The COVID-19 Pandemic

Data and Decisions: A Framework to Guide Community Response

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The COVID-19 pandemic is testing the limits of public health and global health care systems. Communities are well-positioned to learn from areas affected earlier and draw on the knowledge of international experts experienced in combating the spread of contagion.

Any effective public health response must be based on accurate, current, and comprehensive data to guide the response. This document outlines an effective data access and use approach for counties and states, along with guidance on how data might inform prevention and mitigation strategies over the coming weeks. Successfully combating the spread of the disease will require unprecedented collaboration, compilation and interpretation of data, and innovative approaches to analysis and presentation.

Public health has three primary strategies to reduce the spread of COVID-19. Planning and adjusting our public health response requires comprehensive and current data to utilize these strategies.

Testing

Testing includes establishing clear and evidence-based guidance on who to test and under what circumstances, ensuring that testing is available, and that testing results, including both positives and negatives, are reported to inform case isolation and contact tracing efforts. Testing data must include who is tested and why to provide useful information for policymakers.

Contact tracing

Contact tracing includes identification, notification, testing and potential quarantine of contacts to interrupt spread of the virus. Contact tracing is labor intensive and a typical task of field epidemiology teams, especially at the beginning of the epidemic. With an increasing number of cases, resources may be insufficient to track all contacts, making the process less effective. Monitoring the yield and effectiveness of these activities is necessary; for example, shortening the time between symptom onset and testing is an indicator of effectiveness of tracing.

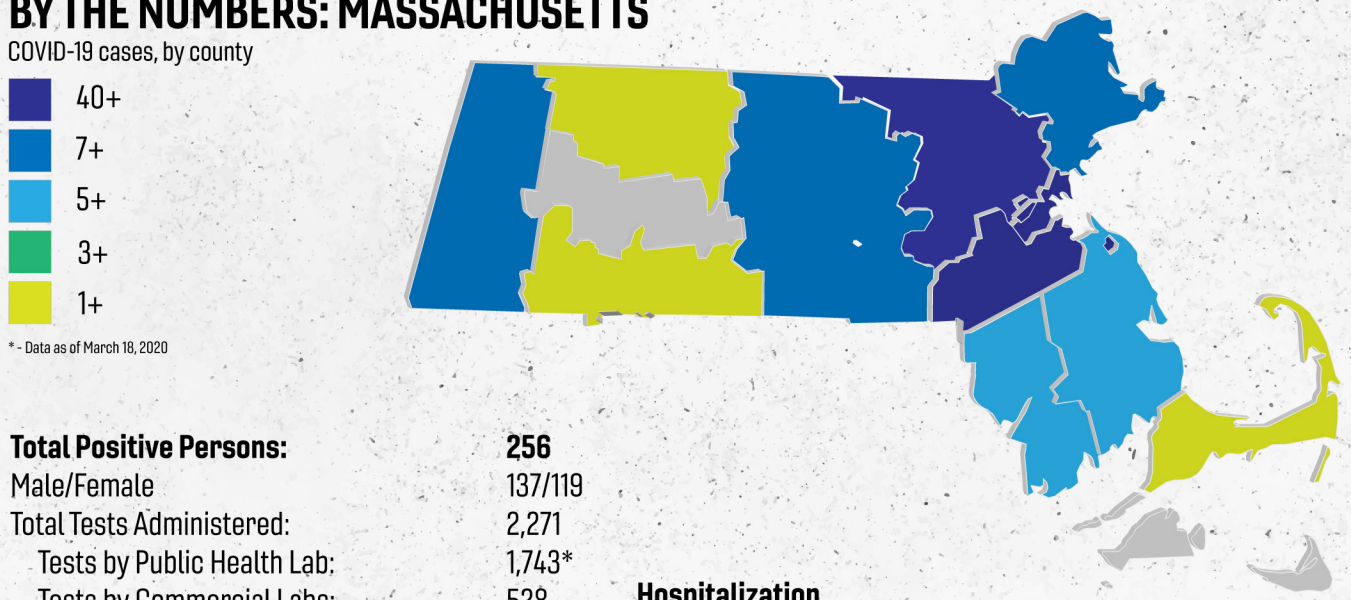
Social distancing and hygiene

The benefits of social distancing policies, ranging from recommending remote work to "lock-downs" of geographic areas, may differ by population and the degree of community spread. Adherence to social distancing recommendations and hygiene should be monitored, enforced, and adjusted over time.

