

DESIGNING AN EFFECTIVE LAW ENFORCEMENT DATA DASHBOARD

Getting It Right and Why It Matters: An Introduction

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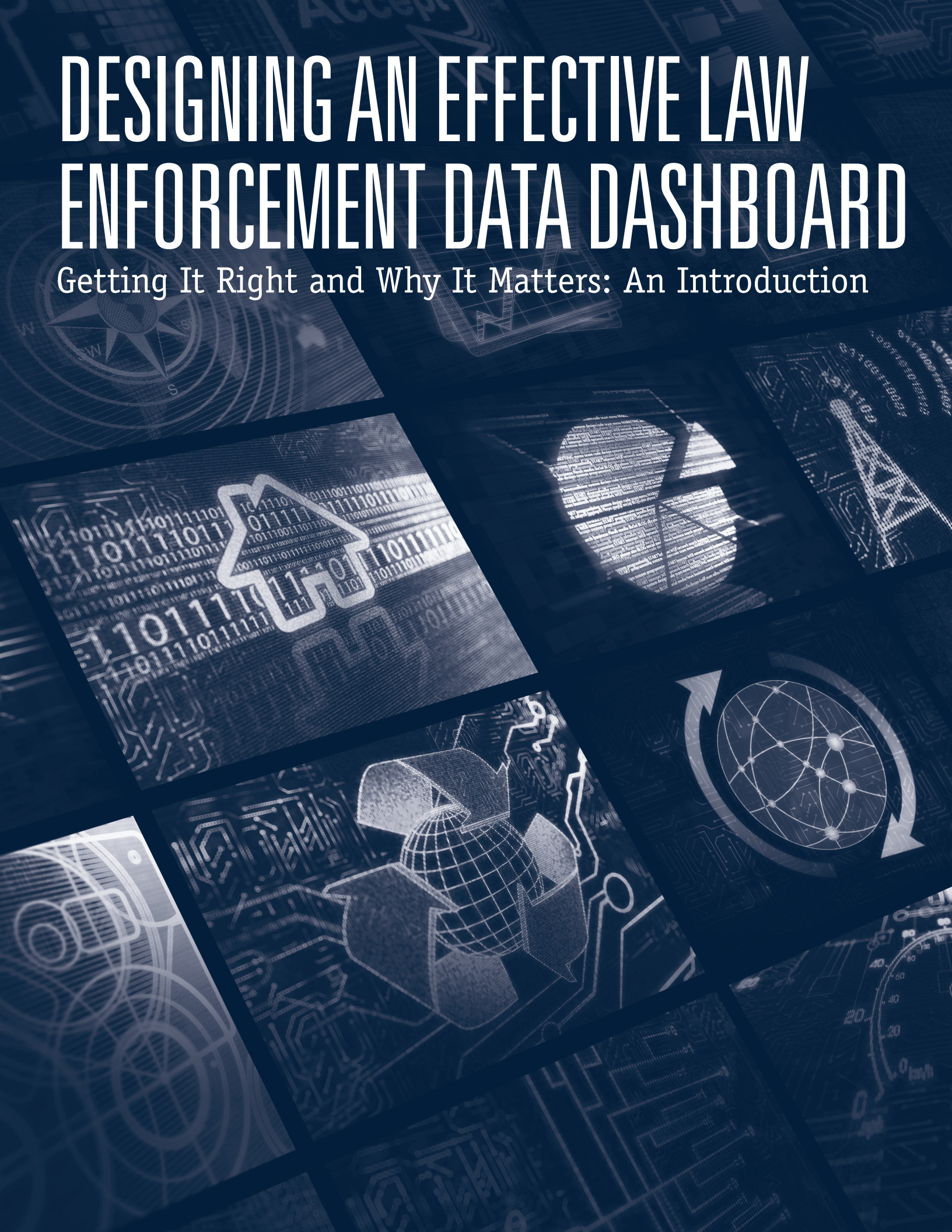



COPS

Community Oriented Policing Services
U.S. Department of Justice

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Letter from the Director of the COPS Office

Colleagues:

Policing, like so many other fields, is increasingly data-driven. Timely, accurate data, in useable formats, are necessary to law enforcement agencies seeking effective answers to policing challenges.

Data are in high demand outside the agency as well. The public wants to know how much crime is occurring in their neighborhoods, what agencies are doing to address it, the budgetary costs of these efforts, and how well they are succeeding—and law enforcement agencies want to provide these data, to create greater transparency and foster community trust. One method for making data more accessible is through a data dashboard.

Data dashboards, when implemented well, can provide much of this information, at a glance, to the people who require it. An effective, well-designed dashboard can enhance internal operations and fight informational silos while also informing the public about what is happening in their communities.

This series of three publications, *Getting It Right and Why it Matters*, *Developing a Concept of Operations Document*, and *Functional and Technical Requirements*, draws together best practices for conceptualizing, designing, and implementing a data dashboard, both for law enforcement agencies developing their own product and those using an external vendor.

The COPS Office's resources and technical assistance consistently support law enforcement agencies in developing a "what works" approach to working collectively with their communities to solve modern policing challenges. Data dashboards can be a powerful tool for increasing public transparency. We hope these three publications will help agencies use their own data to improve performance metrics, agency response, and community trust, and to enhance safety in their communities.

Sincerely,



Hugh T. Clements, Jr.

Director

Office of Community Oriented Policing Services

Letter from the Executive Director of PERF

Dear colleagues,

Police departments have more data than ever before, and a growing number have created dashboards to help them make better, data-driven decisions. But there are many possible approaches to designing a data dashboard, and a number of pitfalls to avoid. A dashboard that is ineffective—one that's easy for end users to misread or misinterpret, for example—is worse than none at all.

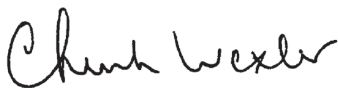
The most effective dashboards often seem simple in their design and presentation, but a lot of hard work goes into making something that is easy for users to operate. These three reports are designed to help departments design data dashboards that are useful and meet a department's unique needs. *Getting it Right* gives examples from the field about following an organized approach to developing data dashboards. *Developing a Concept of Operations* focuses on creating a shared understanding across users of the capabilities a data dashboard should provide. *Technical Functional Requirements* looks at the technical side of developing and implementing data dashboards.

I would like to thank the staff of the National Consortium for Justice Information and Statistics (also called SEARCH) and the U.S. Department of Justice's Office of Community Oriented Policing Services (COPS Office) for their collaborative efforts on the three reports. I would also like to thank the project advisory board (see appendix B) for their expertise, which assisted in molding and completing this work.

Finally, I would like to thank PERF staff members Dave McClure, Senior Principal and Kevin Morison, Chief Program Officer, for their work on this project.

I hope you will find these reports useful.

Sincerely,



Chuck Wexler

Executive Director

Police Executive Research Forum

Letter from the Executive Director of SEARCH

Dear colleagues,

Law enforcement agencies are implementing data dashboards to communicate valuable information, support data-driven decision-making, and provide information to the public.

SEARCH is pleased to provide the law enforcement and public safety communities with three educational documents on how to develop effective data dashboards: (1) *Getting It Right and Why it Matters*, (2) *Developing a Concept of Operations Document*, and (3) *Functional and Technical Requirements*.

The effective use of data is more important than ever for promoting transparency and accountability, and data dashboards are often the best way to do this. They provide timely information “at a glance” about important topics of interest to the many different audiences interested in law enforcement and public safety activities, both internal and external.

The goal of these three guides is to cover the lifecycle of the data dashboard development process from inception—providing the justification and benefits of developing a dashboard—through design and requirements. Using these documents as guides, any agency should be able to develop their own data dashboards or prepare an effective Request for Proposal (RFP) to acquire a dashboard product from a vendor or service provider.

