

**Project Report
MMHC-1**

Envisioning an Integrated Crisis Data System in Maine: Data-Informed Decision-Making for Maine's Behavioral Health Crisis System

**M. A. Hernandez
G. H. Cohen
K. Assefa-McNeil
N. Elmouttaqi
A. Lapadula
M. M. Shattuck
K. Wilkens
B. Pochee-Smith
J. Sedivy
R. A. Taylor**

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Lincoln Laboratory
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
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Data-Informed Decision-Making for Maine's Behavioral
Health Crisis System

M. A. Hernandez

A. Lapadula

M. M. Shattuck

Humanitarian Assistance and Disaster Relief Systems Group

MIT Lincoln Laboratory

G. H. Cohen

K. Assefa-McNeil

N. Elmouttaqi

Boston University School of Public Health

K. Wilkens

Maine Office of MaineCare Services

B. Pochee-Smith

J. Sedivy

R. A. Taylor

Maine Office of Behavioral Health

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Massachusetts

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EXECUTIVE SUMMARY

PROBLEM STATEMENT

Stakeholders of Maine's behavioral health crisis system have limited resources to answer fundamental questions required to inform decisions around crisis system performance and reform, such as the number of individuals who experience a behavioral health crisis in Maine each year.

CHALLENGES

- **Siloed data** across the crisis care continuum limit the production of actionable information.
- **Lack of unified infrastructure** for integrating crisis data results in duplicated efforts.
- **Varying levels of data quality, completeness, and access** across crisis datasets hinder data integration efforts.

VISION FOR INTEGRATED CRISIS DATA SYSTEM

Developing an integrated crisis data system would produce needed information to support decision-making around crisis system reform and improvements. The ideal integrated crisis system would include:

- **Cross-agency collaboration and data governance strategy** to standardize data management and sharing practices across the crisis care continuum.
- **Integrated data infrastructure** to facilitate data sharing, individual-level data integration, and analysis.
- **Data-to-decision analytics** to produce timely and actionable information that support key decisions around crisis system reform.

ENVISIONING IMPACTS OF INTEGRATED CRISIS DATA SYSTEM

An integrated crisis data system would enable data-informed decision-making around resource allocation, funding, crisis response planning, and crisis system improvements.

This report highlights three concepts to show how the development of an integrated crisis data system would enhance data-informed decision-making for crisis system reform (see Figure 1). The report also provides context-specific examples for each concept. The concepts are:

1. **Crisis Population Metrics.** Understanding population-level characteristics and needs of crisis system users to provide more appropriate and equitable crisis care.

Example: Analysis of population of crisis system utilizers who encounter law enforcement to inform crisis response planning and supportive services to prevent recurring encounters and promote diversion to mental health services.

2. **Crisis System Flow.** Analyzing how individuals enter and move through the crisis system to identify opportunities to improve crisis service quality.

Example: Analysis of barriers in referring individuals from Maine Crisis Line to Mobile Crisis Teams to improve crisis care coordination and transitions across crisis system.

3. **Crisis Service Need Mapping.** Examining area-level trends in crisis service need—including need among individuals who do not currently access the crisis system—to improve regional access to crisis services.

Example: Analysis of regional need for youth crisis services to inform the most equitable location for new crisis services.

What If Maine Develops an Integrated Crisis Data System?

Enables Crisis System-wide Analyses	Produces Key Information that Current Crisis Data Tools Cannot	Supports Data-Informed Decision-Making
Capability to characterize the population of crisis system users	Count of unique crisis system users Prevalence of behavioral health crisis in Maine Population characteristics of crisis system users	Equitable resource allocation Response plans to disrupt cycles of recurring crisis Grant reporting requirements (e.g., SAMHSA block grants)
Capability to examine how people move through the crisis system	Counts of people flowing through different parts of crisis system Identification of most common and impactful barriers to care	Improvements to crisis response coordination and diversions Strategy to address barriers to care
Capability to map regional need for crisis services	Assessment of crisis service need – including individuals outside the crisis system Geographic areas with the highest need for crisis services	Locating new crisis services to improve access and equity Planning around regional staffing needs for crisis services

Figure 1. Potential impacts of developing an integrated crisis data system on analysis, information, availability, and decision making. Examples of enhanced decision-making capabilities highlighted by three concepts for data-to-decision analytics: analysis of crisis population metrics, analysis of crisis system flow, and crisis service need mapping.

RECOMMENDATIONS

1. **Facilitate cross-agency collaboration in constructing a crisis data catalog.** Catalog crisis data sources across the crisis continuum, including assessments of data quality and data sharing processes. Share catalog for collective awareness. Leverage opportunity to begin discussions around data governance.
2. **Leverage existing efforts and assets in Maine to build infrastructure for data integration across crisis continuum.** Partner with Office of Information Technology to leverage their expertise in building longitudinal individual-level data integration systems. Build on ongoing crisis management software efforts.
3. **Start to develop components of an integrated crisis data system with most accessible and highest quality crisis data.** Demonstrate minimum viable product to elicit feedback and promote buy-in among crisis system stakeholders to join crisis data integration efforts.
4. **Engage with collaborators in the Maine Office of Behavioral Health division of substance use disorders.** Apply lessons learned from existing data integration efforts in Maine in the area of opioid overdose prevention. Explore potential synergies in combining efforts across crisis and substance use.
5. **Invest in internal workforce of data analysts and partner with external institutions to advance analytical tools.** Expand and train workforce of data practitioners to automate processes for data cleaning, integration, visualization, and analysis.

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1. DEFINITIONS

In this report, we make a distinction between the *crisis system* and the *crisis continuum*. Here we define these two terms.

We refer to the *crisis system* interchangeably with the *behavioral health crisis system* and the *crisis system of care*. The crisis system refers to the constellation of behavioral health crisis services funded by the State of Maine. The crisis system primarily comprises the Maine Crisis Line (MCL), Mobile Crisis Teams (MCT), and Crisis Receiving Centers (CRC). Funders of the behavioral health crisis system—and adjacent crisis systems—consist of offices across the Maine Department of Health and Human Services (DHHS), including the Office of Behavioral Health (OBH), the Office of Child and Family Services (OCFS), the Office of MaineCare Services (OMS), and the Office of Aging and Disability Services (OADS).

We refer to the *crisis continuum* interchangeably with the *behavioral health crisis continuum* and the *crisis care continuum*. The crisis continuum comprises the crisis system *and* all other potential touchpoints where individuals experiencing a behavioral health crisis may interface with state services. The crisis continuum includes a wider range of stakeholders across Maine government. Stakeholders consist of entities and data owners associated with hospitals, emergency departments, and public health departments—such as OMS, the Maine Center for Disease Control and Prevention (CDC), the Maine Health Data Organization (MHDO), and the Office of Chief Medical Examiner (OCME). Stakeholders also include the Maine Department of Public Safety (emergency medical services and law enforcement), the Maine Department of Corrections (jails and juvenile justice facilities), the Maine Department of Education, and community action programs in Maine.

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2. PROBLEM STATEMENT AND OBJECTIVE

2.1 PROBLEM STATEMENT

Stakeholders of Maine's behavioral health crisis system have limited resources to answer fundamental questions required to inform decisions around crisis system performance and reform, such as the number of individuals who experience a behavioral health crisis in Maine each year.

2.2 OBJECTIVE

This report proposes a vision for an integrated crisis data system to address the current challenges associated with data-informed decision-making in Maine's behavioral health crisis system. The report aims to stimulate and inform discourse among stakeholders across the crisis continuum to collectively envision the possibilities, impacts, and challenges in developing such an integrated crisis data system. The report should serve as a starting point to further develop and refine these ideas to fit the needs of stakeholders across the crisis continuum.

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3. CHALLENGES

3.1 SILOED DATA ACROSS THE CRISIS CARE CONTINUUM LIMIT THE PRODUCTION OF ACTIONABLE INFORMATION

Fragmented data will impede the development and implementation of intuitive tools that translate data for stakeholders and decision makers. Such fragmentation of data results in significant limitations in the scope and specificity of information available for decision-making.

The lack of such data may risk (1) implementation of ineffective services or programs, (2) inequitable distribution of these resources, (3) waste and ineffective use of valuable financial resources, and (4) inability to meet treatment performance targets.

3.2 LACK OF INFRASTRUCTURE FOR INTEGRATING CRISIS DATA RESULT IN DUPLICATED EFFORTS

Lack of master data records or identification numbers results in challenges in matching individuals by event, area of service, and across systems of care. Inability to easily match individuals results in disparate efforts to share data across key stakeholders.

Ad-hoc efforts to integrate crisis data are duplicative across agencies and result in a high administrative burden. Lengthy and fragmented processes for data use agreements lead to an inability to respond quickly and holistically to ongoing and emergent challenges in the crisis system.

