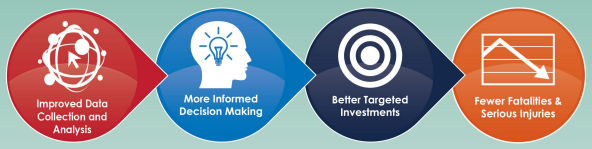
SECOND U.S. ROADWAY SAFETY DATA CAPABILITIES ASSESSMENT

FHWA Safety Program



U.S. Department of Transportation
Federal Highway Administration

Safe Roads for a Safer Future
Investment in roadway safety saves lives

http://safety.fhwa.dot.gov

FOREWORD

The Federal Highway Administration (FHWA) conducted a second capabilities assessment for each State plus the District of Columbia and Puerto Rico in terms of the collection, analysis, management, and integration of roadway, traffic, and crash data. The previous U.S Roadway Safety Data Capability Assessment was conducted in 2012 resulting in the establishment of the FHWA Roadway Safety Data Program (RSDP). The current assessment is part of the RSDP's, continuing collaborative effort between the FHWA and States to ensure that they are best able to develop robust data-driven safety capabilities. This final report provides an overview of findings based upon the assessment of each State.

Notice

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TECHNICAL DOCUMENTATION PAGE

1. Report No. FHWA-SA-19-018	2. Government Accession No. N/A	3. Recipient's Catalog No.
4. Title and Subtitle **Second U.S. Roadway Safety Data Capabilities Assessment Final Report**		5. Report Date September 19, 2019
		6. Performing Organization Code N/A
7.Author(s) Bob Scopatz, Matt Albee, Geni Bahar, Richard Brown, Daniel Carter, Joshua DeFisher, Claudio Figueroa Bueno, Jeff Gooch, Elissa Goughnour, Frank Gross, Ian Hamilton, Tim Harmon, Frances Harrison, Kari Signor, Sarah Smith, Jack Stickel, Saleem Taha, Eric Tang, Bethany Turner, Tony Wyatt, Yuying Zhou, Esther Strawder, Dana Gigliotti		8. Performing Organization Report No. N/A
9. Performing Organization Name and Address VHB Venture 1: 940 Main Campus Dr., Suite 500 Raleigh NC 27606-5217		10. Work Unit No. N/A
		11. Contract or Grant No. DTFH61-16-D-00005
12. Sponsoring Agency Name and Address Federal Highway Administration Office of Safety 1200 New Jersey Ave., SE Washington, DC 20590		13. Type of Report and Period Final Report, September 2019
		14. Sponsoring Agency Code FHWA
15. Supplementary Notes The contract manager for this project was Esther Strawder.		
16. Abstract The Federal Highway Administration (FHWA) conducted a second roadway data capabilities assessment of each State's collection, analysis, management, and use of roadway safety data. This final report provides an overview of findings based upon the assessment of fifty States plus the District of Columbia and Puerto Rico.		
17. Key Words: Roadway safety data, data collection, data management, data governance, data analysis, data integration, safety performance measurement, capability assessment, capability maturity model	18. Distribution Statement No restrictions.	

19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 57	22. Price N/A

Form DOT F 1700.7 (8-72) Reproduction of completed pages authorized

SI* (MODERN METRIC) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
		AREA		
in^2	square inches	645.2	square millimeters	mm^2
ft^2	square feet	0.093	square meters	m^2
yd^2	square yard	0.836	square meters	m^2
ac	acres	0.405	hectares	ha
mi^2	square miles	2.59	square kilometers	km^2
		VOLUME		
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
	NOTE: volumes greater than 1000 L shall be shown in m^3			
		MASS		
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
		TEMPERATURE (exact degrees)		
°F	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	°C
		ILLUMINATION		
fc	foot-candles	10.76	lux	lx
fl	foot-Lamberts	3.426	$candela/m^2$	cd/m^2
		FORCE and PRESSURE or STRESS		
lbf	poundforce	4.45	newtons	N
lbf/in^2	poundforce per square inch	6.89	kilopascals	kPa

APPROXIMATE CONVERSIONS FROM SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
		AREA		
mm^2	square millimeters	0.0016	square inches	in^2
m^2	square meters	10.764	square feet	ft^2
m^2	square meters	1.195	square yards	yd^2
ha	hectares	2.47	acres	ac
km^2	square kilometers	0.386	square miles	mi^2
		VOLUME		
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m^3	cubic meters	35.314	cubic feet	ft^3
m^3	cubic meters	1.307	cubic yards	yd^3
		MASS		
g	grams	0.035	ounces	oz
kg	kilograms	2.202	pounds	lb
Mg (or "t")	megagrams (or "metric ton")	1.103	short tons (2000 lb)	T
		TEMPERATURE (exact degrees)		
°C	Celsius	1.8C+32	Fahrenheit	°F
		ILLUMINATION		
lx	lux	0.0929	foot-candles	fc
cd/m^2	$candela/m^2$	0.2919	foot-Lamberts	fl
		FORCE and PRESSURE or STRESS		
N	newtons	0.225	poundforce	lbf
kPa	kilopascals	0.145	poundforce per square inch	lbf/in^2

*SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380. (Revised March 2003)

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ACRONYMS

DOT	Department of Transportation
CDIP	Crash Data Improvement Program
CMM	Capability Maturity Model
CMF	Crash Modification Factor
EMS	Emergency Medical Service
FDE	Fundamental Data Elements (of MIRE)
FMCSA	Federal Motor Carrier Safety Administration
FHWA	Federal Highway Administration
GAO	Government Accountability Office
GIS	Geographic Information System
GHSO	Governor's Highway Safety Office
HPMS	Highway Performance Monitoring System
HSIP	Highway Safety Improvement Program
HSIS	Highway Safety Information System
HSM	Highway Safety Manual
HSP	Highway Safety Plan
IHSDM	Interactive Highway Safety Design Model
IT	Information Technology
LIDAR	Light Detection and Ranging
MIRE	Model Inventory of Roadway Elements
MPO	Metropolitan Planning Organization
NHTSA	National Highway Traffic Safety Administration
NRSAP	National Roadway Safety Data Action Plan
RDIP	Roadway Data Improvement Program
RITA	Research and Innovative Technology Administration
RSDP	Roadway Safety Data Partnership
SHSP	Strategic Highway Safety Plan
SPF	Safety Performance Function
TRCC	Traffic Records Coordinating Committee
TRSP	Traffic Records Strategic Plan
USDOT	United States Department of Transportation

EXECUTIVE SUMMARY

The Federal Highway Administration (FHWA) conducted a second capabilities assessment for each State, the District of Columbia, and Puerto Rico on the collection, management, and use of roadway safety data. The first-round of the capabilities assessment ended in 2012. Its results helped FHWA develop technical assistance, guidance, peer exchanges, and noteworthy practice writeups aimed at helping States improve their data collection, analysis, data governance, and data integration efforts—the four key areas of the original assessment. In this new assessment, FHWA identified how the States have progressed since the first assessment and baselined a new area of Safety Performance Management.

The results of the second-round capability assessment will help drive FHWA's safety assistance and resources to States for the next several years. The three primary objectives of this project were to:

- Update the assessment process, forms, and scoring, while adding the new Safety Performance Management Area.
- Quantify States' status and goals and help them identify critical gaps and potential actions to achieve those goals.
- Identify safety programs, guidance, and technical assistance that States could use to reach their goals and promote data-driven highway safety management.

The capability assessment process used a five-level Capability Maturity Model (CMM) with 1 (lowest) to 5 (highest) scoring to describe the current capabilities of each State. The assessment focused on the following five areas in each State:

- **Area 1: Roadway Safety Data Collection / Technical Standards** – This section developed two types of capability scores: how good are the data, and how good are the management practices applied to the data. Unlike the first-round survey, which concentrated mainly on roadway inventory data, the second-round survey addressed roadway inventory, traffic volume, and crash data. States provided information in the sub-areas of completeness, timeliness, accuracy, and uniformity of their safety data, and received scores based on these quality attributes (data scores) and their management of the data (CMM scores).
- **Area 2: Data Analysis Tools and Uses** – This section focused on how well States are implementing advanced analytic methods and using the various tools that support those methods. States provided information in the sub-areas of network

screening (method, data, and coverage); diagnosis; countermeasure selection; evaluation; and accessibility.

- **Area 3: Data Management and Governance** – This section focused on States' data management and data governance in the sub-areas of roles & responsibilities, policies, and processes.

- **Area 4: Data Integration** – This section focused on integration among the six core traffic records system components: crash, roadway, driver, vehicle, citation and adjudication, and injury surveillance data. States received scores on data integration in general, expandability, and spatial data integration.

- **Area 5 (new): Safety Performance Management** – This section focused on States' safety performance management. States received scores in the sub-areas of safety performance measurement data, safety performance management processes, and performance analysis capabilities.

The project team used questionnaires and interviews to describe the capability of each State in the five areas. The States participated by providing relevant information, reviewing, and completing the questionnaire, and discussing the answers in a half-day meeting. The project team used a standardized scoring procedure to develop CMM scores for each State on each section of the assessment. Finally, each State confirmed their current capability level and selected their desired capability level. Along with this final report, FHWA will receive a database of all questionnaire answers and notes, the States' action plans, plus the capability scores and goals on every segment of the CMM. This will help FHWA identify high (and low) performers in each area, and scan for agencies that plan to improve in specific areas. FHWA will review the scores and the notes from the assessments to identify candidates for hosting and attending peer exchanges, and the most requested areas of technical assistance, training, and guidance.

The overall national average capability level scored 3.20 on a scale of 1 (low defined as ad hoc) to 5 (high defined as optimized). The capability level is below 3 in several key subareas: data quality management practices for completeness, timeliness, accuracy, and uniformity; analyses supporting countermeasure selection, the roles, responsibilities and policies for data management and governance; and safety performance management analysis. The national average of States' desired capability level is 3.97, i.e., States wish to improve, on average, by almost one full capability level.

In general, States want to improve their current roadway safety data capabilities and take the necessary steps to achieve their desired level. Most States are currently in the process of implementing data improvement projects, where their desired level is higher, and following a

plan for improvement, in one form or another. FHWA has access to each States desired levels through the States' Action Plans.

Overall, the States appear challenged by managing data quality using formal processes. In Area 1: Roadway Safety Data Collection/Technical Standards, the management process (CMM) scores are all much lower than the scores for data quality (average of 2.28 versus 3.64, respectively). Further, the data management and governance scores for both sub-areas roles and responsibilities and policies are low (2.46 and 2.3, respectively). The data management and governance area is one where capabilities appear to have dropped since 2012's assessment. This is most likely due to States learning more about data governance in the intervening years—the lowest scores are in the subarea of data governance roles and policies. There are improvements in data governance processes since the first assessment. This implies that States have learned about data governance between 2012 and 2018. States are performing some data governance, but they are mostly doing it for single systems and without including agencies outside the State's Department of Transportation (DOT).

In Area 1: Roadway Safety Data Collection/Technical Standards, national scores for completeness, timeliness, accuracy, and uniformity have improved from 2012 to 2018. However, scores for States' capabilities in managing these same attributes using formal data quality management processes are much lower. These scores were disaggregated for this second-round capability assessment. The low CMM scores in Timelines (2.13), Uniformity (2.25), Completeness (2.32), and Accuracy (2.4) indicate that States could use assistance establishing data management practices including establishing data standards; measuring and routinely reporting data quality; setting data quality goals; and establishing quality control checks. Overall, States reported that their data quality itself was good, but there is a clear desire to improve quality as well. The national average goals showed increases for completeness (3.29 to 4.16), timeliness (3.38 to 3.94), accuracy (3.94 to 4.45), and uniformity (3.94 to 4.36). States can coordinate these efforts through expanded data governance. In 2012, the Data and CMM scores were combined into an overall score and may not be directly comparable to the 2018 scores; however, the 2012 version of the questionnaire was more heavily weighted toward the data quality measurements versus management practices (the CMM scores in 2018). Using those as a baseline for data quality, there are noticeable improvements between 2012 and 2018 in data quality as follows: Completeness increased from 2.6 to 3.29 from 2012 to 2018. Timeliness improved from 3.3 to 3.38; accuracy improved from 3.7 to 3.94; and uniformity improved from 3.8 to 3.94

In Area 2: Data Analysis Tools and Uses identified national needs for improved countermeasure selection and expanded coverage for all public roads in network screening. States appear to have sufficient data for network screening and most are using advanced methods for network screening, diagnosis, and evaluation. Improved countermeasure selection would include expanded use of the Crash Modification Factor (CMF) Clearinghouse and enhanced analytic

capabilities. It is important to note that the national average for countermeasure selection has not changed in this area since the 2012 assessment—States still average roughly 2.8 on the five-point scale. The needed improvements may include complete data on all public roads as well as stronger reliance on advanced analyses and tools. Other scores did improve as follows: network screening methods improved from 3.6 in 2012 to 3.94 in 2018; network screening data improved from 3.5 to 3.79; and accessibility improved from 4 to 4.33. Only one area showed a decreased score: network screening coverage went from 3.4 in 2012 to 3.25 in 2018.

In Area 3: Data Management and Governance, the scores show that States are practicing data governance (3.25 score for processes) but are not well advanced in defining roles and responsibilities (2.46) or setting and enforcing data governance policies (2.31). These aspects of data governance would affect data quality management directly by setting and enforcing data standards and establishing data quality measurement as a standard business practice. The national average goals for roles and responsibilities (3.55) and policies (3.43) show that the States are interested in making large improvements in both aspects of data governance. Still, only the national goal for data governance processes reached a high level (4.08). There was a noticeable decrease in scores between 2012 and 2018 for data governance roles and responsibilities (from 3.1 to 2.46). The team believes this is due to many States not truly understanding what is involved in data governance in 2012, especially with respect to formal assignments of roles as well as policies. The policy score also showed a slight decrease between 2012 and 2018 (from 2.5 to 2.31). The data governance processes score did increase, from 2.9 to 3.25, indicating that States have adopted some of the data governance procedures that match the available guidance.

In Area 4: Data Integration, which was referred to as Interoperability and Expandability in 2012, the scores improved and show that States rely heavily on spatial data integration tools and methods, and this likely is also reflected in a relatively high score for expandability. States scored lower on overall integration. There were small increases in the scores between 2012 and 2018 as follows: data integration overall increased from 3.1 to 3.19; expandability increased from 3.7 to 3.75; and spatial data integration increased from 3.6 to 3.83. States' goals for spatial data integration (4.55) are higher than for the other aspects of data integration as well. It is noteworthy that many more States achieved level 4 on the five-point scale for spatial data integration than in 2012 (32 versus 20, respectively). This reflects a major expansion in GIS for spatial data integration.

