COVID-19: A View from New York State

Cheryl G. Healton, DrPH
Dean, School of Global Public Health
Professor, Public Health Policy and Management
New York University

Local Data Sources:
- Governor Andrew M. Cuomo’s COVID-19 Briefings (March 31, April 1, April 2)
Rikers Island Inmates Offered $6 Per Hour to Dig Mass Graves as COVID-19 Deaths Rise

Source: GQ.com
Source: CNN.com; Refrigerated trailers in place as workers built a makeshift morgue outside of Bellevue Hospital.

Source: Dailymail.co.uk; A makeshift morgue set up outside of Bellevue Hospital to handle a possible surge.
Increase Continues

Daily New Positive Cases

March 3

+0 +2 +22 +11 +24 +28 +63 +44 +56 +102 +164 +131 +294 +432 +1,009 +1,769 +2,950 +3,254 +4,812 +5,707 +4,790 +6,448 +7,379 +7,681 +7,195 +6,984 +7,917

March 31

STAY HOME. STOP THE SPREAD. SAVE LIVES.
<table>
<thead>
<tr>
<th>COUNTY (TOP 10)</th>
<th>TOTAL TESTED</th>
<th>NEW TESTED (3/31)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NYC</td>
<td>104,041</td>
<td>7,513</td>
</tr>
<tr>
<td>Westchester</td>
<td>39,081</td>
<td>1,891</td>
</tr>
<tr>
<td>Nassau</td>
<td>24,308</td>
<td>1,908</td>
</tr>
<tr>
<td>Suffolk</td>
<td>21,453</td>
<td>2,148</td>
</tr>
<tr>
<td>Rockland</td>
<td>9,111</td>
<td>904</td>
</tr>
<tr>
<td>Orange</td>
<td>5,752</td>
<td>628</td>
</tr>
<tr>
<td>Monroe</td>
<td>3,980</td>
<td>381</td>
</tr>
<tr>
<td>Albany</td>
<td>3,810</td>
<td>106</td>
</tr>
<tr>
<td>Onondaga</td>
<td>3,616</td>
<td>191</td>
</tr>
<tr>
<td>Dutchess</td>
<td>2,892</td>
<td>330</td>
</tr>
<tr>
<td>TOTAL</td>
<td>238,965</td>
<td>18,031</td>
</tr>
</tbody>
</table>
## Positive Cases

<table>
<thead>
<tr>
<th>COUNTY (TOP 10)</th>
<th>TOTAL CASES</th>
<th>NEW CASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>NYC</td>
<td>51,809</td>
<td>4,370</td>
</tr>
<tr>
<td>Westchester</td>
<td>11,567</td>
<td>884</td>
</tr>
<tr>
<td>Nassau</td>
<td>10,587</td>
<td>1,033</td>
</tr>
<tr>
<td>Suffolk</td>
<td>8,746</td>
<td>1,141</td>
</tr>
<tr>
<td>Rockland</td>
<td>3,751</td>
<td>430</td>
</tr>
<tr>
<td>Orange</td>
<td>1,993</td>
<td>237</td>
</tr>
<tr>
<td>Dutchess</td>
<td>667</td>
<td>120</td>
</tr>
<tr>
<td>Erie</td>
<td>617</td>
<td>153</td>
</tr>
<tr>
<td>Monroe</td>
<td>420</td>
<td>71</td>
</tr>
<tr>
<td>Albany</td>
<td>253</td>
<td>13</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>92,381</strong></td>
<td><strong>8,669</strong></td>
</tr>
</tbody>
</table>
Current Hospitalizations

92,381 tested positive
13,383 people currently hospitalized (+1,157)
3,396 ICU Patients (+374)
7,434 patients discharged (+1,292)
Number of Deaths

2,373
up from
1,941

STAY HOME. STOP THE SPREAD. SAVE LIVES.
Change in Daily Intubations
2 Missions

“Frontline” of the battle is our hospital system

Social responsibility: Stay home
Frontline Hospitals

- Follow projections of experts
- Procure equipment
- Identify beds
- Support staff
  - They are the “frontline”
  - Need relief
  - Physical/emotional exhaustion
Remember: main battle is at the “apex” of the curve

- Plan now
- Staffing plan now
- Equipment stockpile now
- Social acceptance of time expectations now
Function and Plan as One System

Upstate New York

Westchester

NYC

Long Island
Must Break the Barriers
WE KNOW WHAT WE HAVE TO DO

WE JUST HAVE TO DO IT

INDIVIDUAL DISCIPLINE
GOVERNMENT SKILL & PERFORMANCE
SOCIAL STAMINA
NATIONAL UNITY
DR. DAVID R HOLTGRAVE

Dean, SUNY Empire Innovation Professor, and
SUNY Distinguished Professor
University at Albany School of Public Health
"While we must prepare for 100,000 or more deaths in the U.S. we do not have to be prepared to accept it."