Sincerely,



David J. Roberts
SEARCH Executive Director

About This Product Suite

The **Law Enforcement Data Dashboard Project** is a collaboration between SEARCH Group, Inc. (SEARCH), the Police Executive Research Forum (PERF), and the Office of Community Oriented Policing Services (COPS Office) to produce user-friendly guidance and tools to help law enforcement agencies successfully plan, design, implement, and sustain effective information dashboards within their ecosystems.

This report is part 1 of a three-product suite, *Designing an Effective Law Enforcement Data Dashboard*, which is intended to educate law enforcement and public safety executives, thought leaders, dashboard designers, project managers, and other integral stakeholders in the development process from project inception to technical design and development. Each product is based on extensive research and consultation with law enforcement leaders and subject matter experts in law enforcement, data science, information systems, project management, and technology innovation. Throughout each publication, the reader will find helpful tips with examples of real-world operational dashboards that are helping law enforcement agencies manage, analyze, and display actionable information in a user-friendly interface.

Three themes cut across all three products:

1. **Purpose.** Think methodically about the specific issue you intend to address by developing a dashboard.
2. **Collaboration.** Engage with key stakeholders, data owners, and end users throughout the design and development process to ensure the purpose envisioned for the dashboard matches the reality of what is possible.
3. **Communication.** Dashboards tell a story about high-value information to an end user. The organization or unit behind the dashboard is communicating its values in what it measures, tracks, and reports through its dashboard.

Beyond these three themes, each product focuses on a different aspect of dashboard creation and a different audience:

- *Getting it Right and Why it Matters: An Introduction*

Audience: Law enforcement executives, thought leaders/influencers, end users, community members, all stakeholders

Purpose: This guide serves as a primer on the promise and perils of dashboard inception, design, and development. It offers key insights from law enforcement leaders, designers, and technology innovators with extensive knowledge and expertise on the topic. Individuals who want to learn about what a dashboard is, how it can be leveraged as a powerful tool and resource in law enforcement, and pitfalls to avoid should read this guide.

- *Developing a Concept of Operations*

Audience: Project managers, agency stakeholders, end users, IT staff

Purpose: This guide provides a roadmap for developing a concept of operations (ConOps) document for a law enforcement dashboard. The purpose of a ConOps is to ensure that all stakeholders share a common vision and understanding of the capabilities a data dashboard can and should provide. This document includes helpful checklists, templates, and a complete example dashboard that readers can modify to suit their own purposes. Individuals who are charged with designing and implementing a law enforcement dashboard or writing a ConOps should read this guide. Individuals with approval authority or otherwise significant stake in the end product should also read this guide.

- *Developing Technical and Functional Requirements*

Audience: Project managers, IT staff

Purpose: This guide provides a roadmap for developing the technical and functional capabilities of a law enforcement dashboard system. It can be used to procure, develop, and implement a dashboard solution. Like *Developing a Concept of Operations*, it includes helpful checklists, templates, and instruction that readers should adapt to suit their agency-specific needs.

Introduction

Data dashboards are a tool for turning raw data into actionable information that agencies can use to identify problems, develop strategies, and evaluate outcomes. They display select performance measures that are important to a given audience in a manner that is easy to use and understand—typically as graphic visualizations (e.g., charts and graphs). Data dashboards use these visualizations to simplify complex data and more easily convey information to inform decisions.

Increasingly, law enforcement agencies (LEA) are implementing data dashboards to communicate valuable information and support data-driven decision-making. In a 2021 Police Executive Research Forum (PERF) questionnaire about data dashboards,¹ approximately 60 percent of the 126 responding law enforcement agencies said they already have at least one internal-only data dashboard, and another 20 percent said they are considering implementing one the future. Nearly half said they had a public-facing data dashboard, with almost 30 percent more considering it for the future.

“The reason for a dashboard is to increase communication within the agency, as well as identify problem-solving techniques to solve various issues within the community.”

—Lieutenant Scott W. Ausmus, Support Services,
Cypress (California) Police Department

“We created our dashboards to keep the agency informed. Our dashboards empower end users to make data-informed decisions.”

—Police Data Research Supervisor Christian Peterson, Strategic Services Division,
Portland (Oregon) Police Department

1. See appendix A. Sources of Information Used in This Report for more information about PERF's questionnaire and other research supporting this brief.

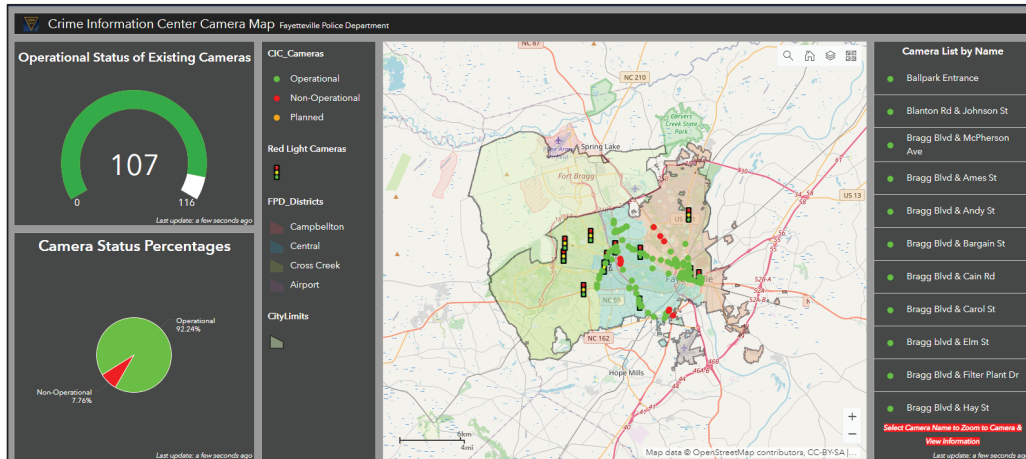
Data dashboards are flexible tools. They can analyze and display a wide variety of topics to address problems that law enforcement agencies face:

- Crime trends, patterns, and locations
- Hiring and recruitment
- Trainings and certifications
- Software update compatibility
- Officer activities
- Budgets
- Staffing, shifts, and overtime
- Use of force and other personnel complaints
- Specialized initiatives
- Response times
- BOLOs
- Arrests, stops, and citations
- Automated license plate reader (ALPR) vehicle hits
- Jail population
- Pursuits
- BWC activations/nonactivations and usage compliance
- Officer weapon draws
- Traffic collisions
- Squad car availability
- Missing persons
- Citizen concerns
- House watches
- Arrestee demographics
- Gang locations and activities
- Calls for service
- Homeless contacts
- Missing or overdue incident reports
- Locations of people on parole/probation
- Detective caseloads
- Drug overdoses
- Uncommitted patrol time vs. time spent responding to calls
- Crisis interventions
- Citizen/community contacts
- Transit ridership, rates of inspection, and frequency of violations

Data dashboards can organize and present that data to serve a wide variety of purposes:

