NHTSA
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

U.S. Department of Transportation
Federal Highway Administration

Data Quality Management, Performance Measures, and Traffic Records Inventory

Illinois Workshop

February 2023

Workshop Overview

Introductions

Traffic Records Inventory

Overview of Data Quality Management

Data Quality Management Implementation

Practical Performance Management

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Traffic Records Inventory

What is a Traffic Records Inventory?

- NHTSA's *Traffic Records Program Assessment Advisory, 2018 Edition* (DOT HS 812 601)
- "Traffic Records Inventory: A compilation of contact information, data dictionaries, data flows, user and instructional manuals, and other system documentation for all components of the traffic records system."

What is Included?

- Traffic records data sources
- System custodians
- Data elements and attributes
- Linkage variables
- Linkages useful to the State
- Data access policies

Why Have One?

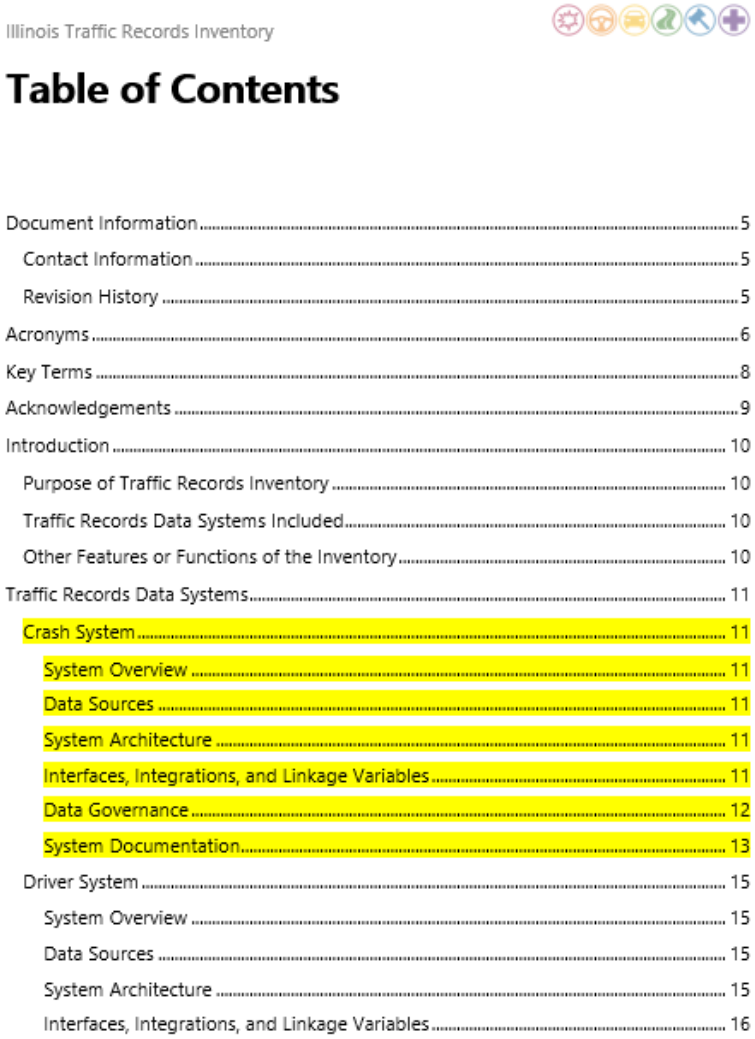
- Stakeholders
  - Provides contact information
  - Improves accessibility
- Analysis
  - Identifies data that is collected
- Linkage and Integration
  - Identifies data elements that are common in datasets
  - Allows for more robust analysis