3.3 LACK OF DATA GOVERNANCE POLICIES RESULT IN VARYING LEVELS OF DATA QUALITY AND COMPLETENESS ACROSS DATASETS

The absence of standardized data governance policies across systems of care leads to limitations in data collection, disparate data quality, and mismatches in the level of detail. For example, one service in the crisis system may collected information on race and ethnicity, while others may not. Conflicts in data standards across datasets may present significant challenges in data quality control.

Lack of consistent data standards may limit the ability of systems of care to report on racial, ethnic, and economic inequalities in access to services and quality of care. These limitations may preclude reporting of disparity impact statements and ability to respond accurately and efficiently to requests for information from state and federal regulators.

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4. VISION FOR INTEGRATED CRISIS DATA SYSTEM

An integrated data system for Maine’s behavioral health crisis system would address many of the current challenges in making data-informed decisions. In this section, we envision three key components for an ideal integrated data system for crisis:

1. **Cross-agency collaboration and data governance** to standardize data management and sharing practices across the crisis care continuum.
2. **Integrated data infrastructure** to facilitate data storage, sharing, cleaning, integration, and analysis.
3. **Data-to-decision analytics** to produce timely and actionable information that support key decisions around crisis system reform.

This section also highlights past and existing efforts within Maine that could serve as a starting point for each component of a future integrated crisis data system.

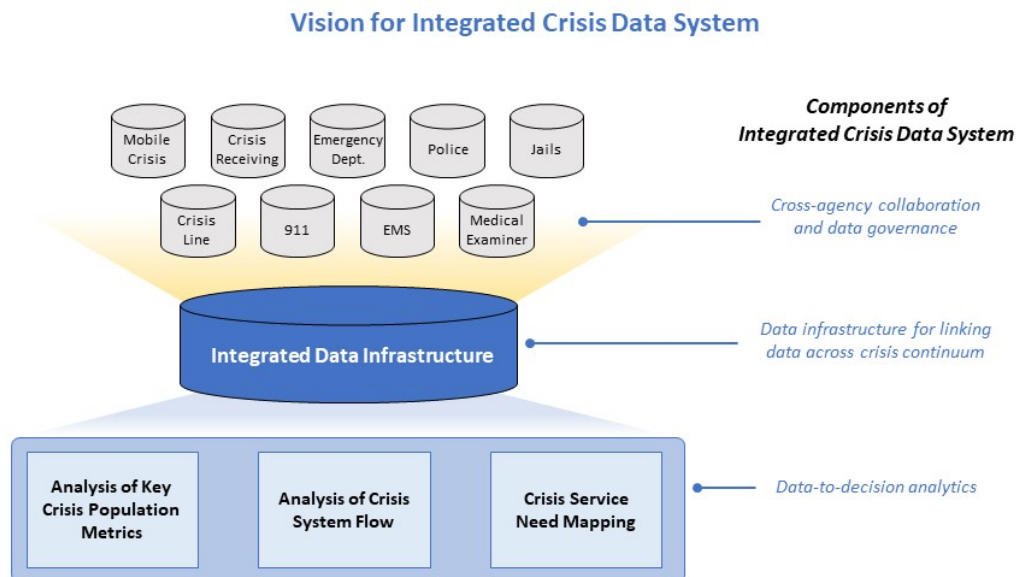


Figure 2. Vision for integrated crisis data system (cross-agency collaboration, integrated data infrastructure, and data-to-decision analytics).

4.1 CROSS-AGENCY COLLABORATION TO IDENTIFY AND DOCUMENT EXISTING ASSETS, PROCESSES, AND INFORMATION NEEDS ACROSS THE CRISIS SYSTEM WOULD PROMOTE COLLECTIVE AWARENESS AND CONSENSUS-BUILDING AROUND STANDARDS FOR DATA SHARING

The development of an integrated crisis data system should begin with creating a collaborative forum for data owners, analysts, and decision-makers across the crisis continuum to develop a shared understanding of existing assets, data sharing processes, and information needs. Such a collaboration would enable an effort to catalog and document existing data sources across the crisis continuum. A catalog of crisis data would describe the technical specifications of each data source (e.g., key indicators, geographic resolution and extent, time resolution, reporting frequency, reporting lag, data sharing process, etc.). Publishing this data catalog would help develop a collective awareness of existing data assets that stakeholders across the crisis continuum can leverage for their project-specific priorities.

A collaborative forum and data catalog would also inform a process of consensus building around best practices for data management and data sharing across the crisis system. In examining the current state of crisis data, stakeholders can identify limitations of current data processes (data gaps, excessive administrative burden, duplicate efforts, etc.) and potential areas for improving data management and data sharing practices. This collaborative process could serve as the basis for data governance—developing a formal set of standards and internal policies for collecting, storing, processing, and sharing pertinent crisis data. Data governance would improve interoperability and coordination across data silos and increase the overall utility of crisis data in informing system-wide decision-making.

State partners at the University of Maine led a similar data-centered, cross-agency collaboration in the adjacent area of substance use. The University of Maine team conducted extensive cross-agency stakeholder engagement to construct a data index in the Maine Drug Data Hub which documents existing datasets related to Maine’s overdose response efforts [1]. Such an effort for stakeholder engagement and data cataloging can serve as a model for the crisis system. The cross-agency collaboration around crisis data integration can leverage existing working groups that have focused on crisis system reform in identifying key stakeholders most familiar with their respective data silos.

4.2 AN INTEGRATED DATA INFRASTRUCTURE WOULD ENABLE THE LINKING OF DATA SILOS ACROSS THE CRISIS CONTINUUM AND STREAMLINE PROCESSES FOR DATA CLEANING, STORAGE, SHARING, AND ANALYSIS

Here we highlight four key components of an integrated data infrastructure to address the challenges of disparate crisis data across the crisis continuum. The integrated data infrastructure could be implemented in a variety of ways. (See APPENDIX A: Integrated Crisis Data System.)

1. **Data warehouse.** A data warehouse would serve as storage for all pertinent crisis-related data. Data from across the crisis continuum would be stored and secured according to

standards set through the cross-agency collaboration and data governance effort. The data warehouse would be maintained by the Office of Information Technology (OIT) in Maine.

2. **Standardized data ingestion and cleaning processes.** The integrated data infrastructure would implement standardized processes for data ingestion and cleaning (e.g., de-duplication). These processes would be implemented, automated, and documented to meet the needs of data owners, data warehouse administrators, and data governance oversight personnel. These processes would ensure that the methods for producing clean datasets for analysis are consistent, well-documented, and replicable.
3. **Application programming interface (API).** An API would serve as the connection between the integrated crisis data and the data users (including analysts, software developers, and program managers). Data users who want to analyze crisis data across the crisis continuum would request an integrated dataset through the API. The API would automate the process of (1) validating that the data user has permissions to access the requested data and (2) querying and exporting the requested data. The API would protect the integrated crisis system's data, as well as the privacy of all data contributors, while also streamlining the data request process for users. This capability would improve overall efficiency and security of data sharing—reducing the administrative burden associated with responding to data sharing requests.
4. **Unique person identifiers (UPIs) and master data repository (MDR).** Creating UPIs that link individual-level data across the crisis continuum is essential for answering fundamental questions about the population of crisis system users and how they move through the system. An MDR would facilitate the process of resolving discrepancies across data silos to provide an accurate representation of crisis system users and their characteristics. Both UPIs and an MDR would facilitate more comprehensive system-wide data analyses to inform crisis system decision-making. For possible implementations of UPIs and an MDR, see APPENDIX A: Integrated Crisis Data System.

There are several existing efforts and expertise within Maine that can be leveraged to develop an integrated data infrastructure for the crisis system. Maine OIT has expertise in building data systems that integrate the data silos of various departments across Maine government. For example, OIT has partnered with the Department of Labor on a data integration project, linking individual-level, longitudinal data to improve awareness of how people interface with multiple State services and their long-term outcomes related to employment and wages. OIT is currently developing MDRs for a specific application to non-fatal overdose response and a broader application to link data across Maine DHHS. Leveraging existing OIT expertise and ongoing MDR efforts across DHHS would be essential for creating the integrated data infrastructure for Maine's crisis system.

4.3 ANALYTICS WOULD LEVERAGE DATA ACROSS THE CRISIS CONTINUUM TO INFORM KEY DECISIONS IN IMPROVING CRISIS SYSTEM'S CAPACITY TO DELIVER THE MOST SUPPORTIVE, LEAST RESTRICTIVE BEHAVIORAL HEALTH CRISIS CARE

Leveraging integrated data from across the crisis continuum would enable comprehensive analyses of the crisis system. New system-wide analyses could translate data to decision-relevant information that would be otherwise unattainable with siloed crisis data. Such enhanced analytic capability would support stakeholders in making decisions around crisis system reform, informed by a holistic awareness and understanding of trends across the crisis continuum.

In the next section, we highlight how these types of analytics could directly inform key decisions around crisis system reform, focusing on three proposed use cases: analytics to characterize the population of crisis system users (crisis population metrics), analytics to examine how people move through the crisis system (crisis system flow), and analytics to characterize and map regional need for crisis services (crisis service need mapping).

