



# CVSA and FMCSA

## SSDQ Performance Measures: Fatal Crash Completeness (FCC) Non-Fatal Crash Completeness (NFCC) Crash Consistency Indicator (CCI)

**April 21–22, 2013**  
CVSA Spring Workshop



Office of Research and Information Technology

# Introduction

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# Agenda

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- Overview of Crash Reporting Measures
- Why Reporting All Crash Records Matters
- Training Objectives and Expected Outcomes
- How Ratings Are Determined
- How to Interpret Data Quality Reports
- When and How to Improve Data Quality

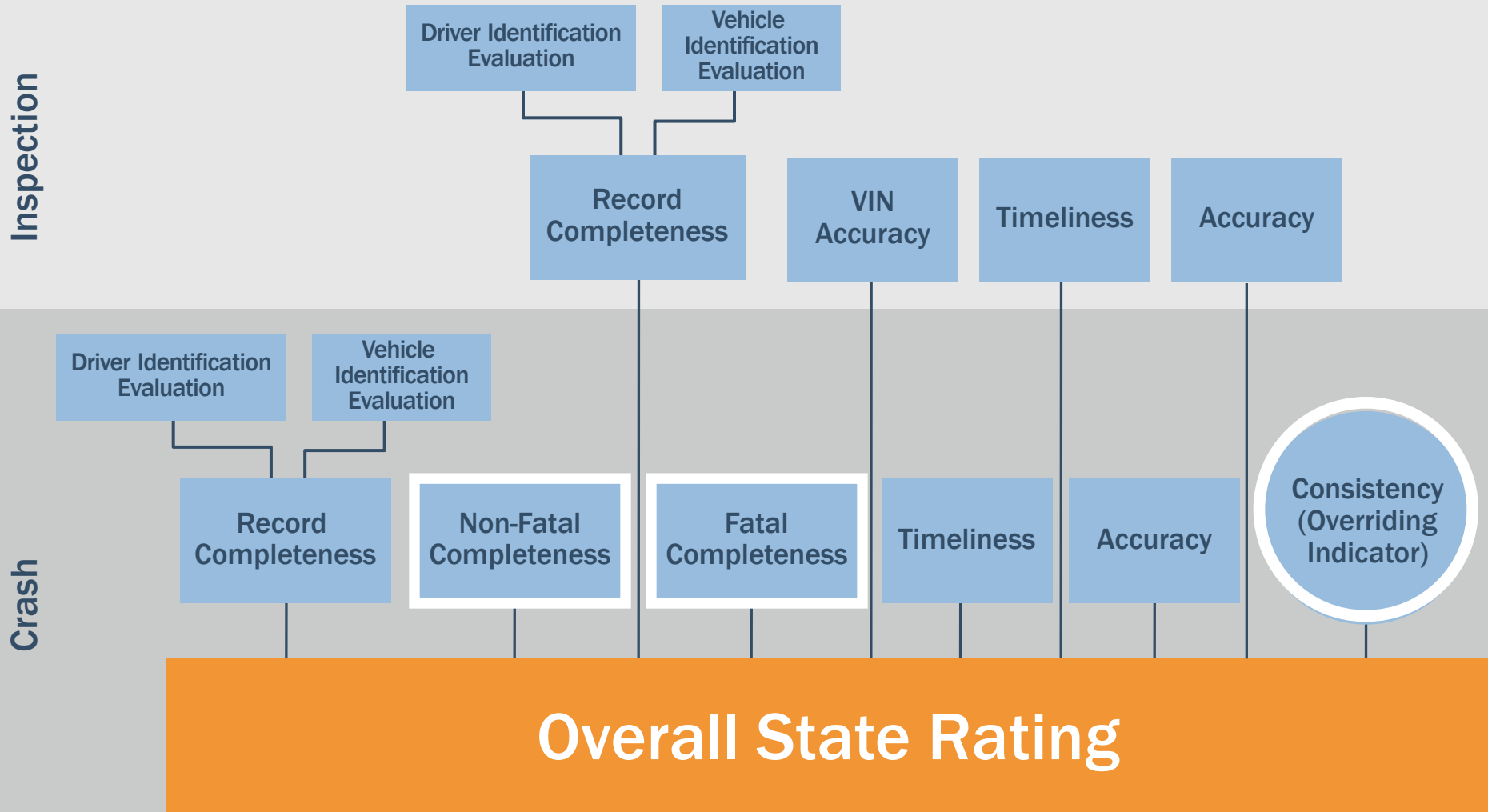


# Overview of Crash Reporting Measures

- **Fatal Crash Completeness (FCC):** the number of a State's Motor Carrier Management Information System (MCMIS) fatal records reported during a calendar year compared to the number of Fatality Analysis Reporting System (FARS) fatal records over the same year
- **Non-Fatal Crash Completeness (NFCC):** the number of non-fatal crash records reported to MCMIS during a 12-month period compared to an expected range of non-fatal crash records
- **Crash Consistency Indicator (CCI):** the number of non-fatal crash records reported to MCMIS during a 12-month period compared to the average number of non-fatal crash records reported over the prior three years



# State Safety Data Quality (SSDQ) Measures



# Why Reporting All Crash Records Matters

## Data-Driven Safety Systems

Safety Measurement System (SMS)

New Applicant Screening (NAS)

Inspection Selection System (ISS)

Driver Information Resource (DIR)

Pre-Employment Screening  
Program (PSP)

Driver Safety Measurement System (DSMS)

Safer Roads

# Training Objectives

- Explain the three crash reporting measures
- Review the reports available and how to use the FARS/MCMIS Matching Tool
- Show how data collection and processing can affect crash reporting ratings
- Identify Federal Motor Carrier Safety Administration (FMCSA) resources for improving data quality

# Expected Outcomes

- Understand the three crash reporting measures
- Interpret the crash reporting rating results
- Interpret the FARS/MCMIS Matching Tool results
- Identify potential sources of collection and reporting issues
- Know the FMCSA resources available to help make improvements