In Area 5: Safety Performance Management, the scores show that processes (3.44) and analytics (2.96) lag data availability (3.71) and coordination (3.82). This reflects similar findings in the earlier areas of the questionnaire where the data are generally at a higher capability level than analyses and processes. States' averaged goals are quite high for safety performance management in general with analysis at 3.98 and all other national goals above 4. This is an area where targeted assistance and guidance may be useful.

The findings of this effort present not only the current capabilities of the States through a consistent and thorough assessment process; but, also provide insight on the States' desired capabilities and the actions needed to move the Nation forward in roadway safety data. States worked with the assessment team to develop an action plan as a source of specific steps toward desired improvements. The States can also use their action plans when they develop their next Traffic Records Strategic Plan (TRSP) and their Strategic Highway Safety Plan (SHSP) and Highway Safety Plan (HSP). FHWA will follow up on these report findings through a series of peer exchanges developed by the FHWA Office of Safety.

Appendix A presents additional results including State-specific anonymized results for each assessment area.

CHAPTER 1. INTRODUCTION

This is the second-round of the U.S. Roadway Safety Data Capabilities Assessment. It includes all 50 States plus the District of Columbia and Puerto Rico (hereafter referred to collectively as "States"). The first round, completed in 2012, showed where the States shared some common needs. Those included specific data quality improvements, data governance in general, and data integration to support data driven decision-making. At that time, the *Highway Safety Manual* was new, as were many of the tools available to States to support advanced safety analysis. Geographic Information System (GIS), though well established as a tool for safety data management, was just beginning to become accepted as a tool for data integration and analysis beyond its core utility for mapping and overlays. Data governance was an entirely new concept for many safety practitioners even in States where the Information Technology (IT) support staff were aware of the value of more formal methods of data management.

Now, in 2019, highway safety analysis is still evolving, and the importance of *integrated* data has grown. The past few years have seen new requirements established so that every State is working toward a public roadways database, acquisition of the Model Inventory of Roadway Elements (MIRE) Fundamental Data Elements (FDE) applicable to segments and intersections, and finding accessible and maintainable ways to coordinate State, regional, and local efforts to improve the data. This is all in support of a level of safety management that relies on better data for better decision making. It aims to support more advanced safety analysis and yield decisions that are more cost effective in reducing serious injuries and fatalities.

Crash data alone are useful but leave safety practitioners with purely reactive approaches—identifying the locations where crashes have already happened. With the addition of traffic volume data, it is possible to develop estimates of the expected crash frequency and compare crash rates for roadways with vastly different levels of service. As detailed roadway inventory information is added to the mix, safety practitioners can now develop a more in-depth understanding of the roadway attributes that contribute to crash risk thus allowing them to adopt a proactive approach seeking out those factors associated with a high risk of crashes and addressing sites that share those features. The three datasets together support both systemic and location-specific predictive safety improvement. With the addition of other safety data sources describing drivers, vehicles, violations, and injury outcomes, engineering practitioners can collaborate with others seeking to affect behavior and emergency responses in ways that further reduce the frequency and severity of crashes.

FHWA developed the Roadway Safety Data Program (RSDP) after the first assessment as a collaborative effort between FHWA and States to ensure that they are best able to develop robust data-driven safety capabilities. RSDP includes a variety of projects all aimed at improving the collection, analysis, management, and expansion of roadway data for use in safety programs

and decision-making. This report provides the highlights, methodology, and lessons learned from the assessments of each State in terms of the collection, analysis, and management of roadway safety data. This assessment describes national gaps, recommends actions, and provides FHWA with the information to develop guidance, peer exchanges, noteworthy practice descriptions, case studies, training, and technical assistance.

BACKGROUND

A mature data-driven safety program requires that analysts can combine reliable crash, roadway inventory, and traffic data for the entire public roadway network. Using reliable tools and methods, analysts must provide usable information to decision makers. Decision makers must select and implement cost-effective countermeasures and evaluate their impact after implementation. All this work traditionally falls within the purview of the State DOT. That is why this assessment focuses on the State DOTs and on State Safety Data Systems. That focus does not end with the State's DOTs, however. Managing safety performance of an entire State's roadway network involves multiple business units and agencies, some responsible for engineering decisions at the local and regional levels, and others with responsibility for behavior, enforcement, courts, and injury surveillance. All of them need reliable data. Within FHWA, the agency's safety improvement efforts involve multiple areas including Operations, Infrastructure, Asset Management, Policy, and Planning. Additionally, within the United States Department of Transportation (USDOT), safety improvement efforts involve the National Highway Traffic Safety Administration (NHTSA), the Federal Motor Carrier Safety Administration (FMCSA), and the Research and Innovative Technology Administration (RITA). This report is meant to be inclusive of FHWA's efforts for improving safety data. It also incorporates some aspects of other USDOT efforts (such as crash data improvement). Throughout, the reader is invited to expand their own appreciation for the inter-connected nature of safety management and to consider ways to increase safety data capabilities while including State and local agency partners across the broad spectrum of engineering, education, enforcement, and emergency response.

Data Capabilities Peer Exchanges

Following completion of this assessment project, FHWA will invite States to participate in one of three Peer-to-Peer (P2P) exchanges based on the results of their assessment. In these meetings, participants will exchange ideas and provide information about their practices that other States can adopt and adapt. The P2P exchanges will help strengthen State safety data action plans, leadership plans, and strategies.

Each P2P exchange will have differences in composition and theme. The needs and areas of interest identified by the participating States will determine the peer exchange topics. FHWA

will invite experts and States that have strengths and needs within each area. All peer exchanges will touch on the best practices, approaches, and techniques in the following areas:

- Data Collection and Capability Maturity Models covering Areas 1 and 5 of the capability assessment, plus the overall assessment process.
- Data Management and Integration covering Areas 3 and 4 of the capability assessment.
- Data Analysis and Tools covering Area 2 of the capability assessment.

CHAPTER 2. OBJECTIVE

The purpose of this project was to conduct a consistent and thorough roadway safety data capabilities assessment and record goals for each of the States. The resulting information is useful in two ways. First, States can use their specifically created Action Plan to promote activities that will increase their capability levels in data, analysis, governance, integration, and safety performance management. Second, FHWA can use the updated status and goals to identify areas of common interests and needs among the States. This will help FHWA decide how best to support States and meet the shared needs. This will include technical assistance, training, noteworthy practices, case studies, guidance, and peer exchanges over the next several years.

The three primary objectives of this project are:

- Update the assessment process, forms, and scoring, while adding the new Safety Performance Management Area.
- Quantify States' status and goals and help them identify critical gaps and potential actions to achieve those goals.
- Identify safety programs, guidance, and technical assistance that States could use to reach their goals and promote data-driven highway safety management.

The assessment teams pre-filled the questionnaires and provided the results to their States. The assessors asked States to complete and correct the questionnaires, and then review the final answers with the consultant teams. The assessors then scored the final questionnaire answers using a CMM process, giving each State an objective review of their capabilities. The States met with their assigned assessment team and decided on goals for each area of the CMM and discussed the best ways for the State to meet those goals. This final meeting resulted in an Action Plan for each State that shows status, goals, and methods for reaching those goals. The CMM and Action Plans have five focus areas, each with appropriate sub-areas:

- **Area 1: Roadway Safety Data Collection / Technical Standards** – This section developed two types of capability scores: assessing the data, and assessing the management practices applied to the data. Unlike the first-round survey, which concentrated mainly on roadway inventory data, the second-round assessment addressed roadway inventory, traffic volume, and crash data. States provided information on the completeness, timeliness, accuracy, and uniformity of their safety data, and received scores based on these quality attributes (data scores) and their management of the data (CMM scores).

- **Area 2: Data Analysis Tools and Uses** – This section focused on how well States are implementing advanced analytic methods and using the various tools that support those methods. States provided information on network screening (method, data, and coverage); diagnosis; countermeasure selection; evaluation; and accessibility.

- **Area 3: Data Management and Data Governance** – This section focused on States' data management and data governance roles & responsibilities, policies, and processes.

- **Area 4: Data Integration** – This section focused on integration among the six core traffic records data sets: crash, roadway, driver, vehicle, citation and adjudication, and injury surveillance data.

- **Area 5 (new): Safety Performance Management** – this section focused on States' safety performance management. States received scores on safety performance measurement data, safety performance management processes, and safety performance analysis capabilities.

CHAPTER 3. METHODOLOGY

The project team developed and conducted a capability assessment for each of the 52 States. The capability assessment uses a methodology that is flexible in working with States; but, consistent in process to provide a fair and accurate assessment across the States reviewed. After testing the process through four pilot States, the assessment in each State followed a three-stage process: pre-assessment, assessment, and post assessment. The following sections describe the CMM as it applies to this project, the development of the assessment process through the pilot phase, some of the challenges addressed, and the resulting three-stage process. The project's technical advisory group reviewed all materials and provided comments, which the assessment team addressed in final versions of each product.

ASSESSMENT QUESTIONNAIRE UPDATE

Technical advisors from USDOT, States, and consultants updated the first-round questionnaire. The changes included:

- Rewording questions for clarity and focus.
- Expanding the scope of Area 1 to include crash and traffic volume data.
- Adding items and specificity to Area 2's list of analyses and tools.
- Creating a new section (Area 5) on Safety Performance Management.

CAPABILITY MATURITY MODEL UPDATE AND EXPANSION

This first round assessment used a custom CMM developed specifically for that project. The second assessment used an updated CMM to allow for separate scoring of data and management practices in Area 1: Data Collection/Technical Standard. The second assessment also included a CMM for Area 5-Safety Performance Management.

Maturity Levels

- **Initial / Ad hoc:** The organization does not possess a stable implementation environment and the safety data collection, management (entering/coding, processing, and evaluating) and maintenance process is 'ad hoc' with no interconnection within the organization. There is no plan for interoperability or expandability.

- **Repeatable:** The results of previous projects and the demands of the current project drive activities and actions. Individual managers decide what to do on a case-by-case basis during individual projects.
- **Defined:** The organization documents the process rather than on a per-project basis. The organization's standards tie to an adopted strategy and this guidance determines project outcomes.
- **Managed:** Process management initializes and supervises individual projects. Through safety performance management, processes are predictable, and the organization can develop rules and conditions regarding the quality of the products and processes.
- **Optimizing:** The whole organization focuses on continuous improvement. The organization possesses the means to detect weaknesses and to strengthen areas of concern proactively.

ASSESSMENT AREAS

The assessment focused on identifying a capability level for each State within each of the five areas.

The following sections present an overview of each area in the assessment.

Area 1: Roadway Inventory Data Collection/Technical Standards

This area covered four elements: completeness, timeliness, accuracy, and uniformity. Assessors scored each area separately for data capabilities and data management as follows:

- 1A Completeness (data): addressing perceived completeness of the State's safety data.
- 1A Completeness (CMM): addressing completeness quality control processes.
- 1B Timeliness (data): addressing perceived timeliness of the State's safety data.
- 1B Timeliness (CMM): addressing timeliness quality control processes.
- 1C Accuracy (data): addressing perceived accuracy of the State's safety data.
- 1C Accuracy (CMM): addressing accuracy quality control processes.
- 1D Uniformity (data): addressing perceived uniformity of the State's safety data.
- 1D Uniformity (CMM): addressing uniformity quality control processes.

Area 2: Data Analysis Tools and Uses

This area covered five steps in the safety management process: network screening, diagnosis, countermeasure selection, evaluation, and accessibility. States received CMM scores in the following:

- 2A Network Screening:
    - Method: addressing the analytic methods used for network screening.
    - Data: addressing the data available for network screening.
    - Coverage: addressing the application of network screening to all public roads.
- 2B Diagnosis: addressing the processes for diagnosing safety conditions.
- 2C: Countermeasure Selection: addressing the processes for choosing treatments.
- 2D: Evaluation: addressing the processes for assessing effectiveness of treatments after implementation.
- 2E Accessibility: addressing the availability of safety analyses and tools to a wide range of users.

Area 3: Data Management and Governance

This area covers three elements as follows:

- 3A Roles and Responsibilities: addressing the defined duties of participants in the data governance process.
- 3B Policies: addressing the formal policies for pursuing data governance.
- 3C Processes: addressing the formal processes for data governance.

Area 4: Data Integration

This area covered three aspects of data integration as follows:

- 4A Data Integration: addressing the capabilities to integrate safety data including crash, roadway, driver, vehicle, citation and adjudication, and injury surveillance information.

- 4B Expandability: addressing the capabilities for adding new data sources and combining State and local data sources to an integrated dataset.
- 4C Spatial Data Integration: addressing the use of GIS platforms to facilitate spatial data combination and analysis.

Area 5: Safety Performance Management

This area covered overall safety performance management and safety performance management coordination as follows:

- 5A Safety Performance Management:
    - Data: addressing the quality and availability of data needed for safety performance management.
    - Processes: addressing the formal processes used to conduct safety performance management.
    - Analysis Capabilities: addressing the ability to conduct analysis in support of safety performance management.
- 5B Safety Performance Management Coordination: addressing the methods of interagency coordination including State, local, tribal, and regional participants.

PROCESS

The assessment team pilot tested the updated questionnaire in four States: Arizona, Louisiana, Missouri, and Washington State. The team updated the questionnaire and process and then scheduled full assessments with the remaining States. Each State reviewed the pre-filled questionnaire provided by their assessment team and participated in three meetings with that team. The first meeting was a review of the questionnaire to finalize all answers. The second meeting was scheduled after the assessment team had scored the State's answers using the updated CMM. At the second meeting, the State reviewed and accepted the scores on the CMM and decided what CMM levels they would like to achieve over the next five years. During the third meeting, the assessment team met to provide an Action Plan to each State describing how the State could achieve their target CMM levels.

Final Steps

During the three meetings (kickoff, assessment, and Action Plan), the project leaders gave each State information about peer exchanges planned as the final phase of this project. Based on

States' scores and Action Plans, FHWA identified hosts and participating States in three peer exchanges held in 2019.

CHAPTER 4. FINDINGS

This section presents the national averages and highlights of the State assessments. These results come directly from conversations between the States' participants and the lead assessors, the completed questionnaires, as well as the Action Plans. See Appendix A for additional results.

FINDINGS ABOUT THE OVERALL ASSESSMENT PROCESS

The assessment process worked well. Those States that had previously worked with Federal agencies on other data-related efforts (e.g., the Crash Data Improvement Program (CDIP) Roadway Data Improvement Program (RDIP), and various technical assistance projects) discussed goals and specific actions arising from those efforts.

