Toolkit for *From Silos to Superhighways*

A Framework for Public Health Data Modernization

About the Authors

Zach Finn
Senior Technical Architect – Ruvos
Founder & President – Data Finn

Zach is the founder and President of Data Finn, a boutique data consulting firm that specializes in studying the U.S. healthcare system and developing innovative ways to improve it. In addition to leading Data Finn, he serves as a senior technical architect at Ruvos, a national leader in public health informatics and health information technology. His work in Health IT began in 2005 when he led the creation of one of the nation's first Health Information Exchanges (HIE) in northern Florida, The Big Bend Regional Healthcare Information Organization.

A nationally recognized advisor, Zach has provided expertise to HIEs, state public health agencies, and hospitals across the country. His recent focus has been on Data Modernization Initiatives, working with states including Vermont, Idaho, Missouri, New Jersey, and Florida. He also shares his knowledge as an adjunct professor at Florida State University, where he teaches Advanced Health Informatics when time allows.

Jeff Couch
Managing Partner – Ruvos

Jeff is a co-founder and Managing Partner at Ruvos, leading the company's strategic direction in public health data modernization and healthcare technology solutions. He plays a hands-on role in shaping Ruvos' approach to data interoperability, security, and infrastructure modernization, ensuring that public health agencies and healthcare institutions can effectively harness the power of data.

With extensive experience in complex data ecosystems, Jeff works closely with partners to design scalable, secure, and forward-thinking solutions that support national and state-level modernization initiatives. He provides direct guidance on cloud strategy, data governance, and interoperability, helping organizations navigate evolving technical landscapes. Under his leadership, Ruvos has expanded its capabilities in cloud computing, cybersecurity, and data science, reinforcing its position as a trusted partner in public health innovation.

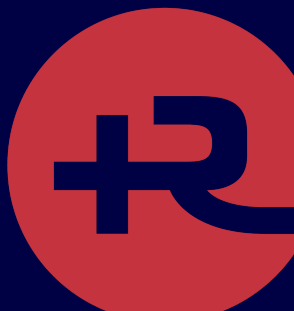
Welcome!

This toolkit is a supplement to *From Silos to Superhighways – A Framework for Public Health Data Modernization,* which lays out an ambitious but attainable vision of what a modern public health data system can optimally look like and provides time-tested goals and guidelines for getting there.

The toolkit provides practical support for two of the core lines of action proposed in the framework. It features a live spreadsheet which includes:

- a register for recording the current state of your data systems
- a matrix to facilitate scoring and prioritizing your modernization options

The authors are happy to discuss any questions you may have. Feel free to reach out at hello@ruvos.com.



In This Document...

Toolkit

This toolkit provides supplementary materials to support efforts described in *From Silos to Superhighways – A Framework for Public Health Data Modernization*.

Working Spreadsheet

Below is a link to a spreadsheet file that contains a system registry and prioritization matrix, essential tools for assessing and prioritizing systems during a modernization initiative.

Spreadsheet link: PublicHealthDataModernizationFramework-SystemRegistry-Prioritization...

The system registry facilitates creation of a comprehensive inventory of systems, capturing critical information to facilitate informed decision-making. It allows you to document key details about each system, including its functionality, significance, and current state. This registry serves as the foundation for a thorough analysis, enabling stakeholders to understand the landscape of existing systems and identify those that require modernization.

The prioritization matrix provides a structured framework for scoring and ranking systems based on various qualitative factors and alignment with modern architectural principles. The tool facilitates a systematic approach to evaluating and prioritizing systems. By capturing scores for modern architecture alignment as well as value and effort factors, this matrix helps ensure that modernization efforts are focused on the most critical and impactful systems. The matrix provides a clear, transparent method to rank each system, facilitating strategic decision-making and efficient resource allocation.

Together, the system registry and prioritization matrix exemplify best practices in system assessment and prioritization, offering a practical guide for jurisdictions undertaking modernization initiatives. These tools can be customized to meet the specific needs and priorities of your organization, ensuring a tailored and effective approach to system modernization.

Refer back to the scoring rubric section of *From Silos to Superhighways – A Framework for Public Health Data Modernization* and review the scoring example below when utilizing the prioritization matrix. For ease of reference, keep this document handy while working with the spreadsheet to review concepts and understand point values while working through your systems.

