into the ITEMS. Apart from this, an EMS Unit which performs the EMS operation at an event is also required to complete another report form. The type of such a form would correspond with the level of severity of the event and the type of the EMS Unit. After completed, all EMS Report Forms would later be compiled and submitted to the Provincial Public Health Office.

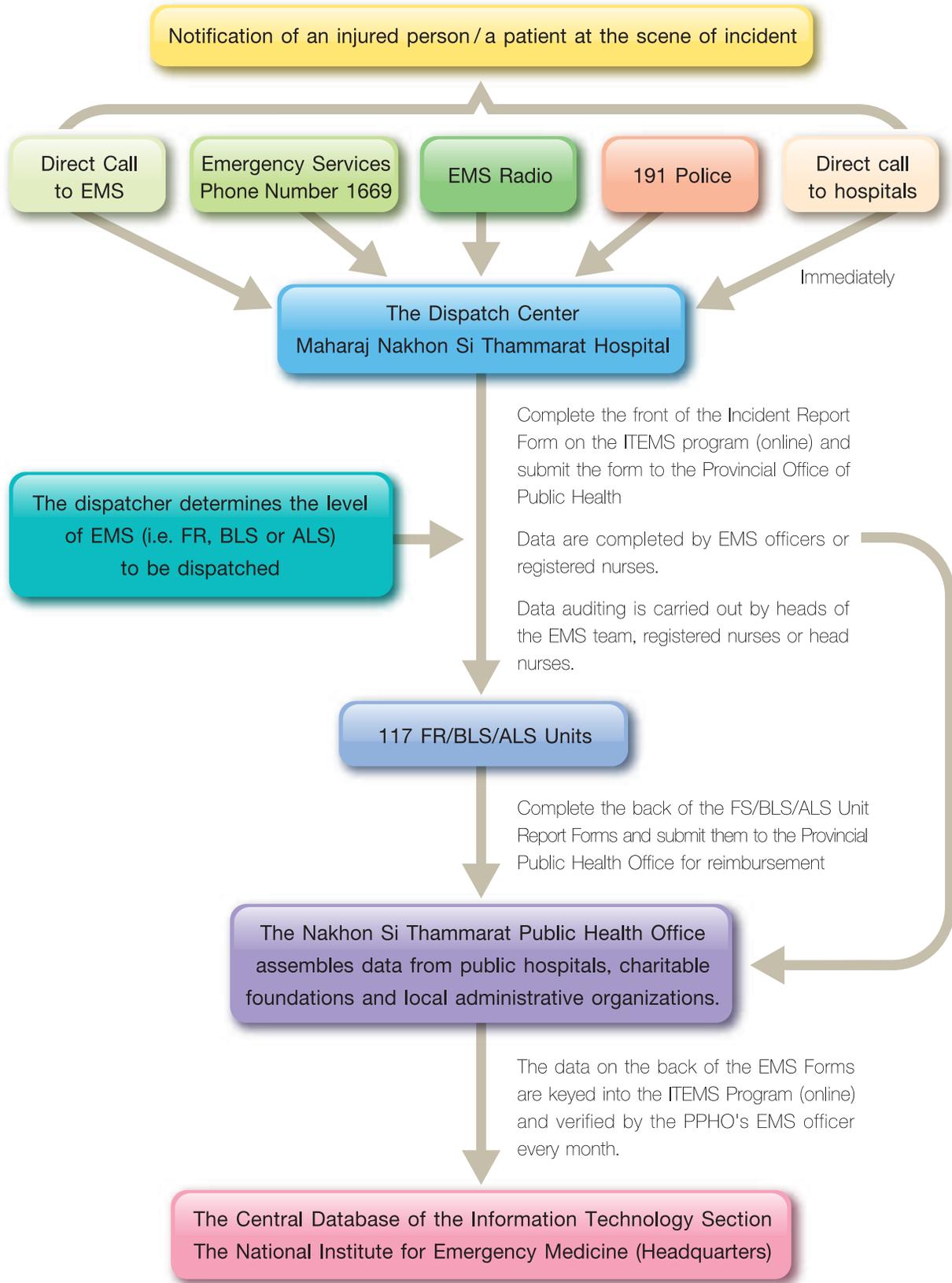
Tools :

- The EMS Dispatch Form
- The First Responder Unit Report Form (or the FR Unit Report Form)
- The Basic Life Support Unit Report Form (or the BLS Unit Report Form)
- The Advance Life Support Unit Report Form (or the ALS Unit Report Form)
- The ITEMS Computer Program (Online)



Figure 4

Data Flow of the ITEMS



Data Users :

Data are used by the Headquarters of the National Institute for Emergency Medicine and the Provincial Emergency Medical Services Office for the purpose of internal performance evaluation and budget management.

Data Quality Control and Verification :

Access to the information system is controlled by password protection. The data collected in the system can be viewed and made use of by the public but any alterations to them are not permitted.

The data are checked for accuracy by responsible officers of the Dispatch Center, private and public hospitals and the Office of the Emergency Medical Services System. Particularly, the Provincial Public Health Office always seeks to ensure that data on Incident Report Forms correspond with those on FR, BLS or ALS Unit Report Forms before entering the data into the ITEMS.

THE DEATH REGISTRATION (DEATH CERTIFICATE) SYSTEM**System Definition :**

The death registration system classifies deaths into two categories: 1) deaths registered by relatives at local/district registration offices, and 2) deaths in hospitals or other health care facilities of which certificates are issued by attending physicians of the hospitals or the health care facilities.

System Objectives :

- 1) To provide information for preparing reports on mortality statistics of the Thai population
- 2) To provide information for developing and planning policies relating to health promotion and medical treatment of Thai people.

Target Population :

The system keeps data of all deaths that are registered at local/district registration offices. Also, it contains some variables that are specifically designed to collect data of deaths incurred by road traffic accidents.

Data Collection Units :

Data collection takes place at every private and public hospital and every local/district registration office in Nakhon Si Thammarat.



Data Collection Officers :

At local/district registration offices

- Local registrars

At hospitals

- Data reporting officers: Ward clerks, nurses and physicians
- Data auditing officers: Statisticians at the professional level, registered nurses and physicians
- Data entry officers: Statisticians at the professional level

Data Collection Tools, Methods and Procedures :

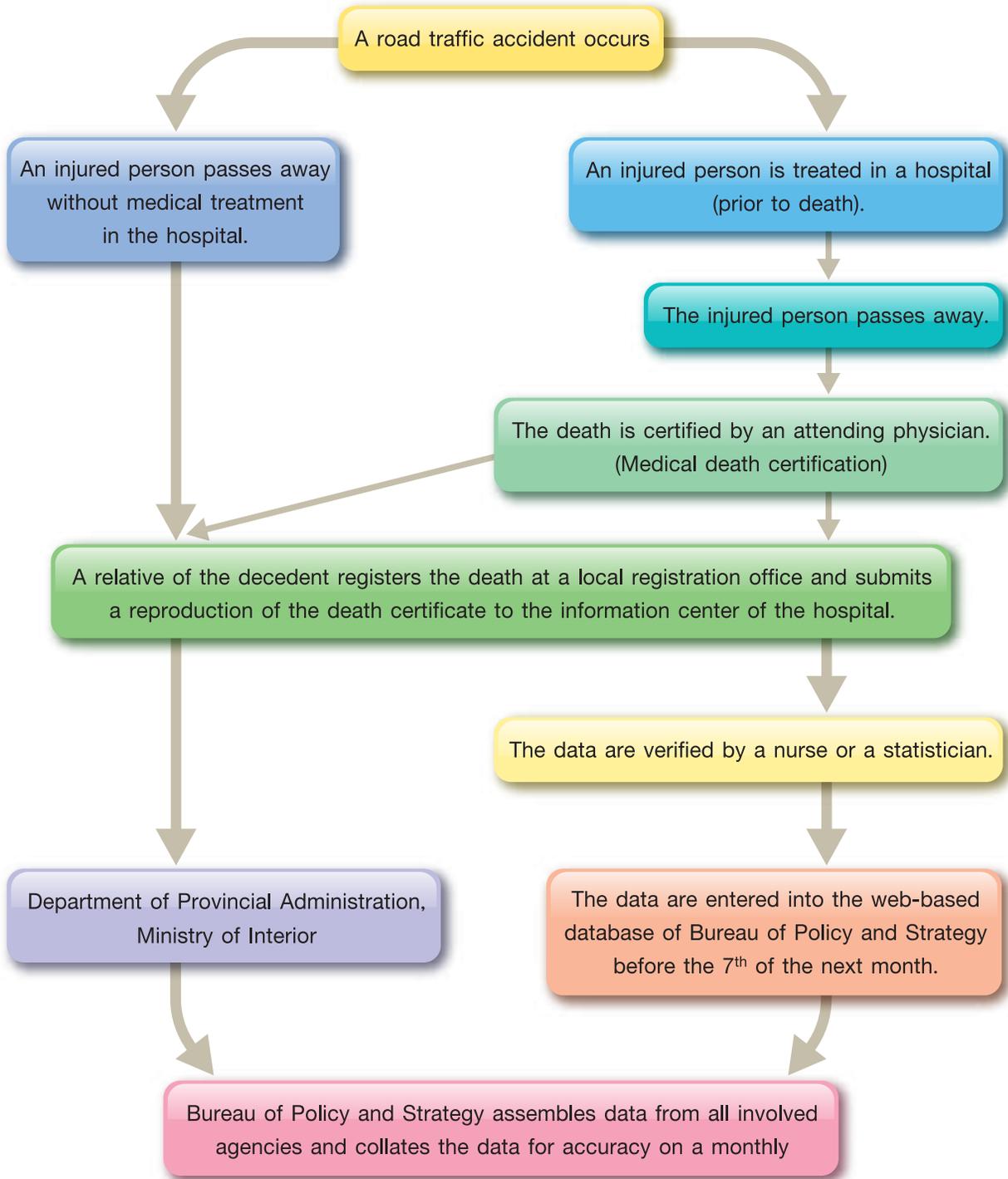
At a hospital, a physician in charge would issue a medical certificate giving the cause of death (Thor. Ror. 4/1 Form) to a relative of the decedent to be used for filing a death report with a local registration office. A reproduction of the certificate will be filed with the hospital. After that, a statistician at the professional level of the hospital will verify data of deaths as a result of road traffic accidents and record the data into a web-based database of Bureau of Policy and Strategy, Ministry of Public Health.

At a local/district registration office, a relative of a decedent needs to register the death with the registrar irrespective of certification of the death by a physician in a hospital. In case where the decedent has not been seen by a hospital physician, an official under Ministry of Interior, e.g. a village chief or a sub-district headman, may be able to issue such a certificate of cause of death instead. After this, a registrar of the local registration office will enter data on a death certificate and onto a computerized database of Department of Provincial Administration, Ministry of Interior.



Figure 5

Data Flow of the Death Registration (Death Certification) System



Use of Data :

Data in the system are not available for use or analysis by concerned agencies at the provincial level because they are stored in the central database of Bureau of Policy and Strategy. An official request for permission to access the data is required to be submitted to the Bureau on an ad hoc basis.

Data Users :

A key user of the data system is Bureau of Policy and Strategy, Office of Permanent Secretary, Ministry of Public Health.

Data Quality Control and Verification :

The data on a death that has been certified by a hospital physician would be audited by a registered nurses or a statistician at a professional level. An ICD cause-of-death code is automatically checked by the HosXP software program.