5. ENVISIONING IMPACTS OF INTEGRATED CRISIS DATA SYSTEM

In this section, we dive deeper into how an integrated crisis data system would enhance data-informed decision making. Figure 3 highlights the potential benefits of an integrated crisis data system in enabling more impactful data-to-decision pipelines. The first column shows how integrated crisis data would enable three types of crisis system-wide analyses: analysis of crisis population metrics, analysis of crisis system flow, and crisis service need mapping. The second column shows how these system-wide analyses would satisfy key information needs and answer fundamental questions about the crisis system. The third column shows how that key information would support specific decisions and actions around the crisis system. The three rows in Figure 3 highlight three concepts for data-to-decision analytics: analysis of crisis population metrics, analysis of crisis system flow, and crisis service need mapping.

What If Maine Develops an Integrated Crisis Data System?

Enables Crisis System-wide Analyses	Produces Key Information that Current Crisis Data Tools Cannot	Supports Data-Informed Decision-Making
Capability to characterize the population of crisis system users	Count of unique crisis system users Prevalence of behavioral health crisis in Maine Population characteristics of crisis system users	Equitable resource allocation Response plans to disrupt cycles of recurring crisis Grant reporting requirements (e.g., SAMHSA block grants)
Capability to examine how people move through the crisis system	Counts of people flowing through different parts of crisis system Identification of most common and impactful barriers to care	Improvements to crisis response coordination and diversions Strategy to address barriers to care
Capability to map regional need for crisis services	Assessment of crisis service need – including individuals outside the crisis system Geographic areas with the highest need for crisis services	Locating new crisis services to improve access and equity Planning around regional staffing needs for crisis services

Figure 3. Potential impacts of developing an integrated crisis data system on analysis, information, and decision making. Examples of enhanced decision-making capabilities highlighted by three concepts for data-to-decision analytics: analysis of crisis population metrics, analysis of crisis system flow, and crisis service need mapping.

Each concept highlights the potential for an integrated crisis data system to inform a variety of decisions and actions around the crisis system. The decisions and actions informed by integrated crisis data could significantly impact mental health crisis intervention in the following ways:

- **Supportive and timely response:** Understanding the population of crisis system users would help inform staffing decisions for crisis response teams to ensure that there are enough trained professionals available to promptly address mental health crises and connect individuals with supportive services.
- **Enhanced coordination and collaboration:** Understanding the dynamics of how people move through the crisis continuum would allow for more effective coordination among different agencies, organizations, and professionals involved in mental health crisis intervention.
- **Systematic improvements:** By analyzing data on outcomes, resource utilization, and service effectiveness, stakeholders could identify service gaps and make informed system changes to allocate resources more equitably and efficiently.

In the following subsections, we describe the three concepts for data-to-decision analytics in more detail to envision specific use cases and stimulate discussions around potential paths forward. Each section is structured to include:

- guiding questions that reflect key information needs for decision-making that current crisis data cannot answer
- a description of the data-to-decision analysis
- a description of the downstream impact of data-to-decision analysis on key decisions
- opportunities to leverage existing efforts within Maine to develop this analysis
- a context-specific example showcasing the potential utility of the analysis

Note that the figures provided for the following context-specific examples do not contain actual data—with the exception of example #3 (youth crisis service need mapping) which shows maps from publicly available dashboards. At the time of this report, the authors did not have access to sufficient crisis data to develop prototypes. This reflects the current barriers in accessing and integrating data across the crisis continuum. However, as Maine begins to develop a system for integrating crisis data, the ideas proposed in this report can be prototyped, validated, deployed, and continuously improved with timely data as they become available.

5.1 CONCEPT 1: CRISIS POPULATION METRICS

Guiding Questions

1. How many people use Maine’s behavioral health crisis system?
2. What is the prevalence of behavioral health crisis in Maine?
3. What are the unique characteristics and needs of the population of crisis system users? How can crisis response provide the most appropriate care?

Integrating individual-level crisis data across the crisis continuum is essential for generating key insights about the population of crisis system users. Implementing a crisis data management system that assigns and tracks unique individual-level identifiers would link service utilization records across the crisis care continuum. This data integration would enable an accurate account of unique users of the crisis system across all possible touchpoints of the system. After identifying the population of crisis system users, further analyses of population characteristics would provide important information about who is using the crisis system and what their unique needs are. These insights would serve as a basis for examining subpopulations of crisis system users that may require more specific social services and support.

Characterizing the population of crisis system users would inform more effective crisis system reform and crisis care practices. Quantifying how many people use the crisis system is essential for understanding and communicating the scope of the issue of behavioral health crisis in Maine. Such information would enable the State of Maine to more effectively advocate for federal grants, such as block grants from the Substance Abuse and Mental Health Services Administration (SAMHSA), and resources to meet the need for crisis services. Generating statistics on crisis system user demographics would also help meet federal grant reporting requirements meant to promote equitable service delivery (e.g., SAMHSA disparity impact statement) [2].

Understanding the population characteristics of crisis system users—such as demographics, co-occurring issues, and social context—would also inform more appropriate and equitable crisis response plans. For example, stakeholders responsible for setting guidelines and requirements for crisis response staffing (e.g., team structure, training requirements) could use information about crisis population characteristics to center decisions around the unique needs of the population of crisis system users.

Existing OIT expertise in data integration can serve as a basis for analyzing key crisis population metrics. There are opportunities to leverage existing OIT expertise in integrating data silos across Maine government offices to quantify the population of those who have experienced a crisis—including those who have not encountered the crisis system. In linking individual-level data within the crisis system and across the crisis continuum (including emergency departments, law enforcement, and jails), a broader integrated crisis data system could more accurately estimate the prevalence of behavioral health crisis in Maine. Such an effort would require close collaboration with OIT in developing an integrated data system for crisis.

5.1.1 Context-specific example: Understanding crisis population encountering law enforcement

Understanding Crisis Population Encountering Law Enforcement

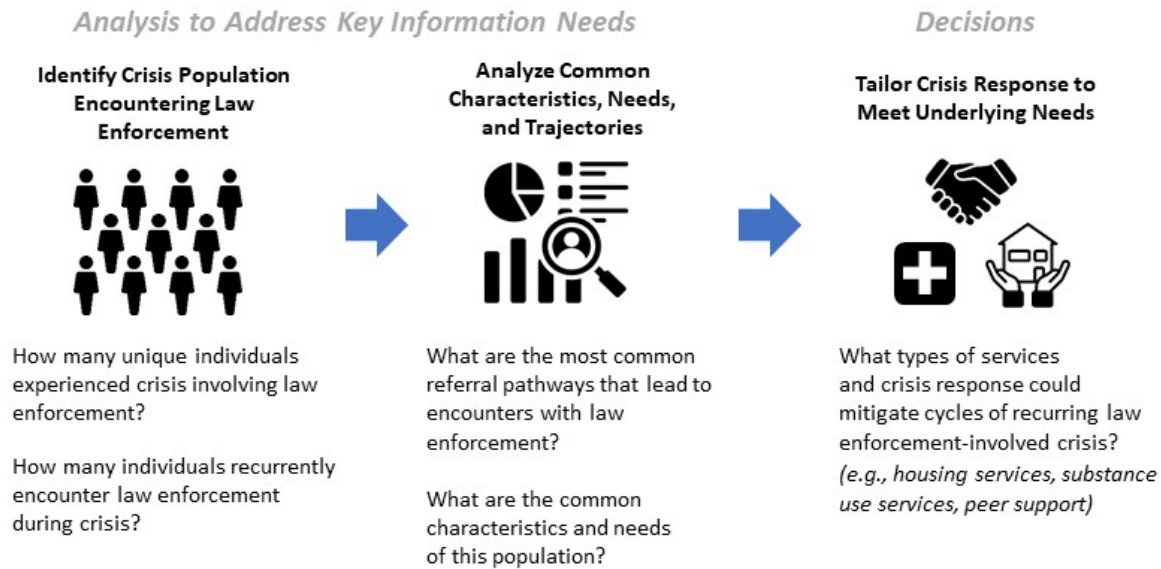


Figure 4. Use case for analyzing crisis population metrics. Understanding the population of crisis system users who encounter law enforcement in order to inform decisions around delivering the most supportive crisis response.

