

A MEETING
OF THE UNIVERSITY FACULTY SENATE
TUESDAY, JUNE 24, 2020

CHARLIE VAN LOAN: Hello, everybody. This will be our last meeting. Jill, let's get going with the announcements.

We're in the summer now, and just a couple of points. First of all, today's meeting is about the reopening reports, basically, and we have set up a website that breaks them down into critical parts, and you can pose questions and concerns. That will be active over the summer, we'll be checking it, so just want you to know about that.

Every so often, we'll send the senators updates or whatever. And those first two things, then, may be enough to trigger a meeting. But for now, we're probably pretty good until mid-August. Again, it's all tentative and we are flexible.

I'd like to thank -- there are about 30 or 40 of you whose terms are ending. Of course, some of you will be back, but I want to thank you for participating in the pretty tumultuous year. We've had 16 meetings this year, so when you go and update your resume, you can put a little asterisk by it, saying that you survived the 2019-20 senate calendar.

We do have a vote today, and we have to be somewhat formal and make sure that we have enough senators in the room. That number is about 64. Right now, if you are a senator or an alternate, just post a message on chat saying that you were here, and Jill will count them up, and we'll trust that only senators and alternates are

responding. If not, you'll be banned for life. I'm not sure what -- but please, only senators and alternates.

We have 160 participants, we have 126 or 127 senators. I think we're okay. So let's proceed, Jill, and you can do the count behind the scenes. I need someone here to make a motion to discuss the employment, the continued employment resolution. Would someone just raise their hand. Okay, good. Would someone second that? Okay, good.

Let's go on now and hand it over to Carl Franck, who is one of the cosponsors of this resolution. There's the lineup, and let's get on to Carl's first slide.

CARL FRANCK: Thank you very much, Charlie and all the senators. I'd like to first quickly paraphrase our resolution. Resolution in support of continued employment for Cornell staff during the COVID-19 crisis. Whereas, during this crisis, university staff has demonstrated resilience, ingenuity and dedication.

Cornell's administration's recently announced financial plans addressing the crisis-related budget shortfalls include the possibilities of layoff and furloughs of university staff. Loss of employment at Cornell would impose severe financial hardships on staff and their dependents. Comparable employment elsewhere will not be available for staff, particularly in the conditions of high unemployment during the crisis.

Layoffs or furloughs of staff will have a severely negative impact on the broader community, given Cornell's role as the primary employer in Tomkins County. Significant staff layoffs during the financial downturn of 2008 damaged morale throughout the university, negatively affecting the character of the institution. Preservation of

employment of Cornell staff is essential to maintain the cooperative spirit that has sustained us thus far and is essential to our recovery.

Be it therefore resolved that the senate recognizes the vital role and contributions of university staff; that the senate urges the Cornell administration to commit to maintaining the employment of all current staff during the crisis; that the senate calls on the Cornell administration to respond to the current crisis with alternatives to layoffs or furloughs, including reassigning staff to positions that will meet the university's critical needs.

Finally, that the senate encourages the Cornell administration to charge deans, faculty and staff to work collaboratively to maintain employment of all current staff, including devising adaptable, appropriate and sustainable staff reassignments to carry the university through this crisis and continuing its flourishing when it is over.

We have received considerable support and thank the faculty and senators for this. I will quickly show a list. As of early this morning, we are currently at 108 faculty sponsors, of which 17 are senators. Again, this is earlier this morning. One can see the current list of sponsors at the website that's noted in the comments section for this proposal. This is just a glimpse of those 103 supporting faculty.

Now I would like to turn -- just give the comments from our Faculty Senate web page. By the way, I speak for our sponsors, and we've decided that we'll just give you some selected comments of themselves. I'll just read them to you for the purposes of brevity.

First comment is from the Faculty Senate web page. From the article and op-ed a week or so ago in The New York Times, research by economists in England and Australia demonstrated that it takes longer to adapt to the pain of unemployment than to losing a loved one. Layoffs wound people not just economically, but emotionally and spiritually.

There's a whole body of literature suggesting that layoffs don't ultimately help the bottom line, once the economy heats back up. Experienced and dedicated humans are hard to replace. Those were based on studies of all the major companies in the 2008 crisis.

Associate Dean at University of Kansas says now is the time for every organization to express its values. These are now comments from the faculty web page, senate web page. To begin with, our staff provide essential functions that otherwise would need to be performed by faculty effort.

In my department, staff also intrinsically sense and maintain academic department culture in ways busy faculty often neglect, and we function collectively better for it. I know I would not be able to write nearly as many grants, counsel students and plan programs without the essential help of each of the staff in my department.

These support roles and occasional gains they conceive of on their own is well worth the support each of us can give. No amount of automation can replace these roles, and the faculty would do a much worse job at this and still cost us resources and time and money. I'm paraphrasing.

Why can't we all be in this crisis together and share the burdens it is imposing? Can we all please consider whether the faculty already are more comfortable economically than many other people, Cornell employees. If not, then is not at little sacrifice for us worth the much more tremendous value and security it provides all the others who are part of our team here at Cornell that make the university function smoothly for all of us.

It certainly seems like a moral, humane, compassionate and ultimately beneficial thing to do for everyone and for the university as a whole. If we give a little now, we may get back much more later.

As a long-term staff member, I want to thank the faculty involved in this for being our voice. The fact that the president and provost can't even produce -- this is from June 15 -- how many staff have already been laid off or furloughed speaks volumes. They simply don't care.

A temporary cut in salaries and temporary stop in retirement contributions would give us all a guarantee that we will return to where we were when the crisis ends. We're all willing to do our part, but we need to keep our positions. This part of the state is an employment desert. For most of us, there's nowhere else to work.

Now, some selected comments from my senate cosponsors. Joanie Mackowski: If tenured faculty believe that staff layoffs are necessary to preserve our university, then I think we're already lost. Tenure isn't a mere privilege. It's an obligation. As researchers and scholars, we work in the service of truth. Tenure exists to protect the

disturbing expression of truth from abuses of power. There's nothing true or just about terminating staff employment and without good cause in the midst of this pandemic.

If we worry about temporary pay cuts while rationalizing that staff layoffs are somehow unavoidable, then it's no wonder that people in the U.S. are losing confidence in higher education. To survive this crisis, we must support each other and demonstrate our values. Then quoting, tenure at colleges and universities will not survive unless it is tied to the broader moral agenda of defending some kind of job security for everyone, given how important that is for human well-being, inside academia and out.

Buz Barsto says: America has always been an individualistic country, but I think if we look back at the historical record, it's gone through waves of individualism and solidarity. For much of the past 40 years, we've been in this hyper-individualist state, where it's been everyone for themselves. I think this state is beginning to end, and I think our students really want it to end.

Risa Lieberwitz: Cornell has many alternatives for addressing the current public health crisis and its financial impact. It is wrong and unnecessary to pit faculty, students and staff against each other.

Consistent with Cornell's core values that President Pollack articulated, deans, faculty and staff can work together to choose principled, humane and feasible alternatives to address the university's financial concerns without layoffs or furloughs. These alternatives include hiring freezes, construction pauses, borrowing against the endowment, and staff reassignments.

Finally, Chris Schaffer: The consequences of a generational crisis should not be borne so heavily by the most financially vulnerable members of the Cornell community. This has been recognized with the extraordinary commitment made to maintain current financial aid models for our students.

It should also be recognized by protecting the employment of staff whose positions have been threatened by the crisis. Cornell community members, past, present and future, should all bear some of the burden, so that no dedicated Cornell employees are laid off, due to the crisis.

Thank you.

CHARLIE VAN LOAN: Let's open this up for conversation. There have been several comments on the website. Anyone who would like to add to that, offer suggestions --

CARL FRANCK: If I could start off, I just forgot a very important slide. We deeply appreciate the efforts that the administration and the opening committees and the entire Cornell community have made and are making to preserve our university.

CHARLIE VAN LOAN: Okay, that's fine.