In case where a death has not been certified by a hospital physician, but an official of Ministry of Interior, e.g. a village chief and a sub-district headman, the data on the death will be checked once they are transmitted to Bureau of Policy and Strategy, Ministry of Public Health.

THE E-CLAIM SYSTEM**System Definition :**

This information system has been developed by Road Accident Victims Protection Co., Ltd. to provide a database for the purpose of compensation disbursement. With this system, the company's officer stationed at the provincial branch office of RVP Co., Ltd. or at a hospital where a road accident victim is being treated can record the victim' data into the database through the E-Claim Program (online). The data collected in the system are used for efficient internal management of the company. Also, they can facilitate a motor vehicle victim's claim of compensation according to the Protection for Motor Vehicle Victims Act.

System Objectives :

- To provide information for the purpose of compensation disbursement

Target Population :

The system is intended to encompass victims of motor vehicles, that have insurance against loss according to the Protection for Motor Vehicle Victims Act, who submit a petition form for preliminary compensation within 180 days from the damage date at the provincial branch of RVP.



Please be noted that the motor vehicle victims may authorize the hospitals or other health care facilities where they have been treated to submit such a petition on their behalf if they are not able to submit a petition by themselves. Also, the motor vehicle victims may file an application for preliminary compensation regardless of the fact that their cases may or may not have been brought to the court proceedings (for example, in case of motor vehicle riders or drivers injured in non-collision transport accidents).

Data Collection Units :

Data collection is undertaken at the RVP branch office of Nakhon Si Thammarat and the hospitals providing medical treatment for victims of road traffic accidents.

Data Collection Officers :

Data are collected by RVP officers stationed at the provincial branch office or at Maharaj Nakhon Si Thammarat Hospital and public health officers in community hospitals.

Data Collection Tools, Methods and Procedures :

- In case of application for compensation is made at the RVP provincial branch office or Maharaj Nakhon Si Thammarat Hospital, an RVP officer would enter data which are acquired through an interview of the motor vehicle victim or his or her relative, and documents from related agencies in the company's network such as hospitals, networks of rescue squads and charitable foundations providing volunteer first response services and from the road accident victim him- or herself. Following this, the data will be collated for completeness and accuracy with those in the E-Accident system and then be entered into the E-Claim system online.

- In case of application for compensation is made at a community hospital, a hospital officer would enter data of the motor vehicle victim into the database of the E-Claim system online.



Figure 6

Data Flow of the E-Claim System



Use of Data :

- Data in the system are used to ensure accuracy and promptness of compensation disbursement.
- Data in the system are used as evidences for re-imbusement of medical expenses in hospitals or other health care facilities.
- The system provides information that is used in planning prevention of road traffic accidents

Data Users :

- RVP Co., Ltd.
- Local hospitals
- Provincial Road Traffic Accident Prevention Committee

Data Quality Control and Verification :

The data in the E-Claim System are cross-checked with those in the E-Accident System for accuracy to avoid errors and duplication. The database of the system may be verified, corrected or updated with additional information when incorrect statements or any other discrepancies are found.

THE POLICE INFORMATION SYSTEM (POLIS)**System Definition :**

The system records the Royal Thai Police's statistical data on cases of traffic road accidents that are brought to civil or criminal courts.

System Objectives :

- To provide information to be used for planning budgets and workforce and monitoring performance of related agencies under the Royal Thai Police

Target Population :

The system targets victims of road traffic accidents that occur within the jurisdiction of a particular district police station and are referred to courts for civil or criminal prosecution.

Data Collection Units :

Data collection is conducted at every district police station in Nakhon Si Thammarat.

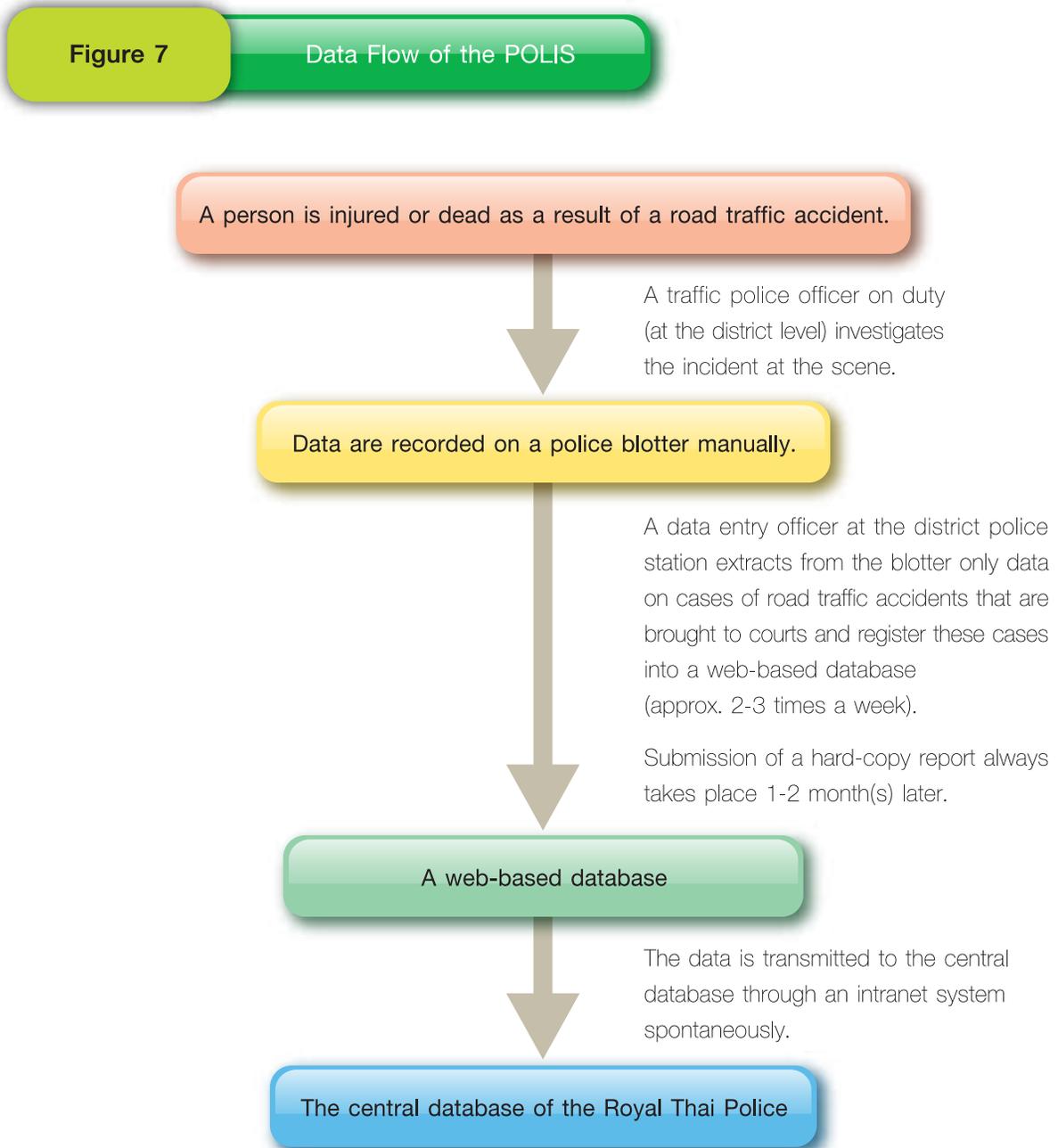
Data Collection Officers :

Data in the system are collected by traffic police officers on duty and data entry police officers at district police stations.



Data Collection Tools, Methods and Procedures :

A traffic police officer on duty would undertake an investigation at the scene of an accident and then record data on a police blotter manually. Then, a police officer at the police stations who is responsible for data entry would enter the same data into a web-based database in correspondence with the variables required by the system.



Use of Data :

- The system provides information to be used for internal evaluation on performance and workforce by the Royal Thai Police.
- The system provides baseline data on injury and death incurred by road traffic accidents to be used during some meetings on road safety operations at the provincial level.
- Some government agencies, e.g. the Office of Disaster Prevention and Mitigation, use data in the system as references to present the number of injuries and the number of deaths as a result of road traffic accidents.

Data Users :

The data in the system are made use of by the Royal Thai Police, Nakhon Si Thammarat Road Safety Working Group and other related government agencies.

Data Quality Control and Verification :

Data collected in the system are compared with those in a monthly summary report on the number of road traffic accident cases which is submitted to the Royal Thai Police by every district police station. The report is checked for completeness and accuracy by Provincial Police and Regional Police, respectively.



Results of the Study on the Road Traffic Injury Information Systems Udon Thani Province

Performance on Road Traffic Injury Prevention and Mitigation of Udon Thani

Road traffic injuries constitute a critical health problem of Udon Thani which leads to deaths, disabilities and damages to properties of a large number of people. To deal with this problem, Road Safety Directing Center has been established in the province and the Provincial Office of Disaster Prevention and Mitigation has been appointed as its Secretariat. The Road Safety Directing Center comprises several Working Groups responsible for different areas of road safety strategies as following: 1) law enforcement and traffic management, 2) engineering, 3) education, public relations and participation, 4) emergency medical services, 5) information integration, evaluation and information system, and 6) campaign and environmental regulation according to related laws, all of which are geared towards the elevation of the road safety standard of Udon Thani. Key functions of the working groups are to ensure that policies on reduction and prevention of road traffic accidents will be implemented and road safety interventions will be directed to the attainment of measures, approaches and plans as designated.

Official meetings among these working groups are usually held 1-2 time(s) a month by the Provincial Office of Disaster Prevention and Mitigation. The working groups bring in related data that are assembled from unofficial small groups meetings having been organized every 1-2 week(s) so as to discuss and exchange some information as collected by individual agencies, including issues such as road traffic accident statistics, the number of road traffic accidents, the number of deaths incurred by road traffic accidents, blackspots and scenes of road traffic accidents. Such meetings serve as a platform of cooperation where the working groups seek both short-termed and long-termed solutions to the problem together by developing intervention programs and assigning responsible agencies accordingly. The meetings are also a platform where situations concerning road traffic safety will be updated and reported to Governor of Udon Thani.

Udon Thani has designated a set of strategies and policies on reduction of injuries and deaths as a result of road traffic accidents in accordance with the intent of the declaration of 2011-2020 as the Decade of Action for Road Safety. To evaluate the achievement of the defined strategies and policies, a set of targets and indicators has been developed for 2011-2012 as following:

- 1) Motorcycle users wear helmets at a rate of 100%.
- 2) Front-seat occupants use seatbelts at a rate of 80% or above.



- 3) Rates of road traffic accidents decrease by 10% in comparison with the rates in 2010.
- 4) Rates of severe road traffic injuries decrease by 10% in comparison with the rates in 2010.
- 5) Rates of fatalities as a result of road traffic accidents decrease by 10% in comparison with the rates in 2010.