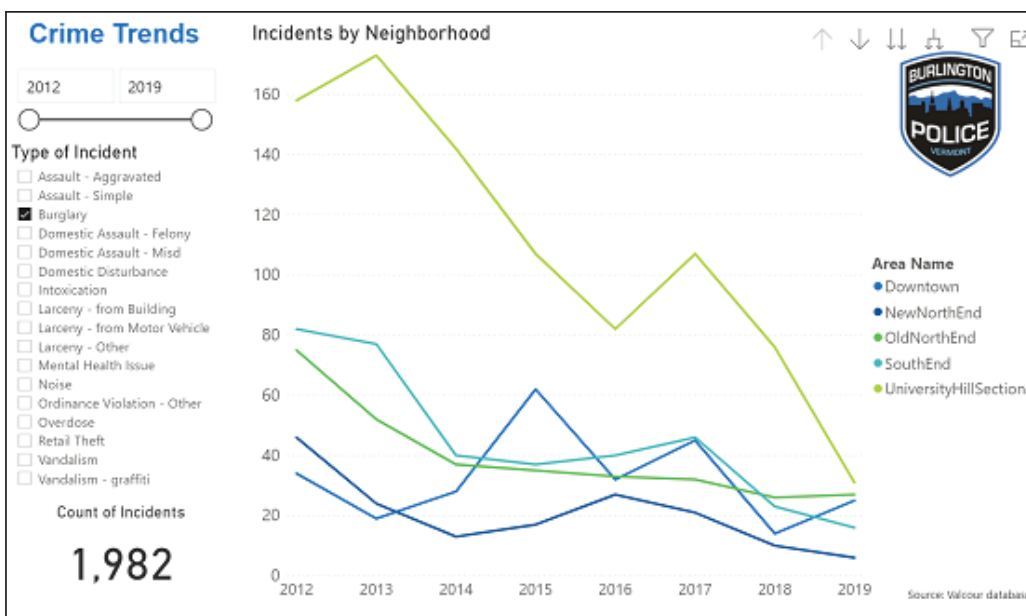
- Monitoring real-time operations (figure 1 on page 5)
- Supporting long-term strategic purposes (figure 2 on page 5)
- Exploring data patterns or trends (figure 3 on page 6)
- Locating individual records (figure 4 on page 7)

Figure 1. Example of a law enforcement data dashboard focused on monitoring real-time operations



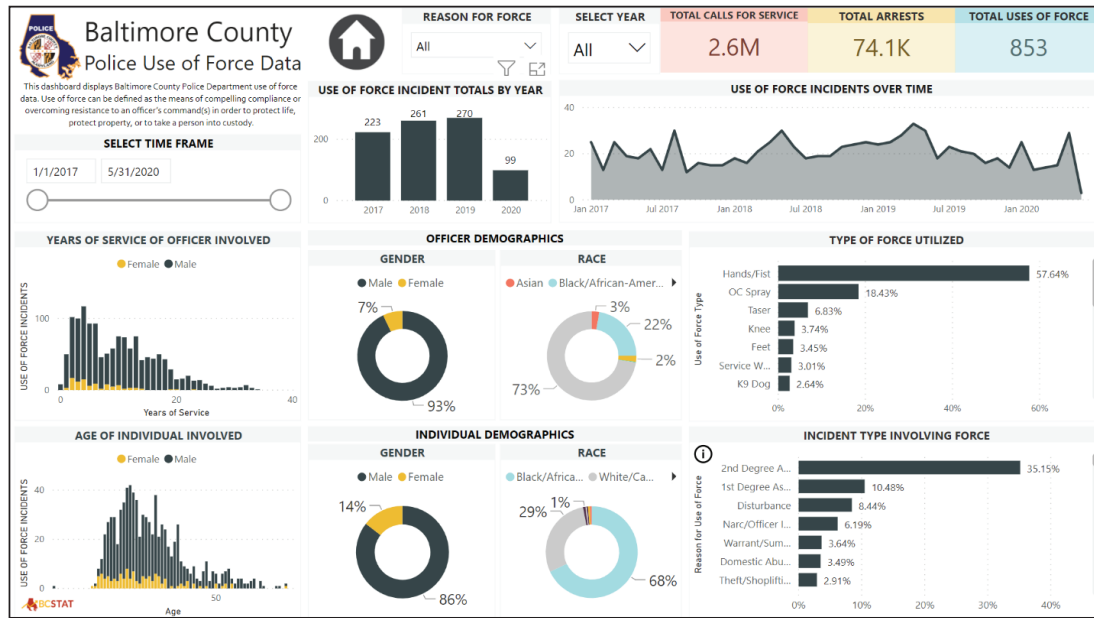
Some dashboards monitor operations in real time, providing users with specific alerts when something deviates from the norm or falls outside predefined thresholds. These operations-focused dashboards can also provide end users with precisely the information they need—and remove the distracting information they do not need—to quickly get operations back to normal. The data dashboard in figure 1 shows the status of the jurisdiction’s cameras, making it easier for the end user to understand where the agency has coverage, where repairs are needed, and how many repairs are needed.

Figure 2. Example of a law enforcement data dashboard focused on longer-term strategic purposes



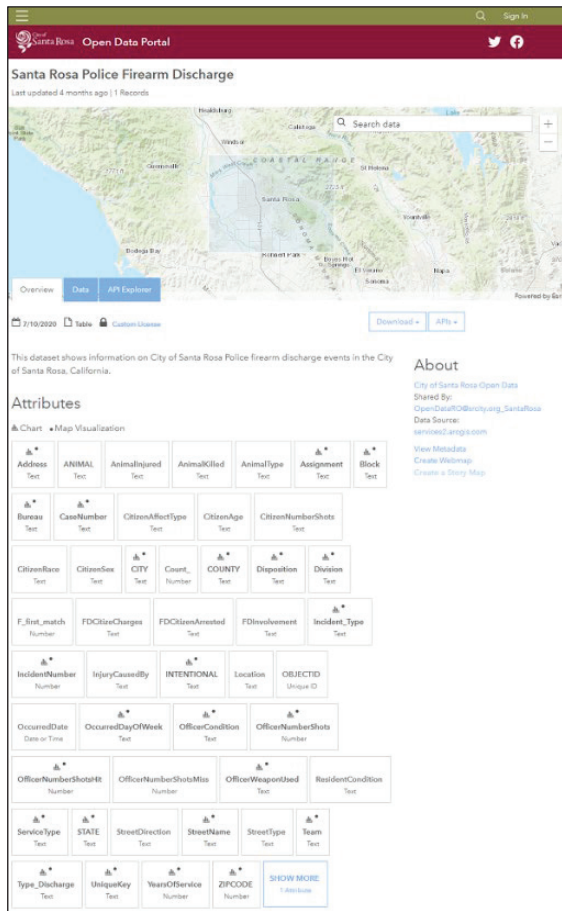
Data dashboards can focus on high-level performance measures that reflect longer timelines and support longer-term strategic and policy decisions. The data dashboard in figure 2 shows fluctuations in local crime rates over time.

Figure 3. Example of a law enforcement data dashboard focused on exploring data patterns or trends



Other types of data dashboards focus on exploring and interacting with data to develop a deeper understanding of an issue. This might involve selecting multiple data points and searching for patterns, relationships, and trends over long timelines; CompStat dashboards often provide extensive abilities to visually navigate an agency's data in this way. The data dashboard in figure 3 is an example of a public-facing dashboard designed to help the public understand and explore use-of-force data.

Figure 4. Example of a visual data tool that facilitates easy navigation to individual-level records

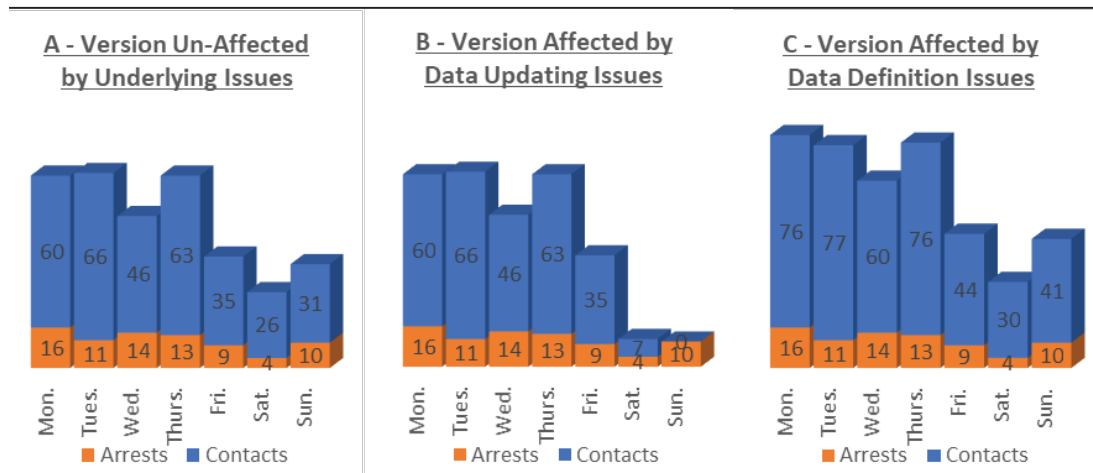


Some law enforcement officials define data dashboards more expansively, to include data tools that allow visual navigation of raw data to locate specific individual records. The highly filterable interface shown in figure 4 is designed to make it easy for an end user to sort, filter, and search through data to find the original record of a specific incident report.