One of the overwhelming findings, related to both data capability and project approach, is that each State is unique. Various divisions, districts, and regions within a State may operate in an independent and decentralized manner to collect, use, and manage data. Coupled with the fact that there are multiple data files managed by different business units within a DOT as well as agencies outside the DOT, it is unlikely that one answer from the questionnaire would adequately capture the State's true capability. In these cases, the questionnaire alone would not yield a consistent and thorough assessment. The conversation about the answers to the questionnaire proved extremely valuable to the objectives of the assessment. One of the most important changes implemented for this second-round assessment was the addition of comment fields for every question in the questionnaire and every score in the CMM and Action Plan worksheets.

States found value in assembling multiple internal agencies and professionals together to respond to the assessment questions. This process led several States to strengthen their interagency coordination and data ties. The assessment process will lead to further conversations at the State level.

GENERAL ASSESSMENT FINDINGS

- In general, States want to improve their current roadway safety data capabilities and take the necessary steps to achieve their desired level. Most States are currently in the process of implementing data improvement projects, where their desired level is higher, and following a plan for improvement, in one form or another. FHWA has access to each States desired levels through the States' Action Plans.

- States indicated the need for a focused USDOT effort to increase awareness of the technical assistance, tools, training, and other resources available to improve their roadway safety data.

- In some States, the organizational structure, and relationships across State agencies and with localities impede data quality improvement efforts. A more inclusive data governance process with assigned roles for local, regional, and tribal participants offers a solution.

- Data quality management practices lag well behind the perceived quality of the data. The result is a lack of governance and specifically of data quality performance measurement. In short, States appear satisfied with the quality of their core safety data, but they do not quantify its quality attributes and thus are not certain of the precise level of completeness, timeliness, accuracy, or uniformity achieved. The CDIP and RDIP programs help States develop their own measurement systems now. This can be a key step in data governance as well since that is an effective process for establishing and enforcing data standards.

- States are expanding their analytic capabilities in most areas of safety management. The States plan to improve safety analytic capabilities, especially for network screening. The most frequently cited examples of how States plan to increase their safety management and analysis capabilities center on adopting modern tools that support decision making. These include the latest generation of software from GIS vendors as well as tools like AASHTOWare Safety Analyst™ and the Interactive Highway Safety Design Model (IHSDM).

KEY FINDINGS FOR AREA 1: DATA COLLECTION AND DATA QUALITY

Figure 1 shows the national average capability scores and goals for Data Quality. For each of the four data quality attributes (completeness, timeliness, accuracy, and uniformity) each State received two sets of scores. The data scores reflect the perceived level of data quality achieved. The CMM scores reflect the States' capabilities for formal management of that data quality attribute. The data quality scores are consistently higher than the data management scores. On average, the States set goals for improving both data quality and data quality management.

Figure 1 also shows the scores from the first assessment in 2012. In that assessment, the data and CMM scores were combined for each data quality attribute. The 2012 data is shown alongside the second assessment's data scores for each attribute. The comparison shows that scores rose between the first and second assessments, with the largest gain in completeness.

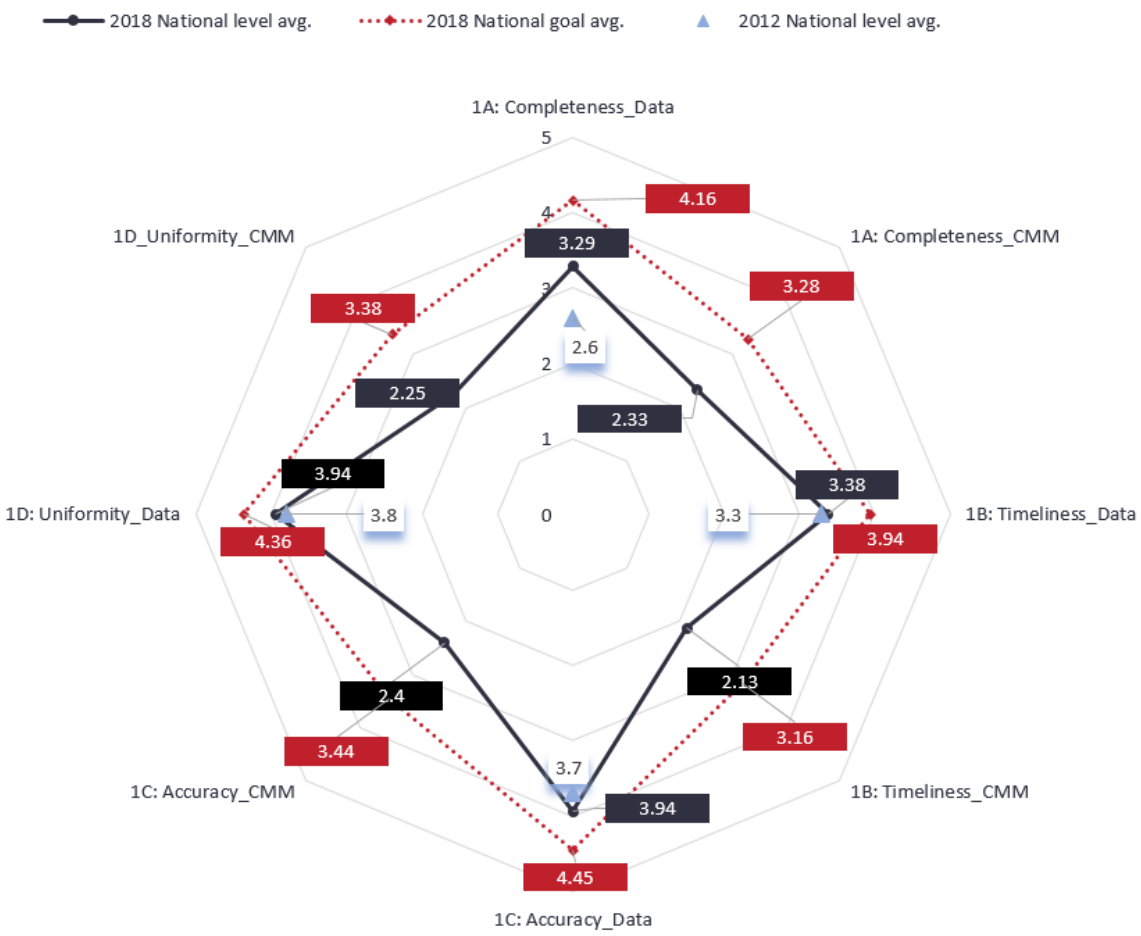

Figure 1. Radar chart of national average scores and goals for data quality.

The following highlights some of the key findings under Data Collection.

- On average, States set goals to improve both data quality and their data management practices. Planned improvements in CMM scores aim for more than one full point improvement in data management capabilities. The data quality goals are near or above level 4.
- Perceived data quality is consistently higher than the States' capabilities for managing data quality. This is not to say that those perceptions are inaccurate or indicative of an inflated score for data quality. The growing use of automated systems for data collection is raising the levels of quality even in the absence of formal data quality measurement or data governance. States are implementing automated methods for collecting roadway inventory data. Field data collection systems for crash reporting are common as well.
- Elements collected at the State level are not the same level of detail as those on locally-maintained roadways or functionally-classified local roads. The MIRE FDE clarifies for States the recommended minimum set of data elements for each class of roadway.

However, even with this guidance, the State-maintained portion of the network is more likely to have more complete and timely data. States are making progress toward collecting the appropriate MIRE FDE for each class of roadway. States have provided plans for their collection of the MIRE FDE by 2026 and several states are actively engaged in collecting an expanded set of data elements. Examples include States using automated collection systems to gather roadway inventory and asset management data on the entire network and tying that information to their linear referencing system through a GIS.

- Intersection inventory systems lag the segment-oriented data. This situation is improving based on some GIS-based automated methods for creating an intersection inventory.
- Data quality measurements are more robust for traffic count and crash data than for roadway inventory data.

Suggested Actions

- Help States move forward with cost-effective, accurate, and innovative data collection practices. Specifically, States need examples of how to fund, process, and extract roadway inventory items, especially with respect to automated methods for collection and extraction and for intersections and interchanges. Arranging peer-to-peer information sharing, example contracts, and direct technical assistance are three ways that continue to help States in recent years with MIRE roadway data collection efforts.
- States need help deciding how best to formalize their data quality management practices. This is best done in the context of a formal data governance process which, as seen in Area 3's results, States have a good understanding of their needs and capabilities.
- Develop guidance for collecting intersection, curve, and grade inventory data, including automated methods for extracting the information and methods of quality control.
- Encourage States to use the CDIP, RDIP, and technical assistance programs.

KEY FINDINGS FOR AREA 2: DATA ANALYSIS

Figure 2 shows the national average scores and goals for Safety Analysis Capabilities. Except for countermeasure selection, the national average is high for each facet of safety analysis. States are using advanced methods for network screening and diagnosis. They are making the analyses accessible to decision makers across multiple agencies and jurisdictions. Countermeasure selection is clearly lagging the other data analysis areas.

Figure 2 also shows the first capabilities assessment results for comparison. The largest improvements by the second assessment were in Network Screening: Method and Data, and in

Accessibility. The other scores are essentially unchanged between the two assessments, although there does appear to be a slight drop in the score for Network Screening: Coverage.

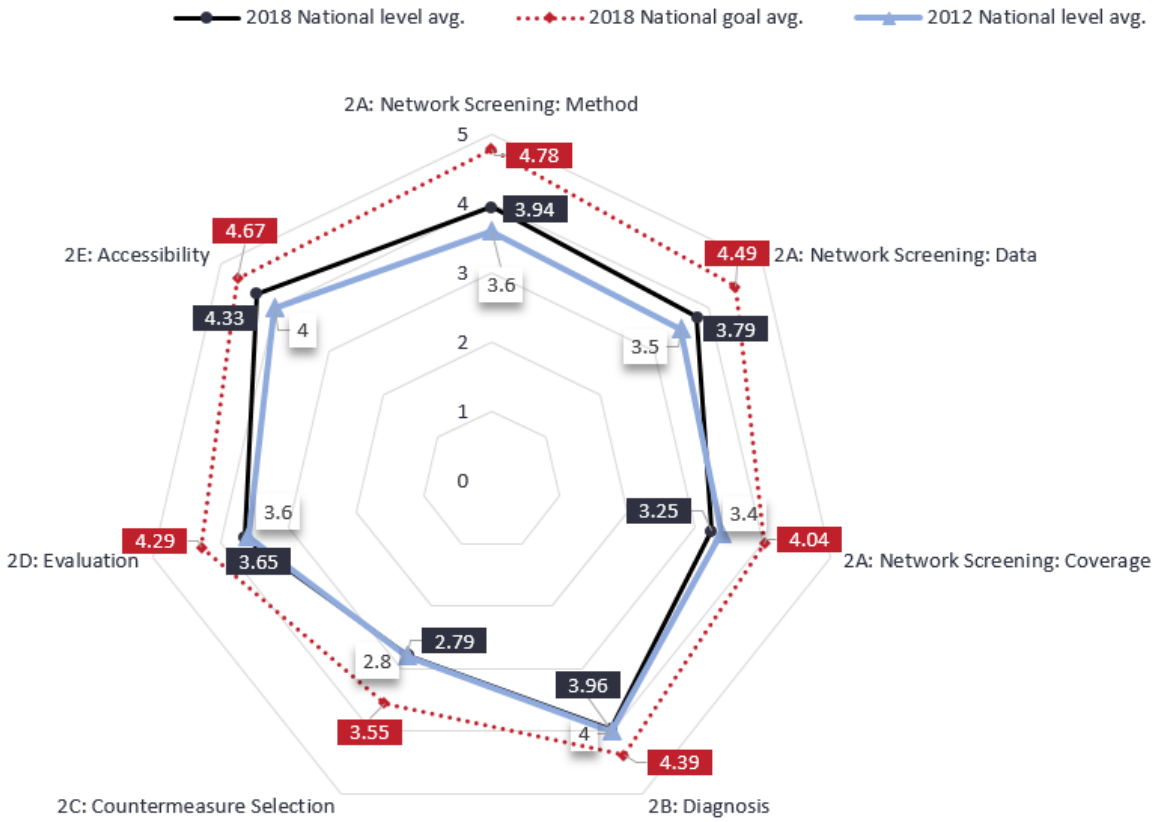

Figure 2. Radar chart of national average scores and goals for safety analysis.

The following highlights some of the key findings under Data Analysis.

- Use of data analysis tools and support varies from State to State, with some States using State-specific tools and some using national tools. There are several States already using advanced analytic methods and tools, including AASHTOWare Safety Analyst™. Some States are pursuing their own custom analytic tools. The *Highway Safety Manual* is serving as a guide for States' use of advanced analytic techniques and many States are developing State-specific Safety Performance Functions (SPFs) and Crash Modification Factors (CMFs).

- Most States are using the Crash Modification Factor (CMF) Clearinghouse. Nonetheless, average scores for countermeasure selection lag the other safety analysis areas. This is due to States not adopting the CMF methodology in all relevant cases, most notably local roads.

- Network screening and countermeasure selection require complete and integrated roadway inventory, traffic volume, and crash data. States are using GIS to integrate spatial data (as shown in Area 4). This supports more efficient use of the advanced analytic methods and tools. Five States specifically mentioned using systemic safety methods to identify countermeasures that they can apply to any location matching a specific configuration of attributes.

Suggested Actions

- Continue to promote advanced safety analysis methods and tools with guidance, training, and technical assistance. Specific suggestions include:
    - Continue promoting States' and local agencies' use of the CMF clearinghouse for a broad range of countermeasure selection opportunities. This could include webinars, case studies, peer exchanges, and training.
    - Develop technical assistance for States interested in improving any of the five subareas of data analysis. Network screening coverage, countermeasure selection, and evaluation show the largest needs; however, States are interested in improving in all data analysis areas. This suggestion could include hands-on training and assistance in analysis methods and how to use the analyses in decision-making.
    - Continue and expand guidance and training on systemic safety analysis and decision making.
- Work with States to find ways to incorporate advanced safety analysis (and, countermeasure selection methods) into a broader range of DOT business processes. In particular, DOTs (and their partner agencies) could use guidance and assistance bringing safety analysis into the standard operating procedures in planning, design, maintenance, and asset management.
- Consider a continuous tracking of States' analysis improvements to identify and address the circumstances when implementations stall or fail. This is especially important to consider with respect to software tool implementations that can take several years and may hit roadblocks along the way.

KEY FINDINGS FOR AREA 3: DATA MANAGEMENT & GOVERNANCE

Figure 3 shows the national average scores and goals for Data Management and Governance. Compared to other areas of the assessment, scores in this area are low. This indicates that States are challenged, especially with formalizing policies and roles and responsibilities in a data governance framework. Scores are slightly higher for processes, indicating that States are implementing some aspects of data governance, but statewide, institutionalized, and enforced

data governance is not the norm. The goals indicate that States are interested in strengthening their data management and governance practices.

