**https://www.justsecurity.org/69202/highlights-of-expert-panel-on-covid-19-from-harvard-mit-mass-general/**

## What are the Main Clinical Challenges?

Epidemiologists talk about the "basic reproductive number," which is the average number of secondary cases caused by each infected person in an unmitigated epidemic.

Dr. Marc Lipsitch, a professor of epidemiology and Director of the Center for Communicable Disease Dynamics at Harvard's school of public health, summarized available data for COVID-19, which currently suggests that the reproductive number is around 2 – similar to the infectiousness of pandemic flu of 1918.

If this is the case, models of disease spread predict that around 50 percent of the population will need to become immune — either by way of infection or vaccine — before the disease will die out.

Dr. Lipsitch cited data that about 1-2% of those who become symptomatic will die, with the bulk of the mortality risk occurring in the elderly and people with cancer, heart disease, or other chronic health conditions. Children, for the most part, appear to be spared by this disease.

### Hospital transmissions

COVID-19 has been spreading in communities but also in hospitals.

In one report from Wuhan, China, more than 40% of hospitalized patients with COVID-19 were thought to have been infected in the hospital itself. These data represent a first report from one single hospital site, where many healthcare staff themselves were hospitalized.

Before drawing conclusions about the risk of hospital-acquired COVID-19 in the United States, one would also want to know data from American hospitals regarding infection transmission rates in healthcare settings, which may differ from those in Wuhan.

Yet the specter of hospital transmission of COVID-19 is another source of concern for healthcare systems that may soon become overwhelmed by this new pathogen.

### Hospital beds and ventilators: Critical shortages and rationing ahead

When experts speak of health systems possibly being overwhelmed, the very concept may seem too abstract to imagine. But the concern comes down to numbers that are concrete and profoundly sobering.

The United States has a limited number of hospital beds, ventilators, doctors and nurses throughout the nation, far fewer than would be necessary even if the COVID-19 outbreak were less severe than past epidemics of the 20th century.

An article in Saturday's Washington Post makes it plain: "A planning study run by the federal government in 2005 estimated that if the United States were struck with a moderate pandemic like the 1957 influenza, the country would need more than 64,000 ventilators. If we

were struck with a severe pandemic like the 1918 Spanish flu, we would need more than 740,000 ventilators — many times more than are available."

**Transmission before symptoms**

Patients can transmit COVID-19 before they have any symptoms at all.

In one study, even among patients who required hospital admission for treatment of COVID-19, fewer than half (44%) had fevers at the time of presentation. This makes it difficult to identify patients in the community by way of routine screening measures. It is also different from some other viruses like SARS in which the majority if not all cases present with fever as an initial symptom.

**https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3556998**

## Will Coronavirus Pandemic Diminish by Summer?

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## Abstract

The novel coronavirus (2019-nCoV) has been declared a pandemic by the World Health Organization. While influenza virus has been shown to be affected by weather, it is unknown if COVID19 is similarly affected. In this work, we analyze the patterns in local weather of the regions affected by 2019-nCoV virus.

**Our results indicate that 90% of the 2019-nCoV transmissions have so far (March 22, 2020) occurred within a certain range of temperature (3 to 17C)** and absolute humidity (4 to 9g/m3) and the total number of cases in countries with mean Jan-Feb-March temperature >18C and and absolute humidity > 9 g/m3 is less than 6%.