COMMONWEALTH OF KENTUCKY

TRAFFIC RECORDS ASSESSMENT

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National Highway Traffic
Safety Administration
Technical Assessment Team

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EXECUTIVE SUMMARY

The National Highway Traffic Safety Administration (NHTSA) assembled a team to conduct a traffic records assessment in response to a request from the Kentucky Transportation Cabinet (KYTC), Office of Highway Safety. Office of Highway Safety staff then carried out the logistical and administrative steps necessary for an onsite assessment. A team of professionals with backgrounds and expertise in the various traffic records data systems (crash, driver, vehicle, roadway, citation and adjudication, and EMS/injury surveillance) conducted the assessment May 6-11, 2012.

The scope of this assessment included all of the components of a traffic records system. The purpose was to determine whether the traffic records system in Kentucky is capable of supporting management's need to identify the State's highway safety problems, to manage the countermeasures applied in attempts to reduce or eliminate those problems, and to evaluate those efforts for their effectiveness.

Background

Kentucky underwent a traffic records assessment in 2007, the report of which contained recommendations for improvement of the traffic records system. During this assessment, the State has demonstrated progress in its traffic records system that has resulted from implementation of some of the recommendations for improvement and the State's own initiative in identifying and seeking solutions.

While Kentucky has long been a national leader in law enforcement electronic field data collection, and its crash system was adopted by most law enforcement in the state, (98 percent of crash reporting is electronic), it has been determined that a more effective or accurate crash location tool was needed. As a result, a mapping tool was devised that has increased accuracy of crash locations, from 50 to 92 percent.

The adoption and use of electronic citations has grown as well, which has enabled full electronic reporting of convictions from the courts to the driver history file.

The driver licensing system is compliant with the best practices for secure identification and the vehicle system is being re-engineered and funds have been appropriated for a replacement of the driver license system.

The injury surveillance system is collecting a greater percentage of data and is striving to improve accuracy, completeness and uniformity of its data, which are widely used within the injury prevention and traffic safety communities.

At this time, however, some opportunities remain to improve the ability of the present traffic records system to optimally support Kentucky's management of its highway safety programs. These are discussed in the summary below and the full report that follows.

Crash Records

The official crash file for the Commonwealth is operated and maintained by the Kentucky State Police (KSP). The reporting threshold for motor vehicle traffic crashes are those crashes involving death or injury or property damage in excess of $500.

Accuracy of the crash data is improved by the continuing increase in the percentage of reports that are prepared using electronic data collection software, due to the embedded edits and validations and to the ability to capture driver data from barcodes on the driver license. Currently, the electronic Collision Report Analysis for Safer Highways (E-CRASH) system maintained by KSP accounts for nearly all (98 percent) submitted crash reports, compared to a baseline of approximately 80 percent in 2007. This is a tremendous accomplishment. Only a few states have achieved this level of e-crash reporting.

Accessibility to crash information has improved greatly since the last assessment and was a topic of great satisfaction by users of the system. There are two web-based applications. One is for law enforcement (https://kycrash.state.ky.us/KYCrash/Public/Home.aspx) and the other is for public use (http://crashinformationky.org/KCAP/KYOPS/SearchWizard.aspx). Within these applications the user can obtain almost all information on the crash report. The only difference between the two applications is the law enforcement site has all the data. The public site has all data except identifying information of the individuals, such as names and addresses.

The future of CRASH and the ability to make system improvements is threatened by the obsolete Visual Basic 6 development environment. This technology is no longer supported by Microsoft, the developer of Visual Basic 6. Since the system is no longer supported, any changes (such as upgraded database technology, new servers, or updated operating systems) could render the current configuration inoperable. It is critical that Kentucky consider a new development environment and update the system to the new technology in the very near future.

Roadway Data

The Transportation Enterprise Data sharing and reporting system (TED) serves as the KYTC enterprise database. The business area database systems, like the Highway Information System and Pontis (Pontis is a comprehensive bridge management system developed as a tool to assist in the challenging task of bridge management), provide a weekly or periodic data dump to TED so that dashboard reporting and updating and linking to other systems can be accomplished. Spatial data is also exported to support Cabinet-wide GIS for customers who need data from varying systems to accomplish their day to day tasks. The TED also contains traffic data from the TRAffic DAta System (TRADAS). TRADAS is a software system for collecting, editing, summarizing, and reporting a wide range of traffic data. TED is designed to be a data warehouse of transportation datasets including crash, roadway features, bridge, pavement, maintenance, driver licensing, vehicle registration, traffic citation, injury and traffic count data. TED is intended to serve the information needs of transportation asset and program management, highway safety management, injury prevention, and congestion management at the State and local level.

Driver and Vehicle Records

The Division of Driver Licensing (DDL) has implemented features in its driver licenses and state-issued identification cards and in its driver licensing system that are compliant with secure identification benchmarks. The State uses facial recognition software to assist in verifying applicants have only one identity in the driver file. These advances have been accomplished using the legacy database system. Conviction reports from the courts are almost totally electronic and timely. Convictions for serious offenses can be withheld from the DDL as a result of court diversions in approximately twenty counties that have a county-run traffic school. Although the State checks for and denies issuance if suspensions and other types of restraints are in effect for new Kentucky applicants, it does not obtain and record all serious adverse records from previous states of licensure for non-commercial drivers, thereby washing the adverse records of problem drivers. The histories of convictions and crashes that are kept are purged after five years. These factors limit the ability to identify problem drivers in Kentucky. Funds have been appropriated in Kentucky's Fiscal Year 2013-2014 biennium budget that will allow for replacement of the driver license system.

The vehicle record system is undergoing a complete revision, and it is expected that the new system will become operative in August, 2013 and that a barcode will be placed on registration documents to address the needs of law enforcement. The Division of Motor Vehicle Licensing has the opportunity to coordinate personal identification of vehicle owners with the information being stored in the driver licensing system.

Statewide Injury Surveillance System Records

Kentucky has many components of a statewide injury surveillance system. With the assistance of Section 408 funding Kentucky Board of Emergency Medical Services is developing the Kentucky Emergency Medical Services Information System (KEMSIS) and the Kentucky Trauma Registry (KTR) has been expanded from four to 11 reporting hospitals. The Kentucky Hospital Association's Inpatient Outpatient Data Collection System (KY IPOP) contains both the emergency department and inpatient databases. The Kentucky Vital Statistics database is maintained by the Kentucky Cabinet for Health and Family Services, Department of Health. The Kentucky Injury Prevention and Research Center (KIPRC) is a partnership between the Kentucky Department for Public Health and the University of Kentucky's College of Public Health that combines academic investigation with practical public health initiatives. KIPRC houses and analyzes the KTR, KY IPOP, and vital statistics databases. Data have been used for presentations, publications, and to support a number of traffic safety initiatives including graduated driver licensing and booster seat legislation. KIPRC is also home to the Kentucky Crash Outcome Data Evaluation System (CODES) project which has integrated the collision file with the injury surveillance data.

Citation and Adjudication Records

The Kentucky District Courts, of which there are 116 in the Commonwealth, are responsible for the adjudication of non-felony traffic cases. Felony traffic cases are adjudicated by Circuit Courts. Kentucky has a unified court system, which uses KyCourts as its Case Management System and a system called CourtNet, which includes a summary of cases statewide. This provides the courts with a great deal of readily available data related to pending court cases.

Additional uniformity is afforded by the use of a uniform traffic citation by all law enforcement agencies in the State. The citations are centrally managed and have good controls on their dissemination and use.

Electronic crash field data collection has fostered the adoption of electronic citations, which are gaining in popularity and adoption as well. The Kentucky Open Portals Solution electronic ticket system is provided by the State Police and is the only electronic citation approved for use within the State. As a result, the ability to feed data from the citation into the Court Case Management system and then to forward disposition data to the Division of Driver Licensing is made more efficient due to the uniformity of the entire system.

Electronic citations afford more accuracy due to the edits embedded in the system. One additional benefit of the broad adoption of use of electronic citations and crash forms within the state is the ability to use multi-layer analysis of enforcement actions and types of violations with crash incidence and classification of crash type and cause. This would provide an excellent opportunity to gauge countermeasure success. The weak link in this process has been the fact that the two systems do not always contain consistent location references. The new Map It tool being used in the crash database has almost doubled the accuracy of location references in crash reports, but the location description on citations has been noted differently. Consistency of the data for evaluation is essential and should be a priority for the Commonwealth.

Traffic Records Coordinating Committee (TRCC)

The Commonwealth of Kentucky Traffic Records Coordinating Committee is an effective two-tiered organization. The executive level is the Governor's Executive Committee on Highway Safety and the technical level group is the Kentucky Traffic Records Advisory Committee (KTRAC). The Executive level provides executive oversight of the activities and programs recommended by the KTRAC incorporating the traffic records strategic plan into the Strategic Highway Safety Plan. The activities and recommendations of KTRAC are aligned with the State's strategic vision for improving the traffic records system and improving highway safety.

Representation on both levels is expansive and includes executive and managerial personnel from numerous state agencies, federal partners, interest groups, and highway safety stakeholders. Information Technology professionals could increase the technical understanding of the intricacies of integrating and linking disparate data systems.

A review of data needs from every corner of the traffic safety community, development of a strategy to obtain those data or access to them and a formalization of the KTRAC via a Charter or Memorandum of Understanding are needed at this time. These actions can help to insure that those who are responsible for the data used in effective traffic safety decisions recognize their responsibilities and their potential for saving lives and improving the future of all residents and visitors in Kentucky.

Strategic Planning

Kentucky's Strategic Highway Safety Plan (SHSP) was developed in 2006 in response to the requirements of the federal transportation legislation SAFETEA-LU. The SHSP was developed under the guidance of the Governor's Executive Committee on Highway Safety (GECHS). The Committee is an executive-level, multi-agency group of highway safety advocates from varying backgrounds and is chaired by the Secretary of the Kentucky Transportation Cabinet (KYTC).

The GECHS established twelve Emphasis Areas for targeted safety action. Teams were formed to address specific concerns for reducing fatalities and injuries on Kentucky's highways. These teams identify and develop innovative strategies through a data-driven process and recommend performance-based action plans to address the particular emphasis area. One of these Emphasis Areas is Traffic Records. The Traffic Records Emphasis Area in the SHSP is considered the

Traffic Records Strategic Plan (TRSP). The KTRAC serves as the Traffic Records Emphasis Area Task Team. Although it is one of 12 emphasis area programs, traffic records central role in providing the information necessary for the support and justification of the remaining 11 programs.

The following are the major recommendations for improvements to the State's traffic records system. The references indicate the sections of the report from which the recommendations are drawn.

MAJOR RECOMMENDATIONS

Crash Records System

- ❑ Upgrade as soon as possible the current Kentucky Open Portal Solution (KYOPS) development environment to current technology. **(Section 2-A)**

- ❑ Continue to invest in the future development of Kentucky Open Portal Solution (KYOPS) including the need for future technology upgrades. **(Section 2-A)**

Citation and Adjudication Records

- ❑ Provide for Map It location description on the KYOPS e-ticket consistent with the crash location description. **(Section 2-E)**

- ❑ Continue to support the development and transition of police agencies to e-ticketing systems. **(Section 2-E)**

- ❑ Provide driver history access to prosecutors to ensure case adjudication and sentencing of repeat offenders is applied consistent with established statutes. **(Section 2-E)**

Traffic Records Coordinating Committee (TRCC)

- ❑ Develop a formalized memorandum delineating the roles and responsibilities of both the executive and working groups of the KTRAC in meeting the objectives contained in the *Advisory*. **(Section 1-A)**

- ❑ Establish a KTRAC data quality improvement sub-committee team that would be charged with regularly reviewing the existing system, identifying potential improvements, and reporting to the KTRAC membership. **(Section 1-A)**

- ❑ Establish a KTRAC training assessment sub-committee team that would be charged with regularly identifying training needs and recommending training methods for traffic records system components reporting to the membership. **(Section 1-A)**

Driver and Vehicle Records

- ❑ Record the adverse driver histories from previous states of record on non-commercial drivers as required for commercial driver records. (This was previously recommended.) (**Section 2-C)**

- ❑ Retain traffic conviction history on the state driver records beyond five years. (This was previously recommended.) (**Section 2-C)**

- ❑ Coordinate the development of the system upgrade with the upgrade of the Automated Vehicle Information System to identify and exploit all opportunities to be mutually supportive and to be responsive to the needs of law enforcement officers. Conduct the coordination through the Traffic Records Coordinating Committee. (**Section 2-C)**

- ❑ Place a barcode on the registration document, and coordinate the plans to do so with the Kentucky Traffic Records Advisory Committee to maximize the benefit for law enforcement in auto-populating the electronic crash and citation reports. **(Section 2-D)**

- ❑ Coordinate the identification of persons titling and registering vehicles with the Division of Driver Licensing to enable a consistency in personal identification and to enhance the possible interfaces with the driver licenses and driver histories and with other components of the traffic records system. Conduct the coordination through the Kentucky Traffic Records Advisory Committee. **(Section 2-D)**

Statewide Injury Surveillance System (SWISS)

- ❑ Increase the number of agencies reporting to the Kentucky Emergency Medical Services Information System (KEMSIS). **(Section 2-F)**

- ❑ Increase the number of hospitals reporting to the trauma registry. **(Section 2-F)**

- ❑ Coordinate with Kentucky Traffic Records Advisory Committee to secure funding to continue the Crash Outcome Data Evaluation System program once NHTSA's financial support ends. **(Section 2-F)**

Roadway Information

- ❑ Consider the inclusion of the fundamental data elements of the Model Inventory of Roadway Elements in the Highway Information System. **(Section 2-B)**

Strategic Planning

- ❑ Charge the Kentucky Traffic Records Advisory Committee (KTRAC) with the development of a new Traffic Records Strategic Plan (TRSP) addressing the recommendations in this traffic records assessment. Identify deficiencies apart from those noted in the traffic records assessment by canvassing each KTRAC member and especially each traffic records system component custodian for their input. The TRSP should be developed apart from the preparation of the Section 408 Application. Ideally the Section 408 Application should be prepared based on the TRSP proposed projects. The agreed upon projects should be the strategies included in the Traffic Records Emphasis Area. **(Section 1-B)**

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The team recognizes and thanks the principal participants in the assessment for the time they invested, the information they presented, and their candor in answering the many questions put forth by the team.

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INTRODUCTION

A complete traffic records system is necessary for planning (problem identification), operational management or control, and evaluation of a State's highway safety activities. Each State, in cooperation with its political subdivisions, should establish and implement a complete traffic records system. The statewide program should include, or provide for, information for the entire State. This type of program is basic to the implementation of all highway safety countermeasures and is the key ingredient to their effective and efficient management.

As stated in the *National Agenda for the Improvement of Highway Safety Information Systems*, a product of the National Safety Council's Association of Transportation Safety Information Professionals (formerly the Traffic Records Committee):

> "Highway safety information systems provide the information which is critical to the development of policies and programs that maintain the safety and the operation of the nation's roadway transportation network."

A traffic records system is generally defined as a virtual system of independent real systems which collectively form the information base for the management of the highway and traffic safety activities of a State and its local subdivisions.

Assessment Background

The Traffic Records Assessment is a technical assistance tool that the National Highway Traffic Safety Administration (NHTSA), the Federal Motor Carrier Safety Administration (FMCSA) and the Federal Highway Administration (FHWA) offer to State offices of highway safety to allow management to review the State's traffic records program. NHTSA has published a *Traffic Records Program Assessment Advisory* which establishes criteria to guide State development and use of its highway safety information resources. The Traffic Records Assessment is a process for giving the State a snapshot of its status relative to that *Advisory*.

This assessment report documents the State's traffic records activities as compared to the provisions in the *Advisory*, notes a State's traffic records strengths and accomplishments, and offers suggestions where improvements can be made.

Report Contents

In this report, the text following the "*Advisory*" excerpt heading was drawn from the *Traffic Records Program Assessment Advisory*. The "*Advisory*" excerpt portion is in italics to distinguish it from the "Status and Recommendations" related to that section which immediately follows. The status and recommendations represent the assessment team's understanding of the State's traffic records system and their suggestions for improvement. The findings are based entirely on the documents provided prior to and during the assessment, together with the information gathered through the face-to-face discussions with the listed State officials. Recommendations for improvements in the State's records program are based on the assessment team's judgment.

SECTION 1: TRAFFIC RECORDS SYSTEM MANAGEMENT

Advisory Excerpt: *Management of a State TRS requires coordination and cooperation. The data that make up a TRS reside in a variety of operational systems that are created and maintained to meet primary needs in areas other than highway safety. Ownership of these databases usually resides with multiple agencies, and the collectors and users of the data span the entire State and beyond.*

The development and management of traffic safety programs should be a systematic process with the goal of reducing the number and severity of traffic crashes. This data-driven process should ensure that all opportunities to improve highway safety are identified and considered for implementation. Furthermore, the effectiveness of highway safety programs should be evaluated. These evaluation results should be used to facilitate the implementation of the most effective highway safety strategies and programs. This process should be achieved through the following initiatives.

1-A: Traffic Records Coordinating Committee

Advisory Excerpt: *The National Highway Traffic Safety Administration's (NHTSA) 2004 Initiatives to Address Improving Traffic Safety Data Integrated Project Team report (hereafter referred to as the Data IPT Report) includes guidance on establishing a successful Traffic Records Coordinating Committee (TRCC). The following include recommendations from the Data IPT Report and additional items of an advisory nature:*

- ❑ *Establish a two-tiered TRCC.*
  There should be an executive and a working-level TRCC. The executive-level TRCC should be composed of agency directors who set the vision and mission for the working-level TRCC. The Executive TRCC should review and approve actions proposed by the Working TRCC. The Working TRCC should be composed of representatives for all stakeholders and have responsibilities, defined by the Executive TRCC, for oversight and coordination of the TRS. Together, the two tiers of the TRCC should be responsible for developing, maintaining, and tracking accomplishments related to the State's Strategic Plan for Traffic Records Improvement.

- ❑ *Ensure Membership is Representative.*
  TRCCs should be representative of all stakeholders, and each stakeholder representative must have support from their top management. When departments are considering changes to their systems, all TRCC members should be notified and departments should consider how to accommodate the needs of all the TRCC agencies.

- ❑ *Authorize Members.*
  The Working TRCC should have formal standing, recognition, and support of the administrators of participating agencies. This support will help the TRCC succeed in overcoming the institutional barriers, lack of focus, and lack of resources that prevent collaboration and progress in integrating highway safety data. The exact role and powers of the TRCC should be made explicit in its charter. Legislators, the governor, and top management of participating agencies should give authority to the TRCC members to make policy decisions and commit their agencies' resources to solve problems and approve the State's strategic plan for traffic records. The most important responsibility of the TRCC should be to provide the leadership necessary to ensure that available funds are sufficient to match stated needs. Despite challenges stemming from collective decision making by members from different agencies with competing priorities, TRCC members should speak with "one voice." The TRCC should have guidelines to determine who speaks for the TRCC and how its recommendations should be communicated.

- ❑ *Appoint an Administrator/Manager.*
  A single point of contact for managing a data improvement project is necessary to ensure leadership. The TRCC should designate a traffic records administrator or manager and provide sufficient time and resources to do the job. This person should be responsible for coordinating and scheduling the TRCC, in addition to tracking the progress of implementing the State's traffic records strategic plan. Uniform criteria should be established for monitoring progress. NHTSA can facilitate training for the TRCC administrator/manager regarding traffic record systems, program management, and data analysis.

- ❑ *Schedule Regular Meetings.*
  The TRCC should establish a schedule of regular meetings, not only to discuss data coordination issues and make progress on the strategic plan, but also to share success stories to aid in overcoming fears of implementation. The meetings should take place as required to deal with the State's traffic records issues and to provide meaningful coordination among the stakeholders. The TRCC should gain broader support by marketing the benefits of improved highway safety data. An example to provide data and analytical expertise to local government officials, legislators, decision makers, community groups, and all other stakeholders. TRCC meetings should include strategy sessions for such marketing plans.

- ❑ *Oversee Quality Control/Improvement.*
  The TRCC should have oversight responsibility for quality control and quality improvement programs affecting all traffic records data. Regularly scheduled presentations of quality control metrics should be part of the TRCC meeting agenda and the TRCC should promote projects to address the data quality problems that are presented.

- ❑ *Oversee Training for TRS Data Improvement.*
  The TRCC should have oversight responsibility for encouraging and monitoring the success of training programs implemented specifically to improve TRS data quality. Regularly scheduled presentations of training needs and training participation should be part of the TRCC meeting agenda, and the TRCC should promote projects to conduct training needs assessments and address the identified training needs.

1-A: Traffic Records Coordinating Committee Status

Establish a two-tiered TRCC

The Commonwealth of Kentucky Traffic Records Coordinating Committee is an effective two-tiered organization. The executive level (leadership) group is the Governor's Executive Committee on Highway Safety (GECHS) and a technical level (working) group is the Kentucky Traffic Records Advisory Committee (KTRAC). The GECHS provides executive oversight of the activities and programs recommended by the KTRAC incorporating the traffic records strategic plan into the Strategic Highway Safety Plan. The KTRAC aligns their activities and recommendations with the State's strategic vision for improving the Traffic Records System and improving highway safety.

Ensure Membership is Representative

The GECHS is comprised of executive level representatives from: Kentucky Transportation Cabinet, National Safety Council, Kentuckians for Better Transportation, Kentucky Department of Public Health, Federal Motor Carrier Safety Administration, Federal Highway Administration, National Highway Traffic Safety Administration, Kentucky Transportation Center of the University of Kentucky, Insurance Institute of Kentucky, Kentucky State Police, Kentucky Injury Prevention and Research Center of the University of Kentucky, Kentucky Office of Alcoholic Beverage Control, Kentucky Operation Lifesaver, Kentucky Board of Emergency Medical Services, Kentucky Administration Chiefs of Police, Kentucky State Fire Marshall's Office, Kentucky Sheriff's Administration, and Kentucky Mothers Against Drunk Driving.