# How Fatal Crash Completeness (FCC) Ratings Are Determined



# FCC Methodology and Evaluation Period





- Compares counts of MCMIS fatal crash records to FARS fatal crash records
  - Includes all trucks
  - Buses not included
- Based on date of event, not date of upload
- Calendar year evaluation period
- Current event date range January – December 2011
  - MCMIS data updated monthly
  - FARS data updated when available



# FCC Rating

- Ratings calculated each month
- Results posted on the A&I Data Quality Website

$$\frac{\text{Number of MCMIS Fatal Records}}{\text{Number of FARS Records}} = \text{MCMIS as a \% of FARS}$$

Rating		Criteria
Good		MCMIS as a % of FARS is $\geq 90\%$
Fair		MCMIS as a % of FARS is 80 – 89%
Poor		MCMIS as a % of FARS is $< 80\%$
Insufficient Data		State has $< 15$ FARS records AND MCMIS as a % of FARS is $< 80\%$

# How to Interpret FCC Data Quality Reports



# How to Use Data Quality Reports

Two types of reports:

- 1 *Rating Results*
- 2 *FARS/MCMIS Matching Tool Reports*

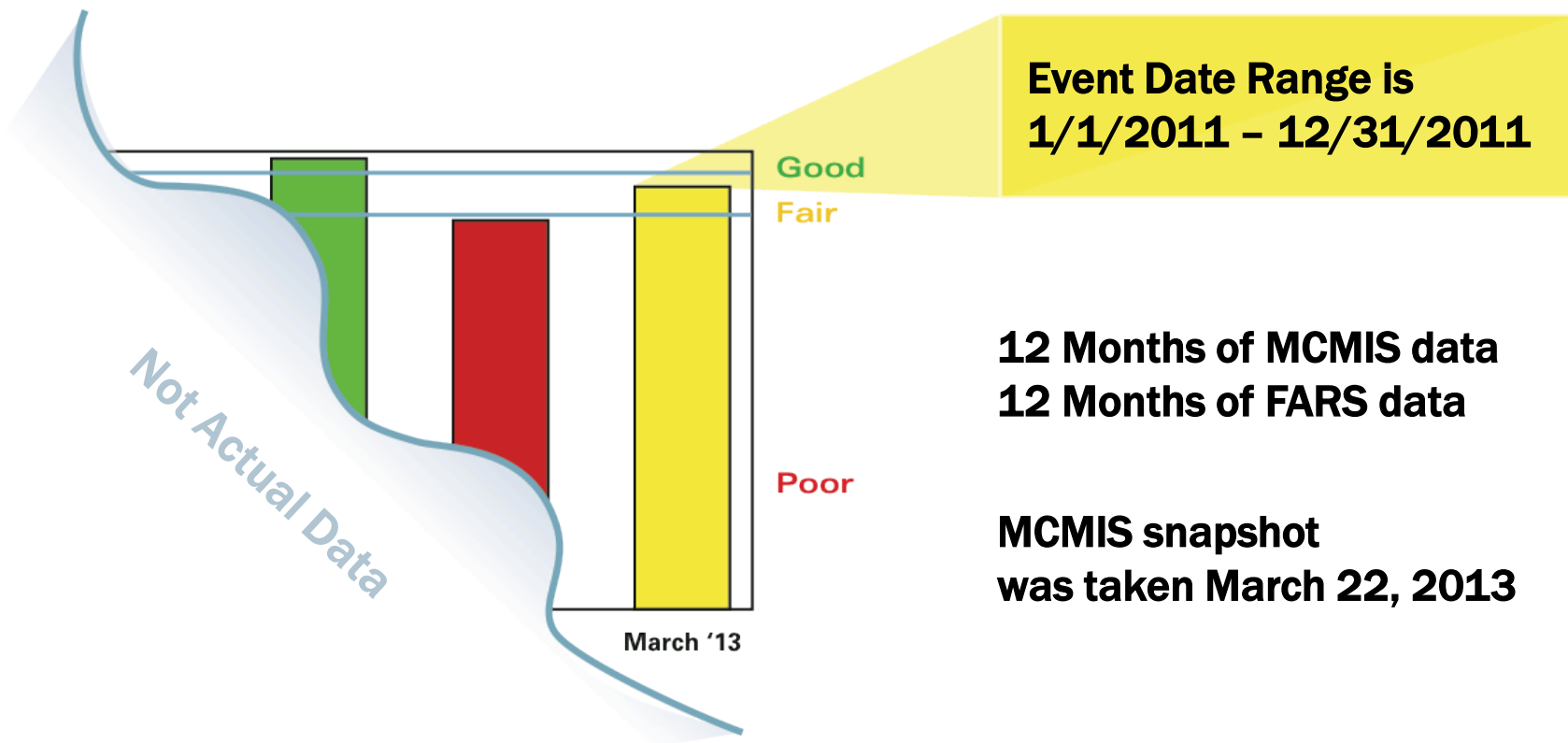
What you can do with them:



*Spot inconsistencies in reporting*

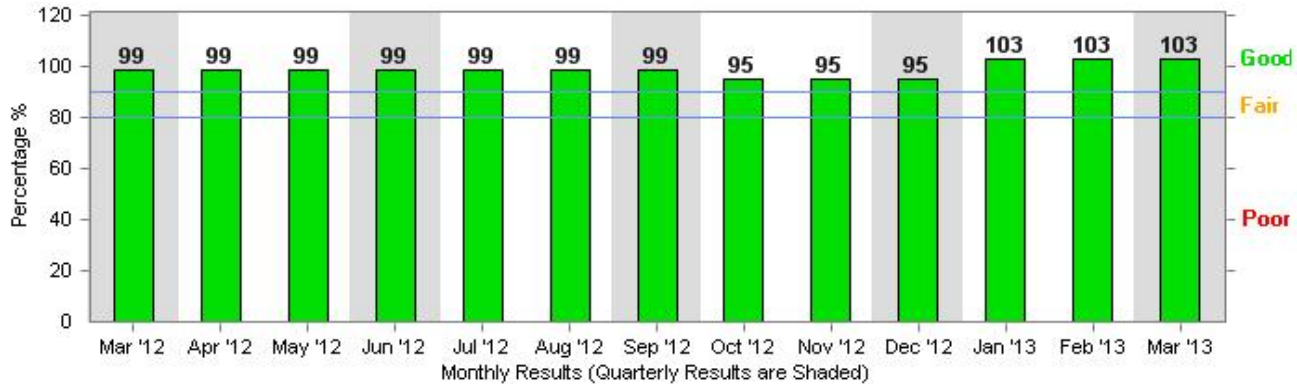
*Review/correct specific records*

# FCC Monthly Rating Results



# FCC Rating Results

Illinois: Fatal Crash Completeness Measure



Illinois: Fatal Crash Completeness Measure

[Download Data](#)

