

Disease Forecasting Tools Can Support Policymaking During Epidemics

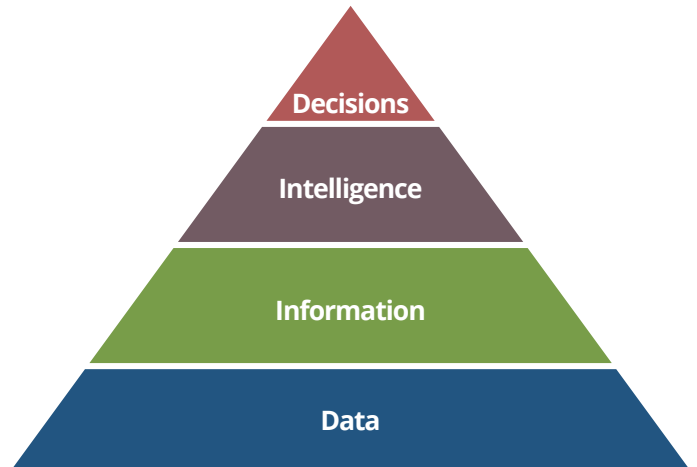
During infectious disease outbreaks, policymakers need to make decisions quickly to prevent illness and allocate resources efficiently and effectively. Effective decision-making relies on information, intelligence and insights derived from accurate and timely data. During the pandemic, policymakers at state, local and federal levels found themselves making decisions with limited insights. Decision-makers at all levels have requested better analytics to inform policymaking during future epidemics. Disease forecasts can help to transform data into decisions.

What Is a Disease Forecast?

A [forecast](#) is a statement about what is likely to occur regarding an event, outcome or trend with surrounding uncertainty. Weather forecasts are a common type of forecast. A 30% chance of rain provides a level of likelihood and uncertainty regarding a statement about a future event. Forecasts can also apply to projections about infectious disease outbreaks. Like weather forecasts, disease forecasts have the potential to protect life and reduce economic burdens associated with public health threats.

As with weather, there are different types of disease forecasts. [“Nowcasts”](#) estimate present conditions, which can help establish situational awareness. [Short-term forecasts](#) project what might happen in the near future based on analyses of past and current data. [Scenario projections](#) estimate possible, longer-term outcomes and “what if” scenarios based on different possible future conditions.

Weather forecasting has become increasingly accurate due to decades of data and thousands of satellites and stations constantly collecting data. Disease forecasting is more complex than weather forecasting due to the variable nature of viruses, human behavior and the complexity of data streams. Forecasts often change as conditions change, particularly with new or emerging diseases, and as forecasters become more knowledgeable about a disease and its progression. Similar to weather forecasting, disease forecasts will provide more accurate and timely information for policymakers as data availability improves.



- Combining intelligence, evidence and qualitative data and presenting it to inform decision making
- Analysis, interpretation and assessment of information to provide intelligence of trends, needs, etc. and review evidence
- Data is presented in an understandable way—such as graphs and tables—but with no narrative or interpretation
- Raw form of data; many sources; needs “cleaning” and processing to be useful

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Examples of Disease Forecasts

The Centers for Disease Control and Prevention has hosted collaborative challenges to generate [short-term forecasts](#) of influenza-like illness over the past decade. The CDC has continued such work to bring together [weekly forecasts](#) that predict numbers of COVID-19 hospitalizations for the next four weeks. In early 2024, the CDC will generate short-term COVID-19 forecasts informed by both hospitalization and wastewater data. These short-term forecasts of disease burden help to inform decision-making by projecting the likely impact of respiratory illness.

The CDC's Center for Forecasting and Outbreak Analytics is building tools to perform complicated analyses quickly and accurately in response to epidemics. The [Current Epidemic Growth Status](#) tool assesses whether certain infections are increasing or decreasing in states and territories. The [Respiratory Disease Season Outlook](#) can be useful in planning for respiratory virus season. The outlook provides a forecast for the season, rationale, key uncertainties, and potential scenarios for peak hospital demand.

Considerations for State Legislatures

To support disease forecasting and best practices in responding to outbreaks and epidemics, policymakers and other leaders may consider the following strategies.

DATA COLLECTION

Advanced and efficient data collection and sharing can help improve the accuracy and timeliness of forecasts and analytics. Federal efforts such as the CDC's new [Data Modernization Initiative](#) are underway to modernize public health data systems.

In 2023, some states took actions to improve data collection and sharing, for example:

- [Illinois H 2039](#) requires certain state departments to provide public health data on local communities to the relevant local public health agency, through data use agreements. Such data includes but is not limited to vital (birth and death) records, hospital discharge data, adverse pregnancy reports, cancer registries, syndromic surveillance and prescription monitoring data.
- [Louisiana S 205](#) creates the Louisiana Foundational Integrated Research System for Transformation, or LA FIRST, to form data sharing agreements between state departments and requires reporting using a single data center.
- [Nevada A 7](#) requires the state department of health and human services to adopt a framework for electronic transmittal of certain health information and requires government entities, health care facilities and insurers to exchange data.

ESTABLISHING RELATIONSHIPS

State legislatures can benefit from identifying reliable and reputable sources of disease forecasts and analytics prior to a public health crisis. State public health departments house experts who can help generate or interpret disease forecasts, outbreak analytics and other critical information for decision-makers.

Forming relationships with public health departments and other partner organizations prior to disease outbreaks can increase the efficiency and effectiveness of response efforts during an emergency. Forming ongoing relationships can also help establish appropriate contacts, increase understanding of roles and responsibilities and address barriers prior to an outbreak response.

EFFECTIVE COMMUNICATIONS

The pandemic created an opportunity for learning valuable lessons about communicating during an emergency. Understanding how people may perceive a risk can determine [how a message is framed](#). For example, less acceptable risks are those perceived as being new, human-caused or having imposed action rather than choices. More acceptable risks are those that are familiar, naturally occurring and involving choices.

[Uncertainty can lead to misinformation](#). Uncertainty exists when the details of situations are ambiguous, complex or unpredictable, and when people feel insecure about their state of knowledge. Communications that are transparent can help lessen misinformation and mistrust. While disease forecasts inherently involve some uncertainty, clearly explaining levels and types of uncertainty can help build trust and reduce misinformation.

Federal and National Action

During the pandemic, the CDC recognized the need for more tools and experts on disease forecasting and created a new center devoted to addressing such needs. The [Center for Forecasting and Outbreak Analytics](#) was established in 2021 to use data, modeling and analytics to respond to outbreaks in real time and drive effective decision-making during outbreak responses.

To help build capacity to fulfill its mission, the center is bringing together academic, private and public partners to innovate, integrate and implement disease outbreak tools for use by state and local decision-makers. [Insight Net](#) is a network of partners established to improve the timeliness, accuracy and use of data during public health emergencies. The network uses a hub-and-spoke model with 13 primary partners that work with more than 100 state, local, academic, public and private partners across the U.S.

National organizations are also building capacity on disease forecasting and outbreak analytics and can facilitate connections. For example, the [Association of State and Territorial Health Officials](#), the [National Association of County and City Health Officials](#) and the [Council of State and Territorial Epidemiologists](#) can help policymakers connect with state and local public health officials and epidemiologists.

Related NCSL Resources

- [Disease Forecasting, Nowcasting and Scenario Modeling](#), podcast, October 2023
- [Lawmakers Turn to Data Systems to Guide Vaccine Decision-Making](#), brief, June 2023
- [The Critical Role of Public Health Data](#), podcast, August 2022
- [Using Data Exchange to Improve Public Health](#), State Legislatures News article, June 2022

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