Tabular Data

System	Agency	Data	Data Type	Website	POC Name	POC Title	PO
Citation or Adjudication	ISP	CHRI Criminal History Record Information		N/A- available under LEADS			
Citation or Adjudication	ISP	CCH Computerized Criminal History		N/A- available under LEADS			
Citation or Adjudication	ISP/ILSOS	ADR Automated Disposition Reporting	Data Dictionary availab	Not available to outside parties			
Citation or Adjudication	AOIC	Circuit Court Vicil, Criminal, and Traffic Assess	Assessment Reports	https://www.illinoiscourts.gov/reports/reports-circuit-court-civil-criminal-an			
Citation or Adjudication	AOIC	Plead and Pay Traffic/Conservation Tickets (e-	Electronic Guilty Pleas	https://www.illinoiscourts.gov/eservices/Plead-and-Pay-Traffic			
Citation or Adjudication	AOIC	Illinois Circuit Court Statistics	List of quarterly statist	https://www.illinoiscourts.gov/courts/circuit-court/illinois-circuit-court-statis			
Citation or Adjudication	ISP	NCIC	Manual	https://isp.illinois.g	ISP		ISP
Citation or Adjudication	FBI	LEEP- Law Enforcement Enterprise Portal	Portal	https://www.cjis.go	FBI		
Crash	IDOT	CIS	Data Dictionary	https://idot.illinois.g	Mark Blankenship	Crash Information Section r	230
Crash	IDOT (NHTSA)	FARS		https://www-fars.nh	Greg Gifford	Fatality Data Unit Manager	230
Crash	IDOT	Third Party XML System	Manual; Database Sche	https://idot.illinois.g	Anne Hillen	Traffic Statistics Unit Manag	230
Crash	IDOT	Crash Data		https://idot.illinois.g	Bureau of Data Collection		IDC
Crash	IDPH	Data Collection		https://data.illinois.	IDPH		
Crash	DOT/IDOT	Work Zone Safety and Mobility	Rule	https://idot.illinois.gov/Assets/uploads/files/Doing-Business/Manuals-Guide			
Crash	IDOT	ISATe - Enhanced Interchange Safety Analysis	User Manual	https://idot.illinois.g	Martha Brown	Safety Policy & Initiatives E	IDC
Crash	IDOT	HSM Crash Prediction Tool Version 3.0	User Manual	https://idot.illinois.g	Martha Brown	Safety Policy & Initiatives E	IDC
Crash	IDOT	HSIP Benefit-Cost Tool	DRAFT User Manual	https://idot.illinois.g	Martha Brown	Safety Policy & Initiatives E	IDC
Crash	DOT	HSIS Highway Safety Information System	Database	http://www.hsisinfc	Ana Maria Eigen		Tur
Crash	IDOT	HSIP Policy: Safety 1-06	Policy	https://idot.illinois.g	Martha Brown	Safety Policy & Initiatives E	IDC
Crash	IDOT	Safety Portal	Safety Portal (Scroll to	https://idot.illinois.g	IDOT		
Crash	IDOT	Illinois Traffic Crash Report	Instruction Manual	https://idot.illinois.g	Bureau of Data Collection		
Crash	IDOT	SHSP	Plan	https://idot.illinois.g	Martha Brown	Safety Policy & Initiatives E	IDC
Crash/EMS or Injury Sur	IDPH	IVRS Illinois Vital Records System	Database	https://ivrs.dph.illin	IDPH		
Crash/EMS or Injury Sur	IDPH	IVRS Illinois Vital Records System	Data Dictionary				
Crash/EMS or Injury Sur	IDPH	Vital Statistics- Death Statistics		https://dph.illinois.gov/data-statistics/vital-statistics/death-statistics.html			
Crash/Roadway	IDOT	Data Driven Decisions	Work in progress but o	https://idot.illinois.gov/data-driven-decisions.html			
Driver	ISP	LEADS 3.0	https://isp.illinois.gov/LawEnforcement/LE		ISP		ISP
Driver	ILSOS	CDLIS		N/A	Jamie Daley		
Driver	ILSOS	PDPS		N/A	Jamie Daley		
Driver	ILSOS	Illinois Driver System	Data Dictionary- this w	N/A	Unknown		
Driver	IDPH	IQUERY	Query System in IPLAN	https://iquery.illinois.gov/iquery/			
Driver	IDPH/CDC	BRFSS- Illinois Behavioral Risk Factor Surveillance System		https://www.cdc.go	Sam Saini	BRFSS Coordinator	IDP
Driver/Vehicle	IDOT	SafetyNet			Tom Wise	Commercial Vehicle Safety	IDC
Driver/Vehicle	ILSOS	*Microsoft Azure (will be implemented to cre	Data Lake	Not yet created	Jamie Daley		

Does the Illinois TRCC Have One?

Walk Through Crash System



Illinois Traffic Records Inventory

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Crash System

Traffic Records Data Systems

Crash System

System Overview

The Illinois Crash system, referred to as the Crash Information System (CIS), is consolidated into a single database housed within the Illinois Department of Transportation. Illinois utilized MMUCC and ANSI D.16 as part of the establishment of their Crash system and referenced MMUCC 5th edition during 2019 revisions to the crash report form.

Illinois has the ability to populate Driver and Vehicle data through its LEADS interface, which improves data quality and accuracy for the Crash system. An interface with the Roadway system data allows for population of centerline and roadway inventory data into the Crash system.