Data on these three strategies is critical to chart the current spread of the infection in our communities, plan for new cases, and prepare additional strategies

BY THE NUMBERS: MASSACHUSETTS

COVID-19 cases, by county



* - Data as of March 18, 2020

Total Positive Persons:	**256**
Male/Female	137/119
Total Tests Administered:	2,271
Tests by Public Health Lab:	1,743*
Tests by Commercial Labs:	528
(* : includes repeat tests)	
Exposure	
Biogen and household contacts	97
Local transmission	38
Travel related	26
Under investigation	95
Total Deaths:	**0**

Hospitalization	
Patient was hospitalized	27
Patient was not hospitalized	151
Under Investigation	78
Quarantine	
Individuals subject to quarantine	2,054
Individuals no longer in quarantine	886
Individuals under quarantine	1,186

or revisions to minimize the impact of the infection. Data are also needed to customize activities for sub-populations, such as front-line health care workers, who may warrant more targeted approaches for prevention.

Central to each of these strategies is the need to understand **community prevalence** (how common the disease currently is and how likely the public is to come in contact with it) and **incidence** (new cases, reflecting spread). Both of these rates may differ for sub-populations. Both also offer guidance on what interventions may be effective at the population level and how social distancing should be implemented.

Building a Decision-making Dashboard

Currently, publicly available data for most areas only includes numbers and ages of cases identified at the county level, with a considerable time lag. Critical information is needed to put positive cases in context, including the total number tested or the timing of detection, is not always available.

Included above is a mock-up of a COVID-19 dashboard for the state of Massachusetts based on data available on the MassHealth website on March 18, 2020. It includes the basic features critical for calibrating a response to this pandemic at the state and local level.

These basic features include:

- **Total Positive Persons:** Cases by age, gender, how they were exposed, hospitalization, and

Acquiring data on community COVID-19 prevalence, risks, and especially environments can be used to support policy and social distancing decisions.

total deaths (updated daily.)

- **Total tests administered** by public and commercial labs (updated daily.)
- **The number of individuals** subject to quarantine, under quarantine, and no longer under quarantine (updated weekly.)

We recommend that these basic data be collected for counties, collated and summarized by a trusted source, and made available daily on a customized dashboard. Because county-level data for Massachusetts are updated daily, charts of the number of positives per day, and as a proportion of positive tests to numbers of tests, can be calculated. We also recommend that the dashboard have the capability to display trends in each of these areas.

Additional information on cases collected as part of case report forms **(CDC's COVID-19 reporting form)** should be summarized, organized in the same way, and made available daily to guide public health professionals in determining appropriate responses. This additional information should include:

- How the case was identified - e.g. through travel exposure or symptoms.
- Time from onset of symptoms to testing.
- Key patient risk factors and comorbidities.
- Criteria used to determine need for testing.

These data are needed to put the rate of positive results in context. For example, the interpretation of 5% of at-risk individuals having contact with known cases being found positive would be very different from 5% of the general population presenting to a walk-in clinic with mild cold symptoms.

In addition, data on the number of tests administered but not yet processed (i.e. the backlog) will yield information on testing capacity and throughput. This information is needed to determine how limited testing resources should be used.

The data above would enable policymakers and public health officials to understand important transitions, including changes in testing criteria, shifts in populations testing positive, and trends in community spread. Such transparency would also build trust in our public health systems.

The proposed process would require health systems to share information they do not traditionally share. Such sharing is necessary to prevent the spread of COVID-19 and adjust mitigation efforts. It will also likely require that a trusted source be able to analyze and ensure the data are presented in ways that maintain the confidentiality of patients and health systems.

These data are essential to determine when to change testing strategies, when to impose stronger quarantine measures, and when we might ease social distancing in the future. They are also critical for use in forecasting the likely impact of the pandemic on local populations and the healthcare system so that communities can prepare local health professionals and secure needed supplies.

Notes: Strategies for combating the spread of COVID-19 and their likely effectiveness, a review of models for forecasting the spread and severity of COVID-19, and other topics will be the subject of additional working papers. The views expressed are those of the advisory group and do not necessarily reflect the views of Vanderbilt University School of Medicine or Vanderbilt University Medical Center. Please see vumc.org/health-policy/covid-19-advisory-memos for those papers.