With such a wide variety of data dashboards and ways to use them, the extensive possibilities can even become a problem for LEAs. Having so many options and variations can overwhelm decision-makers. Consequently, decision-makers can inadvertently focus on differences between the easily identified visual elements of data dashboards while losing sight of the underlying operational and functional role a data dashboard could provide. This inattention can lead to data dashboards that might “look right” but actually “get it wrong” in important ways that are harder to see.

Losing sight of the underlying—and less obvious—operational and functional roles of a data dashboard can create confusion and misunderstandings; these misunderstandings, in turn, can lead to the loss of public trust and legitimacy and to bad decisions that cause avoidable harm (see figure 5). It may be better for a LEA not to have a dashboard at all than to have a data dashboard that is not done well.

Figure 5. Example of a law enforcement data dashboard focused on exploring data patterns or trends



A graph showing the daily number of police-citizen contacts and the daily number of arrests (figure 5A) may seem like a simple and obvious way to visualize the agency's engagement with the community. However, the way a data dashboard manages less obvious aspects of the graph significantly affects how its information is presented, interpreted, and used. In all versions of figure 5, the arrest data are the same, but different nuances in the contact data significantly affect the information the graph conveys. For example, a data dashboard drawing arrest data from a source that updates every hour and police-citizen contact data from a source that updates every 24 hours could produce results that show an artificially low number of police-citizen contacts (figure 5B), leading to confusion. If the agency's public-facing data dashboard includes this graph without clearly explaining these update issues, the public may perceive the unexplained changes in previously reported numbers between 5A and 5B as the agency inappropriately manipulating its data to manufacture a more favorable image. This perception can compromise public trust and legitimacy. If the underlying data for police-citizen contacts include arrests as a contact, supervisors in the agency could develop the mistaken impression that arrest rates are much lower than they are (figure 5C), leading to misinformed decisions and the possibility of undesirable consequences (such as failing to recognize and address a high arrest rate) that could have been avoided.

“Getting it right” means developing a data dashboard that effectively provides law enforcement officials and other stakeholders with quick and easy access to accurate, timely, relevant, and understandable information that helps them know what they need to know and do what they need to do. Fortunately, there are insights, experiences, tools, and resources law enforcement agencies can draw upon to ensure they are developing and using effective data dashboards that provide their agency with value.

This brief is the first of three in a series intended to help LEAs develop and use data dashboards effectively and avoid the subtle problems that can easily arise. It provides insights and examples from the field to demonstrate some of the significant benefits of effective data dashboards, how simple aspects of data dashboards can have a large effect on the dashboard’s impacts, and some of the problems that can arise from ill-conceived or under-supported data dashboards. This brief is organized into three sections:

1. What “Getting it Right” Means for the Law Enforcement Data Dashboard End User
2. Why Effective Data Dashboards Require So Much Work to Seem So Effortless
3. How an Ineffective Data Dashboard Can Be Worse Than Having None at All

The second document in the series, *Developing a Concept of Operations Document*, provides guidance on clarifying the purposes, needs, and specific uses for a given data dashboard system. The third document, *Developing Technical and Functional Requirements*, provides guidance on gathering and documenting design requirements to develop an effective dashboard system.

1. What “Getting it Right” Means for the Law Enforcement Data Dashboard End User

Working with data can be challenging. There are many ways to make mistakes or miss something important, often without realizing it. Making proper use of data involves at least seven steps, which can require significant effort, knowledge, and skill. Specifically, a person must know

1. the right questions to ask about a given topic of interest;
2. what kinds of law enforcement data exist that are relevant for answering those questions;
3. where to find those data and how to access them;
4. how the data were generated and what they represent;
5. how to correctly scrub, combine, and analyze those data in ways that answer the questions;
6. how to interpret the results of the analysis within correct contexts and limitations.

Many different people—with many different purposes and capabilities—want (or need) to use an LEA’s data. Not all of them will have the knowledge and skill required to successfully accomplish all these steps.

“Getting it right” means developing a data dashboard that effectively provides law enforcement officials and other stakeholders with quick and easy access to accurate, timely, relevant, and understandable information that helps them know what they need to know and do what they need to do.

Data dashboards, by incorporating many of these steps into their surface design and underlying organization, can ease the burdens people face in using an LEA’s data.

Letting the data dashboard system handle data challenges for the end user

An effective data dashboard's design and underlying supporting systems do much of the work end users would otherwise need to do for themselves to extract meaningful and actionable information from the LEA's data. With proper forethought, data dashboards can be set up to locate, analyze, and display key data automatically. This way, the end user needs only to interpret the significance or importance of that information and then figure out what to do with it.

One way these up-front design efforts can ease the challenges of interpreting data is by providing cohesive sets of related measures focusing on a particular issue. Such data dashboards (like the one shown in figure 6) present an overview of the situation that allows the user to find basic answers on their own and identify more sophisticated questions to take to an analyst.

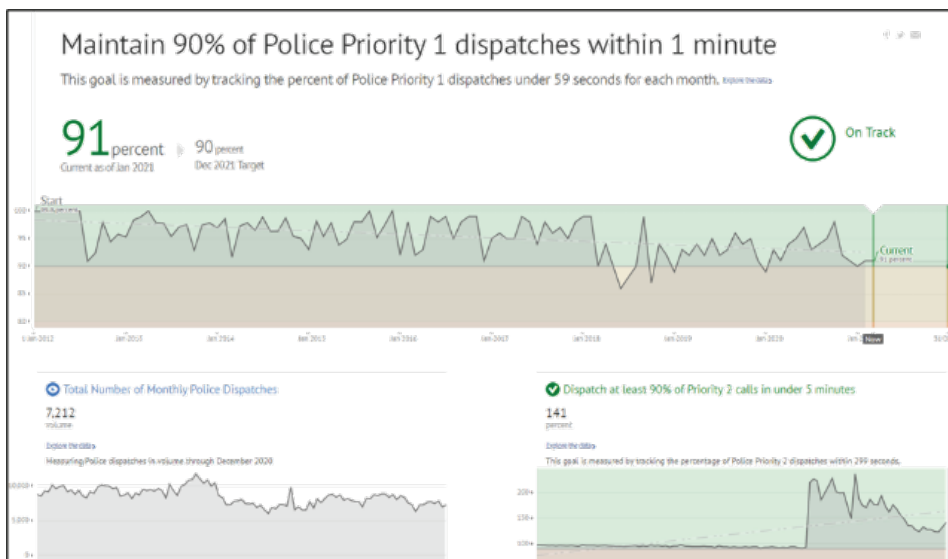
Well-designed data dashboards present the results of specific analyses aimed at specific purposes and outcomes. They are not general overviews of everything happening in an agency but are meant to show the current or recent state of the agency in some key area of performance. They may show multiple measures related to that area or benchmarks or goals the agency is trying to achieve in it (such as response times in figure 7 on page 10). By showing these specific benchmarks and demonstrating how the data collected and analyzed further agency goals, dashboards can also convey and contextualize the agency's priorities. In turn, this analysis can facilitate the end user's interpretations of the information and help them make decisions based on those interpretations.