CARL FRANCK: Thank you. Sorry for the interruption.

JILL: Is that Tracy Stokol that would like to speak?

TRACY STOKOL: Thanks, Jill. Just had a quick question. Can you clarify by what you mean, staff? Is it just university staff or does it include RTE faculty? I think that's really important, because if it just includes staff and not RTE faculty who are protected

as tenured faculty, then an alternative to said costs could be to furlough or lay off or not renew appointments of RTE faculty.

CARL FRANCK: I'd like to quickly reply to that, please, and I think Risa can elaborate. It's implicit in our words and in the comments that we've written that we consider RTE equally important. Our stress was really folks we saw most endangered by the comments.

It has been offered as an amendment, if you see in the comments, and I've tried to reply to that in the proper spirit; we feel it's very important to pass this resolution today, now. And for that reason, we don't want to make a mistake. But, please, I can't speak for all 108, but I think I do, I believe I do, we thoroughly support your comment, and we just didn't want to modify the resolution. 108 of us are a pretty unwieldy group to move.

CHARLIE VAN LOAN: Tracy, any follow-up? Are you okay?

TRACY STOKOL: The problem with implicit is that it's implicit. I'm not saying we need to have an amendment to this, but maybe just a footnote that this includes RTE faculty; because when I read this, I was like is this just staff or RTE faculty. And others had the same --

CARL FRANCK: Please look at our comments. We've tried to respond to that immediately this morning. I think that's part of the record. Risa, would you care to add a comment, please?

RISA LIEBERWITZ: Yeah, sure. Just to build on what Carl was saying, the reason for the focus here in this proposal, this resolution is because the administration, in

laying out the scenarios, was targeting the staff as the place where they were looking at the potential for furloughs or layoffs. And they were saying well, we can't promise that there won't be layoffs or furloughs of staff; and so that's where they targeted it and that's what this resolution was addressing.

But absolutely, in terms of what Carl was saying, the idea was to protect broadly all employment of people who are currently employed at Cornell. And that would be all faculty, which would be tenure track, tenured and RTE faculty. The broad protection is absolutely the meaning of this resolution.

CHARLIE VAN LOAN: Let me mention that, as we did last week, Neema and I transmit these resolutions, as they are passed, to the president and the provost. And we always put a cover letter in there that includes the kinds of comments that come up in the senate meeting that are relevant to the resolution. To the issue about RTE faculty, we can certainly include a comment about that in that letter.

CARL FRANCK: And I believe Joanie Mackowski has made a comment in the chat line along these lines also.

TRACY STOKOL: Yeah, I get that. But again, I personally would be a lot more comfortable if it was written. So Charlie, as long as it's stated somewhere, because it's not in the resolution. And from the chat, it's clear that I'm not the only one that is a little unclear about this.

CHARLIE VAN LOAN: We review the transcript and the chat and, if there are ambiguities and whatever, we try to set those right, so that's fully appreciated.

Carl?

CARL FRANCK: Please understand, we expected to go in with ten minutes for this, and we caucused on Sunday and we felt that we couldn't do more than present the resolution as is.

CHARLIE VAN LOAN: Are you happy with the presentation at this point, Carl?

CARL FRANCK: Yes, I am.

CHARLIE VAN LOAN: Okay, let's go to the next slide. I don't see any more questions. Next slide, please, Jill. I need someone to show their hand, saying they'd like to have a motion to vote on the resolution. Someone raise their hand.

Okay, we're up for a vote --

UNIDENTIFIED SPEAKER: Is someone trying to amend it in the chat?

CHARLIE VAN LOAN: Tracy brought up some points, and we talked those through, but there's no formal amendment --

CARL FRANCK: No amendment has been placed.

CHARLIE VAN LOAN: The usual thing, where you vote by chat. It's yes, no or abstain. And, please, only senators and alternates.

While that's going on, Jill, let's go to the next slide.

The main business today is to talk about the two reports that were released on Monday. One of them basically says if we're going to go totally online, here's how we should do it, here's how we can optimize it.

And the other one is we're going to have a measure of residential instruction, and here are some things to think about and to work on, if that is our chosen path. There's 150 pages of report. It's kind of overwhelming, but what we've done is kind of

picked out a couple of things that are pretty relevant and also things that we haven't really talked about yet in the senate.

We'll first have Julia Thom-Levy, who's Vice Provost for Academic Innovation. Julia was on the committee, the online committee. She also oversees the Cornell -- the CTI, Center for Teaching Innovation. And both of those things are highly relevant to the faculty, and I asked Julia to give a brief overview of both of them. Julia, are you on the line and unmuted?

JULIA THOM-LEVY: Yes, I am. Let me try to do a very quick summary. And I'm focusing on the report, our Committee on Preparation for Online Teaching, assuming that many or all courses are taught online. And before I start, I wanted to thank Courtney Roby, Neema Kudva. Many other faculty who were on this committee worked very hard, Mike Thompson, Maria Fitzpatrick and also our student participants; they brought a lot of diversity of opinion to this, and these were very important conversations.

And Courtney and Neema and I think others are here and may want to add to the few points I'll make in this summary. Among the questions in this particular report that we were asked to consider were what about curriculum, do we go ahead with a curriculum. What are the key challenges for effective teaching in this new format, using experience from the spring? And what are the technology needs?

And then Charlie particularly asked me to focus on one challenge, which is academic integrity in this new mode. I know that many of us have been struggling with this. Let me just start with integrity. Always been a problem, but we discussed how it's

confounded by the stress, by access to Internet while students are taking exams unsupervised, long exam windows. And really, we all know --

CHARLIE VAN LOAN: Advance the slide, please.

JULIA THOM-LEVY: Yeah, sorry. Summarize those -- undermining our ability to assess in a fair way where students are in their learning. For example, in Arts and Science, we've seen significant increase in suspected violations. And I wanted to just call out the service Chegg, for example, and Course Hero, where you can pay for post-exam questions and pay for answers to come back to you by tutors, and then also the practice that we suspect or have seen of students sharing answers among them in their networks, to the point where I think we're seeing academic integrity hearing processes breaking down.

It's a huge additional burden, in addition to everything else that instructors are shouldering last semester and over the summer. And Laura Brown and many others, Courtney have done a lot of work on surfacing and discussing these issues.

In the report, we recommend multiple approaches to this. Of course, completely depends on your discipline, on your course, on your students, whether you are freshman gateway course or not, so there's not a one-size-fits-all solution to this. Some of these approaches include alternative assessment strategies. Many of us have thought and implemented this. They need to be spelled out in a concise document.

For example, the CTI has lots of courses and materials on this, but I think people have called for sort of a short list of what we know, for that to be circulated. So Lisa Nishii and others are working on that. Reduced exam windows. The long exam

windows were introduced to help our students who were dispersed across time zones. We may continue to have some of that problem, but we should really think about exam windows.

Education discussion with our students about this issue. We're working with Chegg centrally, so I'm just coming from a meeting with them to push back and to voice our concerns and see what we can do, also collect information so instructors don't have to reinvent the wheel to talk about in-person exams.

And I think this is going into the calendar considerations to have before Thanksgiving -- obviously, no decision made, but could we even for online courses have as many in-person exams as possible. Depends on lots of factors, of course.

In talking to faculty groups, there seems to be little appetite for sort of a broad university-wide online proctoring solution. The obvious problems with this sort of surveillance -- and many instructors report that it actually also doesn't work; it's problematic, but we should have it in the toolbox for individual instructors who may want to use it, if no other solution is possible.

Let me just maybe mention this last point. You are dealing with Chegg and Course Hero and these kinds of sites. I'm skeptical what they can do. It's an emerging market, extremely successful, so I think we have to work on the things that we can effect, conversations with students, instructors, parents.

I wanted to raise if there's appetite to review the academic hearing process, many of our peers are moving to centralized support to move some of the burden from the instructors. Would be interesting to benchmark what others are doing and if this is

something that we may want to take on, since we're in this brave new world of new tools and how students are interacting with that.

