



Rhode Island navigates an unpredictable pandemic

IBM helps the state generate timely analytical insights for COVID-19 response

by Karen Boush

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In spring 2020, COVID-19 gained a modest foothold in the State of Rhode Island with a relatively low case rate. However, geographic, demographic and socioeconomic factors put the state at high risk for increased transmission. By December, Rhode Island, the nation's smallest state by area, was reporting the highest rates of new cases per capita.

From the pandemic's start, everyone from the governor to public health responders, the media and residents sought accurate, data-driven and timely Covid insights to help them make decisions. They asked a myriad of questions: What is the current rate of transmission? What are the root causes of surge across different population groups? Who is at the greatest risk of contracting the virus and being hospitalized? What types of social, recreational and professional activities contribute to higher transmission? Should K-12 operations be moved online?

Meanwhile, the state's data team worked diligently to provide actionable information from investigations into confirmed cases and from contact tracing and testing operations, hospitalizations and deaths. Yet the pandemic had hit with such speed, the team didn't have the staff or systems in place to efficiently process and analyze the huge volumes of data being submitted from hospitals, labs and other facilities across the state.

"There's a thirst for data, a thirst for the numbers, a thirst for the science behind the decisions we're making," says Joseph Wendelken, Public Information Officer at the Rhode Island Department of Health (RIDOH). "But we needed to collect the data first [from disparate sources] and have it prepared in a way that people could digest."

Time was of the essence. Collaborating closely with the Analytics and AI team at [IBM® Consulting](#), the state immediately brought in several specialists, [built a cloud-based data lake](#) and automated processes to enable faster, more sophisticated and more reliable analysis. Within three weeks, the data team was disseminating deeper Covid insights needed to guide policy and operational decisions and keep the public informed.

Accelerates production of
geospatial analytics from

~3 days

to 4 hours

Provides near real-time
COVID-19 insights to
state leaders, who can
respond within

hours

to update public health policies

Helps close health disparity
gaps by facilitating more

equitable

resource allocation

“IBM has been a game-changer for the Rhode Island Department of Health and for the state on the whole.”

Leanne Lasher, Chief Data Officer,
COVID-19 Response, State of Rhode Island



Health equity first



RIDOH was in many ways well-positioned to help the state respond to a pandemic. It had a national reputation for being forward-thinking. It employed world-renowned infectious disease and other experts, and it collaborated with leading academic and research institutes.

In addition, it had built an extensive network of local and regional community

partners and then capitalized on that network to help launch the Rhode Island Health Equity Zone initiative. Taking a collaborative, place-based approach, the initiative established statewide Health Equity Zones in which community leaders and residents could come together to identify and address the socioeconomic and environmental conditions driving health disparities in their areas.

Still, Rhode Island is the [second most densely populated state](#) (external link) in the US. Plus, a relatively large percentage of Rhode Island's population lives in nursing homes, assisted living facilities and other congregate settings. For these reasons, Rhode Island was especially susceptible to rapid spread of the potentially deadly virus.

Once Covid cases were detected in Rhode Island, former Governor Gina Raimondo put in motion a unified, whole-of-government response to the crisis. She formed the COVID-19 Response Unit, an interagency organization tasked with helping the state mitigate and reduce the virus's impact and spread in Rhode Island.

She collaborated with the state's Equity Council to help ensure prioritization of the specific needs of communities of color, low-income neighborhoods and high-density areas, which were among those hardest hit by the pandemic. In addition, she urged citizens to stay at home, temporarily closed all public schools, and initiated widespread tracing and testing programs.

Raimondo and her leadership team adopted science- and data-driven decision-making as foundational to the state's emergency response and recovery strategies. "The data on case rates and how Covid is impacting different communities throughout the state are really at the heart of every decision we make," says Wendelken.

For example, early in the pandemic, the state used insights gleaned from case and hospitalization rates and other zip-code-based data to identify impacted communities. Then, leveraging Health Equity Zone relationships and infrastructures, it distributed food, masks and other supplies to people isolating in impacted areas and facilitated contact tracing and testing in those areas.

"Something that's unique about Rhode Island is that people really identify with where they live. It's a very community-oriented place ... So we worked very closely with our Health Equity Zones, with city and town governments, to really build that engagement at the local level. That's been consistent throughout the response," says Wendelken.



An urgent need for timely insights



Leanne Lasher, Chief Data Officer of COVID-19 Response for Rhode Island, oversees the Data and Analytics team on the COVID-19 Response Unit. She and her team are responsible for generating daily Covid surveillance data, analytics and insights to be shared internally and with the public.