Figure 6. Example of a data dashboard that combines data from multiple sources into a single visualization



Behind the scenes, this data dashboard assembles data from multiple sources and processes the information to provide the end user with relevant information about the LEA's responses to homelessness calls for service. The data dashboard also helps the user focus on the metrics that are priorities for the agency and makes it easy for the user to explore the data in multiple ways. Without this data dashboard, an end user would need a significant amount of knowledge and effort to accomplish what this data dashboard makes possible almost instantly.

Figure 7. Example of a data dashboard that incorporates a benchmark or performance target into its visualization



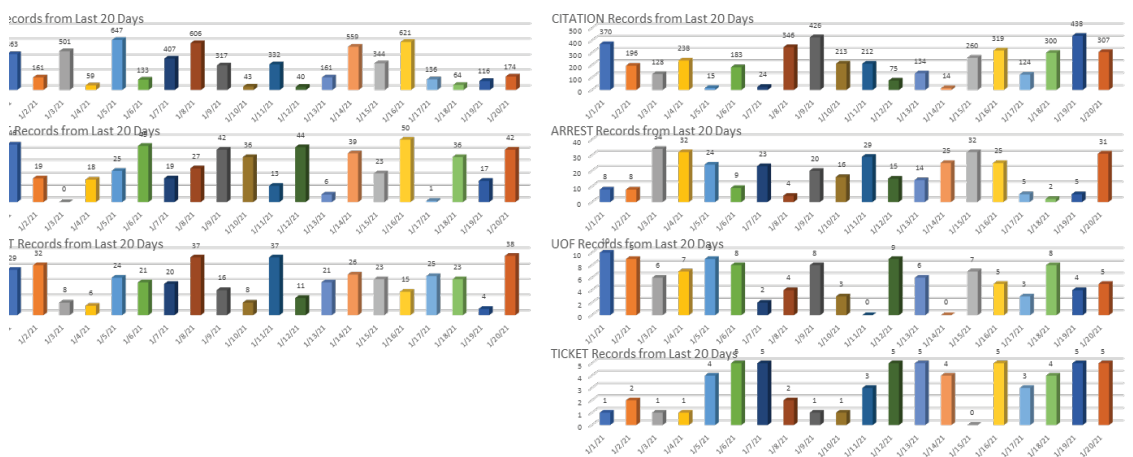
To help end users better interpret the information they see, data dashboards can incorporate benchmarks or performance targets into their graphics. Incorporating these targets makes it easier for end users to understand how the LEA is performing compared to its own goals or expectations. For example, the data dashboard above shows the LEA's monthly goal of dispatching at least 90 percent of priority one calls within one minute. By explicitly stating this goal and using colors to show the areas of the graph that are below (dark gray) or within (light gray) the performance target, it is much easier for an end user to see how often the LEA successfully achieved its goal and easier to focus on the few times the LEA began to fall short.

Effective data dashboards do more than present users with information about different law enforcement topics of interest. Rather, these data dashboards streamline the otherwise cumbersome process of extracting information from raw data and prime the user to focus on answers to the right questions about those topics—even if they did not previously know to ask those questions.

Easy to use and understand

One way data dashboards focus end users’ attention is by providing an easy and intuitive way to emphasize critical information about a topic of interest. Keeping the data dashboard’s visualizations clean and simple is essential for making the critical information easy to find and interpret. However, achieving simplicity requires more than just knowing what to include in the data dashboard; it also requires the difficult and equally important knowledge of what to leave out. Designers and developers who may not know all the substantive details of the dashboard they are creating may want to err on the side of including too much. While this tendency is understandable, it can create distractions and make it difficult for users to understand what they are looking at (such as in the example in figure 8).

Figure 8. Recreation of a data dashboard that presents too much information



The art of getting it right with a law enforcement data dashboard has as much to do with knowing what to leave out as it does with what to include. For example, the recreated data dashboard in figure 8 includes so much information in such a small space that it is difficult to know where to focus. This example presents so much content in the single window that it makes it difficult to read the labels describing the data.

Providing too much information can be as problematic as not providing enough. It takes thought to decide what is important enough to include in a data dashboard—or what is not important to include. To make sound decisions about what data and analyses to focus on, leadership must clearly define the agency’s priorities. If the data dashboard reflects those priorities and accurately renders the relevant data, its design will show end users what information is most important to consider.

“Make it user-friendly; too much clutter can become distracting and overwhelming.”

— Lieutenant Gregory Wallace, Toledo (Ohio) Police Department

“Some of the dashboards I’ve seen other agencies do are a bit overwhelming in detail (and I’m an analyst).”

— Crime analyst in a mid-sized police department

The most effective data dashboards are often those that are seemingly simple in their design and presentation. Ironically, however, simple appearance and intuitive use can create the mistaken impression that the data dashboard is doing something easy or obvious.

Without an appreciation of how much effort goes into creating a data dashboard, and of the benefits of all the components that cannot be seen, LEAs may produce underthought, underdeveloped, or undersupported data dashboards. The resulting products might look good but provide little or none of the value created by an effective data dashboard that gets it right.

2. Why Effective Data Dashboards Require So Much Work to Seem So Effortless

As we have seen, the core value of an effective data dashboard is that it quickly and easily focuses end users on the right information in the right context. It takes a lot of work behind the scenes to make a dashboard that provides an effortless experience to end users. It is easy to discount or underestimate the challenges and level of effort required. Nevertheless, optimizing the benefits a data dashboard hinges on up-front effort and forethought.

There are three key aspects to creating an effective data dashboard:²

1. A data dashboard's design should be user-specific. Many kinds of stakeholders are interested in crime and law enforcement data, both inside and outside LEAs. Each stakeholder has different experiences and attributes that affect their ability to make use of law enforcement data. For a data dashboard to be most useful for an end user, it must account for the user's preexisting understandings, skills, and technical abilities.

“Understand the technical capabilities of your customers. Whether they're limited by software or experience, building a gee-whiz dashboard may not answer their needs. It might even irritate them.”

— Crime Analyst Kent Christen, Investigations,
Cedar Rapids (Iowa) Police Department

An end user's knowledge, needs, and abilities directly affect how they will be able to use the data dashboard. A data dashboard that is right for one kind of user will not necessarily be right for another kind of user with different attributes.

2. The other documents in this suite, *Developing a Concept of Operations Document* and *Developing Technical and Functional Requirements*, provide thorough guidance on the purposes, needs, and specific uses for a dashboard system, as well as advice on gathering and documenting design requirements for a dashboard system.

“It is important to provide context and supplemental documents for the dashboards. It is important the public understands the data you are presenting—and do not assume they know police terminology, data collection practices, or operation procedures. These materials reduce follow-up questions and the need to correct misinformation when external parties report on your data.”

— Police Data Research Supervisor Christian Peterson, Strategic Services Division,
Portland (Oregon) Police Department

A dashboard’s design needs to account for an individual stakeholder’s unique combination of knowledge, needs, and abilities. However, it takes significant effort to understand the end user well enough to build the system that is right for them. How well the dashboard’s design accounts for these factors can make it more useful and intuitive.

2. A data dashboard’s design should be purpose-specific. Expanding the scope of a single data dashboard to address too many topics simultaneously creates the risk an end user will misinterpret or misunderstand the data. It is better to create multiple data dashboards with more narrowly defined purposes for more targeted audiences. Ideally, an end user should be able to quickly get the answer to the question that brought them to the dashboard, as well as to identify and form follow-up questions to take back to an analyst for further inquiry.