Maybe just to -- we are working on guidelines, very clear information for instructors, hopefully helpful, and thinking about revisiting and reaching out to students, instructors, parents about this topic to address the challenges we've seen.

The other thing that came out very clearly is that going into the fall semester, if we have some fully online courses and some in-person with remote access, instructors may need some help to think about that; and so at the Center for Teaching Innovation, we are restructuring the website and thinking about what would be most useful.

Jill, if you go back one slide. This is not completely done yet, but we are thinking of a guided track -- if people are interested in learning about best practices in sort of the online course design, we have a guided track that will run throughout the summer for people to participate, and then also independent, small modules that people can peel away and use online assessment, how can I structure exams with rolling question banks and things like that, to discourage cheating.

Obviously, all of this has to be synergistically with what is happening at the department and college level. And the discussions, as in the spring, will be very locally people helping each other, what has worked, what has not worked. But if you have suggestions for other resources that should be made available, I'm interested in hearing that.

We've heard a lot through this committee work about resources, technology that is needed, software and hardware, and we're trying to help with sort of centralized bulk

ordering of things we will need for the fall, so that's underway. And if other ideas and suggestions are out there, please let me know.

Charlie, over to you.

CHARLIE VAN LOAN: Thank you, Julia. Any questions from faculty on this very important issue? We had a town hall on it, we talked about it in the senate. It's a huge problem, and we expect to work on it with some of the people that Julia mentioned, over the summer, to try to walk into the fall with a better infrastructure for handling this.

Joanie.

JOANIE MACKOWSKI: Thank you, Charlie, and thank you, Julia. I think, too, that the academic integrity issues that we encountered this semester could have been mitigated, had we implemented mandatory binary grading. We had that discussion, and I think that some of us just didn't realize the gravity, the intensity of what was coming.

So we had an opportunity to provide more space, less stress for students, and we missed it by insisting on grades and also -- my experience on the Academic Records Committee in Arts and Sciences, we had hundreds of petitions -- just so many cases of students who are below standards for reasons of stress.

And just looking at how there will be one transcript where a student has a combination of Ss and Us, and another transcript where the student with an A, a student with an F, I mean, it's all mixed up. And so I wonder about the students who down the line are thinking about their college experience and the A they pulled off in

whatever class -- in my class for sure, because I was handing out As like it was sugar-free gum. I think that we contributed to the problem of the academic integrity cases.

And I also feel that when students are coming into the semester, having chosen themselves whether to do an online class, I think it's going to be better. I don't want to be naive about it, because this is stressful. Students are young, they don't have the full rational decision-making capabilities, resisting stress and impulse, but we contributed to the problem; I just want to put that the out there. Thank you.

CHARLIE VAN LOAN: Buz, and then David Delchamps.

BUZ BARSTO: Thanks, Charlie. Joanie, first of all, you might recall, I was a very vocal advocate for not having universal pass. I really appreciated your arguments at the time. And now, as time has gone on, I'm really starting to question my thought process about that.

That being said, I'd like to sort of follow up on the resolution that Carl brought up. In addition to sort of technological fixes for cheating, you could almost think of this as being dope testing in sports. Is there some sort of psychological shift in our students that we could try to engender, much as we are trying to do in the faculty, where we sort of try to start to make people think less of themselves as being in it only for themselves and being on their own, and kind of being more in it together.

Excuse me if that's not very coherent, but can we make our students think more collectively and feel like they're less vulnerable, feel less that their lives are going to end if they don't get an A. And I'll leave it at that.

CHARLIE VAN LOAN: Thanks, Buz. David Delchamps.

DAVID DELCHAMPS: Question for Julia. Online courses exist at Cornell; I know that. They have existed for a long time. I've had many of my advisees take them. I've also served on Academic Integrity Hearing Board and chaired it for quite a while in Engineering, and I've never seen a case, appeal case for a student who was found guilty of an academic integrity violation in an existing online course.

And I'm just curious, did you folks look into the stats of that at all, find out whether existing online courses have an epidemic of academic integrity problems and that kind of thing?

JULIA THOM-LEVY: Yeah, you're right. I'm not aware of big challenges there. It might not have surfaced. I can look. I mean, there's online courses for external audiences, so that's different. I assume you mean --

DAVID DELCHAMPS: Yeah, for Cornell students. The thing is, I'm not sure, though -- these kids are taking the courses online, but maybe they have in-person exams because they're on campus; they just happen to be taking the courses online. I don't know. That's why I'm asking. I'm just curious. I'm not sure whether any kind of assessment that they use in these existing online courses would work for actual remote online instruction, but I'm curious what they've been doing and whether there've been cases there.

JULIA THOM-LEVY: So CTI works with many of the faculty who mount real online courses. The courses we're talking about for the fall will never be the highly produced, designed for a year kind of fully online courses. That's a lot of work.

At best, we can implement best practices and do the best job we can; but yes, they use some of the assessment practices, like many short assessments, not huge high-stakes exams. And those work better. We have the resources, if we are curious, to see how a fully online course does that. We do have those available at the CTI -- self-run track.

CHARLIE VAN LOAN: Neema.

NEEMA KUDVA: Thank you, Charlie. Thanks, Julia. Just wanted to add a couple of things, and Courtney can speak to this, I think better than I, but I'll quickly graze it. In terms of trying to understand what was happening with academic integrity, Courtney had a lot of meetings, brought people together. And I think many of the senators were on call, on a town hall we had about academic integrity.

We also had one or two conversations with student representatives from the SA, in particular. And what was interesting, and I think all of us need to hear this, was their accounts of a culture of cheating at Cornell and at universities and in high schools.

The kinds of stories that the students were telling us were quite disheartening at one level, because it spoke to a very broad kind of very widespread culture that just got sort of amplified during the pandemic, not because they were stressed by the situation as much -- I mean, some of them were -- but because it was so much easier to actually cheat, and it's online and it's anonymous.

So some of the take-aways, for those of us who were listening on or were part of these calls were that we, as faculty, need to make the ethical sort of dimensions and the ethical conversations in our classrooms super-clear.

Courtney had this fantastic sentence in response to one of the students talking about gray areas. She said you can come into my class and take an exam only with what's inside your head, nothing else. And I thought that was really -- that kind of took away all the gray zones.

Now, some of us don't give exams like that, but what it brought up again and again was how we manage our classrooms, the kind of ethical conversations we have and the standards we set. If I make it really clear to the students -- and it's hard. Some of our classes are small, we can create those kinds of relationships. Some of us are in joined classes where it's much harder, so how does one actually try and start this business of setting an ethical standard within the classroom is something that we need to think about.

And the mechanistic or more logistical ways one can do it are questions that have come up and are in the C-POT Committee report, the ways in which CTI is really thinking about the kinds of tools we can have and all of that, but it starts as a conversation we have in our classrooms as faculty. I think that's super, super important to emphasize.

CHARLIE VAN LOAN: Okay, thank you, Neema. I think we probably want to move on to our next segment here. First, Julia, thank you so much for coming, and I'm sure we'll be in touch over the summer. And I'm also sure that, when we come back in August, this will be pretty high up, because we're going to have to get things set up for when the students come back and follow up on these things.

So thanks again, Julia, and the faculty also fully appreciates CTI's work over the last few months, and we look forward to working with the Center in the fall. So thanks again.

Ever since this started, when we emptied out the dorms and people started thinking about dorms as cruise ships and so on, this has always been behind every -- in our minds a lot. Of course, we focused on classrooms and our courses and whatever, but this whole scene, the student life scene, what the dorms will look like, is clearly a primo issue. And Pat Wynn is here to give us an overview of what was written about this in the TRO report. So Pat.

PAT WYNN: Thanks, Charlie. I just want to say, as a staff person, how I want to thank you all for that resolution. That's really meaningful because I am a staff person, I'm not faculty, and I've been at Cornell now nine years, and it's just very meaningful, so thank you.