Similarly the KTRAC is composed of broad representation from State and local agencies as well as highway safety stakeholders. Included in the membership of the KTRAC are: Kentucky Transportation Cabinet, Kentucky State Police, local police agencies, Kentucky State Fire Marshall's Office, Office of Health Policy, Federal Motor Carrier Safety Administration, Federal Highway Administration, Kentucky Hospital Association, Kentucky Motor Transport Association, and other highway safety stakeholders.

There appears to be broad representation from executive and managerial personnel on both committees as well as broad representation from State agencies, federal partners, interest groups, and highway safety stakeholders. The only skill determined to be lacking from the KTRAC is an information systems and technology representative who could advise the committee on the feasibility of linking or integrating compatible datasets from disparate systems.

Authorize Members

The KTRAC is appropriately authorized to identify and seek resolution of issues and to make recommendations to the GECHS for the Strategic Highway Safety Plan. The KTRAC is positioned to identify and recommend projects that create or improve the quality and availability of traffic records for the Commonwealth. The KTRAC uses consensus to determine the priority and impact of proposed projects to garner the greatest benefit to enhance the Traffic Records System and improve highway safety.

There are six subcommittees of the KTRAC: Crash, Roadway, Citation/Adjudication, Vehicle, Driver, and EMS/Injury Surveillance. Membership on these subcommittees is from Commonwealth agencies and local law enforcement agencies to ensure that the end user perspective is represented.

There are no Memoranda of Understanding or Agreements between member agencies and the KTRAC delineating duties and responsibilities. A formalized document of understanding to memorialize the participation and commitment to support the KTRAC is often useful in maintaining the continuity of cooperation and level of support as personnel change within both the leadership of member agencies and the membership of the committee.

Appoint an Administrator/Manager
The co-chairmanship of the KTRAC is held by two individuals who are representatives from member agencies who serve indefinite terms. The State Traffic Records Coordinator (Coordinator) from the Office of Highway Safety, Division of Safety Programs acts as the liaison between the Kentucky Transportation Cabinet and the KTRAC. The Coordinator assists in scheduling meetings and providing administrative support to the KTRAC.

Schedule Regular Meetings
The KTRAC meets quarterly as well as when called by the chairmen. Meeting minutes are recorded and distributed to both attending and non-attending members. Meeting agendas are prepared by the chair with input from the membership.

Oversee Quality Control/Improvements
The KTRAC does not exercise oversight responsibility for quality control and improvement programs affecting all traffic records system data. The focus of the KTRAC is on resolving issues raised by the traffic records assessment and to proactively identify data improvement issues and programs from the membership. The KTRAC has not focused on overseeing quality control or improvements of many traffic records system components in a coordinated manner. An emphasis on quality control and monitoring improvements to each traffic record system component enables leveraging of individual system improvements or implementation that could benefit the highway safety community as a whole. Proactive coordination of traffic records system design, integration, data sharing, and data quality improvements have proven to provide both greater benefit from the funds expended and greater highway safety impact from data-driven countermeasure programs. The KTRAC oversight would begin with an inventory of the traffic records system components within the Commonwealth and developing performance standards to monitor both the quality control and improvements of these systems.

Oversee Training for TRS Data Improvement
The KTRAC does not routinely review and discuss training issues as they relate to the traffic records system components. Training needs are generally identified by system component custodians based on their experience with end users. This approach to training generally does not identify training needs of related highway safety partners or the problems they encounter when attempting to analyze or evaluate the data. The KTRAC membership is well positioned to identify training needs to improve the use or quality of the traffic records data. Significant additional training opportunities should be considered with the expansion of electronic ticketing,

electronic crash reporting, and the new driver and vehicle systems. As other traffic records system changes or improvements are implemented, training needs of end users should be considered including methods to deliver training.

Recommendations:

- ❑ Expand the membership of the KTRAC to include information technology expertise on the committee.

- ❑ Develop a formalized memorandum delineating the roles and responsibilities of both the executive and working groups of the KTRAC in meeting the objectives contained in the *Advisory*.

- ❑ Establish a KTRAC data quality improvement sub-committee team that would be charged with regularly reviewing the existing system, identifying potential improvements, and reporting to the KTRAC membership.

- ❑ Include in each KTRAC meeting agenda: progress reports on each project in the strategic plan and data quality measurement for each traffic records system component.

- ❑ Establish a KTRAC training assessment sub-committee team that would be charged with regularly identifying training needs and recommending training methods for traffic records system components reporting to the membership.

1-B: Strategic Planning

Advisory Excerpt: *The TRS should operate in a fashion that supports the traffic safety planning process. The planning process should be driven by a strategic plan that helps State and local data owners identify and support their overall traffic safety program needs and addresses the changing needs for information over time. Detailed guidance for strategic planning is included in the NHTSA Strategic Planning Guide and the FHWA Strategic Highway Safety Plan documents. The strategic plan should address activities such as*

- ❑ *Assign Responsibility for the Strategic Plan.*
  The strategic plan should be created and approved under the direction of the TRCC. The TRCC should continuously monitor and update the plan, to address any deficiencies in its highway traffic records system.

- ❑ *Ensure Continuous Planning.*
  The application of new technology in all data operational phases (i.e., data collection, linkage, processing, retrieval, and analysis) should be continuously reviewed and assessed. The strategic plan should address the adoption and integration of new technology as this facilitates improving TRS components.

- ❑ *Move to Sustainable Systems.*
  The strategic plan should include consideration of the budget for lifecycle maintenance and self-sufficiency to ensure that the TRS continues to function even in the absence of grant funds.

- ❑ *Meet Local Needs.*
  The strategic plan should encourage the development of local and statewide data systems that are responsive to the needs of all stakeholders.

- ❑ *Promote Data Sharing.*
  The strategic plan should promote identification of data sharing opportunities and the integration among federal, State, and local data systems. This will help to eliminate duplication of data and data entry, assuring timely, accurate, and complete traffic safety information.

- ❑ *Promote Data Linkage.*
  Data should be integrated to provide linkage between components of the TRS. Examples of valuable linkages for highway and traffic safety decision making include crash data with roadway characteristics, location, and traffic counts; crash data with driver and vehicle data; and crash data with adjudication data, healthcare treatment and outcome data (e.g., Crash Outcome Data Evaluation System [CODES]).

- ❑ *Coordinate with Federal Partners.*
  The strategic plan's budget-related items should include coordination between the State and the various federal programs available to fund system improvements. The data collection, management, and analysis items in the strategic plan should include coordination of the State's systems with various federal systems (e.g., the Fatality Analysis Reporting System [FARS], the Problem Driver Pointer System [PDPS] of the National Driver Registry [NDR], the Motor Carrier Management Information System [MCMIS], and the Commercial Driver License Information System [CDLIS]).

- ❑ *Incorporate Uniform Data Standards.*
  The strategic plan should include elements that recognize and schedule incorporation of uniform data elements, definitions, and design standards in accordance with national standards and guidelines. Current examples of these standards and guidelines include:

  - *Model Minimum Uniform Crash Criteria (MMUCC)*
  - *American National Standards Institute (ANSI) -D20.1 and ANSI-D16.1*
  - *National Governors Association (NGA)*
  - *Global Justice XML Data Model (GJXDM)*
  - *National Center for State Courts, Technology Services, Traffic Court Case Management Systems Functional Requirement Standards*
  - *Guidelines for Impaired Driving Records Information Systems*

- *National Emergency Medical Service Information System (NEMSIS) Data Dictionary.*

❑ *Plan to Meet Changing Requirements.*
To help the State meet future highway safety challenges, the strategic plan should include a periodic review of data needs at the local, State, and federal levels. It should be updated to include tasks to meet those needs as they are identified.

❑ *Support Strategic Highway Safety Planning and Program Management.*
The strategic plan should include elements designed to ensure that the State captures program baseline, performance, and evaluation data in response to changing traffic safety program initiatives. Additional elements should be present for establishing and updating countermeasure activities (e.g., crash reduction factors used in project selection and evaluation).

❑ *Strategic Planning of Training and Quality Control.*
The strategic plan should incorporate activities for identifying and addressing data quality problems, especially as these relate to training needs assessments and training implementation.

1-B: Strategic Planning Status

Kentucky's Strategic Highway Safety Plan (SHSP) was developed in 2006 in response to the requirements of the federal transportation legislation SAFETEA-LU. The SHSP was developed under the guidance of the Governor's Executive Committee on Highway Safety (GECHS). The Committee is an executive-level, multi-agency group of highway safety advocates from varying backgrounds and is chaired by the Secretary of the Kentucky Transportation Cabinet (KYTC). The SHSP was revised in 2010 by the GECHS and covers the period 2011-2014.

Emphasis Area Teams were formed by the GECHS to address specific concerns for reducing fatalities and injuries on Kentucky's highways. These teams identify and develop innovative strategies through a data-driven process and recommend performance-based action plans to address the particular emphasis area. The 2006 SHSP identified ten Emphasis Areas for targeted highway safety action and in the recent revision of the Plan added two. The Emphasis Areas are:

- Aggressive Driving
- Motorcycles
- Commercial Motor Vehicles
- Occupant Protection
- Distracted Driving
- Roadway Departure
- Drive Smart Safety Corridors
- Traffic Records
- Impaired Driving
- Young Drivers
- Incident Management
- Legislative Issues

Each Emphasis Area Team submits strategies and implementation plans to the GECHS for approval. The Kentucky Office of Highway Safety (OHS) is responsible for the day-to-day operations of Kentucky's Highway Safety Management Program. The Office serves as the focal point and staff to the GECHS.

The OHS provides support and data analysis expertise to the GECHS for identification and prioritization of the emphasis areas. The OHS also provides requested information to the Kentucky Traffic Records Advisory Committee (KTRAC). KTRAC is a subcommittee of the GECHS and manages and coordinates the Task Teams in the development of various strategies.

The Traffic Records Emphasis Area in the SHSP is considered the Traffic Records Strategic Plan (TRSP). The KTRAC serves as the Traffic Records Emphasis Area Task Team. Although it is

one of 12 emphasis area programs, traffic records central role in providing the information necessary for the support and justification of the remaining 11 programs.

The incorporation of Traffic Records as an Emphasis Area in the SHSP encourages the collaboration of all safety planning efforts existing in Kentucky. Following are some of the major safety plans:

- Highway Safety Improvement Program (HSIP)
- High Risk Rural Roads Program (HRRRP)
- Highway Safety Plan (HSP)
- Motor Carrier Safety Assistance Program (MCSAP)
- Commercial Vehicle Safety Plan (CVSP)

With the endorsement of the GECHS and the support of the OHS, the KTRAC can play a crucial role in strategic planning for the substance of the Traffic Records Emphasis Area strategies. It would be appropriate for the KTRAC to undertake the development of a fresh multi-year TRSP in harmony with the SHSP especially because an update of the SHSP is under consideration.

Offered in the following paragraphs are suggested activities to be undertaken by the KTRAC in a new strategic planning effort. The italicized headings and narrative are taken from NHTSA's *State Traffic Safety Information Systems Strategic Planning: A Guide for the States*. The assessment team comments follow. Presenting the NHTSA guide is not intended to be a prescriptive planning process but an illustration on how to address issues pertaining to the current and future strategic plan development. Only a selected number of the guide's statements are offered since the KTRAC has addressed many of the issues in the guide. These issues are considered the most critical by the assessment team.

Traffic Records Coordinating Committee

The vital first element in the planning process is to define the group that will be responsible for approving, developing, and implementing the plan. Each State should have a policy-level group that oversees the State's highway safety data systems. The TRCC function may be vested in an existing information systems planning group within the State, but there should be a group within the State that can commit personnel and resources to address multiyear data systems planning across different State agencies. The TRCC-driven planning process should result in a statewide data improvement program that assures coordination of efforts and sharing of data between the various State safety data systems.

Kentucky has in place a KTRAC that has membership representing all components of the traffic records system including managers, collectors and users of traffic records data. The current Co-Chairs and Coordinator appear to possess the understanding and enthusiasm to successfully conduct and implement a Traffic Safety Information Systems Strategic Plan.

Traffic Records Assessment
The second key element of a good State traffic safety data system planning process is the performance of a Traffic Records Assessment in a State.

The OHS in the KYTC commissioned this assessment in preparation for developing a new strategic plan and Section 408 application.

Potential Projects and Programs
The TRCC should identify potential projects and data system improvement programs that will move the State's traffic safety information system in the direction defined by its goals and objectives.

Workshops should be conducted for members of the KTRAC at regularly scheduled meetings to explore and develop new strategies, review existing strategies, and modify or reject strategies for inclusion in the Traffic Records Emphasis Area of the SHSP. The Traffic Records Coordinator should serve as the facilitator for the workshops. The facilitator would lead the planning process, especially encouraging KTRAC members to define problems and develop solutions for the defined problems. The KTRAC should secure the commitment of personnel and resources to address multiyear data systems planning across different state agencies. The KTRAC-driven planning process should result in a statewide data improvement program that assures coordination of efforts and sharing of data between the various safety data systems. Having co-chairs who are also researchers at the Transportation Center of the University of Kentucky and were involved in current and past activity with the SHSP increases the potential for success of this undertaking.

Project Descriptions
Each candidate improvement project should be concisely defined in terms of project plans which provide a basic overview of each project as identified within the strategic plan. Each project plan should contain information such as: responsible project director, agency, goal/purpose of the project, anticipated results of the project (how will its success or failure be measured), any inter-relationships or dependencies on other projects, estimated timelines, and resource requirements. The Plan must identify the cost of each potential project and timelines along with the funding source for each project and how those funds will be used.

The project director of each traffic records strategy ideally would be a member of the KTRAC. This is not necessary but would assure KTRAC oversight and awareness of problems with the project's implementation schedule, cost overruns and inter-relationships with other traffic records systems that may be impacted. The following excerpt from the NHTSA guide is related to this topic.

Assign Accountability and Set Deadlines
For each project there should be a clear definition of the agency or project director who is responsible for the project. Each project description should provide a clear set of milestones and expected completion dates for each milestone. This accountability and timeline component of the strategic plan will serve to assist in the State's annual progress evaluation report.

The custodian (or designee) of each of the traffic records system components should be an active member of the KTRAC and provide information about any new initiatives or modifications to the existing system so that impending new initiatives or changes are reviewed for their impact on existing systems. The KTRAC should have the authority and charge of overseeing the planning and improvement of the key safety data systems within the State. A collaborative approach to developing the plan will be necessary to jointly identify the gaps in existing resources, negotiate with the various authorities to perform each task, and assign who should be responsible, in terms of people and agencies, for completing each task.

Evaluations

Each project plan should include specific criteria that will be used to measure the success or failure of the project in terms of the project's impact on achieving the safety data improvement goals and objectives. By defining in the beginning the expected impact upon measures such as timeliness, accuracy, completeness, integration, uniformity, and accessibility, the success or failure of each project can be determined. Each State will be expected to provide annual evaluations of their various projects and their success toward achieving the goals and objectives as defined in their strategic plan.

Component custodians, or their KTRAC representatives, should provide annual evaluations of their various projects and their success toward achieving the goals and objectives as defined in the strategic plan. The evaluations should include measures (relating to timeliness, accuracy, completeness, integration, uniformity, and accessibility) for the system component as a whole and to indicate the success or failure of each project in terms of the project's impact on achieving the safety data improvement goals and objectives.

Prioritization – Four-Box Analysis

Having clearly defined each potential project, its responsible agent, timeline, impact upon the program goals, and likely resource requirements, each TRCC must then prioritize the candidate projects and select those that will be undertaken in the short term and those that are more suitable long-term projects. Although there are many techniques for assigning priority, all potential projects and improvement programs should be assessed and projects should be prioritized using some systematic method. The four-box process is one of the least complicated to implement. It is essentially a process by which each project is ranked in terms of two measures: potential payoff if implemented and successful, and potential cost or difficulty. Those projects that fall into the low-cost/high payoff cell are the ones that should probably be undertaken first. Irrespective of the technique used for rating possible improvement projects, the ultimate responsibility for a coordinated, effective implementation plan lies with the State TRCC.

It is highly recommended that the KTRAC use a formal priority setting method. The State should select a voting technique to be used along with the Four-Box analysis suggested by NHTSA. Sometimes getting a group to decide on a focus can be very challenging. An agreement on the criteria for setting priorities, using any of the methods (four-box, weighted voting, consensus voting, others), will depend on time and resources, and the nature of the group.

The following two topics are taken from the Traffic Records Program Advisory.

Support Strategic Highway Safety Planning and Program Management

The KTRAC under the leadership of the GECHS was involved in developing the SHSP and is responsible for the Traffic Safety Information Systems Strategic Plan. The collaboration between the State agencies involved in both planning efforts should enable planning and coordination of strategies in each. The SAFETEA-LU legislation requires a comprehensive SHSP that relies on accurate, timely, and consistent data which must be made available to the State and local safety planners. In order to assure that the required data are available, Congress established a funding program. The Section 408 program calls for funding of state safety data improvement projects. Congress specified that every state shall develop a data-driven, comprehensive, strategic highway safety plan as a precursor to receiving federal safety program funds.

The highway safety community in Kentucky will be well served by the development of a Traffic Safety Information Systems Strategic Plan that is based on a KTRAC consensus-built vision and mission and is related to the safety strategies listed in the SHSP, the Highway Safety Improvement Program, the Motor Carrier Safety Plan, and the Highway Safety Performance Plan. It would also enable the KTRAC to establish a foundation to address unanticipated changes brought about by demographic shifts, economic down turns, budget shortfalls, and requirements necessitated by new technology and/or new legislation. The Co-chairs of the KTRAC and the Traffic Records Coordinator as well as each member should seek support for the initiatives advanced by the KTRAC that were determined by the strategic planning process.

Strategic Planning of Training and Quality Control

Performance measures should be added to each Emphasis Area of the SHSP, and data quality is a concern for the Traffic Records Emphasis Area. Many of the system components have quality control mechanisms in place through system and logic edits and manual quality assurance procedures. These mechanisms, in many instances, are not enough. The *Model Performance Measures for State Traffic Records Systems* has been published by NHTSA. The Model recommends quality metrics for each component of a traffic records system. The Model does not state that each of the quality metrics suggested for each component should be applied, but does suggest that these measures or others developed by the states should be considered to measure the quality of each component system and to be able to determine the effect of projects on the quality of the system component in general.

The Model provides definitions of the performance measures and examples of how the measures can be applied. It is recommended that these measures be reviewed in the strategic planning and the project selection processes and applied where appropriate. Consideration of quality control or quality metrics at the planning and implementation stages of a project has more potential for success in measuring quality for a particular system and evaluating the effectiveness of the projects selected. The results of the quality assurance and control mechanisms should be a primary source of information for ongoing and new training efforts relating to data collection, data entry and data use for each system component.

Recommendations:

- ❑ Charge the Kentucky Traffic Records Advisory Committee (KTRAC) with the development of a new Traffic Records Strategic Plan (TRSP) addressing the recommendations in this traffic records assessment. Identify deficiencies apart from those noted in the traffic records assessment by canvassing each KTRAC member and especially each traffic records system component custodian for their input. The TRSP should be developed apart from the preparation of the Section 408 Application. Ideally the Section 408 Application should be prepared based on the TRSP proposed projects. The agreed upon projects should be the strategies included in the Traffic Records Emphasis Area.

- ❑ Assure that all Kentucky Traffic Records Advisory Committee members participate in the development of the Traffic Records Strategic Plan (TRSP) and the selection and priority setting of the projects in the plan. Since the Traffic Records Strategic Plan will be developed in concert with the development of a new Strategic Highway Safety Plan, it is advisable to use the Traffic Records Coordinator as the facilitator to conduct workshops for the joint TRSP and the Strategic Highway Safety Plan development.

- ❑ Include items in each Kentucky Traffic Records Advisory Committee (KTRAC) meeting agenda that address progress reports on each system and project, as well as the status of the quality metrics developed by the KTRAC following the guidelines in NHTSA's *Model Performance Measures for State Traffic Records Systems.*

1-C: Data Integration

Advisory Excerpt: *The Data IPT Report recommends that States integrate data and expand their linkage opportunities to track traffic safety events among data files. Integrated data should enable driver license and vehicle registration files to be updated with current violations, prevent the wrong driver from being licensed, or keep an unsafe vehicle from being registered. Integration should ensure that all administrative actions are available at the time of the driver's sentencing. Data linkage is an efficient strategy for expanding the data available, while avoiding the expense and delay of new data collection.*

State TRCCs should develop working relationships with the health care community to ensure that the causation, crash, emergency medical services, hospital, and other injury-related data linked during the event can be merged statewide. They should also link to other data such as vehicle insurance, death certificates, medical examiner reports, etc., to support analysis of State-specific public health needs.

Linkage with location-based information such as roadway inventory databases and traffic volume databases at the State level can help identify the kinds of roadway features that experience problems, allowing States to better address these needs through their various maintenance and capital improvement programs. Data integration should be addressed through the following:

- *Create and Maintain a Traffic Records System Inventory.*
  The TRS documentation should show the data elements and their definitions and locations within the various component systems. Ancillary documentation should be available that gives details of the data collection methods, edit/error checking related to each data element, and any known problems or limitations with use of a particular data element. The system inventory should be maintained centrally, ideally in a data clearinghouse, and kept up-to-date through periodic reviews with the custodial agencies. Funding for system development and improvement should include a review of existing systems' contents and capabilities.

