THREE STRATEGIES FOR CAMPUS TEACHING AND REACTIVATION IN THE ERA OF THE COVID-19 PANDEMIC

Strategy 1: Identification and Containment of Infection
Limiting infections in the community of SARS-CoV-2, the coronavirus that causes COVID-19 disease, is important for mitigating potential risks of reactivating campus. Because individuals infected with the virus may be asymptomatic for many days (for some, even during the entire course of their infection), the best way to know if an individual carries the virus is by testing that individual for presence of the virus. Hence, a cornerstone of our recommended strategy to limit infection within our community is a rigorous testing program.

Viral Testing Program
A cornerstone recommendation is establishing a robust viral testing program. The goals of a testing program are to rapidly identify those individuals who are infected with COVID-19, to isolate them to prevent transmission, and to identify, test, and quarantine their close contacts. We believe that this can best be accomplished by developing internal capacity for testing using the Animal Health Diagnostic Center at the College of Veterinary Medicine and Cornell Health, and partnering with Cayuga Health System, the largest local health care delivery network in the region. Students will need to be told that consent to surveillance and gateway testing is a requirement for return to campus facilities in advance of their return. Students who are already in Ithaca would also need to be tested; the goal is to test them before other students return to Ithaca so that a more accurate baseline prevalence can be established, and positive cases can be contained.

A. Testing for Cause

Individuals with Symptoms
Our committee recommends that all members of the Cornell community be tested for virus as soon as possible if they exhibit signs or symptoms of COVID-19. Individuals that have been authorized to work on campus will be alerted to such symptoms by answering a daily self-assessment (henceforth “Daily Check-in”) that must be completed if the individual is coming to campus that day. Additionally, all members of the community should be aware of the CDC COVID-19 website that provides more detail about symptoms that might suggest COVID-19 infection. During the pandemic, Cornell Health and medical practitioners in our community will use a low threshold for instructing individuals who present with symptoms to be tested for COVID-19. One of the most important recommendations of our committee is that there be a public health campaign to reinforce the value of individual responsibility to seek COVID-19 testing if one believes that they may be harboring an infection, both for their protection and, importantly, the protection of others.

Contacts of Individuals Who Have Tested Positive for COVID-19
TCHD has primary authority under state law to conduct contact tracing. All individuals identified as having COVID-19 (the “index case”) will be interviewed by TCHD to identify others with whom they have had close contact. TCHD’s contact tracing focuses on rapid identification of:
• Individuals who share living arrangements with the index case (the interpretation of which will need to be further refined for higher education contexts), and
• Individuals who have been within six feet of the index case for more than 10 minutes during the 48 hours before the onset of the index case’s symptoms, or 48 hours prior to testing (in the case of asymptomatic presentation).

All such contacts identified by TCHD should be tested for COVID-19 infection at the first opportunity. TCHD or other health department, depending on county of residence, will also require isolation\(^1\) of the index case and both testing and quarantine\(^2\) of close contacts\(^3\) whenever possible (see “Isolation and Quarantine” below). It will again be critical that Cornell establish a communication strategy encouraging our community to work closely with TCHD or their local health department to identify all who are at risk of infection.

In addition, Cornell Health may recommend additional testing of students based on interviews with the index case to ensure that additional contacts who may have become infected are not missed. Finally, although individuals known to be COVID-19 positive will be required to isolate themselves, it is possible that a member of our community may come into close contact with an individual known to be COVID-19-positive. Similarly, it is possible that an individual from our community might encounter a COVID-19-positive patient outside of the local region. Should such contacts occur, individuals are encouraged to seek immediate testing. All members of the community will be reminded of this through the Daily Check-in.

**Individuals Engaging in High Risk Behaviors**

Some behaviors put individuals at higher risk for becoming infected with COVID-19, even if there was no known specific contact with a COVID-19 patient, a phenomenon known as community spread. When individuals are identified, they will also be encouraged to be tested for the virus at the earliest possible time. Examples of such circumstances include, but are not limited to, attendance at gatherings without appropriate physical distancing and/or use of face coverings and return from travel to a region with high prevalence of COVID-19. Our messaging campaign should continue to remind our community of potential risks for contracting COVID-19 and encourage testing. Such testing for students will be made available at Cornell Health, and for faculty and staff through the Cayuga Health System-sponsored Ithaca Mall testing site.

**Seasonal Influenza**

Although not directly related to COVID-19 testing, our committee also acknowledges that signs and symptoms of seasonal influenza can mimic the presentation of COVID-19. Additionally, co-infection with seasonal influenza and COVID-19 may substantially increase the severity of disease. Therefore, we recommend that it should be required for all members of the Cornell community to be immunized against seasonal flu in the fall 2020 unless they have a religious or medical exemption. Participation must be negotiated with unions before it can be required of represented employees.

