



UF HSC Coronavirus Symposium

Introductions

Scott Strome, MD

Executive Dean of the College of Medicine

April 6, 2020

Jon McCullers, MD

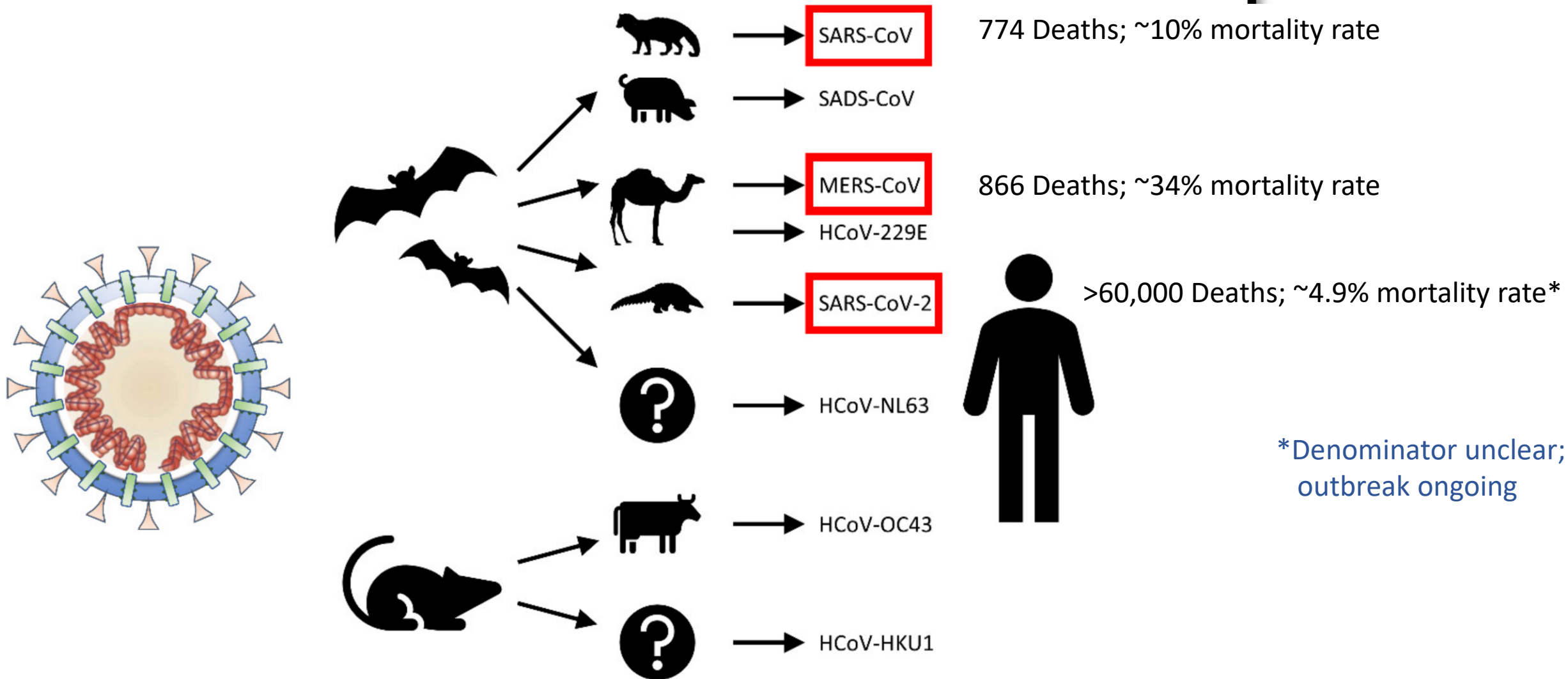
Senior Executive Associate Dean of Clinical Affairs
UTHSC College of Medicine
Pediatrician-in-Chief
Le Bonheur Children's Hospital

The COVID-19 Pandemic

Jon McCullers, MD

Senior Executive Associate Dean of Clinical Affairs
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Coronaviruses



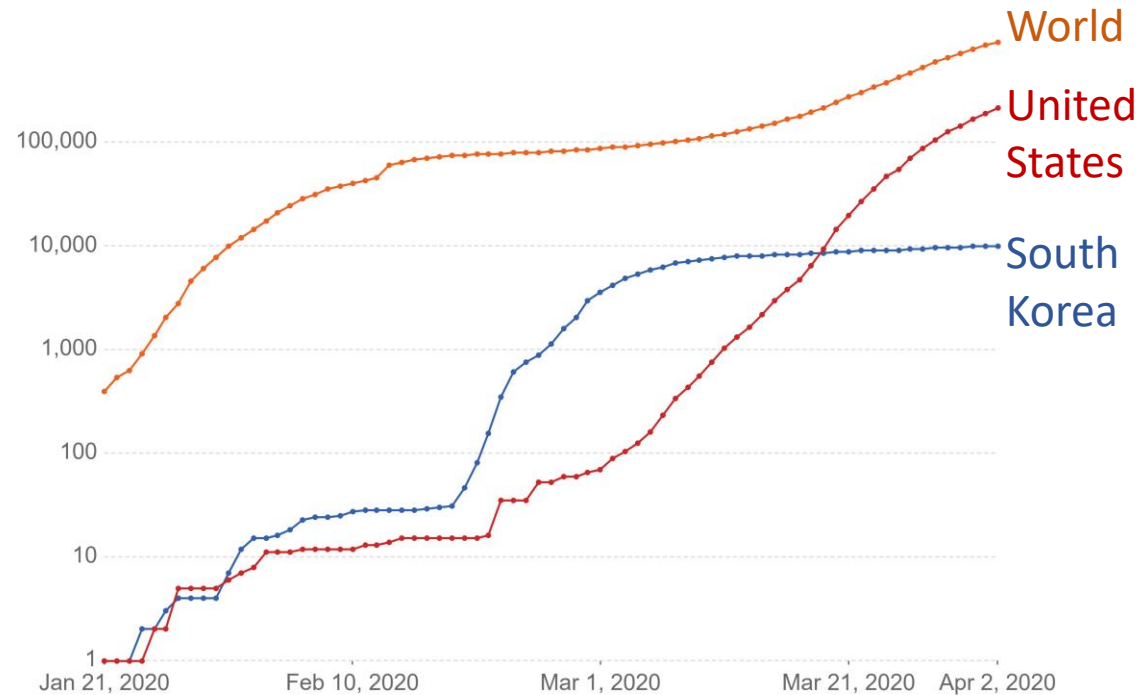
*Denominator unclear; outbreak ongoing

US vs. South Korea



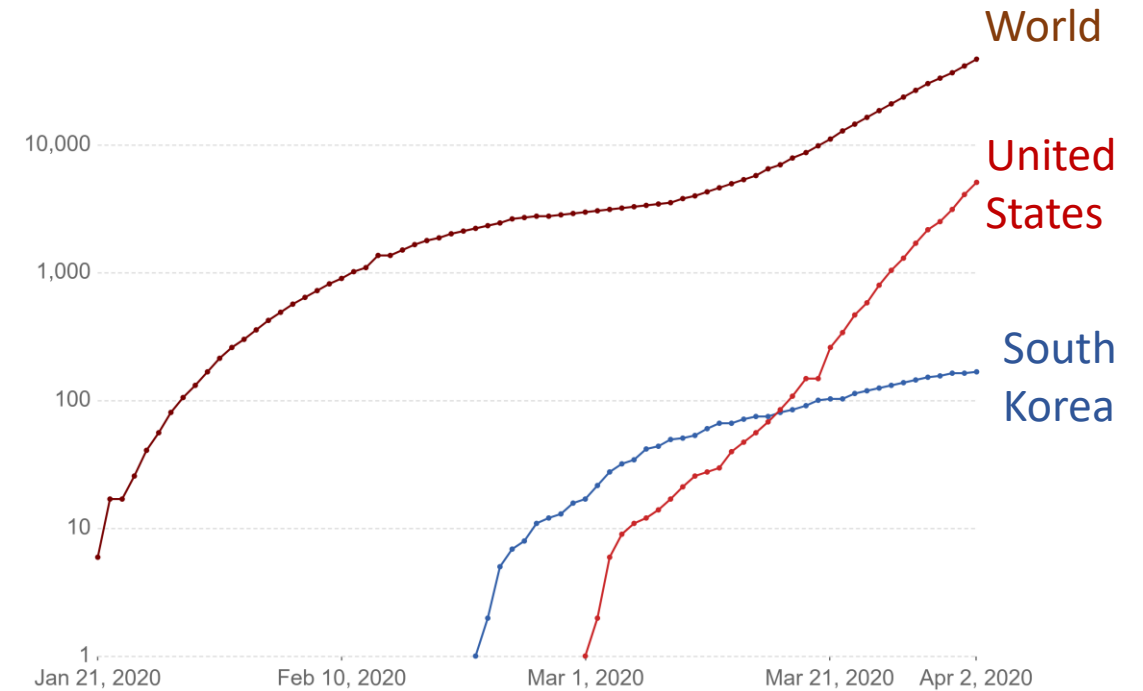
Cases

Total confirmed COVID-19 cases



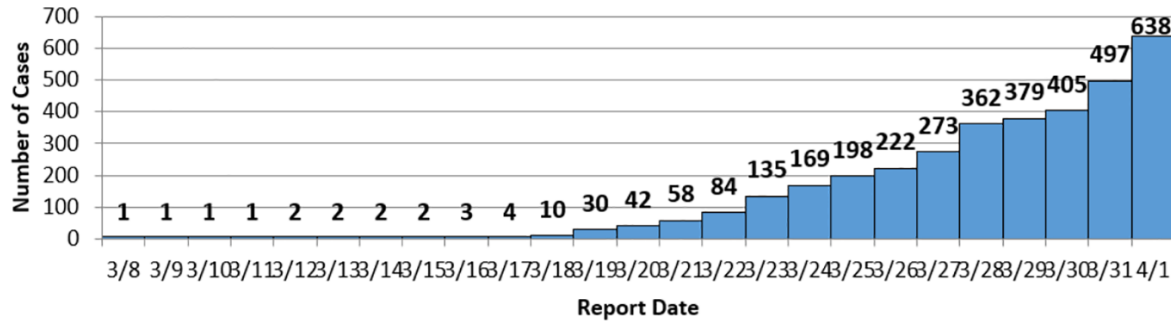
Deaths

Total confirmed deaths due to COVID-19

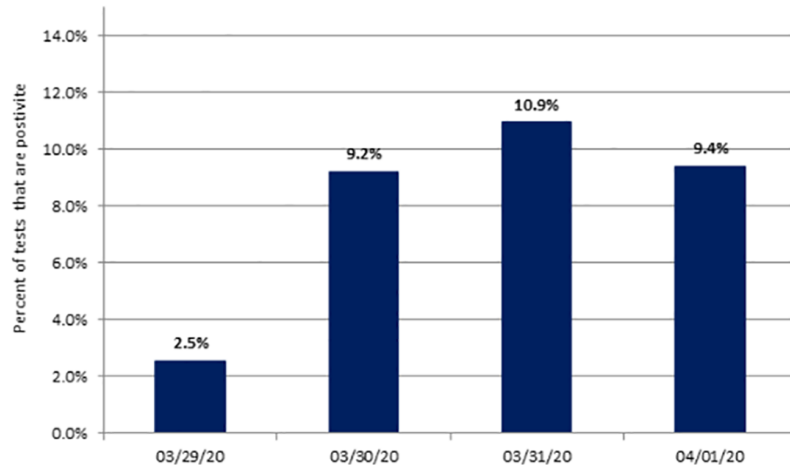


Data as of Thursday, April 2nd

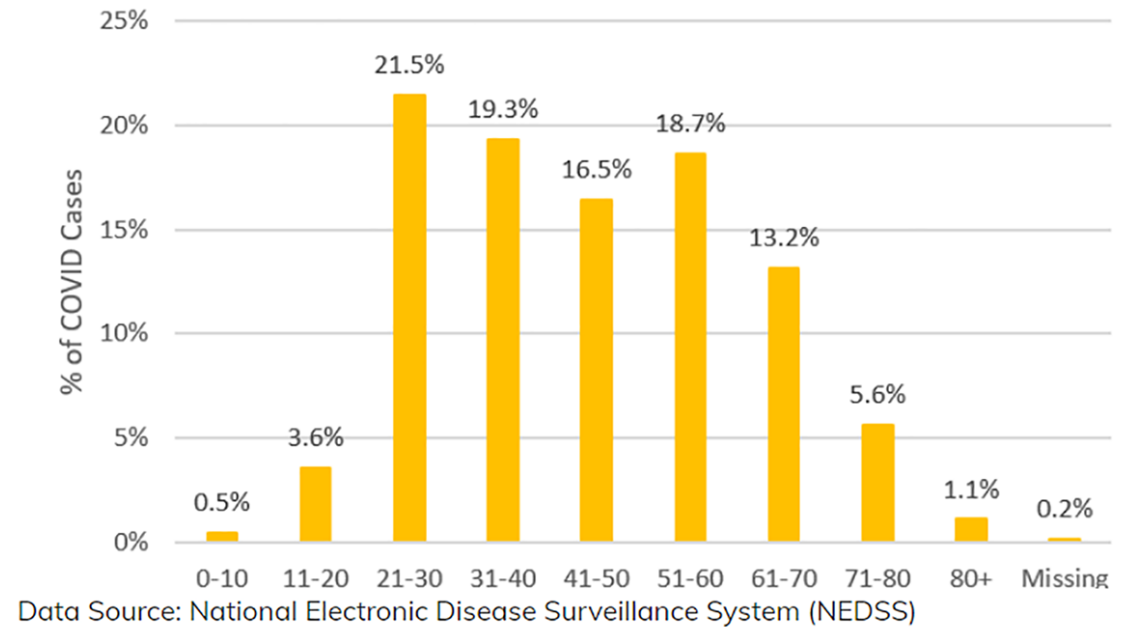
Shelby County COVID-19 Cumulative Case Count