Figure 3 also shows the first assessment results for comparison. In the Data Management and Governance area, two scores *dropped* between the first and second assessments: Roles and Responsibilities, and Policies. The third score, Processes, improved from 2.9 to 3.25 nationally. The two scores may have dropped because, in 2012, States over-estimated their capabilities in data governance, reporting that they had these pieces in place. In fact, most States in 2012 had not engaged in formal data governance and the concepts had to be defined for practitioners during the assessment meetings. By 2018, most States had extensive experience with data governance and the scores probably reflect this more accurate understanding of what is involved.

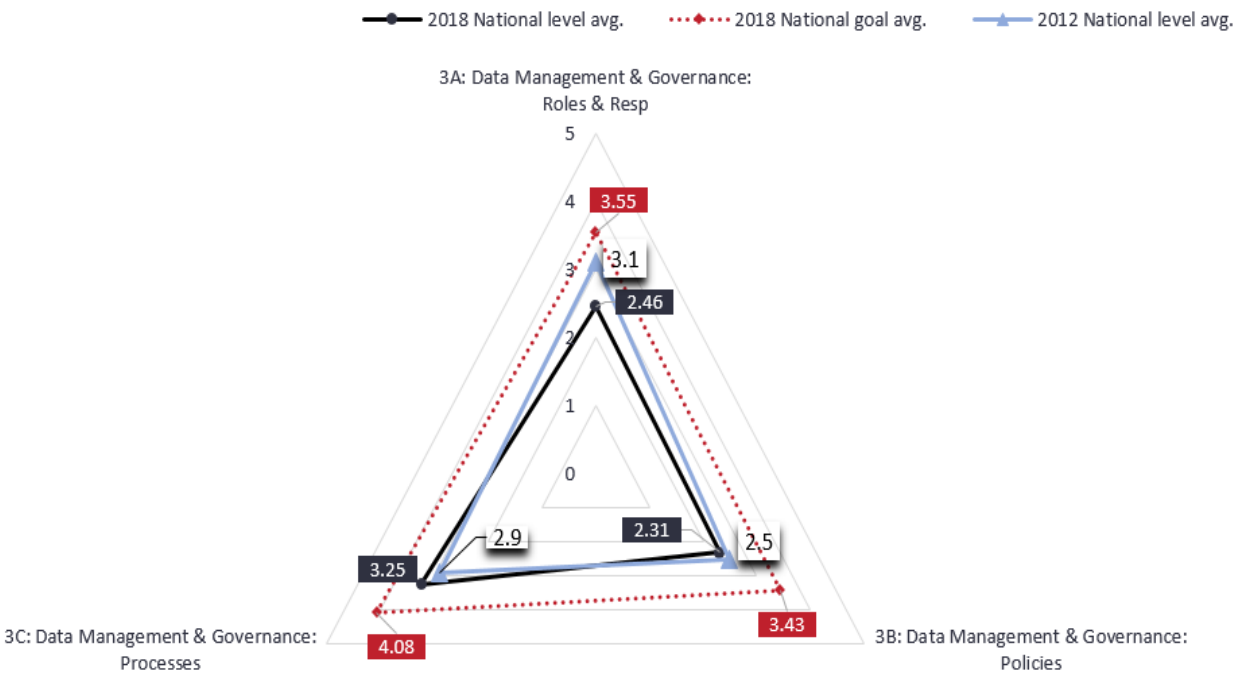

Figure 3. Radar chart of national average scores and goals for data management and governance.

The following highlights some of the key findings under Data Management and Governance.

- Compared to the 2012 capabilities assessment, scores in this area slipped lower. This likely indicates a more complete understanding of data management and governance. Unlike the first-round assessment, State safety engineers generally understand what data governance is and how far their State is from optimal performance.

- States are engaged in formal data governance now, but very few are at the highest levels on the CMM. Many of the implementations affecting safety data are quite recent. Most States are not yet comfortable with the idea of going outside the DOT to include local and tribal representatives in data governance committees.

- Enforcing data standards is difficult. States are recognizing the need, but have a challenging time deciding how to work with the local agencies.

- The safety engineering data users often do not own the systems they rely on to do their jobs. In that environment, users are often the strongest supporters of improved data governance. Within State DOTs, the agency's subject matter experts are getting involved; however, the IT (information technology) and GIS groups are concerned that implementing more formal data governance will stretch their staff and, at least at the beginning, pull too many resources away from high-priority efforts like implementing an enterprise GIS or advanced analytic system. Data governance helps those implementations work better, but some States view it as slowing progress.

- Data system documentation is incomplete. This makes it difficult to establish and enforce data standards. It also impedes system improvements and makes it more likely that application development will stall for lack of a clear definition. As States move to enterprise GIS solutions the interactions among IT, GIS, and business unit experts is critical to success.

Suggested Actions

- The planned peer exchanges for this project will include at least one session covering data governance practices. The higher-performing States' examples will be useful to many of the States who set ambitious goals on the CMM. Sharing the results of the 2019 peer exchanges and continuing to offer relevant peer exchanges in future years will meet many States' needs for shared experience and knowledge.

- Continue to support data governance efforts with technical assistance and guidance. State DOTs need help identifying the right time and circumstances for bringing local and tribal agencies into the data governance process.

- Develop case studies, guidance, and technical assistance on enforcing data standards among multiple agencies. Specifically, States and their local and regional partners need to understand how they benefit from enforced standards. As indicated in Area 1, this effort should include formal data quality measurement and management.

KEY FINDINGS FOR AREA 4: DATA INTEGRATION

Figure 4 shows the national average scores and goals for Data Integration. The scores for Spatial Data Integration are the highest of the three. This is a direct result of expanded GIS implementation for safety data integration and analysis.

Figure 4 also shows the first assessment average scores for comparison. For each assessment component in Data Integration, there were small improvements between the first and second assessments. The largest gains were in Spatial Data Integration.

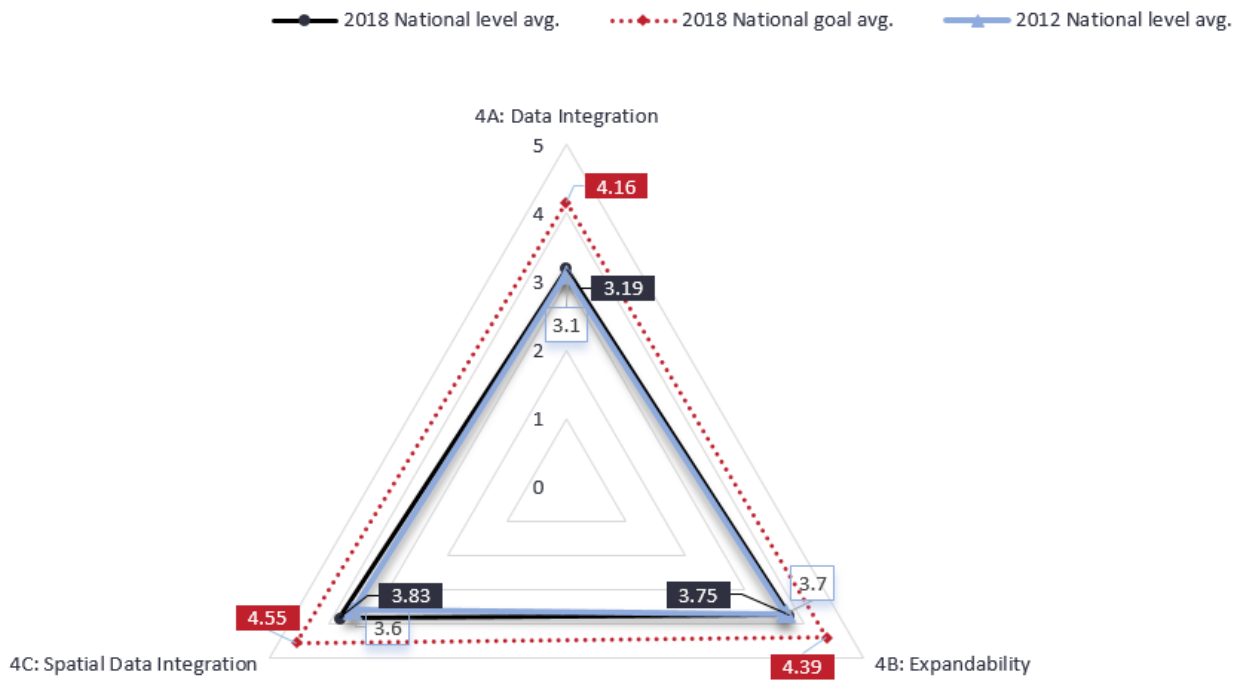

Figure 4. Radar chart of national average scores and goals for data integration.

The following highlights some of the key findings under Data Integration:

- States are using GIS as a key tool for integration of roadway inventory, traffic, and crash data. Integrating other traffic safety-relevant data from driver, vehicle, citation and adjudication, and injury surveillance sources are lagging.

- Business units outside of the State DOT safety sections are more concerned with expanding data integration beyond the crash, roadway, and traffic data. Traffic Records Coordinating Committees (TRCCs) may be an appropriate venue for those discussions.

- States are interested in expanding all forms of data integration. This is a major change since the first-round capabilities assessment and may indicate a growing awareness of the value of merged data, especially for including outcome data from the injury surveillance system.

Suggested Actions

- Expand guidance for data integration to include high-value items like crash outcome analysis and a behavioral focus as part of safety planning and countermeasures. High-value, in this case, refers to examples of expanded analyses and deeper insights that States have gained using integrated crash and injury surveillance data. One potential benefit is that the economic appraisal analyses include State-specific costs of treatment for those injured in crashes—a method that corrects for some of the inherent limitations in using the at-scene data recorded by law enforcement immediately after a crash. This could be done in conjunction with NHTSA. NHTSA and FHWA both have relevant experience to share with States on how to prioritize, finance, and manage a data governance effort.

- Consider peer exchanges and case studies examining a more holistic or safe systems approach to safety that would engage the engineering, enforcement, education, and emergency response (4-Es) communities.

- Continue promoting the all public roads safety data integration efforts, especially through advances in spatial data integration and GIS. This is an ongoing project by FHWA and includes a recently funded pooled fund study on Enterprise GIS for Transportation.

KEY FINDINGS FOR AREA 5: SAFETY PERFORMANCE MANAGEMENT

Figure 5 shows the national average scores and goals for Safety Performance Management. The lowest score was for Safety Performance Management Analysis Capabilities. The highest score was for Coordination. This reflects the benefits of States' efforts to improve data for decision making. Since the Safety Performance Management area did not appear in the first-round capabilities assessment, there are no comparisons to make with the past. The results in Area 5 fit well with those of Areas 1 through 4 showing analysis capabilities lagging the data capabilities. It is somewhat surprising that Coordination scores are high in this area, but that is likely a reflection of the requirements for States to include local agencies in their safety performance management planning. Local plans for safety improvement targets must align with the State-level plans, so there is mandatory coordination. Also, States have well established safety planning processes that typically include some coordination within the DOT and with groups like the State TRCC and SHSP stakeholders.

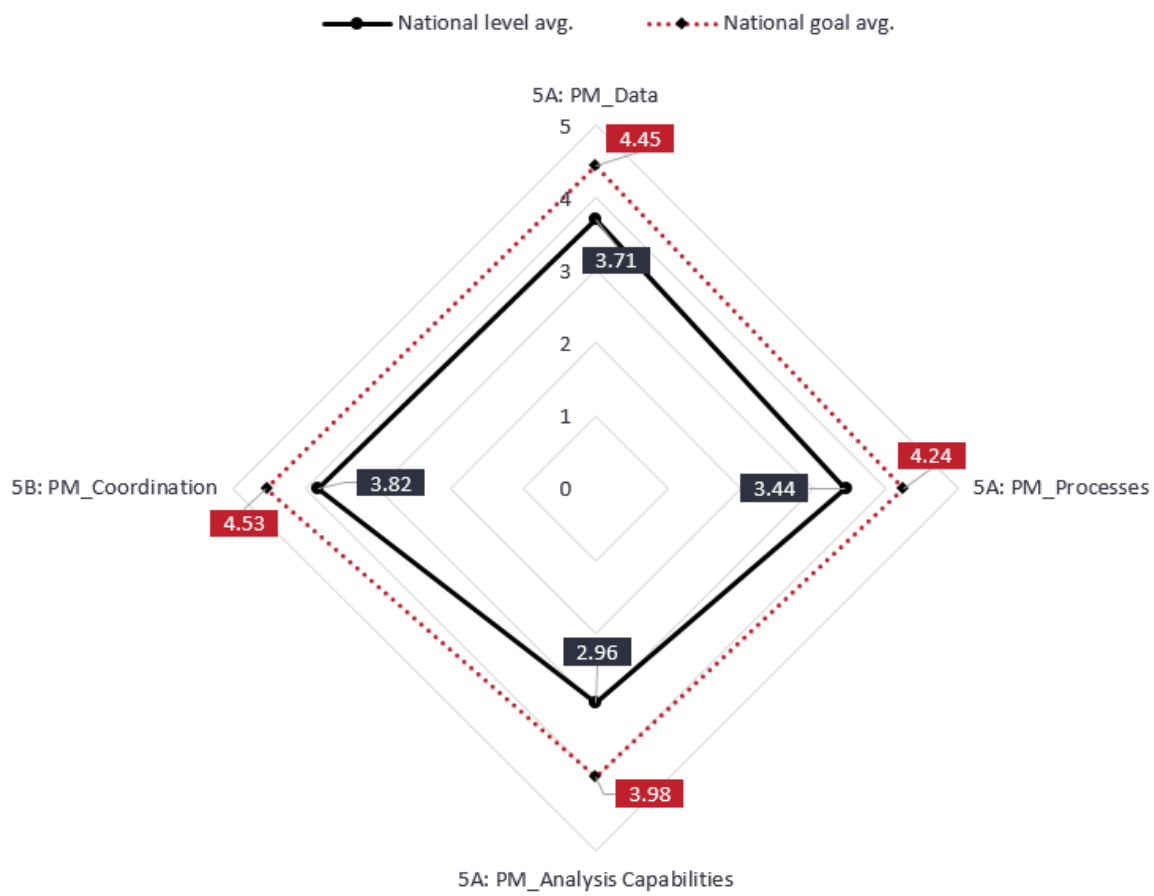

Figure 5. Radar chart of national average scores and goals for safety performance management.

The following highlights some of the key findings under Safety Performance Management:

- The relatively low scores for safety performance management analytic capabilities mirrors the gaps in States' capabilities in network screening for all public roads and advanced countermeasure selection processes. Without strong safety analysis for local roads, the States have limitations on their ability to plan and monitor performance.

- Coordination has a high capability score now. It is possible, however, that without local and regional involvement in data governance, States will find it difficult to reach their goals for improved coordination. Coordinating on annual safety performance targets has made this a priority, but full integration of MPOs and local agencies into the data management process could stall efforts to coordinate safety performance management.