- *Support Centralized Access to Linked Data.*
  The traffic records user community should be able to access the major component data files of the TRS through a single portal. To support this access, the State should promote an enterprise architecture and database, and develop a traffic records clearinghouse to serve as the gateway for users. The databases in the clearinghouse should be linked in ways that support highway safety analysis. At a minimum, this would include linkage by location, involved persons, and events.

- *Meet Federal Reporting Requirements.*
  The TRS, where possible, should link to or provide electronic upload files to federal data systems such as FARS, MCMIS/SafetyNet, Highway Performance Monitoring System (HPMS), and others.

- *Support Electronic Data Sharing.*
  The TRS should support standard methods for transporting data between systems. At a minimum, these should include a documented file structure and data definitions for information to be transferred to statewide databases. Standard information transfer formats and protocols, such as XML format and FTP, should be supported.

- *Adhere to State and Federal Privacy and Security Standards.*
  The TRS should make linked data as accessible as possible while safeguarding private information in accordance with State and federal laws. This includes security of information transferred via the Internet or other means.

1-C: Data Integration Status

Create and Maintain a Traffic Records System Inventory

A complete traffic records system inventory does not exist within the Commonwealth. Individual agencies maintain inventories of varying detail. The Kentucky Transportation Cabinet (KYTC) maintains a metadata inventory system of data stored in the Highway Information System (HIS) and provides access to the inventory on their website. The Kentucky Public Health Data Resource Guide contains information about injury surveillance datasets. The Kentucky State Police (KSP) maintains data dictionaries and code tables for the Collision Report Analysis for Safer Highways (CRASH) system on their websites to facilitate information regarding data extracts.

A complete system inventory, as called for in the *Advisory*, would include the data elements and their definitions and locations within the various component systems. Ancillary documentation should be available that gives details of the data collection methods, edit/error checking related to each data element, and any known problems or limitations with use of a particular data element. The system inventory should be maintained centrally, ideally in a data clearinghouse, and kept up-to-date through periodic reviews with the custodial agencies. Funding for system development and improvement should include a review of existing systems' contents and capabilities.

Support Centralized Access to Linked Data

There are a few examples of centralized access to linked data. Users within the KYTC have access to a merged dataset containing both crash and roadway inventory information in the Transportation Enterprise Database (TED). This dataset is made possible through the location coding process as crash reports are entered into the KSP E-CRASH system using their Map It tool. The Kentucky Transportation Center (KTC) at University of Kentucky creates a combined dataset of crash and roadway information for managing the Highway Performance Monitoring System (HPMS) and creating analysis reports.

The Kentucky Injury Prevention and Research Center (KIPRC) a partnership between the Kentucky Department for Public Health and the University of Kentucky's College of Public Health creates a linked dataset using crash data, emergency department data, hospital discharge data, and vital statistics information for their Crash Outcome Data Evaluation System (CODES) program.

Meet Federal Reporting Requirements

Federal reporting requirements for the HPMS, Federal Aid System, SafetyNet requirements to the FMCSA, and the Fatality Analysis Reporting System (FARS) are all being met.

Support Electronic Data Sharing

There are numerous examples of electronic data sharing. The E-CRASH System managed by the KSP is currently accepting almost all (98 percent) crash reports from the State's law enforcement agencies (LEAs). The E-CRASH system uses the barcode from the driver license to reduce keying and support validation of driver information. Also e-ticket is electronically

submitting citations from the LEAs to the Circuit Court clerk for loading into their KyCourts system.

KSP manages the process of reporting CMV-involved crash information to SafetyNet. The CRASH system is able to identify CMV reportable crashes and electronically transmit the information to SafetyNet for posting to the Motor Carrier Management Information System (MCMIS) database.

Traffic convictions are transmitted electronically to the Division of Driver Licensing, for updating the official driver history file.

Adhere to State and Federal Privacy and Security Standards
Kentucky is well aware of the need to protect personal identifying information and has implemented data security procedures in line with their privacy laws as well as the Driver Privacy Protection Act (DPPA) and the Health Insurance Portability and Accountability Act (HIPAA).

Recommendations:

- ❑ Develop a statewide traffic records system inventory.
- ❑ Develop additional linked datasets including merged data sets for crash, roadway, injury surveillance, citation/adjudication, vehicle, and driver information.
- ❑ Develop a public-use version of all linked datasets and provide a centralized access point for these resources.

1-D: Data Uses and Program Management

Advisory Excerpt: *Data availability and quality directly affect the effectiveness of informed decision making about sound research, programs, and policies. Accurate, comprehensive, and standardized data should be provided in a timely manner to allow the agency or decision-making entities at the State or local levels to:*

- *Conduct Problem Identification.*
  Problem identification is the process of determining the locations and causes of crashes and their outcomes and of selecting those sites and issues that represent the best opportunity for highway safety improvements. States should be able to conduct problem identification activities with their traffic records system.
- *Develop Countermeasure Programs and Program Management Procedures.*
  States select and evaluate strategies for preventing crashes and improving crash outcomes. This requires that decision makers can select cost-effective countermeasures and that safety improvement programs and funds should be managed based on data-driven decision making.
- *Perform Program Evaluation.*
  States should be capable of measuring progress in reducing crash frequency and severity. Ideally, the effectiveness of individual programs and countermeasures should be evaluated and the results used to refine development and management processes.
- *Support Safety-Related Policies and Planning.*
  The States are responsible for developing SHSPs. These data should be available to support this and other policy and planning efforts such as development of agency-specific traffic safety policies, traffic records strategic planning, safety conscious planning, and others.
- *Access Analytic Resources.*
  Data users, and decision makers in particular, should have access to resources including skilled analytic personnel and easy to use software tools to support their needs. These tools should be specifically designed to meet needs such as addressing legislative issues (barriers as well as new initiatives), program and countermeasure development, management, and evaluation, as well as meeting all reporting requirements.
- *Provide Public Access to Data.*
  The TRS should be designed to give the public or general non-government user reasonable access to data files, analytic results, and resources, but still meet State and federal privacy and security standards.
- *Promote Data Use and Improvement.*
  The TRS should be viewed as more than just a collection of data repositories, and rather as a set of processes, methods, and component systems. Knowledge of how these data should be collected and managed, along with where the bottlenecks and quality problems arise, is critical to users understanding proper ways to apply the data. This knowledge should also aid in identifying areas where improvement is possible.

1-D: Data Uses and Program Management Status

Problem Identification

The Office of Highway Safety (OHS) in the Department of Highways of the Kentucky Transportation Cabinet has two divisions: Incident Management and Highway Safety Programs. The Division of Incident Management has high public recognition resulting from the Transportation Operations Center and the SAFE Patrol that provides emergency assistance on freeways and major roads without charge. "OHS" in this section refers to the Division of Highway Safety Programs (DHSP) where the Highway Safety Plan is prepared to address highway safety projects and programs, identify problems, apply countermeasures, and evaluate their results.

The DHSP has two branches: Grants Management and Safety Education. Both focus on the safety programs in the priority areas:

- Occupant Protection and Seat Belt Safety Education
- Impaired Driving Countermeasures and Education
- Distracted Driving Education and Countermeasures
- Traffic Records
- Motorcycle Safety
- Child Passenger Safety

Grants Management has oversight for the individual projects in the priority areas and may apply more targeted focus on specifics within a priority area; Safety Education then disseminates the findings and results from the projects and assists in refining the definitions of the problems that will be addressed as new or continuing projects are undertaken. OHS has program coordinators who address all of the program types in the three major geographic regions of the Commonwealth.

Problem identification for the grant projects is much more advanced in Kentucky than in most other states. The Traffic Records Coordinator maintains continuing awareness of the crash data and the types of problems revealed by the data—both historic results and very current results. Nearly all crash reports are electronic with the crash database being current to the past few days. The Coordinator sends the Daily Fatality Summary to an extensive list of users, and that information is presented on the OHS web site as are other presentations of the data and access to the public query capability for the crash data.

When an organization such as a law enforcement agency submits a grant application, the applicant must identify the problem to be addressed. OHS provides the information resources to the applicant who then submits their identified problem(s). OHS works with applicants who misunderstand and fail to recognize the problem(s) that need to be addressed.

The application is reviewed but may be found to be incorrect. In that case, the Traffic Records Coordinator will help the applicant to disclose the actual type(s) of problems so the grant can address the actual problem(s).

A typical process for initiating problem identification for an applicant is a variant of using information that is provided on the OHS web site. OHS provided the following description:

> Daily Fatality Reports are generated and distributed to highway safety staff and partners in highway safety. This tracks the current fatality count and compares that number to previous five years. Targeted enforcement maps are provided to each law enforcement grantee indicating the roadways having the greatest problem in their city/county - (this is based on five years of crash data). They are specific to their program area such as impaired driving, speeding or occupant protection.

The Top 25 County Problem Ranking Maps can be downloaded from the Internet. The information is not a single map identifying 25 counties with problems, but sets of maps showing which 25 counties for specific types of highway safety problems. There are obvious overlaps. Then for individual counties or other specified locations, detailed maps show where crashes occur (by severities), and other features. These are adjuncts to queries into the crash data where the selection process ends with options to create a map, view details from the selection, or to create an extract of the data for import into Microsoft Access or Excel with tab or comma delimited files. Historic information is also presented in the collision fact books and the Crash Data Five Year Report.

Countermeasure Programs

The OHS provided the following details about the uses of crash data in the countermeasure programs:

> Fatalities, serious traffic injuries, rural fatalities, urban fatalities, unrestrained passenger vehicle occupant fatalities, alcohol-impaired driving fatalities, speed-related fatalities, motorcyclist fatalities, unhelmeted motorcyclist fatalities, driver fatalities 20 and younger and pedestrian fatalities. This data is used in selecting the areas for targeted enforcement from the Kentucky CRASH system. The Kentucky Transportation Center within the University of Kentucky has been involved in the evaluation and research.

Perform Program Evaluation

The program evaluation process was described as follows:

> Highway safety projects submit monthly claims that include their activities as well as supporting documentation for their claim. The program managers review/monitor their monthly activity. Law enforcement projects activity are then entered into a tracking database that includes a breakdown of traffic citations and arrests written during federal overtime. If activity is poor, the program managers contact the agency to discuss poor activity. Program managers as well as Law Enforcement Liaisons conduct an on-site monitoring visit annually to discuss the status of their activities as well as the progress they've made thus far in meeting

their objectives. The performance measures are directly related to their specific objectives within their grant application.

Support Safety-Related Policies and Planning

To combat the epidemic of fatalities and injuries occurring on Kentucky's highways, the Governor's Executive Committee on Highway Safety was established. The Executive Committee created an integrated and strategic highway safety management program that is data driven and performance-based. The Executive Committee also coordinates the development and implementation of goals and supporting actions, facilitates the acquisition of needed resources and provides whatever additional support is needed.

The Office of Highway Safety (OHS) was designated as staff to the Executive Committee and charged with developing the Strategic Highway Safety Plan. The OHS is also responsible for developing the Highway Safety Plan and the Traffic Records Strategic Plan. These multi-agency strategic plans are designed to provide all traffic safety agency stakeholders in Kentucky with a planning and coordination tool to allow better collaboration between the stakeholder agencies.

Access Analytic Resources

The Kentucky safety community benefits from a number of analytic resources. The Traffic Records Coordinator position in the Kentucky Transportation Cabinet (KYTC), Office of Highway Safety is very knowledgeable about the State's safety datasets and analysis tools. Members of the Kentucky Traffic Records Advisory Committee (KTRAC) indicate he is always available to provide support and facilitate State safety initiatives.

The KYTC and other safety stakeholders use resources at the University of Kentucky, Kentucky Transportation Center (KTC) to support development of the *Kentucky Traffic Collision Facts*, safety belt surveys, HPMS, and to conduct traffic safety research and analysis. KTC is home to excellent analysts who could also be used for training existing staff (transfer of knowledge) as well as developing statistics for supporting safety programs. The KTC provides an excellent website referencing many of their research projects and reports at http://www.ktc.uky.edu/.

The Kentucky State Police, Criminal ID and Records Branch offers full access to crash information. There are two web-based applications. One is for law enforcement (https://kycrash.state.ky.us/KYCrash/Public/Home.aspx) and the other is for public use (http://crashinformationky.org/KCAP/KYOPS/SearchWizard.aspx). Within these applications the user can obtain almost all information on the crash report. The only difference between the two applications is that the law enforcement site has access to all information. The public site offers access to all information, except personal identifiers such as names and addresses.

The KYTC Department of Planning provides information from several other traffic record files within transportation, mainly roadway and crash information. Data from these files are available upon request and most often used as shapefiles through ArcGIS.

The KYTC has an opportunity to further enhance its safety planning and programming functions by including several analytic software tools suggested in the recently published Highway Safety Manual. *SafetyAnalyst* has the capability not only to identify crash patterns at specific locations

and determine whether those crash types are over-represented, but also to determine the frequency and percentage of particular crash types system-wide or for specified portions of the system (particular highway segment or intersection types). This capability can be used to investigate the need for system-wide engineering improvements and for enforcement and public education efforts that may be effective in situations where engineering countermeasures are not.

Public Access to Data

The Kentucky State Police (KSP) has developed an online query tool, Kentucky Collision Analysis for the Public (KCAP), where the crash database may be queried extensively. In addition to downloading pre-calculated tables and charts, users may create reports at the crash, vehicle, or person level. Results can be exported to a number of formats including text or Excel files, or an Access database. An exceptional feature of the KCAP system is the user's ability to generate maps. If desired, a case listing may also be generated. While the website makes a wealth of information available to users not regularly available in other states and users expressed extreme gratitude for the accessibility of the data, it was mentioned that some aspects of the site, especially crash report terminology, are challenging to new users. Members of the public may also contact the Kentucky Office of Highway Safety with data requests.

A similar online query system for injury surveillance data does not exist. The Kentucky Injury Prevention Research Center (KIPRC), located at the University of Kentucky, is working on implementing the Injury-Based Information System (IBIS), which will provide a tool for organizing injury-related publications and creating injury indicator reports and online query modules. Progression towards implementing IBIS has been slowed by lack of funding. Until IBIS is deployed, parties interested in data from the injury surveillance systems must contact KIPRC directly with their data requests.

Promote Data Use and Improvement

The Kentucky Traffic Records Advisory Committee (KTRAC) member agencies that are represented on the committee have undertaken system developments and improvements that are beneficial to the highway safety community in the Commonwealth. Notable among these are the Kentucky Collision Analysis and the Map It locating tool. Substantial traffic record data are contained in crash, citation, driver, vehicle, courts, and injury databases that can be correlated and evaluated in a merged data environment. The merged data would provide a more comprehensive view of the highway safety conditions on the roadways throughout the Commonwealth. Ongoing year-to-year analysis of the data compared to safety improvement countermeasures would enable highway safety personnel to evaluate the effectiveness of countermeasures and utilize resources to the greatest benefit making the roadways safer and reducing traffic fatalities and serious injuries.

Some interviewees indicated they were unaware of or unable to access traffic record datasets for research, program support, or completion of their daily duties. However, often the data were available and accessible. An inventory of traffic record dataset query capabilities and the data they provide would benefit highway safety professionals in evaluating improvement programs and research.

Recommendations:

- ❑ Publish non-technical descriptions of data elements and their attributes for lay users of the Kentucky Collision Analysis for the Public website.

- ❑ Secure funding for the faster implementation of the Injury-Based Information System.

- ❑ Develop a consolidated data warehouse and query tool that assimilates traffic record data for research and analysis.

- ❑ Establish an inventory of traffic records data access query tools to share with highway safety partners.

SECTION 2: TRAFFIC RECORDS SYSTEM COMPONENTS

Advisory Excerpt: *At the time of passage of the Highway Safety Act of 1966, State centralized TRS generally contained basic files on crashes, drivers, vehicles, and roadways. Some States added data on traffic safety-related education, either as a separate file or as a subset of the Driver File. As traffic safety programs matured, many States incorporated EMS and Citation/Conviction Files for use in safety programs. Additionally, some States and localities maintain a Safety Management File that consists of summary data from the central files that can be used for problem identification and safety planning.*

As the capabilities of computer hardware and software systems increased and the availability of powerful systems has expanded to the local level, many States have adopted a more distributed model of data processing. For this reason, the model of a TRS needs to incorporate a view of information and information flow, as opposed to focusing only on the files in which that information resides.

Under this more distributed model, it does not matter whether data for a given system component are housed in a single database on a single computer or spread throughout the State on multiple local systems. What matters is whether the information is available to users, in a form they can use, and that these data are of sufficient quality to support its intended uses. Thus, it is important to look at information sources. These information sources have been grouped to form the major components of a TRS:

- ❑ *Crash Information*
- ❑ *Roadway Information*
- ❑ *Driver Information*
- ❑ *Vehicle Information*
- ❑ *Citation/Adjudication Information*
- ❑ *Statewide Injury Surveillance Information*

Together, these components provide information about places, property, and people involved in crashes and about the factors that may have contributed to the crash or traffic stop. The system should also contain information that may be used to judge the relative magnitude of problems identified through analysis of data in the TRS. This includes demographic data (social statistics about the general population such as geographic area of residence, age, gender, ethnicity, etc.) to account for differences in exposure (normalization) and data for benefit/cost and cost effectiveness determinations. Performance level data should be included to support countermeasure management.

A frequently used overview of the contents of a TRS is the Haddon Matrix, named after its developer, William Haddon, the first NHTSA Administrator. It provides a valuable framework for viewing the primary effects of Human, Vehicle, and Environmental factors and their influence before, during, and after a crash event. Table 1 is based on the Haddon Matrix.

Table 1: Expanded Haddon Matrix With Example Highway Safety Categories

	Human	***Vehicle***	***Environment***
Pre-Crash	· *Age* · *Gender* · *Experience* · *Alcohol/Drugs* · *Physiological Condition* · *Psychological Condition* · *Familiarity with Road & Vehicle* · *Distraction* · *Conviction & Crash History* · *License Status* · *Speed*	· *Crash Avoidance* · *Vehicle Type* · *Size & Weight* · *Safety Condition, Defects* · *Brakes* · *Tires* · *Vehicle Age* · *Safety Features Installed* · *Registration*	· *Visibility* · *Weather/Season* · *Lighting* · *Divided Highways* · *Signalization* · *Geographic Location* · *Roadway Class, Surface, Cross-Section, Alignment, etc.* · *Structures* · *Traffic Control Devices, Signs, Delineations, and Markings* · *Roadside Appurtenances, Buildups, Driveways, etc.* · *Volume of Traffic* · *Work Zone* · *Animal Range Land & Seasonal Movements*

Crash	· *Belt Use* · *Human Tolerance* · *Size* · *Seating Position* · *Helmet Use*	· *Crash-Worthiness* · *Passenger Restraints* · *Airbags and Airbag Shutoff*	· *Guardrails* · *Median Barriers* · *Breakaway Posts* · *Rumble Strips and Other Safety Devices* · *Maintenance Status of Roadway and Devices*
Post-Crash	· *Age* · *Physical Condition* · *Insurance Status* · *Access to Health Care* · *Driver Control Actions* · *Court Actions* · *Probation*	· *Post Crash Fires* · *Fuel Leakage* · *Power Cell Securement* · *Hazardous Materials* · *Title*	· *Traffic Management* · *Bystander Care* · *EMS System* · *First Responders* · *Hospital Treatment* · *Long-Term Rehabilitation*

The Haddon Matrix has proven to be a meaningful way to examine primary effects of contributing factors on crash frequency and severity. It helps decision makers to consider countermeasures designed to address specific contributing factors. In recent years, with availability of more detailed data analyses, awareness has grown about the interactions among contributing factors. A good example of such interactions would be weather and drivers' skill or experience levels. To make the contribution of interaction effects more obvious, the matrix in Table 2 can be used to supplement the Haddon Matrix.

Table 1: Examples of the Interactions among Crash Characteristics

	Human	***Vehicle***	***Environment***
Human	· *Road Rage* · *Ped/Bike Behavior & Driver Behavior* · *Driver Age & Passenger Age & Number*	· *Familiarity with Vehicle & Training* · *License Class & Vehicle Type* · *Rollover Propensity & Driver Actions* · *Vehicle Ergonomics & Person Size*	· *Crash Avoidance* · *Vehicle Type* · *Familiarity with Roadway* · *Experience with Weather Conditions*
Vehicle		· *Vehicle Size Weight Mismatch* · *Under-Ride/Over-Ride* · *Shared Roads, No-Zone* · *Tire Inflation & Rollover Propensity*	· *Rollover Propensity & Road Configuration* · *Roadway Debris & Vehicle Size Weight* · *Vehicle Type & Weather Conditions* · *Vehicle Condition & Weather Conditions*
Environment			· *Congestion Interaction with Road Type* · *Congestion & Vehicle Mix & Lane Width* · *Animal Management Policies & Roadway Access & Seasons*

Taken together, these views of traffic safety factors offer a way of thinking about highway safety issues that is both conceptually robust and practical. For the purposes of this Advisory, the most important aspect of the TRS is that it supports high-quality decision making to improve highway safety. The remainder of this section of the Advisory presents details about the various components of the TRS.

2-A: Crash Data Component

Advisory Excerpt:

- *Description and Contents*
  The Crash Data Component should document the time, location, environment, and characteristics (e.g., sequence of events, rollover, etc.) of a crash. Through links to other TRS components, the Crash Data Component should identify the roadways, vehicles, and people (e.g., drivers, occupants, pedestrians) involved in the crash. These data should help to document the consequences of the crash (e.g., fatalities, injuries, property damage, and violations charged), support the analysis of crashes in general, and the analysis of crashes within specific categories defined by:

  - *person characteristics (e.g., age or gender)*
  - *location characteristics (e.g., roadway type or specific intersections)*
  - *vehicle characteristics (e.g., condition and legal status)*
  - *the interaction of various components (e.g., time of day, day of week, weather, driver actions, pedestrian actions, etc.)*

  The Crash Data Component of the TRS contains basic information about every reportable (as defined by State statute) motor vehicle crash on any public roadway in the State.