Previously, Lasher was a Data and Analytics team manager for the COVID-19 Response Unit. During the early months of the pandemic, she and the team built several Covid data systems that pulled information from complex sources. They also developed multiple routine reports to relay relevant statistics and critical insights to state officials, leveraging descriptive and predictive dashboards. Their work helped establish Rhode Island as a leader in data-driven decision-making, including earning the state a top data-quality grade from the [COVID Tracking Project](#) (external link) that monitored public Covid data.



Still, the team relied on cumbersome, often paper-based processes to merge data sets into a single, trusted source of core data needed to produce descriptive statistical reports and geospatial analyses.

“The Covid data systems were set up so quickly and collected in a variety of different manners, so there were many complex data sets. For example, we were collecting lab results from over 40 different testing sites,” explains Lasher. In addition, bugs in the code used to download and merge data sets could take a full day to resolve, she says.

“We were producing an extremely high number of reports and responding to multiple data requests. There was so much information for leadership to digest that we needed a way to synthesize data sets so that we could generate actionable

insights to be disseminated through several channels for leadership and citizens,” says Lasher.

Furthermore, Lasher didn’t have enough staff with the required skills. Her team had been expanded, but turnover rates remained high. Lasher estimates that during the summer months she spent approximately 50% of her time on recruitment and training.

Given these challenges—and an ever-changing pandemic landscape—by August it became clear that Covid response was a few weeks away from experiencing an interruption in its ability to provide consistent and effective data and insights to inform its operation and strategy. The data team needed an urgent inflow of analytics support and robust technologies to continue its mission.

Partnering with IBM



The COVID-19 Response Unit had recently engaged IBM Consulting to help modernize and automate its Covid systems, in part so that K-12 students could return to in-person classrooms in September. Toward this end, IBM helped the state set up a specialty K-12 case investigation and contact tracing team and a K-12 testing call center in two weeks. The department also worked with IBM to establish a COVID-19 Operations Contact Center and launch an online virtual agent for the general public assistance around COVID-19.

As part of this engagement, the unit participated in a two-week design thinking and analytics insights usability workshop with IBM as an initial step for improving the state's data and analytics operations. Using [IBM Enterprise Design Thinking®](#) and other [IBM Garage™](#) methodologies—proven practices that guide organizations through designing, building and scaling solutions for end-to-end transformation—IBM helped the unit assess “as-is” data and analysis processes and map their desired “to-be” state.

In a collective ideation session, participants identified and prioritized the importance of analytics projects and queries the unit hadn't yet had the time, capacity, skills or resources to address. This exercise led to the shared realization that one of the unit's top priorities should be to enable faster, more reliable, near real-time insight generation enabled by a new Covid data lake.

Appreciating IBM's thought leadership, innovative methods and high-quality work, the unit engaged IBM to help it achieve the goals envisioned in the workshop. It also took into account IBM's collaborative, empathetic approach and demonstrated ability to quickly scale analytics.

"I was surprised with how quickly IBM earned my trust ...," says Lasher. "IBM came on board and said, 'Let's learn about this together and talk about the best approach.' So I really felt that they were thought partners in approaching the work. They had a clear process for how they were going to help us with staffing and for knowledge transfer. They had resources available immediately."



Teamwork in action



To facilitate project development, IBM assembled a team of data scientists, data engineers, insights strategists and an insights storyteller to share their expertise and know-how. IBM also contributed

natural language processing and machine learning capabilities and external, non-Covid data sets unique to IBM, such as those containing mobility and citizen behavior insights.

To achieve rapid time to value, the team drew from the [IBM Consulting for AI at Scale](#) services offering—a comprehensive consult-to-operate framework for developing a data strategy, governing data and scaling analytics. Plus, IBM continued to use Garage user-centered, agile methods, including two-week sprint planning processes.

In collaboration with RIDOH, the state's Department of IT and [Amazon Web Services \(AWS\)](#), IBM helped build a platform to support the Covid data lake. The data lake, running on an AWS cloud infrastructure, holds complex case investigation and contact tracing data captured through [Salesforce](#) software. IBM connected the data lake to the Salesforce platform, used for case investigation and contact tracing, so that data sets could be automatically produced and made available at 10 AM every day for generating critical reports. IBM also automated creation of geospatial analytics, which pull from COVID-19 case and other data to highlight concentrated areas of COVID-19 infection in Rhode Island.

“When you already [lack] resources to produce the work, to have that kind of [time] savings is really incredible. So the automation of those systems was a tremendous value to the Department of Health,” says Lasher.

Within the first month of IBM coming on board, the initial iteration of the AWS-based data lake was completed. In addition, the Data and Analytics team and IBM presented a series of key findings to the governor and her cabinet. Insights confirming that community-based spread was responsible for the majority of the state’s COVID-19 cases were shared the next day in a [press conference](#) (external link).