Suggested Actions

- Develop guidance for effective and inclusive safety performance management. Training and technical assistance could also help States reach their safety performance management targets.

- Help States prioritize safety performance management analysis as part of the data governance and analysis improvement efforts. This could take the form of guidance, case studies, and peer exchanges.

NATIONAL GAPS SUMMARY

Relatively high scores nationally appear in data accuracy and uniformity; network screening methods and data; safety diagnosis, and safety evaluation; spatial data integration and expandability; and safety performance management coordination and data.

These comparisons suggest areas for increased focus by States and FHWA. There are multiple resources that States can use to guide their improvement efforts. These include:

- FHWA's data prioritization guide (FHWA-SA-17-032) provides a practical method for deciding how best to meet important safety data collection needs. The data integration (FHWA-SA-16-118) and data business planning (FHWA-SA-17-047) guides include methods for a data gaps analysis planning data collection to fill the gaps.

- CDIP and RDIP efforts that focus on data quality management of crash and roadway data, respectively. These programs could help States improve the CMM scores for completeness, timeliness, accuracy, and uniformity. Both programs provide suggested data quality measurements and describe noteworthy data management practices.

- The RSDP Toolbox lists analytic tools and resources for all facets of safety data management. States can use the toolbox to support improvements in any area. FHWA could prioritize advanced methods of countermeasure selection to help States improve in that area. The CMF Clearinghouse continues to expand and provide well documented CMFs. States could use help in applying CMFs more broadly as part of their safety business practices. FHWA developed a set of instructional videos encouraging expanded use of CMFs. These are available through the RSDP website.

- Data management and governance technical assistance is available through the FHWA Office of Safety. States can ask for help developing a Safety Data Business Plan or through separate technical assistance with data governance implementation. FHWA may wish to prioritize data governance policy development and procedures for

establishing formal roles and responsibilities as these scored lower than the actual governance processes.

- FHWA offers data integration technical assistance for the core datasets of crash, roadway, and traffic volumes. The assistance focuses on integrating State, tribal, and local data into a resource that supports advanced safety analysis and decision making. NHTSA and FHWA both offer technical assistance to States that can go beyond the core safety data sets. Within the DOT setting, integrating safety with asset and other spatial data is part of the enterprise GIS pooled fund study. Beyond the DOT, integrating crash data with injury surveillance and other traffic records system components is part of NHTSA's traffic records assessments, the CDIP, and GO Team efforts.

- FHWA's guidance and safety program technical assistance on safety performance management is also available to States.

Figure 6 on the next page shows a side-by-side comparison of the national average capability scores for all sections of the assessment. This view makes it easy to spot gaps in State capabilities. The lowest scores are in CMM data quality management, even while States scored relatively high on data itself. Other low scores appear in countermeasure selection; data management and governance policies and roles and responsibilities; and in safety performance management analysis capabilities. Scores for the first round of the assessment are also noted in the chart where appropriate. The safety performance management scores (Area 5) were not collected in the first round, so no prior scores are indicated.

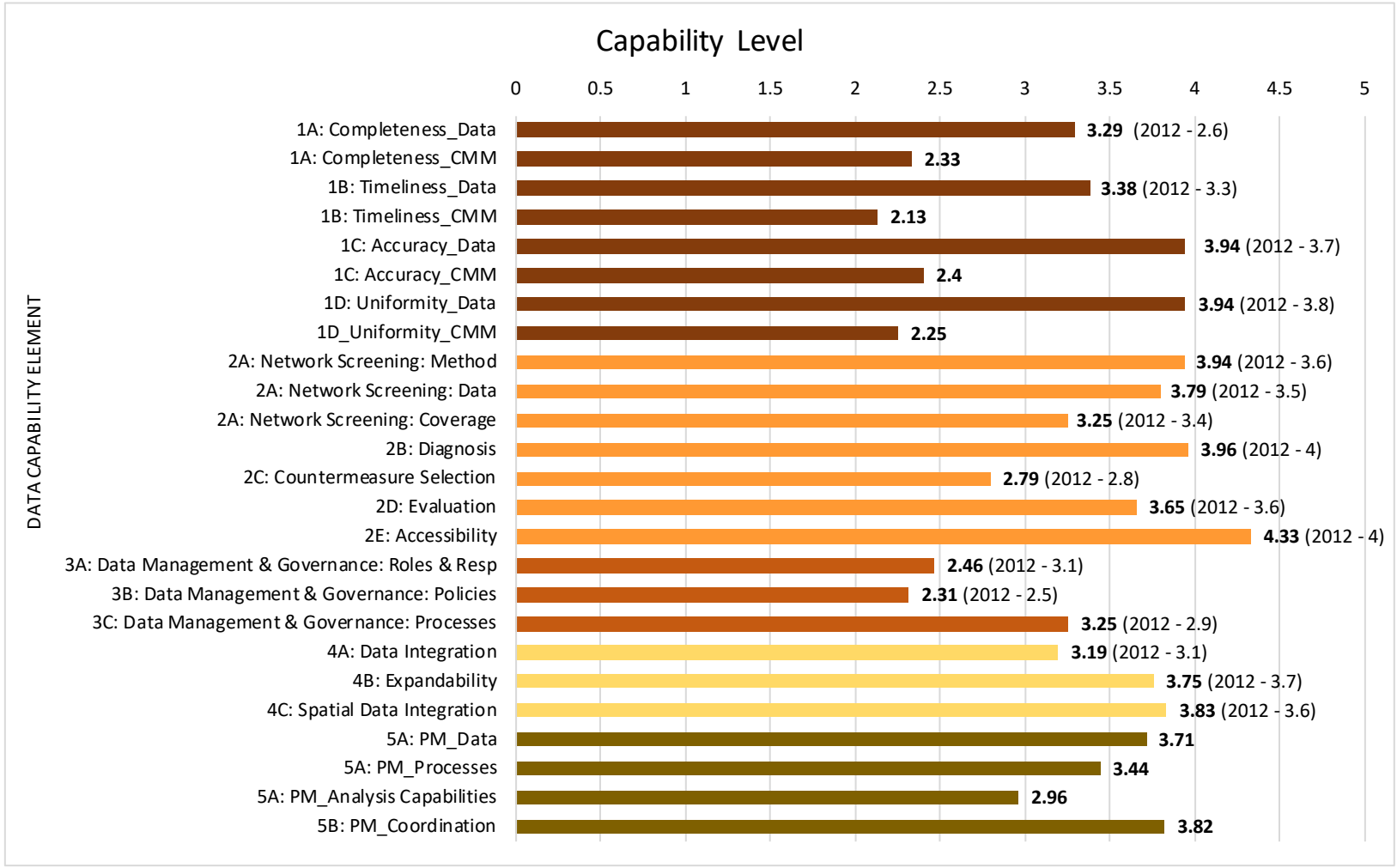

Figure 6. National average baseline for State data capability.

CHAPTER 5. CONCLUSIONS

This effort measured roadway safety data capability in each of the 50 States, plus the District of Columbia and Puerto Rico. Experience from the first-round capabilities assessment showed that the results are useful to the States and to FHWA. In the second-round capabilities assessment, FHWA and the States asked that the Action Plans be made more specific to the plans that States themselves developed in response to their CMM scores. The assessment teams worked to tailor the Action Plans to the activities that the State is likely to perform.

The second-round assessment will be useful to FHWA. Following the first-round assessment in 2012, FHWA used the results to identify the most pressing needs and develop new programs or expand existing programs. This led directly to resources like the RSDP toolbox, multiple case studies and noteworthy practice descriptions, web-based training, guidance on data integration and data governance, and related technical assistance. The updated assessment data will serve a similar purpose for the FHWA Office of Safety in the future. FHWA plans peer exchanges to address key needs identified in the assessment. FHWA also plans to use the information from this second-round assessment to refine and expand the resources available through the RSDP and promote States' use of the information, guidance, technical assistance, and tools included in the RSDP.

The appendix to this report includes detailed information comparing the first and second round assessment results. There are many areas of improvement and some surprising results indicating a lowering of capabilities—notably in data governance. This unexpected result is most likely due to the growing understanding of data governance among the States since 2012. They have acknowledged the gap between ideal practices and their present state. The true situation is that the scores for data governance capabilities were likely too high in 2012, not that States have somehow failed to maintain the efforts they had implemented in the past.

States identified the ways they hope to advance their data capability. Many had recommendations for FHWA as well. Ultimately, FHWA could tailor the approach to each State, through consideration of a "Focused Approach to Safety" category for data improvements or other methods, to implement their Roadway Safety Data Action Plans in alignment with their safety goals outlined in their SHSPs or TRSPs. While this initiative looked at the State-level data capability, parallel work has revealed that safety data capability at the regional MPO and local level may be quite different, and in a few cases, more robust. States are seeing the value of coordinating with local agencies on data collection and safety performance management. They will need help and assistance involving local agencies in data governance.

APPENDIX A – STATE MATURITY LEVELS

One of the more useful components of this Assessment will be the determination of capability maturity at the State and national levels. The State Maturity Levels are based on the principles of the "Capability Maturity Model" – CMM. This approach provides the project team the ability to subjectively assess the States. The principles of the CMM place each State into "capability categories." These categories are based on a five-point scale from less to more mature. The five maturity levels used in this analysis are:

- **Initial / Ad hoc (Capability Level 1):** The organization does not possess a stable implementation environment and the safety data collection, management (entering/coding, processing, and evaluating) and maintenance process is 'ad hoc' with no interconnection within the organization. There is no plan for interoperability or expandability.
- **Repeatable (Capability Level 2):** The results of previous projects and the demands of the current project drive activities and actions. Individual managers decide what to do on a case-by-case basis during individual projects.
- **Defined (Capability Level 3):** The organization documents the process rather than on a per-project basis. The organization's standards tie to an adopted strategy and this guidance determines project outcomes.
- **Managed (Capability Level 4):** Process management starts and supervises individual projects. Through safety performance management, processes are predictable, and the organization can develop rules and conditions regarding the quality of the products and processes.
- **Optimizing (Capability Level 5):** The whole organization focuses on the continuous improvement. The organization possesses the means to detect weaknesses and to strengthen areas of concern proactively.

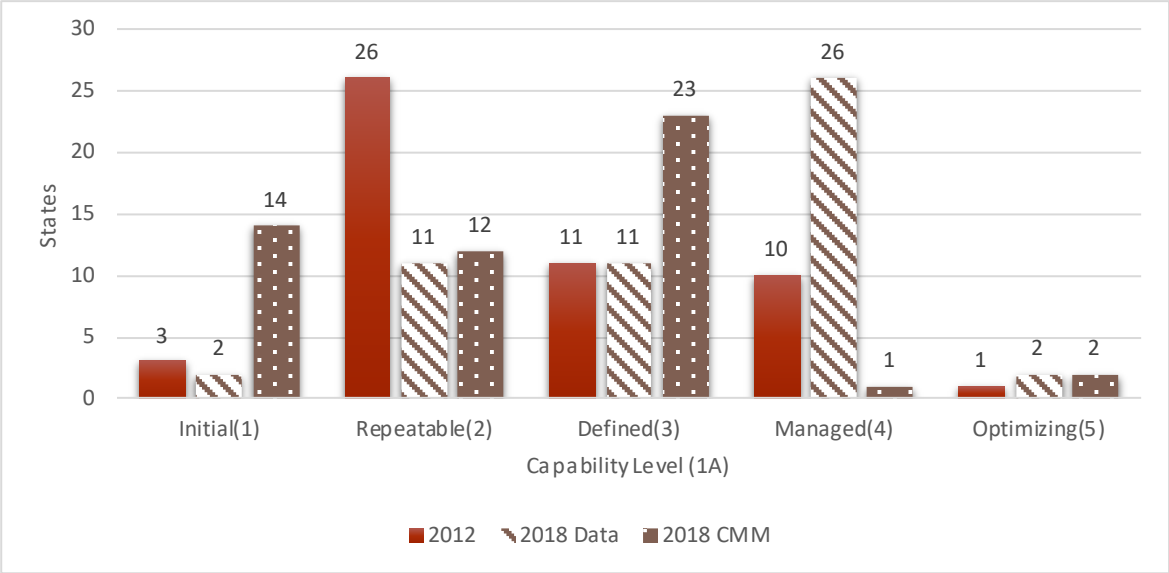

Figure 7. Capability maturity level distribution for data collection: Completeness.

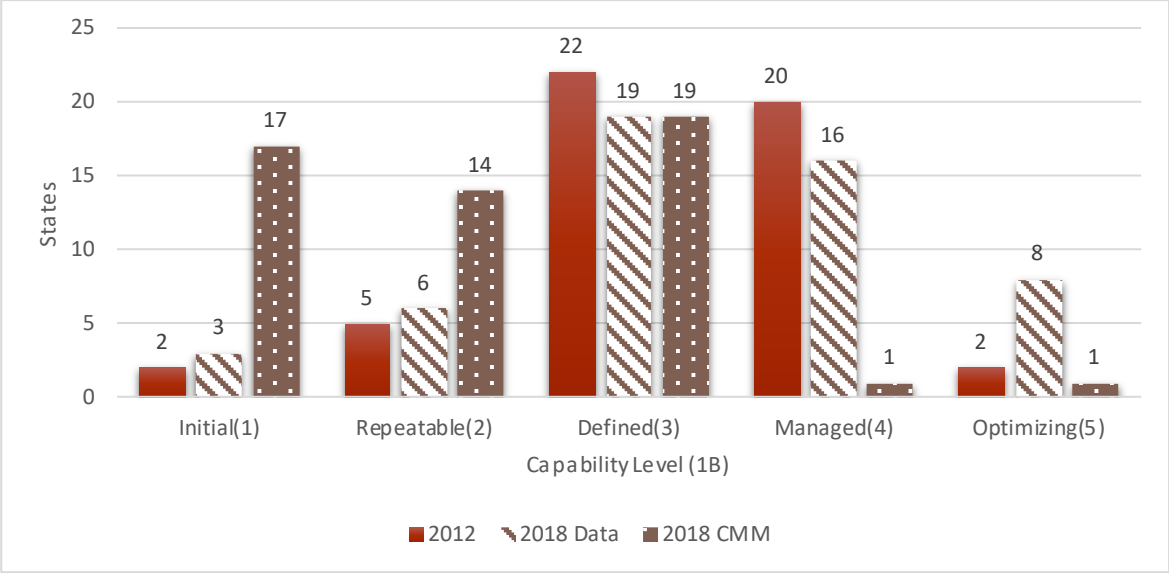

Figure 8. Capability maturity level distribution for data collection: Timeliness.