- *Applicable Guidelines*
  Details of various data elements to be collected are described in a number of publications. The MMUCC provides a guideline for a suggested minimum set of data elements to be collected for each crash. Additional information should be collected for crashes involving an injury or fatality to meet the tracking and analysis requirements for the State and other systems (e.g., the FARS, SafetyNet).

- *Data Dictionary*
  Crash data should be collected using a uniform crash report form that, where applicable, has been designed and implemented to support electronic field data collection. Law enforcement personnel should receive adequate training at the academy and during periodic refreshers, to ensure that they know the purpose and uses for the data as well as how to complete each field on the form accurately.

  Information from the quality control program should be used to develop and improve the content of training. The training manual on crash reporting should be available to all law enforcement personnel. The instructions in the manual should match the edit checks that are performed on the crash data prior to its being added to the statewide crash database. The edit checks should be documented and sufficient to flag common and serious errors in the data. For example, these errors include missing or out of range values in single fields and logical inconsistencies between the data recorded in multiple fields (e.g., time of day is midnight and the lighting condition is coded as daylight). All data element definitions and all system edits should be shared with collectors, managers, and users in the form of a data dictionary that is consistent with the training manual and the crash report form.

- *Process Flow*
  The steps from initial crash event to final entry into the statewide crash data system should be documented in process flow diagrams. The diagram should be annotated to show the time required to complete each step and to show alternate flows and timelines depending on whether the reports are submitted in hardcopy or electronically to the statewide system. The process flow diagram should include procedures for error correction and error handling (i.e., returning reports to the originating officer/department, correction, resubmission, etc.). Process flow diagrams should show all major steps whether accomplished by staff or automated systems and should clearly distinguish between the two.

- *Interface with Other Components*
  The Crash Data Component has interfaces, using common linking variables shown in Table 3, to other TRS components to support the following functions:

- *Driver and vehicle data should be used to verify and validate the person and vehicle information during data entry and to flag records for possible updating in the driver or vehicle files when a discrepancy is identified. Key variables such as driver license number, vehicle identification number (VIN), license plate number, name, address, and date of birth should be available to support matching of records among the files. The Driver Data Component should also enable access to drivers' histories of crashes and convictions for traffic violations.*
- *Crash data should be linked to roadway inventory and other roadway characteristics based upon location information and other automated and manual coding methods. This linkage supports location-based analysis of crash frequency and severity as well as crash rate calculations based on location-specific traffic counts.*
- *Law enforcement personnel should be able to link crash, contact, incident, citation, and alcohol/drug test results through their own department's records and/or a secure law enforcement information network. For agencies with computer-aided dispatch and/or a records management system, the crash data should be linked to other data through incident, dispatch, and/or crash numbers and by names and locations to support analysis at the local level.*
- *Linkage to injury surveillance data should be possible either directly or through probabilistic linkage in order to support analysis of crash outcomes and overall costs of treatment. Key variables for direct linkage include names of injured persons or EMS run report number. Key variables for probabilistic linkage include the crash date and time, crash location, person characteristics such as date of birth and gender, EMS run report number, and other particulars of the crash.*

Table 3: Common Linking Variables between Crash And Other Data Components of a Traffic Records System

Crash Linkages to Other Law Enforcement and Court Files	- *Incident Number* - *Location (street address, description, coordinates, etc.)* - *Personal ID (name, address, DL number, etc.)*
Crash Linkages to Roadway Information	- *Location Coding (linear referencing system, reference post, coordinates, local street codes)*
Crash Linkages to Driver and Vehicle Information	- *Driver License Number* - *Vehicle Identification Number* - *Personal Identifiers (name, address, date of birth, etc.)*
Crash Linkages to Statewide Injury Surveillance System Information	- *Personal Identifiers (where allowed by law)* - *Crash Date, Time, Location* - *EMS Run Report Number* - *Unique Patient ID Number*

Furthermore, there should be data transfer and sharing linkages between State and local crash databases. The State crash data system should support the electronic transfer of crash data from a variety of law enforcement agencies' (LEAs) records management systems. The State's crash data system management should publish the specifications and editing requirements for generating the outputs from the various agency systems that can be processed into the official State crash data system.

- ❑ *Quality Control Program*

The crash data should be timely, accurate, complete, and consistent and these attributes should be tracked based on a set of established quality control metrics. The overall quality of the information in the Crash Data Component should be assured based on a formal program of error/edit checking as the data are entered into the statewide system. In addition, the custodial agency and the TRCC frequently work together to establish and review the sufficiency of the quality control program and to review the results of the quality control measurements. The crash data managers should receive periodic data quality reports. There should be procedures for sharing the information with data collectors through individual and agency-level feedback, as well as training and changes to the crash report instruction manual, edit checks, and data dictionary. Example measurements are presented in Table 4

Table 2: Examples of Quality Control Measurements for Crash Data

Timeliness	- *# days from crash event to receipt for data entry on statewide database* - *# days for manual data entry* - *# days for upload of electronic data* - *Average # of days to enter crashes into the system* - *Average # of days of backlogged crash reports to be entered*
Accuracy	- *% of crashes "locatable" using roadway location coding method* - *% VINs that are valid (e.g., match to vehicle records that are validated with VIN checking software)* - *% of interstate motor carriers "matched" in MCMIS* - *% crash reports with uncorrected errors* - *% crash reports returned to local agency for correction*
Completeness	- *% LEAs with an unexplained drop in reporting one year to the next* - *% LEAs with expected number of crashes each month* - *% FARS/MCMIS match* - *% FARS/State Crash fatality match*
Consistency	- *% time that an unknown code is used in fields with that possible value* - *% logical error checks that fail* - *% compliance with MMUCC guidelines*

The measures in Table 4 are examples of high-level management indicators of quality. The crash file managers should have access to a greater number of measures and be prepared to present a standard set of summary measures to the TRCC on a periodic schedule, such as monthly or quarterly.

2-A: Crash Data Component Status

Status

In the time since the previous assessment, the crash data component has experienced several major improvements. Kentucky is to be commended for the following notable achievements over the past five years:

- Expansion of electronic field data collection of crash reports. Currently, the electronic Collision Report Analysis for Safer Highways (E-CRASH) system maintained by the Kentucky State Police (KSP) accounts for nearly all (98 percent) submitted crash reports, compared to a baseline of approximately 80 percent in 2007. This is a tremendous accomplishment. Few states have achieved this level of e-crash reporting.
- Implementation of electronic data sharing between the E-CRASH field data collection system and driver license data. The new process provides the ability to auto-populate driver information in the E-CRASH system by scanning the driver license barcode.
- Increased availability of the crash data. In 2007, data extracts could only be provided by request. The KSP website and the Kentucky Transportation Cabinet (KYTC) website provided authorized users the ability to run queries on the full dataset (including personal identifiers). Now, the public has access to a KSP website providing data extracts and analytic capabilities via a redacted dataset where personal identifiers have been removed.
- Management of data quality has continued to improve from the existing excellent baseline in 2007. This has been accomplished by expanded use of the KSP E-CRASH field data collection system along with the addition of some 300 data edits that now total 1,500.
- Improved crash location accuracy. KSP has implemented "smart mapping" functionality in the E-CRASH system. The Map It solution provides the ability to zoom in on the map, point and click on the crash location which then auto-populates information about the location including the coordinates, county, route, milepost, and the street name. Implementation of Map It has significantly improved the accuracy of crash locating and has proven to be a very popular system enhancement. Even though crash location has been greatly improved, concern was expressed on how the Map It transportation layer is updated and then how the updated information is distributed to the many client-based systems throughout the State.
- Expanded E-CRASH data element collection. E-CRASH has been improved to collect 30 additional data elements regarding commercial motor vehicle-involved crashes and new occupant restraint information about child booster seats improving MMUCC compliance and data completeness.

The State is to be commended for these and other efforts, many of which resulted from implementing recommendations presented in the 2007 traffic records assessment. It should be noted that the rest of this report section addresses current status and deficiencies but with an eye toward helping Kentucky achieve the next level of crash data management and data quality. The State has demonstrated an ability and desire to improve the crash data component and is poised

to achieve a complete, formal data quality management program and broad accessibility of data and powerful analytic tools for all users.

Description and Contents
The crash data component is created based on traffic crash reports submitted by law enforcement agencies using the Kentucky Uniform Police Traffic Collision Report (KSP 74) form (rev. June 2004). This is a multi-page form with data fields recording the location, environment, persons, and vehicles involved in the crash. The property damage threshold for reportable Kentucky crashes is $500.

The crash component in Kentucky is a state-of-the-art relational database system originally designed and implemented in 2000. This statewide system–Collision Report Analysis for Safer Highways (CRASH)—is maintained by the Kentucky State Police (KSP) and forms the original core of the Kentucky Open Portal Solution (KYOPS) suite of law enforcement/public safety software.

The requirements for crash reporting and data management appear in Commonwealth law (KRS 189.635). Law enforcement officers may complete a paper crash report or use the KSP-provided E-CRASH field data collection system. KSP provides their E-CRASH system free of charge to law enforcement agencies. This system has undergone major revisions since 2000 to result in a state-of-the-art electronic field data collection system for crashes.

KSP processes approximately 130,000 crash reports per year. Almost all crashes (98 percent) are received electronically from users of E-CRASH. The few remaining crash reports are received on paper forms. The State is to be commended for this accomplishment. During the assessment, users of the system often commented on the good data quality, timeliness of the crash component, and its ability to support their safety programs.

Processes are in place to immediately forward reports of fatal crashes to the Fatality Analysis Reporting System (FARS) staff and those describing a reportable commercial vehicle crash to the SafetyNet staff. Both processes appear to be working well in that timeliness of reporting to FARS and SafetyNet meets the federal requirements.

As mentioned earlier in the report, accessibility to crash information has improved greatly since the last assessment and was a topic of great satisfaction by users of the system. There are two web-based applications. One is for law enforcement (https://kycrash.state.ky.us/KYCrash/Public/Home.aspx) and the other is for public use (http://crashinformationky.org/KCAP/KYOPS/SearchWizard.aspx). Within these applications the user can obtain almost all information on the crash report. The only difference between the two applications is that the law enforcement site has all information. The public site has all information, except identifying information of the individuals, such as names and addresses.

The future of CRASH and the ability to make system improvements is threatened by the obsolete Visual Basic 6 development environment. This technology is no longer supported by Microsoft, the developer of Visual Basic 6. Since the system is no longer supported, any changes such as upgraded database technology, new servers, or updated operating systems could render the

current configuration inoperable. It is critical that Kentucky consider a new development environment and update the system to the new technology in the very near future.

Applicable Guidelines
The KSP 74 paper form was designed originally with reference to the ANSI D-16.1 and ANSI D-20 standards. The form has not been formally evaluated for its MMUCC compliance. Further, the crash data collected by E-CRASH has been changed a number of times and now is significantly different in its data content when compared to the paper form. Consequently, the difference in data collected on the paper form and the E-CRASH system does cause completeness and consistency problems.

There are no plans to update the KSP 74 paper form at this time even though modifications continue to be made to E-CRASH.

Data Dictionary
The KSP maintains a data dictionary for the crash records system. This document is available to users of the full crash database. A version of the data dictionary and extensive help files are maintained on the KSP website and are available to users of the public-use version of the crash data – an extract of the file with personal identifiers removed. Additionally, a KSP 74 manual provides a field-by-field description of the KSP 74 form for use as a reference for data collectors in law enforcement. This manual may also serve as a valuable resource for data users interested in the data collection guidelines for specific fields on the form.

Process Flow
Process flow diagrams were not supplied in the response to the pre-assessment questionnaire, but the following process narrative was provided. It would be worthwhile to develop an annotated process flow diagram for the complete crash processing system.

There are two ways an officer can submit a report.

> Electronic: Once the officer has investigated the collision he opens the KYOPS software program and enters the collision data creating the collision report. There are approximately 1,500 edits built into the program to reduce officer errors. Once the officer has completed the report he will transmit it for supervisor review. The report will then go to a server to wait for a supervisor to download it for review. A copy also stays with the officer. It is put in the officer's 'submitted' folder within the program on the computer. The supervisor must download the report to his computer. After downloaded, the supervisor completes a review of content then may accept it or reject it. If it is accepted it will go to the State Police collision repository. When the officer transmits again, the report will be moved from his 'submitted' folder to his 'accepted' folder. If the report is rejected it is sent back to the officer with a note from the supervisor advising what needs to be corrected. The rejected report will show up in the officer's 'rejected' folder the next time they transmit. Once they make their corrections the same process will be followed again.
>
> Paper: An officer will fill out a paper collision report after they investigate a collision.

Depending on department policy the officer has a certain amount of time to submit the report to the supervisor for review, normally by end of shift or within 24 hours. After it is reviewed and approved, the report will then be sent to the State Police. It is then scanned and keyed into the processing system. The report is then processed using the same 1,500 edits in the E-CRASH software. The report is then accepted or rejected. If it is rejected it is returned with a list of errors to correct. The data at this point is not available for dissemination or public use. If it is accepted, it is placed in the collision database for use. Rejected reports must be corrected and returned to the KSP. However, if an agency does not return a report with corrections, the system will auto-accept the report after 90 days with the original errors. Letters are sent to the departments that have not corrected the reports in error. These letters are sent at 30, 60, and 90 days. Departments have ten days to submit original reports to the central repository maintained by the State Police.

Interface with Other Components

Crash reporting has an interface with the roadway data component for the purposes of data validation and auto-population of data entry fields. Location codes are added to the crash reports during field data collection (i.e., E-CRASH provides latitude/longitude coordinates, county, route, milepost, and street names). E-CRASH users with barcode readers obtain driver license information electronically to auto-populate personal identifying information on the crash report. A similar process is desired to auto-populate vehicle information, but the vehicle registration document does not contain a barcode.

CRASH has an automated process to create the SafetyNet upload file. A similar upload file could be created to support the FARS process but NHTSA prohibits an upload to their system. KSP also creates a file extract for use by the Division of Driver Licensing to post crash involvement into the driver history file.

In addition, crash data are linked to several other traffic records system components for the purposes of enriching the datasets to support analysis. Crash and roadway inventory data are linked based on location code and/or latitude/longitude coordinates. Crash data are also linked to data files in the injury surveillance system, including emergency department, hospital discharge data, and vital statistics.

Quality Control Program

The crash data quality control program managed by the KSP Criminal ID and Records Branch, exhibits some of the attributes of a formal, comprehensive data quality management program.

Data quality is managed at three points in the process from the initial crash event through final posting of data at KSP. Law enforcement agencies conduct a supervisory review of the reports prior to submission to KSP. E-CRASH's extensive edit checks require a high degree of quality data as the crash data are collected at the scene. The edit checks validate data types, data value ranges, and logical agreement among two or more data fields. CRASH edit checks are run again as the data are submitted and accepted or rejected in the KSP database.

KSP did provide an extensive list of quality metrics for the purpose of this assessment. It is clear that KSP routinely assesses the quality of their data and could support a formal data quality control program.

The following data quality metrics were supplied in the response to the pre-assessment questionnaire.

Quality Control Measurements for Crash Data

Timeliness	- # days from crash event to receipt for data entry on statewide database = 8.4 - # days for manual data entry = 9.8 - # days for upload of electronic data = 8.2 - % reports entered into the system within 30 days of the crash = 95% - % reports aged more than 60 days = 2%
Accuracy	- % of crashes "locatable" using roadway location coding method = 99% - % VINs that are valid (i.e., match to vehicle record and decode) = 89% - % of interstate motor carriers "matched" in MCMIS = 88% - % crash reports with 1 or more uncorrected "fatal" errors = 1% - % crash reports with 2 or more uncorrected "serious, non-fatal" errors = 0.2% - % crash reports with 5 or more uncorrected "minor" errors = 0.06%
Completeness	- % LEAs with > 10% unexplained drop in reporting one year to the next = 0 - % LEAs within 5% of "expected" number of crashes each month = 100 - % FARS/MCMIS match = 95%
Consistency	- % of time "unknown" code is used in fields with that possible value = 1% - % logical error checks that fail = <1% - % compliance with MMUCC guidelines = Est. 85% (please provide a date and source for this estimate)

The description of an ideal quality control program is provided below for the State's consideration. The provisions of the program are not to be interpreted as formal requirements but rather as best practices gleaned from experience in other states.

- **Automated edit checks/validation rules that ensure entered data falls within the range of acceptable values and is logically consistent between fields.**

Edit checks are applied when the data are added to the record. Many systems have a two-tiered error classification: (1) critical errors that must be corrected before submission and (2) warnings that may be overridden.

- **Limited State-level correction authority granted to quality control staff working with the statewide crash database to correct obvious errors and omissions without returning the report to the originating officer.**
  Obvious errors include minor misspellings, location corrections, and directional values. Obvious omissions include missing values that can be easily obtained from the narrative or diagram.

- **Processes for returning rejected crash reports in place to ensure the efficient transmission of rejected reports between the state-level database and the collecting official as well as tracking resubmission of corrected reports.**
  Placing the responsibility for correcting report errors on the originating officer is a valuable learning tool that reduces future data quality errors.

- **Performance measures tailored to the needs of data managers and address the concerns of data users. Measures can be aggregated for collectors, users, and the State TRCC.**
  The crash data should be timely, accurate, complete, uniform, integrated, and accessible. These attributes should be tracked based on a set of State-established quality control metrics. The measures shown in the *Advisory* are examples of high-level management indicators of quality.

- **Numeric goals for each performance measure established and regularly updated by the State in consultation with users via the TRCC.**

- **Performance reporting that provides specific feedback to each law enforcement agency on the timeliness, accuracy, and completeness of their submissions to the state-wide database relative to applicable State standards.**
  Specific feedback to law enforcement agencies helps them understand the need to improve data quality.

- **Quality control reviews comparing narrative, diagram, and the coded contents of the report considered part of the data acceptance process for the statewide database.**
  Based on experience in other states, as the proportion of reports received electronically increases it is crucial to transition the data entry staff positions to increased quality control functions.

- **Periodic independent sample-based audits conducted for the reports and related database contents for that record.**
  A random sample of reports is selected for review. The resulting reviews are also used to generate new training content and data collection manuals, update the validation rules, and prompt form revisions. At a minimum, these audits occur on an annual basis.

- **Periodic comparative and trend analyses used to identify unexplained differences in the data across years and jurisdictions.**
  At a minimum, these analyses occur on an annual basis.

- **Data quality feedback from key users regularly communicated to data collectors and data managers.**
  This feedback will include corrections to existing records as well as comments relating to frequently occurring errors. Data managers disseminate this information to law enforcement officers as appropriate.

- **Data quality management reports provided to the State TRCC for regular review.**
  The TRCC uses the reports to identify problems and develop countermeasures.

Recommendations:

- ❑ Upgrade as soon as possible the current Kentucky Open Portal Solution (KYOPS) development environment to current technology.

- ❑ Continue to invest in the future development of Kentucky Open Portal Solution (KYOPS) including the need for future technology upgrades.

- ❑ Develop and add a barcode to the vehicle registration document to support electronic data collection and auto-population of vehicle information in E-CRASH.

- ❑ Establish a formal comprehensive data quality management program. This program should include a complete set of data quality measurements covering each of the attributes of timeliness, accuracy, completeness, consistency, integration, and accessibility. The program should also include formal processes for monitoring timeliness, accuracy, and completeness with specific feedback to individual law enforcement agencies.

- ❑ Assign staffing to fulfill the data quality assurance role and to support the formal comprehensive data quality management program.

- ❑ Update the current KSP 74 crash report form to make it consistent with data as collected in E-CRASH and improve MMUCC compliance.

- ❑ Conduct a formal evaluation of the newly designed KSP 74 crash report form and the CRASH database for MMUCC compliance.

- ❑ Develop annotated process flow diagrams for the complete crash processing system.

- ❑ Develop a formal process of identifying errors in the Map It transportation layer and track the errors through the update process until they are resolved and available in KYOPS Map It.

2-B: Roadway Data Component

Advisory Excerpt:

- ❑ *Description and Contents.*
  Roadway information includes roadway location, identification, and classification, as well as a description of a road's total physical characteristics and usage. These attributes should be tied to a location reference system. Linked safety and roadway information are valuable components that support a State's construction and maintenance program development. This roadway information should be available for all public roadways, including local roads.

  The State Department of Transportation (DOT) typically has custodial responsibility for the Roadway Data Component. This component should include various enterprise-related files such as:

  - *Roadway Inventories*
    - *Pavement*
    - *Bridges*
    - *Intersections*
  - *Roadside Appurtenances*
    - *Traffic Control Devices (TCD)*
    - *Guard Rails*
    - *Barriers*
  - *Traffic*
    - *Vehicle Miles Traveled (VMT)*
    - *Travel by Vehicle Type*
  - *Other*
    - *Geographic Information Systems (GIS)*
    - *Location Reference System (LRS)*
    - *Project Inventories*

- ❑ *Applicable Guidelines*
  The major guideline that pertains to the Roadway Data Component is the HPMS. This provides guidance to the States on standards for sample data collection and reporting for traffic volume counts, inventory, capacity, delay, and pavement management data elements. Guidelines and tools that address roadway data, as well as identifying which of these are expected to have the greatest correlation with crash incidences, should be considered part of this advisory. Examples of these resources are the Highway Safety Manual, Safety Analyst, and the Interactive Highway Safety Design Model. In addition, the American Association of State Highway and Transportation Officials (AASHTO) is developing a series of guides for its Strategic Highway Safety Plan. This multi-year cooperative effort includes guidelines relevant to several TRS components.