The information system on road traffic injury is a significant mechanism that will lead the road safety efforts to the success. Good information should be indicative of: degree of the problem in the province, vulnerable groups of populations of the injuries, degree of loss incurred, contributing factors such as risk behaviors and blackspots, etc. According to the study of the research team, it is found that there are six information systems collecting data on road traffic injuries in Udon Thani. These systems vary in terms of details of data to be collect and purposes of data use. They comprise:

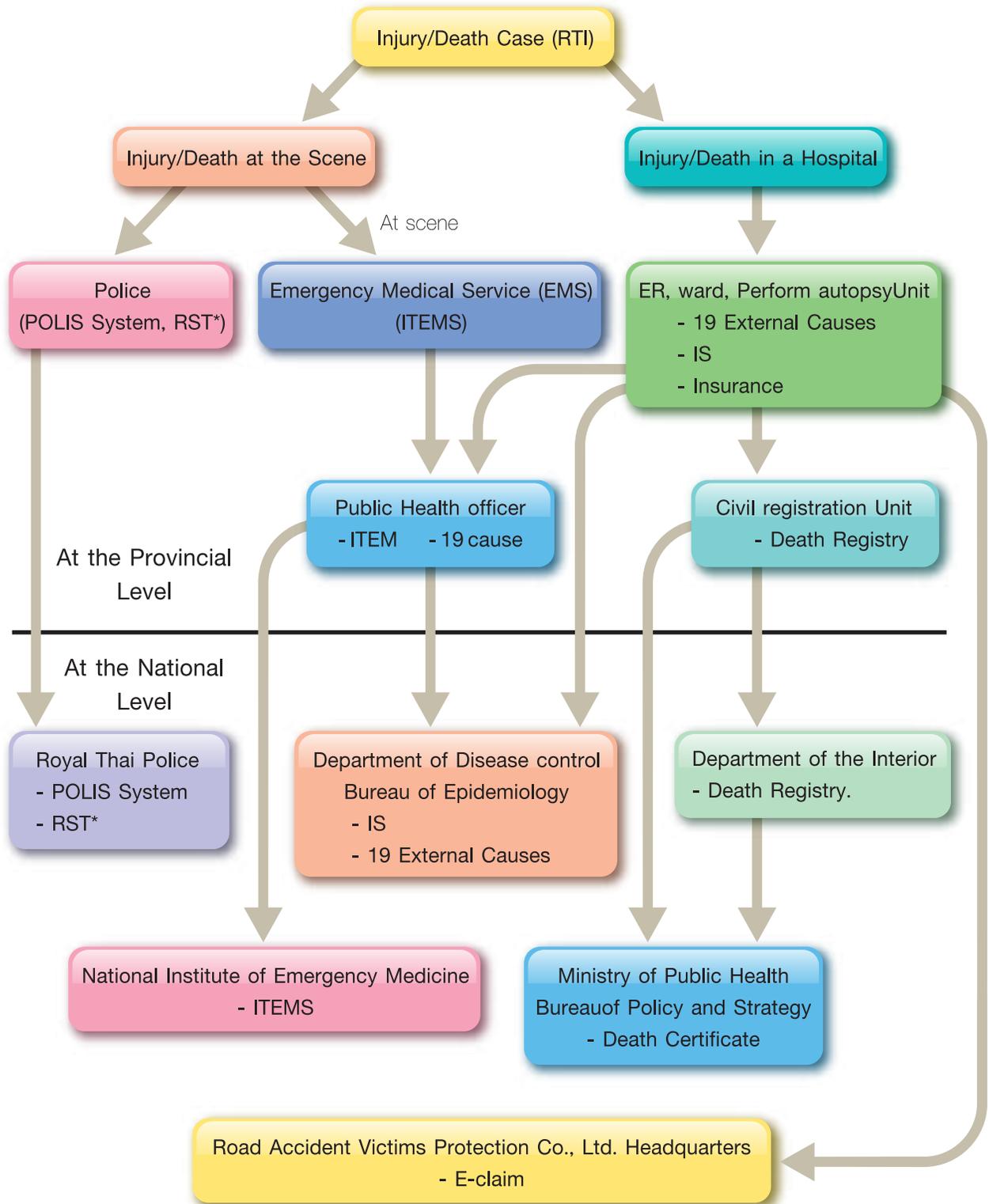
- 1) Injury Surveillance (IS) System by Bureau of Epidemiology, Ministry of Public Health
- 2) 19 External Causes of Injury System by Ministry of Public Health
- 3) Information Technology for Emergency Medical System (ITEMS) by the National Institute for Emergency Medicine, Ministry of Public Health
- 4) Death Registration System by Department of Provincial Administration, Ministry of Interior
- 5) E-Claim System by Road Accident Victims Protection Co., Ltd.
- 6) Police Information System (POLIS) by the Royal Thai Police

Apart from the above, there is another system run by Road Safety Team of the Royal Thai Police to collect data related to road traffic accidents and road safety. However, the system has newly been initiated since June 2012. It is thus not included in this study. Linkages and exchange of information of the six systems happen at the provincial level and at the national level as shown in the following figure.



Figure 8

Transmission of Information on Road Traffic Accidents in Udon Thani



*RST = Road Safety Team



THE INJURY SURVEILLANCE (IS) SYSTEM

System Definition :

The Injury Surveillance (IS) System is a sentinel surveillance system that counts on general and regional hospitals which serve as centers of medical care and referral services to be data sources for surveillance of moderate to severe injuries occurring in the province. It aims to provide information about vulnerable groups of populations, contributing risk factors, determinants of sizes and trends of the problems, quality and coverage of first aid and transport services so as to monitor, audit and evaluate services provided to the injured. Also, the system is meant to be used for improvement of the hospitals' internal management and to provide a database for injury surveillance at the national level.

System Objectives :

- 1) To develop a database which is necessary for improvement of medical care and referral services for the injured or patients
- 2) To develop an appropriate surveillance system to be used for improvement of medical care and referral services for the injured or patients in general and regional hospitals
- 3) To develop a surveillance system that can be used for prevention and mitigation of road traffic accidents and injuries at the provincial and national levels

Target Population :

The IS System targets any persons who are injured within 7 days or die within 30 days as a result of a road traffic collision and obtain medical services at the emergency room of a hospital where the system is operated.

Data Collection Units :

Data collection is conducted in the Emergency Medicine Unit and the Trauma Care Unit at Udon Thani Hospital, emergency rooms at community hospitals in every district in the province. (Please be noted that the information system used at these hospitals is the Mini Injury Surveillance (Mini IS) System. The system draws upon the same data collection program but has less variables for data collection as agreed between the hospitals and the Provincial Public Health Office.)

Data Collection Officers :

With this system, a nursing assistant would interview an injured person or a patient and then a hospital officer would enter relevant data into the IS database system. Subsequently, the records would be checked by a registered nurse at each particular shift and another responsible registered nurse would verify and interpret the data before submission to the Provincial Public Health Office on a monthly basis. At the Provincial Public Health Office,

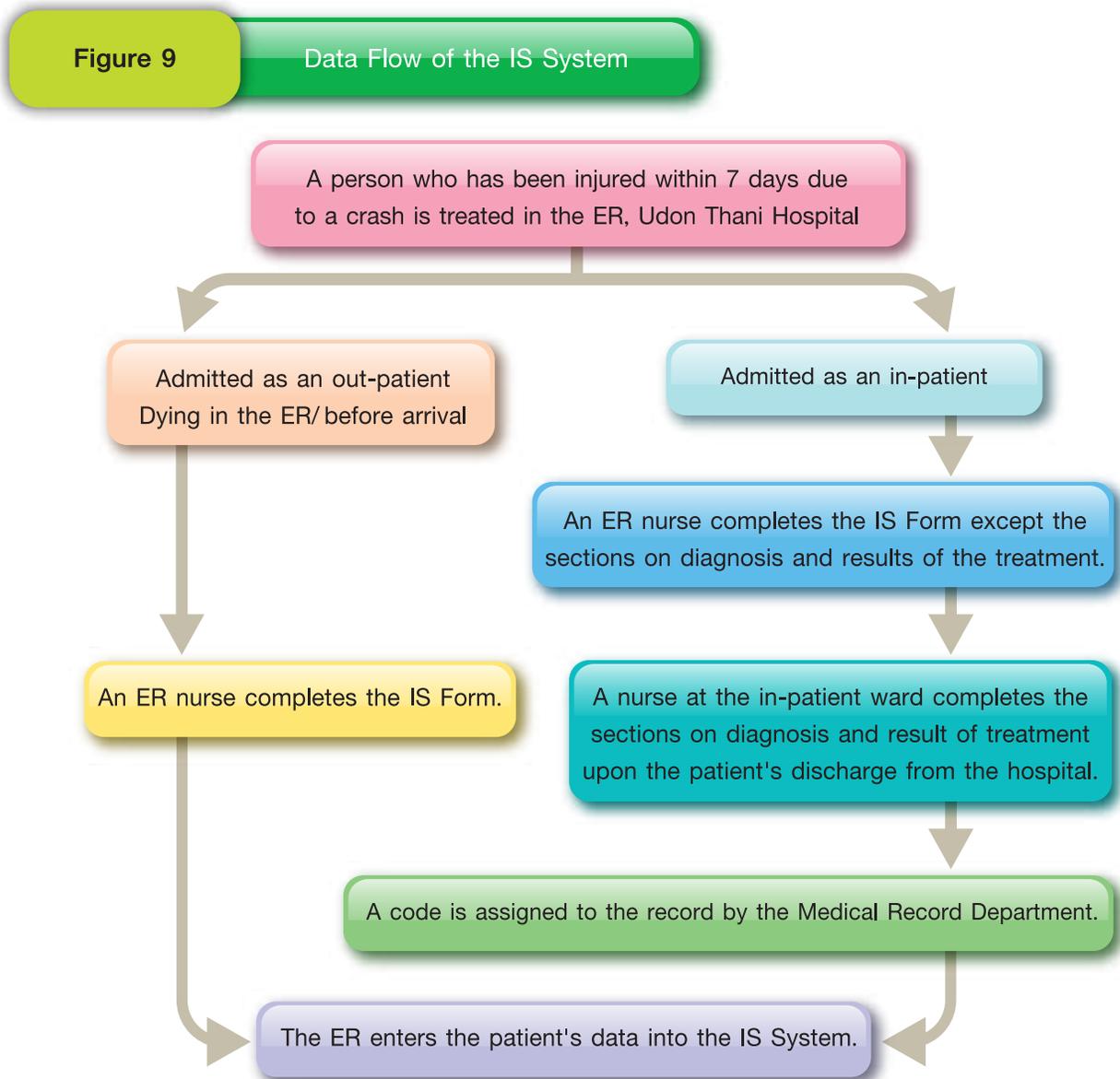


Head of Injury Surveillance Division would seek to ensure that all procedures related to the data are in place every month.

Data Collection Tools, Methods and Procedures :

Data collection in the system involves following steps

- 1) Conducting observation and interviews and collecting data on contributing risk factors, time of occurrence and nature of injury on the ER Report Form
- 2) Filling in the "Final Diagnosis" items on the Form
- 3) Filling in the "Body Region (BR)" items and enter a code as listed in the Abbreviated Injury Scale (AIS)
- 4) Entering relevant data into the IS-WIN Program
- 5) Verifying the information
- 6) Preparing and disseminating a report



Use of Data :

- With the data from the system in hands, some agencies concerned, e.g.hospitals, can be informed of their workloads and therefore can arrange workforce for peak periods, provide services to patients or handle mass casualty accidents as appropriately.

- The data in the system are used for the purpose of evaluating treatment quality of the Surgery Unit and the Trauma Care Unit every month by using the probability of survival (Ps) > 0.75 from the Trauma and Injury Severity Scoring (TRISS) Methodology.

- The data in the system are used for quality evaluation of referral services every month.

- The data in the system are used for prevention of road traffic accidents during some festivals. For example, they can also be used to classify at-risk groups by age, occupation, risk behavior and blackspots and to develop interventions specifically designed for each particular group.

- The data in the system are used to provide information to some organizations such as schools in which high frequency of accidents have been found.