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1 Isolation is the practice of separating infected people with COVID-19 from others until they are no longer infected to limit transmission.
2 Quarantine is the practice of separating healthy, close contacts of an index case for the incubation period (for COVID-19, thought to be 14 days) from others to limit transmission during the period in which the close contact may be infected, but is unaware.
3 Guidance from NYS DOH on the [definition of close contacts](#).
B. Testing for Surveillance

As noted above, one of the most vexing problems with COVID-19 is that individuals may harbor virus and transmit disease, although asymptomatic. Hence, we cannot rely solely on individuals self-identifying as needing testing. To address this concern, our committee recommends that Cornell test our community on a regular basis to catch those positive at the earliest possible time and isolate them from the community until they clear the virus. Given information available currently, we expect the surveillance testing program should be done for all faculty, staff, and students living, studying, and working on campus. The frequency of testing to minimize COVID-19 transmission will be determined based on baseline prevalence (as described below), infection trends at the start of fall semester, and infectious disease modeling. A research team led by Peter Frazier, Associate Professor, School of Operations Research and Information Engineering (an expert in population modeling and simulations) has developed COVID-19 transmission models incorporating parameter estimates from current literature, CDC guidelines, and medical expertise to provide evidence-based information to guide testing decisions (Appendix 2). Our committee also appreciates that over the next few weeks to months, local and national conditions will change and this changing landscape may influence the best approach to surveillance testing. Finally, our committee recognizes that scientific understanding of asymptomatic transmission of COVID-19 is continuing to develop and will require that surveillance testing programs be regularly re-evaluated as research into this important feature of the pandemic is reported.

Baseline Surveillance

Our committee recognizes that currently the presumed prevalence of COVID-19 in the Tompkins County region is quite low; however, to date, there has been no rigorous assessment. Given the recent shelter-in-place order in New York State, it is very likely that the prevalence of virus in the Cornell community mirrors that of our region. However, our committee also appreciates that the reactivation of our campus will result in more interactions among members of our community (with each other and with others in the region) and bring individuals from around the world to our community. These changes may increase prevalence of COVID-19 on our campus. To understand the dynamics of infection on campus that may unfold and to be able to evaluate the significance of viral prevalence at future points in time, our committee recommends measuring the baseline prevalence of COVID-19 on campus. We believe that the best means to accomplish this will be to test all students, staff, and faculty who work or live on campus as soon as our testing program is established. Further, we recommend that individuals planning on returning to work or study at Cornell who have not recently been or are not currently in the region, be tested for COVID-19 immediately on return, then work or study remotely for five days, then be retested for COVID-19 before returning to the campus community. (See Appendix 5 for more about testing students throughout the summer).

Ongoing Surveillance Testing of Our Community

In addition to measuring baseline prevalence and testing of individuals who enter our community, our committee recommends that Cornell adopt a protocol for periodic testing that will provide a longitudinal view of coronavirus in our community, allow identification and isolation of infected individuals, and provide lead time to prevent serious outbreaks of disease. Although our committee is unanimous in its agreement that periodic surveillance is highly valuable given the current understanding of asymptomatic transmission, we do not feel that we can recommend a defined protocol for such testing as of this date; the modeling to provide guidance
remains underway. Among the issues that still need clearer resolution and being studied by the Frazier group include, but are not limited to:

- Determining if all members of the community should be tested with the same frequency or if subsets of the community should be tested more often than others;
- Addressing whether all members of community subsets should be tested or if it would be better to sample from within subsets;
- Balancing practicality and cost of testing (and compliance of those being tested) with the risks of virus remaining undetected in our populations to determine the frequency of testing;
- Understanding our off-campus students (in Ithaca), who outnumber residential students, and develop strategies to encourage compliance with testing.

Our committee appreciates that as our local data emerge, we will be in a much better position to model the future. It is our recommendation that Cornell adopt an aggressive and comprehensive testing strategy at the start of the campus reactivation in the hopes that the number and frequency of tests needed will diminish over time.

C. Gateway Testing for Students
The largest influx of individuals to our community will be students returning for fall instruction. We have learned from others (i.e. universities bringing athletes to campus and the experience of West Point bringing back its graduating cadets) that invariably, there are individuals positive for COVID-19 among those returning to campus. We have therefore carved out a draft protocol for consideration by university leadership for viral testing for students returning to campus for fall instruction.