- ❑ *Data Dictionary*
  Roadway information should be available for all public roads in the State whether under State or local jurisdiction. The contents of the Roadway Data Component should be well documented, including data definitions for each field, edit checks, and data collection guidelines that match the data definitions. Procedures for collection of traffic data and calculation of vehicle miles traveled (VMT) should be documented as well.

- ❑ *Process Flow*
  The steps from initial event to final entry onto the statewide roadway data system should be documented in process flow diagrams for each file that are part of the Roadway Data Component. The diagrams should be annotated to show the time required to complete each step and to show alternate flows and timelines depending on whether data are submitted in hardcopy or electronically to the statewide system. The process flow diagram should include processes for error correction and error handling (i.e., returning reports to the original source for correction, resubmission, etc.). Process flow diagrams should show all major steps whether accomplished by staff or with automated systems and clearly distinguish between the two.

- ❑ *Interface with Other Traffic Records System Components*
  A location reference system should be used to link the various components of roadway information as well as other TRS information sources, especially crash information, for analytical purposes. Compatible location coding methodologies should apply to all roadways, whether State or locally maintained. When using a GIS, translations should be automatic between legacy location codes and geographic coordinates. This process should be well established and documented. Compatible levels of resolution for location coding for crashes and various roadway characteristics should support meaningful analysis of these data.

- *Quality Control Program*

  The roadway data should be timely, accurate, complete, and consistent and these attributes should be tracked based on a set of established quality control metrics. The overall quality of the roadway data should be assured based on a formal program of error and edit checking as the data are entered into the statewide system and procedures should be in place for addressing the detected errors. In addition, the custodial agency and the TRCC should frequently work together to establish and review the sufficiency of the quality control program and to review the results of the quality control measurements. The roadway data managers should receive periodic data quality reports. There should be procedures in place for sharing the information with data collectors through individual and agency-level feedback, as well as training and changes to the applicable instruction manuals, edit checks, and roadway data dictionary. Audits and validation checks should be conducted as part of the quality control program to assure the accuracy of specific critical data elements. Example measurements are shown in Table 5.

Table 3: Examples of Quality Control Measurements for Roadway Data

Timeliness	- *% of traffic counts conducted each year* - *# days from crash event to location coding of crashes* - *# days from construction completion to roadway file update*
Accuracy	- *% of crashes locatable using roadway location coding method* - *% errors found during data audits of critical data elements*
Completeness	- *% traffic data based on actual counts no more than 3 years old* - *% public roadways listed in the inventory*

The measures in Table 5 are examples of high-level management indicators of quality. The managers of individual roadway files should have access to a greater number of measures. The custodial agency should be prepared to present a standard set of summary measures to the TRCC monthly or quarterly.

2-B: Roadway Data Component Status

The Kentucky Transportation Cabinet (KYTC) is an executive branch agency responsible for overseeing the development and maintenance of a safe, efficient multi-modal transportation system throughout the Commonwealth. The Cabinet manages more than 27,000 miles of highways, including roughly 20,500 miles of secondary roads, 3,600 miles of primary roads, and more than 1,400 interstate and parkway miles. The Cabinet also provides direction for 230 licensed airports and heliports and oversees all motor vehicle registration and driver licensing in the Commonwealth.

The KYTC Division of Planning, Data Enterprise Branch, is responsible for all public roadway information pertaining to State and locally owned roads. The Data Enterprise Branch is responsible for maintaining and updating the Highway Information System (HIS). The HIS is a spatially enabled Oracle database that links GIS road centerlines to various sets of roadway information with a spatial location reference systems (LRS) county, route, and mile point supplemented by GIS latitude/longitude coordinates.

The GIS layers are made available on a weekly basis through varying Internet Mapping Services (IMS) websites or as a free download from the KYTC Division of Geographic Information website. The web reports concerning ownership and mileages can be found within the KYTC webpage.

In order to keep this information as current as possible the KYTC contracts with the 15 Area Development District (ADD) offices to work with local officials to assure locally owned roadway information is accurate and complete. This contract allows for a local road submittal every two weeks for every county in the State. The expectations are for the local governments and the ADDs to work together to assure the information relayed to KYTC is as accurate and complete as possible. Locally owned roads are about 53,000 miles of the 80,000 miles of the public road system. The ADDs are quasi-state agencies, much like a Regional Planning Organization in other states that assist rural areas with development issues. They have GIS/GPS staff and are capable of performing this task for KYTC.

The importance of this process to local officials is that the information submitted by the ADDs to KYTC is the basis of the Rural and Secondary Roads program concerning local road funding. The information the ADDs send to KYTC includes ownership, mileage, name, geographic representation, just to name a few. This information also serves as the basis of roadway information for the rest of KYTC and other State and federal agencies. This includes the annual Highway Performance Monitoring System (HPMS) report to the Federal Highway Administration (FHWA) that supports the apportionment of federal road funds to Kentucky.

The Transportation Enterprise Data (TED) sharing and reporting system serves as the KYTC enterprise database. The business area database systems, like HIS and Pontis, provide a weekly or periodic data dump to TED so that dashboard reporting and updating and linking to other systems can be accomplished. Spatial data is also exported to support cabinet-wide GIS for customers who need data from varying systems to accomplish their day-to-day tasks. The TED also contains traffic data from the TRAffic DAta System (TRADAS). TRADAS is a software

system for collecting, editing, summarizing, and reporting a wide range of traffic data. TED is designed to be a data warehouse of transportation datasets including crash, roadway features, bridge, pavement, maintenance, driver licensing, vehicle registration, traffic citation, injury and traffic count data. TED is intended to serve the information needs of transportation asset and program management, highway safety management, injury prevention, and congestion management at the State and local level.

KYTC uses several of these data sources to provide the informational support for the Department's major roadway safety countermeasure programs. Among these are the HIS, the crash data base, TRADAS, etc. The major safety programs depending on these data sources are:

- The Strategic Highway Safety Plan
- The Highway Safety Improvement Program (HSIP)
- The High Risk Rural Roads Program (HRRRP)
- The Highway Safety Plan

The State's nine Metropolitan Planning Organizations (MPOs) depend on data from the KYTC HIS and the Kentucky Open Portals Solutions (KYOPS) data systems to conduct planning and safety studies for their respective geographic areas. While some issues concerning the data needs of the MPOs are unresolved with regard to source documents of crash reports and query flexibility the MPO representatives were pleased with the availability and access to timely and accurate data from the State data systems.

Most recommendations presented in the roadway section of the 2007 traffic records assessment have been addressed and resolved satisfactorily. The Kentucky Transportation Center of the University of Kentucky conducted an *"Evaluation of the Locations of Kentucky's Traffic Crash Data"* published in November 2010. The study examined the accuracy of location information collected by police on the crash report. The study found an increase from 50 to 92 percent in location accuracy primarily due to the use of an electronic mapping tool (Map It) included in the electronic collection software.

Applicable Guidelines

Guidelines and standards were taken into consideration with the development of the roadway data systems especially with respect to the HPMS. The HPMS is a national guideline for reporting to FHWA certain road data on federally-aided roads. The HPMS provides guidance to the states on standards for sample data collection and reporting for traffic volume counts, inventory, capacity and delay, and pavement management data elements.

The Traffic Engineering branch is aware of the analytic software tools recommended in the *Highway Safety Manual* (HSM). They are weighing the benefits/costs and feasibility for use in Kentucky. Adoption would require the collection of additional roadway features data and adherence to data requirements for use with the analytic safety software tools. In conjunction with the use of these tools, they are also considering the resources required to collect and maintain the data elements suggested in the Model Inventory of Roadway Elements (MIRE) guideline.

A subset of the MIRE roadway and traffic data elements that are critical to support the HSIP is referred to as the Fundamental Data Elements for HSIP (FDE/HSIP). The fundamental data elements are a basic set of elements an agency would need to conduct enhanced safety analyses regardless of the specific analysis tools used or methods applied. The elements are based on findings in the FHWA report "*Background Report: Guidance for Roadway Safety Data to Support the Highway Safety Improvement Program*." Definitions of fundamental data elements may be found in this Background Report. The fundamental data elements have the potential to support other safety and infrastructure programs, in addition to the HSIP.

Data Dictionary
The KYTC does not maintain a data dictionary for the roadway files as such, but they have electronic files that define each individual data element.

Process Flow
Process flow diagrams are not maintained for any of the roadway features and inventory systems.

Interface with Other Traffic Records System Components
The KYTC uses county, route and milepost as the prime location reference system (LRS) for the State highway system. The road files also include latitude/longitude coordinates as supplemental LRS. The analysis capability is greatly enhanced with the interface of roadway features, traffic volume and crash data to provide merged sets of data which reside in the HIS database.

Quality Control Program
The HIS is updated through data extracted from design plans and then followed up with site visits after a newly constructed or reconstructed road is open to traffic. The KYTC Planning staff updates the State roads as they become open to traffic. The goal is for the higher systems roads (i.e., Principal Arterials) to be updated in the systems within the same week they are opened to traffic. The lower system roads are generally updated within two to three weeks. The local road updates take place on a cycle determined before the fiscal year to accommodate the customers within KYTC of the road centerline file. Traffic count data are updated on a statewide basis every three years. The counts National Highway System roads are updated annually.

Recommendations:

- ❑ Support the continued development of the Transportation Enterprise Database.
- ❑ Consider the inclusion of the fundamental data elements of the Model Inventory of Roadway Elements in the Highway Information System.
- ❑ Include representation of local transportation officials on the Kentucky Traffic Records Advisory Committee.

2-C: Driver Data Component

Advisory Excerpt:

- *Description and Contents*
  Driver information should include data about the State's population of licensed drivers, as well as data about convicted traffic violators who are not licensed in that State. Information about persons licensed by the State should include: personal identification, driver license number, type of license, license status, driver restrictions, convictions for traffic violations in this State and the history of convictions for critical violations in prior States, crash history whether or not cited for a violation, driver improvement or control actions, and driver education data.

  Custodial responsibility for the Driver Data Component usually resides in a State Department or Division of Motor Vehicles. Some commercial vehicle operator-related functions may be handled separately from the primary custodial responsibility for driver data. The structure of driver databases should be typically oriented to individual customers.

- *Applicable Guidelines*
  The ANSI D-20 standard should be used to develop data definitions for traffic records-related information in the driver and vehicle files. Driver information should be maintained to accommodate information obtained through interaction with the NDR via the PDPS and the CDLIS. This enables the State to maintain complete driving histories and prevent drivers from circumventing driver control actions and obtaining multiple licenses. Data exchange for PDPS and CDLIS should be accomplished using the American Association of Motor Vehicle Administrators (AAMVA) Code Dictionary. Security and personal information verification should be in accordance with the provisions of the Real ID act.

- *Data Dictionary*
  At a minimum, driver information should be available for all licensed drivers in the State and for all drivers convicted of a serious traffic violation (regardless of where or whether the person is licensed). The contents of the driver data files should be well documented with data definitions for each field, and where applicable, edit checks and data collection guidelines that match the data definitions. Procedures for collecting, reporting and posting of license, conviction, and license sanction information should be documented.

- *Process Flow*
  The steps, from initial event (licensure, traffic violation, etc.) to final entry onto the statewide driver and vehicle data files, should be documented in process flow diagrams for each file that is part of the Driver Data Component. The diagram should be annotated to show the time required to complete each step and to show alternate flows and timelines depending on whether the data are submitted in hardcopy or electronically to the statewide system. The process flow diagram should include processes for error correction and error handling (i.e., returning reports to the original source for correction, resubmission, etc.). The process flow should also document the timing, conditions, and procedures for purging records from the driver files. Process flow diagrams should show all major steps whether accomplished by staff or automated systems and clearly distinguish between the two. The steps also should be documented in those States that have administrative authority to suspend licenses based on a DUI arrest independent of the judicial processing of those cases.

- *Interface with Other Traffic Records System Components*
  The Driver Data Component should have interfaces (using common linking variables shown in Table 6) to other TRS components such that the following functions can be supported:

  - *Driver component data should be used to verify/validate the person information during data entry in the crash data system and to flag records for possible updating in the driver or vehicle files when a discrepancy is identified. Key variables such as driver license number, name, address, and date of birth should be available to support matching of records among the files. Social Security Numbers should be validated for interstate records exchange.*

  - *Driver and vehicle owner addresses are useful for geographic analyses in conjunction with crash and roadway data components. Linkage in these cases should be based on conversions of addresses to location codes and/or geographic coordinates in order to match the location coding method used in the roadway data component and in the GIS.*

  - *Links between driver convictions and citation/adjudication histories are useful in citation tracking, as well as in systems for tracking specific types of violators (DUI [Driving Under the Influence] tracking systems, for example). Even if a citation tracking system is lacking, there is value in being able to link to data from enforcement or court records on the initial charges in traffic cases. These linkages should be based usually on driver name and driver license number but other identifiers may be used as well. The National Center for State Courts (NCSC) is looking for these identifiers in addition to methods to improve data sharing. "NCSC offers solutions that enhance court*

operations with the latest technology; collects and interprets the latest data on court operations nationwide; and provides information on proven best practices for improving court operations." (http://www.ncsconline.org/)

- *Linkage to injury surveillance data should be possible either directly or through probabilistic linkage in order to support analysis of crash outcomes and crash risk associated with specific driver characteristics (e.g., the driver's history of violations or crash involvement). Key variables should include names, date of birth, dates, times, and locations of crashes and citations.*

Table 6: Common Linking Variables between Driver And Other Data Components of a Traffic Records System

Driver Linkages to Other Law Enforcement & Court Files	- *Citation Number & Case Number* - *Location (street address, description, coordinates, etc.)* - *Personal ID (name, address, DL number, date of birth, etc.)*
Driver Linkages to Roadway Information	- *Driver Addresses (location code, coordinates)*
Driver Linkages to Crash Information	- *Driver License Number* - *Personal Identifiers (name, address, date of birth, etc.)*
Driver Linkages to Statewide Injury Surveillance System Information	- *Personal Identifiers (where allowed by law)* - *Crash Date, Time, Location*

❑ *Quality Control Program*

The driver data should be timely, accurate, complete, and consistent and these attributes should be tracked based on a set of established quality control metrics. The overall quality of the information in the Driver Data Component should be assured based on a formal program of error/edit checking as data are entered into the statewide system and procedures should be in place for addressing the detected errors. In addition, the custodial agency (or agencies) and the TRCC should work together frequently to establish and review the sufficiency of the quality control program and to review the results of the quality control measurements. The driver data managers should receive periodic data quality reports. There should be procedures in place for sharing the information with data collectors through individual and agency-level feedback, as well as through training and changes to the applicable instruction manuals, edit checks, and the driver and vehicle data dictionaries. Audits and validation checks to assure the accuracy of specific critical data elements should be conducted as part of the formal quality control program. Example measurements are presented in Table 7.

Table 3: Examples of Quality Control Measurements for Driver Data

Timeliness	- *Average time to post driver licenses* - *Average time to post convictions after receipt at DMV* - *Average time to forward dispositions from court to DMV*
Accuracy	- *% of duplicate records for individuals* - *% "errors" found during data audits of critical data elements*
Completeness	- *% drivers records checked for drivers moving into the State* - *% of driver records transferred from prior State*
Consistency	- *% of SSN verified online* - *% of immigration documents verified online* - *% violations reported from other States added to driver history*

The measures in Table 7 are examples of high-level management indicators of quality. The managers of individual driver files should have access to a greater number of measures. The custodial agency should be prepared to present a standard set of summary measures to the TRCC monthly or quarterly.

2-C: Driver Data Component Status

Description and Contents

The Division of Driver Licensing (DDL) in the Kentucky Transportation Cabinet (KYTC) maintains the driver records on commercial and non-commercial licensed drivers, those with convictions for traffic offenses who are not licensed in Kentucky, and those who obtain an identification card. Kentucky's driver licenses and identification cards meet secure identification benchmarks.

Driver licenses are issued by the Circuit Court Clerks in the 112 offices serving the 120 counties in the Commonwealth of Kentucky. Driver testing is conducted by the Kentucky State Police. The court clerk personnel receive training in fraudulent document recognition and determine an individual's eligibility for a license.

The NDR/PDPS is checked to determine whether the applicant is currently under suspension or revocation in another state and the SSOLV is checked to verify the authenticity and accuracy of the Social Security Number. The CDLIS is checked for commercial drivers, and those with current valid CDLs from another state will have their records conveyed to the DDL when Kentucky becomes the new State of Record. No information (with the exception of license status) about a non-commercial driver's record in another state is obtained. However, two months prior to the time for renewal of the non-commercial driver license, another NDR/PDPS inquiry will be processed to determine whether a suspension or revocation has been applied by another state.

Applicants who are not US citizens must go in person to one of the 12 DDL Field Offices or the One Stop Shop at DDL headquarters where their immigration documents are verified using the SAVE file, obtain a "blue letter" and return for testing and completion of the license issuance process. Those offices conduct other processes requiring personal appearance such as hearings.

Fingerprints are taken for the HazMat-endorsed CDL applicants who must submit to a Transportation Security Administration-required Security Threat Assessment, and at the end of the licensing process, a photograph is taken of the licensee, and all information about the applicant is sent to the DDL headquarters office. Facial recognition is run that evening, and problem cases are referred for investigation and cannot obtain a license without resolution of identity issues. The driver license has a 2-D barcode and a magnetic stripe on the reverse.

The driver records are stored on the legacy data system. Funding has recently been allocated for a system upgrade for the driver file. A Request for Proposals for the development of the new system has not been developed, but it is not expected to integrate with the vehicle information system that is also administered in the KYTC.

Basic Characteristics

Kentucky has a graduated driver licensing program and a No Pass/No Drive program that enables constraints for instruction permits as described in the partial quotation following:

> If a sixteen or seventeen year old does not present a school compliance verification form he/she will not be eligible to obtain an instructional permit or license.
>
> When a sixteen or seventeen year old student drops out of school or is declared to be academically deficient, the schools will report electronically to the Division of Driver Licensing. The Division of Driver Licensing will suspend the student's privilege to drive and notify the driver of the suspension. The schools will also report when a student is back in compliance with Kentucky Revised Statute 159.051 to the Division of Driver Licensing. The Division of Driver Licensing will reinstate the student's driving privilege.

Satisfactory completion of a high school driver education course is noted in the file. The DDL also conducts the State Traffic School that is a remedial program that may be required of drivers convicted for the more serious offenses and/or the accumulation of points, and that information is posted to the driver's record. The point system information is presented on the DDL web site.

Involvement in a crash is applied to a driver's record through an electronic process during the entry of crash records at the Kentucky State Police onto their crash database. BAC information is recorded in conjunction with a DUI arrest.

Convictions and Courts

Most conviction reports are sent from the courts to the DDL electronically. Law enforcement uses electronic citations except for the smallest agencies that do not use computers. Even then, the courts receiving paper citations enter them into their electronic systems, so it is rare that a paper/non-electronic conviction is received by the DDL. The driver data in electronic citations are usually populated by scanning the driver license; that, in turn, facilitates posting the conviction record to the correct driver history record in a timely manner.

Paper citations are tracked from printing to posting the final adjudication only when an enforcement agency chooses to do so—making it impossible to know if all convictions are sent to the DDL. There are convictions that are withheld because of diversion programs administered by the court and a history of case dismissals simply to prevent sending a conviction to the DDL.

Shielding in-state convictions from the DDL makes the driver histories incomplete. The deficiency is compounded by the failure to obtain and retain driver histories from previous states of licensure for non-commercial drivers. As reported in the previous traffic records assessment, "The fact that individuals that move to Kentucky from another state with a prior driver violation history are able to start their Kentucky record with a 'clean' slate is a shortcoming. This is even true if the violations are serious (DUI, Motor Vehicle Homicide, etc.)."

Making that change was recommended in the previous traffic records assessment; it has not been done. Doing so is important for identifying problem drivers, especially those with a history of DUI convictions.

Conviction and crash records are purged for non-commercial drivers after five years thus

diminishing the value of the driver histories. CDLIS basic procedures are best practices that should be applied to all of the DDL records. At a minimum, alcohol-involved violations should not be purged.

Applicable Guidelines
The AAMVA Code Dictionary (ACD) is used for the CDLIS records, and the data are compatible with NCIC transactions.

Data Dictionary
No information was available.

Process Flow
No information was available.

Interface (Integration) with Other Traffic Records System Components
The driver file does not interface with any of the other traffic records system components. A transmission from the Kentucky State Police provides the crash data for the driver histories.

Quality Control Program
It was reported that there are quality reports produced, but no details were available.

Quality Control Program
No quality control program information or quality control measurements were provided.

Recommendations:

- ❑ Record the adverse driver histories from previous states of record on non-commercial drivers as required for commercial driver records. (This was previously recommended.)

- ❑ Retain traffic conviction history on the state driver records beyond five years. (This was previously recommended.)

- ❑ Coordinate the development of the system upgrade with the upgrade of the Automated Vehicle Information System to identify and exploit all opportunities to be mutually supportive and to be responsive to the needs of law enforcement officers. Conduct the coordination through the Traffic Records Coordinating Committee.

2-D: Vehicle Data Component

Advisory Excerpt:

- ❑ *Description and Contents*
  Vehicle information includes information on the identification and ownership of vehicles registered in the State. Data should be available regarding vehicle make, model, year of manufacture, body type, and vehicle history (including odometer readings) in order to produce the information needed to support analysis of vehicle-related factors that may contribute to a State's crash experience. Such analyses would be necessarily restricted to crashes involving in-State registered vehicles only.

