



*Briefing Memorandum on hospital capacity during SARS-CoV-2
Omicron outbreaks.
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To: Rochelle Walensky, MD, MPH
Director, Centers for Disease Control and Prevention

Re: Short-term circuit breaker parameters.

Dear Dr. Walensky,

Due to the contagiousness of the SARS-CoV-2 Omicron variant, infection counts are rising rapidly in some areas and other areas will likely follow. In any jurisdiction, the resulting number of severe Covid-19 cases requiring hospitalization will largely depend upon local vaccination rates and the age distribution among newly infected individuals.

Because many regions are entering this wave with higher hospital censuses (both due to Covid-19 and other conditions) than in previous waves, it is possible that uncontrolled spread of Omicron could quickly overwhelm hospital capacity, despite the existing immunity of the population.

Recognizing that many of our fellow Americans no longer wish to disrupt their lives to slow down the spread of SARS-CoV-2 in general, it is nevertheless our belief that many would be willing—and should be asked—to do so temporarily *with the narrow goal of avoiding catastrophic hospital overload and the avoidable deaths and suffering* that would otherwise ensue.

We propose that the Centers for Disease Control and Prevention (CDC) urgently develop a guideline or framework based on the following proposal to help state and local officials to determine when a short “circuit breaker” is required. We define circuit breakers as temporary restrictions on high-risk activities including indoor dining, performances, and non-essential work outside of the home. Given our knowledge of serial transmission intervals, we propose that these circuit breakers might routinely last 5-7 days but would be unlikely to be necessary for longer than 14 days in order to achieve the stated objective.

These circuit breakers should be gated to go into effect only when clearly defined threshold parameters have been met or are approaching rapidly. However, such thresholds must be sensitive and provide sufficient warning so that appropriate action can be taken in the relevant timeframes.

Here, we suggest the broad outline for how to achieve precisely that.

This plan leverages the following vital information and tools that we now routinely possess, and that we did not during all previous waves.

- Testing capacity. Using molecular, antigen, and/or wastewater data, we can detect community outbreaks early.
- Public data. Using local, state, and federal reporting on hospital use and capacity, we can anticipate when hospital capacity may soon be at risk of being exceeded.
- Epidemiologic data. Using local, state, and federal reporting, we can estimate how many hospitalizations will be projected to occur 7-14 days after a daily case count is reported.

We offer Massachusetts as a use case and assume an average length of hospital stay of 10 days for patients admitted with Covid-19 (which approximates figures here).

In this state, there are a total of approximately 14,500 hospital beds per day. Currently as of December 19, 86.3% (12,513 beds) are in use, leaving 13.7% (1,986 beds) available statewide. As below, assuming a detected infection hospitalization rate of 5% (a low input estimate), the threshold number of new SARS-CoV-2 cases reported that should trigger a circuit breaker would be 39,730 *more* new cases over 10 days than the previous 10 days, or 3,973 *more* per day than the previous day.

Threshold parameters:		
Total # of beds in the state	Percent of beds open in the state	Open # beds in state
14,500	13.7%	1987
Usual infection hospitalization rate (%)*	Circuit breaker increased # of cases threshold (10 days)**	Circuit breaker increased # of cases threshold (per day)***
5.0%	39,730	3,973

**rates depend on the average age and vaccine coverage among infected persons.*

***increase over the previously rolling 10-day average new case count.*

****increase over the previous day's new case count.*

Currently, over the last 10 days, approximately 6,200 new SARS-CoV-2 cases per day were reported in Massachusetts. Therefore, if 10,173 new cases (6,200 + 3,973) were to occur tomorrow, the emergency threshold would have been met and a circuit breaker would need to be considered, as 9 more days of similar new case rates would be projected to exceed the state's hospital capacity. Therefore, under our proposed parameters, Massachusetts would not need to institute a circuit breaker today (December 19, 2021) but may have to in the coming days.

In addition, if the number of available hospital beds decreases due to infections among the healthcare staff, causing a reduction in the workforce (and we note that even a fully boosted workforce would not adequately prevent this, given what we know about Omicron's force of attack even among the boosted), the actual number of available and open beds would have to be revised downward, and a circuit breaker threshold might be met sooner. Therefore, rising case counts and falling numbers of available beds must be considered when implementing this framework. Some added complexities can be incorporated into this, which we would gladly discuss.

We are aware that events on the ground including changes in contact networks and behavior could alter these assumptions. But such changes may lag behind a rapid burst of Omicron transmission. Nor can we assume anything about the severity of Omicron infections, other than that disease severity will likely remain reduced in vaccinated and appropriately boosted individuals. As the risks of Omicron are acute, we fear that any delayed action may be of substantial consequence.



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The Omicron variant is moving quickly. To keep up, we must adjust our strategies urgently and accordingly.

Thank you for considering these ideas and, as you see fit, for circulating this memorandum, which is:

Most Respectfully Submitted.

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