I really want to talk a little bit just about our planned move-in logistics and how we're going to try to manage the residential capacity. I have a lot of slides that aren't in this presentation that show the financial impacts of some of the ideas that we tossed around or were sort of given to us to consider.

One of those recommendations was to go to all singles. We did the math, and between the housing revenue that would be lost and the dining revenue that would be lost, it was going to be about a \$21 million hit to student and campus life. Basically, why bother. I mean, it would wipe us out. The spring really hit -- I mean, the spring hit us

hard. The spring hit us to about \$20 million, so to have another semester where we lost that kind of revenue, it just didn't make sense.

Plus, the real issue is in dedensifying the campus to that degree, all we would be doing would be pushing the problem to off-campus. Apartments that maybe were designed for eight people would have twelve people because students won't have any place to live. We are going to be hard-pressed as it is to accommodate all of the students who are applying for housing right now.

As of Monday morning, we had 3,333 undergrads who wanted on-campus housing, and that's right up against our capacity, and that does not include almost 500 transfer students who would like to live on campus. I don't know if you all know this, but only 46% of our students live on campus, and the remainder do live off-campus.

Some of our guiding principles in this, and I think this was pretty much common to all the reports, obviously, caring for our students, safeguarding the future of Cornell, maintaining our staffing -- so again, thank you -- and seeking new knowledge. We have to make these decisions relative to the level of risk we're willing to assume.

For our planning purposes, we're assuming a scenario with testing, initial testing and surveillance testing; masks are being worn all the time, unless you're in your own residence. Thermometers, I've already purchased thermometers for 30,000 people, so that's faculty and staff. We want anyone who comes on campus to have a thermometer given to them, in addition to a mask, in addition to hand sanitizer, and we're putting these together in little packages that we're going to hand out to everybody as part of the testing protocol. Of course, as much social distancing as we can accommodate.

One of the goals, safely move in about 7,000 students in preparation for an in-person, on-campus instruction of some type, add density to the campus in a very controlled manner, and then eliminate and mitigate the impact of the student move-in process on current volume of Tomkins County COVID-19 cases, which as of this morning, was one positive case.

Our assumptions are based on all students must be tested upon return to Ithaca -- that includes off-campus -- ability to set up multiple points of distribution for these testing; a testing capacity of at least 4,000 in one day, including weekends, and I'll refer back to that in a minute.

And we have two different scenarios. The first scenario is predicated on the idea that test results are rapid and are available within two to four hours. The second scenario is that test results will be available within 24 hours. We think that's probably the most realistic scenario, because even if the test results come back quickly in the clinical phase, the process of getting the information back out to us and to the students would probably take longer than that two- to four-hour time frame.

Positive cases must be isolated for 14 days. We are assuming that the southern tier region continues to demonstrate this very positive progress. We are going to put some pretty strict restrictions in place; for example, no parents, no families or visitors will be allowed in our residential buildings starting on day one. That means on moving day, parents will drop their students at a designated point and leave.

That means we're going to be restricting really, really heavily the amount of items that students can bring. We are suggesting you can have two suitcases and a

backpack. Some people heard that and fainted, but our international students have been doing this now forever, and it's time that the domestic students follow along.

I think the last point is one of the most important: There is no zero-risk scenario. It just doesn't exist, so the question is how much risk are we willing to accept. Here's Option 1. It's a four-day move-in. I know it's a little hard to see on this slide, because it was reduced dramatically; but basically, in this scenario, in a double, Roommate 1 moves in on day one, and then Roommate 2 moves in on day two, and then that just cascades through the whole process.

The idea here is Roommate 1 moves in on day one, they get tested, we have the results in two to four hours, we send them to the residence hall. If they test positive, we send them to a hotel. Then on day two, the roommate comes, they're tested, same process. We will be renting shuttle buses to move students from residence halls to hotels and back.

Minimal volunteers are needed because we're not going to let them bring refrigerators and freezers and all the other stuff they bring. And this would be predicated on a move-in of August 27, and classes would begin September 2. At no point are two students in the same room when both have not been tested and cleared.

This is the eight-day move-in, and I apologize that print is so small, but I can walk you through it. This was with a lot of guidance from Gary Koretzky on the Health Committee. He suggested that we try to move in as many students as we can on day one.

On day one, in this scenario, we would be moving in 4,000 students, and they would move into every room as a surrogate single. Even if the room has two beds, we're only going to move in one student on day one. We will have testing sites set up across campus. Most of them will be drive-throughs. We figure if we have eight drive-through locations, we can accommodate about 500 cars during the course of that day.

Students drive up, they either self-administer the test or someone administers it for them -- that's still to be determined -- the sample is given to the person who's monitoring the testing. The student is then driven to his or her residence hall. They will be instructed that they're under quarantine for the rest of the day, until the next morning, when the test results come in.

If you're negative, you're fine, you don't have to be quarantined anymore. If you're positive, we will take you to a hotel. We have already made arrangements with multiple hotels throughout Ithaca. We'll be paying for this. It's not on the student. And many of those hotels are very interested in having this business right now.

And several of the hotels have very strict cleaning protocols and room flipping protocols, actually to the point where in some of these hotels, if we put a student in on a Monday, they won't even rent that room to us again until Wednesday because they have a very strict cleaning.

For students who are arriving in public transportation, they will be asked to meet at certain hubs across campus. And we are going to be collecting this data prior to them arriving, so we'll know who's coming by plane, train, automobile. They will be put on shuttles and we'll probably do their testing in a large venue like Barton or Bartels, where

the shuttles can park, the students go in, they're tested and then we take them again to the residence hall.

On day one, we move in 4,000. On day two, we will receive results from day one. Another 800 comes in. On day three, no one comes in because we're waiting for test results. On day four, another 800 come in. On day five, no one comes in. Then 80, 0. And then if we need a day eight for stragglers, we built that into the plan. Again, at no point are two students in the room when both have not been tested and cleared.

I don't know if you saw the declaration from the governors of New York, New Jersey and Connecticut earlier today, where they are imposing a 14-day mandatory quarantine for students coming from hot spots -- and I'm going to do this list from memory -- I think it's Florida, the Carolinas, Arkansas, Alabama, Texas, and I may have forgotten someone.

The good news is, we don't have that many students that come from those states, except for Florida. When I got that information, I convened my team, and right now we're making plans on how we would handle this new wrinkle, so to speak. One of our ideas is that we would begin room assignments based on home states, because we have that information. So anybody from Florida will be rooming with someone who lives in Florida.

A lot more discussion has to happen around this. We just found this out a few hours ago. And I just wanted to say thank you, governors, for making this decision after we've made all these plans, but that's how it's been. It's been a roller coaster, as you know, for a couple of months.

Personal belongings, very limited. Restrictions will be placed. We will offer the option to purchase a dorm room essentials package through the Cornell Store, very reasonable prices. It will be similar to what you could get at Target or a Wal-Mart.

We're going to offer the option of pre-arrival in-room shipping for students through Big Red Shipping & Storage, which is a student organization. They're more than willing to do this. So we are going to provide parents and students with this information and, if they want to ship their refrigerator and the freezer, they have the option to do it. Big Red Moving & Storage will take control of it, and then they will move the stuff in a couple days prior to move-in.

Again, parents, guardians, family members, friends will not be allowed into the residence halls. Students will need to move themselves in with minimal assistance from volunteers. Actually, any students that we place in quarantine or isolation because they test positive -- I guess isolation -- the parents will not be allowed to even visit with them. That's going to be a tough sell, but we're going to be communicating these changes very soon and in great detail.

The community centers will continue to operate their normal status. Dining will be operating. We will provide in the residence halls meals for that first day. The 4,000 that move in on day one, we will have outposts assigned all through the campus with meals being brought into the kitchenettes that are all throughout the residence halls.

They'll get into the residence hall, whether it's 4:00 in the afternoon or 1:00, whatever, and there will be a meal waiting for them. They won't -- well, they won't be allowed to go to anyplace else, but in their residence hall. We'll have bathroom

monitors. We want to really make this very serious and make them really quarantine for that first day.