-Paraphrased from Dr. Anthony Fauci, White House Coronavirus Briefing, March 31, 2020
WAYS TO AVOID ACCEPTING PROJECTED FATALITY LEVELS IN NY STATE

- Maximize physical distancing (avoiding looking for "loopholes"... e.g., playgrounds in New York City)
- Maximize physical distancing but also maximize social connection (please stop saying "social distancing")
- Accept micro-level health screenings (ala checking temperatures to gain access to essential businesses in South Korea)
- In New York State, especially New York City, testing is very largely diagnostic, and there is a truly urgent need to expand testing very broadly
WAYS TO AVOID ACCEPTING PROJECTED FATALITY LEVELS IN NY STATE (continued)

- Reinvigorate contact tracing after larger testing strategy is rolled out
- Rapid studies of potential therapies (blending an array of observational studies and randomized controlled trials)
- Keep expanding hospital surge capacity, and creatively utilize "all COVID-19" hospital designations (e.g., SUNY Downstate)
- Creatively produce PPE for HCWs (and eventually beyond) from sources very large and very small (use every 3D printer, and every needle & thread!)
- Bring all of the above to scale and don't stop until the metrics move to necessary levels (accelerate until we get to where we need to go)
Role of models in understanding the trajectory of the COVID-19 pandemic

Eli Rosenberg, PhD
Associate Professor
Department of Epidemiology and Biostatistics, University at Albany
School of Public Health

NYS DOH COVID-19 Response Team
Models are front and center of pandemic

Remember: main battle is at the “apex” of the curve
- Plan now
- Staffing plan now
- Equipment stockpile now
- Social acceptance of time expectations now

Grim Models Project High U.S. Toll in a Months-Long Crisis

Updates: Studies Forecast 100,000 Dead and Millions Infected

Statistical models that appeared to have convinced President Trump to extend social distancing guidelines will be made public today.

The number of deaths in the U.S. has surpassed China’s toll, but the figures from Beijing are being questioned. Here’s the latest.

Live 39m ago 956 comments
Why are models suddenly so popular?

• Although things have looked less catastrophic so far, models let us peer into future.

• Understand impact of COVID-19 on population and healthcare system

• Lets us ask “what if” questions to help plan policies and resources
  ▫ Under different intervention scenarios
  ▫ Under different assumptions about COVID-19 and in the US setting, for which we have thin empirical data
  ▫ Under different “data realities” on the ground
What’s in a model?

• General structure and mechanics
  ▫ Statistical
  ▫ Simulation: SEIR, agent-based models

• Many assumptions
  ▫ How long can people transmit SARS-Cov-2?
  ▫ How many asymptomatic?
  ▫ What’s the likelihood of needing to be hospitalized? To need an ICU? Mechanical ventilation? For how long?
  ▫ ……

• Many outcomes to track
  ▫ Infections
  ▫ Hospitalization
  ▫ ICU
  ▫ Deaths
  ▫ …..

• Intervention scenarios
  ▫ Base case
  ▫ New interventions compared to base
Impact of non-pharmaceutical interventions (NPIs) to reduce COVID-19 mortality and healthcare demand


On behalf of the Imperial College COVID-19 Response Team

United States

**ICU beds**

Surge critical care bed capacity
Do nothing
Case isolation, household quarantine and general social distancing
School and university closure, case isolation and general social distancing
But COVID-19 is best modeled locally

Probably NY – much earlier peak than US picture
Note earlier peak than Imperial College Model. Also constantly updated with new data.
The charts below show projected hospital resource use based on COVID-19 deaths. The model assumes continued social distancing until the end of May 2020.

8 days until peak resource use on April 9, 2020

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Needed</th>
<th>Available</th>
<th>Shortage</th>
</tr>
</thead>
<tbody>
<tr>
<td>All beds</td>
<td>75,224</td>
<td>13,010</td>
<td>62,214</td>
</tr>
<tr>
<td>ICU beds</td>
<td>11,621</td>
<td>718</td>
<td>10,903</td>
</tr>
<tr>
<td>Invasive ventilators</td>
<td>9,287 ventilators</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All resources: 
- All beds (projected)
- ICU beds
- Invasive ventilators

Date range: March 1 to August 1

Resource count: 0 to 100,000
A few takeaways for comparing models

• Pay close to attention to the specific outcomes, assumptions, and interventions!

• Significant variations between states and even within NYS on when the peaks will be

• Models have a limited shelf life, as we learn more
  ▫ Older models less useful now
  ▫ All models likely to converge on truth over time

• All models show we are likely to vastly exceed vital healthcare resources in next few months and many lives will be affected.
  ▫ Differences only on when exactly and by how much.
Coda: Models show us this is a long game

- Short-term apparent successes of strategies are misleading

- With current medical tools and one period of mitigation, COVID-19 will bounce back and be mainly stopped by population-level immunity due to earlier infection
Imperial College Model – possible but impractical approach to managing this

Figure 4: Illustration of adaptive triggering of suppression strategies in GB, for $R_0=2.2$, a policy of all four interventions considered, an "on" trigger of 100 ICU cases in a week and an "off" trigger of 50 ICU cases. The policy is in force approximate 2/3 of the time. Only social distancing and school/university closure are triggered; other policies remain in force throughout. Weekly ICU incidence is shown in orange, policy triggering in blue.