Summary of Brookings COVID-19 Public Health Thresholds

Week Ending 3/11/2021

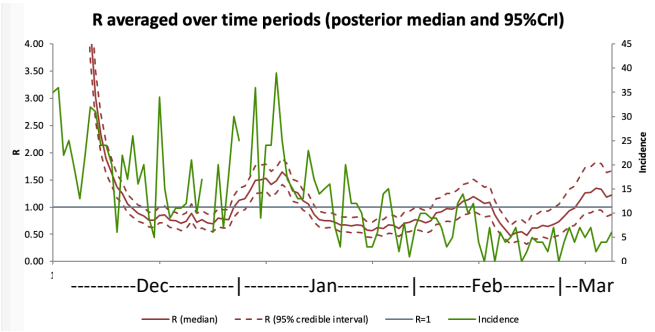
1. Is the epidemic controlled? **No. R_t was above 1.0 for 7 of the last 14 days; community spread is currently *moderate* per DOH definition.**
2. Is the health system able to cope with a resurgence of COVID-19 cases that may arise after adapting some measures? **Based on current census, Brookings Health System feels they can handle the lowest of the anticipated numbers (n = 1). However, staffing will be challenged, thereby limiting the ability to sustain care for the long-term, with the highest anticipated number (n = 5).**
3. Is the public health surveillance system able to detect and manage the cases and their contacts, and identify a resurgence of cases in Brookings?
   a. Mitigation Level: **Yes, according to BHS data (includes sentinel testing, multiple tests on same person, non-county residents) and state data using tests done as denominator (not unique people tested).**
   b. Suppression Level: **No, test positivity is 6% based on BHS data and for state data there is a range of 3% based on tests done to 13% based on unique individuals tested.**
   c. Approximate time to receive test results: **1-2 days**
   d. Percent of Brookings population aged 16 years or older that has received at least one vaccine as of 3/10/21: **19%**

Committee's Summary: These thresholds do not account for the introduction of the new variants (the UK or South African variants), some of which are currently circulating in the US and states bordering South Dakota. The ability of the new variants to more efficiently transmit and thus, more easily infect susceptible people, requires additional vigilance. It will be important to meet the challenge of these new variants to prevent or at least minimize new cases, hospitalizations, and deaths.

DATA:

1. *Is the epidemic controlled?* R_t evaluated weekly. If R_t is <1.0 for 14 days or longer this would be a 'yes', otherwise it would be a 'no'.

   R_t exceeded 1.0 in 7 of the last 14 days. Below are the R_t based on number of cases in Brookings for 106 days ending on 3/11/21. The level of community spread is moderate.



Based on Data for Week Ending:	Brookings	South Dakota
2/26	0.67	1.07
2/27	0.65	1.11
2/28	0.69	1.11
3/1	0.74	1.11
3/2	0.84	1.07
3/3	0.95	0.98
3/4	0.99	1.03
3/5	1.13	1.04
3/6	1.27	1.00
3/7	1.28	1.07
3/8	1.36	1.03
3/9	1.34	1.01
3/10	1.20	1.03
3/11	1.23	1.00

Notes:

- The closer R_t is to 0, the sooner transmission control will be attained.
- Super spreader events are not predicted by R_t and can rapidly affect transmission trajectories.

2. *Is the health system able to cope with a resurgence of COVID-19 cases that may arise after adapting some measures?* Evaluate hospital bed and ICU availability and determine whether an increase of 20% in the number of cases can be absorbed within the health system. If health system can absorb increase than 'yes', otherwise 'no'.

   Yes. Two different case numbers were used including new cases in the past seven days and current number of active cases. These numbers were multiplied by either the overall statewide hospitalization rate or by using current age-specific hospitalization rates applied to age distribution of Brookings cases based on the most recent data provided by the Department of Health. For both numbers, an additional 20% was added as recommended by the WHO and is given below in parentheses.

Based on:	Hospitalization Rate	Age-adjusted Hospitalization Rates
Anticipated admissions based on new cases in past seven days	2 (2)	1 (1)
Anticipated admissions based on active cases	4 (5)	2 (2)

As of 3/10/21, new cases in past seven days = 31 and active cases = 65. SD overall hospitalization rate = 5.9% (3/10/21).
Age-specific hospitalization rates as of 3/10/21 and age distribution of Brookings cases 3/3/21-3/10/21 (n=31; see weekly data report for numbers by age).