Data Sources

Provide a description of the sources for the data in the system.

Example: Crash data is collected by law enforcement officers using [system or form]. There are approximately [number] of law enforcement agencies that collect crash data.

System Architecture

Database Software and Version

[insert information]

Web Application Server

[insert information]

Development Technology

[insert information]

Interfaces, Integrations, and Linkage Variables

Include a list of different interfaces used with the system. Also include possible linkage variables for integration.

Crash System

Illinois Traffic Records Inventory

Example: The data collection tool in CRS interfaces with the Driver and Vehicle systems to autofill information on the drivers and vehicles involved in the crash.

The Crash database includes the following variables that may be used to link to other data systems: Date, Time, Location, Name, Driver License (DL) number.

- Illinois State Police LEADS 3.0 - Populates Driver and Vehicle data into CIS
- Approved Third Party XML Vendors

Data Governance

System Owner (Agency, Point of Contact (POC))

Agency: Illinois Department of Transportation

POC Name: Mark Blankenship

Title: Crash Information Section Manager

Address: 2300 S. Dirksen Parkway, Room 019, Springfield, IL 62764

Email: Mark.Blankenship@illinois.gov

Data Access Policies

Include policies related to data access.

Data Requests

Include policies and procedures for data requests.

Legislative Requirements

- Illinois statute (625 ILCS 5/11-408) requires that crash reports be submitted to the Department "...within 10 days after investigation of the motor vehicle accident."

Data Standards

Include any data standards that the system uses.

- MMUCC
- ANSI D.16
- FARS

Change Management

Include any requirements or processes for changes.

Crash System

Illinois Traffic Records Inventory

Users

Include any system users—collectors, managers, and analysts.

System Documentation

User Manuals

Title	Illinois Traffic Crash Report Instruction Manual
Agency	Illinois Department of Transportation
Point of Contact	Bureau of Data Collection
Date of Last Update	*[Month] [Day], [Year]*
Document Location/Hyperlink	https://idot.illinois.gov/Assets/uploads/files/Transportation-System/Manuals-Guides-&-Handbooks/Safety/Illinois%20Traffic%20Crash%20Report%20SR%201050%20Instruction%20Manual%202019.pdf
Summary/Description	*[Insert]*

Data Dictionary

Title	Dictionary of Data Elements
Agency	Illinois Department of Transportation
Point of Contact	Bureau of Data Collection
Date of Last Update	January, 2019
Document Location/Hyperlink	https://idot.illinois.gov/Assets/uploads/files/Transportation-System/Reports/Safety/ITRCC/IL%20Data%20Dictionary%20March%202011.pdf
Summary/Description	*[Insert]*

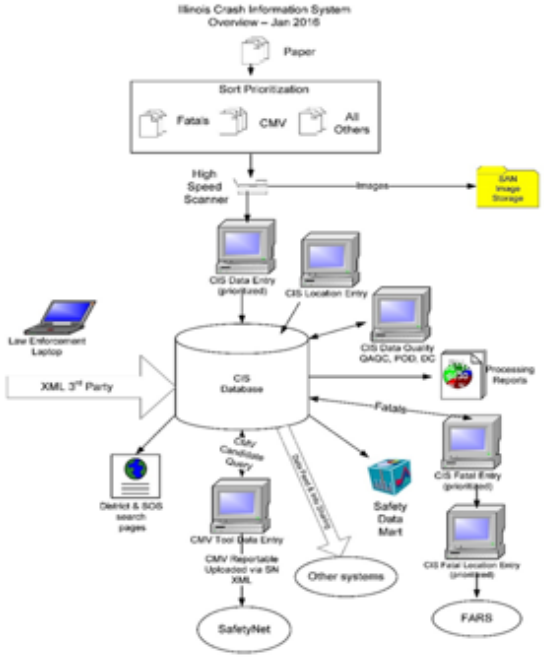
Crash System

Illinois Traffic Records Inventory

Data Schema

Title	*[Insert]*
Agency	*[Insert]*
Point of Contact	*[Insert]*
Date of Last Update	*[Month] [Day], [Year]*
Document Location/Hyperlink	*[Insert]*
Summary/Description	*[Insert]*

System Diagrams



Overview of Data Quality Management

Data Quality Management Overview

- Traffic Records Program Assessment Advisory
- Formal
- Comprehensive
- Applies to every system
- A program *and* a plan