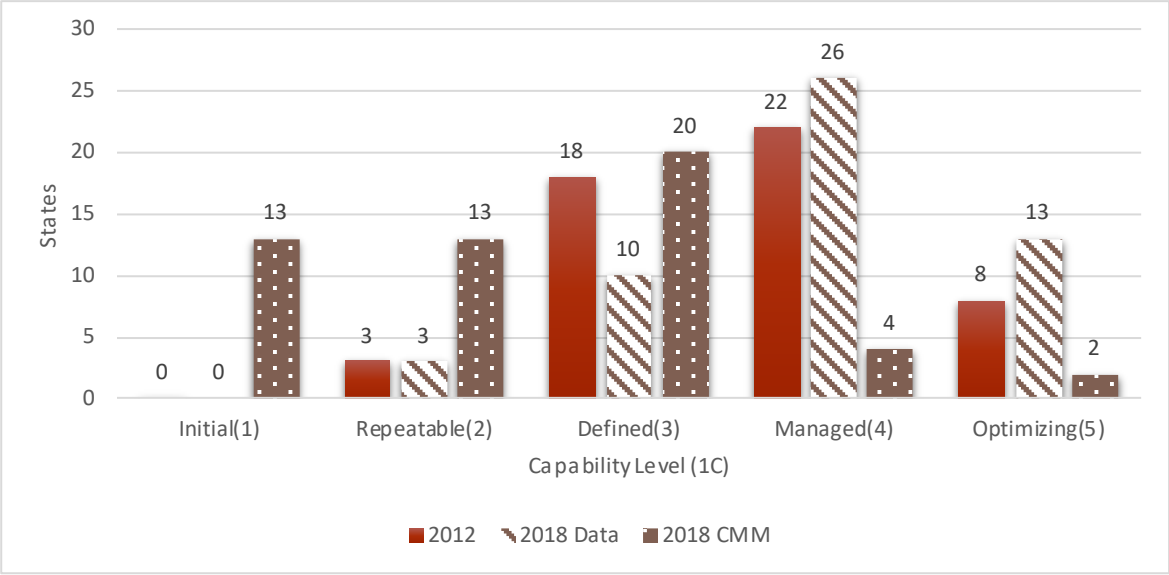

Figure 9. Capability maturity level for data collection: Accuracy.

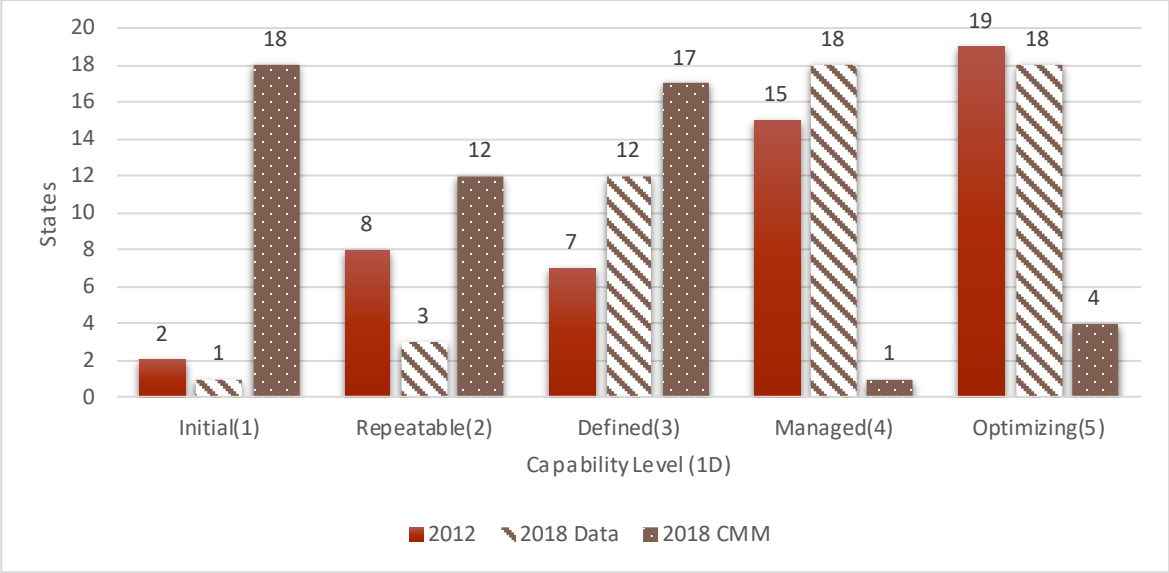

Figure 10. Capability maturity level distribution for data collection: Uniformity/Consistency.

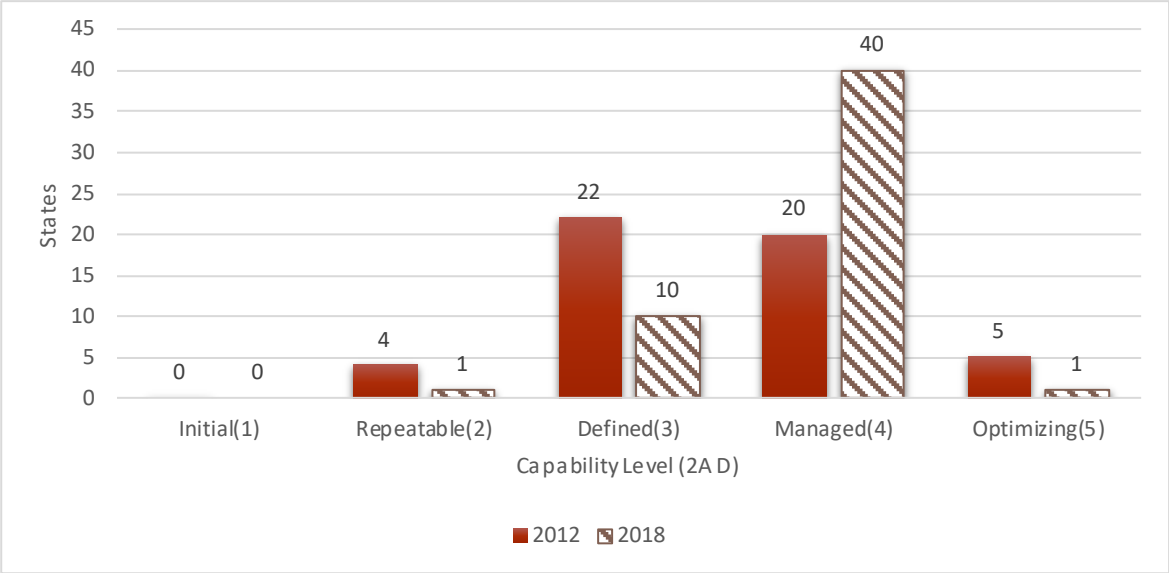

Figure 11. Capability maturity level distribution for data analysis: Network Screening (Data).

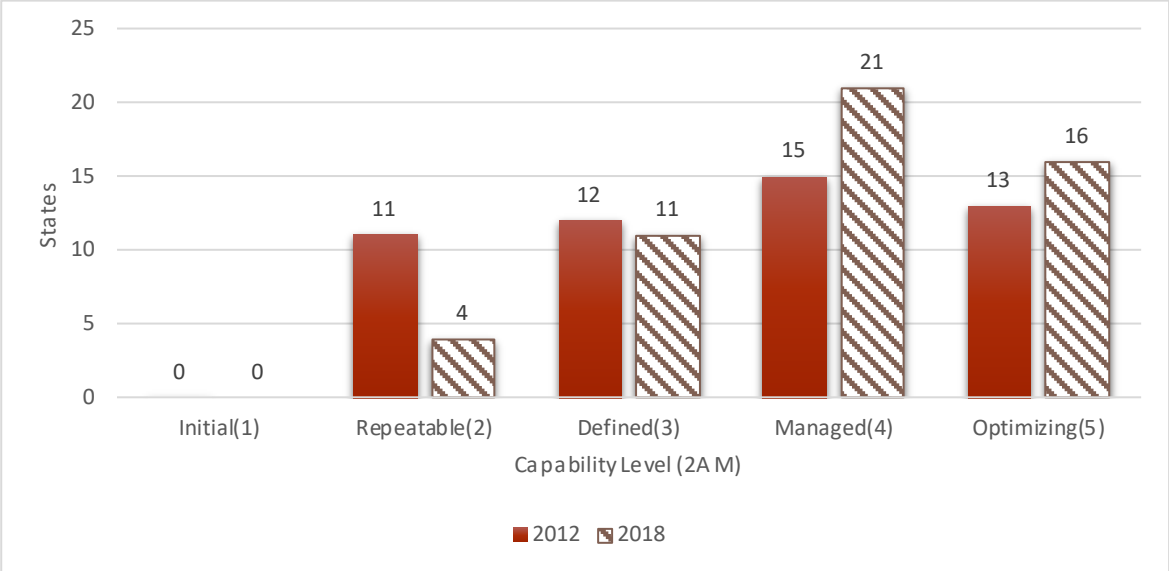

Figure 12. Capability maturity level distribution for data analysis: Network Screening (Methodology).

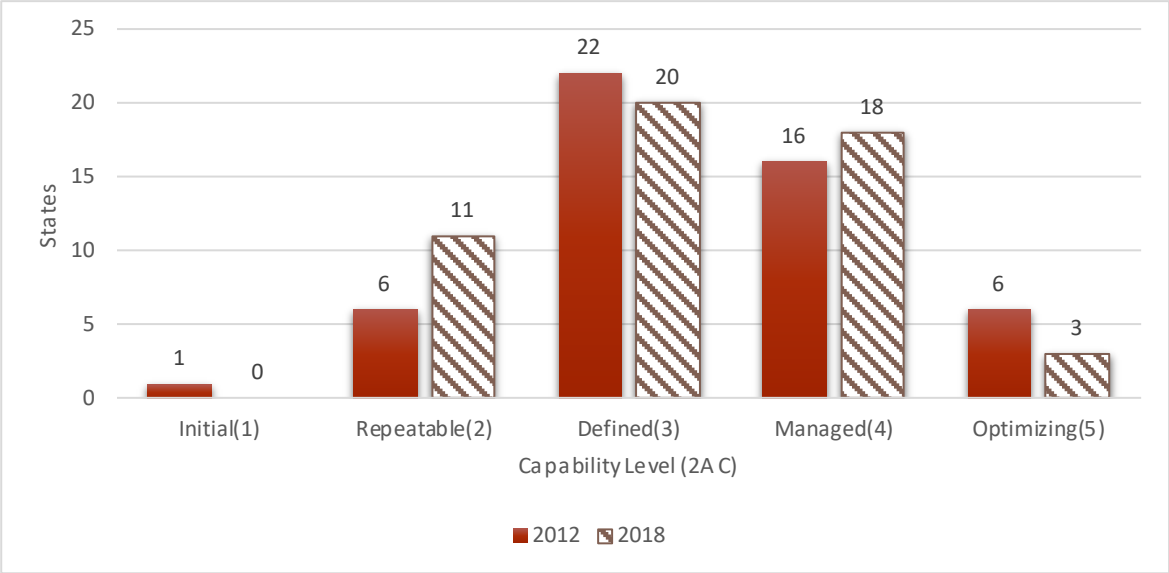

Figure 13. Capability maturity level distribution for data analysis: Network Screening (Coverage).

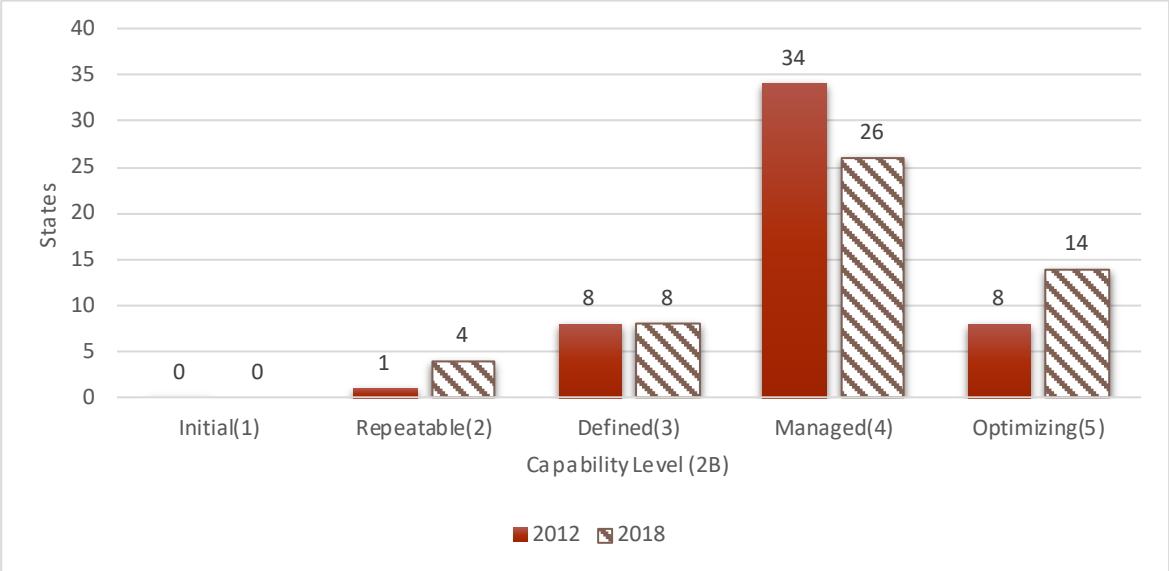

Figure 14. Capability maturity level distribution for data analysis: Diagnosis.

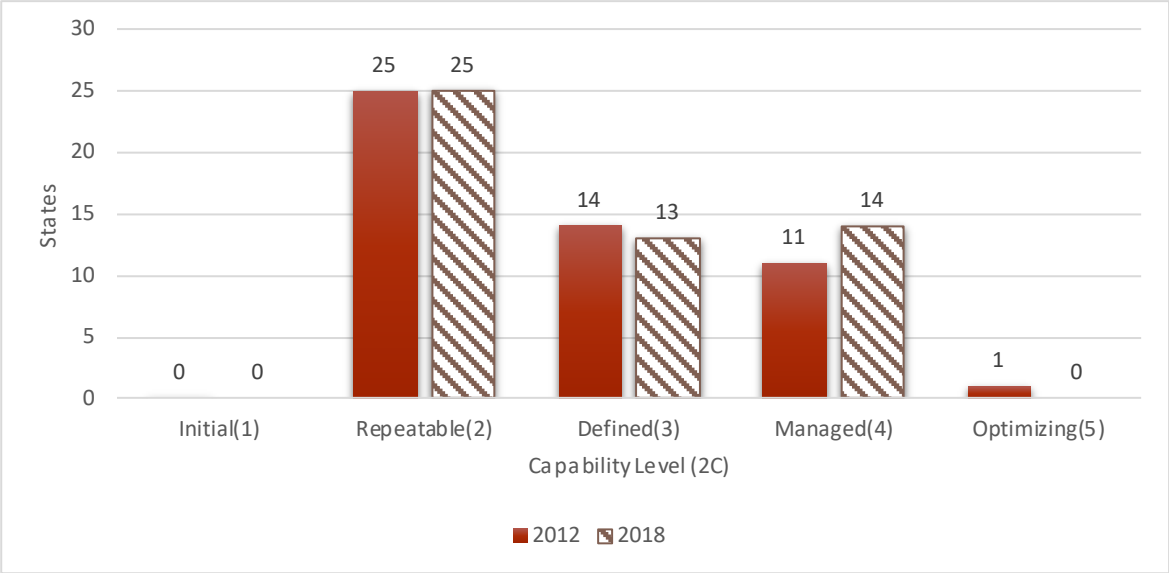

Figure 15. Capability maturity level distribution for data analysis: Countermeasure Selection.