Brookings Health System has a surge capacity of 80 beds and the personnel to handle 45 beds. Based on current census, Brookings Health System felt they could handle the lowest of the anticipated numbers (n = 1). However, staffing will be challenged, thereby limiting the ability to sustain care for the long-term, with the highest anticipated number (n = 5).

3. *Is the public health surveillance system able to detect and manage the cases and their contacts, and identify a resurgence of cases?* Evaluate whether the *mitigation and suppression levels* of testing are being met.

   Mitigation level of testing uses the total number of tests completed in Brookings in the previous seven days and determines whether it is equal to or greater than the total number of new cases identified plus ten times the number of new cases. The number of tests completed does not include targeted testing (i.e., public health surveillance or sentinel testing in nursing homes or on campus).

   Suppression level of testing is being met when the percentage of positive test results in the previous seven days is equal to or less than 3.0%. If mitigation and suppression levels of testing are being met than this would be 'yes', otherwise it would be 'no'.

   Mitigation & Suppression Levels of Testing. Total cases for the previous seven days as of 3/10/21:

	Total # of cases	Ten times number of new cases:	Tests needed to meet mitigation level:	Tests completed (mitigation):	% Test Positivity (suppression)^
Brookings Health System Dashboard as of 3/7/21: *					
Brookings	31	310	341	732	6%
South Dakota Department of Health Dashboard tests completed & %TP as of 3/10/21: **					
Brookings	31	310	341	246/1,160	13%/3%/3%
South Dakota	1,129	11,290	12,419	5,494/22,538	21%/5%/7%

^ Test positivity based on unique people tested/all tests completed/PCR tests only from DOH dashboard.

* Brookings Health System data are based on number of tests completed, not the number of people tested, may include sentinel tests and tests on Brookings County non-residents, and includes PCR and antigen tests. Data for a particular date are not reported until all test results are back. Tests at BHS, Avera, Sanford and SDSU are included.

** Includes sentinel surveillance tests (e.g., nursing homes, first responders, etc.). Tests completed and % test positivity by number of unique people tested/all tests and tests include both PCR & antigen tests. Brookings data are Brookings County residents only and South Dakota data are South Dakota residents only.

Approximate time to receive test results as of 3/10/21 (Brookings): 1-2 days

Brookings COVID-19 Thresholds
Overview of Public Health Criteria Used to Control Transmission of COVID-19

The World Health Organization (WHO) uses three criteria for consideration in adjusting public health and social measures related to COVID-19 and suggests measures that can be used for evaluating these criteria[1]:

1. **Epidemiology** - Is the epidemic controlled?
2. **Health System Capacity** - Is the health system able to cope with a resurgence of COVID-19 cases that may arise after adapting some measures?
3. **Public Health Surveillance** - Is the public health surveillance system able to detect and manage the cases and their contacts, and identify a resurgence of cases?

The various measures suggested by the WHO for evaluating the above criteria are given at the end of this summary as an Appendix. The ones given below are those that are locally available.

Epidemiology

The key measure for assessing whether the epidemic is controlled is the effective reproduction number (R_t). R_t represents the number of secondary cases for each infectious case and a value below 1 is the best indication that the epidemic is controlled and declining. The closer R_t is to 0, the sooner transmission control will be attained. The R_t depends on factors related to the number of susceptible individuals and their potential contact with infectious persons. It should be noted that super-spreader events are not predicted by R_t and can rapidly affect transmission trajectories.

A R_t of less than 1 for at least two weeks is used to indicate the epidemic is controlled. An algorithm is available that will calculate an estimate for R_t if case surveillance data are available.[2]

> **Brookings Measure**: *Is the epidemic controlled?* R_t evaluated weekly. If R_t is <1.0 for 14 days or longer this would be a 'yes', otherwise it would be a 'no'.

Health System Capacity

A key measure for assessing whether the health system is able to cope with a resurgence of cases is that the number of new cases requiring hospitalization is smaller than the estimated maximum hospital and ICU bed capacity of the health system (i.e. the health system can cope with new hospitalizations without becoming overwhelmed while maintaining delivery of essential health services). One of the criteria used is that the health system can absorb or expand to cope with at least a 20% increase in COVID-19 case load.