Law enforcement crisis diversion plays a pivotal role in promoting crisis intervention. Crisis diversion helps alleviate the strain on law enforcement resources by redirecting individuals in crisis away from the criminal justice system and towards appropriate support services. Studies have consistently shown that crisis diversion programs lead to improved outcomes for individuals experiencing mental health crises, substance abuse issues, or homelessness [3]. By connecting individuals with specialized services, these programs address the underlying causes of behavioral health crisis and promote long-term stability. Crisis diversion fosters community trust and cooperation by demonstrating a compassionate and effective response to crises. When law enforcement agencies prioritize diversion over arrest, it sends a powerful message that public safety is not solely reliant on punitive measures but also on a holistic approach to social issues. The literature overwhelmingly supports the notion that crisis diversion is an essential component of effective and humane law enforcement practices, improving the well-being of individuals in crisis and contributing to a more just and compassionate response [4]. Law enforcement diversion encompasses a range of strategies aimed at redirecting individuals away from the criminal justice system and towards

appropriate services and support. Appendix B contains more detail of the variety of law enforcement diversion models that have been implemented across different states and cities.

Literature on the landscape of crisis diversion underscores the importance of data-informed decision-making by stakeholders in Maine. Research studies and policy analyses provide valuable insights into the effectiveness, implementation challenges, and outcomes of various diversion programs [3]. These studies emphasize the need for robust data collection and analysis to understand the impact of diversion efforts on reducing recidivism, improving public safety, and enhancing the well-being of individuals in crisis. The current data tools available in Maine for informing decisions around diversion programs are limited. One of the key challenges lies in the fragmented data available to stakeholders, preventing them from adequately answering fundamental questions about the population that encounters law enforcement during crises (e.g., how many unique individuals encounter law enforcement?). The lack of data integrated at the individual level makes it difficult to gain a clear understanding of the characteristics, needs, and circumstances of individuals involved in such encounters [5]. The development of effective diversion programs becomes a challenging task, as decision-makers question the necessary insights to tailor interventions appropriately. The Maine Office of Behavioral Health needs to explore and implement improved methods and technologies that can provide more robust and detailed data, enabling stakeholders to make better-informed decisions regarding diversion strategies.

Advancing an integrated crisis data system plays a crucial role in characterizing the population by providing valuable insights into those who encounter law enforcement. By merging data from various sources and agencies, this system enables comprehensive analyses that highlight the unique characteristics and needs of the crisis population in such encounters. With the information collected regarding demographics, socioeconomic factors, mental health conditions, substance use patterns, and previous crisis experiences, this system allows for a holistic understanding of the individuals involved. This will help facilitate the development of tailored interventions and services that address the specific challenges faced by this population.

5.2 CONCEPT 2: CRISIS SYSTEM FLOW

Guiding Questions

1. How do individuals in crisis move through the crisis system?
2. Where do individuals most commonly get stuck or fall out of the crisis system?
3. Where are the opportunities to improve transitions, diversions, and coordination across the crisis system?

Integrating individual-level crisis data enables analyses to understand how crisis system users flow through different parts of the crisis continuum. There are many different referral pathways that individuals

may use to move through the crisis continuum. Integrating individual-level data across data silos could enable a greater understanding of movement through these pathways that connect the crisis continuum. Analyses of flow through the crisis system and broader crisis continuum could provide key information around (1) what the unique pathways through the crisis continuum are, (2) how frequently each pathway is traveled, (3) where pathways to care may be blocked, and (4) how specific trajectories through the crisis system influence downstream outcomes. Such information would provide an enhanced awareness of the health of the overall crisis system, the health of the system's components, and the system's effectiveness in getting individuals in crisis the most supportive, least restrictive care.

Understanding how populations flow through the crisis system would inform greater coordination of care between transition points across the crisis continuum. Tracking flows through different parts of the crisis continuum would help identify parts of the system where individuals may be encountering barriers or falling out of the crisis system. The capability to identify pain points across the crisis continuum could help prompt qualitative inquiries into potential barriers to care. The combination of flagging and confirming system issues—using both quantitative and qualitative means—would inform actions around how to address barriers and improve access to care.

Analysis of crisis system flow also could provide insights into the common pathways or system inefficiencies that may lead to adverse downstream outcomes, such as incarceration or emergency department boarding. Such information would allow decision-makers to more effectively identify and prioritize areas for improvement within the crisis system, resulting in better outcomes for individuals experiencing crisis.

Learning from existing journey mapping efforts in the area of overdose response can provide important insights for analyzing flow and trajectory through behavioral health care systems. OBH, Maine CDC, EMS, and the University of Maine are currently conducting a pilot study of mapping patient journeys across the non-fatal overdose continuum of care. This effort closely aligns with the concept of analyzing flows through different interfacing parts of the crisis system (i.e., analyzing groups of common journeys). Initial attempts to develop analysis tools to examine crisis system flows can apply lessons learned from current substance use-related journey mapping.

5.2.1 Context-specific example: Examining barriers to MCL-to-MCT transition

Transition from Maine Crisis Line to Mobile Crisis Teams

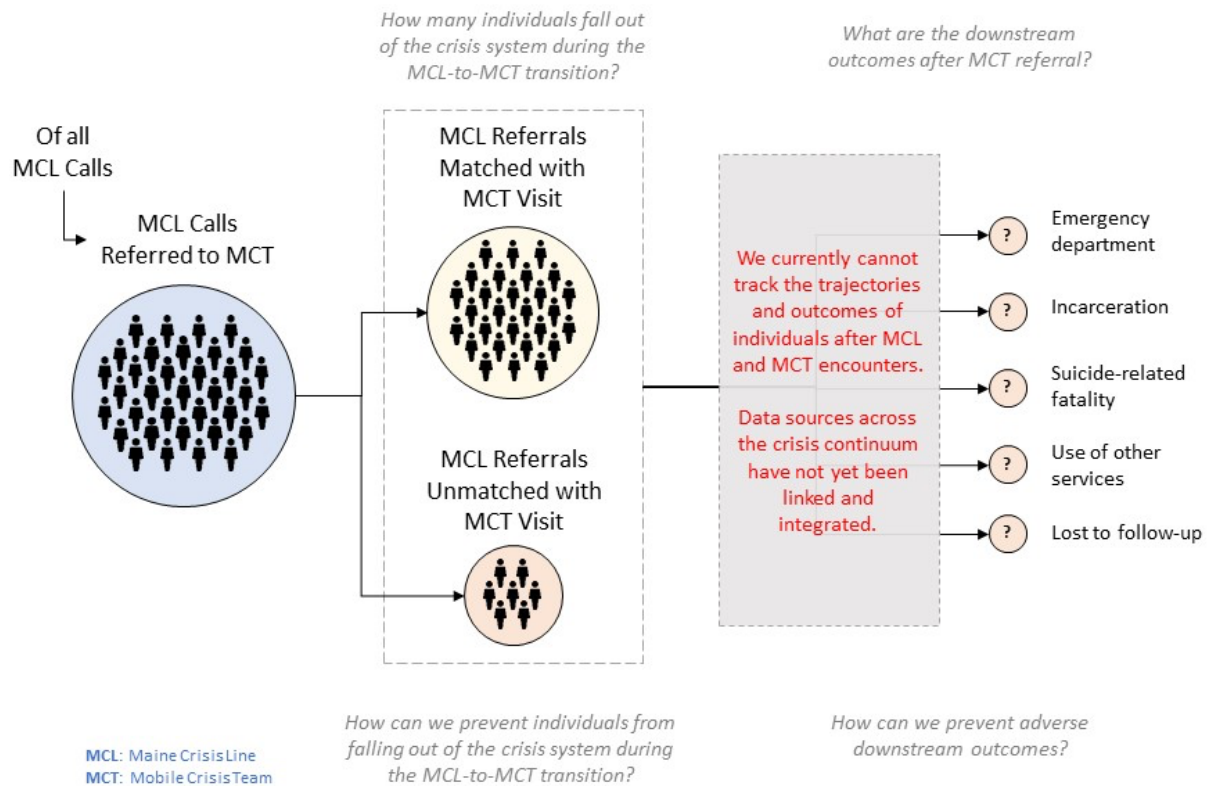


Figure 5. Use case for analyzing crisis system flow. Examining the transition between the Maine Crisis Line to Mobile Crisis Teams to identify potential barriers to care and assess downstream outcomes.

The MCL and MCT are core parts of the crisis system, and understanding their interface is key to understanding how they function in providing supportive, least restrictive care and promoting improved outcomes for individuals in crisis. Coordination between these services—ensuring that individuals in crisis screened by the MCL are appropriately referred to MCT visits and that such connections are not missed—is crucial to ensuring that patients get appropriate care, get care in the least restrictive settings, and do not lose trust in the crisis system.

Data tools for informing decisions around the MCL-MCT interface are currently limited by issues with linking data across those systems and linking individuals across other systems of care after their encounters with the MCT. These system limitations preclude an awareness of how many people are lost

during the MCL-MCT transition, and why, leaving stakeholders with anecdotes but little empirical data to quantify the problem and support root cause analyses. Difficulty linking individual outcomes after their encounter with the MCT limits an awareness of downstream outcomes, particularly for those who may fall out of the crisis system.

An integrated crisis data system would provide a measure of the performance and coordination between the MCL-to-MCT transition and provide a deeper understanding of downstream outcomes of individuals following MCL and MCT encounters and provide insight into how crisis system services influence those longer-term trajectories. Existing data linkages could provide an opportunity to examine the interface between the MCL and MCT crisis services. OIT resources could help expand an integrated crisis data system to help capture patient experiences across the crisis continuum.

