Why are we so uncertain about what will happen next with COVID-19?

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US Cumulative Deaths

Doubling Time is now 4 days

10 doublings is 1 million deaths
At current rate about 40 days from March 25

When will this line bend?
IMHE Forecast based on China, Italy, Spain

Assumes large reduction in deaths 3 weeks after mitigation starts

50K - 150K deaths by May 1

Now forecasting peak in under a week
60K total deaths
But what do other epidemiologists predict?

Estimates of deaths from epidemiologists are all over the map:

- Low-end estimate
- Best estimate
- High-end estimate

The White House Coronavirus Task Force estimates between 100,000 and 240,000 deaths if federal guidelines are followed.

Responses are from a survey of experts conducted March 30-31. Chart omits one expert whose best estimate was 1 million and high-end estimate was 10 million.
Why so much uncertainty?

• What will make the log deaths curve bend?

  • Lockdowns or Herd Immunity

• Key parameters hard to identify in advance of the bend

  • Mitigation: when does it kick in?

  • Herd Immunity: when does it kick in?

• With fast growth, “small” uncertainty over parameters means a lot
Three Cases with Mitigation

Mitigation slows transmission in 70, 75, and 80 days

The log of the number of cumulative deaths early on

500,000 vs. 900,000 vs. 1.3 million deaths
Three Scenarios without mitigation

Unmeasured cases: When does Herd Immunity kick in?

3 million vs. 1.5 million vs 300,000 deaths

Uncertainty over Initial cases/unmeasured cases and fatality rate
Conclusion

• There is much more downside risk that is discussed in the press

• We may learn a lot in the next few weeks