> **Brookings Measure:** *Is the health system able to cope with a resurgence of COVID-19 cases that may arise after adapting some measures?* Evaluate hospital bed and ICU availability and determine whether an increase of 20% in the number of cases can be absorbed within the health system. If health system can absorb increase than 'yes', otherwise 'no'.

[1] https://www.who.int/publications/i/item/public-health-criteria-to-adjust-public-health-and-social-measures-in-the-context-of-covid-19 (downloaded 7/15/20)

[2] https://academic.oup.com/aje/article/178/9/1505/89262

Public Health Surveillance

There are several criteria listed under public health surveillance, including surveillance systems, case investigation and contact tracing. Many of these measures are not known at a county level; however, the number of tests and test positivity are known. The Harvard Global Health Institute has established targets for assessing the adequacy of testing at both the mitigation level and the suppression level:[3]

Mitigation level testing: Mitigation focuses on reducing the spread of the virus through broad testing of symptomatic people, tracing and testing a recommended 10 contacts per new case, isolating positive contacts, social distancing, mask-wearing or stay-at-home orders as necessary. Testing targets for mitigation is set as the sum of symptomatic cases and 10 times the number of cases (to cover the contacts) and does not include targeted testing (sentinel testing of nursing homes, schools, etc.).

Suppression level testing: Suppression allows a community to quickly find and isolate new cases before they lead to a wider outbreak, with an aim of keeping new case levels at or near zero. A test positivity rate of 3% or less can be used as an indicator of progress towards suppression level testing. Suppression level testing requires testing of asymptomatic people in high-risk environments including nursing homes, colleges, etc.

> **Brookings Measure:** *Is the public health surveillance system able to detect and manage the cases and their contacts, and identify a resurgence of cases?* Evaluate whether mitigation and suppression levels of testing are being met using the total number of tests completed and test positivity in Brookings during the previous week and approximate length of time for test results to received back in the clinics.
>
> For mitigation level of testing the number of tests completed should be equal to or greater than the total number of new cases identified plus ten times the number of new cases. For suppression level testing, the test positivity should be 3% or less.
>
> It will be noted whether the mitigation and suppression levels of testing are being met, as well as the approximate length of time between samples being submitted by local labs and test results being received.

<u>Additional notes</u>

Caveats regarding the data:

- The number of cases by day that are used in calculating R_t are based on the numbers posted to the SDDOH dashboard. These dates are not the date symptoms appeared and not necessarily the date the test sample was obtained or the test was conducted; they are the date that the test results were reported to SDDOH. This is the best information that is available.
- The number of tests conducted in Brookings are not the number of individuals tested, but the number of tests performed, which may include repeated testing of the same individual.

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[3] https://globalepidemics.org/testing-targets/

APPENDIX: Criteria recommended by the WHO[4]

Table 1. WHO Criteria for Epidemiological Control

Epidemiological Criteria	Explanation
Decline of at least 50% over a 3-week period since the latest peak and continuous decline in the observed incidence of confirmed and probable cases °	This indicates a decline in transmission equivalent to a halving time of three weeks or less since the latest peak, when the testing strategy is maintained or strengthened to test a greater % of suspected cases.
Less than 5% of samples positive for COVID-19, at least for the last 2 weeks, ° assuming that surveillance for suspected cases is comprehensive	The % positive samples can be interpreted only with comprehensive surveillance and testing of suspect cases, in the order of 1/1000 population/week
Less than 5% of samples positive for COVID-19, at least for the last 2 weeks°, among influenza-like-illness (ILI) samples tested at sentinel surveillance sites	Through ILI sentinel surveillance, a low % of positive samples indicates low community transmission*
At least 80% of cases are from contact lists and can be linked to known clusters	This indicates that most transmission chains have been identified, offering the opportunity for follow-up. This may be limited by the fact that the information will certainly not have been collected at the height of the epidemic.
Decline in the number of deaths among confirmed and probable cases at least for the last 3 weeks °	This will indicate, with an approximately 3-week lag-time, that the total number of cases is decreasing. If testing has decreased, then the number of deaths in probable cases will be more accurate.
Continuous decline in the number of hospitalization and ICU admissions of confirmed and probable cases at least for the last 2 weeks°	This indicates, with an approximately 1-week lag-time and providing that the criteria for hospitalization have not changed, a decline in the number of cases.
Decline in the age-stratified excess mortality due to pneumonia	When pneumonia cases cannot be systematically tested, a decline in the mortality of pneumonia would indirectly indicate a reduction in the excess mortality due to COVID-19.