Improving the MCL-MCT data interface and expanding data systems to capture longer-term flows of patients across the crisis system would help identify issues with transition to MCT for further investigation and action to address the issues, and help identify opportunities for diversion away from adverse downstream outcomes.

5.3 CONCEPT 3: CRISIS SERVICE NEED MAPPING

Guiding Questions

1. How can crisis services reach individuals who experience crisis but do not currently use the crisis system?
2. What are the geographic areas in Maine where there are unmet needs for crisis services?
3. How should resources for crisis care be allocated across Maine to match area-level need?

Integrating area-level data across the crisis continuum can help identify geographic areas with unmet need for crisis services. Siloed crisis system data quantify utilization of core crisis services (MCL, MCT, CRC). These data may not include the population that does not utilize crisis services – for reasons related to access, stigma, or awareness of the services. Data integration across diverse crisis-related data sources at the area-level (e.g., district, county, city or town) could provide insights into unmet need for crisis services. Existing community health surveys can map out the area-level prevalence of upstream risk factors for crisis among the general population (e.g., prevalence of depression, suicidal ideation, or inadequate access to outpatient mental health services), while downstream safety-net service utilization in a region may indicate under-resourced crisis services (e.g., incidence of crisis-related incarceration, emergency department utilization, or suicide-related mortality). Combining upstream risk factors and downstream consequences of crisis enhance our understanding of the individuals not captured in the crisis service utilization data. These integrated data would enable more holistic assessments of strengths and vulnerabilities across

communities in Maine, as well as a greater awareness of where there are discrepancies between crisis service utilization and crisis service need.

Other states have employed integrated crisis data to examine intersections of need to make informed decisions about the geographic distribution of crisis services. For example, the Colorado Office of Behavioral Health (COBH) used integrated data to characterize population level crisis risk factors, crisis service availability and accessibility, and crisis service utilization [6]. Through the analysis of these three domains, the COBH identified geographic areas of need and allocates crisis resources accordingly. For further information, Appendix C gives a detailed description of the COBH's methods in conducting their behavioral health needs assessment.

Mapping measures of unmet need for crisis services would inform more equitable allocation and expansion of crisis services. Generating measures of need for crisis services would support decisions related to improving access among those who may not be interacting with the crisis system. These decisions may impact a range of interventions such as increasing regional staffing, prevention programs, and outreach efforts. As the crisis system grows, mapping crisis service need would allow decision-makers to expand and locate new crisis services to match the need of communities and regions across Maine. Disseminating these maps will also empower regional communities across Maine to (1) supplement their current understanding of their crisis services and (2) support advocacy in receiving adequate and appropriate resources to bolster their crisis care delivery efforts.

Maine can leverage several existing data sources and examples from past efforts to characterize crisis service need and opportunities to expand crisis services. Maine can build on a wealth of existing area-level data. The Maine Community Health Needs Assessment is a valuable resource for accessing population and health survey data that could help characterize regional risk factors for crisis. Particularly, the Maine Integrated Youth Health Survey (MIYHS) provides promising community health survey data that quantifies county-level indicators related to mental health and suicidal ideation in Maine's general population 18 years old and under [7]; it is not limited to those who have already accessed the crisis system. Additionally, syndromic surveillance tools developed by Maine CDC—such as the Emergency Department Surveillance of Nonfatal Suicide-Related Outcomes (ED-SNSRO) dashboard—provides county-level indicators of downstream indicators of need, representing the population of those who experience crisis and end up in the emergency department [8].

Similar needs assessments have been conducted in Maine to understand burden and resources around opioid-related deaths [9]. Consultants from Public Consulting Group, Inc. partnered with Maine CDC, Maine OBH, the University of Maine, and other data owners across several agencies in Maine to integrate and analyze county-level data characterizing vulnerabilities and strengths related opioid outcomes. Lessons learned from this past effort assessing need for opioid-related behavioral health services can inform a future application to assess crisis system needs.

5.3.1 Context-specific example: Characterizing regional need for youth crisis services

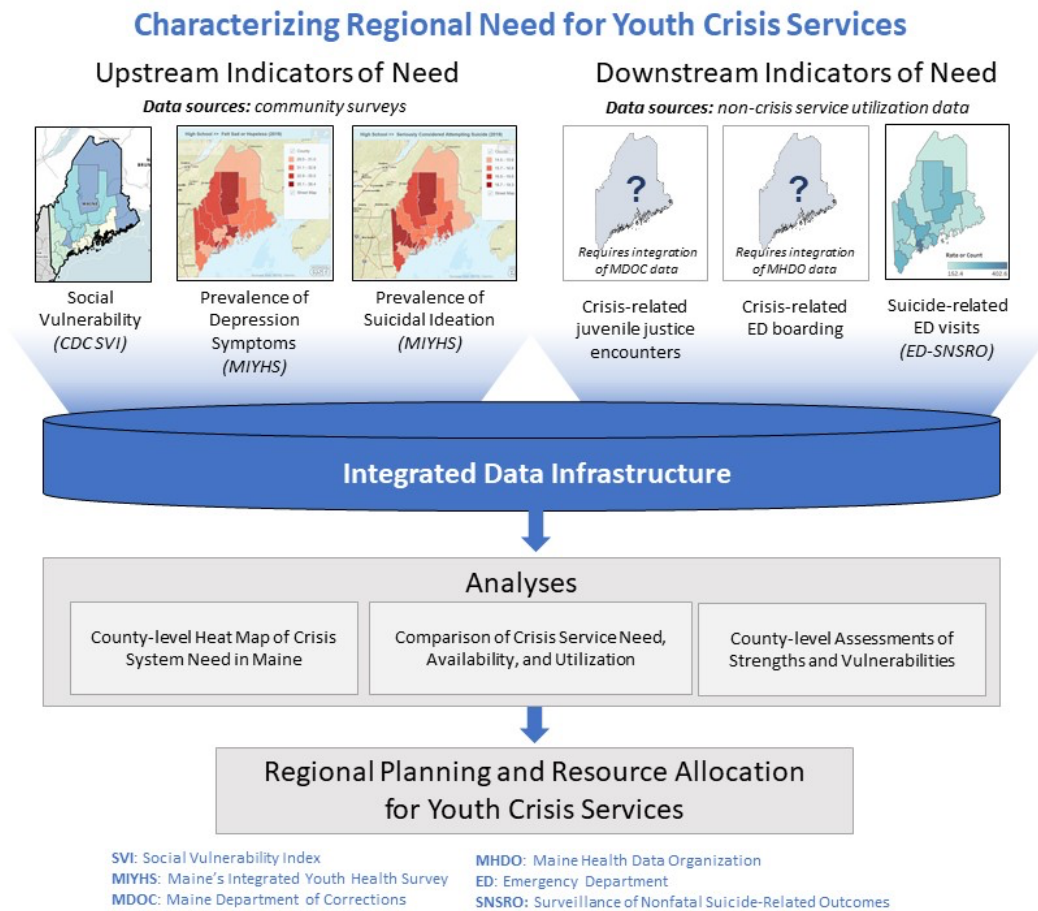


Figure 6. Use case for mapping crisis service need. Integrating youth crisis indicators to inform regional planning and resource allocation for youth crisis services.

Youth in Maine are one population that could benefit from targeted crisis service expansion efforts. In 2021, 33.6% of high school students in Maine reported persistently poor mental health within the last 30 days [10]. Furthermore, across Maine in 2022, the rate of emergency department visits related to suicide attempts among youth under 20 years old was 51 per 10,000 emergency department visits, the highest rate of any age group [8]. These statistics highlight the need for effective allocation of youth crisis services. While youth crisis service utilization in Maine is well known, there is limited understanding of the underlying need for crisis services, especially among youth not currently interfacing with the crisis system. An integrated data system enables a more comprehensive understanding of the need for crisis services,

enabling data-informed decisions around the most impactful and equitable strategy for expanding crisis services. Leveraging integrated crisis data to quantify crisis service need could inform the allocation of mental health resources for youth, such as school-based suicide prevention programs or peer support groups, and produce the most effective outcomes.

Geographically mapping measures of behavioral health service need are crucial for addressing adolescent mental health crises across different regions in Maine. Integrating area-level factors can help characterize the need for youth crisis services. Maine has valuable resources, such as the Maine Integrated Youth Crisis Survey, that could help characterize upstream risk factors for crisis such as the area-level prevalence of feeling sad or hopeless, adverse childhood experiences, and suicidal ideation. Maine could also leverage surveillance data, such as the ED-SNSRO dashboard, to characterize downstream indicators of crisis service need. Utilizing measures of socioeconomic risk factors, similar to the CDC's social vulnerability index, could identify intersecting social determinants of health to inform comprehensive and appropriate crisis services [11].