Monthly Results	MCMIS Run Date	Rating	Fatal Crash Year	Fatal Crash Records		
				FARS	MCMIS	MCMIS as a % of FARS
Mar '13	3/22/2013	●	2011	120	123	103%
Feb '13	2/22/2013	●	2011	120	123	103%

## How to Interpret

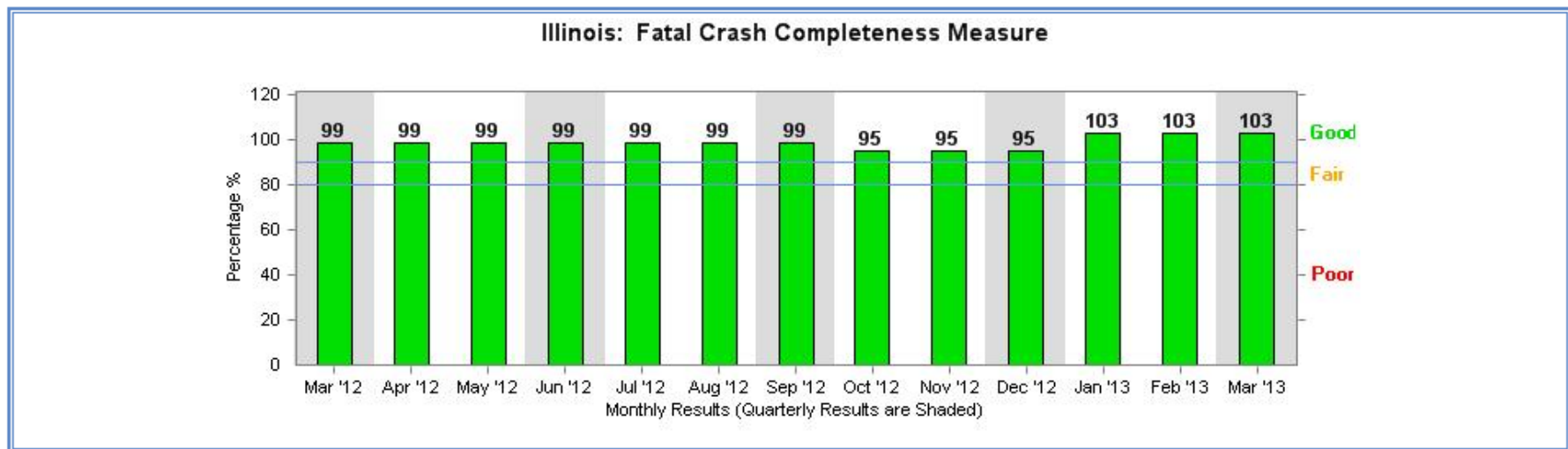
- Report displays the last 13 ratings
- Rating based on the number of fatal MCMIS crashes records as a percent of FARS

## When to Act

- Unusual or significant difference in percent of records
- Even when the rating is Good

# FCC Rating Results

## Room for Improvement, even with Good Ratings



**Illinois: Fatal Crash Completeness Measure** [Download Data](#)

Monthly Results	MCMIS Run Date	Rating	Fatal Crash Year	Fatal Crash Records		
				FARS	MCMIS	MCMIS as a % of FARS
Mar '13	3/22/2013	●	2011	120	123	103%
Feb '13	2/22/2013	●	2011	120	123	103%

- Equal counts in MCMIS and FARS do not mean all crash records match
- Crash records could still be missing from either FARS or MCMIS



# FARS/MCMIS Matching Tool Reports

## Matched, Potentially Matched, and Not Matched Fatal Records

Records Matched		Records Potentially Matched		Records Not Matched		Show All Records						
<b>Illinois: 2011 FARS to MCMIS Records Not Matched (as of March 22, 2013)</b>												
Source	Date	Time	Case/Report Number	County	Vehicle Identification Number	US DOT #	MC/MX #	Driver Age	Driver License State	Vehicle Type	Fatal?	
<b>FARS Truck and Bus Records Not Matched to MCMIS Records</b>												
1	FARS	12/26/2011	09:48 PM	832	LEE	1XKTD29X5WJ7	01009802		51	IL	Truck	Y
2	FARS	12/13/2011	11:42 AM	811	COOK	1T88T4C20712	350651		54	IL	Bus	Y
3	FARS	12/12/2011	05:41 PM	809	LAKE	1FDLF47F5REA			29	WI	Truck	Y
4	FARS	11/7/2011	08:09 PM	746	LA SALLE	1FDAF57R68EC			47	IL	Truck	Y
<b>MCMIS Fatal Records Not Matched to FARS Records</b>												
1	MCMIS	11/7/2011	12:16 PM	IL00M2189335	RANDOLPH	1XP7DB9XX4D829928	10558		35	OH	Truck	Y
2	MCMIS	7/12/2011	11:04 AM	IL00M2148166	MCHENRY	55418S-Y-CC			66	IL	Truck	Y
3	MCMIS	7/5/2011	06:56 AM	IL00M2148241	COOK	2FUYYDYB1TA710076	237360				Truck	Y
4	MCMIS	6/17/2011	03:45 AM	IL00M2139842	MACON	1FVXZCXB3YHG18804	1223277		51	IL	Truck	Y

- Review FARS/MCMIS Matching Tool results each quarter
- Resolve potentially matched and not matched
- Ratings calculated each month and posted on the A&I Data Quality Website