* Trend evaluation requires that no changes occurred in testing or measurement strategy

° 2-week period corresponds to the maximum incubation period and is the minimum period on which to assess changes in trends.

Table 2. WHO Criteria for Health System Capacity

Health System Criteria	Explanation
All COVID-19 patients can be managed according to national standard	This indicates that the health system has returned to a state where all conditions (staff, beds, drugs, equipment, etc.) are there to provide the same standard of care that existed before the crisis.
All other patients with a severe non-COVID-19 condition can be managed according to national standard	
There is no increase in intra-hospital mortality due to non-COVID-19 conditions	
The health system can absorb or can expand to cope with at least a 20% increase in COVID-19 case load	This indicates that the system would be sustainable even if it had to absorb a surge in cases resulting from loosening public health and social measures. This includes sufficient staff, equipment, beds, etc.
An Infection, Prevention and Control (IPC) focal point is available in all health facilities (1 full-time trained IPC focal point per 250 beds) and at district level	This indicates strong capacity for coordination, supervision and training on IPC activities, including in primary health facilities.
All health facilities have screening for COVID-19	This is for ensuring that all patients who come to a facility are assessed for COVID-19 in order to prevent health associated infections.
All acute health facilities have a mechanism for isolating people with suspected COVID-19	The health system has sufficient capacity to isolate all patients with COVID-19

[4] https://www.who.int/publications/i/item/public-health-criteria-to-adjust-public-health-and-social-measures-in-the-context-of-covid-19 (downloaded 7/15/20)

Table 3. WHO Criteria for Public Health Surveillance

Public Health Surveillance Criteria	Explanation
Public Health Surveillance Systems	
New cases can be identified, reported, and data included in epidemiological analysis within 24 hours	A surveillance system for COVID-19 is in place that is geographically comprehensive and covers all persons and communities at risk. Comprehensive surveillance includes surveillance at the community level, primary care level, in hospitals, and through sentinel surveillance sites for influenza and other respiratory diseases, where they exist.
Immediate reporting of probable and confirmed cases of COVID-19 is mandated within national notifiable disease with requirements	This indicates that appropriate public health policies are in place for immediate notification of cases of COVID-19 from all health facilities.
Enhanced surveillance is implemented in closed residential settings and for vulnerable groups	This indicates that public health authorities have identified populations who live in residential settings or are vulnerable and that enhanced surveillance is put in place for these populations.
Mortality surveillance is conducted for COVID-19 related deaths in hospitals and in the community	This indicates the ability to rapidly and reliably track the number of deaths related to COVID-19. Where possible, medical certificate of death for COVID-19 deaths should be issued. Other approaches for mortality surveillance may be considered, such as reports from religious centres or burial sites.
The total number of laboratory tests conducted for COVID-19 virus is reported each day	Knowing the testing denominator can indicate the level of surveillance activity and the proportion of tests positive can indicate the intensity of transmission among symptomatic individuals.
Case Investigation	
Public health rapid response teams are functional at all appropriate administrative levels	A measure of the capability to rapidly investigate cases and clusters of COVID-19.
90% of suspect cases are isolated and confirmed/released within 48 hours of symptom onset	This indicates that investigation and isolation of new cases is sufficiently rapid to minimize the generation of secondary cases.
Contact Tracing	
At least 80% of new cases have their close contacts traced and in quarantine within 72 hours of case confirmation	These indicate that the capacity to conduct contact tracing is sufficient for the number of cases and contacts.
At least 80% of contacts of new cases are monitored for 14 days	Contacts should be contacted each day during the 14-day period and ideally no more than two days should elapse without feedback from a contact.
Information and data management systems are in place to manage contact tracing and other related data	While contact tracing data can be managed on paper at a small scale, large-scale contact tracing can be supported by electronic tools such as the *Go.Data* contact tracing software.