Evaluating the intersection between crisis service need, availability, and utilization will produce the clearest picture of where and how to allocate youth mental health services. Mapping the locations of youth mental health providers and clinics can help identify regions of Maine that lack access to adolescent mental health care. Utilizing an integrated data system to geographically plot key metrics will enhance Maine's capability to make decisions regarding mental health service allocation for adolescents. Appendix C outlines potential data sources from Maine stakeholders that could be included in an integrated system.

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6. RECOMMENDATIONS

Facilitate Cross-Agency Collaborations by Constructing Crisis Data Catalog

Stakeholders and data owners across the crisis continuum should aim to catalog the existing crisis data sources. This crisis data catalog should be accompanied with assessments of data characteristics, data quality and data sharing processes of each source (e.g., key indicators, geographic resolution and extent, time resolution, reporting frequency, reporting lag, etc.). Constructing such a catalog would serve two purposes. First, the process of cataloging crisis data would serve as a structured task to stimulate initial discussions among crisis data stakeholders; such a process would lay the groundwork for productive cross-agency collaborations. Second, the catalog itself would serve as a tangible product that can be continuously shared and updated to promote collective awareness among stakeholders. A centralized crisis data catalog could inform key meetings and broad inter-agency communication, creating a shared understanding of existing data resources, data gaps, and potential areas for improvement. Findings and dialogue generated from the crisis data catalog would serve as a foundation to begin discussions around formal data governance policy for shared crisis data.

Leverage Existing Efforts and Assets in Maine to Build Infrastructure for Data Integration Across Crisis Continuum

The State of Maine should leverage its existing technical resources for designing and building an integrated data infrastructure for the crisis system. Specifically, Maine OIT has extensive expertise in building data systems that integrate the data silos across various departments across Maine government. Crisis system stakeholders should partner with Maine OIT to begin discussions and planning around the most appropriate design for an integrated crisis data system. The design and planning phase can be informed by the cross-agency effort to catalog crisis data, integrating considerations around shared decision-making priorities, information needs, data sources and data sharing processes, and privacy concerns.

Start to Develop Parts of Integrated Crisis Data System with Most Accessible and Highest Quality Crisis Data

Existing crisis data sources will enable opportunities to iteratively build parts of an integrated crisis data system as it is being developed. The State of Maine should begin prototyping minimally viable products that could serve two purposes. First, initial prototypes would demonstrate the utility of an integrated crisis data system; this would help elicit feedback and promote buy-in among crisis system stakeholders to encourage long-term development. Second, initial prototypes would provide novel, decision-relevant information to support immediate improvements to the crisis system.

One potential starting point for prototyping is the data-to-decision analysis highlighted in Concept 3: mapping need for youth crisis services. This concept has these least restrictive requirements for personally identifiable information, as it integrates data at the area level (e.g., counties) rather than the individual level. The Maine Integrated Youth Health Survey also presents a critical data source for quantifying upstream risk factors for the specific application to youth crisis services.

Another potential starting point is Concept 2: examining the flow between MCL and MCT. These datasets already have unique identifiers to link data at the crisis event-level. Such linkages would enable a preliminary examination of the opportunities and challenges of analyzing integrated crisis data. Additionally, this effort can naturally extend to integrate emergency department claims data, as these data are readily available through MHDO.

Engage with Collaborators in the Maine OBH Division of Substance Use Disorders

The State of Maine has invested substantial resources into integrating data to inform behavioral health services around opioid overdose prevention. Crisis system stakeholders should engage with collaborators in the OBH division of substance use disorders in order to (1) apply lessons learned from existing data integration efforts in an adjacent behavioral health context and (2) explore potential synergies in combining data integration efforts across the contexts of substance use and behavioral health crisis. The ongoing effort to development a Master Data Repository and journey mapping tools for substance use disorder services would provide invaluable insights for the crisis context. In order to formalize potential collaborations, stakeholders should explore funding opportunities to build out a use case at the intersection of crisis and substance use disorder.

Invest in Internal Workforce of Data Analysts and Partner with External Institutions to Advance Analytical Tools

Maine OBH should expand and train its internal workforce of data scientists to streamline and automate processes for data cleaning, integration, and analysis of protected health information. Strengthening this internal capacity would facilitate efforts to build and manage an integrated crisis data system in partnership with Maine OIT. The internal capacity to produce clean and timely crisis datasets would also facilitate the development of data-to-decision analytics highlighted in this report. Maine OBH should couple this internal capacity with external partnerships (e.g., academic collaborations) to advance more cutting-edge analytics and epidemiological tools, further maximizing the impact of integrated crisis data.

APPENDIX A: ASSESSING POTENTIAL IMPLEMENTATION OPTIONS FOR INTEGRATED DATA INFRASTRUCTURE

The Integrated Crisis Data System imagined by this report could be architected in a variety of ways. This appendix lays out two possible architectures and highlights their relative strengths and weaknesses.

Architecture 1: Federated Data

In the Federated Data architecture, requests from validated data users would be forwarded to and served by the actual data owners. This allows the data owners to maintain tight control over the uses of their data. Note that the integration infrastructure does not store copies of data from the federated data sources.

Vision #1 for Integrated Data Infrastructure: Federated Data

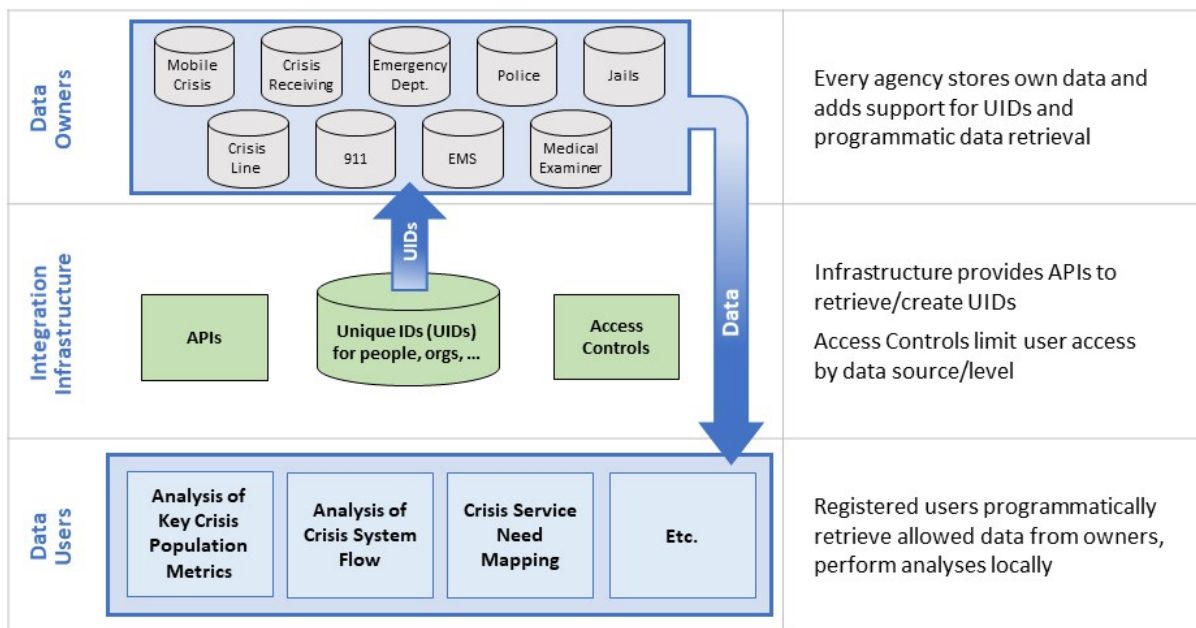


Figure A1. Diagram of federated data architecture for integrating crisis data in Maine.

Architecture 2: Aggregated Data

In the Aggregated Data architecture, the integration infrastructure would store curated data pulled from the data owners. Data requests would be served from this cleaned, de-duplicated data store. This reduces the data owners' control over the data, but allows every data user to view the same curated data, leading to replicable analyses.