**Move-In Process for On-Campus Housing**

- Welcome materials for incoming and returning students should include instructions on best practices to avoid infection while still at home and during travel.
- Students planning to travel to the Ithaca region for the fall semester, whether planning to live on or off campus, will be asked to be tested remotely for COVID-19 and provided instructions for self-quarantine for 2 weeks prior to travel. Our committee appreciates that local testing may not be available to all of our students. Regardless of whether testing can be accomplished, Cornell will urge all students to self-quarantine for two weeks prior to leaving for Ithaca and those testing positive will be asked not to travel to Ithaca until they have recovered from infection and have been cleared to come to Ithaca by Cornell Health.
- If testing is available, students testing positive will be subject to isolation requirements as indicated by local authorities in their places of permanent residence, and those that test negatively will be invited to travel to campus.
- Upon arrival in Ithaca, students will each be provided a questionnaire about symptoms or recent contact with anyone known to be positive for COVID-19.
- All students will be tested for COVID-19 and asked to quarantine until the test results are known.
- Any student who tests positive will be counseled by TCHD on the appropriate course of action, including isolation, as indicated.
• Students who test negative may access Cornell facilities, following relevant physical distancing, face mask, and hygiene policies.
• Students will then be tested five days later for the presence of the virus, to account for the possibility of false-negative initial results or for acquisition of virus during travel.
• There may be circumstances based on COVID-19 risk assessment that would warrant quarantine of an individual student prior to joining the campus community.

Move-In Process for Off-Campus Housing
Our committee recognizes that it will be easier to monitor and orchestrate the arrival of students returning to on-campus housing. Students returning to off-campus housing have more autonomy over when they return; however, they too need to be tested upon return to Ithaca. Historically, the university has not overseen any aspects of students’ return to off-campus housing, and the availability of accurate information about where students live and their local contact information has been dependent on students’ willingness to update this information in Student Essentials. For the 2020-2021 academic year, having an up-to-date registry of students’ local addresses, contact information (cell phone number), and emergency contacts (parents or guardian, in addition to at least one close friend or roommate) will be essential, and all students – whether in on- or off-campus housing – will be required to participate in our testing program and follow our re-entry requirements. Our committee recommends that a series of gating mechanisms be put in place to cause students to register their local presence and address and get tested (and isolated if necessary) in a timely manner in order to mitigate the risks associated with the undetected importation of the virus into the community. (See Appendix 6 for more details about move-in).

Strategies for Phasing the Return of Students
Our committee discussed possible ways to phase the return of students to slow the rate at which students entering Ithaca could seed new infections. One way to do this could be to invite only first year students back first and take them through a longer orientation process (e.g., 14 days) before inviting upper-class students to return. This would, in theory, enable us to spread out the risks associated with move-in. However, many upper-class students might opt to move back to Ithaca anyway and stay with friends in off-campus housing until their on-campus rooms become available, thereby reducing the effectiveness of this phase-in strategy.

A more realistic approach may be to invite the approximately 1,000 students (of whom about 50% are upper-class students) who annually arrive on campus before first year students to participate in training (e.g., orientation leaders, residential advisors, and other student ambassadors) to return at least 14 days prior to the start of the move-in process for first year students so that they can all be tested (and quarantined/isolated if necessary) before their training programs begin. Many of these students live in the residential halls, making it feasible for us to dictate their return date. This year, it may be prudent to invite for early return and training a larger cohort of students that includes those who have been selected to serve as student behavioral modification guides, or public health ambassadors. Treating them as the first official wave of returnees will help contain the influx of the virus prior to the return of first year students.

D. Testing of our Environment
Beyond testing individuals, our committee recommends that Cornell continue to follow the literature on the utility of environmental testing as an early warning marker of virus on the campus. One possibility might include
testing wastewater (for example of dormitories) to determine if there may be individuals that reside in those
dorms who may be positive. This information may lead to directed testing of individuals or changes in how we
suggest individuals interact in particular environments and how these areas are kept sanitized.

E. How to Test for COVID-19
There are many components to the testing strategy described above. Successfully executing this strategy will
require partnerships with a number of different entities within Cornell and in the local community.

Partnership with Cayuga Health System
Our proposed testing for COVID-19 is a substantial undertaking. Individuals to be tested must be notified,
samples must be acquired, labeled correctly, then prepared for analysis; samples themselves must then be run
and evaluated, and results must be collected and reported in a way that maintains confidentiality. Additionally,
expertise is required for billing of insurers for testing that may be covered. Because of these complexities our
committee recommends that Cornell seek a partner with expertise in many of these domains. Partnership
conversations are underway with Cayuga Health System, the major local health care delivery network.
Recommendations about the details of this partnership are beyond the scope of this report, however our
committee recommends that whatever form the partnership takes, Cornell retains control over the testing
program to ensure our current needs are met and that as the testing landscape evolves, the partnership is
adaptable to the changing environment. Our partner should clearly demonstrate capacity to support the extent
of testing (in particular for surveillance) that will be required for the Cornell community.