Data Users :

Agencies and individuals who can make use of the injury surveillance data may include general and regional hospitals, the Provincial Public Health Office, Ministry of Public Health, Department of Disaster Prevention and Mitigation, the Royal Thai Police, Road Accident Victims Protection Co., Ltd., and the general public.

Data Quality Control and Verification :

The system was once evaluated by means of random check for accuracy and completeness in 2007. The results of the evaluation reveal that the data in the system account for 98% of all injuries supposedly to be incorporated. The accuracy of 30 variables to collect data of the injured admitted in hospitals achieves a rate of 83% on average.

THE 19 EXTERNAL CAUSES OF INJURY SYSTEM

System Definition :

The information system provides information of the injured or patients who obtain medical services in public hospitals operated by local public health offices in the province and who meet the criteria of 19 external causes of injury.

System objectives :

To collect data for injury surveillance.



Target Population :

The system targets any injured persons or patients who obtain medical services at public hospitals.

Data Collection Units :

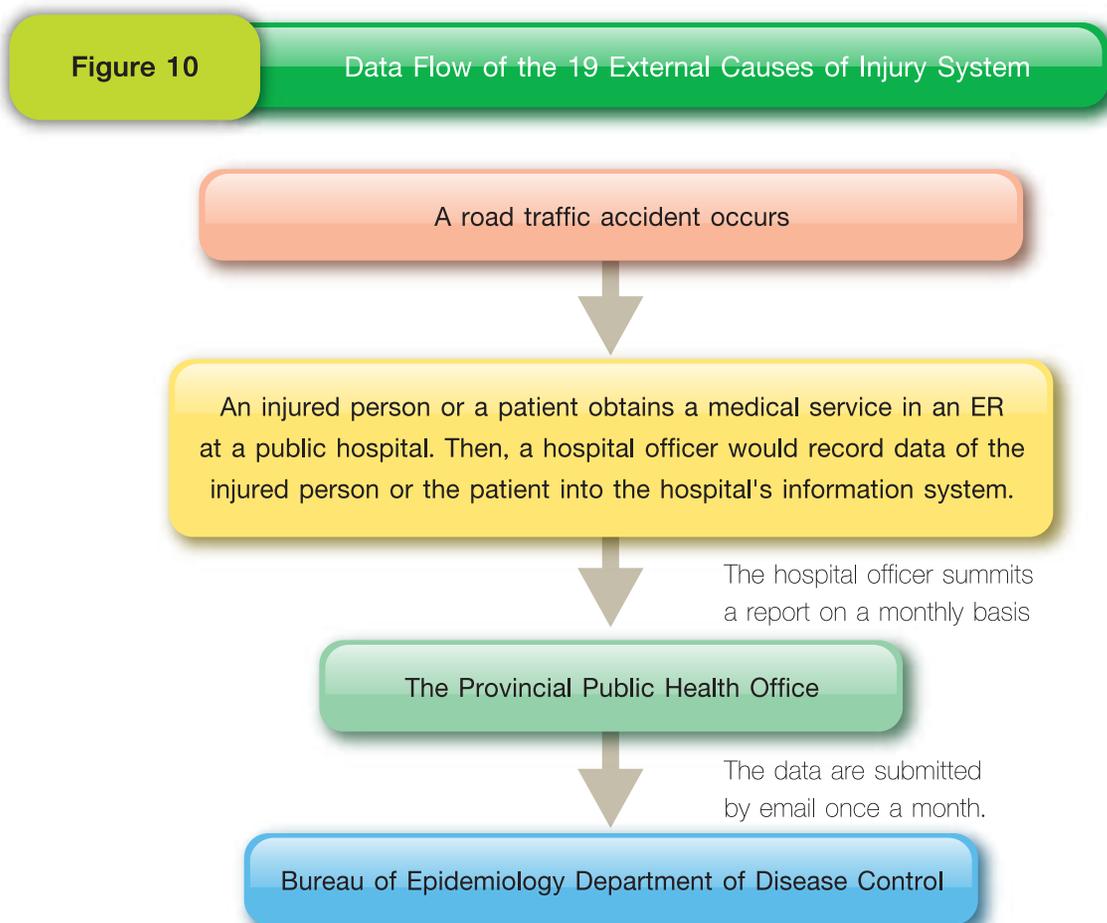
Data are collected by the Social Medicine Section and the Disease Prevention and Control Section in all community hospitals in the province.

Data Collection Officers :

Public health technical officers from the Social Medicine Section submit data collected to the Provincial Public Health Office every month.

Data Collection Tools, Methods and Procedures :

A public health technical officer would compile data from the database of a hospital and enter relevant data onto a data collection form and submit the information in an electronic format to the Provincial Public Health Office on the 10th of every month. The Provincial Public Health Office would later on prepare a summary of the data acquired from all hospitals in the province and submit it to Bureau of Epidemiology further.



Use of Data :

Some agencies at the regional level have made use of the data in the system to analyze major causes of injury and death of the populations in the region, yet mainly in relation to the issue of water transport accidents. So far, there has been no use of the data in the system to plan interventions on prevention of road traffic accidents. Mostly, the data have been analyzed for the road safety purposes by some concerned agencies at the national level. However, such analyses have never been sent back to related stakeholders at the provincial level.

Data Users :

The data in the system are used by Offices of Disease Prevention Control, Bureau of Epidemiology, and the general public.

Data Quality Control and Verification :

There is no measure of quality control and verification applied to the information system.

THE INFORMATION TECHNOLOGY FOR EMERGENCY MEDICAL SYSTEM (ITEMS)**System Definition :**

The system is an emergency medical dispatch system which handles calls for emergency medical services from those who witness incidents through different communication means such as telephone, radio, etc. The system is named as ITEMS = IT + EMS, which is computer program for online recording of information on emergency medical services, including pre-hospital care and treatment, via the internet. Such emergency medical services are delivered to injured persons or critically ill patients in both disaster and non-disaster environments. The system is intended to facilitate involved procedures such as searching for information, entering data on records, reporting results of operations in particular incidents and auditing reimbursements of EMS operations expenses. It also aims to provide data for related policy purposes.

System Objectives :

- To provide information for the purpose of reimbursement of operations expenses to EMS Units and audit of the reimbursement payment
- To provide information for the development of a database that is necessary for the improvement of the Emergency Medical Services Systems (EMSS)
- To be used for searching for information, entering data on records, and reporting results of operations in particular incidents, and to provide data for related policy purposes

Target Population :

The system targets injured persons or patients as a result of any other causes who receive



services from one of the following EMS Units: First Responder (FR) Unit, Intermediate Life Support (ILS) Unit and Advanced Life Support (ALS) Unit.

Data Collection Units :

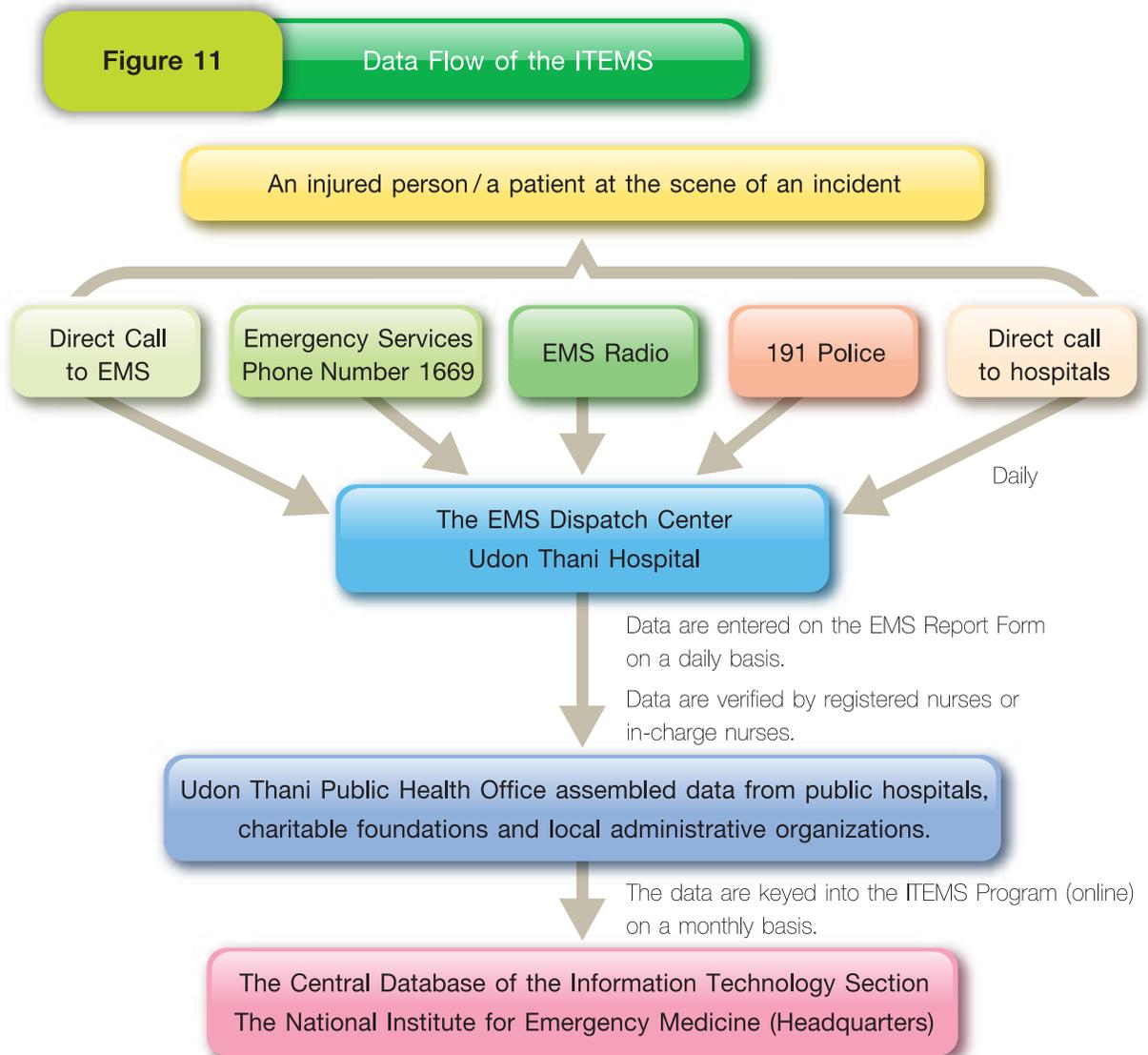
The agency responsible for entering data into the ITEMS is Udon Thani Provincial Public Health Office.

Data Collection Officers :

Data are collected by registered nurses, EMS officers, EMT-2 or EMT-6. They are checked by heads of EMS Units, registered nurses or in-charge nurses who are stationed at the Provincial EMS Dispatch Center (at Udon Thani Hospital).

Data Collection Tools, Methods and Procedures :

Data are obtained by means of interviews according to variables on a patient record form or an incident report form as designated by the Medical Record Unit or the EMS Dispatch Form.



Use of Data :

The data in the system are used for analyzing daily performance of the EMS Units of the hospital.

Data Users :

Data are used by the EMS Units of Udon Thani Hospital and the Provincial Emergency Medical Services System.

Data Quality Control and Verification :

The data in this system are verified by the hospital, the Provincial Public Health Office and the headquarters of the National Institute for Emergency Medicine.

THE DEATH REGISTRATION (DEATH CERTIFICATE) SYSTEM**System Definition :**

The system is a system for registration of deaths by relatives of the decedents, in which deaths are classified into two categories: 1) deaths registered by relatives at local/district registration offices, and 2) deaths in hospitals or other health care facilities of which certificates are issued by attending physicians.