Shelby County COVID-19 Testing Positivity Rate, 4-01-2020



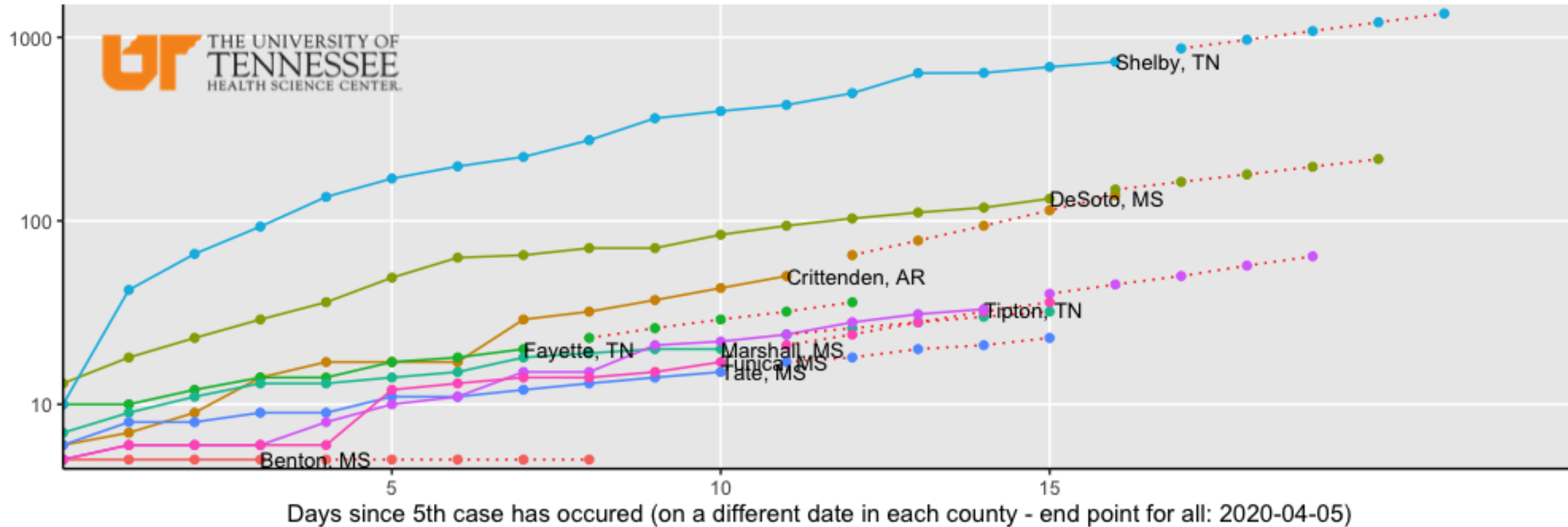
Percent Shelby County COVID-19 Cases by Age



Data as of 4/1/20

Memphis Metropolitan Area: COVID-19 confirmed cases trajectories by county

Short-term forecasts for each county extrapolated from past 7 days in that county

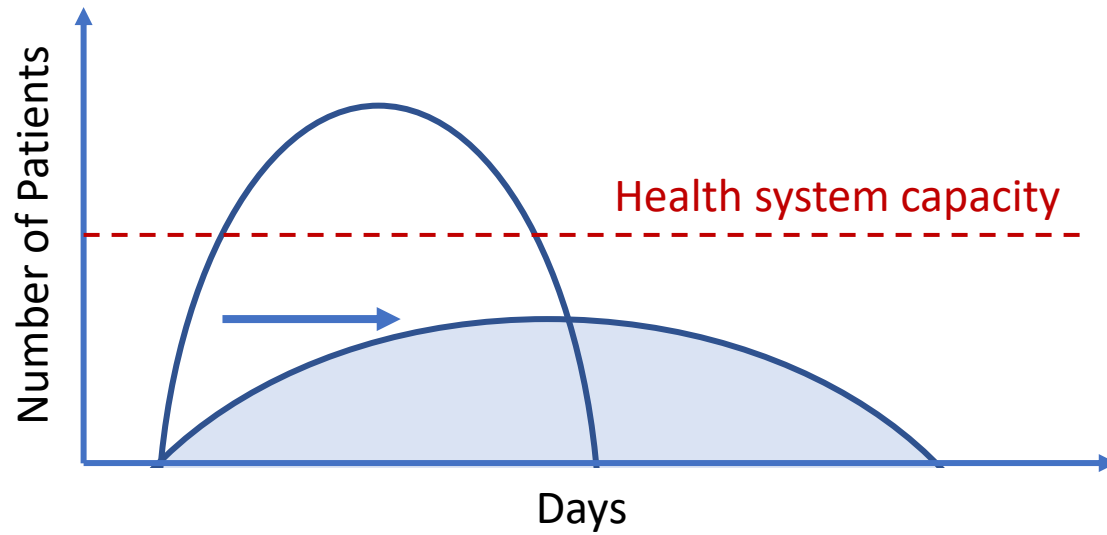


Source: Data from Johns Hopkins University (github; accessed Sun Apr 5 20:50:31 2020); UTHSC College of Medicine | Preventive Medicine | Biostatistics.

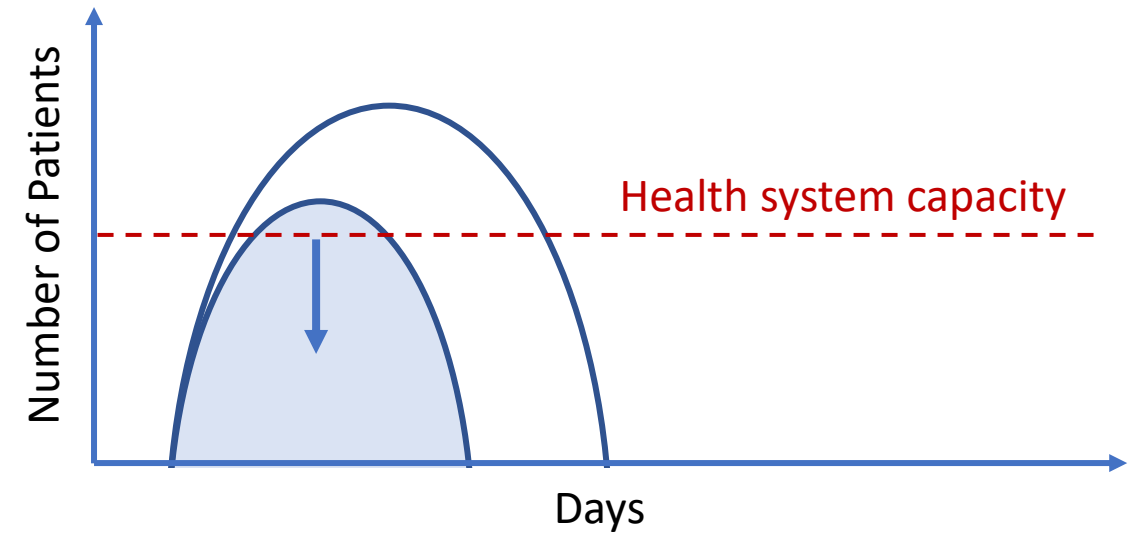
- March 17, 2020, declared a state of emergency for the City of Memphis
- March 19, 2020, issued Civil Emergency Proclamation and Executive Order closing restaurants and bars for on-site consumption as well as closing gyms
- March 21, 2020, issued Civil Emergency Proclamation and Executive Order providing for the additional closures of entertainment and recreational establishments
- March 24, 2020, issued “Safer at Home” Executive Order
- March 27, 2020, closed all city baseball fields, soccer fields, softball fields, basketball courts, dog parks, and skate parks
- March 31, 2020, restricted all access to city parks and closed Riverside drive

Impact of Mitigation Strategies

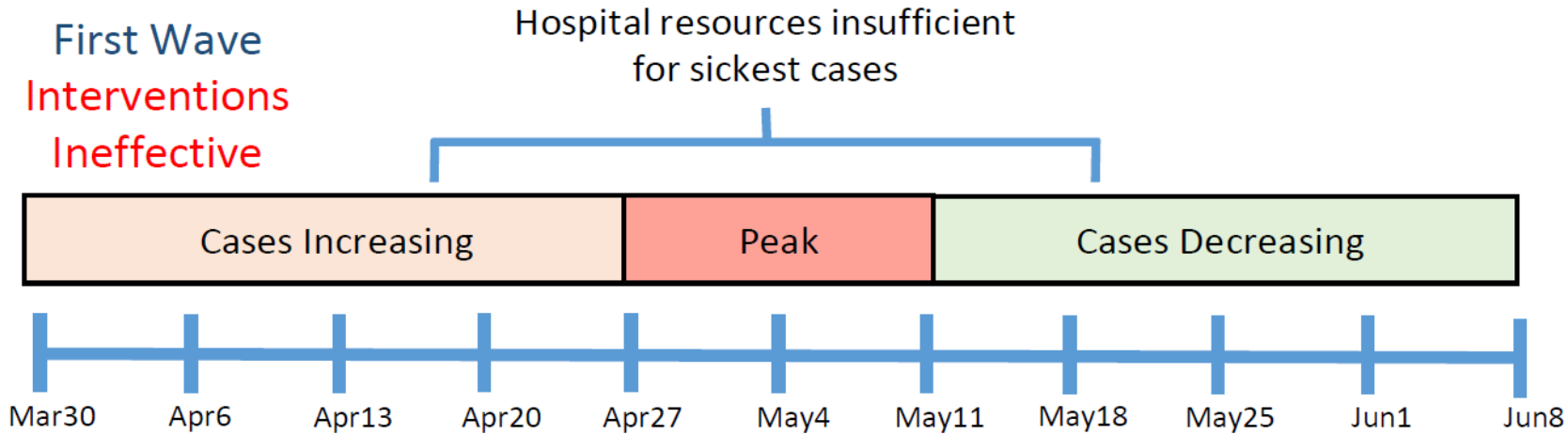
Will we “flatten the curve”



Or truncate the first wave?

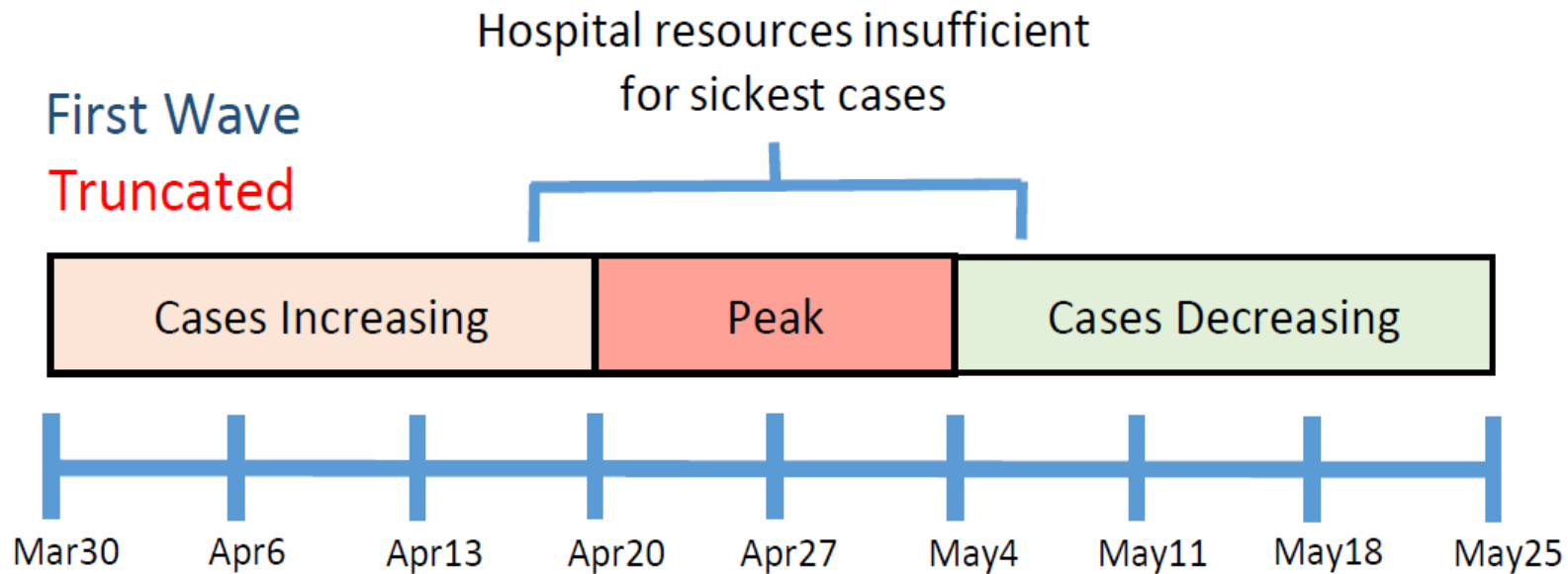
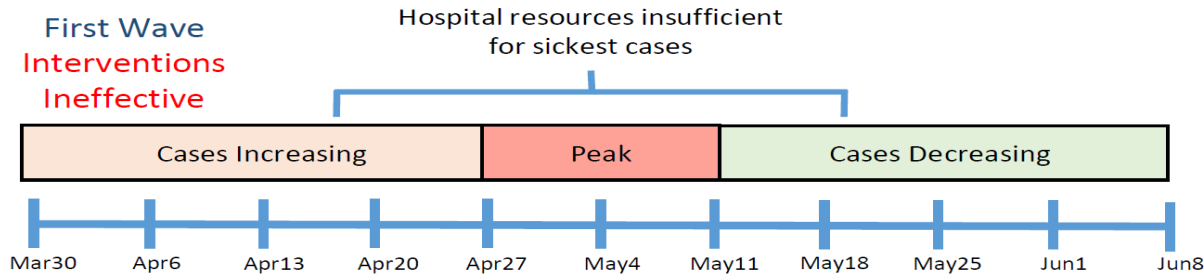