Data Quality Management Overview

- Involves stakeholders
- TRCC role (oversight, support, accountability)
- Roles and responsibilities
- What to do if there are data problems
- How do you *know* when there are problems

Data Quality Management Overview System Attributes

Timeliness

Accuracy

Completeness

Uniformity

Integration

Accessibility

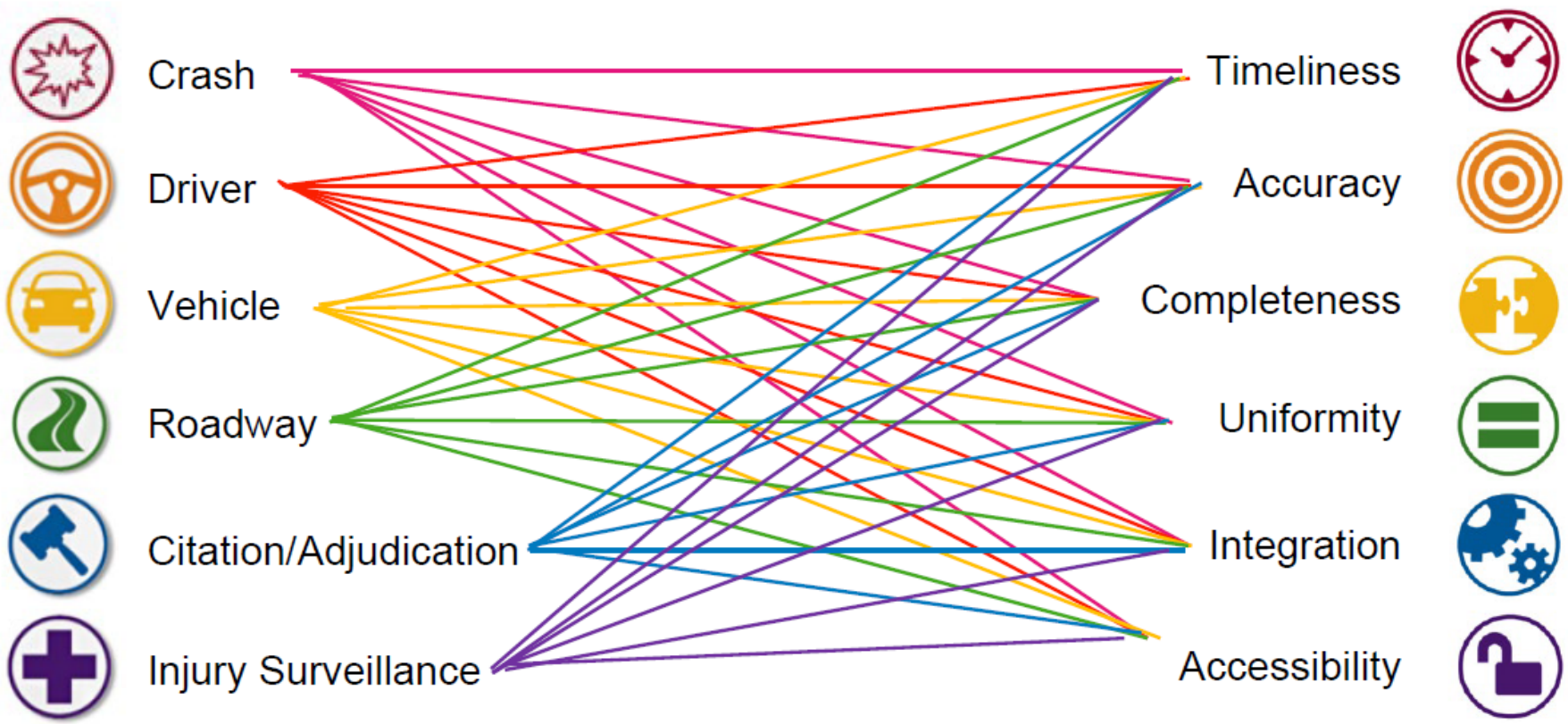
Data Quality Management Overview Performance Measurements

- We will spend more time on this
- It's not the *only* component
- It's important
- States struggle with it
- The six attributes and six systems "issue"

Data Quality Management Overview Data Program Improvements

- All six systems have a set of data quality attributes that TRCCs work to improve
- The next slide shows this interconnectedness

Data Program Improvements



Data Quality Management Overview Strategic Planning Tie-In

- Data program (system) improvements
- TRCC role
- Project funding
- Goals and objectives
- Traffic Records Strategic Plan

BREAK

Open Discussion

- What data do you use?
- Do you use data to support program planning efforts?
- Are there any challenges to accessing data?
- What data do you need?