System Scoring Example for the Prioritization Matrix

The prioritization matrix uses a scoring rubric to evaluate systems based on ***value factors***, ***effort factors***, and ***modernization area alignment***. Here's a breakdown of the scoring with examples:

Value Factors (Positive Points)

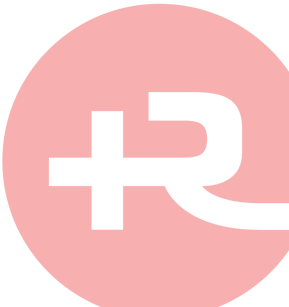
These factors measure the benefits of modernizing a system.

Cross-Program Insight Value (0 to +10)

- Definition: Evaluates the potential for a system's dataset to provide value across multiple public health programs.
- Scoring Example:
  - High Score (+10): A disease surveillance system used by multiple departments for outbreak detection and Medicaid claims processing.
  - Medium Score (+5): A system with datasets that are useful primarily within one program but have some external value.
  - Low Score (+0): A program-specific tool with limited integration potential.

Workforce Automation Value (0 to +10)

- Definition: Measures how modernization will reduce manual effort and streamline processes.
- Scoring Example:
  - High Score (+10): A system that heavily relies on manual data entry and could benefit from automated workflows.
  - Medium Score (+5): A system where some manual processes exist but modernization provides moderate time savings.
  - Low Score (+0): A mostly automated system requiring minimal additional improvement.



Data Quality Value (0 to +10)

- Definition: Assesses the baseline quality of the system's data, considering completeness, accuracy, and documentation.
- Scoring Example:
    - High Score (+10): A well-documented dataset with automated validation and minimal manual corrections needed.
    - Medium Score (+5): A dataset with moderate duplication and inconsistencies but good potential for cleanup.
    - Low Score (+0): A dataset with significant quality issues, requiring major effort to standardize.

Effort Factors (Negative Points)

These factors assess the complexity and challenges of modernization.

Technical Architecture Effort (-10 to 0)

- Definition: Evaluates the complexity of the system's current infrastructure and the ability to work with it.
- Scoring Example:
    - High Score (-10): A legacy system running on unsupported software with poor documentation.
    - Medium Score (-5): A system requiring significant updates to integrate with modern cloud technologies.
    - Low Score (-0): A relatively modern system with existing cloud compatibility.

Data Sharing Effort (-10 to 0)

- Definition: Measures the difficulty of establishing data-sharing agreements and governance.
- Scoring Example:
    - High Score (-10): A third-party-hosted system with restrictive contracts and complex governance requirements.

- Medium Score (-5): A state-managed system with moderate legal and governance hurdles.
- Low Score (-0): A system with straightforward agreements and existing sharing mechanisms.

Dataset Dependency Effort (-10 to 0)

- Definition: Evaluates dependencies on third-party systems or other datasets.
- Scoring Example:
  - High Score (-10): A system that relies on proprietary datasets or requires integration with multiple external platforms BEFORE it can be valuable.
  - Medium Score (-5): A system with manageable dependencies, such as state-managed datasets.
  - Low Score (-0): A self-contained system with no external dependencies.

Modernization Area Alignment (Positive Points)

Each system is evaluated for its alignment with five key modernization areas (MA1-MA5). A system's score is derived by assessing its compatibility and potential benefits within each area. Scores range from +0 (no alignment) to +10 (strong alignment) for each area, with a maximum possible score of +50 across all areas.

MA1

Scalable Data Pipelines (0 to +10)

This area evaluates whether the system would benefit from modular, automated data pipelines that reduce manual data handling and increase scalability.

- Scoring Considerations:
  - Does the system ingest large volumes of data from diverse sources?
  - Is there a need for real-time or near-real-time data ingestion?
  - Does the system currently rely on manual processes or point-to-point connections that could be streamlined?

- Example Scores:
  - +10: A disease surveillance system receiving real-time lab results from multiple healthcare facilities.
  - +5: An immunization registry processing batch uploads weekly.
  - +0: A static dataset manually updated once a year.

MA2

Data Lakehouse (0 to +10)

This area measures the system's alignment with centralized storage for structured, semi-structured, and unstructured data.