Potential Timelines



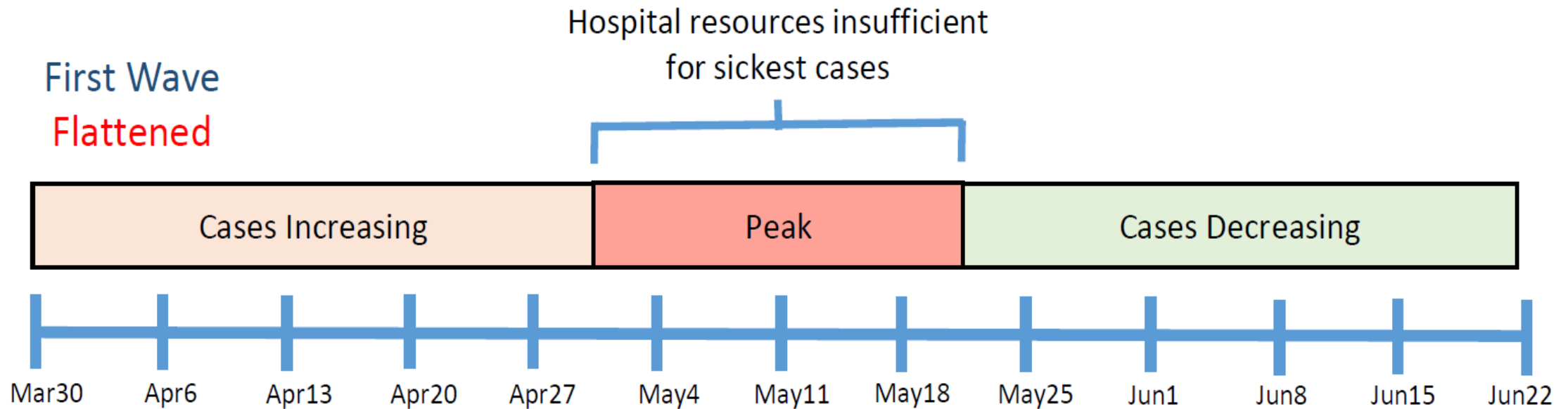
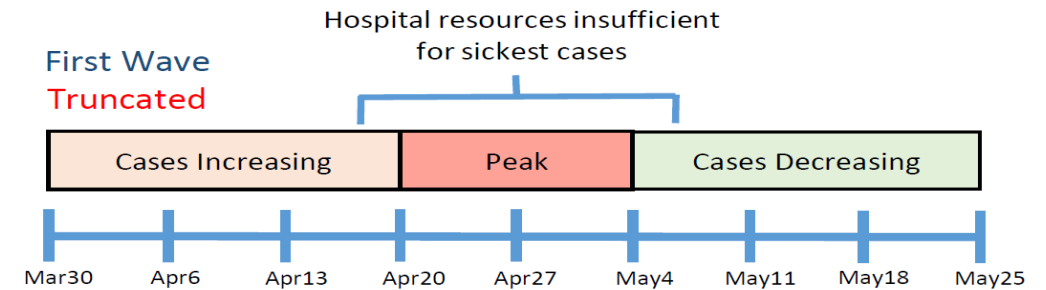
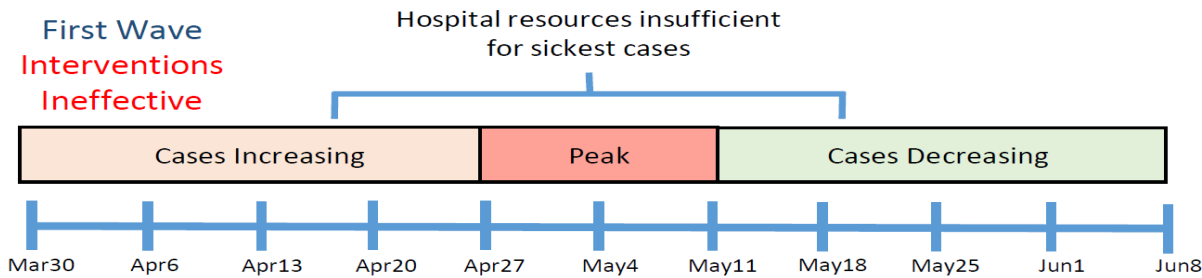
Assumes we follow a similar course as Italy, NYC, New Orleans, etc.

Potential Timelines



Assumes “Safer at Home” measures halt or greatly slow transmission

Potential Timelines



Assumes social distancing slows transmission, but same number of cases occur over a longer period of time

Four potential outcomes

Maintain “safer at home” for ~2 years (vaccine is developed)



Fewer deaths.
Economy is devastated

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Economy is preserved

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Cycle between open and shutdown as waves come through



Intermediate deaths. Economy is severely disrupted

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Intermediate deaths. Economy is severely disrupted

Massive expansion of public health measures after first wave



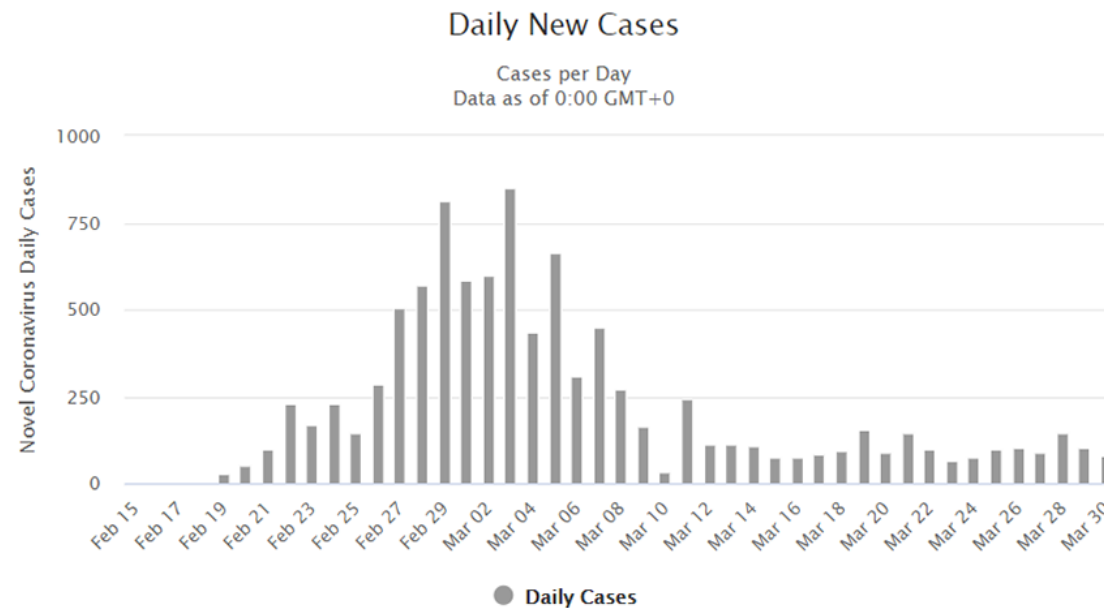
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COVID-19 in Singapore and S. Korea

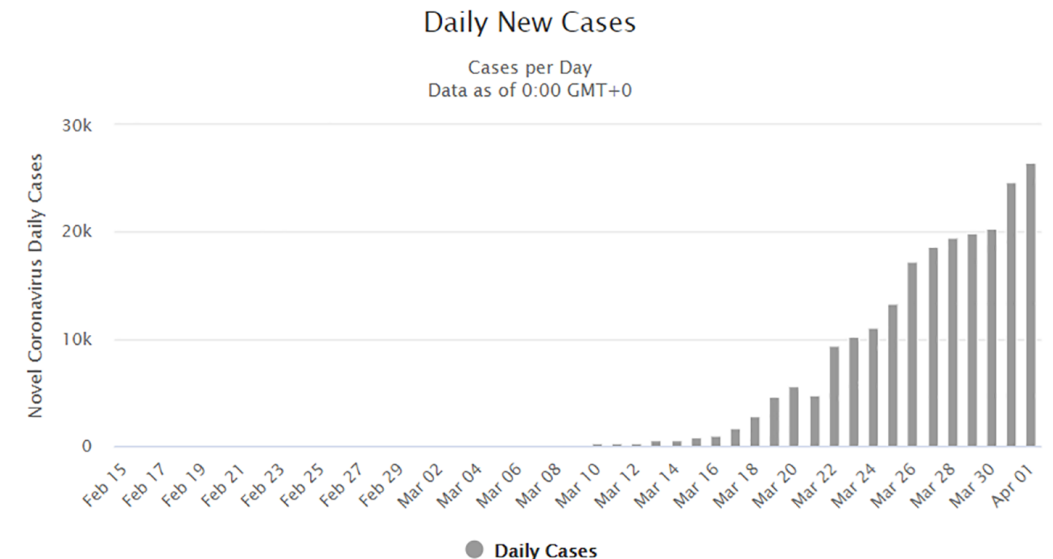


South Korea and Singapore experienced the novel coronavirus shortly after China, but both were able to control it after a short, flattened first wave. Infections continue but no new peaks. South Korea and the US reported their first cases on the same day

Daily New Cases in South Korea



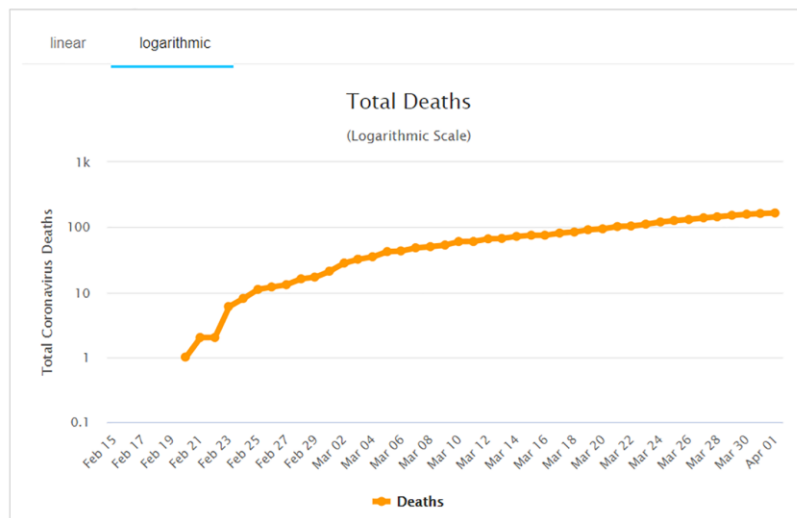
Daily New Cases in the United States



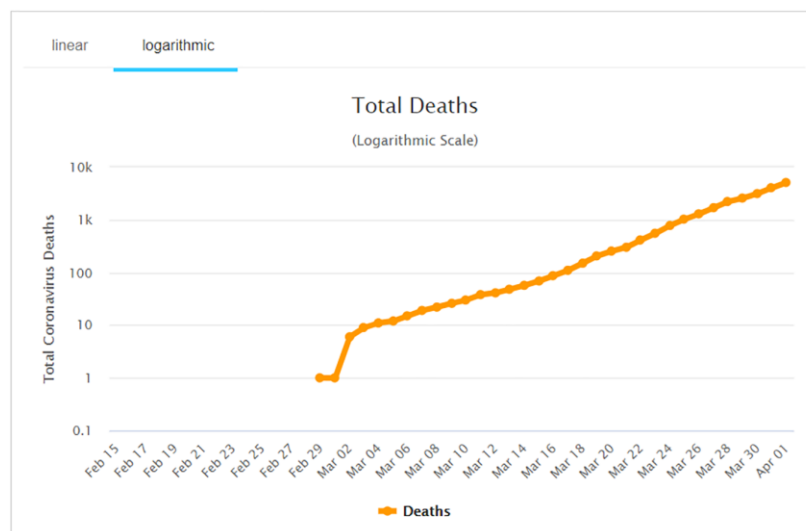
COVID-19 in Singapore and S. Korea



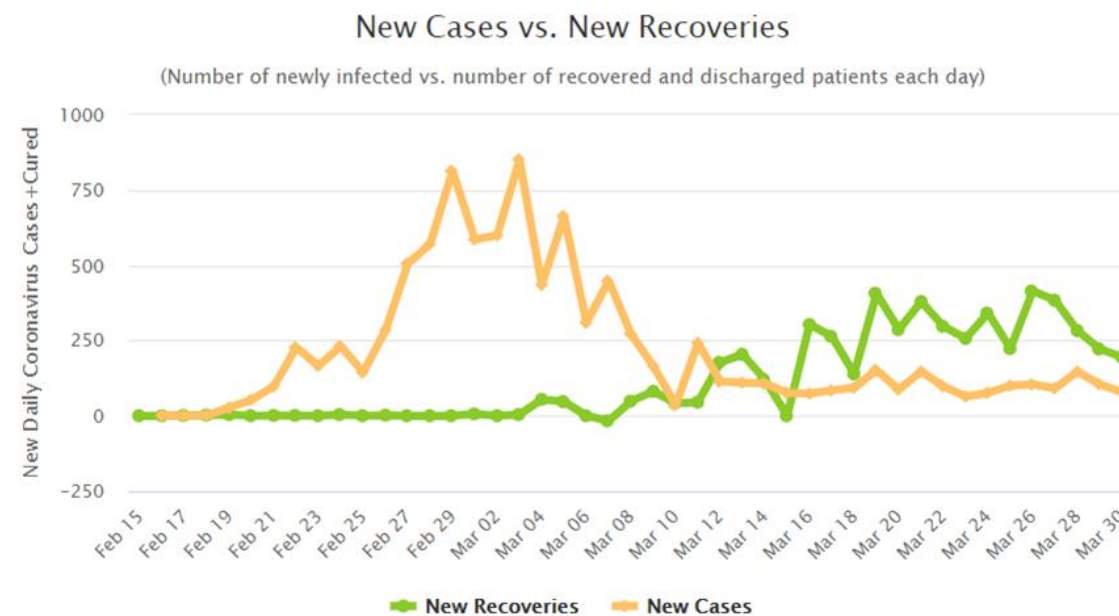
Total Coronavirus Deaths in South Korea



Total Coronavirus Deaths in the United States



Newly Infected vs. Newly Recovered in South Korea



How were they successful?

- Open, transparent, timely communication
- Large-scale testing
- Massive public health response identifying infected individuals, quarantining them, tracing their contacts, and isolating all contacts

- Practiced social distancing including work from home programs, but never had to close businesses

UTHSC has provided expertise and leadership since the start of the pandemic

- Major website with collated information
- Press conferences, this symposium, extensive cooperation with media as expert sources
- Led establishment of Tiger Lane drive-through testing (with City and County)
- Scaled up “in house” testing with large capacity and short turnaround time
- Developing antibody tests for immunity

Tiger lane – drive-through testing



Tiger lane – drive-through testing



Testing Ramp-up



Cumulative count of performed SARS-CoV-2 tests and their outcome: MLH, ROH, and UTHSC Community Drive

Date	Performed tests	Positive	Negative	Pending	% positive
Mon Mar 23 2020	1054	37	455	562	7.5%
Tue Mar 24 2020	1344	61	855	428	6.7%
Wed Mar 25 2020	1841	88	1124	629	7.3%
Thu Mar 26 2020	2333	115	1372	846	7.7%
Fri Mar 27 2020	2799	127	1575	1097	7.5%
Sat Mar 28 2020	3020	166	2009	845	7.6%
Sun Mar 29 2020	3297	206	2499	592	7.6%
Mon Mar 30 2020	3772	245	2720	807	8.3%
Tue Mar 31 2020	4183	317	3199	667	9.0%
Wed Apr 01 2020	4708	348	3434	926	9.2%
Thu Apr 02 2020	5293	404	3666	1223	9.9%
Fri Apr 03 2020	5496	430	3843	1223	10.1%

Displayed % positive tests assume that pending results mirror the observed ones (identical proportion of positive tests in the pending results compared to the obtained results within the same day and site of testing).