We are asking traffic and transportation to modify some of the routes to maximize campus circulation. We will have diagrams we'll provide to the parents for different check-in options, and students who have parking passes will be issued permits and directed to designated parking after the move-in. We'll have shuttle buses for any number of runs between hotels, residence halls, airports, whatever's needed, so that's a big logistical thing we have to resolve pretty soon.

There will be food service during the move-in. We'll have dining, snack and beverage stations set up at each location. We will provide isolation and quarantine delivery to hotel sites off-campus and residence halls on campus.

And for those of you who don't know, we did this throughout the spring, as we had patients under investigation and we were housing them in Hasbrouck, and in some cases we were housing them in Hasbrouck and off campus. We were delivering meals to both locations. And dining and retail operations will function, exercising precautionary measures in accordance with New York State guidelines.

That's it. One last thing; we are initiating a very aggressive social norming campaign, where we do express the message that we are all in this together, we have a shared fate, and everybody sort of has to play by the rules for this to work.

And it's not necessarily a message that necessarily resonates with everyone, but we feel it's really important to get this out there now; because if we do have students coming from Arizona and their rules are very lax, if any, and they can't just show up on

our campus and we say oh, by the way, here's all these rules you have to follow in New York State. We need to make it very clear from the beginning that New York State has its own set of rules and regulations that need to be followed and we expect everyone to be in this together. Thank you very much.

CHARLIE VAN LOAN: Thanks, Pat.

Let's open this up for questions. I think we all see how complex this is, but I'm sure we also have some questions. Some hands up, please. I know the chat line was busy. Questions for Pat? While people get unshy, let me ask you a question, Pat. When you map out all the strategies for the residence halls, behind the scenes, of course, is Collegetown, and the chain no stronger than its weakest link. I'm just wondering how you personally feel about that sort of relationship.

PAT WYNN: Well, I have been talking to a lot of students. I have a student group that I talk to once a week, and I've been talking to the landlords and I talk to them once a week, and they are already doing it, they're posting our social norming campaigns and our COVID-19 rules and regulations that have been created by Cornell, and they're posting our signs throughout their buildings.

All off-campus students will have to be tested as well, so we are going to send out emails that say we need the following information from you: Where you're coming from, how are you getting here, what date do you think you'll be arriving, what's your address, what's your phone number.

I don't know if you know this, but Cornell currently does not require us to have this information for students. It will be a requirement for this fall and hopefully going

forward. It's insane to me that we don't know where our students are. They will have to provide that information ultimately in order to be able to access Canvas. These are some of the gating mechanisms embedded in the C-TRO report.

CHARLIE VAN LOAN: Thanks. Kate Bronfenbrenner.

KATE BRONFENBRENNER: I was walking just in my neighborhood in Belle Sherman and I saw 20 students who had walked up from Collegetown. None of them had masks, they were all less than a foot apart from each other, and they were all actually laughing about how they were going to go up to the grocery store, East Hill Plaza, and they hadn't brought masks with them.

I'm very concerned that those who are in Ithaca already are not following the rules. I think we're going to have a very hard time not just with those who are coming from out of state, but those who are already here. It's going to be very hard to -- I saw there was the idea that we're going to have to try to find those who are in Ithaca, living off campus. That's going to be a very difficult group, those who have been living in Ithaca and trying to change their behavior.

PAT WYNN: We agree. It's the social norming campaign, it's this shared fate, and we're going to make it very clear that all it takes is one big party, where there's five people that are infected, they go spread it then to eight other people, and then we're done.

We are equally concerned, but the other thing is, we have not communicated with these students in any meaningful way. We have not started any communication with them at all, so I blame us a little bit for this. I think we should have been

communicating with them starting on June 1, when a lot of these leases came due, and we haven't communicated anything at all.

I'm hearing about parties, I'm hearing about gatherings. It's very dispiriting, it's very unsettling. However, in some cases, like we've had a couple of reports of parties at X, Y, Z house. Well, it turns out they all live in that house, so they're a cohort, so they're already sharing each other's air and snot and whatever else. They're already in it. It's those people who live on that street and this street and that street, and they're all getting together that is a problem.

We share that concern and we're hoping that their better selves will rise to the occasion, once we start communicating with them and once they understand the gravity of the situation. Again, we don't know where they came from. They all could have come from Arizona, for all we know.

CHARLIE VAN LOAN: Harold Hodes, then Joanie.

HAROLD HODES: I was thinking that for a 17-year-old, away from his or her family for the first extended period of time, suddenly being isolated for at least 24 hours, likely to be a pretty disturbing and depressing way to start one's college career. I wonder if there could be some kind of Zoom common room set up, so that students in those positions at least will have the opportunity of getting to know some of their fellow students who are also in those positions.

PAT WYNN: Harold, we're working on that. So the res life team is putting together a whole plan for that day that involves Zoom meetings, talking about the rules for bathrooms and tooth brushing and using the facilities, so we're already working on

that. And we want it to be fun. We don't want it to just be here's the rules, you got to follow them. We want to make it fun, we want the students to be able to introduce each other, understand what floor they live on.

What will probably happen is the RAs for each floor will create these virtual meetings with their team that are there. And then ideally, most of them the next morning are okay, and then they can do whatever they want, they're not in quarantine. They can roam the campus as much as they want to, but thank you. We are already talking about that. It is going to be kind of cruel to say parents, you have to go now, and we understand that as well, but there's only so many things we can solve for.

CHARLIE VAN LOAN: Thanks, Pat. Joanie, then Dennis, then we'll have to move on to the next topic. Joanie.

JOANIE MACKOWSKI: Thanks. I don't know if this has been addressed already, but Pat, there's no zero-risk way to do this. I'm wondering, though, about all the opportunities to perhaps negate the efforts. You know, students who test positive are quarantined, but then if off-campus students -- all the boundaries are permeable, aren't they?

PAT WYNN: They are. And Peter's going to talk about that, right after me, about some of the analysis that was done. But even for off-campus students, they will be tested upon arrival and they will be surveillance tested, so they will not be alone. Yeah, this whole plan is very permeable, but the economic impact to Cornell will be devastating and the economic impact to Tompkins County would just bring it to its knees.

JOANIE MACKOWSKI: The economic impact of what is devastating?

PAT WYNN: If we didn't have any in-person instruction this fall.

JOANIE MACKOWSKI: Yeah, thank you so much.

CHARLIE VAN LOAN: Last question from Dennis Miller.

DENNIS MILLER: Hi. I was just wondering how many positive cases can we tolerate in quarantine before we end up having to shut the whole thing down and send all the students back home.

PAT WYNN: That's a very good question, Dennis, and I think the answer to that has to come from the Health Committee. We modeled a 1% infection rate, which means we'd need about 300 -- Kate, do you remember the number of hotel rooms?

You're muted, dear.

KATE: It was 250.

PAT WYNN: Okay, so we'll have 250 hotel rooms available. The other thing to remember is when we moved out in the spring, that was done very abruptly. We had a plan in place to move out two weeks beyond the date that we actually did move out, so we had to really scramble to get all those logistics in place, and we ended up keeping 400 students on campus through the spring semester because they either couldn't go home or they didn't want to go home.

If, in fact, we have to shut down in-person teaching this fall and we already have a bunch of students here, we are talking about maybe not sending everybody home because of the disruption to their lives, the travel, the expense. A lot of this is being worked through levels much higher than mine, but there will probably be, I would

guess, 400 to 1,000 students who, again, either couldn't go home or don't want to go home and they end up staying with us through the semester, but it's a really good question.

CHARLIE VAN LOAN: Okay, thanks an awful lot, Pat. Clearly, this is an interesting topic, a very important topic, and we'll be following along over the summer how this plays out.

Jill, the next slide, please. Last, we have Peter Frazier, who was on the Teaching Reactivation Options Committee. Peter's in operations research and led the team that did some critical modeling and simulations that will figure heavily, I'm sure, in the decision about what happens this fall.