3. Data dashboards and their supporting systems should be easy to manage and maintain.

It is important for the data underlying the dashboard to be accurate, consistent, and current. Given the many nuances of law enforcement data, cultivating high-quality data can require significant care and attention.

“We found some records where the officer listed did not have any level of force checked. We also found a record where force was used on an individual who was 82 and where the individual was two years old. Once we researched these outliers, it was determined that some of the incidents listed the level of force in the narrative but didn’t check the corresponding box that was a data field we were planning on sharing. . . . Some of the incidents with no force were injured persons where the subject injured themselves and the officer didn’t use any force. . . and the 82-year-old was a valid age—the person attacked officers with a knife. . . . And the two-year-old was actually an incident where the officer used force on a two-year-old dog. Without researching the data in detail first and reviewing it for reasonableness, not just for blanks, these types of data elements wouldn’t have been identified.”

— Police Research Supervisor Karen Kontak, Crime Analysis and Research Unit,
Phoenix (Arizona) Police Department

Data cleaning can be a tedious task. There are techniques that can quicken the process, and some that can even automate much of the work. These approaches require significant up-front investments of time and effort to provide value over the long-term; however, this early streamlining of data processing makes it much easier to support and maintain the dashboard’s effective operation in the future. Reliable data, reliably supported and updated, are necessary for producing actionable information.

Taken together, these three aspects of data dashboards mean that LEAs will likely need to create (and maintain) multiple data dashboards covering different purposes and in variations that are responsive to the needs and abilities of their intended end users. Ignoring this advice and trying to create mega-dashboards that attempt to answer all questions for all users will not produce as much value as creating dashboards that follow these principles—and may even create problems.

3. How an Ineffective Data Dashboard Can Be Worse Than Having None at All

The purpose of any data dashboard is to present end users with information that supports their decision-making. Effective data dashboard systems meticulously process data so they can consistently convey clear and essential information to the end user. By design, the end user should not encounter this complex and potentially distracting behind-the-scenes work. While shielding end users from these aspects of a data dashboard makes it easier for them to focus on the information, it also makes it impossible for the end user to discern how well that behind-the-scenes work has been done. As a result, end users face a take-it-or-leave-it decision about trusting the data dashboard as a valid source of information. When end users must rely on data dashboards that have not been carefully and thoughtfully designed and executed, they may feel they would have been better off finding the information another way.

Data dashboards should provide actionable and purpose-specific information, which usually requires significant planning, prioritization, and internal organizational development work. However, it can be easy (and tempting) for LEAs to create data dashboards from the data that are convenient and readily available rather than investing time and other resources in gathering the specific data most applicable to the dashboard's purpose. In this situation, it is unlikely the resulting data dashboard will provide much value to the end user, who will likely need to go elsewhere to get the information they need.

Data quality is another critical factor in any law enforcement data dashboard. Under any circumstance, making decisions based on out-of-date or inaccurate data can lead to poor outcomes.

“To be useful, the information in a dashboard has to be as up to date as possible, drawn almost from the time the report is written/approved. The longer the delay, the worse the decisions are that you will make from it.”

— Captain Don Gross, Communications/Data Analysis Bureau,
Fresno (California) Police Department

Without proper context, it is easy for end users to misread the data or misinterpret the implications of the information a data dashboard presents. The nature of data dashboards inherently suggests to end users that they are seeing new and current data. If the dashboard is presenting data from the prior week or month or even the same time the prior year but does not make this clear, the data dashboard can inadvertently encourage end users to make decisions based on outdated data. Similarly, dashboard metrics that are insufficiently clear about how they are constructed create a risk that end users will make mistaken assumptions about what they are viewing.

For example, a public-facing data dashboard on hate crimes may want to use a “word cloud” to convey a sense of the relative frequency of these crimes across the groups experiencing them (see figure 9). However, the simplicity of this visualization comes at the expense of critical contextual information about what it is based on, leaving end users to make important assumptions that will significantly affect how they interpret the information. In figure 9, end users will develop very different understandings if they assume the word cloud is based on “language used by a community member during a call for service” rather than “language used by an officer and transcribed from body camera footage” or “language reported to have been used by a suspect during a hate crime.”

Figure 9. Word cloud representing the relative frequency of hate crimes across the groups experiencing them



A word cloud analyzes text to visualize the frequency of repeated terms. The more a term appears in the source material, the larger it appears in the word cloud. However, word clouds typically do not analyze or reflect any information about the context in which a term is used in the text. Typically, it does not matter whether the term is used in a positive manner, as a quote, or in any other way that would affect its meaning. The word cloud shows the prominence of the term separate from its context, leaving the end user to make assumptions about the context surrounding every appearance of the term within the source text.

A different problem can occur when data dashboards successfully collect and process accurate data but allow them to be *overly* precise for the intended audience. LEAs face a persistent tension between sharing too much and too little information with the public. Agencies want to be as transparent as possible, but some information, such as about active investigations and other sensitive matters, clearly cannot be shared in a public-facing dashboard.

“We have concerns about citizen privacy rights, not being able to control the context in which our data is displayed or re-shared, and any potential liabilities associated.”

— Crime analyst in a mid-sized county sheriff’s office

In 2016, the Federal Trade Commission’s (FTC) Chief Technologist, Dr. Lorrie Cranor, addressed the risk of law enforcement agencies inadvertently disclosing sensitive information through their efforts at public transparency (see excerpt of the statement in the sidebar).

Excerpt from a Statement by Dr. Lorrie Cranor, Chief Technologist for the U.S. Federal Trade Commission (FTC), on the Risks of Re-Identifying Open Police Data

Geographic information is commonly used to re-identify people. For many of the purposes for which people want to use public data, geographic information is important. But due to privacy concerns, the granularity of geographic information may be reduced. However, we are faced with a dilemma. Data is more useful when it includes more specific geographic information but is also more identifiable.

Knowing only the state associated with a police report allows for the compilation of state-level crime statistics, but does not provide information about crime rates or policing patterns in specific communities.

Providing zip codes makes the information more useful, but it is more likely to be identifiable. While some zip codes are fairly heterogeneous, others are not. The zip code of a college town might include an unusually large number of residents aged 18 to 24. A police report might mention a 20-year-old woman living in the zip code without much risk of identifying that individual. However, a police report that mentioned an 80-year-old woman might inadvertently identify that individual, since there may be only a very small number of 80-year-old women living in that zip code. Likewise, a young person who lives next door to a retirement community may be one of only a small number of people in their age bracket in that zip code. In a zip code where most people are all of the same race, those of a different race may also be readily identified in records that mention race.

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At the same time, zip code may not be granular enough to identify community trends. It may be important to know on what block an incident occurred, not just the zip code. In a large city, a block containing high-rise apartment buildings may include hundreds of residents. However, in the suburbs or rural areas, only a handful of people may live on some blocks. Thus, when we report that a crime occurred on the 700 block of a particular street, we may narrow down the address of the victim considerably. If other characteristics of the victim are revealed, such as gender, age, or even approximate age, the victim may be uniquely identified. How many 37-year-old women live on the 700 block of Mulberry Street?

Source: Federal Trade Commission. "Open Police Data Re-Identification Risks," April 27, 2016.
<https://www.ftc.gov/news-events/blogs/techftc/2016/04/open-police-data-re-identification-risks>.

In addition to the risks of releasing overly precise information, de-identified or seemingly anonymous data the agency release to the public can sometimes be re-identified by combining them with data from other sources. Importantly, this ability to recombine data means the risks of re-identifying potentially sensitive law enforcement data can depend on the availability of other data sources.