Vision #2 for Integrated Data Infrastructure: Aggregated Data

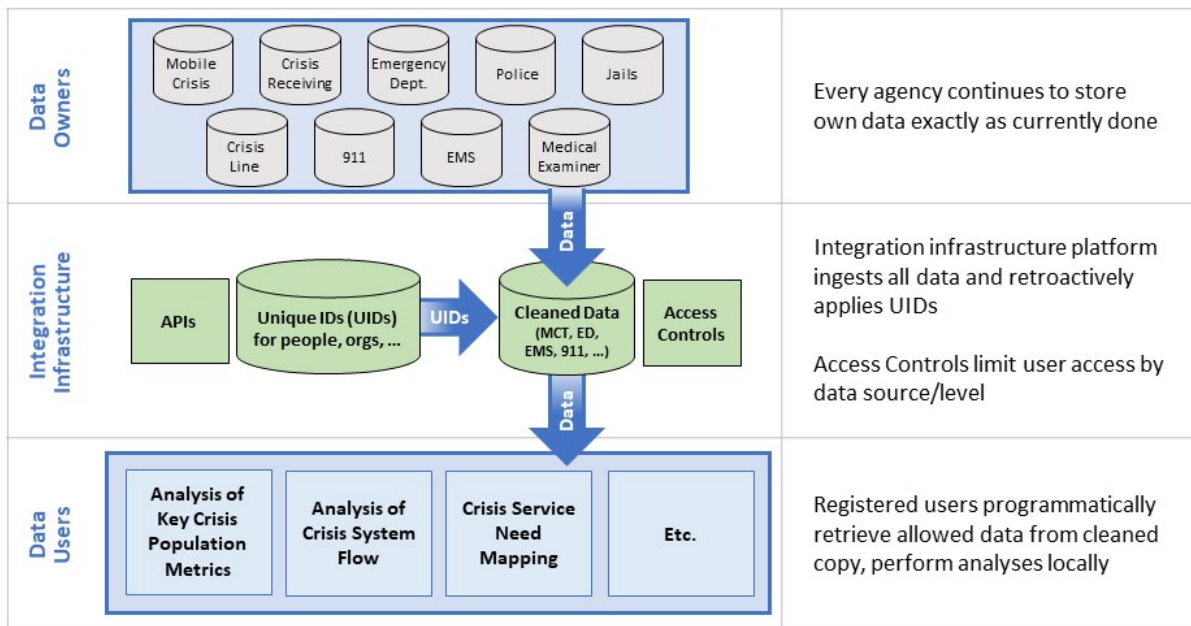


Figure A2. Diagram of aggregated data architecture for integrating crisis data in Maine.

Architecture Comparison

The following table compares the two proposed architectures. Text in green indicates a relative advantage of one architecture over the other.

Table A1

Comparison of Federated and Aggregated Data Architecture for Integrating Crisis Data

Architecture #1: Federated Data	Architecture #2: Aggregated Data
Every data owner must update schemas and apply UUIDs at data entry time	No changes to existing schemas or data entry workflow
Data owners need to call UUID API at data entry time, so tooling changes are required	No changes to data entry workflow
Data owners can limit access to data	Data owners delegate data access controls to integration infrastructure
Exactly one copy of data, so master data is clear	Two copies of data, so master data is less clear
No need to merge new/changed data records	Need to periodically merge new data records from owners, apply edits to old records
Data owners know exactly who is using their data	Data owners lose ability to track who uses their data (without additional feedback from the integration infrastructure)
Records in every silo will have UUIDs attached, improving data quality everywhere	Individual silos are unimproved, and only the integrated data is improved
Assignment of UUIDs at record creation time will increase data quality	Integration infrastructure will need to use heuristics to apply UUIDs, lowering data quality
Ad hoc data cleaning protocols	Consistent data cleaning protocols
MHDO data dictionary could be extended to include each data source	Integrated data could be sole data source for MHDO data dictionary
Changes to systems can be made incrementally	Changes to systems can be made incrementally

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APPENDIX B: LANDSCAPE OF LAW ENFORCEMENT DIVERSION PROGRAMS

This section explores the landscape of law enforcement diversion programs across the U.S.

Pre-arrest diversion programs, such as crisis intervention teams and co-responder models, involve trained professionals working alongside law enforcement officers to handle calls involving mental health crises, substance abuse, or homelessness. Post-arrest diversion programs may involve alternatives to traditional prosecution, such as drug courts, mental health courts, or restorative justice programs. Specialized diversion programs target specific populations, such as veterans, individuals with mental health or substance abuse disorders.

Across various states and cities, law enforcement diversion programs have emerged as innovative and effective alternatives to traditional policing for nonviolent situations involving mental health crises, substance abuse issues, and homelessness.

Examples of Law Enforcement Diversion Programs Across Different States and Cities:

Oregon. CAHOOTS (Crisis Assistance Helping Out on The Streets) is an innovative crisis intervention program in Oregon that provides an alternative to traditional policing for nonviolent situations. Dispatched by the White Bird Clinic, CAHOOTS teams consisting of a medic and a crisis worker respond to a variety of crises, including mental health issues, substance abuse problems, and homelessness [12]. Their primary aim is to de-escalate situations and offer immediate on-site assessment, intervention, and referral services, such as transportation to mental health facilities and crisis counseling. CAHOOTS has proven to be cost-effective and has gained recognition for its compassionate and effective care, leading to its replication in other cities across the state.

Boston. The BEST (Behavioral Emergency Services Team) is a crisis intervention program that operates in various locations, including Boston, Massachusetts. The program is designed to provide specialized and immediate assistance to individuals experiencing mental health crises. BEST teams typically consist of mental health professionals, such as therapists or social workers, who are trained in crisis intervention techniques [13]. They work collaboratively with law enforcement officers to respond to crisis calls and provide on-site assessment, de-escalation, and referral services. The goal of the BEST team is to ensure the safety of the individual in crisis while connecting them with appropriate mental health resources for further support and treatment. The program aims to provide a compassionate and effective response to mental health emergencies and reduce the reliance on law enforcement in such situations.

California. California has implemented a crisis intervention team (CIT) program called the Mental Health Evaluation Team (MHET). The MHET program is designed to enhance the response to individuals experiencing mental health crises and promote de-escalation, appropriate assessment, and referral to

behavioral health services. The MHET teams typically consist of mental health professionals, such as licensed clinicians or psychiatric emergency response teams, who work in collaboration with law enforcement officers. When a mental health crisis is reported, the MHET teams are dispatched to the scene to provide specialized assessment and intervention. They aim to ensure the safety of both the individuals in crisis and the responding officers, while also facilitating access to appropriate mental health care.

APPENDIX C: CONCEPTS FOR CRISIS SERVICE NEEDS ASSESSMENT (COLORADO EXEMPLAR)

In this section, we highlight crisis service needs assessment conducted in Colorado. We then envision how the State of Maine could leverage its existing resources to conduct and build upon a similar approach to identify areas with the highest need for youth crisis services.

Exemplar: The Colorado Department of Human Services, Office of Behavioral Health

The Colorado Department of Human Services, Office of Behavioral Health (COBH) utilized a robust data system, which allowed for a thorough assessment of Colorado's crisis service needs. The COBH integrated state population health surveys, health insurance claims data, service directories, and various demographic characteristics in order to analyze the need, reach, and effectiveness of behavioral health services [6]. Using this data, the COBH was able to map and visualize regional crisis service need and identify gaps in allocation. The analysis was categorized into three domains: population level crisis risk factors, crisis service availability and accessibility, and crisis service utilization. To assess regional crisis risk factors, the COBH mapped key indicators including the rate of behavioral health emergency department (ED) visits, the percentage of adults experiencing poor mental health days, the concentration of socially vulnerable populations, and the rate of suicide deaths. To determine service availability and accessibility, the COBH overlaid data reflecting locations of providers who accept Medicaid, locations of community mental health centers, and structural barriers that would result in underutilization of services such as lack of transportation. The COBH also evaluated service penetration, a measure of how many people with need actually receive care, through insurance claims data. In their analysis of behavioral health data, the COBH ascertained that rural and frontier communities were of highest need based on the overlap between gaps in service coverage and higher social vulnerability, informing the future allocation of mental health resources [14].

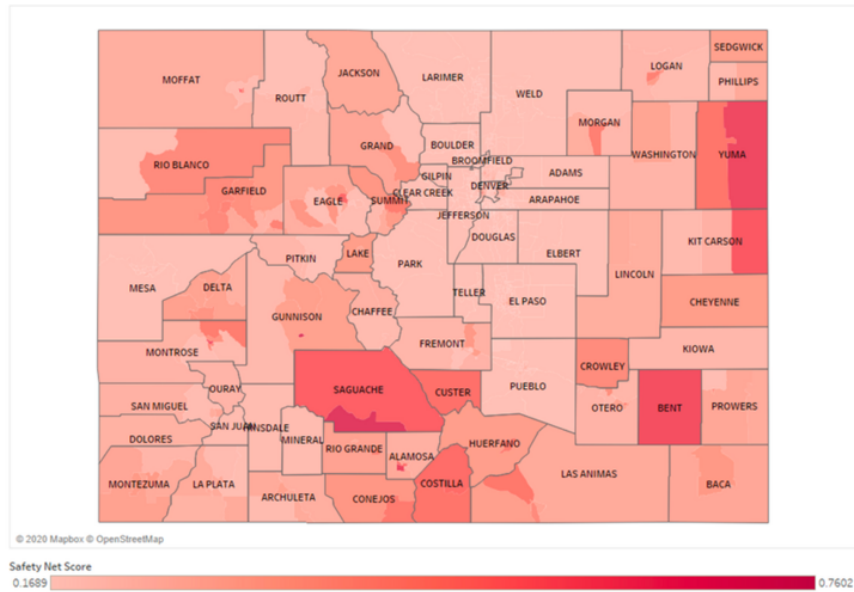


Figure A3. Safety net population score by neighborhood in Colorado. Figure imported from Colorado crisis needs assessment (data source: American Community Survey, five-year estimates, 2014–2018).

