

Getting started with modeling

Center for Forecasting
and Outbreak Analytics



The basics

When to use modeling:

- [When is it appropriate to use modeling?](#) (webpage)
- [Practical Modeling Concepts for Public Health](#) (video series)

Different types of models:

- [CFA Modeling Handbook](#): Resources for understanding how models work and interpreting output
- [How to think like a modeler](#)* (video)

How to choose the right tool:

- [Measles modeling tool](#) and [seasonal respiratory virus comparative guide](#)*: Understand and select the right tool for measles and seasonal respiratory viruses

Nowcasts

- [Behind the Model: Nowcasting](#)
 - Guidance on how nowcasting can address reporting delays
- [CDC Nowcasting Package](#)
 - GitHub repo for producing nowcasts of cases and R_t for measles
- [Baseline Nowcasting Package](#)*
 - Baseline methods for handling delays in data

R_t

- [Disease Outbreak and Metrics Guide](#)*
 - Guidance on which R_t estimation software to choose for different analytical goals
- [Behind the Model: Tools to Assess Epidemic Trends](#)
 - Resources for estimating epidemic trends (based on R_t)

Short-term forecasts

- [Behind the Model: Short-term Forecasts](#)
 - Overview of short-term (1-4 weeks) forecasting methods
 - Resources for short-term forecasts of COVID-19 hospital admissions

Scenario models

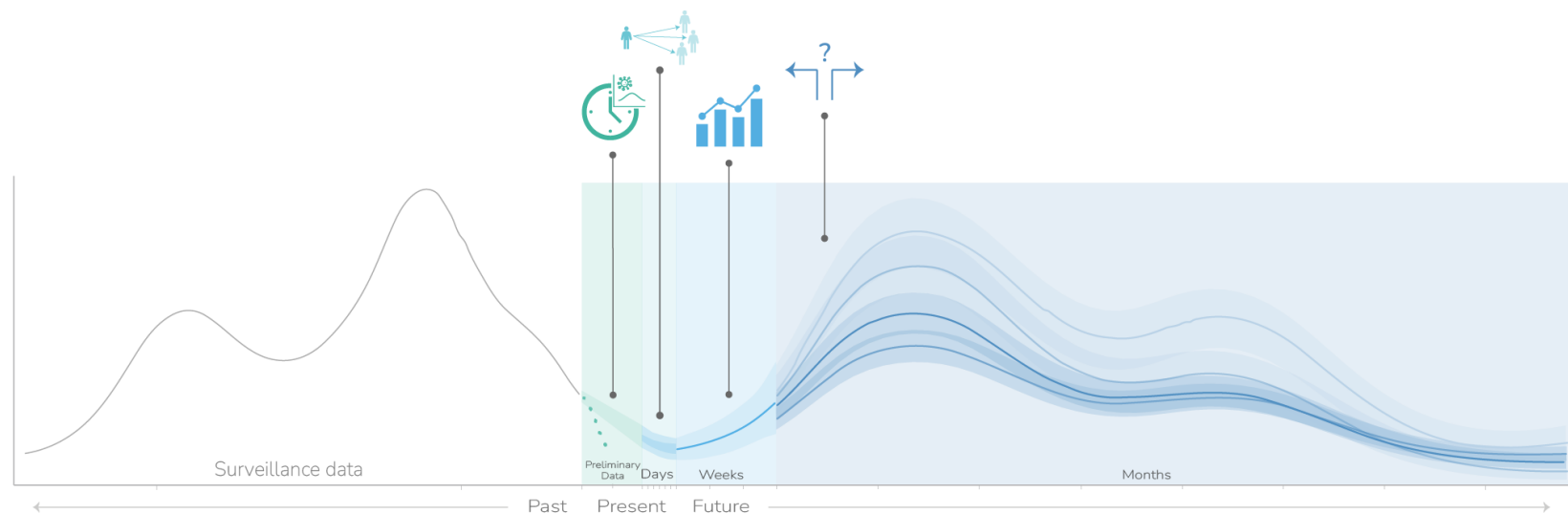
- [CDC Measles Simulator](#)
 - Impact of measures on outbreak size
- [Ebola Screening Tool](#)*
 - Scenario exploration dashboard
- [Resp Disease Season Outlook](#)
 - Includes scenario modeling for respiratory disease season
- [Vaccine Impact Map](#)*
 - Vaccine scenario modeling

- **Connect with peers:**
 - [CSTE Forecasting and Modeling Workgroup](#)*
- **Learn more about how Insight Net supports modeling:**
 - [InsightNet](#) | InsightNet@cdc.gov
- **Technical assistance:**
 - [CSTE Connect](#)* | [CSTE Peer-to-Peer Technical Assistance](#)*
- **Public health departments interested in partnering with CFA or not sure where to start?**
 - Contact.CFA@cdc.gov

**Need
additional
resources?**

Getting started with modeling

Different modeling approaches are appropriate to answer questions at different time horizons. Shown here are multiple modeling approaches, which are used to provide insights into the present, short-term future, and long-term future.



Nowcasting

What is it?

Estimate of current disease activity

Why is it useful?

To improve situational awareness by adjusting estimates of recent disease activity for reporting delays

What are the inputs?

Surveillance data, disease reporting delays



R_t

Estimate of trends in disease activity (growing, not changing, declining)

To anticipate trends in infection, assuming current trends continue in the short-term

Nowcasted data, disease-specific parameters



Short-term Forecasting

Estimate of likely short-term disease activity

To anticipate activity for communication and resource planning

Nowcasted surveillance data, and one or more of: R_t , other data streams (wastewater, mobility), historical data, seasonality



Scenario Modeling

Possible longer-term future directions of disease activity dependent on unknown/uncertain factors

To predict the potential impact of policies or interventions, as well as unknowns (e.g., new variants)

Surveillance data, vaccine effectiveness, vaccine uptake, variant immune escape properties, other interventions