# FARS/MCMIS Matching Tool Reports

## Potentially Matched Fatal Crash Records

Records Matched		Records Potentially Matched		Records Not Matched		Show All Records						
<b>Illinois: 2011 FARS to MCMIS Potentially Matched Record Sets</b> (as of March 22, 2013)												
Source	Date	Time	Case/Report Number	County	Vehicle Identification Number	US DOT #	MC/MX #	Driver Age	Driver License State	Vehicle Type	Fatal?	
<b>FARS Truck and Bus Records Potentially Matched to MCMIS Non-Fatal Crash Records</b>												
1	FARS	10/23/2011	04:22 PM	770	WILL	4V4NC9GH33N3	1575065		61	IL	Truck	Y
	MCMIS	10/23/2011	04:22 PM	ILU100102789	WILL	34FV55329XM016575			61	IL	Truck	N
2	FARS	9/12/2011	10:13 AM	800	COOK	5FYD4FV148B0			40	IL	Bus	Y
	MCMIS	9/12/2011	11:01 AM	ILU110055754	COOK	5FYD4FV148B034016			40	IL	Truck	N
3	FARS	9/2/2011	06:40 AM	745	LIVINGSTON	2FZHRJBA7XAA	1639926		26	IL	Truck	Y
	MCMIS	9/2/2011	06:40 AM	ILU100308898	LIVINGSTON	1FZHRJBA7XAA51858	1639926	604265	26	IL	Truck	N
4	FARS	8/17/2011	01:00 PM	544	WILLIAMSON	1M2AT04Y07M0	01999502		60	IL	Truck	Y
	MCMIS	8/17/2011	01:00 PM	IL00M2164419	WILLIAMSON	1M2AT04Y07M01101	1999502		60	IL	Truck	N
5	FARS	4/15/2011	10:34 PM	151	COOK	1L00M2122055						Y
	MCMIS	4/15/2011	10:32 PM	IL00M2122055	COOK	1L00M2122055						N
6	FARS	3/27/2011	12:48 PM	170	COOK	1L00M2122055						Y
	MCMIS	3/27/2011	12:48 PM	ILU100364332	COOK	1L00M2122055						N

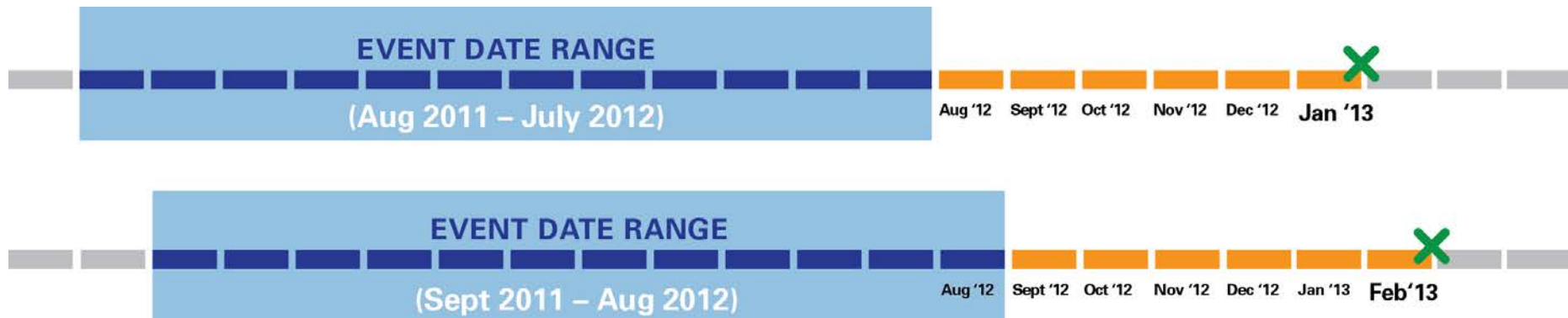
- Crash record designated a tow in MCMIS
- Potential match to FARS record
- Corrected record receives higher Crash Severity Weight in SMS

# How NFCC Ratings Are Determined



# NFCC Methodology and Evaluation Period

- Determines rating based on number of MCMIS non-fatal crash records reported compared to range of expected non-fatal crash records
- FCC is a factor in the rating
- Based on date of event, not date of upload
- Rolling 12-month period
- Excludes the most recent six months



# Methodology: Step 1



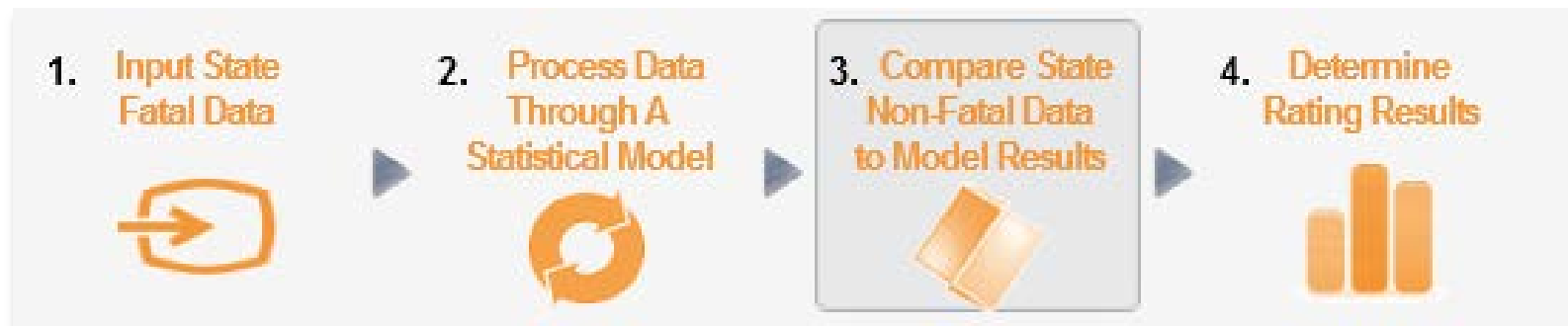
- Step 1: Input State Fatal Data
  - 12 months of State fatal crash records from MCMIS
  - MCMIS records updated on a monthly basis