IBM also enhanced RIDOH’s statistical methods so that the Data and Analytics team had access to more variety of descriptive and predictive data science models. Plus, it developed a structure for storytelling with data to rally policy- and decision-makers and subject matter experts around fact-based decision-making.



Data to insights to policy



With the winter months and holiday season fast approaching, the governor and COVID-19 Response leaders next turned their attention to the anticipated surge in infections. To help translate

Covid data to insights to policy, former Governor Raimondo asked one of the Analytics and AI leaders at IBM Consulting to temporarily join her leadership team as chief data officer.

For the next several months, Rhode Island principals worked shoulder to shoulder with IBM to identify existing and emerging data patterns and then put in place appropriate mitigation strategies, including the following:

- Implementing the “Rhode Island Pause,” a three-week period in late 2020 when the state shut down major public events and curtailed other social gatherings to help slow recent spikes in Covid cases and hospitalizations.
- Prioritizing vaccine distribution in early 2021 based on age, preexisting conditions, geographic location and other variables so that limited vaccine supplies could be optimized to help prevent hospitalizations and deaths.
- Allocating testing and treatment resources based on transmission hotspots and near real-time emerging trends.
- Identifying pandemic-fueled disparities in health and healthcare and prioritizing equitable allocation of emergency response services.
- Guiding the state’s economic recovery, including when and where to apply restrictive policies.

Wendelken and his colleagues in the Policy, Information and Communications division within RIDOH also used the insights to help convey the rationale behind the decisions to the media and public, such as for the Rhode Island Pause. “It was important that people understood why we were taking the approach that we were taking, because [for many] it was a huge sacrifice,” he says.

During regular internal meetings, Wendelken gathered with COVID-19 Response team members, including IBM specialists, to review the latest data briefs and put context around the numbers. “I sometimes think about ourselves as data translators ..., and it’s hard to tailor [translations] to people with different levels of data literacy,” he says.

Working with the IBM team on a daily basis, Wendelken didn’t view it as a separate entity. “[They were] partners in our trust ... Having that trust and building those relationships was really foundational to what we were able to do,” he says.





Near real-time, data-driven decisions

RIDOH benefited in several ways from its collaboration with IBM.

First, RIDOH can perform faster, more effective insight generation, including taking advantage of external data sources unique to IBM. For example, some reports, such as geospatial analytics, that used to take four days are now generated in as few as four hours. In addition, the team quickly processed data and reported on up to approximately one million test results per month.

Second, RIDOH can ensure continuity of operations. Having augmented its staff with the right mix of IBM data engineers and data scientists, the Data and Analytics team saved hours of time previously spent on recruiting and training.

Third, with an AWS cloud-based Covid data lake, RIDOH can help the state deliver a robust and systematic response. Rhode Island leaders now have access to high quality, easy-to-comprehend, digestible

and actionable insights generated through complex analytical, descriptive and predictive modeling. As a result, they can use near real-time information to update public health policies and Rhode Island citizens, if needed, within hours.

The state can also use the insights to better address health disparity gaps through effective allocation of vaccines, tests, treatments and other supplies to the hardest-hit areas, in the process strengthening its ties with Health Equity Zone and other community leaders. In addition, it can empower residents with insights needed to better protect themselves, their loved ones and their communities, especially as new Covid variants appear and spread.

“IBM has been a game-changer for the Rhode Island Department of Health and for the state on the whole,” emphasizes Lasher. IBM made it possible for RIDOH to approach analytics with not only new technologies, processes and data sets but also a new mindset.

The collaboration continues. Teaming with the state’s IT department and AWS, with whom it has a strategic partnership, IBM is helping the state further develop and scale the Covid data lake and streamline processes through automation. As the pandemic transitions into an endemic, Lasher and other COVID-19 Response leaders also anticipate working with IBM to evaluate and define data and analytics requirements for a new phase of response focused on recovery. Areas of potential analysis include the impact of COVID-19 on mental health and socioeconomic development within the state.

COVID-19 Response leaders also plan to build and run models that take advantage of the state’s and other data sets to predict future scenarios around COVID-19 infection trends. “The amount of Covid data that [RIDOH] has is tremendous ...,” says Lasher. “We would love to work with IBM to dig into that data.”



About the State of Rhode Island

Most fittingly, “Hope” is the motto of [Rhode Island](#) (external link), home to roughly one million people. Nicknamed the “Ocean State,” it’s America’s smallest but boasts 40 miles of coastline. Rhode Island is one of the nation’s original 13 states and one of six that make up the New England region.

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