Peter. I'm quite sure we'll run over, and I don't really feel bad about that, so just want to make sure, Peter, you'll be able to hang on a little bit past 5:00.

PETER FRAZIER: I can do that, Charlie. I actually have a meeting at 5:00 that's about planning for this, but I can be a little bit late.

CHARLIE VAN LOAN: Okay, good. Here we go. So Peter Frazier, please tell us what you're seeing from your position.

PETER FRAZIER: Thanks, Charlie. Yeah, I have the -- pleasure is the wrong word, but I have been leading the modeling effort at Cornell, looking at COVID-19 and trying to support decisions about what we'll do in the fall.

Before I talk about what we're doing, I just want to acknowledge especially the Ph.D. students who have done all the work. They've been working late at night, responding to questions at the last minute, working over weekends, also been working

with Shane Henderson and David Shmoys in ORI. And then I'll also mention Yujia Zhang. She's a Ph.D. student in the Center for Applied Math.

And then I also want to acknowledge all the feedback and, in many cases, detailed reviews of the work that we're doing and help in estimating parameters from a number of people at Cornell, and then also people at Boston University that have a similar effort to this and were instrumental in a number of ways, and also at Virginia Tech.

In the comments this morning, someone posted a new article that just appeared in Nature that is very nice. It's titled "Five Ways to Ensure that Mathematical Models Serve Society." Before I talk about our results and how we came to them, I just want to take a moment to emphasize that it is really hard to do modeling in support of decisions, because people really want to know things with certainty.

And there's a danger that, when a model provides an output, people will take it literally, they'll think that this is a prediction, that it is what's actually going to happen. But unfortunately, especially in the context of this epidemic, that's knowledge that we can't provide because the results that we produce, they're really sensitive to parameters and to assumptions. Unfortunately, because this disease is so new, we don't know what the parameters are.

And then also, because of time pressure associated with needing to make decisions on a time table, we made assumptions that if we had another six months, we would have investigated and likely changed. And we're continuing to work on those, but what we do is we do not provide predictions about what will happen.

Instead, what we try to do is we use our models to try to articulate a range of possible scenarios, likely scenarios, and then to try to surface the results from those to stakeholders in a way that on the one hand balances the uncertainty about what we don't know and articulating that appropriately, but also acknowledges that we can say some things that are meaningful about how likely different outcomes are.

Oh, there's one other thing I want to call out. In the C-TRO report, there's an executive summary of the outcomes from the modeling; but that's only, I think, three pages. If you are interested in details, you can go to the URL that's at the bottom of this slide, or you can just -- I have it posted on my web page, and you can read our full report. And that has lots of details, may answer some questions that you might have.

Yeah, Charlie asked me to describe some of the input data and some of the key model parameters behind the simulation and to talk through the extent to which we're living off current pandemic technology. The way that our current -- we have a couple of different pieces in our modeling, but the main piece is a Python simulation that builds off a standard epidemiological modeling framework called an SEIR model, susceptible, exposed, infected and then recovered.

And we differentiate between someone being -- we build on that kind of standard framework and add a couple of details. One kind of detail we add is tracking of differences in age across the population because, in the Cornell population, that's really important. You have a really unusual heterogeneous distribution over ages, where you have a large number of young people who tend to be asymptomatic carriers and tend to have relatively mild health outcomes.

Paul says that URL flashed by too quickly. Yes, if you search for my name, you can just look at my web page and you'll be able to find -- okay, thanks.

CHARLIE VAN LOAN: Let me mention, the link is on the senate -- the meeting web page as well. It's right there, and it's a great article. It's very expository.

PETER FRAZIER: Thank you. That's great. There's a couple of extra things we add to the standard SEIR technology. We also add the difference between asymptomatic cases and symptomatic cases. That's another aspect that's really important about this disease, where the fraction of people who are asymptomatic is relatively large. Nobody really knows what it is, but anywhere from 20% to 50%. In some cruise ships and some specialized data sets, it's been 80%, 90%, so a high percentage. And people believe that to be an important aspect of curing the disease.

So it's a compartmental simulation, where we track the number of people in each of these categories and then we simulate forward in time and we track the number of infections and also the number of hospitalizations. There are a number of assumptions in here that if we had more time we would address. I'll call out that simulation does not include social network structure, unfortunately. And the way in which we account for contact tracing and also the way that age influence transmission is also approximate.

The key thing in all of this, to be honest, are the parameters. I mentioned at the top that the results are sensitive to model parameters; so in the report, Table 12 has a list of all the model parameters. Some of these are less important. Some of them are very important.

I'll call attention to this implied R_0 . We have three different parameter settings: Nominal, optimistic and pessimistic. The numbers that you'll see in the executive summary are from the nominal setting, but we also, to some extent, assess sensitivity by looking at these other parameter settings. And this 2.5 is the number of secondary cases that result from each primary case in a setting without intervention and without any immunity.

So the 2.5 number is the CDC baseline recommended number. Basically, we are assuming in our student population, with extra interventions like masks and extra cleaning and messaging campaigns around social distancing, that we'll have a rate of growth without intervention that's comparable to what we saw in the general population without those measures.

The results are sensitive to parameters. If you want to dig in, and I encourage you to do so, you can see plots like these which vary individual parameters, and then look at outcomes, infections and hospitalizations under our three different sets of parameters. Here, I'm just showing two different sensitivity analyses, but you can see sensitivity analyses with respect to most or all the important parameters.

Let's go to the next slide. These sensitivity analyses are actually not in the report. We didn't realize how important the -- we did an analysis of virtual instruction, and we didn't anticipate how much interest there would be in that and how that would play a role in decision-making.

Last week, we did a collection of additional sensitivity analyses, so that setting. You can see these here, if you want to dig in. I imagine many people have read the C-

TRO report, and one of the things that's described there is that virtual instruction is likely to result in worse health outcomes than the residential fall semester, under the assumption that some students would come and live in Ithaca or are already here in a virtual instruction setting and that we would have difficulty doing asymptomatic screening for them. We would have trouble mandating that and it would be difficult to ensure high compliance, if we weren't able to mandate it.

Essentially, what happens in the model, without screening, is that if the virtual instruction students have frequent enough contacts between each other to bring their R_0 far enough above 1, you get an uncontrolled epidemic that infects a significant fraction of that population.

What that means is because the asymptomatic screening that we're planning on doing is controlling prevalence really well in the residential population, as long as we can do it frequently enough, then even if the student population here under virtual instruction is a factor of 2 smaller than residential student population or even a factor of 3 or 4, or even 10 smaller than we have in the residential instruction setting, then you get more infections with virtual instruction than with residential.

It's a really important question to understand how robust that conclusion is to assumptions. And if you dig in, you can sort of piece together robustness with respect to different parameters being assumed. While there are parameter settings where it isn't true, where actually virtual instruction results in fewer infections than the residential, the conclusion is robust across a wide range of parameters that seem to be set that will include what will happen in the fall.

The way I think about it is that we don't know for sure that residential instruction is better than virtual; but in the most plausible settings where virtual provides fewer infections than residential, it's because contact rates are low.

The thing we were just talking about with students walking around in Collegetown in groups of 20 less than a foot from each other, the parameter settings in which virtual instruction are safe are ones in which that happens very rarely. If that happens rarely, then the residential semester is also likely to be safer than anticipated. In that sense, despite all the uncertainty we have about the right parameters, what we know suggest that residential is the lower risk, more robust option.

This summarizes the numbers that are in the report under the nominal parameters, but given significant uncertainty about parameters, I do also urge you to look at those other plots, so you can form your own opinions.

There's a question in the chat: Lower risk for students, not faculty. Actually, lower risk for students and faculty, yeah. Just maybe one other -- lower risk per student and faculty, under the assumption that there is some nontrivial amount of interaction between faculty and students in Collegetown, or faculty and the broader Tompkins County community; because if you have 60% or 70% of students in Collegetown that are carriers for the disease, that creates a really significant number of infections more broadly in Tompkins County. When you're on campus in that setting, you're pretty safe, because we're testing. But when you go to the grocery store, when you go to the gas station, that's when it fails to be safe.