System Objectives :

1) To provide medical certificates of cause of death that will be used as supporting documents for issuance of death certificates

2) To provide information for filing death reports with Bureau of Policy and Strategy through the website of the agency

Target Population :

The system keeps data of all deaths that have occurred in hospitals, both in in-patient wards and in Autopsy Section, or elsewhere but autopsies of the deaths must be undertaken by hospitals.

Data Collection Units :

Every private and public hospital in the province can issue medical certificates of cause of death to relatives of the deceased and file death reports with Bureau of Policy and Strategy by entering data into the deaths into web-based database of the agency through a password-protected access. For Udon Thani Hospital, an administrative officer from the Census Registration Division is responsible for assigning reference numbers to certificates of cause of death whereas another officer from an in-patient ward or from the Autopsy Section for entering completing the



certificate and an attending physician for filling out the cause-of-death section and signing the certificates, respectively.

Data Collection Officers :

An administrative officer from the Census Registration Division of Udon Thani Hospital is responsible for issuing a certificate of cause of death and entering data into a relevant web-based database of Bureau of Policy and Strategy.

Data Collection Tools, Methods and Procedures :

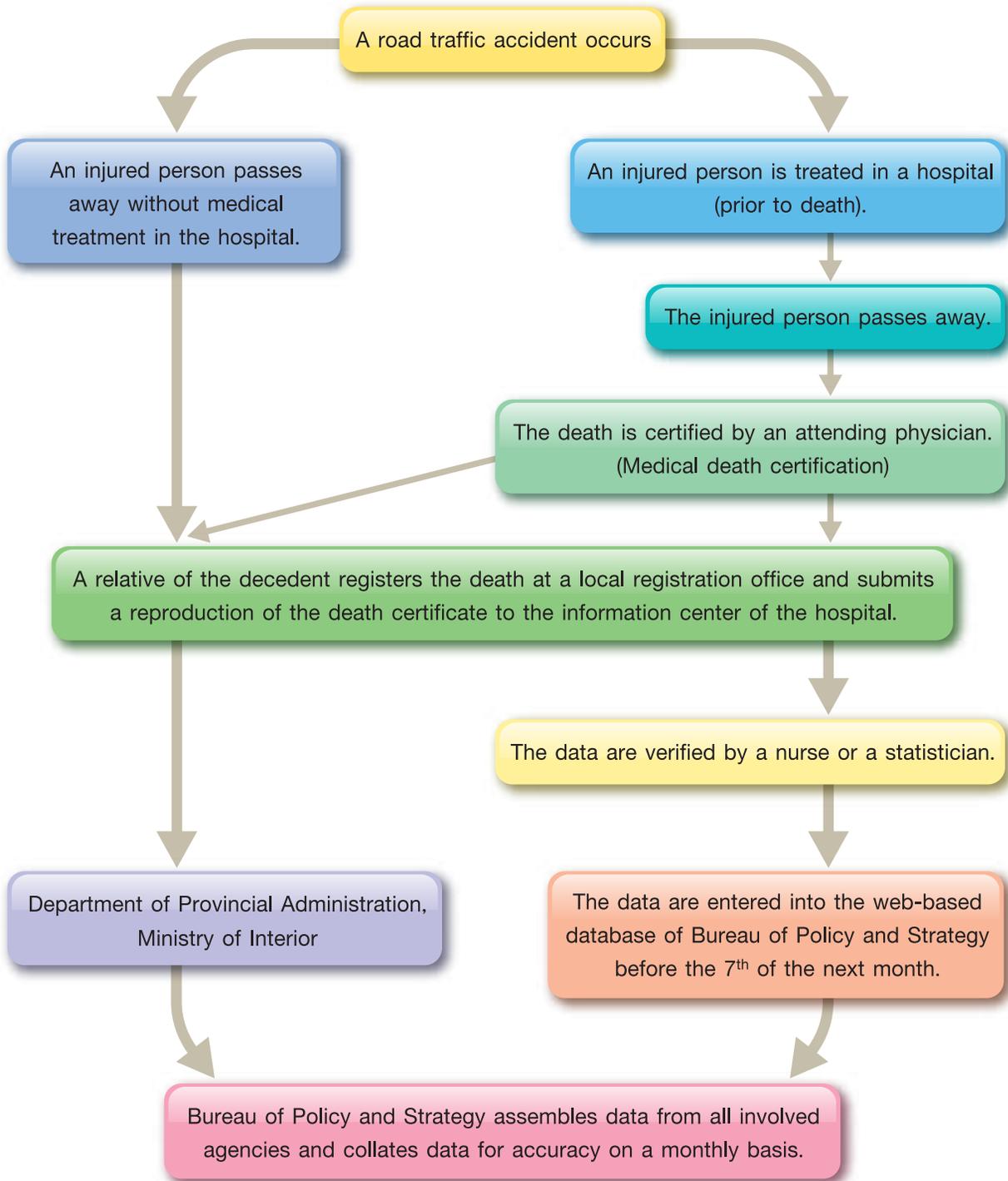
A hospital officer i.e. an officer from an in-patient ward or the Autopsy Section would enter data on a certificate of cause of death manually while an attending physician would complete the section on the cause of death (including diseases or conditions significantly contributing to death) and would then sign the certificate.

After that, an administrative officer from the Census Registration Division of Udon Thani Hospital would verify the following items: ID number, address and basic demographic data. After assigned with a reference number, the certificate would be issued to a relative of the decedent for registering the death with a local registrar. A reproduction of the certificate will be filed with the hospital. Then, the administrative officer from the Census Registration Division would record the data into the web-based database of Bureau of Policy and Strategy, Ministry of Public Health, with a password of the hospital entered.



Figure 12

Data Flow of the Death Registration (Death Certification) System



Use of Data :

Usually, data in the system are analyzed by Bureau of Policy and Strategy and are made available for use by related agencies. However, they are still under-used supposedly due to certain limitations. For instance, road traffic accidents may have not been pronounced clearly as cause of death in the records by attending physicians. This has contributed to a significant flaw on the data in the system in terms of the accuracy of the cause of death.

Data Users :

Bureau of Policy and Strategy takes the lead in making use of the information for road safety purposes of the country as a whole.

Data Quality Control and Verification :

An administrative officer from the Census Registration Division in Udon Thani Hospital would check the following items for accuracy: ID number, address and basic demographic data. After assigned with a reference number, a certificate giving the cause of death would be issued to a relative of the decedent to be used for request for a death certificate from a local registrar. A reproduction of the death certificate would then be kept at the hospital. However, there is no procedure to check the data on the cause of the death entered by an attending physician.

THE E-CLAIM SYSTEM**System Definition :**

This information system has been developed by Road Accident Victims Protection Co., Ltd. to provide a database for the purpose of compensation disbursement. With this system, the company's officer stationed at provincial branch office of RVP Co., Ltd. or data hospital where a road accident victim is being treated can record the victim's data into the database through the E-Claim Program (online). The data entered into the system will be used for payment of compensation.

System Objectives :

- To provide information for the purpose of compensation disbursement of RVP Co., Ltd.
- To provide information for the database of the company which is used for policy making

Target Population :

The system targets victims of motor vehicles who are treated in public or private hospitals and submit a petition form for preliminary compensation from RVP Co., Ltd. (Please be noted that the victims who are entitled to the compensation may or may not have died as a result of the accidents.)



Data Collection Units :

Data collection is undertaken at the RVP branch office of Udon Thani.

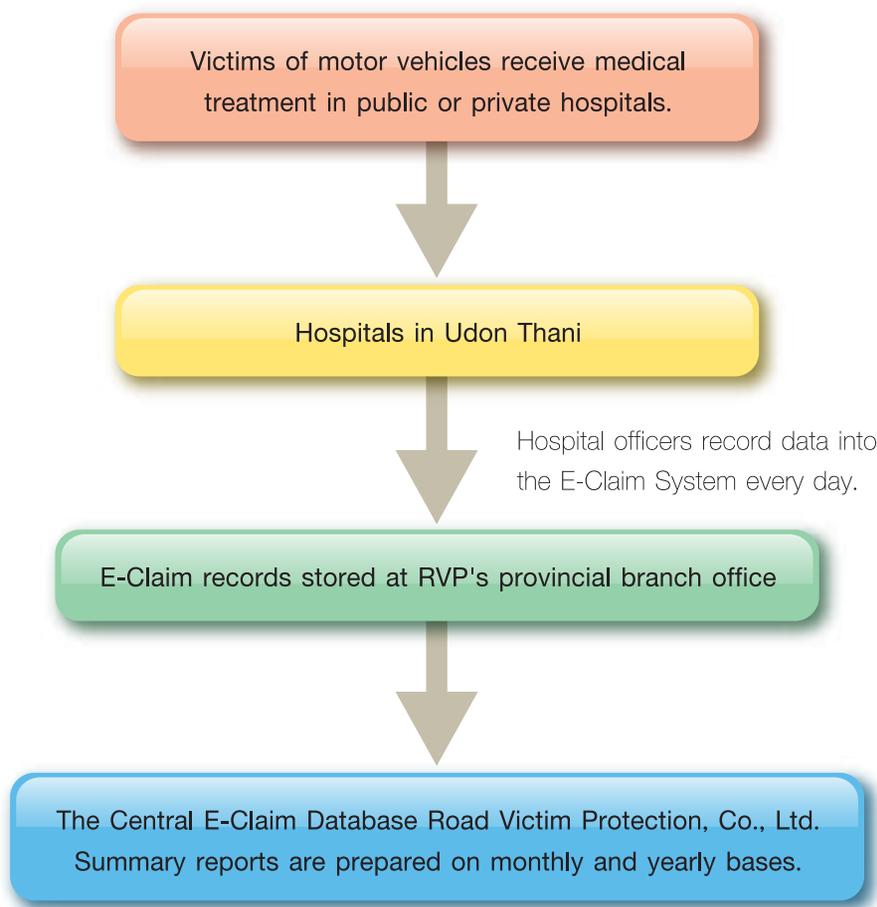
Data Collection Officers :

RVP officers of the provincial branch office are responsible for entering data into the system and the branch manager, for data auditing.

Data Collection Tools, Methods and Procedures :

The data in the system are gathered from the hospitals where motor vehicle victims have been treated and from documents of insurance claimants. Following this, they data would then be entered into the E-Claim System.

Figure 13 Data Flow of the E-Claim System



Use of Data :

- Data in the system are used to file a request for compensation and reimbursement
- Data in the system are collated with data acquired from other agencies and are used for planning remedial actions at high-risk crash sites in the province by the Provincial Office of Disaster Prevention and Mitigation

Data Users :

- RVP Co., Ltd.
- Office of Disaster Prevention and Mitigation
- Working Groups on Road Safety Strategies and the Road Safety Directing Center of Udon Thani

Data Quality Control and Verification :

RVP officers stationed at hospitals usually collate data acquired from documents of the motor vehicle victims who apply for compensation with data collected in the systems of the hospitals where the victims have been treated before entering them into the database of the E-Claim System.

THE POLICE INFORMATION SYSTEM (POLIS)**System Definition :**

The information system stores the Royal Thai Police's statistical data on all cases of traffic road accidents, that occur within the jurisdiction of district police stations in the province and are brought to civil or criminal courts, possibly involving both Thai and foreign parties.

System Objectives :

To collect data on cases that have been investigated to be used for planning policies and monitoring performances of related agencies under the Royal Thai Police

Target Population :

The system targets victims of road traffic accidents which occur within the jurisdiction of district police stations in the province and are referred to courts for civil or criminal prosecution.