Cornell Health
Cornell Health supports the physical, social, and emotional health and well-being of our student population. Our
committee recommends that Cornell Health continue to be the principal point of contact for our students
around COVID-19 care and be the primary entity responsible for testing for cause of students—including those
with symptoms, those who have been in contact with others with COVID-19, and those identified individually as
being at greater risk for community spread.

Cornell Health may be able to use their secure messaging portal to communicate with students who have been
identified (e.g., through previous clinical encounters with our clinicians, or who self-disclose on their health
forms) that they have risk factors for poor outcome if infected with COVID-19.

The Animal Health Diagnostic Center (AHDC) at the College of Veterinary Medicine
Cornell has on site and outstanding diagnostic laboratory with great skill at high-throughput PCR testing. The
AHDC has COVID-19 testing in place and, in fact, has performed such testing in animals. Our committee
appreciates and endorses the steps that are being taken to explore certification of the AHDC for diagnostic
testing in humans. Utilizing the AHDC will be instrumental in supporting Cornell’s capacity for its testing
program.

Sample Type and Acquisition
Currently, testing for COVID-19 requires a medical worker in full protective equipment to acquire samples from
individuals to be assessed. The most common type of sampling is through swabs of the nasopharynx (NP). A
robust surveillance program based on NP swabbing is not feasible: maintaining the personnel numbers required
for sampling may be daunting and compliance of those being tested will be at risk because of discomfort related
to NP swabbing. In order to increase the probability of a successful surveillance testing program, our committee urges Cornell to continue to take steps with Cayuga Health System and Weill Cornell Medicine to study and then incorporate a sample type and strategy that best meets our needs. Possibilities include testing of the anterior nares, saliva or buccal surfaces, or under the tongue.

Another aspect of testing that may become more available are protocols that will allow for individuals to obtain their own samples (either on their own or under supervision) and deliver those samples to a collection point. We recommend that Cornell continually monitor development of these approaches and, if sensitive enough to detect virus in asymptomatic individuals, consider their adoption. Additionally, Cornell should continue to monitor the development of point-of-care testing, an approach that provides results in minutes, rather than hours. As the semester moves forward, we may find utility in such methodology.

**Group (Pooled) Testing**

Given the large number of individuals we propose to test for COVID-19, testing each individual separately will likely be beyond our capacity. There are, however, protocols that allow for samples from multiple individuals to be pooled, then tested as a group. If a pool tests positive, individuals in the pool are retested to identify the individual(s) who are positive. In situations where the predicted prevalence will be low (our current state vis-à-vis COVID-19), group testing represents a savings in the time, effort, and expense needed for test processing (but not specimen collection) without decreasing sensitivity. Our committee urges Cornell and Cayuga Health System to develop the most robust group testing methodology that preserves the sensitivity that will be necessary for us to accomplish our testing goals.

**Data Management**

Beyond testing itself, our program to evaluate individuals infected with COVID-19 will require a robust information and data management system that is sensitive to personal privacy concerns of those being tested. Developing such an in-house information system *de novo* in the time frame needed to begin our testing program seems overly ambitious to our committee and we recommend that this be done in partnership with Cayuga Health System, where there already exists the appropriate infrastructure to manage subject results on a large scale. In whatever data management system is established, the privacy of data collected for public health purposes is paramount.

**Antibody Testing**

The testing protocols described thus far in this report refer to testing for evidence of current viral infection. The most common methodology for this is to examine specimens for evidence of nucleic acid and, more recently, protein derived from the virus. The other major testing modality that is becoming increasingly available is examination of blood specimens for the presence of antibodies, or proteins made by the host to combat infection. The presence of antibody does not indicate current infection with virus (or transmissibility of virus) but does indicate past infection. It is likely, but not yet proven, that the presence of antibody would confer immunity to subsequent COVID-19 infection.

At the time of our report, our committee is not recommending the use of antibody testing for several reasons. First, a number of the current antibody tests lack specificity. Hence, a positive result, especially in a low prevalence population, has an unacceptably high potential of being inaccurate. Second, it is not yet clear
whether antibody positivity does, in fact, confer protection, so it would be difficult to act on test results. Finally, individuals who discover they are antibody positive may have a false sense of security and feel less compelled to follow the recommended protections, putting themselves and others at risk. Over time, however, antibody testing may be valuable and should be reevaluated as circumstances warrant.