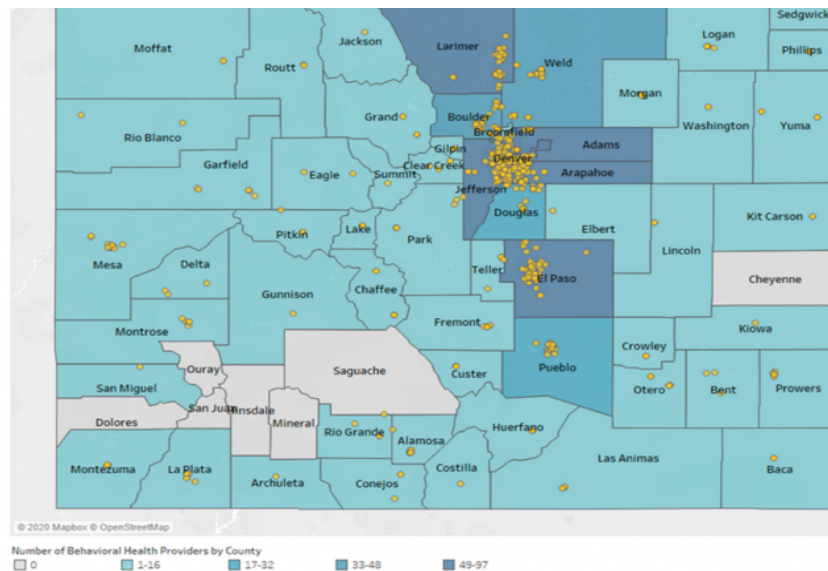


Figure A4. Health First Colorado providers billing behavioral health services. Figure imported from Colorado crisis needs assessment. (Data source: Health First Colorado [Medicaid] Provider List, May 2020).

The COBH first mapped safety net population scores and the locations of Medicaid providers who bill for behavioral health services. The safety net scores were calculated based on certain socioeconomic characteristics including uninsured, Medicaid/high deductible insurance plan enrollment, geographic isolation, low income (under 300% of federal poverty level), and language or cultural barriers. In Figure A3, the darker color indicates higher safety net scores (i.e., more marginalized populations). In Figure A4, there is a higher concentration of providers in urban areas like Denver and El Paso. When looking at these two figures in conjunction, one can conclude that there are fewer behavioral health providers in areas of higher social vulnerability.

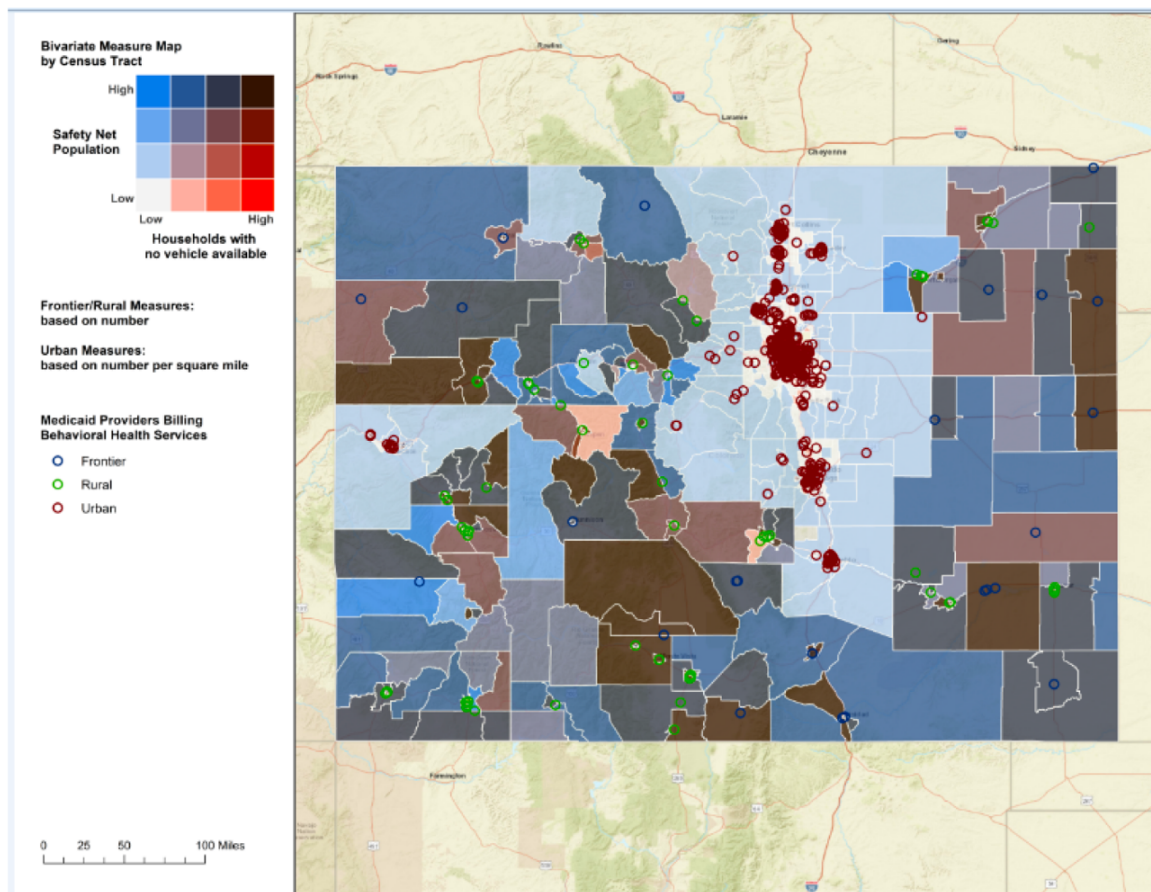


Figure A5. Safety net population scores, households with no vehicle available, and Medicaid provider locations in Colorado (N=744). Figure imported from Colorado crisis needs assessment. (Data sources: Health First Colorado [Medicaid] Provider List, May 2020, and American Community Survey, five-year estimates, 2014–2018).

The COBH then created an overlaid map (Figure A5) that integrated the previous two figures and a metric measuring households without a vehicle. Interpreting this map allowed the COBH to conclude that populations with high safety net scores also do not have access to vehicles, and that there are fewer behavioral health Medicaid providers located in these areas of high vulnerability. Areas considered rural or frontier were of highest need. The information from this integrated data allows the COBH to effectively plan for the allocation of mental health services.

Envisioning a Solution: Using Data to Assess Youth Mental Health in Maine

Integrating crisis data would enable Maine to characterize and assess the youth mental health crisis service delivery and planning. The intersection between crisis service need, availability, and utilization, will produce the clearest picture of where and how to allocate youth mental health services. Service need could be quantified through measures of socioeconomic risk factors and could identify at risk youth who are not currently involved in the crisis system. This would involve the integration of data from the Maine Shared Community Health Needs Assessment and include factors like household income, uninsured residents, and primary care visits that were more than 30 miles from patient's home [15]. Mapping the locations of youth mental health providers and clinics can help identify regions of Maine that lack access to adolescent mental health care. For Maine, potential data sources include the MaineCare provider directory and SAMHSA's Behavioral Health Treatment Services Locator [16, 17]. To assess youth mental health care utilization, service penetration is a key metric that quantifies how many people with need receive care within a population. Integration of Maine insurance claims data from the Maine Health Data Organization—the all-payer claims database—can be used to determine service penetration [18].

GLOSSARY

API	Application Programming Interface
CDC	Center for Disease Control and Prevention
CRC	Crisis Receiving Center
DHHS	Department of Health and Human Services
ED-SNSRO	Emergency Department Surveillance of Nonfatal Suicide-Related Outcomes
EMS	Emergency Medical Services
MCL	Maine Crisis Line
MCT	Mobile Crisis Team
MDR	Master Data Repository
MHDO	Maine Health Data Organization
MIYHS	Maine Integrated Youth Health Survey
OADS	Office of Aging and Disability Services
OBH	Office of Behavioral Health
OCFS	Office of Child and Family Services
OCME	Office of Chief Medical Examiner
OIT	Office of Information Technology
OMS	Office of MaineCare Services
SAMHSA	Substance Abuse and Mental Health Services Administration
UPI	Unique Person Identifier

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14. ABSTRACT <i>This report proposes a vision for an integrated crisis data system to address the current challenges associated with data-informed decision-making in Maine's behavioral health crisis system. The report aims to stimulate and inform discourse among stakeholders across the crisis continuum to collectively envision the possibilities, impacts, and challenges in developing such an integrated crisis data system. The report should serve as a starting point to further develop and refine these ideas to fit the needs of stakeholders across the crisis continuum.</i>					
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