Improve governance of the COVID-19 pandemic. Develop a coordinated response between the eight counties in the Memphis MSA to share data, decision-making, and a public health responses. This will allow informed decisions to be made at every level of government.

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Scale up testing. Secure funding and provide infrastructure for up to 5 more “Tiger Lane” style drive-through testing centers in the Memphis MSA. This will allow public health measures to slow the pandemic and save lives.

Experimental drug therapies – clinical trials with pharma

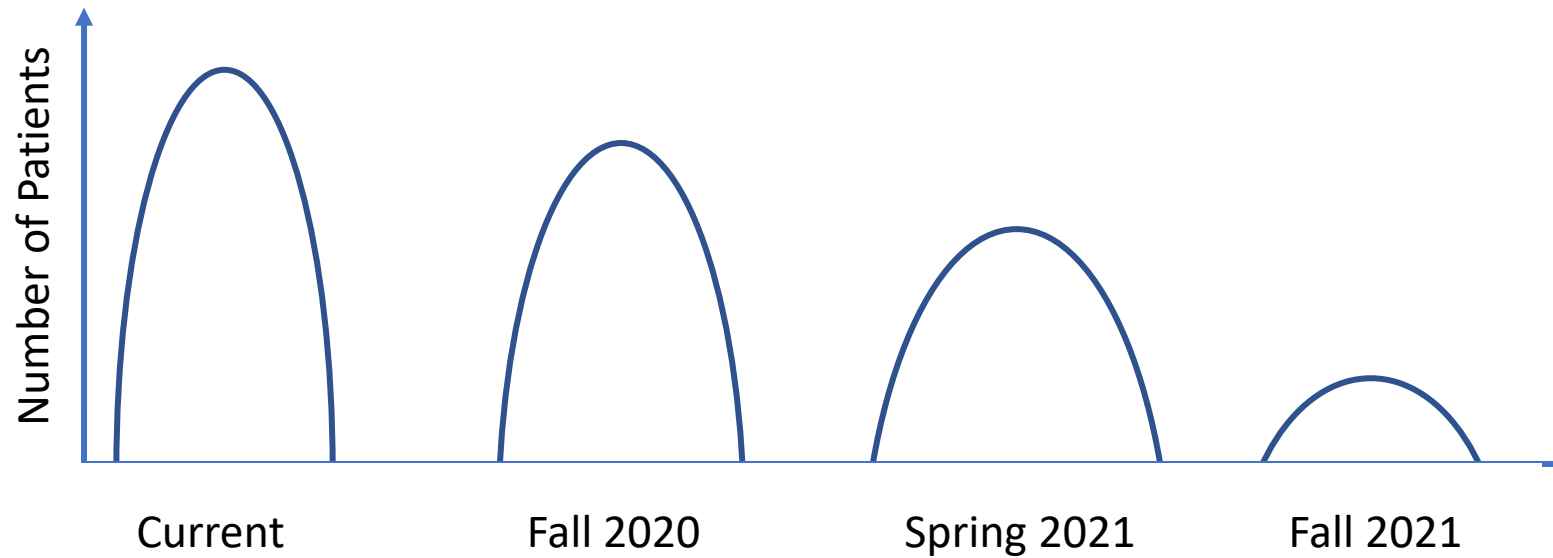
Convalescent plasma therapy

Development of new drugs

Massively expand our public health response. Secure funding for a greatly expanded team to identify infected patients, perform contact tracing, and implement isolation measures. This will allow control of the next waves without resorting to “safer at home” measures.

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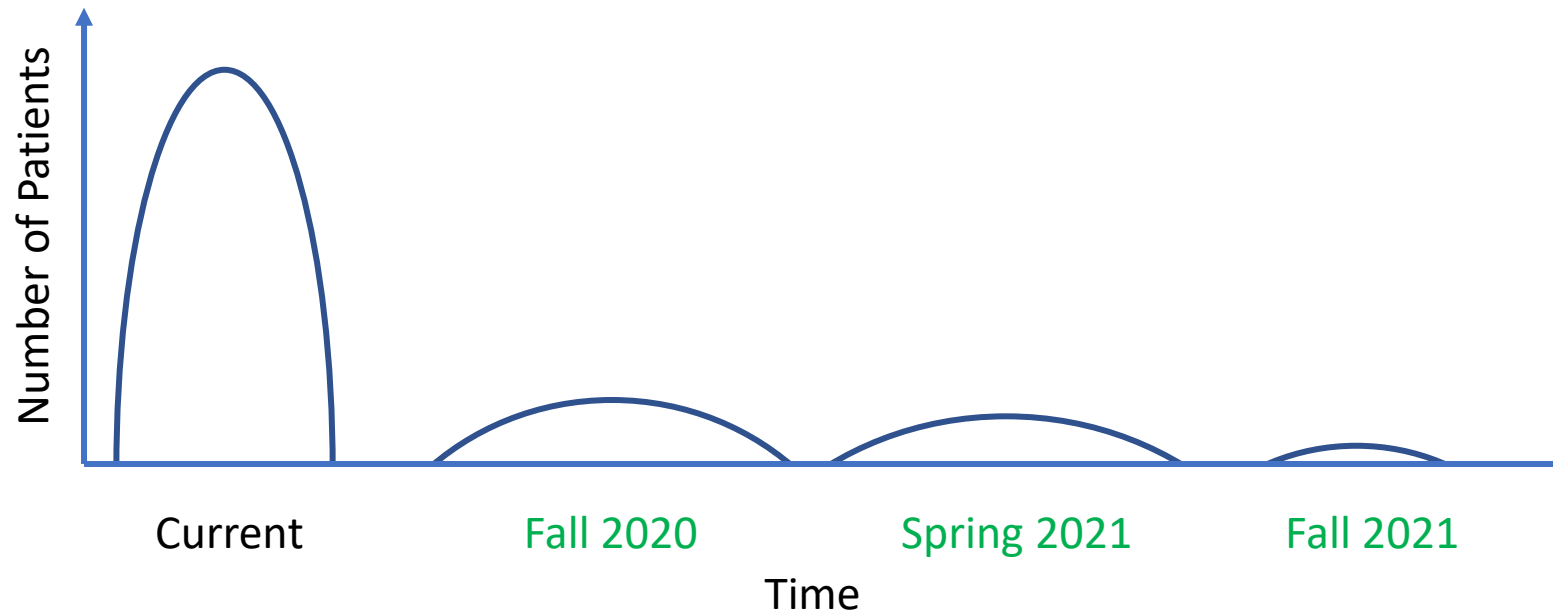
Implement large-scale testing for immunity. Develop and deploy antibody testing to identify immune individuals. Create certification processes so immune persons can work while virus is circulating in the community without restrictions.



Repeated waves of infection over the next ~2 years, decreasing as more individuals become immune

With current capabilities, will need to implement social distancing and close businesses with each wave = economic consequences

Ends only when a vaccine is developed (18-24 months at best)



We weather the first wave, but will stop subsequent waves from having a profound impact (or at least greatly decrease them)

Requires investment in scaled-up testing and an expanded public health team to do contact tracing with infected individuals and mandate isolation

Develop treatment and vaccine options. Long-term (18 months – 2 years) should see the development of novel drug or biologic treatment options, and perhaps a vaccine. This could turn COVID-19 into a serious but preventable and treatable disease.

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Re-design our health systems. Expand public health capabilities and primary care. Expand health insurance coverage to everyone. Invest in research against the multitude of future threats that may turn into the next COVID-19-like pandemic.

The UTHSC College of Medicine has developed a Roadmap for Memphis and the surrounding region to help navigate the pandemic.

It can be accessed at:

<https://uthsc.edu/coronavirus/resources.php>

Nicholas Hysmith, MD, FAAP

Medical Director of Infection Prevention-Le Bonheur Children's Hospital
Medical Director of Associate Health-Methodist Le Bonheur Healthcare
Assistant Professor of Pediatrics, Division of Infectious Disease

Hospital Preparedness to Combat Emerging Infections

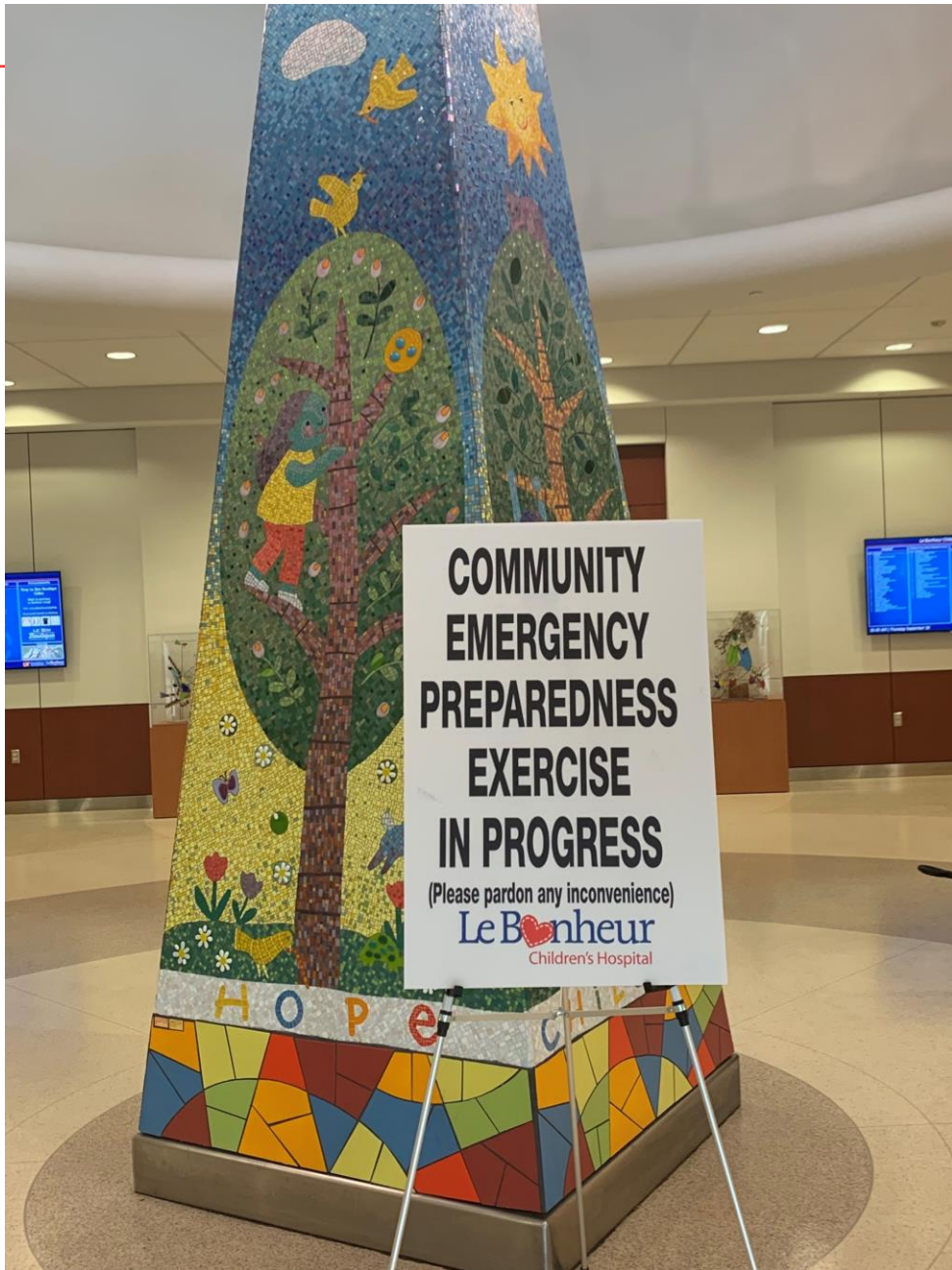
- Nick Hysmith, MD, FAAP
- Medical Director of Infection Prevention-Le Bonheur Children's Hospital
- Medical Director of Associate Health-Methodist Le Bonheur Healthcare
 - Assistant Professor of Pediatrics, Division of Infectious Disease

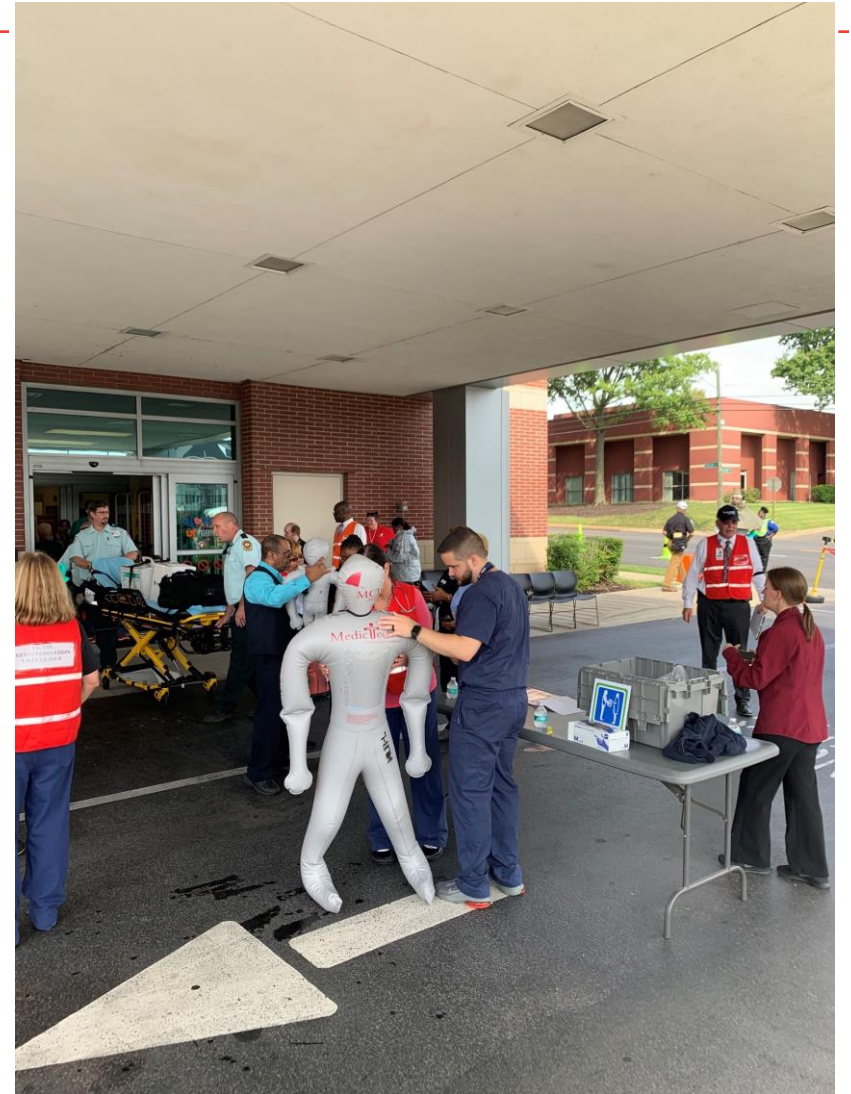
Outline

- Baseline Preparedness
- The Pathogen
- The Facility
 - ED
 - Outpatient
 - Inpatient
 - Office Buildings
- Testing/Treatment
- Innovation