Data Collection Units :

The agencies responsible for data collection are district police stations in Udon Thani.

Data Collection Officers :

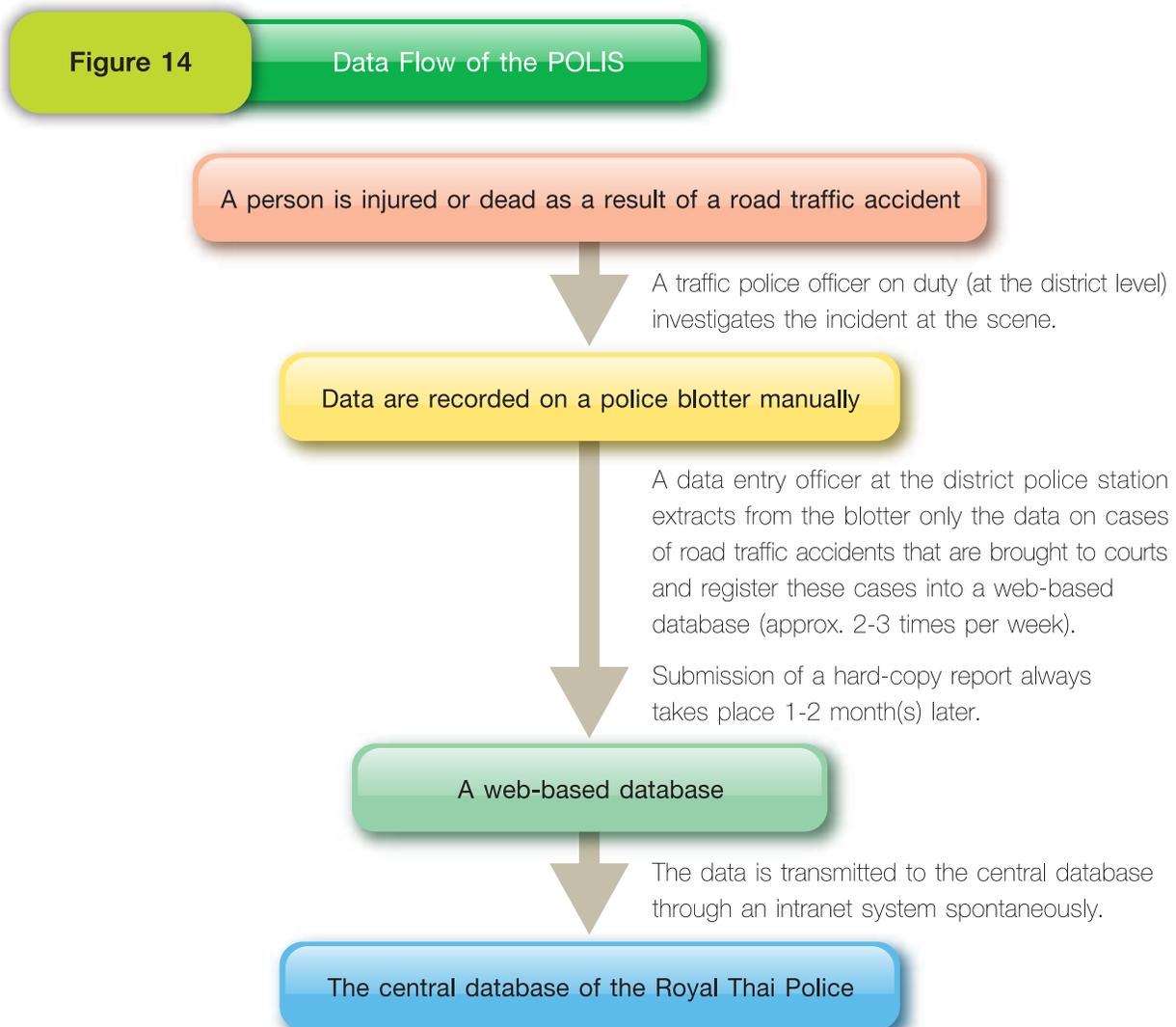
Data in the system are collected by traffic police officers on duty and data entry police officers at particular district police stations.



Data Collection Tools, Methods and Procedures :

Data collection is started in district police stations. It is carried out via an intranet interface of the Royal Thai Police. Police officers, serving the position of data entry officers, from Crime Unit or Traffic Case Unit would enter data on cases of traffic road accidents into the database of the system. Their access to the system always requires a personal password. Generally, only one computer is reserved and used among the involved police officers for this function in order to maintain the integrity and security of collected data. The use of one computer also results from the fact that these police stations have a limited number of computers and related devices.

The data entered would be transmitted from the district police stations to the central server of the Royal Thai Police via the intranet. For the sake of time-saving, the passage of the data would not correspond with the chain of command within the Royal Thai Police, i.e. from district police to provincial police, regional police and the headquarters of the Royal Thai Police, respectively. However, a written summary report on the same set of data would be submitted according to the hierarchy afterwards.



Use of Data :

Agencies in the region including District Police, Provincial Police and Regional Police can access only summaries on the numbers of incidents, the injured and the deceased classified by date and time of occurrence and by police jurisdiction. However, they cannot access comprehensive data such as raw data regardless of the fact that the incidents have occurred within their jurisdictions. Only the Office of Information and Communication Technology under the Royal Thai Police which is responsible for traffic information can access the raw data. Any agencies in the region that need to access these data are required to submit an official request to the office.

Data Users :

Data in the system are used by Udon Thani Road Safety Working Group, the Royal Thai Police and other related government agencies.

Data Quality Control and Verification :

Data in the system are usually compared with those in monthly summary reports on the number of road traffic accident cases which are submitted by district police stations in the province. The summary reports are checked for completeness and accuracy by Provincial Police and Regional Police, respectively.



Table 1

Variables for data collection included in the six information systems of Nakhon Si Thammarat and Udon Thani

Variables	Injury Surveillance (IS)	19 External Causes of Injury	ITEMS	Death Registration	E-claim	POLIS
Basic demographic variables	✓	–	✓	✓	✓	✓
Place of occurrence	✓	–	✓	–	✓	✓
Date of occurrence	✓	–	✓	–	✓	✓
Time of occurrence	✓	–	✓	–	✓	✓
Mode of transport	✓	–	✓	–	✓	✓
Type of injury	✓	–	✓	–	✓	✓
Counterpart	–	–	✓	–	✓	✓
Type of injury	✓	✓	✓	✓	✓	✓
Severity of injury	✓	✓	✓	–	✓	✓
Alcohol abuse	✓	–	–	–	–	✓
Helmet use	✓	–	–	–	✓	✓
Seat belt use	✓	–	–	–	–	✓
Speed of vehicle involved at impact	–	–	–	–	–	✓

Table 2

Steps in the data collection process and information management of the six information systems at the provincial level

Data Collection Process	Injury Surveillance (IS)	19 External Causes of Injury	ITEMS	Death Registration	E-claim	POLIS
Collecting the Data	Daily	Monthly	Daily	Daily	Daily	Daily
Processing and Analyzing the Data	Monthly	Yearly	Monthly	N/A	Monthly	Monthly
Interpreting the Data	Monthly	N/A	Monthly	N/A	Monthly	Monthly
Disseminating the Results	Monthly	Monthly	Monthly	Monthly	Quarterly	Monthly



Table 3

Attributes of the six information systems*

Attributes	Injury Surveillance (IS)	19 External Causes of Injury	ITEMS	Death Registration	E-claim	POLIS
Geographical Coverage	-The system covers only district and provincial hospitals where the system is being used.	-The system covers all public hospitals in the province.	-The system covers all public and private hospitals	-The system covers all areas in the province.	-The system covers all areas in the province.	-The system covers all areas in the province.
Population Coverage	-The system covers only the injured/patients who are treated in the hospitals where the system is being used.	-The system covers only the injured/patients who are treated in public hospitals.	-The system covers only the injured/patients who are assisted by emergency medical services.	-The system covers only the deaths registered with Dept. of Provincial Administration, Ministry of Interior.	-The system covers only motor vehicle victims who file a petition for compensation according to the Protection for Motor Vehicle Victims Act.	-The system covers only cases that are brought to courts.
Data Quality Control	-Data in the system are checked by trained nurses and medical statistics officers.	-Data are checked by the hospitals on a voluntary basis in compliance with the Medical Record Audit Guidelines of the National Health Security Office.	-Data are checked by officers of the Dispatch Center and officers of the PPHOs, respectively.	-Only data on deaths which are certified by the hospitals can be verified by the system. Data on deaths in the cases need to be checked by Bureau of Policy and Strategy.	-Data in the system are collated with data in the E-Accident System.	-Data are checked by related agencies in a hierarchical order, from the provincial level to the regional and national levels, respectively



Attributes	Injury Surveillance (IS)	19 External Causes of Injury	ITEMS	Death Registration	E-claim	POLIS
Resources - Workforce	-There are certain limitations in terms of workforce because hospital staff has already been engaged with other routine responsibilities.	-No problem related to this issue is found because the system can process data electronically.	-No problem related to this issue is found because the system is attended by responsible staff having been assigned for the function specifically and also by officers from private rescue squads.	-No problem related to this issue is found because the system is attended by responsible staff having been assigned for the function specifically.	-No problem related to this issue is found because the system is attended by responsible staff of the RVP branch office, having been assigned for the function specifically.	-A problem related to the issue of workforce is found because staff has already been engaged with other routine responsibilities.
- Equipment	-No problem related to this issue is found. The computer used for the system can also be used for other tasks.	-No problem related to this issue is found.	-There is sufficient equipment.	-There is sufficient equipment.	-There is sufficient equipment.	-Computers and internet devices at some district police stations are outdated and run slow. Computer and internet-related problems occur constantly.
- Budgets	-Data in the system are reported on a voluntary basis. No additional budgets are needed.	-Data in the system are reported as a part of the routine tasks of involved agencies. No additional budgets are needed for this task.	-Budgets are allocated sufficiently for the operation of the system. They have already been included in the remuneration for emergency medical services.	-Data in the system are reported as a part of the routine tasks of involved agencies. No additional budgets are needed for this task.	-Budgets are allocated sufficiently for the operation of the system. They have already been included in the budgets for the operations of other routine tasks.	-Data are reported as a part of the routine tasks of involved agencies. Budgets for the operations of the system, e.g. for equipment maintenance, have already been allocated as for other routine operations.



Attributes	Injury Surveillance (IS)	19 External Causes of Injury	ITEMS	Death Registration	E-claim	POLIS
Procedures						
- Collecting Data	- A data collection form is available. - Variables are clearly defined.	- The procedure is not complicated. - Data collection in the system builds on an existing data collection system used for medical treatment. - Variables are clearly defined.	- A well-designed data collection form is available. - The complete form for data collection comprises two sections: the dispatch section and the EMS operations section.	- A well-designed data collection form is available. - The form contains opinion of an attending physician or, in case where an autopsy is not performed, a testimony of a relative of the decedent.	- A well-designed data collection form is available. - Data are verified in a rather comprehensive manner.	- No data collection form is available. - Data in each record are reported in the form of narrative description.
- Entering Data	- Data are entered into the database of the system through a stand-alone computer which is specifically reserved for this function. - Variables on the electronic form are the same as those on the hand-written form. - Irregularity of data entering is found, for instance, during certain periods of the year, e.g. during peak workload periods.	- Data related to injuries can be extracted from the database that has been entered with data on patients' medical treatment. - Variables on the electronic form are the same as those on the hand-written form. - Information for the system need to be assembled from the two sections on the form.	- Data are entered into the database of the system through an internet interface. - Variables on the electronic form are the same as those on the hand-written form. - Information for the system need to be assembled from the two sections on the form.	- Data are entered into the database of the system through an internet interface. - Variables on the narrative description format that is used for the hand-written form.	- Data are entered into the database of the system through an internet interface. - Variables on the electronic form are the same as those on the hand-written form.	- Data are entered into the database of the system through an intranet interface. - The steps involved are complicated because variables to be completed need to be extracted from the narrative description that has been entered on police blotters. - Entering data into the system is always delayed for 1-2 months after the occurrence of the incidents.