  Custodial responsibility for the vehicle data usually resides in a State Department or Division of Motor Vehicles. Some commercial vehicle -related functions may be handled separately from the primary custodial responsibility for all other vehicle data. The structure of vehicle databases is typically oriented to individual "customers."

- ❑ *Applicable Guidelines*
  Title and registration information, including stolen and salvage indicators, should be available and shared with other States. The National Motor Vehicle Title Information System (NMVTIS) facilitates such exchanges. In addition, some States empower auto dealers to transact vehicle registrations and title applications following the Business Partner Electronic Vehicle Registration (BPEVR) guidelines from AAMVA. The International Registration Plan (IRP), a reciprocity agreement among U.S States and Canadian provinces, administers the registration processes for interstate commercial vehicles.

- ❑ *Data Dictionary*
  Vehicle information should be available for all vehicles registered in the State. The contents of the Vehicle Data Component's files should be well documented, including data definitions for each field, and where applicable, edit checks and data collection guidelines that match the data definitions. Procedures for collection, reporting and posting of registration, title, and title brand information should be documented.

- ❑ *Process Flow*
  The steps from initial event (registration, title, etc.) to final entry onto the statewide vehicle data files should be documented in process flow diagrams for each file that is part of this component. The diagram should be annotated to show the time required to complete each step and to show alternate flows and timelines depending on whether the data are submitted in hardcopy or electronically to the statewide system. The process flow diagram should include processes for error correction and error handling (i.e., returning reports to the original source for correction, resubmission, etc.). The process flow should also document the timing, conditions, and procedures for purging records from the vehicle files. Process flow diagrams should show all major steps whether accomplished by staff or automated systems and should clearly distinguish between the two.

- ❑ *Interface with Other Traffic Records System Components*
  The Vehicle Data Component has interfaces (using common linking variables shown in Table 8) to other TRS components such that the following functions should be supported:

  - *Vehicle data should be used to verify/validate the vehicle information during data entry in the crash data system, and to flag records for possible updating in the vehicle files when a discrepancy is identified. Key variables such as VIN, license plate number, names, and addresses should be available to support matching of records among the files.*

  - *Vehicle owner addresses are useful in geographic analyses in conjunction with crash and roadway data. Linkage in these cases should be based on conversions of addresses to location codes and/or geographic coordinates in order to match the location coding method used in the Roadway Data Component and in the GIS.*

  - *As with crash data, linkage to injury surveillance data should be possible either directly or through probabilistic linkage in order to support analysis of crash outcomes and crash risk associated with specific driver characteristics (e.g., the driver's history of violations or crash involvement). Key variables should include names and dates, date of birth, times, and locations of crashes.*

Table 8: Common Linking Variables between Vehicle And Other Data Components of a Traffic Records System

Vehicle Linkages to Other Law Enforcement & Court Files	- *Location (street address, description, coordinates, etc.)* - *Personal ID (name, address, DL number, etc.)*
Vehicle Linkages to Roadway Information	- *Owner Addresses (location code, coordinates)*
Vehicle Linkages to Crash Information	- *Vehicle Identification Number* - *Personal Identifiers (name, address, date of birth, etc.)*
Vehicle Linkages to Statewide Injury Surveillance System Information	- *Personal Identifiers (where allowed by law)* - *Crash Date, Time, Location*

- *Quality Control Program*

  The vehicle data should be timely, accurate, complete, and consistent and these attributes should be tracked based on a set of established quality control metrics. The overall quality of the vehicle data should be assured based on a formal program of error/edit checking as the data are entered into the statewide system and procedures should be in place for addressing the detected errors. In addition, the custodial agency (or agencies) and the TRCC should work together frequently to establish and review the sufficiency of the quality control program and to review the results of the quality control measurements. The vehicle data managers should receive periodic data quality reports. There should be procedures in place for sharing the information with data collectors through individual and agency-level feedback, as well as training and changes to the applicable instruction manuals, edit checks, and the driver and vehicle data dictionaries. Audits and validation checks should be conducted to assure the accuracy of specific critical data elements as part of the formal Quality Control Program. Example measurements are presented in Table 9.

Table 9: Examples of Quality Control Measurements for Vehicle Data

Timeliness	- *Average time for DMV to post title transactions* - *% title transactions posted within a day of receipt*
Accuracy	- *% of duplicate records for individuals* - *% errors found during data audits of critical data elements* - *% VINs successfully validated with VIN checking software*
Completeness	- *% of records with complete owner name and address*

The measures in Table 9 are examples of high-level management indicators of quality. The managers of individual vehicle files should have access to a greater number of measures. The custodial agency should be prepared to present a standard set of summary measures to the TRCC monthly or quarterly.

2-D: Vehicle Data Component Status

Description and Contents

The Kentucky title and registration data system is administered by the Division of Motor Vehicle Licensing (DMVL) in the Kentucky Transportation Cabinet (KYTC). The records are stored in the Automated Vehicle Information System (AVIS). Commercial vehicles are included in AVIS but are managed under the International Registration Plan (IRP).

Registrations and title applications are processed by the Circuit Court/County Clerks as the driver licensing functions are for the Division of Driver Licensing. At present, auto dealers do not connect with the DMVL to transact registrations and title applications.

The AVIS database operates on the legacy computer system and a new system, KAVIS, is currently being developed through a contract with 3M Motor Vehicle Systems. Sixteen of 24 components of KAVIS have been tested, and August, 2013 is the anticipated date to become operational.

There are desirable enhancements that cannot be done through AVIS but are anticipated for KAVIS. Although integration with the driver system is not anticipated, there is hope that the owner identification key will be the driver license number.

The system that enables viewing of the vehicle records is the Online Vehicle Information System (OVIS) through which queries and registration renewals are processed. Owners can renew registrations online (that is, through OVIS).

Basic Characteristics

Vehicle transactions are processed in daily batches. KAVIS will have real time processing. VIN verification is processed nightly now. KAVIS will have online processing. The National Motor Vehicle Title Information System (NMVTIS) transactions are processed throughout the day; KAVIS will have real time processing. Insurance companies report coverage electronically; KAVIS will seek improved timeliness for the reporting.

Barcodes are applied now to titles but not to registration documents; with KAVIS barcodes are to be printed on registration documents. The following was provided:

> The barcode on the certificate of title has title number; title issue date; vehicle model number; vehicle make; identification number; odometer reading; odometer disclosure such as actual, exceed mechanical limit, not actual, and not required; purchase date; customer name and address; vehicle body style and color; and first and second lienholder.

Law enforcement enters and withdraws stop codes as follows:

> Through an automated night batch process via NCIC, the system codes transactions as stolen or not (1 or 0). A vehicle with stolen code can only be withdrawn after receiving a clearance letter from the Kentucky State Police.

Other actions can be applied to a vehicle record:

> Registrations may be suspended for DUI, civil judgment or court order. Registration cancellation codes are entered in AVIS. Once the requirements are satisfied, the registration may be reactivated by using specific codes. Registrations may also be cancelled by the system due to lack of insurance on the vehicle. A proof of current insurance must be provided before registration can be reactivated.

Applicable Guidelines
The vehicle file content is consistent with NCIC codes, VINA terminology, and NMVTIS. Training is conducted by experienced employees and managers. Reference materials available for the examiners who process registrations and titles include Law books (Kentucky Revised Statutes & Kentucky Administrative Regulations), NADA guides, Polk's Motor Vehicle Registration Manual, SOP manuals, and various memoranda and training documents.

Data Dictionary
There is no data dictionary for the vehicle file.

Process Flow
Process flow diagrams, including error identification and corrections, were reported as available for the following and applicable to both paper and electronic transactions:

- Registration and title application to registration and title issuance,
- None for requests for non-routine statistics from the vehicle file, and
- Production of periodic management reports and summaries.
- Posting of title brands and retention of title brand information from prior States.
- How information on salvage vehicles is obtained and recorded.

Uses of the File
The following users and use types were listed:

> State law enforcement agencies through AVIS and NCIC, local county clerk offices through AVIS, child support agency through AVIS, federal agencies through On-line Vehicle Information System (OVIS), insurance and banking institutions through OVIS, organizations affiliated with specific specialty plates, statistical companies (must enter into agreement with the KYTC and pay for the programming cost to develop the report & $0.02 per record) in compliance with 601 KAR 2:020.

Reports Produced
- Annual renewal report by vehicle type and by county.
- AVIS title/registration state fee and transaction reports by expiration month or vehicle

weight.

Interface with Other Traffic Records System Components
The vehicle file does not now interface with any other file. KAVIS implementation may facilitate interactions with other traffic records components.

Quality Control Program

Quality Control Measurements for Vehicle Data

Timeliness	– Average time to post registrations = _By county clerks____ – Average time to process title documents = _5 days____ – Average time to produce completed titles = _5 days____ – % title brands posted with 24 hours of receipt = _100%____ – % registrations and title brands posted within 24 hours = By county clerks_
Accuracy	– % of duplicate records for individuals = _N/A____ – % "errors" found during data audits of critical data elements = N/A____ – % VINs successfully validated with VIN checking software = _99%___
Completeness	– % of records with complete owner name and address = _99%____

Recommendations:

- ❑ Place a barcode on the registration document, and coordinate the plans to do so with the Kentucky Traffic Records Advisory Committee to maximize the benefit for law enforcement in auto-populating the electronic crash and citation reports.

- ❑ Coordinate the identification of persons titling and registering vehicles with the Division of Driver Licensing to enable a consistency in personal identification and to enhance the possible interfaces with the driver licenses and driver histories and with other components of the traffic records system. Conduct the coordination through the Kentucky Traffic Records Advisory Committee.

2-E: Citation/Adjudication Data Component

Advisory Excerpt:

- ❑ *Description and Contents*
  Information, which identifies arrest and adjudication activity of the State, should be available, including information that tracks a citation from the time of its distribution to a law enforcement officer, through its issuance to an offender, its disposition, and the posting of conviction in the driver history database. Case management systems, law enforcement records systems, and DMV driver history systems should share information to support:

  - *citation tracking*
  - *case tracking*
  - *disposition reporting*
  - *specialized tracking systems for specific types of violators (e.g., DUI tracking systems)*

  Information should be available to identify the type of violation, location, date and time, the enforcement agency, court of jurisdiction, and final disposition. Similar information for warnings and other motor vehicle incidents that would reflect enforcement activity are also useful for highway safety purposes and should be available at the local level.

  The information should be used in determining the level of enforcement activity in the State, for accounting and controlling of citation forms, and for detailed monitoring of court activity regarding the disposition of traffic cases.

  Custodial responsibility for the multiple systems that make up the Citation/ Adjudication Data Component should be shared among local and State agencies, with law enforcement, courts, and the Department of Motor Vehicles (DMV) sharing responsibility for some files (e.g., portions of the citation tracking system). State-level agencies should have responsibility for managing the law enforcement information network (e.g., a criminal justice information agency), for coordinating and promoting court case management technology (e.g., an administrative arm of the State Supreme Court), and for assuring that convictions are forwarded to the DMV and actually posted to the drivers' histories (e.g., the court records custodian and the DMV).

- ❑ *Applicable Guidelines*
  Data definitions should meet the standards for national law enforcement and court systems. Applicable guidelines are defined for law enforcement data in:

  - *National Crime Information Center (NCIC)*
  - *Uniform Crime Reporting (UCR)*
  - *National Incident-Based Reporting System (NIBRS)*
  - *National Law Enforcement Telecommunication System (NLETS)*
  - *Law Enforcement Information Network (LEIN)*
  - *Traffic Court Case Management Systems Functional Requirement Standards*

  Applicable guidelines should be defined for court records in the National Center for State Courts (NCSC), and jointly for courts and law enforcement in the GJXDM (with specific Traffic Processing Standards created through a national committee). Tracking systems for citations (i.e., a citation tracking system) and for specific classes of violators (e.g., a DUI tracking system) should meet the specifications for such systems published by NHTSA.

- ❑ *Data Dictionary*
  The citation/adjudication data files should be well documented, including data definitions for each field and where applicable, edit checks and data collection guidelines that match the data definitions. Procedures for collection, reporting and posting of license, registration, conviction, and title brand information should be documented.

  Law enforcement personnel should receive adequate training at the academy and during periodic refreshers to ensure they know the purpose and uses for the data. Training also should ensure that officers know how to access information on violators and process citations and arrests properly. The training manual should be available to all law enforcement personnel and the instructions should match, as appropriate, the edit checks that are performed on the data prior to its being added to the local records management system and statewide databases. The edit checks should be documented and both common and serious errors in the data should be flagged, including missing or out-of-range values and logical inconsistencies. The data element definitions and system edits should be shared with all

collectors, managers, and users in the form of a data dictionary that is consistent with the training manual and the crash report form. Court case management systems and tracking systems (citation tracking and DUI tracking) should be well documented to include definitions of all data elements and corresponding edit checks to ensure accuracy.

- *Process Flow*
  The processing of traffic violations, citations, arrests, and court cases should be documented in a series of flow diagrams showing the typical procedures and their average time to completion for each step. The administrative handling of payment in lieu of court appearance should be shown separately from those violations that are not handled administratively. The processes for detecting drugs or collecting blood alcohol concentration (BAC) values through various methods (breath test, blood or urine tests) should also be documented. The processes for tracking DUI cases in a DUI tracking system should also be included in the set of process flow diagrams. Processes for paper and electronic filing and reporting should be shown separately. Process flow diagrams should show all major steps whether accomplished by staff or automated systems and clearly distinguish between the two.

- *Interface with other traffic records system components*
  NCIC, GJXDM, NIBRS, LEIN, and NLETS guidelines all define methods and data standards for information transfer and sharing at the State and national level. Typically, there are State-level equivalents of the various networks and standards governing the sharing of law enforcement and court-related data. For the purposes of safety analysis at a State and local level, linkage between the Citation/Adjudication Data Component and other components of the TRS is important because it is useful for analyzing the geographic distribution of traffic violations and incidents, as well as monitoring the effectiveness of countermeasures that involve enforcement or court processes. It also enables the creation and updating of adverse driver histories for the purpose of driver control. Key linkages within the TRS for citation/adjudication information are listed in Table 10.

Table 10: Common Linking Variables between Citation/Adjudication and Other Data Components of a Traffic Records System

Citation/Adjudication Linkages to Other Law Enforcement Files and Tracking Systems	- *Computer Aided Dispatch (CAD) Record Number* - *Citation/Arrest/Incident Number, Court Case Number* - *Location (street address, description, coordinates, etc.)* - *Personal ID (name, address, DL number, etc.)*
Citation/Adjudication Linkages to Driver/Vehicle Files	- *Driver and Owner Names, Driver License Number* - *Driver & Owner Addresses (location code, coordinates)* - *Vehicle Plate Number, VIN*
Citation/Adjudication Linkages to Statewide Injury Surveillance System Information	- *Personal Identifiers (where allowed by law)* - *Crash-Related Citation/Arrest Date, Time, Location*

- *Quality Control Program*
  The citation/adjudication data should be timely, accurate, complete, and consistent and these attributes should be tracked based on a set of established quality control metrics. The overall quality of the citation/adjudication data should be assured based on a formal program of error/edit checking as the data are entered into the statewide system, and procedures should be in place for addressing the detected errors. In addition, the custodial agency (agencies) and the TRCC should frequently work together to establish and review the sufficiency of the quality control program and to review the results of the quality control measurements. The data managers receive regular, periodic data quality reports. There should be procedures in place for sharing the information with data collectors through individual and agency-level feedback as well as training and changes to the applicable instruction manuals, edit checks, and the driver and vehicle data dictionaries. Audits and validation checks should be conducted to assure the accuracy of specific critical data elements as part of the formal Quality Control Program. Example measurements are presented in Table 11.

Table 11: Examples of Quality Control Measurements for Citation/Adjudication Data

Timeliness	- *Average time for citations to be sent from LEAs to courts* - *Average time for convictions to be sent to DMV*
Accuracy	- *% errors found during data audits of critical data elements* - *% violations narratives that match the proper State statute*
Completeness	- *% of cases with both original charges and dispositions in citation tracking system*
Consistency	- *% traffic citations statewide written on a single uniform citation*

The measures in Table 11 are examples of high-level management indicators of quality. The managers of individual citation/adjudication files should have access to a greater number of measures. The custodial agency should be prepared to present a standard set of summary measures to the TRCC monthly or quarterly.

2-E: Citation/Adjudication Data Component Status

Description and Contents

The Commonwealth of Kentucky has a unified court system under the authority of the State Supreme Court as authorized by the amendment to State Constitution in 1975. The Administrative Office of the Courts (AOC) is the operational arm of the Judicial Branch and supports court facilities and programs in all 120 counties, with its main campus in Frankfort.

The AOC was established in 1976 as a result of the Judicial Article. The Judicial Article created Kentucky's unified court system and made the chief justice head of the state court system, also known as the Kentucky Court of Justice.

The AOC carries out duties that are mandated by the Kentucky Constitution, including administering the Judicial Branch budget, building and maintaining court facilities, maintaining court statistics through a statewide case management database, administering personnel policies and payroll for court personnel, and providing educational programs for judges, circuit court clerks and support staff.

Adjudication of traffic cases that are not felony charges is under the jurisdiction of 116 District Courts throughout the Commonwealth. The District Courts adjudicate more than 372,000 cases annually. Felony traffic cases are adjudicated by Circuit Courts.

A uniform citation is used by all law enforcement officers to file traffic charges for violations of state statutes and municipal ordinances. The citation design and content are promulgated by the AOC in consultation with the Kentucky State Police (KSP). The information required on the citation form meets most of the requirements of the *Advisory*. However, the citation form allows for a free text location field that is inconsistent with the location description on crash reports. It was also reported through interviews that the location provided by the Map It application in the electronic ticket is recorded differently than when using Map It to provide crash locations. A consistent location schema is essential for correlating crash with traffic enforcement locations.

All citation forms are controlled by an inventory number. There are two methods for issuing traffic citations: hand-written citations, and electronic ticket (e-ticket) systems.

The KSP prints and issues citation forms to local police agencies which are responsible for the inventory and issuance to their individual officers. Individual officers must account for each citation form issued to them. A chain of command authorization is required for any citation that is not issued by the officer. Completed hand-written citations are submitted to the local Circuit Court Clerk who enters data from the citation into the KyCourts Case Management System. The KYOPS e-ticket system is maintained by the KSP and made available for use to any police agency in the Commonwealth. No private vendors are authorized to provide e-ticket systems in Kentucky. The KYOPS e-ticket system assigns a unique citation number that is tracked in the KYOPS database. Data integrity benefits are derived from KYOPS by automatically populating driver information through barcode readers in patrol vehicles. Further data integrity and efficiency benefits could be realized if driver and vehicle data could be automatically populated to e-ticket and e-crash forms from information returned by Mobile Data Terminals (MDTs) on

driver license and license plate queries or from barcoded vehicle registration documents. Additionally, manual data entry processing activities are eliminated through automated upload of citation data directly to KyCourts. Currently, approximately 72 percent of traffic cases in Kentucky are processed through KYOPS. This is a significant increase in the percentage of citations issued via KYOPS since the previous assessment. KYOPS and established procedures for uniform citation inventory have the components of a functioning citation management system that meets the criteria as called for in the *Advisory*.

Kentucky utilizes KyCourts as the case management and repository for citations, pending actions, and dispositions. KyCourts is the repository for all traffic citations issued within the State regardless of the issuing police agency. KyCourts is utilized by the courts to track the progress of cases from submission to the Circuit Court Clerk through final charge disposition. The AOC has a goal of closing all traffic cases within 90 days from the citation date. Once traffic cases are finally adjudicated, disposition information is transmitted electronically from KyCourts directly to the Division of Driver Licensing (DDL) to be recorded on the driver's record. KyCourts has the components of a functioning court case management system that meets the criteria as called for in the *Advisory*.

It appears there is a risk to the continued operation of both KYOPS and KyCourts. Both systems' software is out-of-date and is no longer supported by the manufacturer. The loss of either or both systems would significantly degrade the timeliness, accuracy, and reliability of the e-crash, e-ticket, and court case management programs.

Plea bargaining is permitted on traffic cases by prosecutors with the final approval of the district court judge except for a few cases where plea reductions are prohibited by law. Driving Under the Influence (DUI) cases are specifically prohibited from being reduced through plea bargains. However, a deferred dismissal program is being utilized by one county attorney on first offense DUIs meeting certain criteria. Most traffic cases are permitted to be pled out at the local prosecutor's discretion. Reports comparing final convictions different from the original charge can be provided on an ad-hoc basis from the AOC.

Additionally, Kentucky has an established State Traffic School (STS) program available to traffic law violators in lieu of having points assessed resulting from a traffic conviction. STS may be requested from the court no more than once each 12 months and completion of the program is recorded on the driver history. However, in compliance with federal guidelines, Commercial Driver License holders are not eligible to participate in STS to dispose of a traffic citation.

Applicable Guidelines

The KSP reports that KYOPS is in compliance with NCIC, NIBRS, NIEM, and NLETS to assure interoperability of data and communications. Additionally, the District Court Clerks follow specific procedures promulgated by the AOC or Supreme Court, including procedures related to the handling of electronic and paper documents. No information was provided on the KyCourts to determine its compliance with criminal justice data exchange standards.

Data Dictionary
No data dictionaries for KYOPS or KyCourts were provided for this assessment. However, information provided indicates that the both systems contain edit checks and verifications to ensure that the data are valid or fit prescribed formats. Law enforcement and data entry clerks receive immediate error messages whenever possible to correct errors before they get in the system.

Law enforcement personnel are provided basic traffic enforcement training in the certifying academy including the proper completion of the uniform citation. Additional training is conducted as a part of the officer's field training when he begins traffic enforcement duties. Additional training is provided on e-ticketing but little further training is provided.