Baseline Preparedness

- Integrated into an Emergency/Disaster Preparedness Plan
- Regularly (yearly) updated plan that can be easily scaled up or down based on the need
- Practice- Table top drills and full-scale drills
- Learn from the experience of others-They are usually very willing to share
 - University of Washington
 - Tuscaloosa





Route of Transmission and Impact on Planning/Response

Contact/Droplet

- Respiratory infections transmitted through droplets $>5-10\ \mu\text{m}$ in diameter
- Droplet transmission occurs when a person is in within 1 meter of someone who has respiratory symptoms and is risk of having his/her mucosae (mouth and nose) or conjunctiva (eyes) exposed to potentially infective respiratory droplets.
- Transmission may also occur through fomites in the immediate environment around the infected person.
- Transmission can occur by direct contact with infected people and indirect contact with surfaces in the immediate environment or with objects used on the infected person

Airborne

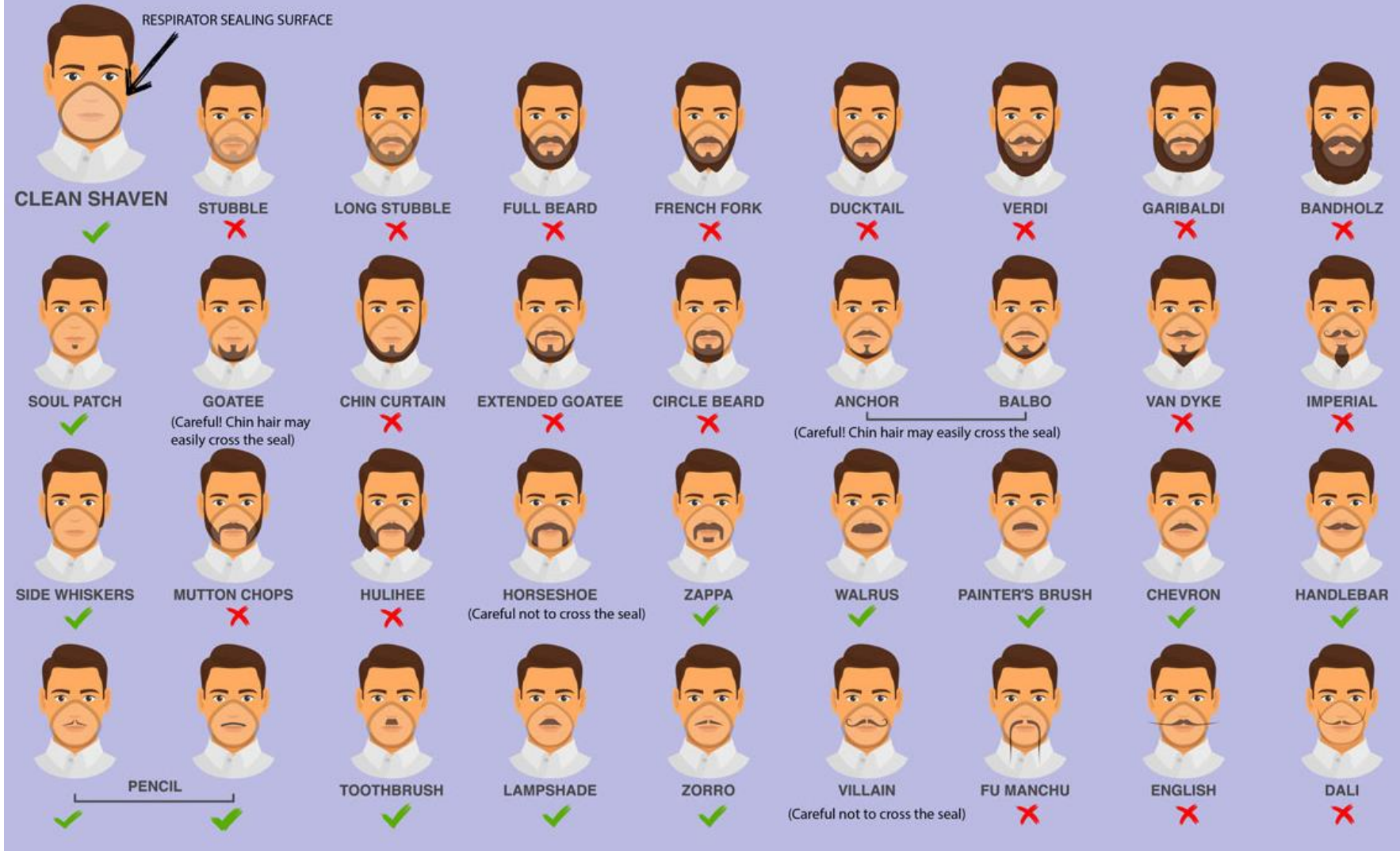
- Droplet nuclei <5 microns can stay suspended in the air for hours and travel >1 meter
- Measles, Varicella, Tuberculosis, SARS-CoV-1, MERS-CoV, SARS-CoV-2 (COVID-19)
- Logistically an airborne pathogens makes ALL processes considerably more difficult

N95 Respirator



- Fit testing should occur yearly
- ~10 minutes for fit testing
- Who does the fit testing? Are all associates fit tested? What about physicians? What about ancillary staff?

Facial Hairstyles and Filtering Facepiece Respirators



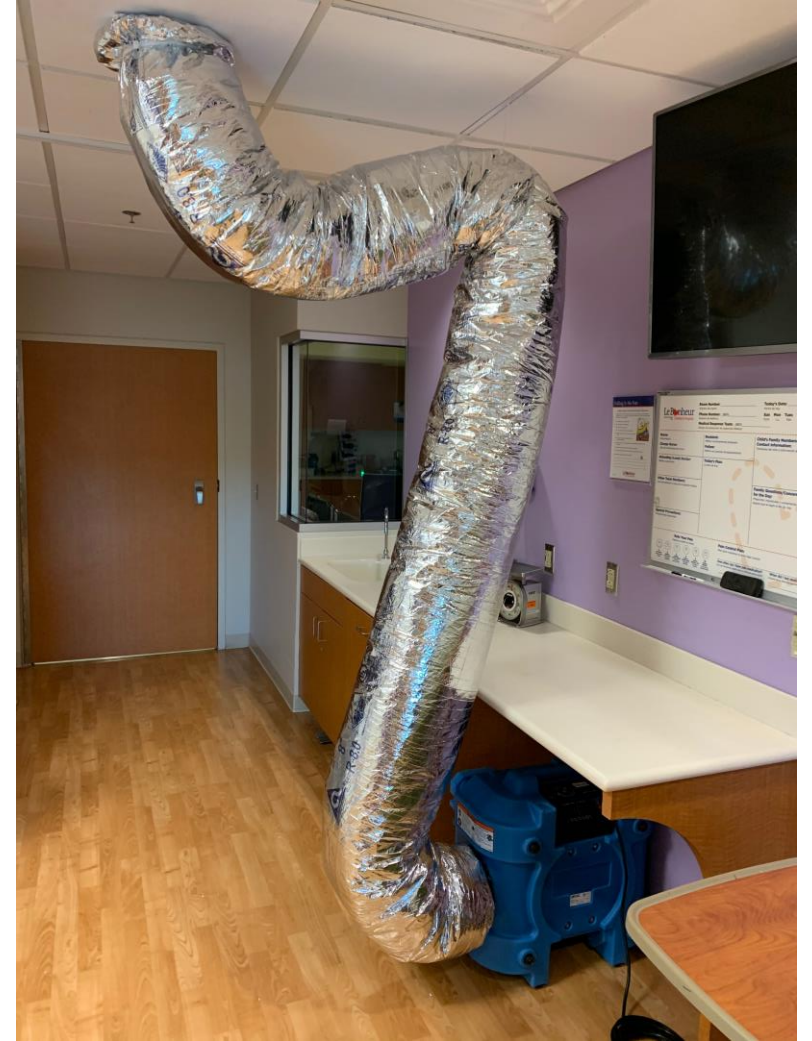
PAPRs



Negative Pressure Rooms

- How many negative pressure rooms do we have?
 - Total
 - Does the total even matter if you are attempting to cohort your patients?
- Where are these rooms located?
 - ED – Are the resuscitation rooms negative pressure?
 - Inpatient floor—Where are they located? How many per floor? Can you cohort on one floor?
 - PICU— How many? Do they have restrooms?
 - Stepdown/Intermediate care- Adequate connections?
 - Clinic-Most don't have any airborne rooms, what to do there?
- Can you convert a room to negative pressure?