Attributes	Injury Surveillance (IS)	19 External Causes of Injury	ITEMS	Death Registration	E-claim	POLIS
- Processing and Analyzing Data	<p>- A data analysis can be carried out at the provincial level.</p> <p>- A format of analysis is provided by the computer program.</p> <p>- An In-depth analysis cannot be conducted because comprehensive raw data are stored by a responsible agency at the provincial level.</p>	<p>- A data analysis can be carried out at the provincial level yet to a limited degree.</p> <p>- An In-depth analysis cannot be conducted because the system provides only quantitative data.</p>	<p>- A data analysis can be carried out at the provincial level yet to a limited degree because comprehensive data are stored in the central database of the country.</p>	<p>- A data analysis cannot be carried out at the provincial level.</p> <p>- All information is stored in the central database of the country.</p>	<p>- A data analysis can be carried out at the provincial level yet to a limited degree because comprehensive data are stored in the central database of the country.</p> <p>- An In-depth analysis cannot be conducted because the system provides only quantitative data.</p>	<p>- A data analysis can be carried out at the provincial level yet to a limited degree because comprehensive data are stored in the central database of the country.</p> <p>- An In-depth analysis cannot be conducted because the system provides only quantitative data.</p>
- Interpreting Data	<p>- The data can be interpreted in many different ways, depending on type and degree of analytical means.</p> <p>- The results of the data interpretation can be presented in several formats such as in the formats of charts or tables.</p>	<p>- The data can be interpreted and presented only in the form of figures which are comparable for different months.</p>	<p>- The data can be interpreted in many different ways. However, the existing data interpretation is still restricted to the formats as designated by the commercial available software program that is currently in use.</p>	<p>- The data can be interpreted and presented only in the form of figures comparable for different months. An analysis is conducted by responsible regional-level agencies and then its results will be sent back to the province.</p>	<p>- The data can potentially be interpreted in many different ways. However, the existing data interpretation is still restricted to the formats as designated by the commercial available software program that is currently in use.</p>	<p>- The data can be interpreted and presented only in the form of figures which are comparable for different months.</p>



Attributes	Injury Surveillance (IS)	19 External Causes of Injury	ITEMS	Death Registration	E-claim	POLIS
- Disseminating and Using Information	- Information generated from the system is disseminated mainly for public health purposes. - The information can be used by different working groups on prevention and control of road traffic accidents in the province.	- Information generated from the system is disseminated mainly for public health purposes. - The information cannot be much used for prevention and control of road traffic accidents in the province because no comprehensive details are provided.	- Information generated from the system is disseminated mainly for emergency medicine purposes. - The information cannot be much used for prevention and control of road traffic accidents in the province because no comprehensive details are provided.	- Information generated from the system is disseminated mainly for public health purposes. - The information cannot be much used for prevention and control of road traffic accidents in the province because no comprehensive details are provided.	- Information generated from the system is disseminated mainly for public health purposes. - The information is not used for prevention and control of road traffic accidents in the province.	- Information generated from the system is disseminated as a resource of referential information for government agencies.

* Please see detailed information on strengths and weaknesses of each system in the Appendix.



Conclusion

Road safety effort in Nakhon Si Thammarat resembles that in Udon Thani in many aspects. Firstly, the key authorities coordinating road safety matters of the two provinces, i.e. Working Group on Road Traffic Accident Prevention of Nakhon Si Thammarat and Working Groups on Road Safety Strategies of Udon Thani, are similar to each other in terms of organizational structures. They are chaired by Governors and have involved government agencies which are directly or indirectly concerned with road safety, initially, as partners and, later, as officially nominated members. These coordinating entities have received cooperation from all sectors across the society, both public and private, such as educational institutions, businesses, etc. in participating in public hearings, voicing opinions, and assisting in planning and implementing road safety interventions. Moreover, road safety procedures in the two provinces also have a certain extent of similarity. For instance, a number of meetings have been organized in an official or an unofficial manner (as small-group meetings), to facilitate consultation and exchange of information in responding to changing dynamics of the road safety situations. The road safety approaches in the two provinces have also been proven to yield highly efficient results.

Apart from the above, the six information systems in each province resemble their parallel systems in another province in the respects of data collection procedures, structures of a data flow from a source of origin to a destination and approaches to data analysis. When considered closely, however, some differences caused by different management styles and contexts of each province are found between each pair of the parallel systems as following.

The Injury Surveillance System: In Udon Thani, the Injury Surveillance System is used in the provincial hospital and the Mini Injury Surveillance System, in community hospitals. This has resulted in an increase in coverage of the overall population in the province by the system. However, the system still needs to be regularly and comprehensively monitored by related authorities at the provincial level.

The 19 External Causes of Injury: In Nakhon Si Thammarat, a central database has been established at the Provincial Public Health Office, having direct linkages with the databases of community hospitals in the province. This facilitates access and use of related data for reporting purposes. However, there is still a need to modify the existing computer programs which are used for collecting clinical data by different hospitals or to replace them with a new one so that they can function as one system for all concerned or can generate comparable data. Moreover, there should be officers specifically assigned to oversee and monitor the operation of the whole



system. In Udon Thani, the Mini Injury Surveillance System is used instead of the 19 External Causes of Injury System.

The Death Registration/Death Certificate System: The death certificate which is being in use has recently been added with a variable concerning road traffic accidents as a cause of death. To complete this variable, it needs a diagnosis on the cause of death pronounced by an attending physician. In Nakhon Si Thammarat, a medical statistics officer would review a medical record of a particular decedent in order to verify his or her data on clinical history, symptoms and approaches to diagnosis and treatment having been used, before entering the relevant information into the database of the system. This way has been proven to enable the collected data on deaths caused by road traffic accidents to be more comprehensive. In Udon Thani, it is found that officers who are responsible for entering data are often deprived of related skills and expertise to identify and verify medical records of the cases of deaths resulted from road traffic accidents. At present, identification and verification of such cases of deaths need to count on diagnoses of pronouncing physicians only. However, it is found that, in some cases, physicians have not pronounced the causes of death clearly.

The ITEMS and E-Claim Systems: The operations of the parallel systems in the two provinces are similar.

The Police Information System: The Police Information Systems being used in the two provinces are similar to each other in terms of their approaches and how they are operated. However, they have some slight differences in terms of management of resources such as computers and internet devices which have effects on promptness in recording data.



Comments on the Results and Recommendations

This study examines the six information systems as well as the structure and the operation process of the multi-stakeholders road safety coalitions working on surveillance and prevention of road traffic accidents in Nakhon Si Thammarat and Udon Thani, i.e. Working Group on Road Traffic Accident Prevention of Nakhon Si Thammarat and Working Groups on Road Safety Strategies of Udon Thani. Findings of the study reveals some resemblances among these entities in terms of their organizational structures which are built on the partnership of agencies directly associated with road safety issues from both the public and private sectors, e.g. Road Accident Victims Protection Co., Ltd. As a consequence of this, the coordinating entities could gain direct access to data on road traffic accidents at ease because some of their member agencies may have already been working to collect this kind of data which are needed for tackling the problem. The enabling attribute of the coordinating entities has facilitated exchange of information and integrative cooperation among concerned member agencies. However, a challenge of such road safety effort having been identified is that some member agencies may have been fully engaged with their routine tasks already yet need to allocate their limited time to perform the injury surveillance and prevention functions. The heightened demands on their time in this way are likely to cause adverse effects on their efficacy to perform both their primary functions and their surveillance and prevention functions which have recently been supplemented. Nevertheless, such a problem may be resolved by means of recruitments of new staff to specifically aggregate and process data from different sources and to present the results of data processing at meetings of the working groups concerned so that the information to be generated can be utilized to best advantage. It is hoped that this proposed solution can alleviate the existing burdens of the core working group and committee also. Besides, it is also suggested that staff who performs data collection be equipped with some technical knowledge and skills, e.g. on statistics, that will help them to analyze more sophisticated data for the benefits of the efforts to prevent road traffic accidents.

Currently, the efforts of all concerned stakeholders who are working on surveillance and prevention of road traffic accidents are geared towards the exchange of information from the systems which these agencies are responsible for and the use of such information for the surveillance and planning purposes. The information which the stakeholders are making use of is mostly derived from the Police Information System. Some strengths of this system, to mention only a few, include the fact that it has long been in place and is consistent in terms of reporting related data. However, a significant weakness of the system lies in its representation of the whole population as the system incorporates only cases of injuries due to road traffic collisions which



have been brought to courts. Apart from the POLIS, the Injury Surveillance System serves another system which is used for planning interventions. A strong point of the system is that it provides a comprehensive database together with a variety of variables that can be analyzed and used for planning preventive interventions. However, the IS System has a drawback in the way that it does not cover the injured persons who have not been treated in the hospitals where the IS System is being in use.

According to the study, there are many information systems which have served as part of the effort to solve the problem of road traffic accidents at the provincial level. Since these systems have been designed for different purposes, they have different variables which are considered necessary for their specific purposes. In such a circumstance, integrating data from several systems which have already existed, instead of building one new complete system, as practiced by the two coordinating entities may serve as the most suitable option since this can generate data in all aspects along the course of road traffic accidents - before, during and after particular accidents. There is thus no necessity to invest resources to set up a new system.

When compared in terms of structure and operating procedure, the core coordinating entities of the two provinces resemble to each other to a great degree, particularly in the way that their members are from agencies which have already been associated with or interested in the issue of road traffic accidents directly or indirectly. These agencies have assembled as integrated working groups at the provincial level after being officially appointed. The working groups in the two provinces are found as having the same pattern of operations.

If considered closely, some differences are found between each pair of the parallel information systems of the two provinces. These differences include issues about management of the information derived from different systems, e.g. collecting, recording and analyzing data. Also, existing resources and other circumstances of some small agencies which are responsible for the information management of particular systems may cause impacts on the quality and the efficiency of data to be used.

This study focuses on the use of information for surveillance of road traffic accidents. Based on the findings of the study, the research team has some recommendations in relation to the use of some types of data for the two coordinating entities at the provincial level as following.

The number of road traffic fatalities: It is recommended that data on the number of fatalities due to road traffic accidents be taken from the death registration system. This is because the system covers data on deaths both within and outside health care facilities and the submission of the data of this kind has been made to the concerned authorities at the provincial level consistently and continually on a quarterly basis. However, a key weakness of the death



registration system lies in the fact that the system cannot identify deaths from road traffic accidents if the cause of the deaths has not been indicated clearly in the medical certificates issued from related hospitals. In contrast to the death registration system, other information systems either have lower population coverage of data on road traffic fatalities or no return of analyzed data to the related authorities in the provinces of origin.

The number of road traffic injuries: It is recommended that data on the number of road traffic injuries be taken from the 19 External Causes of Injury System because of its comprehensiveness. Sources of data of this type for the 19 External Causes of Injury System include all public hospitals in the provinces which are required to submit related reports to the Provincial Public Health Offices on a monthly basis. Also, the step of entering the data into the system is not complicated. However, a weakness of the system is that it cannot reflect cases of minor injuries which have not been treated in hospitals.