"Once you publish something, it can't be taken back. Make sure you have reviewed your dashboards well internally before you release it. Incorrect content can harm transparency efforts. Releasing sensitive/protected information can have negative consequence."

— Police Data Research Supervisor Christian Peterson, Strategic Services Division,
Portland (Oregon) Police Department

“Do not provide more information than you are willing to share with a third-party crime aggregation service. Sometimes, publicly available crime data can be exported to real estate sites and make your city appear unsafe when the opposite is true.”

— Crime Analyst Chris Womack, Office of the Assistant Chief of Police,
Denton (Texas) Police Department

Given the obvious and severe consequences of an LEA releasing sensitive, personal, and private data, LEAs need to carefully consider and routinely evaluate what data will be shared with the public through data dashboards and what the implications are of sharing those data.

Internally, other kinds of problems can arise from failing to rigorously assess the data needed for the data dashboard and determining how they will be obtained, prepared, and used. Neglecting these steps can cause LEAs to invest considerable time, effort, and other resources in developing a data dashboard that is destined to fail if one or more contributors overestimate their ability to follow through on their commitments to the project. Even a few seemingly minor misunderstandings among contributors during the development phases of a data dashboard project can jeopardize the entire project, as well as cause significant strains on the relationships of different stakeholders involved in the effort.

These sorts of challenges were observed and documented in a recently published study³ of an Australian jurisdiction’s efforts to develop a public-facing and an internal-only data dashboard as part of their “Smart City” initiative. Their dashboard efforts began in early 2018 when the city council motioned for it to be created. The motion listed more than 40 metrics that should be included in the dashboard, but also explained that it should not be limited to *just* these 40 metrics. Several weeks later, while working with vendors and designers, it became clear that a lack of good quality data and access to it were going to become obstacles.

3. Jathan Sadowski, “‘Anyway, the Dashboard Is Dead’: On Trying to Build Urban Informatics,” *New Media & Society*, November 27, 2021, <https://doi.org/10.1177/14614448211058455>.

“The data deficit arose for multiple reasons. Some data were unavailable because it had not yet been collected or was outdated. Some data were inaccessible because its owners within the government would not or could not share the data with other agencies/departments. ‘It’s not uncommon for the client to say we’ve got this data and we want to visualize it and then when it comes to actually getting the data for us, they run into a lot of roadblocks’, said a lead designer at the firm building the dashboard (Interview, July 2018). Moreover, organizations often think they possess ‘good’ data, but what they provide is too ‘dirty’ and thus can’t be used.”

—Jathan Sadowski, “Anyway, the Dashboard Is Dead’: On Trying to Build Urban Informatics,” *New Media & Society*, November 27, 2021.

While some of the city’s team worked on addressing the data quality and availability issues, others worked on creating a prototype of the data dashboard using artificial data for demonstration purposes. However, when the team shared the prototype, the stakeholders and end users became fixated on the data presented in the dashboard (despite the team’s reminders the data were not real). Ultimately, the city’s data dashboard efforts permanently stalled because of persistent problems with data quality and access, lack of buy-in and direction from relevant stakeholders, and eventual turnover in city leadership.

Fortunately, LEAs can avoid the potential consequences discussed in this section by following guidance on how to develop effective law enforcement data dashboards.

How to Develop Effective Law Enforcement Data Dashboards

The variety and appearances of data dashboards can be deceiving. Two dashboards can look very similar yet address completely different problems, purposes, or audiences. Likewise, two dashboards that provide identical information can appear completely different. This variety can make it challenging to recognize a good data dashboard from those that are not.

When done well, a data dashboard provides law enforcement officials and other stakeholders (including other government officials and members of the community) with quick and easy access to timely, relevant, and understandable information that helps them know what they need to know and do what they need to do.

A poorly conceived or ineffective data dashboard can quickly and easily confuse end users, misinform decision-making, and even compromise the public's trust in an agency and perception of its legitimacy. Fortunately, there are insights, experiences, tools, and other resources law enforcement agencies can use to ensure they are developing and using data dashboards that support effective decision-making and provide their agency with value.

Getting it right with law enforcement data dashboards can be a significant undertaking. To explain *why* it is important to make sure your agency is developing and using effective data dashboards, this brief has summarized real-world insights and examples to show the potential benefits of good data dashboards for law enforcement agencies. This brief has also described several expectations law enforcement officials should have for the process of creating data dashboards (especially concerning the level of effort required), as well as some of the underappreciated consequences of a cavalier approach. The other two documents in the series provide guidance on *how* to create data dashboards and get the best possible returns on those efforts.

Appendix A. Sources of Information Used in This Report

Much of the research described in this series was conducted under a cooperative agreement between the U.S. Department of Justice's (DOJ) Office of Community Oriented Policing Services (COPS Office), SEARCH (The National Consortium for Justice Information and Statistics), and the Police Executive Research Forum (PERF). There were three primary research activities:

1. A Multidisciplinary Project Advisory Committee to Help Identify and Prioritize Key Issues.

The project team identified a diverse group of law enforcement stakeholders and data experts to serve as a project advisory committee. The committee's role was to inform and help guide the direction of the project, as well as ensure the project remained responsive to the needs of the policing profession. (Members of the Project Advisory Committee are listed as appendix B.)

In the latter half of 2020, PERF held 10 small group interviews with three-person subgroups of the advisory committee. The goals for these discussions were (1) identifying key themes and insights related to law enforcement data dashboards (i.e., issues that came up in multiple, separate conversations), (2) outlining those insights and informing the development of a PERF member questionnaire focused on the most important issues to understand about law enforcement data dashboards, and (3) collaboratively developing the outline and questionnaire results into guidance that reflected the collective insights and experiences of the law enforcement community and the project's advisory committee members.

- 2. An Online Questionnaire of Law Enforcement Officials about Experiences with Data Dashboards.** PERF routinely sends questionnaires to its members to learn about different issues and experiences affecting law enforcement. PERF's February 2021 questionnaire included requests for information about law enforcement agencies' operational and technical experiences with data dashboards. PERF sent the questionnaire to the highest-ranking PERF member in each of more than 1,000 law enforcement agencies. A total of 360 individuals⁴ from at least 126 different agencies spanning at least 38 states completed the questionnaire. They provided a wide range of responses from a diverse set of law enforcement agencies.⁵

4. Some respondents chose to remain anonymous, which is why it is not possible to know the precise number of unique agencies and states.

5. Importantly, we were not attempting to collect a nationally representative sample of police organizations, nor are we attempting to present these data as a representative "snapshot" of what data dashboards look like in law enforcement at the current time. Rather, we present these data as examples of the range of experiences law enforcement agencies are having with data dashboards, which readers can use to help explore different ideas and options that may be well-suited to their own needs.

3. **A Review of More than 350 Internal-Only and Public-Facing Law Enforcement Data Dashboards.** From the outset of the project, PERF began assembling and categorizing examples of public-facing law enforcement data dashboards. PERF also asked members to show the research team examples of their internal-only data dashboards. In total, PERF reviewed more than 350 examples of law enforcement data dashboards.