Modifying Rooms



The Facility



Office Buildings

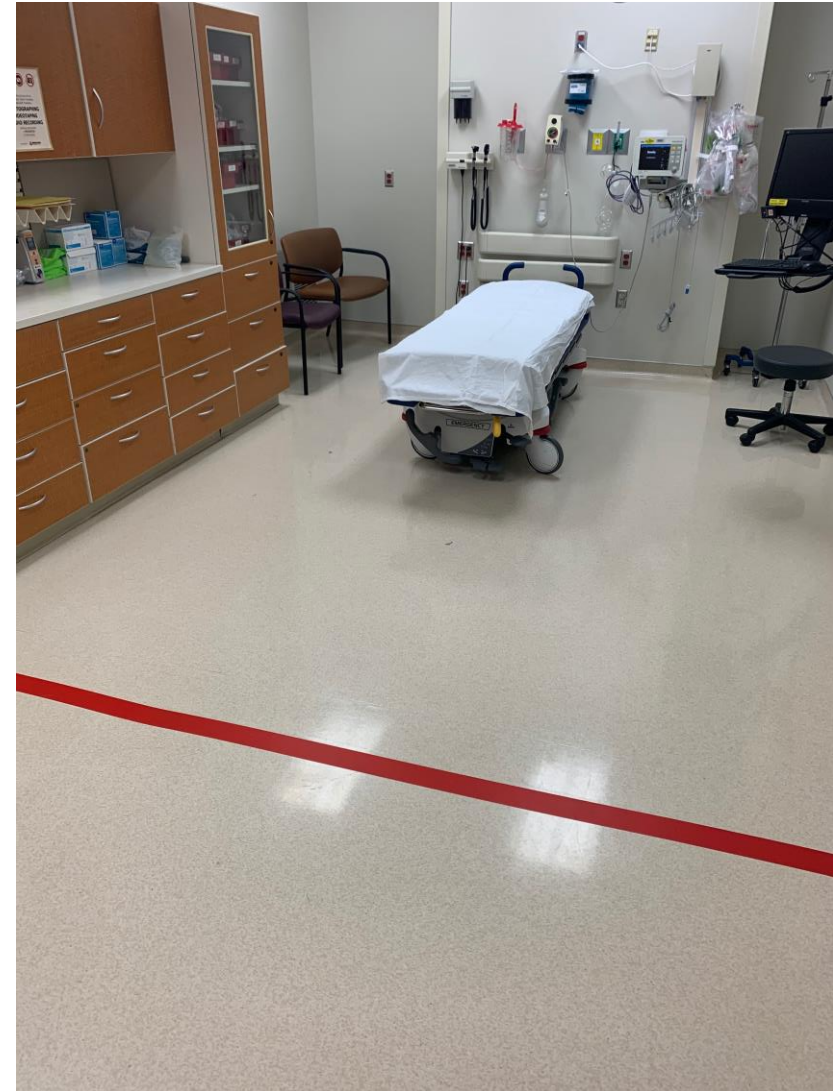


Outpatient Clinic

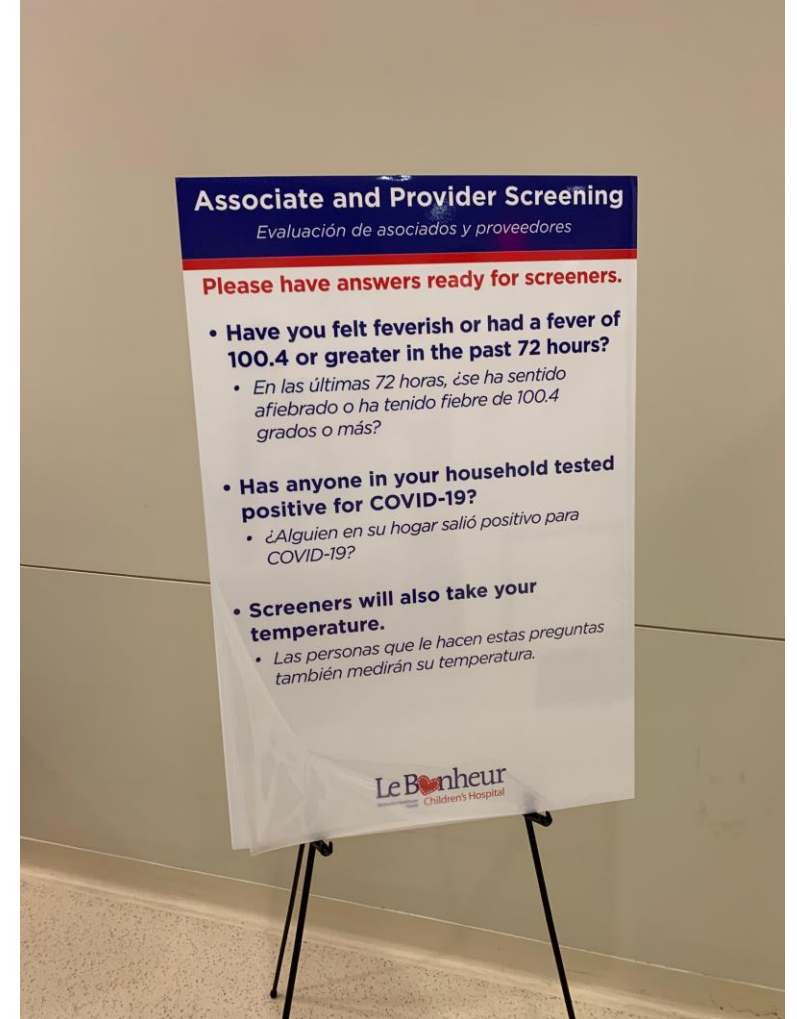
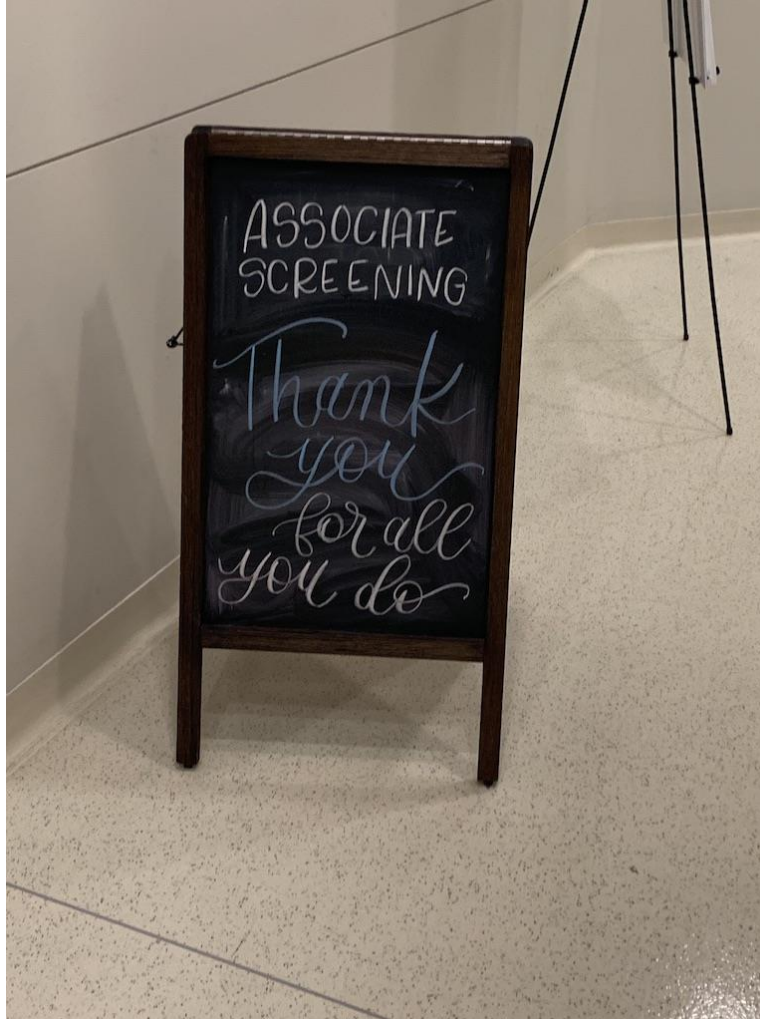
- Is the clinic equipped to manage the patients?
 - Most outpatient centers are not equipped with negative pressure exam rooms
 - How can the ill patients be separated from the well patients?
 - Can the healthcare staff be adequately protected?
- What is the mechanism by which sick kids can be seen if they present to the outpatient
 - Medical screening exam?
 - Test?
 - Send home?
 - Send to the ED?

Emergency Department





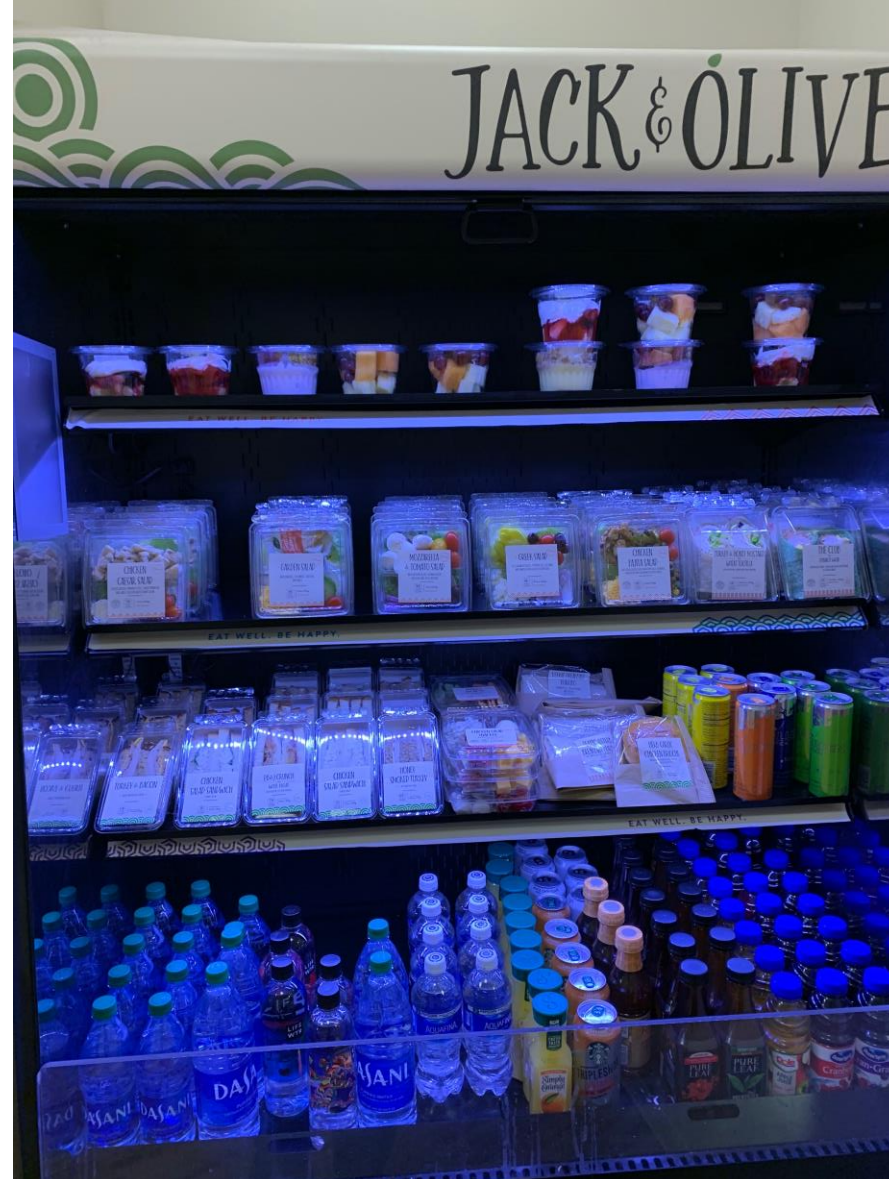
Main Hospital



Main Hospital



Main Hospital



General Medical/Surgical Floors



Intensive Care



Testing

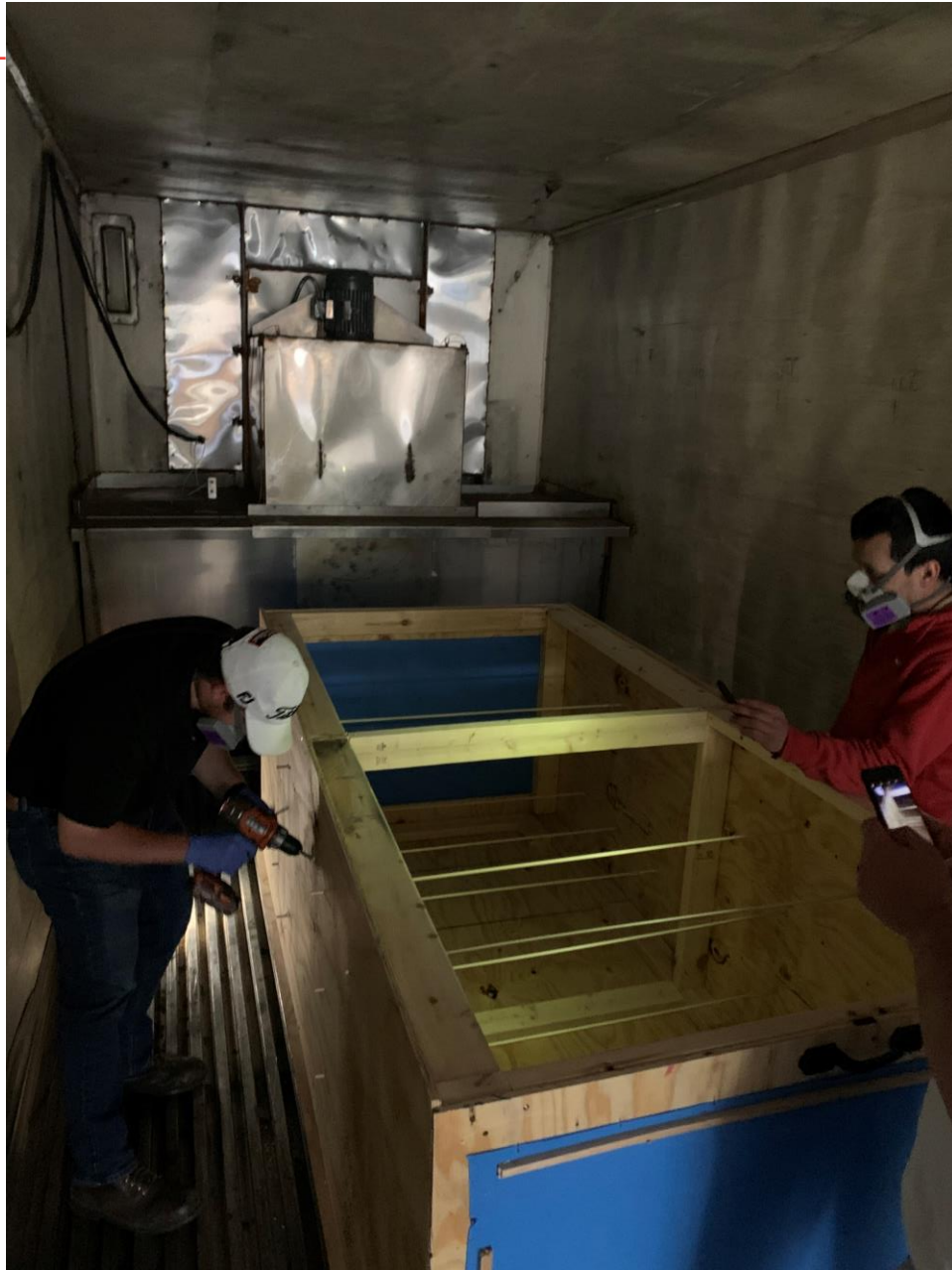
- The keys to testing are purpose and scalability
- What do you gain by testing?
 - Is there a therapy?
 - Will it help in an outbreak setting to identify cases and contact trace?
 - What are the consequences of a positive test?
- Who will you test?
 - The masses?
 - Only symptoms?
 - Those that are high risk?

Innovation











James C. Ragain, DDS, MS, PhD

Dean, UTHSC College of Dentistry

Transmission Routes of COVID-19 and Controls in the Dental Practice

James C. Ragain, DDS, MS, PhD

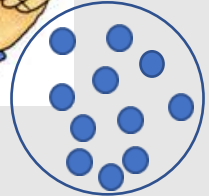
Dean, UTHSC College of Dentistry



Transmission Routes of COVID-19 in the Dental Office

- Airborne droplets from infected patients via a cough or sneeze
- Droplets and aerosols via dental treatment
- Contaminated surfaces

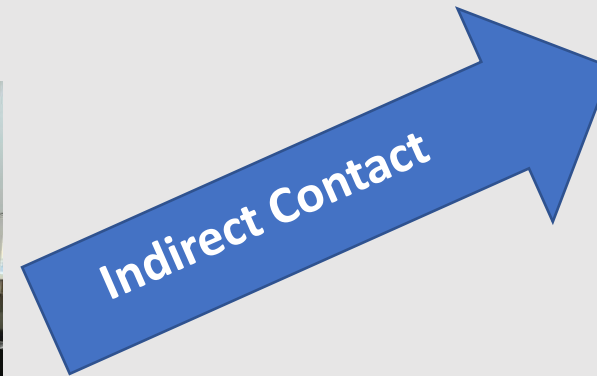
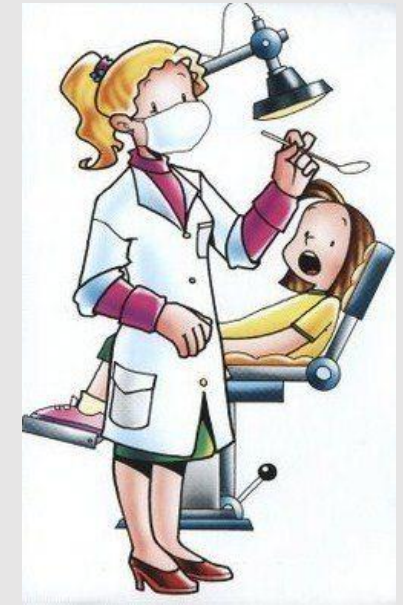
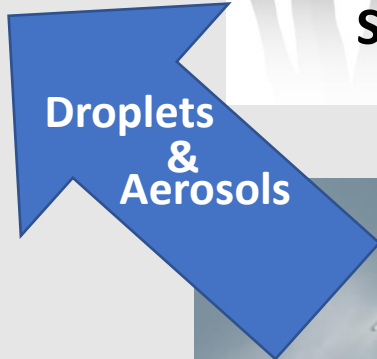




Droplets



Susceptible Individuals



In order to protect staff and preserve personal protective equipment and patient care supplies, as well as expand available hospital capacity during the COVID-19 pandemic, the Centers for Disease Control and Prevention (CDC) recommends that **dental facilities postpone elective procedures, surgeries, and non-urgent dental visits, and prioritize urgent and emergency visits and procedures** now and for the coming several weeks.

Contact Patients Prior to Clinically Urgent/Emergency Dental Treatment:

- Call all patients before their scheduled appointments and screen for symptoms of respiratory illness over the phone (e.g., fevers, cough, shortness of breath).
- If the patient reports signs or symptoms of fever or respiratory illness, dental healthcare providers (DHCP) and medical providers should work together to determine the appropriate facility for emergency treatment.

The CDC recommends using “social distancing”

- Ask patients to arrive on time for their appointments, rather than too early, since that will minimize the amount of time they spend in your waiting room or reception area.
- Remove magazines, reading materials, toys and other objects that may be touched by others and which are not easily disinfected.
- Schedule appointments to minimize possible contact with other patients in the waiting room.