# Methodology: Step 2



- Step 2: Process Data Through a Statistical Model
- Improvements made in 2012
  - More State data
  - More recent crash data
  - Adjustments based in amount of urban-rural traffic
  - Data ranges rather than single number targets are generated

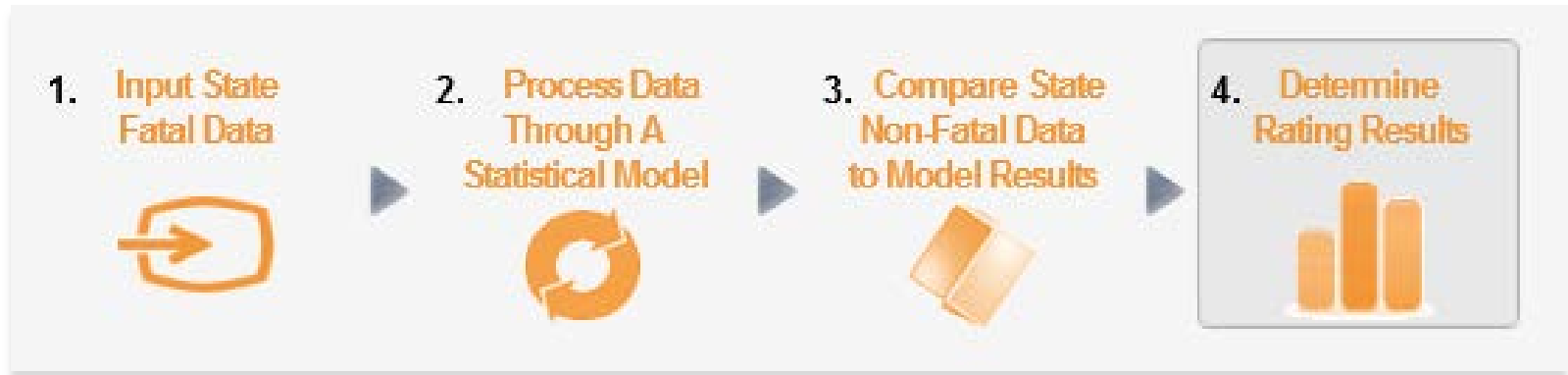
# Methodology: Step 3



Rating Ranges			
Under Reporting			Over Reporting
Poor *	Fair	Good	Fair
Below expected range	Below expected range	Within expected range	Above expected range

Assigns a base rating of 'Insufficient Data' if Reported MCMIS Fatal Records is less than 15 AND Non-Fatal Records is within the Poor Rating Range.

# Methodology: Step 4

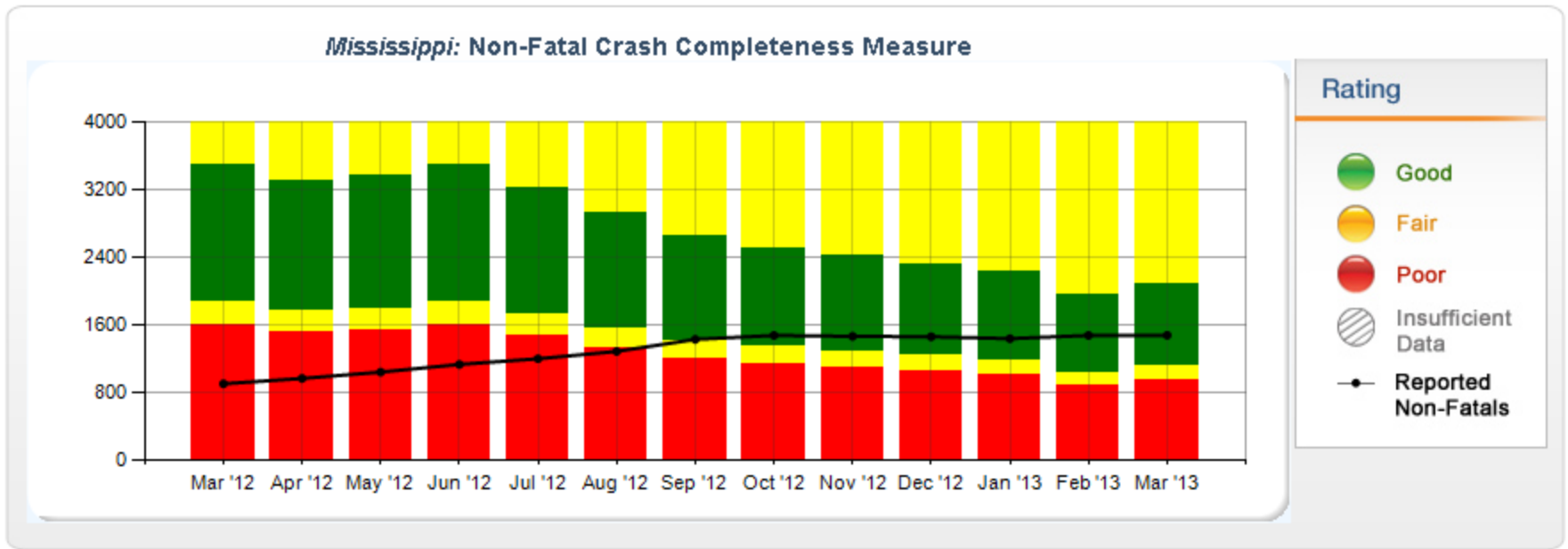


Rating		Criteria
Good		MCMIS non-fatal count falls within Good rating range AND FCC rating is Good or Fair
Fair		MCMIS non-fatal count falls within Fair rating range AND FCC rating is Good or Fair
Poor		MCMIS non-fatal count falls within Poor rating range AND FCC rating is Good, Fair, or Poor
Insufficient Data		Base rating is assigned Insufficient Data OR Reported MCMIS non-fatal records fall within Good or Fair rating range AND FCC rating is Poor OR Insufficient Data