Data Quality Management Implementation

Form a Committee

- TRCC subcommittee
- Data governance subcommittee
- Members should represent all the data systems included in the plan
- Appoint a Chair or Facilitator
- Establish ground rules

Develop a Plan

- The plan should:
  - Reflect the group's ability to implement and maintain
  - Be updated regularly at committee meetings
  - Frame performance management items respectfully and include possible solutions
  - Contain the components discussed in the next section

Incorporate These Components

- Stakeholder involvement
- System documentation review
- Edit checks and validation rules review
- Data audit process
- Periodic QC data analysis process
- Error correction processes
- Aids to data collection
- Performance management

Stakeholder Involvement

Role	Name	Agency
Data system manager	John Doe	
QA/QC supervisor		
Data steward/custodian		
Data entry/quality review staff member(s):		
Data analyst performing QC checks		
Data collector 1		
Data collector 2		
User representatives		
IT system support staff		
Others (TRCC chair, external advisors, liaison to data governance group, etc.)		

System Documentation Review

- System inventory
- Data dictionary(-ies)
- Entity relationships, flow diagrams
- Post processing descriptions
- Data outputs

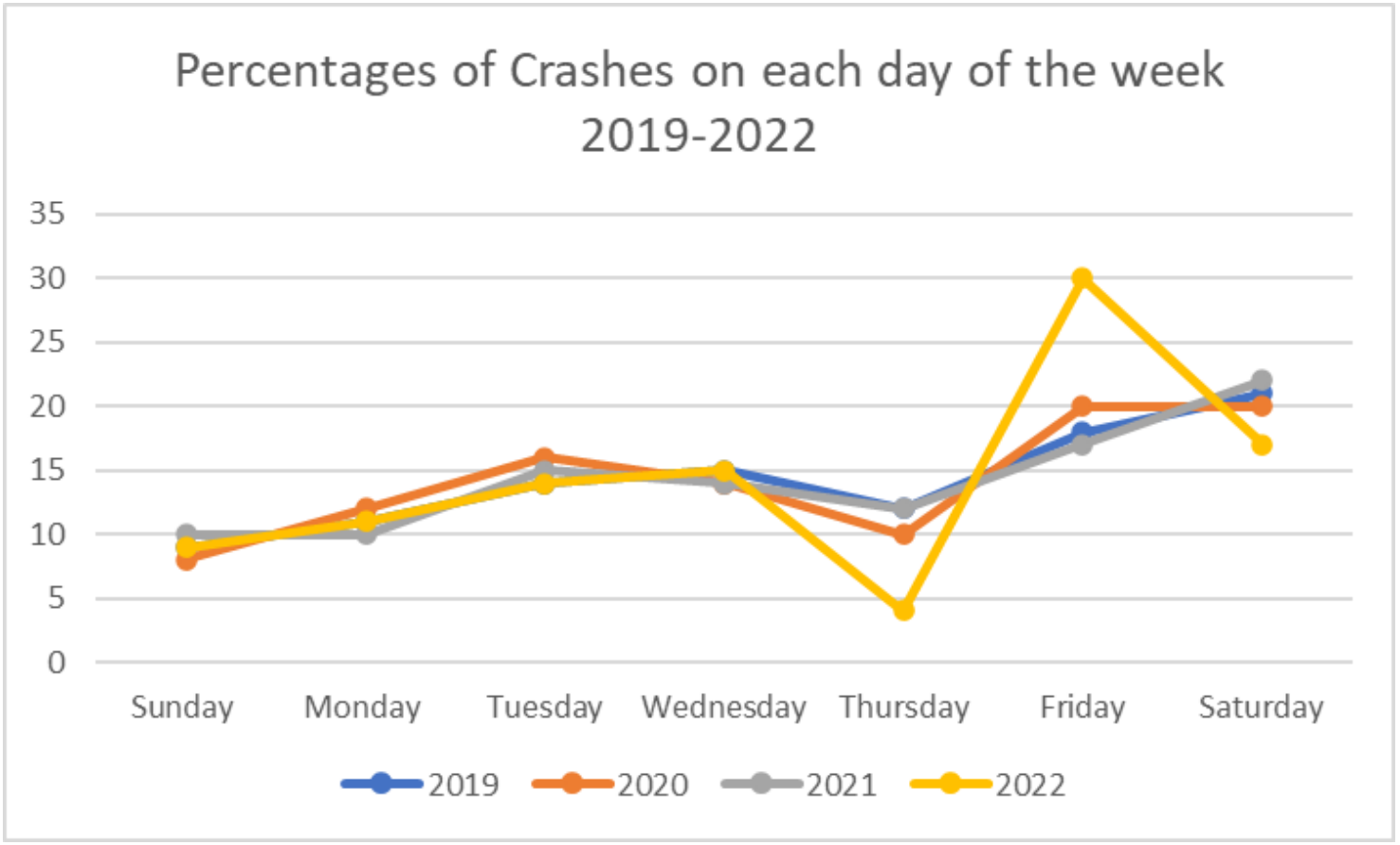
Edit Checks and Validation Rules

- Establish a working group of stakeholders
- Review “consequential” edit checks
- “Logical” agreement between data values
- Catch errors that matter for accuracy/completeness
- Remember system acceptance

Data Audit Process

- Periodic random sample
- Use experts to judge the sample
- Train to criterion agreement
- Use results for training content & new edit checks

Periodic QC Data Analysis Process



Periodic QC Data Analysis Process

STATE AGENCY NAME

Data Elements from Database Name

Critical fields received in error

Report Date Range 1/1/2022-6/30/2022

PCR Sample Size = 150,000

	Percentage Blank or Error Fields†	
Event Description		
1 GPS	12.7%	]]]
2 State Road Number	1.3%	]
3 County	3.0%	]
Vehicles		
20 Inspection	42.0%	]]]]]]]]
21 Permit	96.7%	]]]]]]]]]]]]]]]]]
22 Axis	7.0%	]]
Person		
30 Age	3.4%	]
31 Gender	15.7%	]]]]
32 Person Type	3.5%	]
33 Driver	4.2%	]

Error Correction Processes

TABLE NAME	*ErrorLog*
Record_Num	Key field
Data_Element	Variable containing error
Error_Type	Code value
Error_Descr	Description of Error
Reported_By	Person reporting error
Reported_Date	Date error was reported
Correction	Exact change made to the database
Corrected_By	Person entering the correction
Correction_Date	Date correction was entered into database

Aids to Data Collection

- Smart map technology
- Human factors design
- Linkage/autocompletion