If a patient at your facility is suspected or confirmed to have COVID-19, take the following actions:

- Defer non-urgent procedures.
- Give the patient a mask to cover his or her mouth.
- Send the patient home if not acutely sick.
- Refer the patient to a medical facility if acutely sick (e.g., trouble breathing).
- If treatment is urgently needed, refer to an appropriate facility.

Take Precautions When Performing Aerosol- Generating Procedures (AGPs):

- DHCP in the room should wear an N95 or higher-level respirator, eye protection, face shield, gloves and a gown.
- The number of DHCP present during the procedure should be limited to only those essential for patient care and procedure support. Visitors should not be present for the procedure.
- High volume suction and rubber dams or other isolation covering the operating field should be used.
- Promptly clean and disinfect procedure room surfaces.

After the Patient is Dismissed:

Clean and disinfect the room and equipment according to the "Guidelines for Infection Control in Dental Health-Care Settings-2003."

Putting on PPE

- Keep hands away from face
- Limit surfaces touched
- Change gloves when torn or heavily contaminated
- Perform hand hygiene

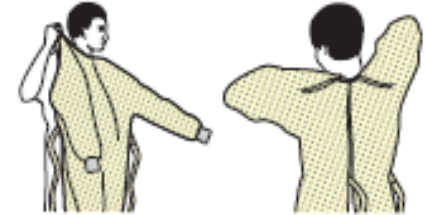


SEQUENCE FOR PUTTING ON PERSONAL PROTECTIVE EQUIPMENT (PPE)

The type of PPE used will vary based on the level of precautions required, such as standard and contact, droplet or airborne infection isolation precautions. The procedure for putting on and removing PPE should be tailored to the specific type of PPE.

1. GOWN

- Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back
- Fasten in back of neck and waist



2. MASK OR RESPIRATOR

- Secure ties or elastic bands at middle of head and neck
- Fit flexible band to nose bridge
- Fit snug to face and below chin
- Fit-check respirator



3. GOGGLES OR FACE SHIELD

- Place over face and eyes and adjust to fit



4. GLOVES

- Extend to cover wrist of isolation gown



Removing PPE

PERFORM HAND HYGIENE BETWEEN STEPS IF HANDS BECOME CONTAMINATED AND IMMEDIATELY AFTER REMOVING ALL PPE



CS20072-8

HOW TO SAFELY REMOVE PERSONAL PROTECTIVE EQUIPMENT (PPE) EXAMPLE 2

Here is another way to safely remove PPE without contaminating your clothing, skin, or mucous membranes with potentially infectious materials. Remove all PPE before exiting the patient room except a respirator, if worn. Remove the respirator after leaving the patient room and closing the door. Remove PPE in the following sequence:

1. GOWN AND GLOVES

- Gown front and sleeves and the outside of gloves are contaminated!
- If your hands get contaminated during gown or glove removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Grasp the gown in the front and pull away from your body so that the ties break, touching outside of gown only with gloved hands
- While removing the gown, fold or roll the gown inside-out into a bundle
- As you are removing the gown, peel off your gloves at the same time, only touching the inside of the gloves and gown with your bare hands. Place the gown and gloves into a waste container



2. GOGGLES OR FACE SHIELD

- Outside of goggles or face shield are contaminated!
- If your hands get contaminated during goggle or face shield removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Remove goggles or face shield from the back by lifting head band and without touching the front of the goggles or face shield
- If the item is reusable, place in designated receptacle for reprocessing. Otherwise, discard in a waste container

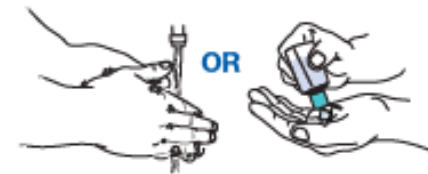


3. MASK OR RESPIRATOR

- Front of mask/respirator is contaminated — DO NOT TOUCH!
- If your hands get contaminated during mask/respirator removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Grasp bottom ties or elastics of the mask/respirator, then the ones at the top, and remove without touching the front
- Discard in a waste container



4. WASH HANDS OR USE AN ALCOHOL-BASED HAND SANITIZER IMMEDIATELY AFTER REMOVING ALL PPE



**UTHSC Emergency Dental Clinics will operate Monday, Wednesday, and Friday
from 8am-12pm**

Adults: Please call 901-448-6200 or visit the Dunn Dental Building:
875 Union Avenue, Memphis, Tennessee 38163

Children age 16 and under: Please call 901-448-KIDS or visit the Pediatric
Dentistry Clinic at Le Bonheur Hospital: 848 Adams Avenue, Memphis, TN 38103

References

Xian Peng, et al (2020), Transmission routes of 2019-nCoV and controls in dental practice, International Journal of Oral Science (2020) 2:9. <https://doi.org/10.1038/s41368-020-0075-9>.

Dental Settings: Interim Infection Prevention and Control Guidance for Dental Settings During the COVID-19 Response
Centers for Disease Control and Prevention.

Interim Infection Prevention and Control Recommendations for Patients with Suspected or Confirmed Coronavirus Disease 2019 (COVID-19) in Healthcare Settings, Centers for Disease Control and Prevention
COVID-19 Transmission-Based Precautions, Centers for Disease Control and Prevention

Guidelines for Infection Control in Dental Health-Care Settings-2003, Centers for Disease Control and Prevention.

Alisa Haushalter, DNP, RN, PHNA-BC

Associate Professor of Advanced Practice and Doctoral Studies

Director

Shelby County Health Department

COVID 19

Public Health Preparedness and Response

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Acknowledgements

Staff

Elected officials

Memphis Shelby County Joint Task Force

Healthcare partners

Safety net partners

Business community

Academic Partners

Community at large

TDH and CDC



National Public Health Week

April 6 - 12, 2020

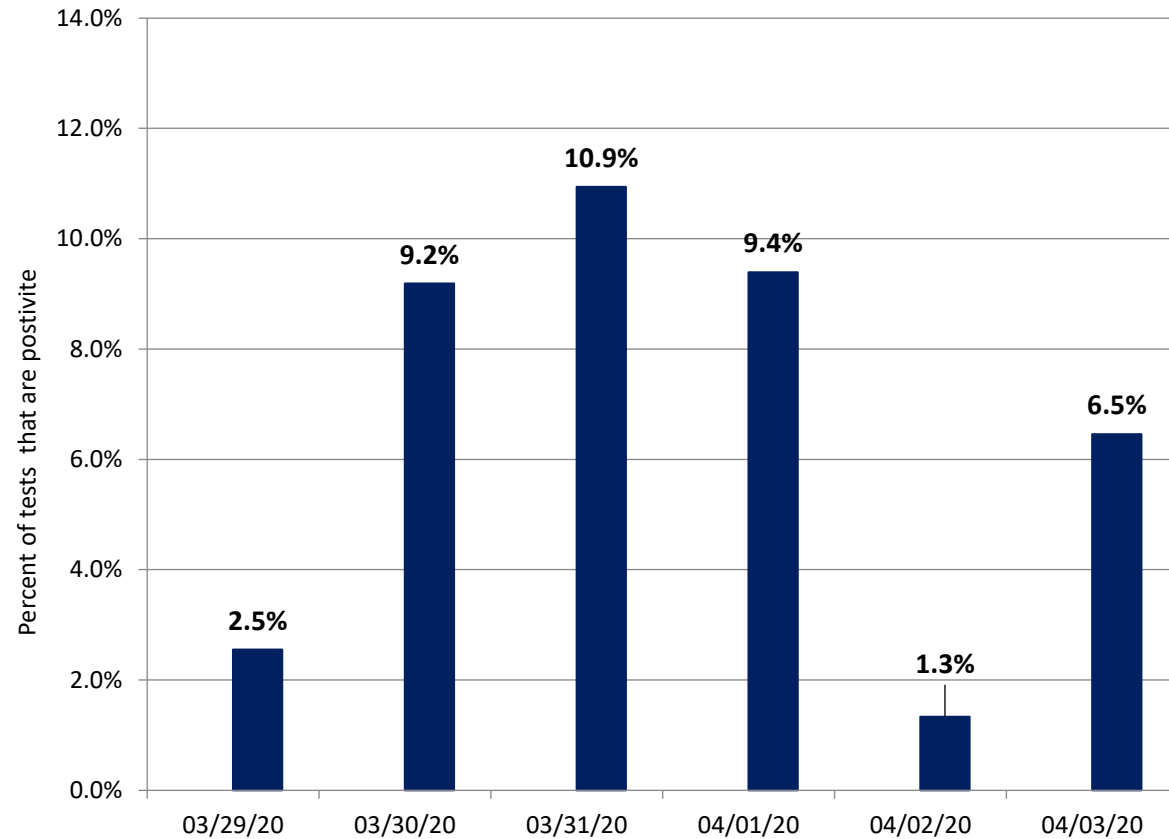
NPHW @ 25: Looking Back, Moving Forward.

Total COVID-19 Tests in Shelby County as of 04-03-2020

COVID-19 Tests	N	%
Positive	706	8.6%
Negative	7473	91.4%
Total	8179	100.0%

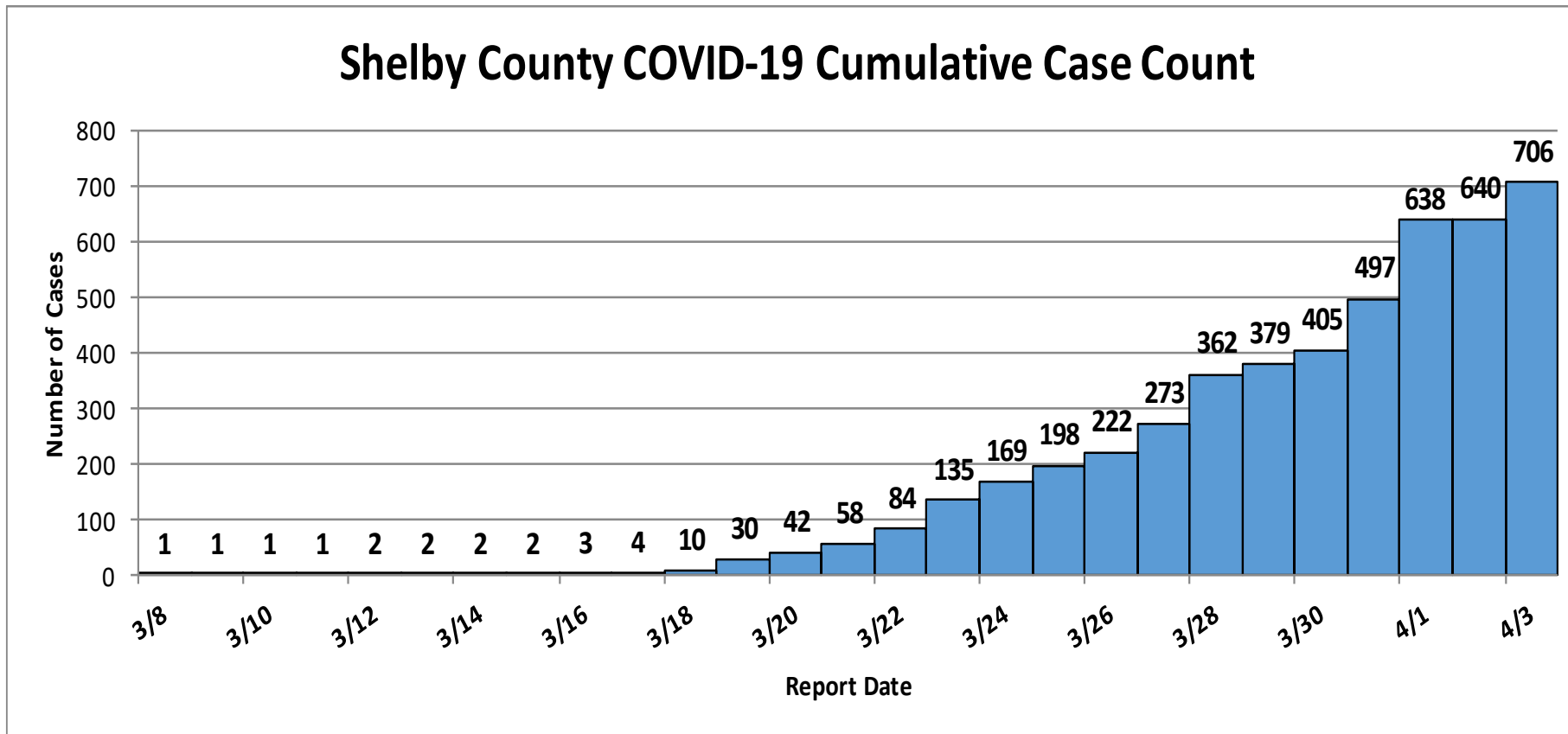
Data Source: National Electronic Disease Surveillance System (NEDSS)

Shelby County COVID-19 Testing Positivity Rate as of 04/03/2020



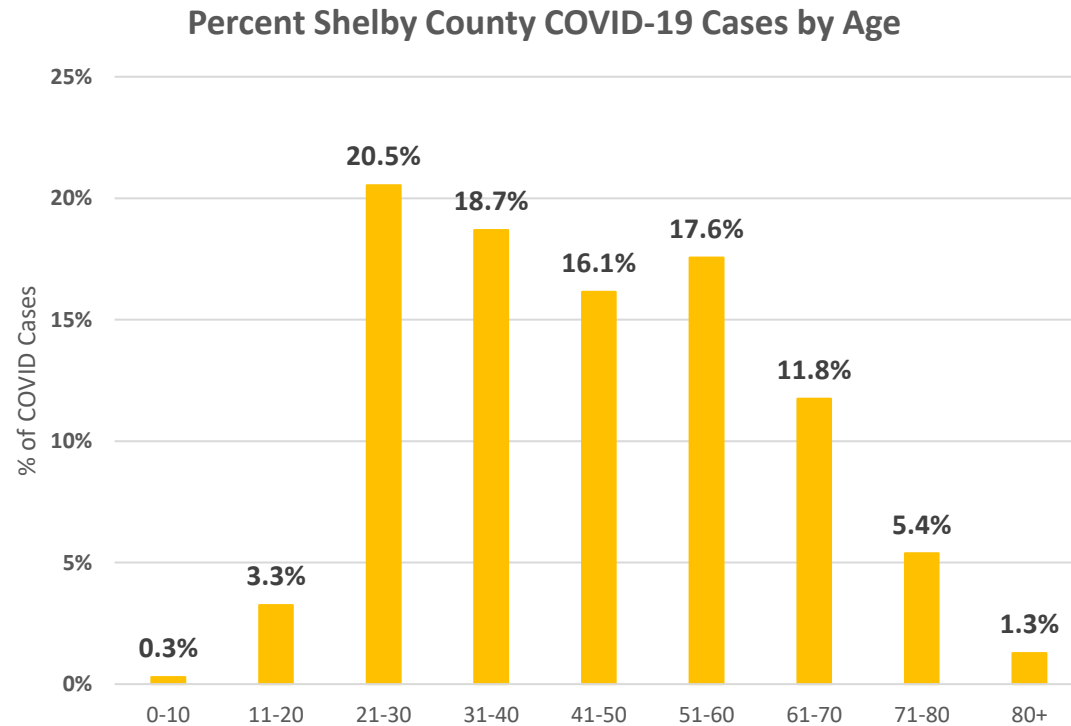
Data Source: National Electronic Disease Surveillance System (NEDSS)