# How to Interpret NFCC Data Quality Reports

# NFCC Rating Results



## How to Interpret

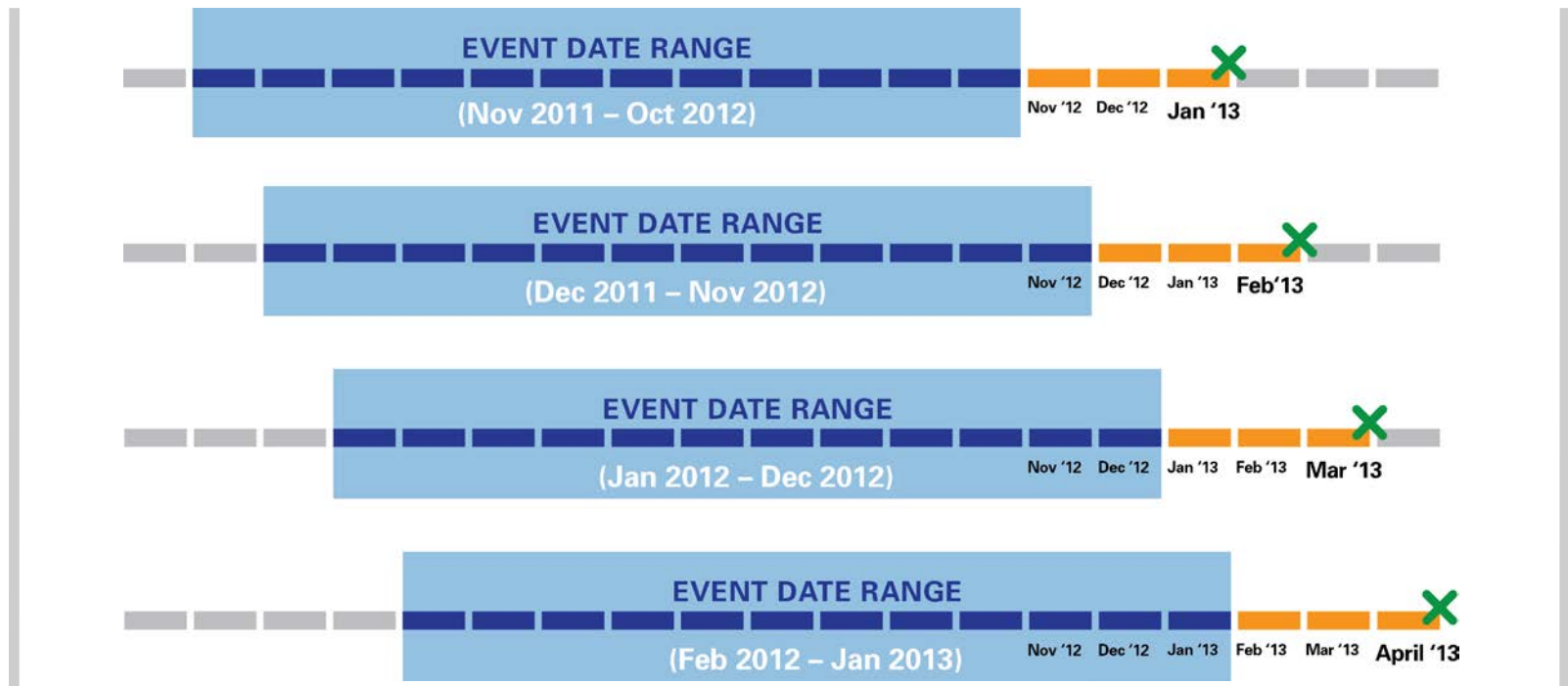
- Report displays the last 13 ratings in a bar chart and a table
- Rating indicates how the reported non-fatal count compares to expected range
- Compare current and previous results to identify trends

Mississippi : Non-Fatal Crash Completeness Measure									
Monthly Results	Rating	Reported MCMIS Records		Rating Ranges					
		Fatal	Non-Fatal	Under Reporting		Good	Over Reporting		
				Poor*	Fair			Fair	
Mar '13	Good	47	1,474	< 939	939 - 1,104	1,105 - 2,086	> 2,086		
Feb '13	Good	44	1,472	< 874	874 - 1,028	1,029 - 1,947	> 1,947		
Jan '13	Good	50	1,434	< 1,004	1,004 - 1,180	1,181 - 2,225	> 2,225		

# How CCI Ratings Are Determined

# Evaluation Period = Event Date Range

- Determines rating based on the number of MCMIS non-fatal records over 12 months as a percentage of the prior three-year average
- Rolling 12-month evaluation excludes the most recent three months







# CCI Rating

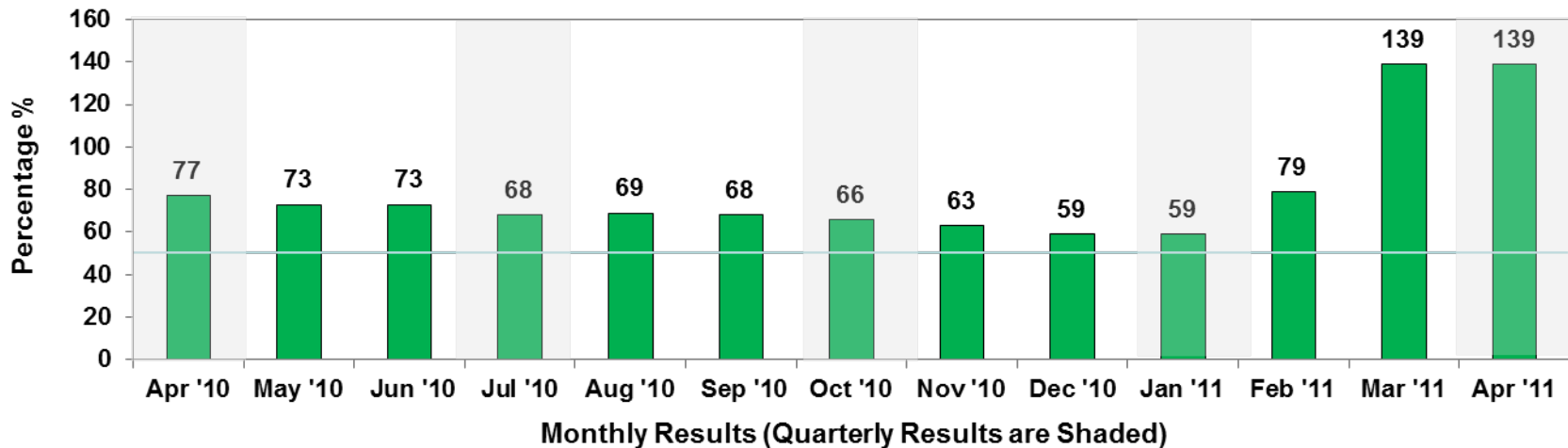
- Ratings calculated each month
- Results posted on the A&I Data Quality Website

$$\frac{\text{Number of Non-Fatal Records}}{\text{Avg of Prior 3 Years Non-Fatal Records}} = \text{Percent of Non-Fatal Reported Records}$$