Let me stop there and answer questions.

CHARLIE VAN LOAN: Thank you very much, Peter. Michael Mazourek.

MICHAEL MAZOUREK: Thanks for the presentation. I have one question; in the chat earlier, but you are the one to ask here now. In the models, as you look at the role of testing and the asymptomatic cases, how are you determining the accuracy of that?

And I say that because someone that was -- when GreenStar thought there was an exposure, I was very surprised; at least one iteration of the Department of Health recommendation was get tested, quarantine anyway, see if you're symptomatic, and then get retested. As someone who does PCR in his lab and with the students and sees some of the sampling videos where they're not doing it right, how do we determine our confidence in the test and how is it evolving or changing?

PETER FRAZIER: Yeah, that's sort of a two-part question. There's a question about what do we assume in the model and then what are we doing in order to make sure that we can actually execute in reality. What we assumed in the model was 90% sensitivity and a very high specificity, I think a half a percent of false-positive rate. And then we also look at sensitivity with respect to that.

What matters for control of the epidemic is the false-negative rate, because when you miss -- oh, I should also say the other thing we assume is that the probability of detecting a positive case is zero during the early stages of your disease, when your viral load is low.

MICHAEL MAZOUREK: Maybe the coming to Cornell, the traveling to Cornell phase.

PETER FRAZIER: Totally, yeah. We have two different kinds of -- the model I talked about mostly here, or almost entirely, was our Python compartmental simulation of the epidemic during the semester, but another component is an Excel-based simulation or calculation, really, of gateway testing.

Part of that gateway testing is modeling -- so the gateway testing just means like when students return to campus. We had talked about doing a test remotely before they come, if that's available for students, and doing a test when they arrive. A reason that we can miss a positive case is because of exposure during transit, and that's in the low-viral load stage and we don't see that.

So yeah, that's included in the model and is one of the -- that's a main danger that that can happen. That's a bit about the modeling assumptions that we make. How do we actually make sure that we can -- if the false-negative rate is 20% instead of 10%, then what you end up seeing is that we do see more infections. It doesn't result in an uncontrolled epidemic, but it is something we should avoid, if we can.

So how do we avoid that? I believe the current plan is to execute on two parallel testing efforts. One is with Cayuga Medical Center and the other one is with the Animal Health Diagnostic Center in the Vet School. And part of the equation is to do pool testing, and we're currently evaluating relatively small pools in order to ensure -- in order to make it really likely that we're going to be able to build this thing in time and to get good sensitivity.

And we're also doing testing now. So CMC recruited ballpark, like, 1,000 people from ILR and Human Ecology and CALS, I believe, this past week; basically developing all

those assays and testing them out and making sure that our sample collection and all that capability is wired, so that we're confident that things will be okay.

CHARLIE VAN LOAN: Thanks. Like to get to two more questions, because Peter's going to have to go. So Car79.

KRISTIN ROEBUCK: Hi. Kristin Roebuck. Thanks, Peter, for all of the work that's gone into this. Really impressive report. I've been studying it and I do have a question and a kind of concern, which has to do with the parameter estimated 8.3 contacts per day. Strikes me as radically underestimating what happens if students attend any classes at all.

If they attend classes, then they're going to be sitting for an hour to two hours in a room, as will all faculty, with several times more people than that every time they go to class. So this model seems to assume that people are coming back to campus, but are not in classrooms, and also that they're not at any social gatherings, that they never attend parties.

That strikes me as really leading to a really misleading and perhaps dangerous estimate of the kind of public health risk you're actually going to see if we reactivate and return to business as usual, especially given that six feet of distance and masks, they don't prevent viral spread when you've got people sitting next to each other for one to two hours at a time.

PETER FRAZIER: Yeah, thank you. That's a really important question. I would refer you to Section 2.5 in the report, where we talk about that in detail. If you were to double the number of contacts that we're assuming and cut the transmission rate in

half, the transmission rate is 2.6% per contact, then the expected number of infections transmitted per day would be the same and you wouldn't see exactly the same results from the simulation, but it would be very close.

The thing that I urge you to focus on is the product of those two things, and it might be a hard number -- contacts per day is like something that we can observe in our day-to-day experience, sort of; whereas contacts per day times transmission per contact is not something that any of us have, fortunately, direct day-to-day experience with.

The number to kind of like have in your head and to ask whether you believe it or not is the R_0 . So it's that 2.5 number. I discussed earlier sort of how that was calibrated. And that is a really important number. If that number rises, then things are problematic.

The nominal testing frequency is once every five days. And with that once-every-five-day testing, kind of what you see is that as you increase contacts per day times transmission, as you increase it, things get worse, but they get kind of like gradually worse. And then, at a certain point, which is roughly double the current contacts per day times transmission, that's when the R_0 after intervention grows above 1 and you start to see an uncontrolled epidemic. It's a very important number to worry about.

The other thing I'll say is that we'll be testing, so we'll see what the prevalence is and we'll be able to know that it's growing faster than we had anticipated, and then we can do two things: We can increase testing frequency and we can also use results from the contact tracing that we do in order to understand where those contacts are coming

from and where those contacts that resulted in transmission came from. And then, with that information, the optimist in me says that we'll be able to address that.

KRISTIN ROEBUCK: Can I just ask a follow-up question, then?

CHARLIE VAN LOAN: We're at 5:00, and I -- if you could post it on chat, we'll make sure Peter sees it, but I want to get to one last raised hand, which is Steve Ellner.

STEPHEN ELLNER: Hi, Peter. First of all, thank you for doing all this work. This is just an amazing amount of work under amazing pressure, in a very short time. I'm just sort of in awe at the amount that you guys have accomplished.

My question is actually very much related to the last one about that magic number 8.3 and what figure enters the comparison between virtual and residential instruction. I think what worries a lot of people about residential instruction is that that's going to increase the number of contacts.

And if I'm reading things correctly, you're assuming that bringing people onto campus and into dorms and dining and all that kind of stuff is not going to increase the contact rate relative to what it would be for virtual instruction. And I'm wondering if you could talk about why that assumption was made, because I think a lot of people are worried -- I would be worried that you'd have a large increase in contact rate because of bringing people onto campus.

PETER FRAZIER: Yeah, if you can go up one slide. That slide specifically addresses your question.

STEPHEN ELLNER: Well, I was thinking about the one if you increase the probability of transmission, in the bottom left corner, that's equivalent to increasing the contact rate.

PETER FRAZIER: That is true. Okay, there are two different ways you can answer the question. One would be that you keep in mind the number from the virtual instruction scenario and then calculate what that is as a fraction of the population, and then we vary the transmission likelihood per contact on the bottom left corner, nominal value is 2.6%. This is a log scale.

That's definitely a way to do this, but I think the next slide down is better, because what we are doing here is -- if you look at the upper row, the upper left row, it's showing the percent change in expected contacts per day between the residential setting and the virtual setting. The reason that we took no change as a nominal value is because, number one, to be honest, we did not understand the extent to which this particular aspect of the analysis was going to be so important, but the other reason is that there are two things fighting against each other.

You definitely worry about dorms. I worry about dorms; but on the other hand, if students are in an unmonitored -- before, in Pat's presentation, we were worrying about conditions in Collegetown and the fact that it's monitored not as well and that probably social distancing norms are not as well enforced. And in a dorm, we can ensure that there's regular cleaning of bathrooms, regular cleaning of surfaces; whereas this is much harder to do in a private residence. So those two things were kind of pushing against each other.

Part of me wanted to raise the expected contacts per day in the virtual instruction scenario. That's why the nominal value was zero, but it's totally appropriate for people to disagree with that. This graph, the upper left one, will let you understand the effect of that.

It's a lot to take in, but there's a line there that's labeled 1,600, and that is -- sorry. There's a line there labeled 1,200. That's the number of infections that result in the residential setting. Up and to the right of that 1,200 line, those are the parameter values for which virtual instruction results in more infections. And you can see kind of how many that results in.