- Scoring Considerations:
  - Does the system have datasets that would benefit from being centralized in a data lakehouse?
  - Can the system's data be enhanced for use across multiple programs?
  - Are there limitations (e.g., legacy constraints, regulatory concerns) that prevent lakehouse integration?
- Example Scores:
  - +10: A statewide immunization registry needing centralized access for public health agencies and Medicaid.
  - +5: A program-specific system with some potential for shared use.
  - +0: A self-contained system with no need for external data sharing or centralization.

MA3

Secure Data APIs (0 to +10)

This area assesses whether the system would benefit from APIs for secure, standardized data sharing.

- Scoring Considerations:
  - Does the system need to exchange data with other public health programs or national networks?
  - Are there frequent manual processes or custom integrations that could be replaced by APIs?
  - Would secure APIs simplify data retrieval, reporting, or compliance?

- Example Scores:
  - +10: A vital records system reporting to federal networks like STEVE and Medicaid Enterprise Systems.
  - +5: A system with occasional data-sharing needs but limited external integration.
  - +0: A standalone system not designed for or requiring external data access.

MA4

Shared Data Quality and Analytics (0 to +10)

This area evaluates the system's ability to benefit from shared data enhancement services (e.g., data quality checks, AI/ML-driven analytics).

- Scoring Considerations:
  - Does the system require data linking and reconciliation across multiple datasets?
  - Could the system benefit from enhanced analytics, such as predictive modeling or anomaly detection?
  - Are there geographic or other metadata dependencies that need normalization?
- Example Scores:
  - +10: A disease surveillance system needing integrated analytics and location-based insights.
  - +5: A smaller program using limited analytics for internal reporting.
  - +0: A static dataset not requiring enhancement or advanced analytics.

MA5

Applications in the Cloud (0 to +10)

This area measures whether the system's operational functionality (e.g., user interfaces, business rules) could benefit from cloud migration.

- Scoring Considerations:
  - Does the system have outdated user interfaces or manual workflows that would benefit from cloud-enabled modernization?
  - Is there a need for centralized Identity and Access Management (IAM) for better, easier to manage, user control and security?
  - Could cloud migration improve operational efficiency or user experience?

- Example Scores:
  - +10: A legacy system with significant manual processes and poor user experience, requiring robust IAM.
  - +5: A moderately modern system with some cloud compatibility but limited scalability.
  - +0: A cloud-native system already meeting operational requirements.

Wildcard Factor (+/- Points)

This flexible component adjusts scores based on unique circumstances:

- Example: A system critical for compliance with upcoming regulations might receive +5 wildcard points.
- Conversely, a system with declining usage might receive a -5 adjustment to deprioritize it.

Example Scoring for a Hypothetical System

To wind up our detailed breakdown of scoring for the prioritization matrix, here is an example of scoring for a hypothetical system – a statewide immunization registry.

System: Statewide Immunization Registry

Factor	Score	Rationale
V1: Cross-Program Insight Value	+10	Data is used by multiple programs (Medicaid, schools, public health).
V2: Workforce Automation Value	+6	Modernization would eliminate some manual data entry and streamline workflows.
V3: Data Quality Value	+8	Moderate data quality with some inconsistencies; high potential for cleanup.

Factor	Score	Rationale
E1: Technical Architecture Effort	-5	Existing infrastructure is outdated but manageable.
E2: Data Sharing Effort	-10	Complex agreements required with schools and national databases.
E3: Dataset Dependency Effort	-8	Requires coordination with third-party systems for data ingestion.
MA1: Scalable Data Pipelines	+9	Processes high volumes of vaccination records from multiple healthcare providers in near real-time but some data sources are still manually integrated.
MA2: Data Lakehouse	+10	Centralized storage would allow public health agencies, Medicaid, and schools to access standardized and enhanced immunization records.
MA3: Secure Data APIs	+10	Frequently shares data with schools, public health programs, and national systems, requiring secure and standardized APIs for efficient exchange.
MA4: Shared Data Quality and Analytics	+8	Could benefit from advanced analytics for identifying vaccination trends and gaps, as well as from location services for geographic distribution insights.
MA5: Applications to the Cloud	+9	User interface is outdated and could greatly benefit from centralized Identity and Access Management (IAM) to streamline access for external stakeholders like schools and other agencies.
Wildcard Factor	+5	Regulatory mandates for improved immunization data tracking.

Total Score: +52

This score positions the hypothetical Statewide Immunization Registry system as a high priority for modernization due to its broad value and alignment with strategic goals, despite moderate to high effort requirements.