Rating		Criteria
No Flag		Estimate Reported is $\geq 50\%$
Red Flag		Estimate Reported is $< 50\%$
Insufficient Data		State has $< 15$ records reported in current timeframe AND State has $< 15$ records reported in previous three-year average AND Estimate Reported is $\leq 50\%$

# CCI Rating Results

Delaware: Crash Consistency Overriding Indicator



## How to Interpret

- Report displays the last 13 ratings in a bar chart and a table
- Compares 3-year average to current counts
- Compare current and previous results to identify trends

## When to Act

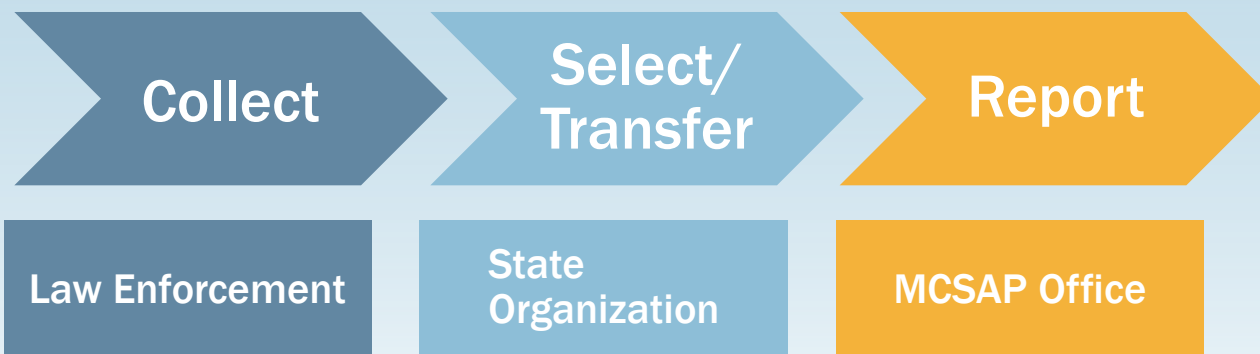
- Unusual or significant change in reporting
- Downward trends nearing 50%

# How to Improve Data Quality

# Data Collection and Reporting Process

- **Key to improving crash reporting:**  
Apply FMCSA reporting requirements throughout the reporting process

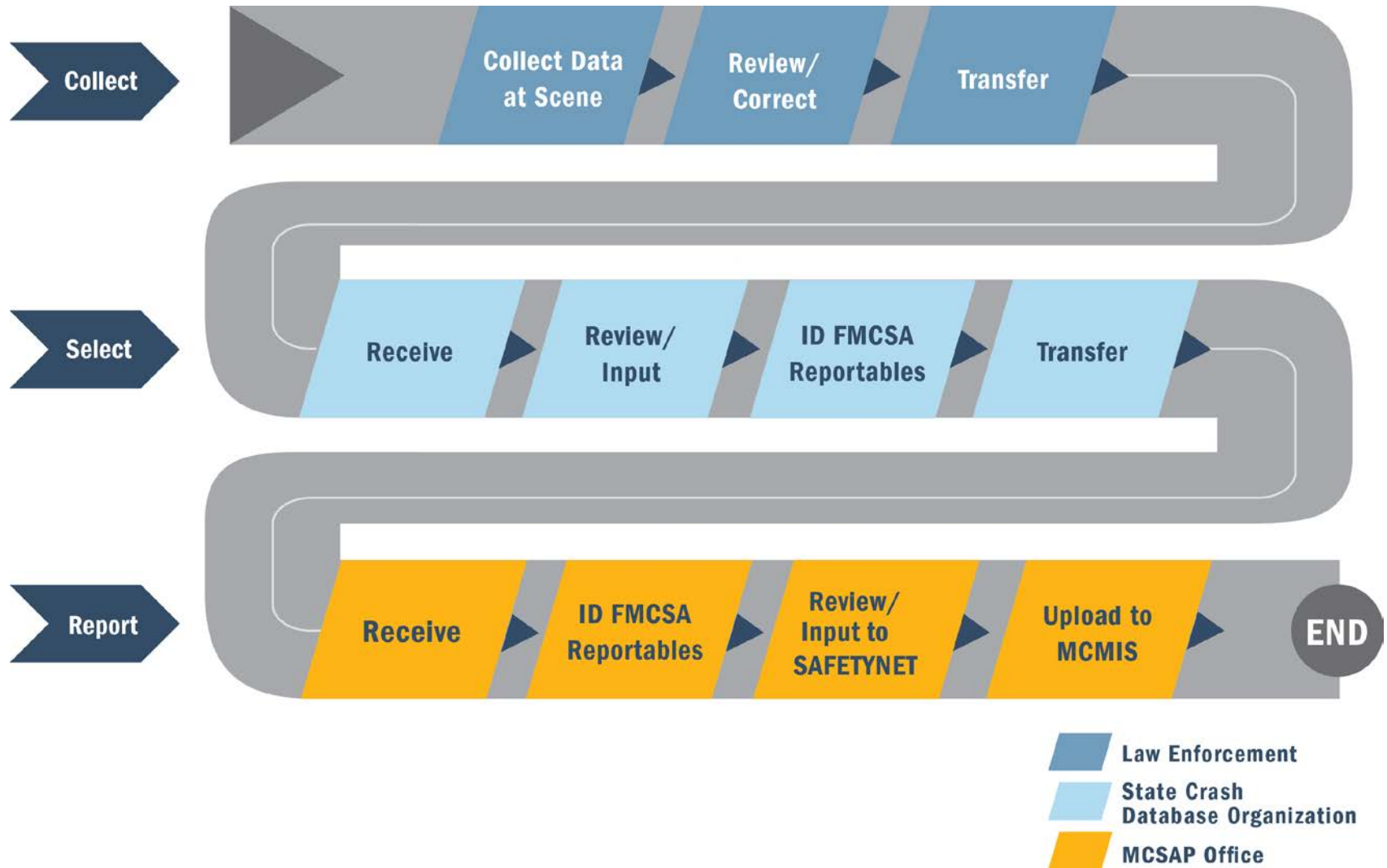
**Report all Crash Records that Meet FMCSA Reporting Criteria**