Apart from the above, the E-Claim System is another comprehensive source of such data because it keeps records of all cases of injuries which have filed application for compensation irrespective of whether the injured persons have been treated in hospitals or not. Also, the system can show only the number of the injuries at the provincial level.

The number of head injuries: It is recommended that data on the number of head injuries be taken from the Injury Surveillance because the system has clearly defined variables on head injuries and it can provide data on all cases of head injuries which have been treated in hospitals. The comprehensive coverage of the system is contributed to the fact that the group of patients is likely to experience signs and symptoms of serious head injuries and is, therefore, likely to be referred to large hospitals, where the IS System is being implemented, for treatment. However, a flaw of the system lies in the fact that it does not represent the cases of head injuries which have not been treated or referred for examinations in the hospitals, or the cases of injuries which have happened outside the jurisdiction of the system.

Accident-prone behaviors: It is recommended that data on risk behaviors leading to road traffic accidents be taken from the IS System because the system has clearly defined variables on risk behaviors related to issues such as use of helmets and safety belts, drinking under the influence of alcohol, etc. However, the system is flawed because it does not cover cases of minor injuries which have not been treated in the hospitals. Also, data in the system are derived from interviews with patients only and there is no solid evidence to support them. The POLIS and the E-Claim systems are alternative sources which store data on risk behaviors contributing to road traffic accidents, but they are less representative than the IS System.

Scenes of road traffic accidents: It is recommended that data on scenes of road traffic accidents to be taken from the ITEMS because the system are of high accuracy and coverage.



It can reflect the scenes of all cases which have been recorded by EMS providers. However, the system does not include the injured persons who have sought medical treatment by themselves and those who have not used emergency medical services.

A proportion of disabilities caused by road traffic accidents: It is recommended that data on a proportion of disabilities resulting from road traffic accidents to be taken from the E-Claim System because the system collects data of this type from motor vehicle victims who have applied for compensation. Data on disabilities due to road traffic accidents are not available in other information systems.

In short, the recommendations as above are based on the descriptive study on six information systems. Key constituents of each system which have been considered and scrutinized in this study include system objectives, definitions and variables used for data collection and access of the data by the coordinating entities working on prevention and control of road traffic accidents at the provincial level. In order to gain the deeper picture of the road safety situations, it is recommended that quality of the data collected in each information system be assessed before any in-depth analysis or any use of the data will be made. Also, designs for data analyses should be developed and provided so that a use of such data can generate the utmost benefits. It is hoped that all of these issues will be included in the future study by the research team.

In addition, it is found that there are some other information systems on road traffic accidents that have not been included in the study due to time and staffing constraints. Those systems include, for instance, the Traffic Report and Accident Management System (TRAMS) by Ministry of Transport, the 43 Files of the National Health Information Standards System by Ministry of Public Health, the Road Accident Investigation System by the Royal Thai Police together with Road Accident Victims Protections Co., Ltd. The research team expects to examine these systems in the future study.



Recommendations for Overall Improvement of the Information Systems at the Provincial Level

Each information system varies to one another in terms of objectives and definitions for different purposes of particular agencies concerned, be they at the local level or the national level. The improvement of these systems should take into account specific needs of the agencies so as to be able to generate the whole picture of the road safety effort of the country.

Overall, the integrative approaches to road safety in the two provinces can be regarded as a model of success happening in many small intervention programs on control and prevention of road traffic accidents. The availability of data from different information systems which have been utilized for analyzing and planning remedial interventions serves as a significant starting point in setting goals and formulating related plans of stakeholders from all sectors into a harmonized direction. It can thus be said that improvement of the surveillance information systems at the provincial level is of high significance.

Any improvement of a road traffic accident surveillance system should start from an analysis of the quality of an information system which is used in a province. This can be carried out by a local research team (comprising officers from the Provincial Public Health Office and information officers from hospitals or officers who are responsible for the central database of the province) in collaboration with those who have expertise on data analysis and assessment of data quality in order to make actual quality of data known. Then, variables from different information system should be aggregated to create an integrative system on surveillance of road traffic accidents at the local level which can analyze data in accordance with specific local needs. This can be achieved by means of involving data users, data managers or data collectors of all information systems in every steps to improve the surveillance and information system, e.g. in developing and analyzing variables and their potential use as well as in providing opinions on related issues so that the integrative surveillance and information system can respond to specific needs of particular locales to the fullest degree. On top of this, any recommendations related to this should be presented to executive administrators of the provinces from the very beginning so that the recommendations would be taken up and applied at the local level as appropriately.



Acknowledgements

Bureau of Non-Communicable Disease would like to express appreciation to the following organizations for their contributions to the development of this report.

- Working Group on Road Traffic Accident Prevention of Nakhon Si Thammarat
- Committee on Road Safety Directing Center of Udon Thani
- Nakhon Si Thammarat Provincial Public Health Office
- Udon Thani Provincial Public Health Office
- Nakhon Si Thammarat Provincial Police
- Udon Thani Provincial Police
- Muang District Police Station of Nakhon Si Thammarat
- Muang District Police Station of Udon Thani
- Maharaj Nakhon Si Thammarat Hospital
- Udon Thani Hospital
- Road Accident Victims Protection Co., Ltd. Nakhon Si Thammarat and Udon Thani Branches
- Bureau of Epidemiology, Department of Disease Control, Ministry of Public Health
- Bureau of Non-Communicable Disease, Department of Disease Control, Ministry of Public Health
- The Thailand MoPH - U.S. CDC Collaboration(TUC)
- Centers for Disease Control and Prevention (CDC), USA



Appendix*

- Injury surveillance (IS)

Strengths of the system :

Strengths	Yes	No
1. Data processing and analysis and dissemination of information in the system are conducted continuously.	✓	
2. The system contains data/variables related to risk behavior surveillance.	✓	
3. Data in the system are indicative of quantity of loss, disability and death caused by road traffic accidents.		✓
4. There is an intervention program on prevention of road traffic accidents among risk groups which make use of information in the system?	✓	
5. There is an evaluation of the injury surveillance system.	✓	

Weaknesses of the system :

Weaknesses	Yes	No
1. There are insufficient resources, i.e. personnel with proper knowledge and skills, equipment and supplies for data collection and processing, etc.	✓	
2. Data collected in the system do not cover the whole population in the province.	✓	
3. Information derived from the data collection and data processing does not correspond with the objectives of the system.		✓
4. Forms, methods or procedures for collecting and recording data and data management are complicated.		✓
5. There is no use of the information in the system for reducing and mitigating road traffic accidents.		✓

* Please note that the "yes" or "no" word sentence used in this appendix is to reply with the truth-value of the situation.



- 19 External Causes of Injury

Strengths of the system :

Strengths	Yes	No
1. Data processing and analysis and dissemination of information in the system are conducted continuously.		✓
2. The system contains data/variables related to risk behavior surveillance.		✓
3. Data in the system are indicative of quantity of loss, disability and death caused by road traffic accidents.		✓
4. There is an intervention program on prevention of road traffic accidents among risk groups which make use of information in the system?		✓
5. There is an evaluation of the injury surveillance system.		✓

Weaknesses of the system :

Weaknesses	Yes	No
1. There are insufficient resources, i.e. personnel with proper knowledge and skills, equipment and supplies for data collection and processing, etc.	✓	
2. Data collected in the system do not cover the whole population in the province.		✓
3. Information derived from the data collection and data processing does not correspond with the objectives of the system.	✓	
4. Forms, methods or procedures for collecting and recording data and data management are complicated.		✓
5. There is no use of the information in the system for reducing and mitigating road traffic accidents.	✓	



- ITEMS

Strengths of the system :

Strengths	Yes	No
1. Data processing and analysis and dissemination of information in the system are conducted continuously.		✓
2. The system contains data/variables related to risk behavior surveillance.		✓
3. Data in the system are indicative of quantity of loss, disability and death caused by road traffic accidents.	+/-	
4. There is an intervention program on prevention of road traffic accidents among risk groups which make use of information in the system?		✓
5. There is an evaluation of the injury surveillance system.	+/-	

Weaknesses of the system :

Weaknesses	Yes	No
1. There are insufficient resources, i.e. personnel with proper knowledge and skills, equipment and supplies for data collection and processing, etc.		✓
2. Data collected in the system do not cover the whole population in the province.		✓
3. Information derived from the data collection and data processing does not correspond with the objectives of the system.	+/-	
4. Forms, methods or procedures for collecting and recording data and data management are complicated.		✓
5. There is no use of the information in the system for reducing and mitigating road traffic accidents.	+/-	



- Death Registration

Strengths of the system :

Strengths	Yes	No
1. Data processing and analysis and dissemination of information in the system are conducted continuously.		✓
2. The system contains data/variables related to risk behavior surveillance.		✓
3. Data in the system are indicative of quantity of loss, disability and death caused by road traffic accidents.	✓	
4. There is an intervention program on prevention of road traffic accidents among risk groups which make use of information in the system?		✓
5. There is an evaluation of the injury surveillance system.		✓

Weaknesses of the system :

Weaknesses	Yes	No
1. There are insufficient resources, i.e. personnel with proper knowledge and skills, equipment and supplies for data collection and processing, etc.	✓	
2. Data collected in the system do not cover the whole population in the province.		✓
3. Information derived from the data collection and data processing does not correspond with the objectives of the system.		✓
4. Forms, methods or procedures for collecting and recording data and data management are complicated.		✓
5. There is no use of the information in the system for reducing and mitigating road traffic accidents.	✓	



- E-Claim

Strengths of the system :

Strengths	Yes	No
1. Data processing and analysis and dissemination of information in the system are conducted continuously.	✓	
2. The system contains data/variables related to risk behavior surveillance.	✓	
3. Data in the system are indicative of quantity of loss, disability and death caused by road traffic accidents.	✓	
4. There is an intervention program on prevention of road traffic accidents among risk groups which make use of information in the system?	✓	
5. There is an evaluation of the injury surveillance system.		✓

Weaknesses of the system :

Weaknesses	Yes	No
1. There are insufficient resources, i.e. personnel with proper knowledge and skills, equipment and supplies for data collection and processing, etc.		✓
2. Data collected in the system do not cover the whole population in the province.		✓
3. Information derived from the data collection and data processing does not correspond with the objectives of the system.		✓
4. Forms, methods or procedures for collecting and recording data and data management are complicated.		✓
5. There is no use of the information in the system for reducing and mitigating road traffic accidents.		✓



- POLIS

Strengths of the system :

Strengths	Yes	No
1. Data processing and analysis and dissemination of information in the system are conducted continuously.		✓
2. The system contains data/variables related to risk behavior surveillance.	✓	
3. Data in the system are indicative of quantity of loss, disability and death caused by road traffic accidents.	✓	
4. There is an intervention program on prevention of road traffic accidents among risk groups which make use of information in the system?		✓
5. There is an evaluation of the injury surveillance system.		+/-

Weaknesses of the system :

Weaknesses	Yes	No
1. There are insufficient resources, i.e. personnel with proper knowledge and skills, equipment and supplies for data collection and processing, etc.	✓	
2. Data collected in the system do not cover the whole population in the province.		✓
3. Information derived from the data collection and data processing does not correspond with the objectives of the system.		✓
4. Forms, methods or procedures for collecting and recording data and data management are complicated.	+/-	
5. There is no use of the information in the system for reducing and mitigating road traffic accidents.	✓	