If we were able to have only 4,000 students living in Collegetown in a virtual instruction setting and we were able to -- and that resulted in an expected number of contacts per day that was half of what was true in the residential setting, so that would be a break-even point.

CHARLIE VAN LOAN: Thank you very much. Peter has to go to another meeting, but let me send around the synopsis. There will be places where you can post questions for Peter on our website. We'll make sure he gets them. And over the summer, we'll make a point of being in touch with Peter as the model gets refined, decisions are made, and so on. Peter, thank you so much, and thank all your colleagues for helping us understand this and for participating in this very difficult decision upcoming.

PETER FRAZIER: Thank you for all your questions, and keep them coming.

CHARLIE VAN LOAN: Very good. We're at 5:00, but insofar as -- people can certainly go whenever they want, but we'd like to sort of wrap up with maybe a more

general discussion. Let me sort of motivate it this way. A bunch of us have been serving on those reopening committees. We've seen a lot of stuff; as you can sort of sense, is an overwhelming amount of data. Everything is related to everything else.

I thought it would be interesting to ask -- I started out by saying Chris, Shorna and Courtney. From what you have seen, how has your view of things changed over these last couple of months? And then Shorna said well, I think you and Neema should also be included in this. So why don't we step through; we have two minutes for each person, just to mention one or two things that were counterintuitive or that you changed your mind about or anything whatsoever. And let's just go down the list, so starting Chris.

CHRIS SCHAFFER: Thanks, Charlie. Chris Schaffer from Biomedical Engineering. I guess I've been very pleasantly surprised by the pace and the smoothness, at least so far, of the reactivation of research activities on campus. At this point, basically, everything is reactivated on campus, with the exception of in-person human subjects research, but there's draft policies for reactivating that that were circulating earlier this week, and I anticipate those will be rolled out soon.

There remains some ongoing desire for using on-campus spaces for things that it's not strictly necessary to use the on-campus space, so it would be easier to be more productive if you were able to use an on-campus office; but in terms of gaining access to labs, initial gaining access to library resources, studio spaces, things like that, it seems like processes have been going well. I guess I'm pleasantly surprised.

CHARLIE VAN LOAN: Shorna.

SHORNA ALLRED: Thanks. I just wanted to mention that in terms of the Reactivation Committee, one of the things that really -- I'll share something that surprised me, and a little preamble to that first is just the enormity and complexity of the process and the number of actors involved.

It's been really heartening to see all of the Faculty Senate members, everyone that participated in the sounding board groups and the messaging strategy, the Faculty Senate, all of the graduate town halls that were held with students.

It's just really been heartening to see everyone come together and share their input and have an opportunity for input and the process, which was something that was very important to me, as a Faculty Senate rep, to make sure that faculty and students' voices are really central to this process, including the idea of personal risk, which was something that really was a strong theme throughout a lot of the discussions and I think factors heavily in the report, which I'm happy to see. I just wanted to mention that.

And as an educational institution, we serve our students, we serve the local, global communities through our extension and outreach engagement work, and we're also a major employer. And so it's such a complex decision to really think through and, just as the presentations have advanced in the call today, but I would say the thing that surprised me the most is what we were just talking about with Peter's model; that I think I had the perception that a virtual semester was perhaps the safest route to go.

And the modeling results cast some doubt on that as the safest scenario, so that really changed, I think, my thinking about rates of infection that might occur, even if we were to go completely virtually online, even if there weren't 9,000 students that were

living in Collegetown, if there were even fewer. So that was something that was surprising and really helped me sort of see this in a different way.

And just the sobering thought that in any scenario, virtual or residential, neither of them are a zero-risk scenario; so that's something that I always take with me, is that what we're really trying to decide between or make recommendations on is just a really challenging situation, regardless of which route we go, so what's the best scenario to mitigate risk for faculty, for students, for the Ithaca community. I just wanted to share that, and grateful for everyone that was part of the process and took their time to contribute.

CHARLIE VAN LOAN: Courtney.

COURTNEY ROBY: Thanks. It's late in the day and late in the year, so I will be very brief and just echo what Shorna says about the buy-in and levels of contributions that we had from different constituencies, which for me, it became apparent that these problems look very different to these different constituencies; so they look different to students, different to administration and different to faculty. While I think that the C-POT report speaks mostly to that administrative audience, as it should, it's mostly about what kind of resources do we need to request from administration.

For me, perhaps the most valuable part of this was the time I spent in consultation with faculty from all over the university, but especially the faculty that was on the committee with me. I compiled those conversations into a brief document, which I'll just drop the link into the chat. That's kind of our faculty-facing set of reflections on online teaching.

CHARLIE VAN LOAN: Thanks, Courtney. Neema.

NEEMA KUDVA: Thank you, Charlie. So when all this started, Charlie, trying to put a process together that will be transparent, that would include as many people as possible who were interested, who could make the time to engage, and we were feeling around in the dark. This was incredibly complex.

I think one of the big sort of learning pieces for me is that thinking through that process carefully, which we tried to do and put in place seems to have worked, to some extent. We had three very strong Faculty Senate voices on these committees, we were able to bring students on, and so it sort of just underscores the importance of all of us faculty, of us participating in these kinds of decisions, because at every point within C-POT, within C-TRO, watching Shorna and Chris and Courtney work, you could see that the ways in which the conversations were sort of being approached was changing. I take that away from this whole process.

I think a lot of times when we, as faculty, don't feel very empowered in this institution, but this has been a moment when our contributions have made a big difference. That is a big part of it, one big part of it for me.

The other big part of it is how things keep coming back to that faculty-student relation. Whether we're talking about integrity, whether we're talking about taking things virtual, whether we're talking about working with our graduate students and taking the research project or research agendas forward, it keeps coming back to that relation. I think holding that close to ourselves when we negotiate all this uncertainty

and risk that's going to be there in front of us in the next year seems to me to be very important. It's been fantastic working with Charlie. So thank you, Charlie.

CHARLIE VAN LOAN: As Courtney says, it's late in the year, late in the day and everything else. I'd just like to relate two things that I think I've learned, and I hope I learned, because at some point, we're going to leave the pandemic behind and we might go back to our old ways; but like many of you, I've taken a lot of thing for granted over my career.

And I want to mention two things I think the pandemic has really changed me permanently on. The first thing is I think I've learned not to take for granted the sacrifices that are involved when a family sends their kid here. I was sort of -- I read through all those 900 comments we had from mostly parents and undergrads on the various calendar options, and just the volume of the impassioned statements really affected me. It was sort of like visiting a disaster zone and just talking to people; you couldn't promise anything. But just to see that really, I think, sort of affected me.

I think right now, empathy across the students, staff and faculty constituencies is at an all-time high, because we're all in this together, and I hope somehow we can use that in the fall and beyond to take us to a new level.

Then the second thing that I feel I've learned is I never want to underestimate just how difficult things are for the current generation of young people, who hope to join our ranks as professors and so on. I think when you look at higher education, at least when I do, I feel that the density of broken dreams is highest among the grad

students, the fresh Ph.D.'s and the post-docs. And that, to me, is a major, major concern.

I think my generation has to sort of reframe how we think about retirement, that becoming an emeritus faculty member is a great thing. I've been working on this for the last four years, but it is really now imperative that when you do retire, if we do it right, you don't really leave the university and still contribute to its operation.

Those are the two things that I think I've learned the most from. But I'm worried because we always slip back into our old ways when the crisis passes; but this has been so profound, I don't think I ever will.

I and the others usually hang around afterwards. We sort of think about it as this hallway chat, and I'm happy to hang around and just talk with folks. We can still use the raised hand. A lot of information flowed our way today, and we'll be in touch over the summer. If you've got to go, thanks for hanging on this long. In any case, we'll just stick around, Neema, myself and the others, to answer questions as they sort of surface. If I had a gavel, that's the end of the senate meeting.