Process Flow
Process flow diagrams were not provided. However, detailed descriptions of the process were furnished.

There are two methods for issuing traffic citations: handwritten citations, and e-tickets. Completed handwritten citations are submitted to the local Circuit Court Clerk who enters data from the citation into KyCourts. Citations issued via KYOPS are uploaded to KyCourts in real time if communication connectivity is available. Otherwise officers upload tickets at the end of each shift. DUI tickets are processed in the same manner as other charges.

Traffic violations which are payable by a fine only do not require a court appearance and may be resolved through an administrative process. Motorists are given three options to pay fines: online, by mail, or in person and the disposition is electronically submitted to DDL for posting on the driver's record. The AOC provides **ePay** as an online service to motorists to pay traffic fines. Traffic violations with a "not guilty" plea or those categorized as non-payable violations are submitted to the District Court for adjudication. Once traffic cases are finally adjudicated, disposition information is transmitted electronically from KyCourts directly to DDL to be recorded on the driver's record. The KyCourts upload of conviction data is submitted daily to DDL.

Interface with other Components of the Traffic Records System
The direct electronic interfaces contained in the citation/adjudication component appear to be the transmission of the e-ticket to KyCourts and the transmission of disposition information from KyCourts to DDL. Additionally, KyCourts data is uploaded from distributed servers in each county to CourtNet to provide a comprehensive view of case history, pending cases and current judicial proceedings.

Interviews with stakeholders indicated that driver and vehicle files could be accessed for information but no direct linkage of data or population of the information was possible to either crash or citation programs in police vehicles. County prosecutors indicated that there was no direct access to driver history information provided them in their offices. The inability to review driver history by prosecutors could result in failure to apply penalty enhancements for serious or repeat offenders.

Common Linking Variables between Citation/Adjudication and Other Data Components of a Traffic Records System

Citation/Adjudication Linkages to Other Law Enforcement Files and Tracking Systems	- Computer Aided Dispatch (CAD) Record Number - Court Case Number - Location (street address, description, coordinates, etc.) - Personal ID (name, address, DL number, etc.)
Citation/Adjudication Linkages to Driver/Vehicle Files	- Driver Names, Address, Driver License Number - Vehicle Plate Number, VIN
Citation/Adjudication Linkages to Statewide Injury Surveillance System Information	- Emergency Medical/Hospital information - Crash information

Quality Control Program

The e-ticket systems contain edit checks and verifications to ensure that the data are valid or fit prescribed formats. The KYOPS e-ticket system will not finalize and upload a citation until the transaction passes all edit checks. Data entry clerks receive immediate error messages whenever possible to correct errors before they are processed in KyCourts. However, no direct validation of drivers or vehicles is performed on the entry of enforcement cases into the KyCourts program. The absence of linked data creates greater potential for incomplete or inaccurate information to be contained in the record sets. Daily error reports are provided from DDL or rejected dispositions to identify and resolve problem cases.

Interviews from the Court Clerks and prosecutors indicated that police routinely use obsolete Uniform Offense Reporting (UOR) codes when filing charges. This jeopardizes the prosecution of the cases and could result in the dismissal of charges.

Examples of Quality Control Measurements for Citation/Adjudication Data

Timeliness	– Average time citations sent from LEA to courts = 1 day average for e-tickets and 2 days for manual tickets – Average time convictions sent to DMV from courts = 1 day
Accuracy	– % "errors" found during data audits of critical data elements = NA – % violations narratives that match the proper state statute = 100% (all entries are matched against a violations table)
Completeness	– % of cases with both original charges and dispositions in citation tracking system = 100%
Consistency	– % traffic citations statewide written on a uniform citation = 100%

Recommendations:

- ❑ Provide for Map It location description on the KYOPS e-ticket consistent with the crash location description.

- ❑ Explore methods to populate data on e-tickets from driver and vehicle query returns.
- ❑ Explore methods to use machine-readable technology to populate driver and vehicle data on e-ticket reports.
- ❑ Continue to support the development and transition of police agencies to e-ticketing systems.
- ❑ Explore methods to upgrade KYOPS and KyCourts to robust and stable business platforms.
- ❑ Provide driver history access to prosecutors to ensure case adjudication and sentencing of repeat offenders is applied consistent with established statutes.
- ❑ Update Uniform Offense Reporting (UOR) code edits in e-ticket software to prevent the use of obsolete codes.

2-F: Statewide Injury Surveillance System (SWISS) Data Component

Advisory Excerpt:

- *Description and Contents*

  With the growing interest in injury control programs within the traffic safety, public health, and enforcement communities, there are a number of local, State, and federal initiatives that drive the development of a SWISS. These systems typically incorporate pre-hospital (EMS), trauma, emergency department (ED), hospital in-patient/discharge, rehabilitation and morbidity databases to track injury causes, magnitude, costs, and outcomes. Often, these systems rely upon other components of the TRS to provide information on injury mechanisms or events (e.g., traffic crash reports). The custodial responsibility for various files within the SWISS typically is distributed among several agencies and/or offices within a State Department of Health.

  This system should allow the documentation of information that tracks magnitude, severity, and types of injuries sustained by persons in motor vehicle related crashes. Although traffic crashes cause only a portion of the injuries within any population, they often represent one of the more significant causes of injuries in terms of frequency and cost to the community. The SWISS should support integration of the injury data with police reported traffic crashes and make this information available for analysis to support research, public policy, and decision making.

  The use of these data should be supported through the provision of technical resources to analyze and interpret these data in terms of both the traditional traffic safety data relationships and the specific data relationships unique to the health care community. In turn, the use of the SWISS should be integrated into the injury control programs within traffic safety, and other safety-related programs at the State and local levels.

- *Applicable Guidelines*

  NHTSA has produced the National Emergency Medical Service Information System (NEMSIS) to serve as a guideline for a uniform pre-hospital dataset. It applies to all EMS runs, not just those related to traffic crashes. The American College of Surgeons (ACS) certifies trauma centers and provides guidelines for trauma registry databases and for a National Trauma Databank. Emergency Department and in-patient data guidelines (UB-92) are available from the US Department of Health and Human Services. The National Center for Health Statistics, within the Centers for Disease Control (CDC), sets ICD-9 codes and E-codes for injury morbidity/mortality. These codes are updated as needed and the ICD-10 codes are expected by the fall of 2007. The CDC also sets standards for reporting to their injury database and for use of the Public Health Information Network for data sharing.

- *Data Dictionary*

  The contents of the SWISS Data Component's files should be well documented to include data definitions for each field, and where applicable, edit checks and data collection guidelines that match the data definitions. Procedures should be documented in instruction manuals for collection, reporting, and posting of EMS run data on a uniform run report, uniform data in various hospital and trauma databases, and for tracking morbidity and mortality for each system.

  Training should include (where applicable) data collection, data entry, use of various injury coding systems (ICD and E-codes) as well as injury and trauma severity scoring systems such as the Injury Severity Score (ISS), Revised Trauma Score (RTS), and Abbreviated Injury Score (AIS) scales.

- *Process Flow*

  The information and processes involved in transport and treatment of victims of crash-related injuries should be documented in a series of flow diagrams showing the typical data collection and management processes and their average time to completion for each step in the data flow process. Processes for paper and electronic filing and reporting should be shown separately. Process flow diagrams should show all major steps whether accomplished by staff or automated systems and clearly distinguish between the two.

- *Interface with other Traffic Records System Components*

  Data transfer and sharing between local systems and the SWISS should be governed by data definitions, quality control requirements, and data transfer protocols defined by the custodial agencies. Transfer and sharing between SWISS files and the relevant national databases are governed by the data definitions, quality control requirements, and data transfer protocols for those systems (e.g., National Trauma Database).

  The CODES project is the primary example of data sharing and integration between SWISS and the other components of a TRS. It can take the form of direct linkage using personal identifiers or probabilistic linkage using other data elements such as incident time, date, date of birth, and locations, responding officer/agency, and others. Key linkages within the TRS for SWISS information are listed in Table 12.

Table 12: Common Linking Variables between SWISS And Other Data Components of a Traffic Records System

Linkages Internal to the SWISS data on injury and healthcare treatments/outcomes	- *Patient name* - *Patient ID number* - *EMS run report number* - *Social Security Number*
Linkages between SWISS data and Crash Data	- *Personal Identifiers: Name, address, date of birth (direct linkage)* - *CODES linking variables (probabilistic linkage)* - *EMS run report number* - *Crash Report Number*
Linkages between SWISS data and other (non-Crash) components of the traffic records system	- *Name & SSN linked to driver file (direct linkage)* - *Location/address* - *Event & treatment date and time*

- *Quality Control Program*

  The SWISS data should be timely, accurate, complete, and consistent and these attributes should be tracked based on a set of established quality control metrics. The overall quality of the information in the SWISS Data Component should be assured based on a formal program of error/edit checking as the data are entered into the statewide system and procedures should be in place for addressing the detected errors. In addition, the custodial agency (or agencies) and the TRCC should work together frequently to establish and review the sufficiency of the quality control program and to review the results of the quality control measurements. The data managers should receive periodic data quality reports. There should be procedures in place for sharing the information with data collectors through individual and agency-level feedback, as well as to provide modifications to applicable training and instruction manuals, edit checks, and the SWISS data dictionaries. Audits and validation checks to assure the accuracy of specific critical data elements should be conducted as part of the formal Quality Control Program. Example measurements are presented in Table 13.

Table 13: Examples of Quality Control Measurements for the Statewide Injury Surveillance System

Timeliness	- *Average time for EMS run reports to be sent to governing agency* - *% EMS run repots sent to governing agency in the prescribed time* - *Average time from treatment & discharge from ED to record availability in the ED discharge database* - *Average time from patient discharge to record availability in the hospital discharge database* - *Average time from date of incident to record appearing in the trauma registry* - *# days from death to appearance of record on mortality database*
Accuracy	- *% EMS run locations that match statewide location coding* - *% correct ICD-9 and E-codes* - *% "errors" found during data audits of critical data elements in EMS, ED, trauma registry, hospital discharge, & mortality databases*
Completeness	- *% of traffic crash-related EMS runs in the EMS database* - *% of ED visits for crash-related injuries recorded in ED discharge database.* - *% of trauma cases represented in the trauma registry* - *% of SCI/TBI cases represented in the SCI/TBI registries*
Consistency	- *% correct ICD-9 and E-codes (see also accuracy)* - *CODES match rate (where applicable)* - *% crash-related deaths with motor vehicle crash in cause of death field on death certificate*

The measures in Table 13 are examples of high-level management indicators of quality. The managers of individual medical data files should have access to a greater number of measures. The custodial agencies should be prepared to present standard sets of summary measures to the TRCC monthly or quarterly.

2-F: Statewide Injury Surveillance System (SWISS) Data Component Status

There are several key components of a statewide injury surveillance system including emergency medical services (EMS), acute care, trauma and rehabilitation facilities, and vital records. Oversight for these entities' activities may be governed by local, State, and regional authorities. Data from these entities provide a wealth of patient care routing, intervention, and prevention information that can be used to evaluate current treatment modalities and injury prevention activities.

Description and Contents

Kentucky has many components of a comprehensive, fully functional, statewide injury surveillance system. The Kentucky Inpatient Outpatient Data Collection System (KY IPOP), containing both the emergency department and inpatient databases, is managed by the Kentucky Hospital Association (KHA). The Kentucky Emergency Medical Services Information System (KEMSIS) and the Kentucky Trauma Registry, housed at the Kentucky Board of Emergency Medical Services (KBEMS); and the Kentucky Vital Statistics database maintained by the Kentucky Cabinet for Health and Family Services, Department of Health.

The Kentucky Injury Prevention and Research Center (KIPRC) is a partnership between the Kentucky Department for Public Health and the University of Kentucky's College of Public Health that combines academic investigation with practical public health initiatives. KIPRC conducts statewide injury surveillance as part of several funded projects: the Center for Disease Control's Core Violence and Injury Prevention Program (CVIPP) and National Violent Death Reporting System (NVDRS) program, the National Institute for Occupational Safety and Health's (NIOSH) Fatality Assessment and Control Evaluation (FACE) and Occupational Safety and Health Surveillance (OSHS) programs, the Kentucky Department for Public Health's State Injury Prevention Program (SIPP), and the NHTSA-funded Kentucky Crash Outcome Data Evaluation System (CODES) project. KIPRC houses and analyzes the emergency department, inpatient, trauma registry, and vital statistics databases. KIPRC produces a number of annual injury prevention and traffic safety reports, presents data at local and national conferences, and supports traffic safety legislation. KIPRC staff respond to public data requests for all of the databases that it houses.

Kentucky Emergency Medical Services Information System (KEMSIS)

Applicable Guidelines

With the assistance of Section 408 funding, KBEMS is in the process of implementing a new electronic field data collection system. The KEMSIS is currently being beta tested by six agencies. Guidelines regarding reporting requirements and penalties for non-compliance have been developed by KBEMS and are currently under review.

Data Dictionary

The draft guidelines contain the proposed KEMSIS data elements and dictionary. While the dictionary was not available for review during the assessment, it is believed that KEMSIS is NEMSIS silver compliant.

Quality Control
Formal rules regarding data quality standards are still under review and have not been implemented. Still, the KEMSIS Field Bridge is capable of incorporating quality control checks at the time of data collection and submission. It was reported that KBEMS has been quick to incorporate suggested checks from the beta tester agencies.

Each agency received training in using KEMSIS when they joined the beta testing process. Supervisors from each of the agencies have user meetings to discuss problems that have arisen during the testing phase and how to overcome them. KBEMS has posted a position for a fulltime Data Administrator to oversee the KEMSIS project. The Data Administrator will be charged with developing a plan for implementing KEMSIS in new agencies and training EMS personnel in its use.

Process Flow
Agencies involved in the KEMSIS beta testing collect data on portable computing equipment. The patient care report (PCR) can be directly transmitted to the KEMSIS server from the scene if the unit has an air card; otherwise, the PCR is transmitted once the unit returns to the station. KBEMS has developed a free web-based version of the PCR and made it available to all licensed EMS agencies in the State. This provides a means for agencies with paper PCRs to submit data online. Also, there are plans to accept data extracts from agencies using different vendors than KBEMS, provided the agency can create an XML extract that conforms to NEMSIS standards.

Once a PCR has been transmitted to the KEMSIS server, data are immediately available to be accessed by the receiving facility for inclusion in the patient's chart. EMS providers can access their own case reports. Those with administrator privileges can develop customizable reports and queries for data from their agency. It is not possible to compare one agency's reports to the rest of the database or that of agencies of comparable sizes or from the same geographic region. Data are not submitted to NEMSIS.

Interface with Other Traffic Records Components
KEMSIS is not currently interfaced with other components of the traffic records system.

Kentucky Trauma Registry

Applicable Guidelines
The statewide trauma care program and Kentucky Trauma Registry (KTR) are established in KRS 211.490-496. Designation of Level I, II, and III trauma centers is based on the American College of Surgeons (ACS) criteria. Hospitals can self-designate at a Level IV based on Kentucky-specific criteria. The KTR is an initiative of the Kentucky chapter of the ACS Committee on Trauma and the Kentucky Board of Emergency Medical Services. The KTR is in the later stages of a Section 408 funded three-year expansion project increasing the number of hospitals reporting from four to 12. Data on eligible cases are being collected from 11 trauma centers and the 12th should begin submission by the end of 2012. KIPRC is responsible for housing and analyzing data from the KTR.

Data Dictionary
The data dictionary for the KTR is based on the National Trauma Data Standard.

Quality Control
Registrars at reporting trauma centers enter data into TraumaBase, extracts are then submitted to a third-party agent, Clinical Data Management Inc. (CDMI). CDMI cleans and verifies the records. While specific examples of quality control checks were not available during the assessment, it was reported that E-Coding is very complete (about 95 percent) but EMS elements are frequently missing. The Kentucky Trauma Advisory Committee is responsible for developing and coordinating training regarding the KTR.

Process Flow
Data on eligible cases are entered into TraumaBase and submitted to CDMI within 90 days of the end of the quarter. CDMI cleans and verifies the records, and forwards an aggregated file to the National Trauma Data Bank (NTDB). The KIPRC also receives a copy of the NTDB file. The 2011 file is expected to be available by the end of May.

Data requests can be made to KIPRC and following review and agreement of the study plan, the request may be granted. KTR data are also incorporated in state reports such as *The Kentucky Trauma Registry Report* and *The Kentucky Trauma Care System Annual Report.*

Interface with Other Traffic Records Components
The KTR is not routinely linked with other traffic records components. A pilot linkage between the KTR and the hospital inpatient database was conducted to determine the completeness of the KTR. It was discovered that E Coding is more complete in the KTR compared to the inpatient database and that information on the same cases were coded differently in the two systems. It is felt that a more thorough study is needed to understand the implication of these findings. The KTR has not been linked to the collision data.

Kentucky Emergency Department and Inpatient Databases

Applicable Guidelines
The KHA compiles data on emergency department, hospital inpatient, and outpatient encounters from all licensed facilities through an agreement with the Kentucky Cabinet for Health and Family Services (CHFS) Office of Health Policy (OHP), which has statutory authority under KRS 216.2920-2929 to collect and analyze health care data. Complete data sets are supplied to the KIPRC which, through agreement with CHFS, serves as the analytic steward of the data.

Data Dictionary
Both the emergency department and inpatient database dictionaries are based on the Uniform Billing Standard. Hospitals may submit up to three external cause of injury codes (E Codes) and 25 ICD-9-CM codes.

Quality Control
KHA employs over 200 quality control checks per record when processing and submitting data. If a record fails these checks it is sent back to the reporting hospital to correct. Rejected records are tracked to ensure that they are resubmitted and verified. KHA produces a quarterly submission verification report for OHP. The number of submitted error-free cases is compared to the number of expected cases per hospital. By regulation, facilities must have a 99 percent error-free submission rate each quarter. If KIPRC notices data quality or inconsistency issues KHA will incorporate the needed validation checks into the quality control process.

The following measures were submitted in response to the assessment.

Timeliness	- Number of days from hospital/ED discharge until data is entered into database	<= 45 days after end of quarter
	- Number of days from end of quarter/year until data is available for analysis on a state level.	~ 100 days
Accuracy	- % ”missing” found during data audits of critical data elements	Essentially no missing values on edited variables
	- % of hospitals participating in statewide database	100% (excluding VA and military hospitals)
Completeness	- % of injury related discharges containing a valid E-Code	85% (2010)

Process Flow
Data are coded at each of the hospitals and submitted to KHA within 45 days of the end of a calendar quarter. Any records failing quality control review are returned to hospitals and correction must be submitted within 75 days of the end of the quarter. Data are available to KIPRC within 100 days of the end of a quarter.

KIPRC incorporates both the inpatient and emergency data into a number of statewide reports including the *Kentucky Injury Indicators* and *Inpatient and Emergency Department Traumatic Injury Data*. Data from both databases are routinely used in presentations at local and statewide injury prevention and traffic safety conferences. Requests for counts or aggregate data can be submitted to OHP or KIPRC. An individual seeking record level data may purchase a public use dataset from OHP. Data are also incorporated into the annual CODES linked database. Data are incorporated into a number of research publications and fact sheets and have been used to support traffic safety initiatives and legislation.

Interface with other Traffic Records System Components
The hospital inpatient and emergency department data are included in the annual CODES linked database. The inpatient database has also been linked to the trauma registry to examine the completeness of injury coding on each file.

Kentucky Death Certificates

Applicable Guidelines
KRS 216.2920 authorizes the Vital Statistics Office (VSO) of the Kentucky Department of Health, Cabinet for Health and Family Services to maintain the vital statistics system for the Commonwealth.

Data Dictionary
Death certificate data are coded according to national guidelines set by the National Centers for Health Statistics (NCHS) for collecting death data. Cause-of-death information is classified in accordance with the ICD-10 standard.

Quality Control
Kentucky is in the process of implementing an electronic death registry system (EDRS). The result is that death certificate information is stored in two different formats, one for paper death certificates and one for electronic. It was reported that there has been difficulty merging the two formats, which has resulted in a delay in the data availability.

Beyond the table below, information regarding quality control procedures for the Kentucky death certificate registry was not available during the time of the assessment.

Timeliness	- Number of days from death until data is entered into database	
	- Number of days from end of quarter/year until data is available for analysis on a state level.	18-24 months until a “final” file is available
Accuracy	- % ”missing” found during data audits of critical data elements	
Completeness	- % of injury related fatalities containing a valid E-Code	100%, but specificity of E-codes varies considerably across mechanisms and demographic groups

Process Flow
Death certificates are initiated by funeral directors and submitted to VSO. If the certificate fails inspection it is returned for corrections. Death certificates passing inspection are registered and reviewed by a nosologist for cause of death coding. Death certificates are sent to NCHS for ICD-10 coding. Once the death certificates are returned they are uploaded into the state registry.

VSO supplies periodic fatality information to the FARS analyst. KIPRC receives an analytical file through an agreement with CHFS. KIPRC incorporates the death data into a number of statewide reports including the *Kentucky Injury Indicators.* Data are routinely used in presentations at local and statewide injury prevention and traffic safety conferences. Requests for counts or aggregate data can be submitted to VSO or KIPRC. Individuals seeking record level access must receive Institutional Review Board (IRB) approval before obtaining the data. Data are incorporated into research publications and fact sheets and have been used to support traffic safety initiatives and legislation.

Interface with other Traffic Records System Components
The death certificate data have been linked to the CODES database but it is not part of the standard annual CODES linkage.