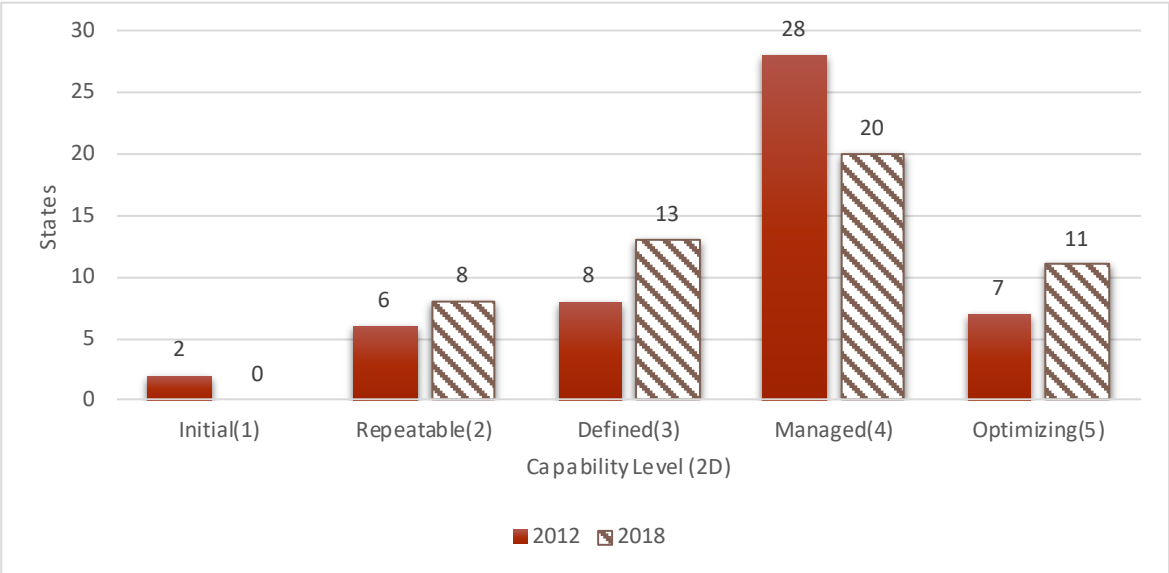

Figure 16. Capability maturity level distribution for data analysis: Evaluation.

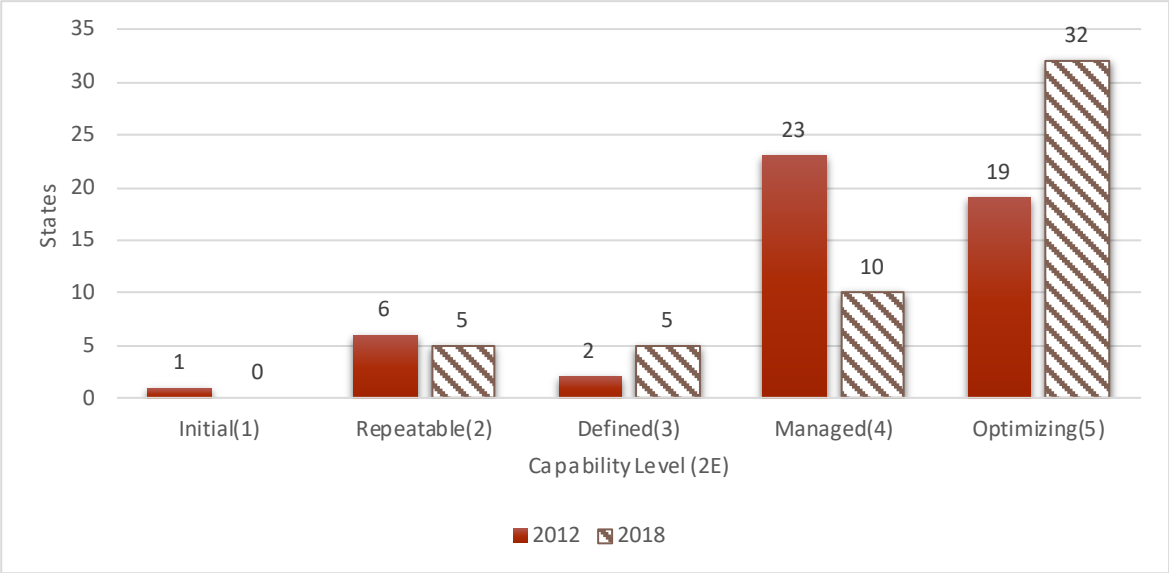

Figure 17. Capability maturity level distribution for data analysis: Accessibility.

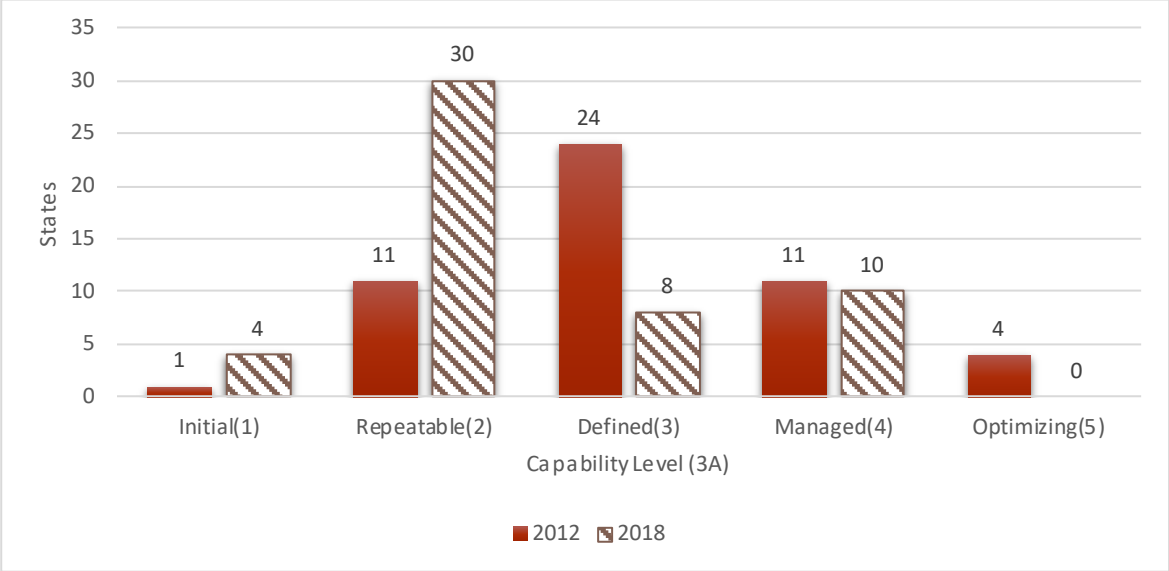

Figure 18. Capability maturity level distribution for data management & governance: Roles and Responsibilities.

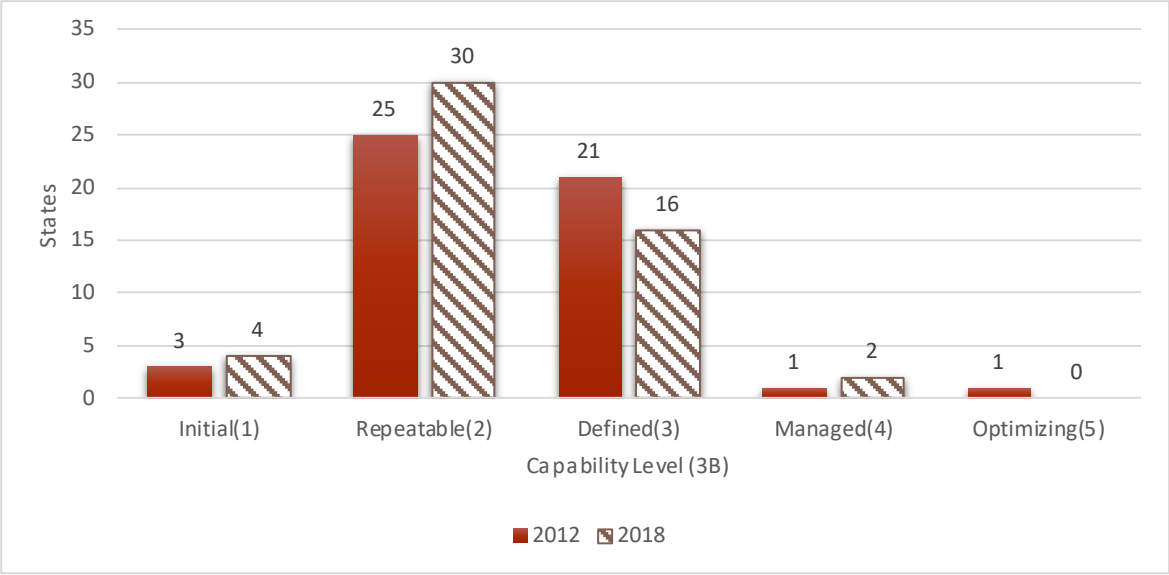

Figure 19. Capability maturity level distribution for data management & governance: Policies.

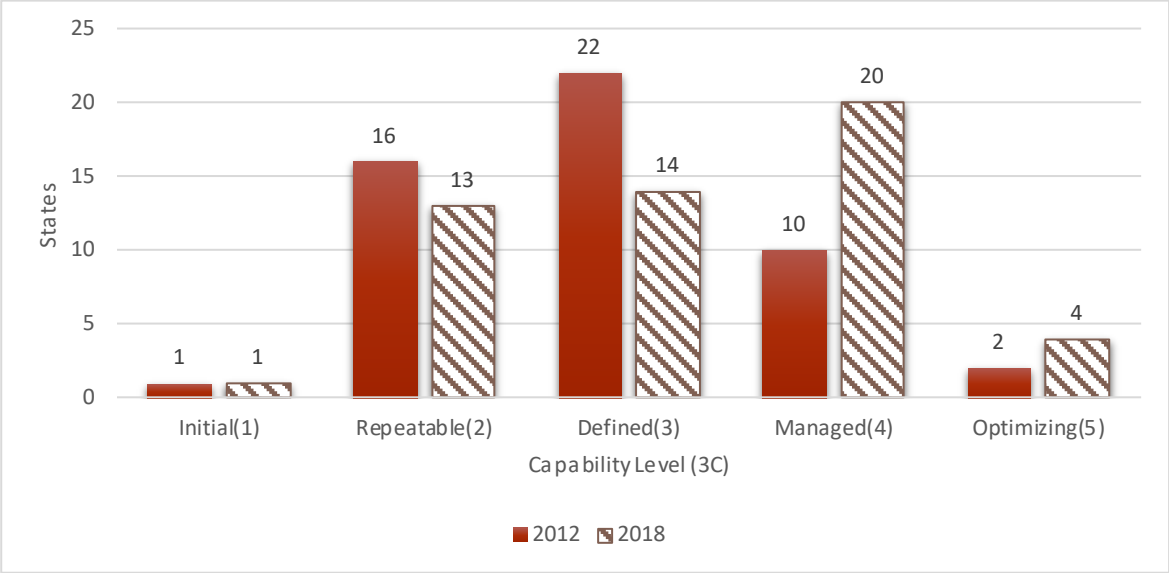

Figure 20. Capability maturity level distribution for data management: Technology.

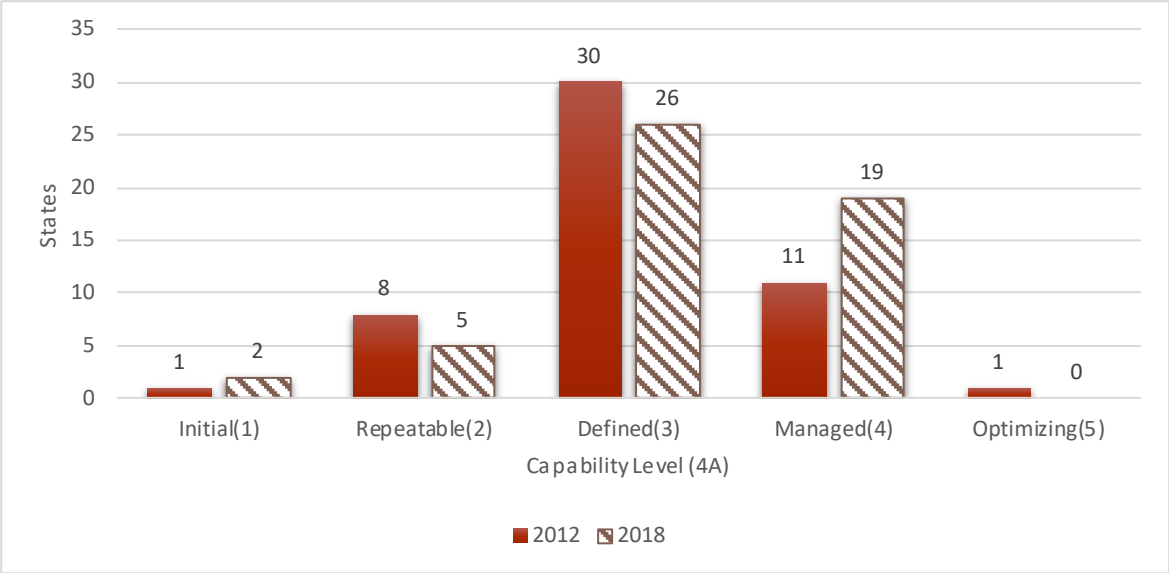

Figure 21. Capability maturity level distribution for data integration: General Integration.