Performance Management

- Observable
- Quantifiable
- Meaningful
- Intentional
- Goal oriented

Performance management ties data to actions.

Data Quality Performance Management

- Uses data about data (metadata)
- Describes “how good”
- Focuses on usefulness for decision-making
- Informs collectors, managers, and users
- Establishes goals

Data quality performance management turns metadata into actions to improve the data to meet quantified expectations.

Benefits of Performance Management

- You *know* your quality
- You can plan improvements
- Tie budgets to size of improvement
- User communication
- Data collector outreach
- Build support among decision makers
- Decide what *not* to do (benefit/cost)
- **Other?**

Practical Performance Management

Start small

Prioritize

Involve

Redefine the measures

Use the results

Start Small

- What can we do easily?
- What can we automate?
- What do we *really need?*

Prioritize

- Which systems are most critical? Most at risk?
- Which attributes matter most?
- What problems are we trying to solve?
- Which data elements do decision makers use?

Involve

- Data **Collectors**

  How would you like to be measured?

- Data **Managers**

  What do you need to know about the data?

- Data **Users**

  What would give you confidence in the data?

Redefine

- There should be variability
- There should be movement
- If it's stable for years on end, why measure?

  (if it's at 99.9% maybe retire the measurement)

Does It *Ever* Change?

- Do you have any measurements right now that aren't changing or aren't telling you much new information from year to year?

Use the Results

- Measure change
- Repeat
- Report
- Consider

Measure Change

- Did data quality really improve or get worse?
- Is it a meaningful change, reflecting reality?
- How much should it change before we agree the change is meaningful?
- Face validity

Repeat

- Can we measure every month, quarter, year?
- Can we report it frequently enough?

Report

- How often should we measure something?
- How often should we report it?
- Are there differing needs depending on who's asking?

Consider: Scalability

- Do the local numbers add up statewide?
- Can we measure combined impacts of programs?
- Do the numbers roll-up over time and jurisdictions?

Consider: Roll-ups and Efficiency

- Are there any measurements that make sense to roll-up from daily (for data managers), to monthly or quarterly (for data collectors and the TRCC), to annual (for data analysts and decision makers)?

Re-cap

Traffic Records Inventory

Overview of Data Quality Management

Data Quality Management Implementation

Practical Performance Management

Q
&
A

Wrap Up

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