Crash Outcome Data Evaluation System (CODES)

Kentucky is an active participant in the National Highway Traffic Safety Administration's (NHTSA) Crash Outcome Data Evaluation System (CODES). The CODES project has integrated many components of the statewide injury surveillance system, including emergency department, hospital inpatient, and death certificate data with the crash database. Due to the immaturity of KEMSIS, EMS data have not been integrated at this time.

The use of CODES data is governed by the CODES Board of Directors which consists of data owners and users from the Kentucky Transportation Center, Kentucky State Police, Kentucky Transportation Cabinet, Federal Highway Administration, Drive Smart! Kentucky, and the Kentucky Cabinet for Health Services, Department of Health. CODES data have been used for a number of State and federal projects, including supporting graduated driver licensing, primary safety belt, and booster seat legislation. Results of analyses are given in presentations at State and national meetings, published as journal articles, and in fact sheets available at the KIPRC website.

CODES is an important participant in the traffic safety community in Kentucky. Continuation of the program is currently in doubt due to NHTSA discontinuing funding in March 2013. Loss of CODES would represent a serious step backwards in Kentucky's integration efforts of crash and injury prevention data.

Recommendations:

- ❑ Establish a formal mechanism for reviewing and implementing quality control checks and standards into Kentucky Emergency Medical Services Information System (KEMSIS).

- ❑ Increase the number of agencies reporting to the Kentucky Emergency Medical Services Information System (KEMSIS).

- ❑ Begin coordinating with NEMSIS for the eventual submission of Kentucky Emergency Medical Services Information System (KEMSIS) data to the national database.

- ❑ Plan for appropriate access to the Kentucky Emergency Medical Services Information System (KEMSIS) data to improve the completeness of EMS information collected by FARS and the Kentucky Trauma Registry.

- ❑ Increase the number of hospitals reporting to the trauma registry.

- ❑ Conduct a formal study linking the hospital inpatient and trauma registry databases to examine the completeness of the reporting to the trauma registry and the quality of E-Coding in each system.

- ❑ Coordinate with Kentucky Traffic Records Advisory Committee to secure funding to continue the Crash Outcome Data Evaluation System program once NHTSA's financial support ends.

APPENDFIX A

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APPENDIX B

Abbreviations and Acronyms

AAAM	Association for the Advancement of Automotive Medicine
AAMVA	American Association of Motor Vehicle Administrators
AASHTO	American Association of State Highway and Transportation Officials
ACS	American College of Surgeons
AIS	Abbreviated Injury Score
ANSI	American National Standards Institute
ATSIP	Association of Transportation Safety Information Professionals
BAC	Blood Alcohol Concentration
BPEVR	Business Partner Electronic Vehicle Registration
CDC	Center for Disease Control
CDLIS	Commercial Driver License Information System
CODES	Crash Outcome Data Evaluation System
DMV	Department of Motor Vehicles
DOT	Department of Transportation
DUI	Driving Under the Influence
ED	Emergency Department
EMS	Emergency Medical Service
FARS	Fatality Analysis Reporting System
FHWA	Federal Highway Administration
GES	General Estimates System
GIS	Geographic Information System
GJXDM	Global Justice XML Data Model
GPS	Global Positioning System
HPMS	Highway Performance Monitoring System
ICD	Injury Coding System
IRP	International Registration Plan
ISS	Injury Surveillance Score
LEIN	Law Enforcement Information Network
MCMIS	Motor Carrier Management Information System
MMUCC	Model Minimum Uniform Crash Criteria

NCIC	National Crime Information Center
NCSC	National Center for State Courts
NDR	National Driver Registry
NEMSIS	National Emergency Medical Service Information System
NGA	National Governor's Association
NHTSA	National Highway Traffic Safety Administration
NIBRS	National Incident-Based Reporting System
NLETS	National Law Enforcement Telecommunication System
NMVTIS	National Motor Vehicle Title Information System
PDPS	Problem Driver Pointer System
RTS	Revised Trauma Score
SHSP	Strategic Highway Safety Plan
SWISS	Statewide Injury Surveillance System
TCD	Traffic Control Devices
TRCC	Traffic Records Coordinating Committee
TRS	Traffic Records System
UCR	Uniform Crime Reporting
VIN	Vehicle Identification Number
VMT	Vehicle Miles Traveled

TEAM CREDENTIALS

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SUMMARY OF EXPERIENCE

Mr. Benac has over 34 years experience in transportation safety. Mr. Benac's transportation safety career began in the Traffic and Safety Division with the Michigan Department of Transportation where he conducted transportation safety research and was responsible for the development of safety systems. He was team leader in the development of the Michigan Dimensional Accident Surveillance System (MIDAS), Michigan Traffic Sign Inventory System (MTSIS), and Michigan Guardrail Information System. He was the Project Manager in developing MDOT's Safety Status System (SAFESTAT). Mr. Benac worked in the private sector where he was a member of a consultant team developing safety systems for the Ohio Department of Transportation and the Illinois Department of Transportation.

Mr. Benac worked as an instructor at Lansing Community College where he developed course material in traffic technology and taught traffic safety classes.

Mr. Benac was employed with the Michigan Department of Information Technology until 2010 where he was a Project Manager and completed a project to reengineer Michigan's Traffic Crash Reporting System. The project received a ComputerWorld Honors award in 2004 and was recognized as one of five finalists in the Government and Nonprofit category.

Mr. Benac retired from Michigan State Government on December 31, 2010.

EDUCATION

- Graduate of Ferris State University in Civil Technology 1970.
- Certificates from Michigan State University in Traffic Simulation Modeling 1985.
- Certificates from George Washington University in the Management of Information Technology Projects 1999-2001.

COMMUNITY

- President, Lake Victoria Property Owners Association 1981-1989
- Community Board of Education from 1989 to 2005
- Member of Volunteer Services, Great Lakes Region, International Red Cross 1991 - Present

ROBERT H. BURROUGHS, MAJOR (Retired)

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Summary of Experience

Robert Burroughs has over 29 years of law enforcement experience including over 20 years of progressive management and executive level experience in highway safety, regulatory programs, and driver licensing programs.

Major Burroughs' transportation career began as a highway patrolman and driver licensing trooper. He progressed through the ranks and served in several highway safety program oversight positions covering motor carrier, vehicle safety inspection, driver licensing, and information technology programs. He was instrumental in automating roadside commercial motor vehicle inspections and traffic citations for the Texas DPS. He also served as a project sponsor for the Texas Crash Records Information System project and as an executive member of the Texas Traffic Records Coordinating Committee.

Professional Business Experience

- Manager of the Motor Carrier Bureau responsible for statewide data management of Commercial Motor Vehicle Roadside Inspection data and oversight of the Motor Carrier Compliance Audit program of the Texas Department of Public Safety

- Program director for the statewide Vehicle Inspection Program responsible for program oversight and enforcement

- Highway Patrol Division record management and information technology manager responsible for integrating citation and disposition data as well as development and deployment of the Texas Highway Patrol In-Car computer program

- Directed the statewide Driver License Field Operations and the Internal Fraud Investigation Unit

- Directed the development of the Compliance and Enforcement Service for the newly formed Regulatory Services Division of the Department of Public Safety.

Professional Societies and National Committees

- Member of the Federal Motor Carrier Safety Administration, Commercial Driver License Advisory Group

- Member of the Federal Motor Carrier Safety Administration, Federal Negotiated Rulemaking Committee to Enhance Driver License and Identity Security Standards

- Past Regional Vice President of the Commercial Vehicle Safety Alliance
- Member of the Information Systems Committee of the Commercial Vehicle Safety Alliance
- Past International Chair of the Law Enforcement Committee of the American Association of Motor Vehicle Administrators
- Past International Chair of the Vehicle Safety Inspection Committee of the American Association of Motor Vehicle Administrators
- Past Region II Chair of the Law Enforcement Committee of the American Association of Motor Vehicle Administrators
- Past Region II Chair of the Vehicle Safety Inspection Committee of the American Association of Motor Vehicle Administrators

Education

B.S., Criminal Justice, Wayland Baptist University
Graduate of the Bill Blackwood Law Enforcement Management Institute and the State of Texas Governor's Executive Management Development Program

LAWRENCE J. COOK, Ph.D.

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EDUCATION

06/93	Bachelor of Science, University of Utah, Mathematics
06/96	Masters of Statistics, Department of Mathematics; University of Utah
06/98	Johns Hopkins University, Summer Institute, Principles and Practice of Injury Prevention
05/08	PhD Department of Mathematics and Statistics, Utah State University

PROFESSIONAL EXPERIENCE

03/02 – Present	Director of Motor Vehicle Research Intermountain Injury Control Research Center
01/96 – Present	Statistician, Intermountain Injury Control Research Center;
	University of Utah, Department of Pediatrics
09/03 – Present	Graduate Teaching Assistant, Utah State University, Department of Mathematics and Statistics
08/94 – 12/00	Associate Instructor, University of Utah, Department of Mathematics Instructor for Introductory Probability and Statistics Course
08/93 – 07/95	SAS Lab Instructor, University of Utah, Department of Mathematics

PROFESSIONAL MEMBERSHIPS AND ACTIVITIES

2004 – 2005	Program Chair, American Public Health Association Injury Control and Emergency Health Services Section.
2005 –Present	Section Councilor, American Public Health Association Injury Control and Emergency Health Services Section
2007 –	Present Board Member, Association of Traffic Safety Information Professional
2005 – Present	Data Committee Member, American Public Health Association InjuryControl and Emergency Health Services Section
1999 – Present	Member American Public Health Association
2005 – Present	Member American Statistical Association
2001 – Present	Data Advisory Board, Utah's Health: An Annual Review
1996 –Present	Coalition for Utah Traffic Safety

PUBLICATIONS

Bissonette, J.A. Kassar, C., Cook, L.J., An assessment of costs associated with deer-vehicle collisions: Human death and injury, vehicle damage, and deer loss. *Human Wildlife Conflicts*. In Press.

Markenson D, Tunik M, Cooper A, Olson LM, Cook L, Matza-Haughton H, et al. A national assessment of knowledge, attitudes, and confidence of prehospital providers in the assessment and management of child maltreatment. *Pediatrics* 2006. 119(1): e103-e108.

Zhu, M., Cummings P., Chu H., Cook, L.J., Association of rear seat safety belt use with death in a traffic crash: a matched cohort study., *Inj Prev*, 2007 13(3): 183-5.

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Hyde, L.K., Cook, L.J., Knight, S., Olson, L.M., Graduated driver licensing in Utah: is it effective? *Ann Emerg Med*, 2005. 45(2): p. 147-54.

Mann, N.C., Knight, S., Olson, L.M., Cook, L.J., Underestimating injury mortality using statewide databases. *J Trauma*, 2005. 58(1): p. 162-7.

Cochran A, Mann NC, Dean JM, Cook LJ, Barton RG. Resource utilization and its management in splenic trauma. *The American Journal of Surgery*, 2004 187(6): 713-719.

Cook LJ, Knight S, Junkins EP, Mann CL, Dean JM, Olson LM. Repeat patients to the emergency department in a statewide database. *Academic Emergency Medicine*, 2004 11(3): 256-263.

Smith R, Cook LJ, Olson LM, Reading JC, Dean JM: Trends of behavioral risk factors in motor vehicle crashes in Utah, 1992 – 1996. *Accident Analysis and Prevention*. 2004; 36(2): 249 – 255.

Vernon DD, Cook LJ, Peterson KJ, Dean JM: Effect of repeal of the national maximum speed limit law on occurrence of crashes, injury crashes, and fatal crashes on Utah highways. *Accident Analysis and Prevention*. 2004; 36(2): 223-229

Knight S, Cook LJ, Olson LM. The fast and the fatal: Street racing fatal crashes in the United States. *Injury Prevention*, 2004 10(1): 53-55

Knight S, Olson LM, Cook LJ, Mann NC, Corneli HM, Dean JM. Against all advice: an analysis of refusals of care. *Annals of Emergency Medicine*, 2003; 42(5):689-696.

Hyde LK, Cook LJ, Olson LM, Weiss HB, Dean JM. Effect of motor vehicle crashes on adverse fetal outcomes. *Journal of Obstetrics and Gynecology*, Volume 102, No. 2, August 2003.

Vernon DD, Diller EM, Cook LJ, Reading JC, Suruda AJ, Dean JM: Evaluating the Crash and Citation Rates of Utah Drivers Licensed with Medical Conditions, 1992 – 1996. *Accident Analysis and Prevention*.2002; 34(2):237 - 46.

Skokan EG, Olson LM, Cook LJ, Corneli HM. Snowmobile Injuries in Utah. Academic Emergency Medicine. 2001 Dec;8(12):1173-7.

Cvijanovich NZ, Cook LJ, Mann NC, Dean JM. Pediatric All-Terrain Vehicle Injuries. *Pediatrics*. 2001 Sep;108(3):631-5.

Cook LJ, Olson LM, Dean JM. Probabilistic Record Linkage: Relationships between File Sizes, Identifiers, and Match Weights. *Methods of Information in Medicine,* 2001 Jul;40(3):196-203.

Dean JM, Vernon DD, Cook LJ, Nechodom PJ, Reading JC, Suruda A. Probabilistic Linkage of Computerized Ambulance and Inpatient Hospital Discharge Records: A Potential Tool for Evaluation of Emergency Medical Services. *Annals of Emergency Medicine*, 2001 Jun;37(6):616-26.

Vernon DD, Diller E, Cook LJ, Reading J, Dean JM. Further Analysis of Drivers Licensed with Medical Conditions in Utah. National Highway Traffic Association. 2001 Mar; Report No. DOT HS 809 211.

Cvijanovich NZ, Cook LJ, Mann NC, Dean JM, Graduated Driver Licensing Restrictions. *Pediatrics.* 2001 Apr;107(4):632-7.

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Corneli HM, Cook LJ, Dean JM. Adults and Children in severe motor vehicle crashes: A Matched-Pairs Study. *Annals of Emergency Medicine,* 2000 Oct;36(4):340-5.

Cook LJ, Knight S, Olson LM, Nechodom PJ, Dean JM. Crash Characteristics and Medical Outcomes of Older Drivers in Motor Vehicle Crashes in Utah, 1992 – 1995. A*nnals of Emergency Medicine* 2000 June;35(6):585-591.

Berg M, Cook LJ, Corneli H, Vernon D, Dean JM. Effect of Seating Position and Restraint Use on Injuries to Children in Motor Vehicle Crashes. *Pediatrics* 2000 Apr;105(4):831-835.

Suruda AJ, Vernon DD, Reading J, Cook LJ, Nechodom PJ, Leonard D, Dean JM. Pre-Hospital Emergency Medical Services: A Population-Based Study of Pediatric Utilization. *Injury Prevention* 1999 Dec;5(4):294-297.

Cvijanovich NZ, Cook LJ, Nechodom PJ, Dean JM. A Population-Based Study of Teenage Drivers: 1992-1996. *43rd Annual Proceedings Association for the Advancement of Automotive Medicine* 1999 Sept;175-186.

Leonard DR, Suruda AJ, Cook LJ, Reading J, Mobasher H, Dean JM. Distinctive Emergency Department Usage for Injury for Worker's Compensation Cases in Utah in 1996. *Journal of Occupational Medicine* 1999 Aug;41(8):686-692.

Diller EM, Cook LJ, Leonard DR, Dean M, Reading JM, Vernon DD. Evaluating Drivers Licensed with Medical Conditions Licensed with Medical Conditions in Utah, 1992 – 1996. National Highway Traffic Safety Administration 1999 June;Report No. DOT HS 809 023.

LANGSTON (LANG) A. SPELL

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Independent Consultant

PROFESSIONAL EXPERIENCE

Mr. Spell entered his professional career in traffic records systems and data exchange over 50 years ago. He is nationally recognized for his work in development of traffic records systems, especially interchange (NDR and CDL) of information amongst various users and the development and promulgation of data standards in information processing.

He served as a member of D16.1 committee. He developed the AAMVA Violations Exchange Code or "ANSI" code (predecessor of the AAMVAnet Code Dictionary or ACD which he also co-developed) while employed with AAMVA and later served as the Accident (Crash) Subcommittee Chairman for the ANSI D-20 Standard, A States Model Motorist Data Base, while employed with the National Highway Traffic Safety Administration.

While employed with NHTSA he created the original reporting forms and file structure for the Fatality Analysis File which was renamed in 1975 as the Fatal Accident Reporting System (FARS) and later renamed again, the Fatality Analysis Reporting System (FARS). He and his staff conducted the training for all of the original analysts.

As an independent consultant, he conducted the NHTSA Uniform Traffic Ticket Study to determine the extent and details of emerging Citation Tracking Systems. He conducted all aspects of the study including on-site State visits and assessments to determine the extent of control being exercised in citation issuance, processing of conviction information through the courts, and recording conviction dispositions in driver history files.

In the private sector, he developed numerous Crash Report forms, instruction manuals for crash reporting, data input procedures, all edits to assure data quality, and reporting and analysis procedures for problem identification. He also developed the EMS Run Report for Kentucky.

He designed the graphical user interface for the Highway Traffic Records Information System for the Virginia Department of Transportation (VDOT) and provided training in the use of the system to the district offices of VDOT.

He was involved in the design and developmental efforts for the Commercial Driver Licensing Information System (CDLIS) and its AAMVAnet environment and was a member of the AAMVAnet "Tiger Team" that made the assessments of selected states to become pilots and eventual founding states in the National Motor Vehicle Title Information System. His background, experience and interested cover the entire spectrum of traffic records systems.

HISTORY

1992 – Present	Independent Consultant (now essentially retired)
1977 – 1992	Senior Traffic Records Analyst National ConServ, Inc. (but 1980 to 1983: Independent Consultant)
1974 – 1977	Vice President GENASYS (Systems Division) (now Keane, Inc.)
1968 – 1974	Chief, Information Systems, NHTSA, US Department of Transportation
1966 – 1968	Director of Data Systems for the AAMVA
1958 – 1966	Staff Specialist in MVRs (driver histories) for Retail Credit Co. (now Equifax) Atlanta, GA

MEMBERSHIPS IN PROFESSIONAL ASSOCIATIONS (FORMER)

Traffic Records Committee, Transportation Research Board

American National Standards Institute, D-16, D-20, and X3L8 Committees

Executive Board, Traffic Records Committee, National Safety Council

Society of Automotive Engineers Committee on Standardization of Vehicle Identification Numbers

EDUCATION

Boston University ..... S.T.B., 1956

Duke University ..... A.B. 1953

JOHN J. ZOGBY, PRESIDENT

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Summary of Experience

Mr. Zogby has over 40 years experience in highway safety engineering and management and motor vehicle and driver licensing administration.

Mr. Zogby's transportation career began in the Bureau of Traffic Engineering in the Pennsylvania Department of Highways, where he was responsible for the statewide application of highway signs and markings. He was instrumental in developing the state's first automated accident record system in 1966. In the late 1960's he helped initiate and was project director for the statewide safety improvement program and the state's in-depth accident investigation function.

Mr. Zogby worked in the private sector in traffic safety research for several years before returning to public service as the Director of the Bureau of Accident Analysis in the Pennsylvania Department of Transportation. He was appointed Deputy Secretary of Transportation for Safety Administration in February of 1979, a position he head for 13 years, until his retirement from public service in December 1991.

Since his retirement from state government, Mr. Zogby has been engaged as a consultant on management and policy issues for federal, state and local government agencies in the area of transportation safety and motor vehicle/driver licensing services.

Professional Business Experience

- Subcontract with GeoDecisions Consulting on a Safety Analysis Management System (SAMS) for the state of Mississippi.
- Subcontract with iTRANS Consulting, Inc. on NCHRP project 17-18-(05), Integrated Management Process to Reduce Highway Injuries and Fatalities Statewide for the Transportation Research Board.
- Contract with the National Academy of Sciences (NAS) to provide AASHTO Strategic Highway Safety Plan – Case Studies (17-18(06A) for the Transportation Research Board.
- Subcontract with ISG, a systems integration consulting company, conducting a re-engineering contract with the Pennsylvania Department of Transportation in the area of motor vehicle processes.
- Subcontractor with the Pennsylvania State University to research the impact of an education provision in state law governing novice drivers.
- Conducted a three week course on safety management for the Ministry of Communications in the Kingdom of Saudi Arabia.

- Subcontractor with a Moroccan engineering firm to develop a national highway safety plan for the country of Morocco.
- Completed a study for the state of Mississippi, Department of Public Safety to develop a Strategic Plan for Highway Safety Information.
- Contracted by the Federal Highway Administration, Office of Motor Carrier Safety to help in the final implementation phase of the Commercial Driver License (CDL) program.
- Participated as a team member conducting Traffic Records Assessments with states in assessing their Traffic Records capabilities to address highway safety program management needs
- Project director and principal instructor for a Federal Highway Administration (FHWA) contract to develop, implement, and instruct a training program for the Highway Safety Management System.

Professional Societies and National Committees

- Member Institute of Transportation Engineers (ITE).
- Member Emeritus of the Transportation Research Board (TRB) Committee on Transportation Safety Management.
- Member of Association of Transportation Safety Information Professionals.
- Past President of the Mid-Atlantic Section of ITE.
- Past Chair of the National Safety Council's Traffic Records Committee.
- Past President of Region 1 of the American Association of Motor Vehicle Administrators.
- Past Chair of the Governing Board of the International Registration Plan.
- Past Chair of a subcommittee of the NGA Working Group on State Motor Carrier Taxation and Regulation.
- Completed six year tenure as the Chair of the TRB Committee on Planning and Administration for Transportation Safety.

Community

- President, Duncannon Area Revitalization, Inc.
- Pastoral Associate, St. Bernadette Church, Duncannon, PA.

Education

- B.S., Economics, Villanova University
- MPA, Penn State University