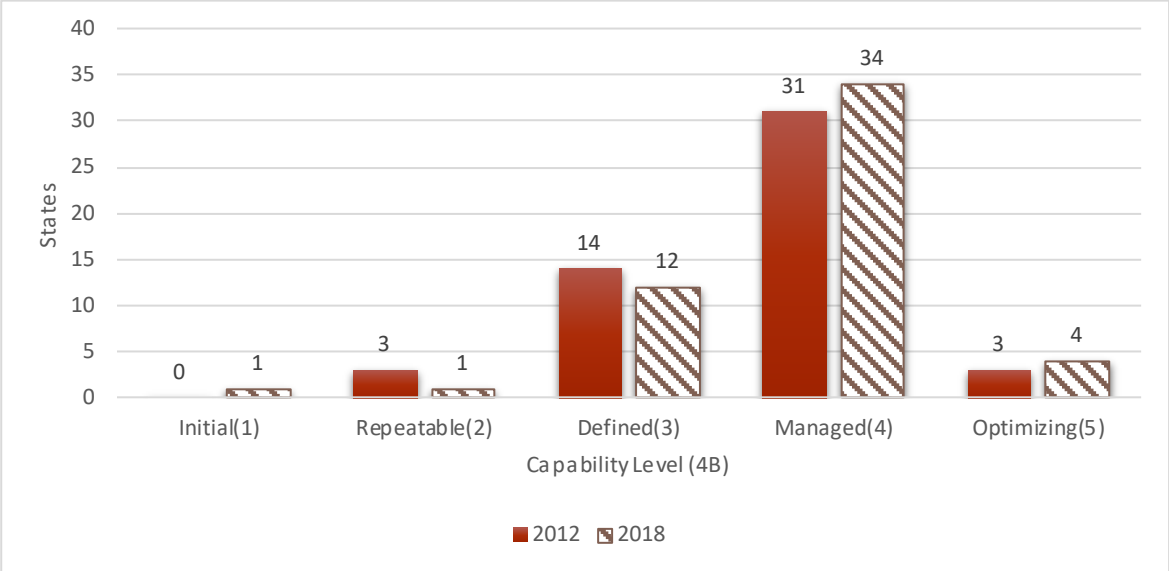

Figure 22. Capability maturity level distribution for data integration: Expandability.

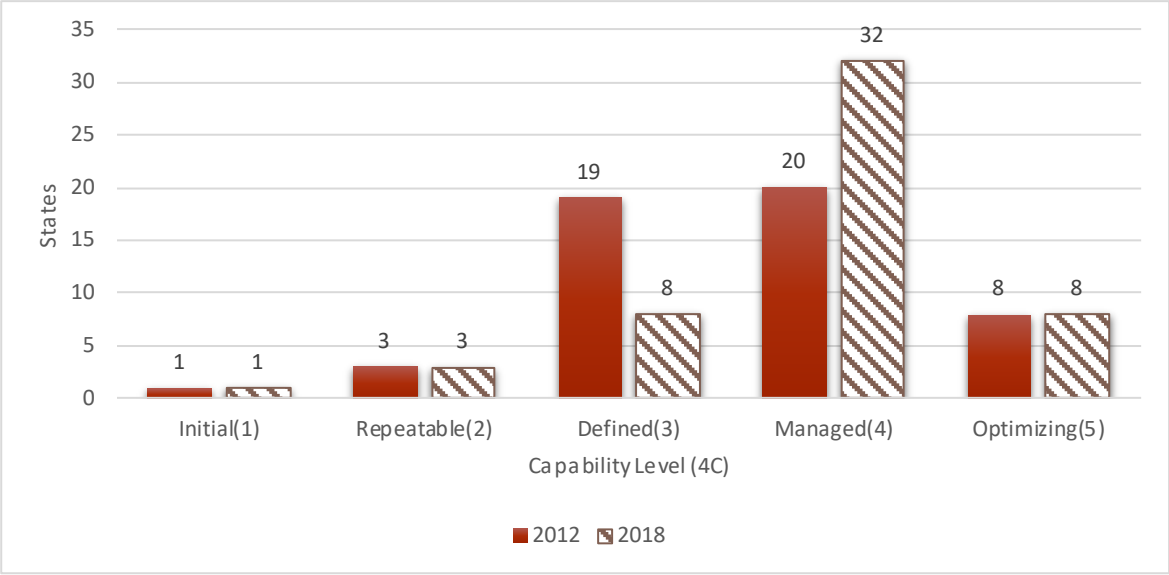

Figure 23. Capability maturity level distribution for data integration: Spatial Data Integration.

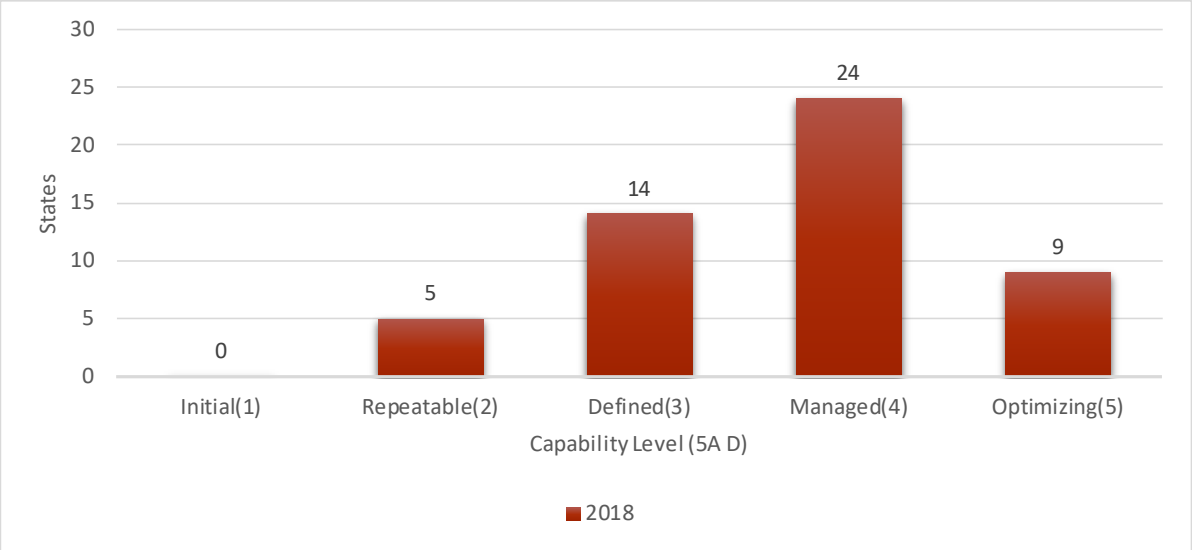

Figure 24. Capability maturity level distribution for safety performance management: Data.

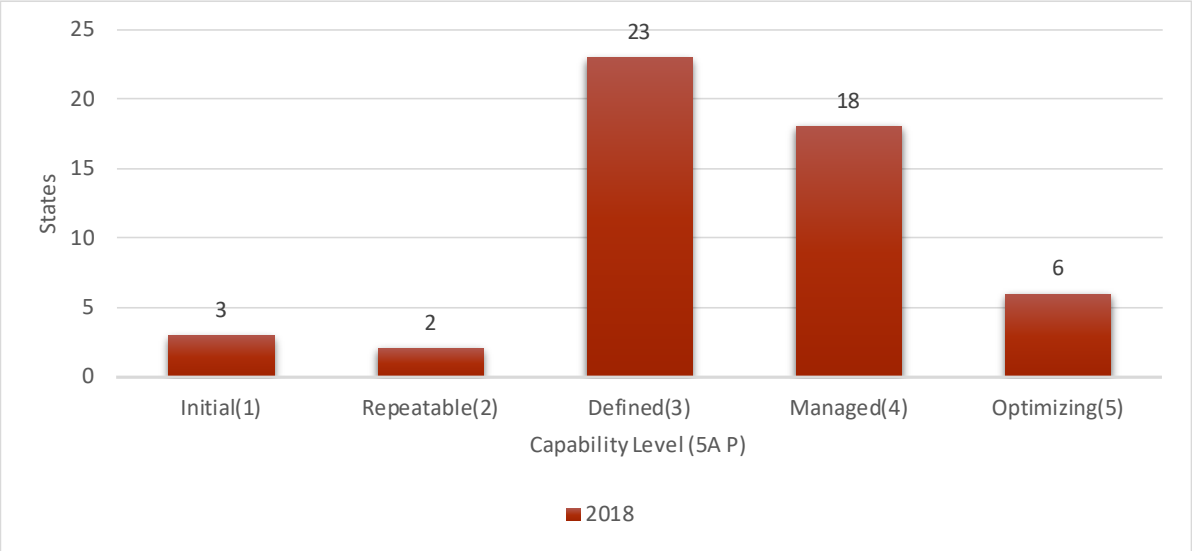

Figure 25. Capability maturity level distribution for safety performance management: Processes.

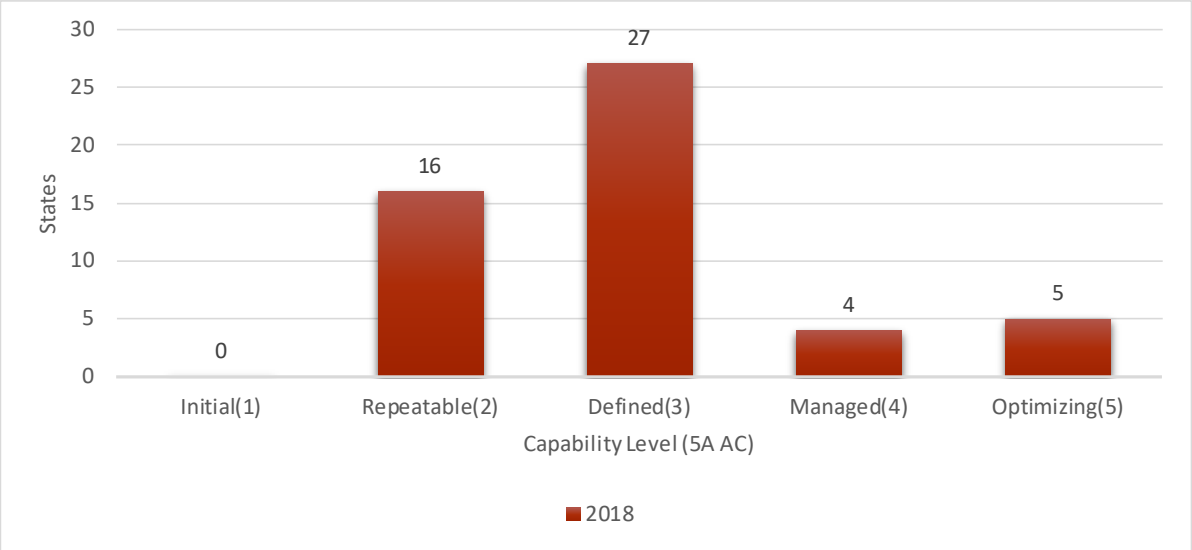

Figure 26. Capability maturity level distribution for safety performance management: Analysis Capabilities.

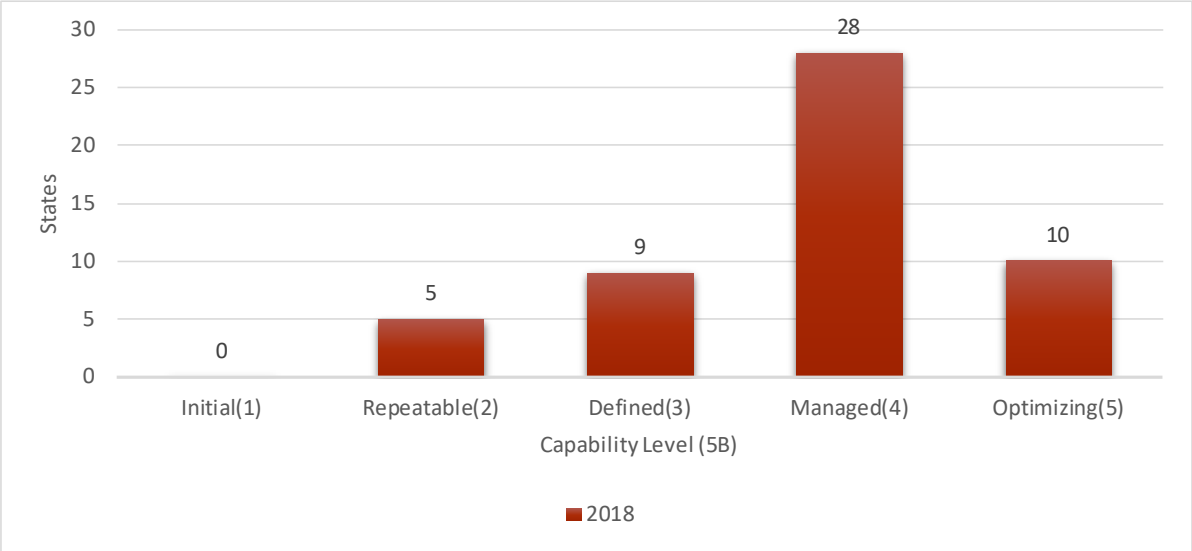

Figure 27. Capability maturity level distribution for safety performance management: Coordination.

The following table presents the results of each maturity level for the States that completed their assessments. States are de-identified and randomized in this presentation.

Key for Table 1:	1 = Initial / Ad hoc	2 = Repeatable	3 = Defined	4 = Managed	5 = Optimizing

Table 1. State capability level scores. NOTE: *3* States were assigned the national average because of missing data

STATE / JURISDICTION	AREA 1: DATA COLLECTION								AREA 2: DATA ANALYSIS							AREA 3: DATA MANAGEMENT			AREA 4: DATA INTEROPERABILITY			AREA 5: PERFORMANCE MANAGEMENT			
									Network Screening							Data Mgt & Gov									
	Completeness Data	Completeness CMM	Timeliness Data	Timeliness CMM	Accuracy Data	Accuracy CMM	Uniformity Data	Uniformity CMM	Method	Data	Coverage	Diagnosis	Countermeasure Selection	Evaluation	Accessibility	Roles & Resp	Policies	Processes	Data Integration	Expandability	Spatial Data Integration	PM Data	PM Processes	Analysis Capabilities	PM Coordination
	1A	1A	1B	1B	1C	1C	1D	1D	2A	2A	2A	2B	2C	2D	2E	3A	3B	3C	4A	4B	4C	5A	5A	5A	5B
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2	5	3	5	3	4	3	5	3	3	4	5	3	4	2	5	3	2	5	3	5	5	5	5	2	5
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4	3	2	4	1	4	2	5	1	4	4	3	4	2	5	5	2	1	2	3	3	4	3	1	2	4
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ACKNOWLEDGEMENTS

The project team would like to thank all the participating States and their leaders who are actively working to improve their roadway safety data. The information collected through this assessment process and the resulting improvements in data capabilities would not be possible without these key leaders.

For More Information:

http://safety.fhwa.dot.gov

FHWA, Office of Safety

Under Contract
DFTH-16-D-00005
Task Order 003
Submitted by VHB Submitted on September 19, 2019

FHWA-SA-19-018