Summary of Testing Recommendations
At the time of this report, our committee is able to recommend that Cornell develop a suite of testing approaches to ensure timely evaluation of all individuals on campus needing testing for cause, gateway testing to decrease the amount of undetected virus that enters our community, and ongoing surveillance. The precise schedule of testing, the best methodology to use, and how to divide the labor among Cayuga Health System, Cornell Health, and CVM AHDC will require additional discussion among all parties. Our committee recommends that, given the importance of rolling out a well-reasoned and practical testing program, the university leadership appoint a testing working group that will continuously evaluate options, lead pilot activities to ensure we are making appropriate progress, and make recommendations regarding questions that remain outstanding at this time.

F. Communication of Testing Efforts
We recommend communicating aggregate results of our testing regime on a regular basis to ensure transparency and build trust among members of the Cornell and broader Ithaca-area community.

Managing Individuals Found to be COVID-19 Positive and Their Close Contacts

A. Isolation and Quarantine
Each individual found to have COVID-19 (designated an index case) needs to be isolated to prevent viral spread. The length of isolation is determined by TCHD and is dependent on the circumstances of each case, including symptoms and subsequent test results. Additionally, individuals with whom the index case had contact are identified through contact tracing and advised to be tested and quarantined for 14 days. TCHD currently reserves the right to manage contact tracing, although Cornell Health nursing staff are trained to do this. We continue to pave the way to assist TCHD in this important function. Cornell Health nursing staff also provide daily phone monitoring of isolated and quarantined students in collaboration with TCHD.

Should an individual in our community be identified as COVID-19 positive, NYSDOH requires this information to be immediately transmitted from the testing lab to the local health department. The next steps in management of positive results fall under the jurisdiction of TCHD (or other local health departments for individuals not living in Tompkins County). That being said, unique features of life in a residential university community argue for a specialized approach to identifying individuals at risk for acquiring COVID-19 and managing their separation from the larger community. For the past month, there have been weekly meetings with TCHD in an effort to map out a joint strategy for quarantine. At the time of this report, these conversations are continuing, and progress is being made. We anticipate that greater clarity around these issues will soon be forthcoming and will allow for more concrete planning of how to identify contacts that require some degree of quarantine. Our committee strongly recommends that Cornell continue these discussions with TCHD to determine the best means to share responsibility for managing circumstances when an individual from our community is identified as COVID-19 positive. We anticipate that a substantial number of individuals will need to be quarantined.
through the fall semester and TCHD and Cornell should work together through the summer to develop a plan for this likelihood. Options to consider include quarantining at one’s permanent residence when possible and utilizing the Statler and other local area hotels (see Appendix 7).

B. Contact Tracing

Contact tracing is the process of identifying individuals who may have come into contact with someone found to be COVID-19 positive. In Tompkins County, this is regulated by TCHD and performed through interviews of index cases, asking these individuals to recall others with whom they had been in close contact with (defined as being within 6’ for 10+ minutes) during the two days prior to the positive test result or the two days prior to the first onset of symptoms, whichever period is longer. While many contact tracing technologies are becoming available to assist in identifying close contacts and augment the in-person interview process, at the time of this report, there is no single technology which we can recommend. We suggest a working group be formed to continually evaluate such technologies as they evolve.

One of the most critical aspects for planning the reactivation of the Cornell campus is planning for housing and support of on-campus residents with known COVID-19 infection and their close contacts. Our committee recommends that Cornell, together with TCHD, be prepared to house a substantial number of individuals in isolation or quarantine based on the Frazier model. The restrictions on what space can be used for quarantine and what individuals can be quarantined together will need to be discussed further with TCHD. As we gain clarity on this our committee has the following recommendations to offer:

- We recognize that being quarantined for 14 days represents a significant burden and may be particularly lonely for students away from home. To meet student needs, Cornell Health should explore ways to work with TCHD to consider if individuals needing to isolate or quarantine can travel safely home for the duration of their time away from the community. This may require transport by private automobile to an environment appropriate both for quarantine and for remote learning as the student will need to pursue their studies online during the period away from campus.

- For individuals who have been living together and who all have been identified as contacts (not as COVID-19 positive), it may be possible to quarantine together and not bear the disruption of having to move from their normal residence.

Students may be hesitant to share information about having attended social gatherings in which physical distancing was not properly observed for fear of repercussions. Obtaining accurate information about close contacts is critical for mitigating viral spread. Therefore, our committee recommends that students be given immunity from any university disciplinary processes if they report unsanctioned social activities for the purposes of cooperation with contact tracing needs.