Figure 10. Size of agencies responding to the questionnaire

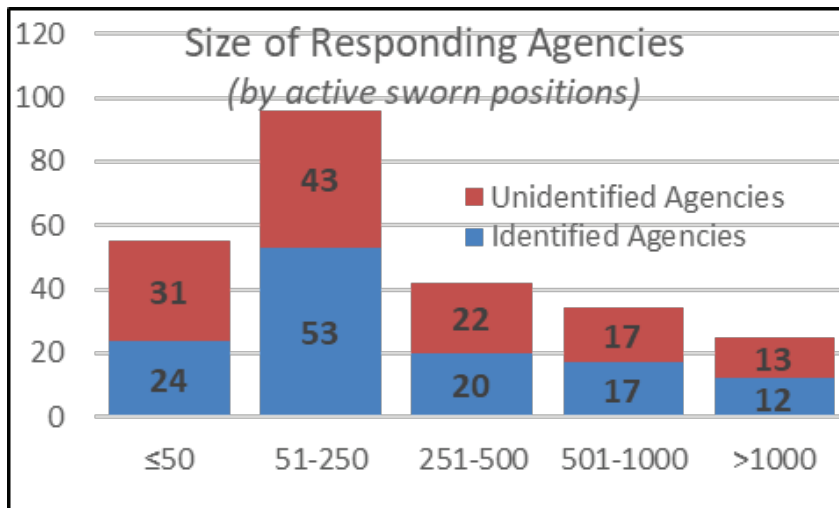


Figure 11. Presence of data dashboards in responding agencies

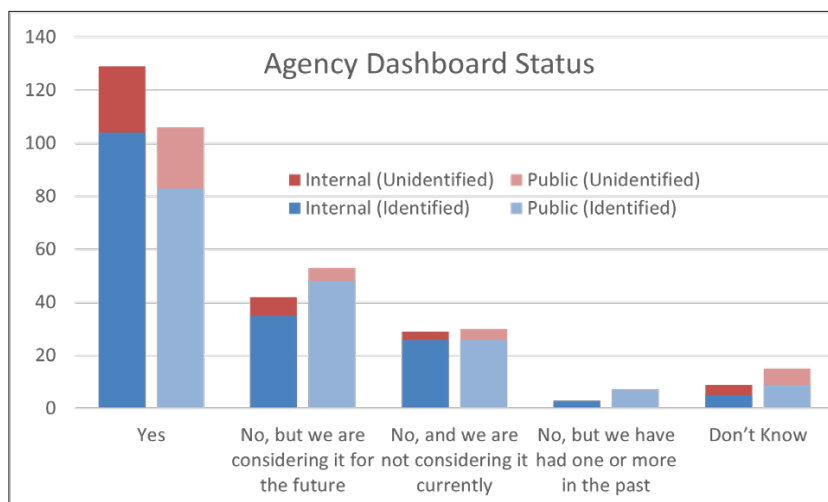


Figure 10 shows the distribution of agency size among those responding to the questionnaire. Figure 11 shows the number of responding agencies with internal-only or public facing data dashboards, as well as the plans of those agencies that did not have dashboards at the time of the questionnaire.

Appendix B. Law Enforcement Data Dashboards

Project Advisory Committee Members

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Julian Sanchez

Senior Fellow
Cato Institute

Jeffrey Sedgwick

Executive Director
Justice Research and Statistics Association

Mike Sena

President
National Fusion Center Association

About PERF

The **Police Executive Research Forum (PERF)** is an independent research organization that focuses on critical issues in policing. Since its founding in 1976, PERF has identified best practices on fundamental issues such as police use of force; developing community policing and problem-oriented policing; using technologies to deliver police services to the community; and evaluating crime reduction strategies.

PERF strives to advance professionalism in policing and to improve the delivery of police services through the exercise of strong national leadership, public debate of police and criminal justice issues, and research and policy development.

In addition to conducting research and publishing reports on our findings, PERF conducts management studies of individual law enforcement agencies; educates hundreds of police officials each year in the Senior Management Institute for Police, a three-week executive development program; and provides executive search services to governments that wish to conduct national searches for their next police chief.

All of PERF's work benefits from PERF's status as a membership organization of police officials, who share information and open their agencies to research and study. PERF members also include academics, federal government leaders, and others with an interest in policing and criminal justice.

All PERF members must have a four-year college degree and must subscribe to a set of founding principles, emphasizing the importance of research and public debate in policing, adherence to the Constitution and the highest standards of ethics and integrity, and accountability to the communities that police agencies serve.

PERF is governed by a member-elected President and Board of Directors and a Board-appointed Executive Director.

To learn more, visit PERF online at www.policeforum.org.

About SEARCH

SEARCH, The National Consortium for Justice Information and Statistics, is a nonprofit organization governed by a Membership Group of governor appointees from the 50 States, the District of Columbia, and the territories.

SEARCH has 53 years of experience supporting the information sharing, information technology, cybercrime investigative and digital forensics, and criminal records systems needs of State, local and tribal justice and public safety agencies and practitioners nationwide.

Information is the lifeblood of justice and public safety systems in the United States. SEARCH leads efforts to facilitate information sharing and communication solutions that help State, local and tribal agencies better predict, prevent, and respond to criminal activity. Better information delivered more quickly means better decisions, and better decisions equal enhanced public safety.

SEARCH's Purpose is to:

- Improve the administration of justice through the effective application and responsible deployment of information and identification technologies.
- Develop and promote constitutionally balanced and effective law and policy governing the use and management of justice information and identification technologies.
- Enhance the efficiency, effectiveness, and quality of decision-making and information management through policy analysis, training, technical assistance, and systems development.
- Inform and improve policy and practice in the administration of justice through evidence-based research and data.

For more information on SEARCH and its products, services, and resources, see www.search.org.

About the COPS Office

The **Office of Community Oriented Policing Services (COPS Office)** is the component of the U.S. Department of Justice responsible for advancing the practice of community policing by the nation's state, local, territorial, and tribal law enforcement agencies through information and grant resources.

Community policing begins with a commitment to building trust and mutual respect between police and communities. It supports public safety by encouraging all stakeholders to work together to address our nation's crime challenges. When police and communities collaborate, they more effectively address underlying issues, change negative behavioral patterns, and allocate resources.

Rather than simply responding to crime, community policing focuses on preventing it through strategic problem-solving approaches based on collaboration. The COPS Office awards grants to hire community policing officers and support the development and testing of innovative policing strategies. COPS Office funding also provides training and technical assistance to community members and local government leaders, as well as all levels of law enforcement.

Since 1994, the COPS Office has been appropriated more than \$20 billion to add community policing officers to the nation's streets, enhance crime fighting technology, support crime prevention initiatives, and provide training and technical assistance to help advance community policing. Other achievements include the following:

- To date, the COPS Office has funded the hiring of approximately 136,000 additional officers by more than 13,000 of the nation's 18,000 law enforcement agencies in both small and large jurisdictions.
- More than 800,000 law enforcement personnel, community members, and government leaders have been trained through COPS Office-funded training organizations and the COPS Training Portal.
- Almost 800 agencies have received customized advice and peer-led technical assistance through the COPS Office Collaborative Reform Initiative Technical Assistance Center.
- To date, the COPS Office has distributed more than eight million topic-specific publications, training curricula, white papers, and resource CDs and flash drives.

The COPS Office also sponsors conferences, roundtables, and other forums focused on issues critical to law enforcement. COPS Office information resources, covering a wide range of community policing topics such as school and campus safety, violent crime, and officer safety and wellness, can be downloaded via the COPS Office's home page, <https://cops.usdoj.gov>.

Data dashboards can help law enforcement agencies manage, analyze, and display actionable information in a user-friendly interface. This publication, *Getting It Right and Why it Matters: An Introduction*, is part of the three-part Designing an Effective Law Enforcement Data Dashboard series produced by the SEARCH Group, Inc and the Police Executive Research Forum. It provides an introduction to data dashboards for law enforcement and public safety executives, and other integral stakeholders, describing the purposes of a data dashboard and the process for developing one. Each publication in this series is based on research and consultation with law enforcement leaders and subject matter experts and contains examples of real-world operational dashboards and tips for planning, designing, implementing, and sustaining data dashboards in a law enforcement agency.



COPS

Community Oriented Policing Services
U.S. Department of Justice

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To obtain details about COPS Office programs,
call the COPS Office Response Center
at 800-421-6770.

Visit the COPS Office online at cops.usdoj.gov.