# Crash Data Collection and Reporting Process





# Capture and Transfer Correct Data at the Scene



## *Possible Actions: Improve Training and Tools*



- Formal training in CMV crash form completion
- Feedback to individual officers and/or agencies
- Crash form content and layout
- Visor cards

## *Possible Actions: Ensure Transfer of All Reports*

- Validate all eligible reports are captured and transferred
- Pay attention to system updates or changes in electronic collection



# Include FMCSA Requirements in State Data Processing



## *Possible Actions at State Crash Repository*

- Validate all eligible reports are captured and transferred
- Ensure FMCSA reporting criteria are understood and applied

# Upload All FMCSA Records

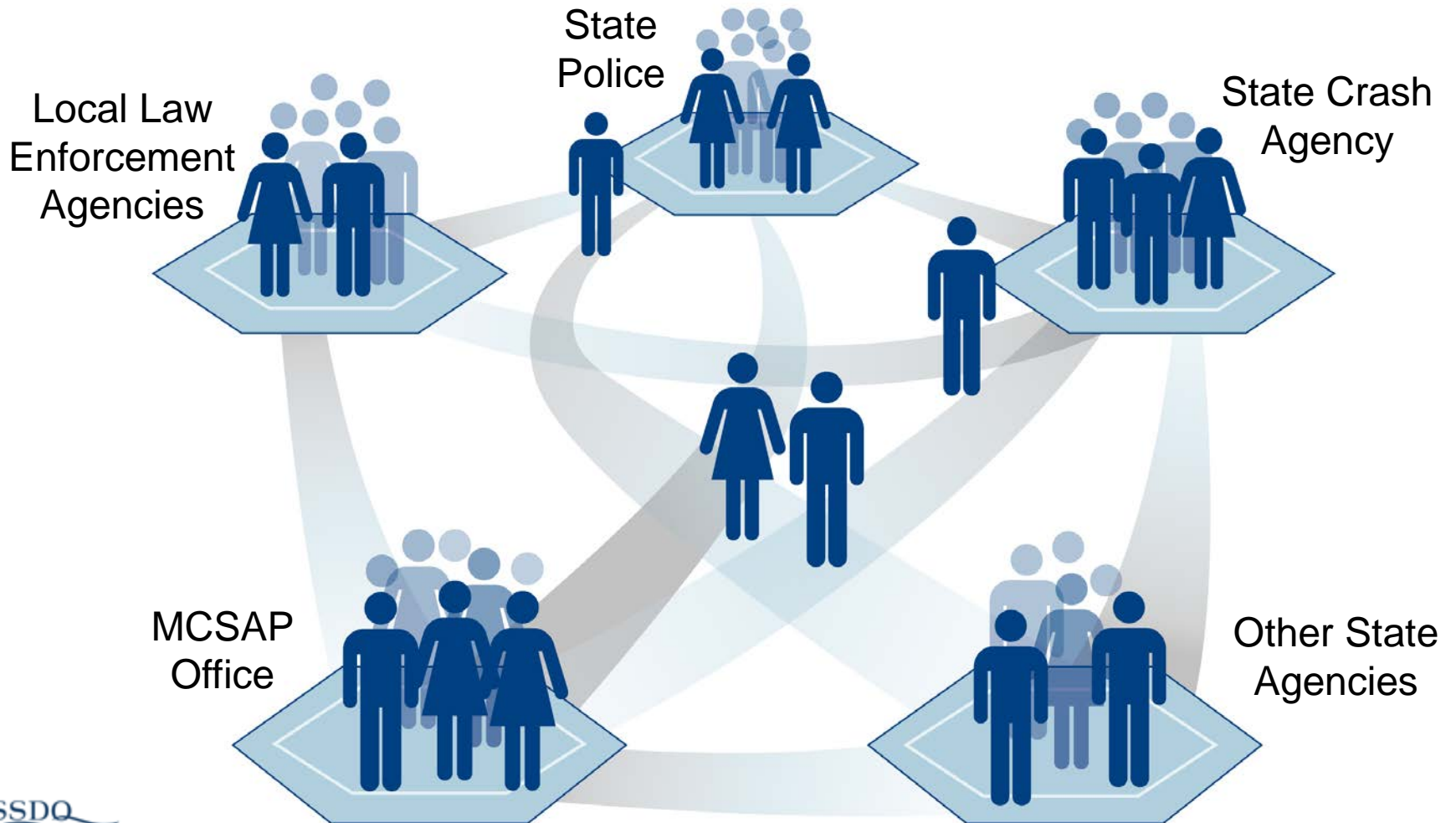


## *Possible Actions in the MCSAP Office*

- Monitor quantity of incoming records
- Ensure FMCSA reporting criteria are understood and applied
- Upload to MCMIS daily and use activity logs
- Coordinate regularly with the FARS office to ensure you are getting all fatalities
- Call your TA with questions about reportability

# What to Do Next

## Interagency Coordination: How Does It Work in Your State?



# Contacts

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# Training Recap

I am now able to:

- ✓ Understand the FCC and NFCC measure methodology
- ✓ Interpret the FCC and NFCC rating results
- ✓ Understand the CCI rating and results
- ✓ Identify points in the reporting process to review and identify for improvement
- ✓ Know the FMCSA resources available to help make improvements