Cumulative total number of COVID-19 cases in Shelby County as of 04/03/2020



Data Source: National Electronic Disease Surveillance System (NEDSS)

COVID-19 Cases in Shelby County by Age as of 04/03/2020



Data Source: National Electronic Disease Surveillance System (NEDSS)

COVID19 Cases in Shelby County by Sex as of 04/03/2020

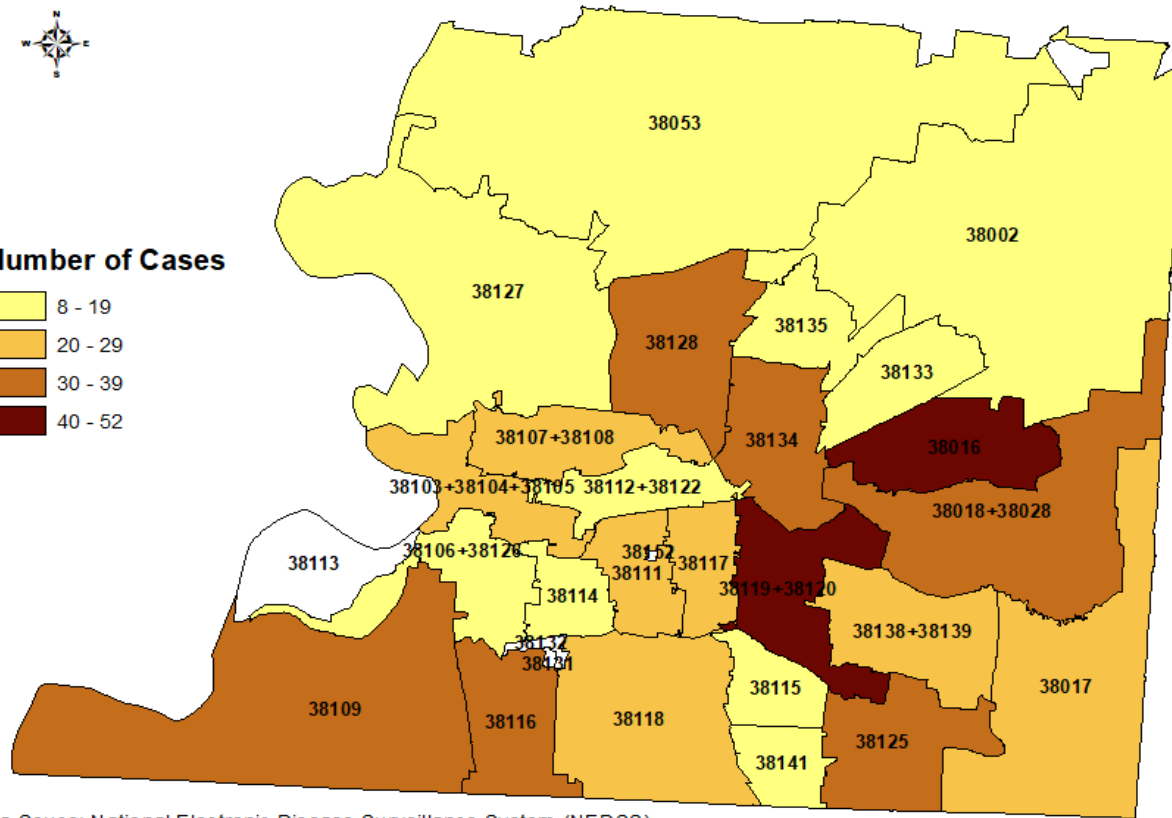
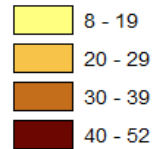
Sex	N	Percent
Female	368	52.12%
Male	297	42.07%
Unknown/Missing	41	5.81%
TOTAL	706	100.00%

Data Source: National Electronic Disease Surveillance System (NEDSS)

Shelby County COVID-19 Cases, 04-03-2020



Number of Cases

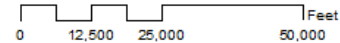


Data Source: National Electronic Disease Surveillance System (NEDSS)

Total Cases = 706, Mapped cases = 646 (Other/Missing Zip Code =60)

Preliminary data subject to change

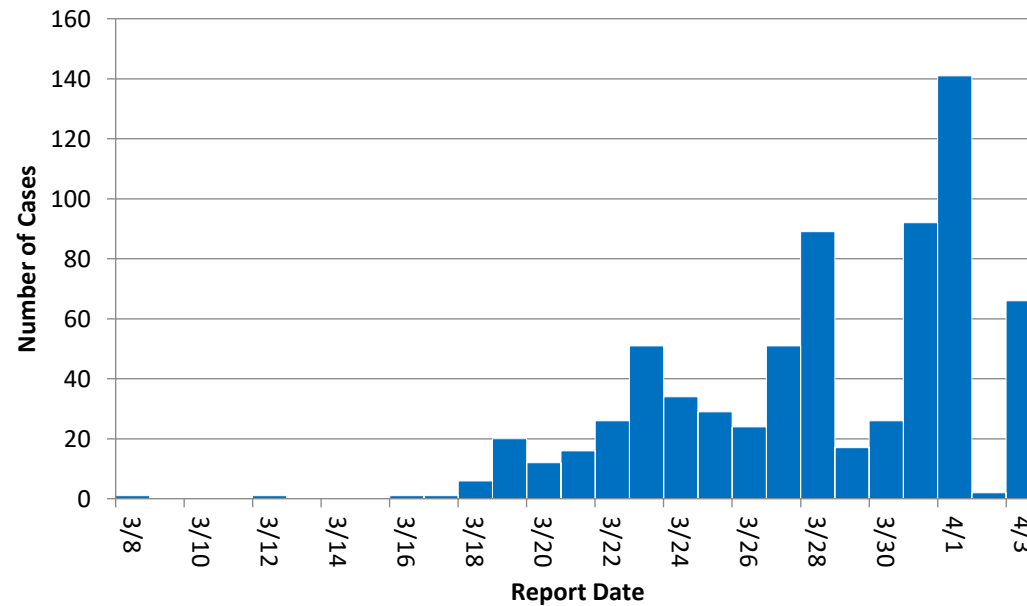
Data has been divided into 4 categories based on the Jenks Natural Breaks method.



Data Source: National Electronic Disease Surveillance System (NEDSS)

COVID19 Cases in Shelby County by Report Received Date as of 04/02/2020

Shelby County, COVID-19
New Case Report Count (N=706)
(By Report Received Date - Not Onset Date)



Data Source: National Electronic Disease Surveillance System (NEDSS)

Total Cases, Investigations and Contacts

As of 04/03/2020	
	N
Number of cases	706
Number of opened investigations	706
Number closed investigations	354
Number of contacts identified to date	1017
Number of contacts currently in quarantine	251

Data Source: Shelby County Health Department, Bureau of Epidemiology and Emergency Preparedness

Memphis and Shelby County COVID19 - Pandemic Priorities

1. Preservation of Life / Mitigation of Spread
2. Continuity of Government – Public Safety and Order
3. Preservation of Systems
 - Commercial, Business, Non-Profit
 - Critical Infrastructure
4. Crisis stabilization – regression of disease
5. Transition to Pre-incident conditions

Public Health Strategies

Surveillance

- Syndromic Surveillance

Case Finding

- Early Detection
- Early Diagnosis
- Early Reporting
- Prompt, Appropriate Medical Care
- Isolation
- Testing
 - Access
 - Equity

Public Health Strategies

Contact Investigation/Tracing

- Timely Investigation
- Timely quarantine
- Adherence to quarantine
- Prioritize high risk settings/roles

Public Health Strategies

Social Distancing

- Policies and Practices to Reduce Community Exposure
 - Executive Orders/Health Directive
 - Education/Social Marketing Campaign
 - Use of Masks
 - Emphasis on Vulnerable Populations
- Policies and Practices to Reduce Workplace Exposure
 - Organizational Policies and Practices
 - Screening
 - Exclusion

Public Health Strategies

Appropriate Medical Management

- Predict, Plan and Prepare for a Surge
- Manage Surge
- Address Staffing Issues
- Seeking and Receiving Appropriate Level of Care
 - Stay at Home Care
 - Primary Care
 - Hospital-based Care

Areas for Continued Improvement

Communication

Alignment with city/municipal efforts

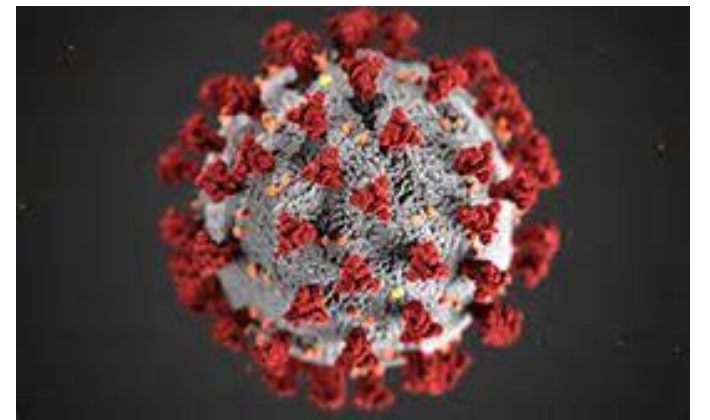
Regional approach

Remain abreast of current information

Expanding testing

Resources for individuals impacted

Economic impact and recovery



Colleen Jonsson, PhD

Professor and Endowed Van Vleet Chair of Excellence in Virology
Director of the Regional Biocontainment Laboratory (RBL) at UTHSC

The Regional Biocontainment Laboratory

www.uthsc.edu/rbl/

A Comprehensive
Regional Resource in
Support of Basic &
Translational
Research for
Biosafety Level 3
Pathogens



UTHSC RBL Director

Colleen Jonsson, PhD

RBL Associate Director

Liz Fitzpatrick, PhD

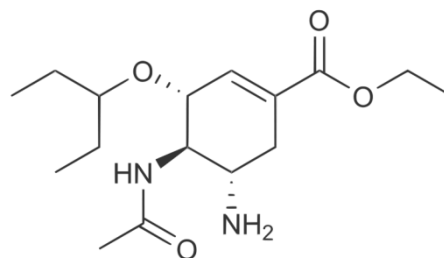
The RBL Provides Facilities for Faculty Research Programs and Fee-for Service Activities that Supports Basic Discovery to Preclinical Studies Across a Broad Range of Pathogens and Emerging Infectious Diseases



Pathogenesis



Efficacy

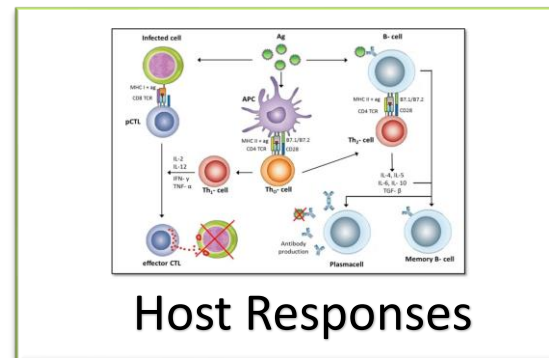
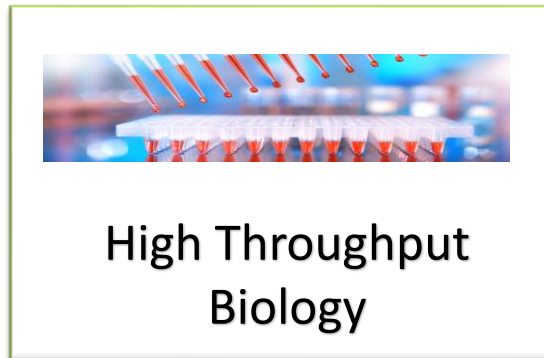
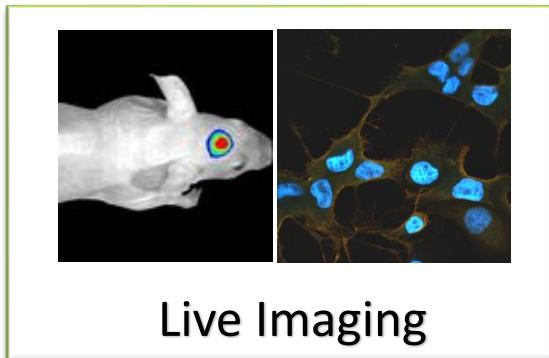
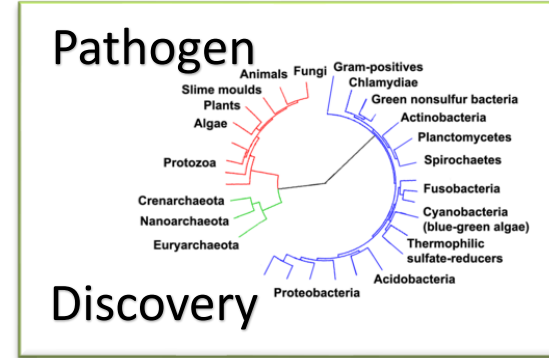
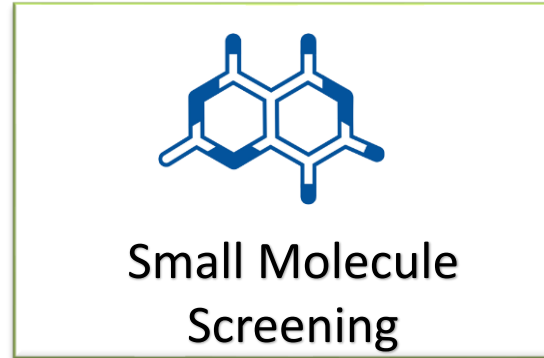


Diagnosis



**Improve
Patient
Outcome**

Comprehensive Research Facilities & Services



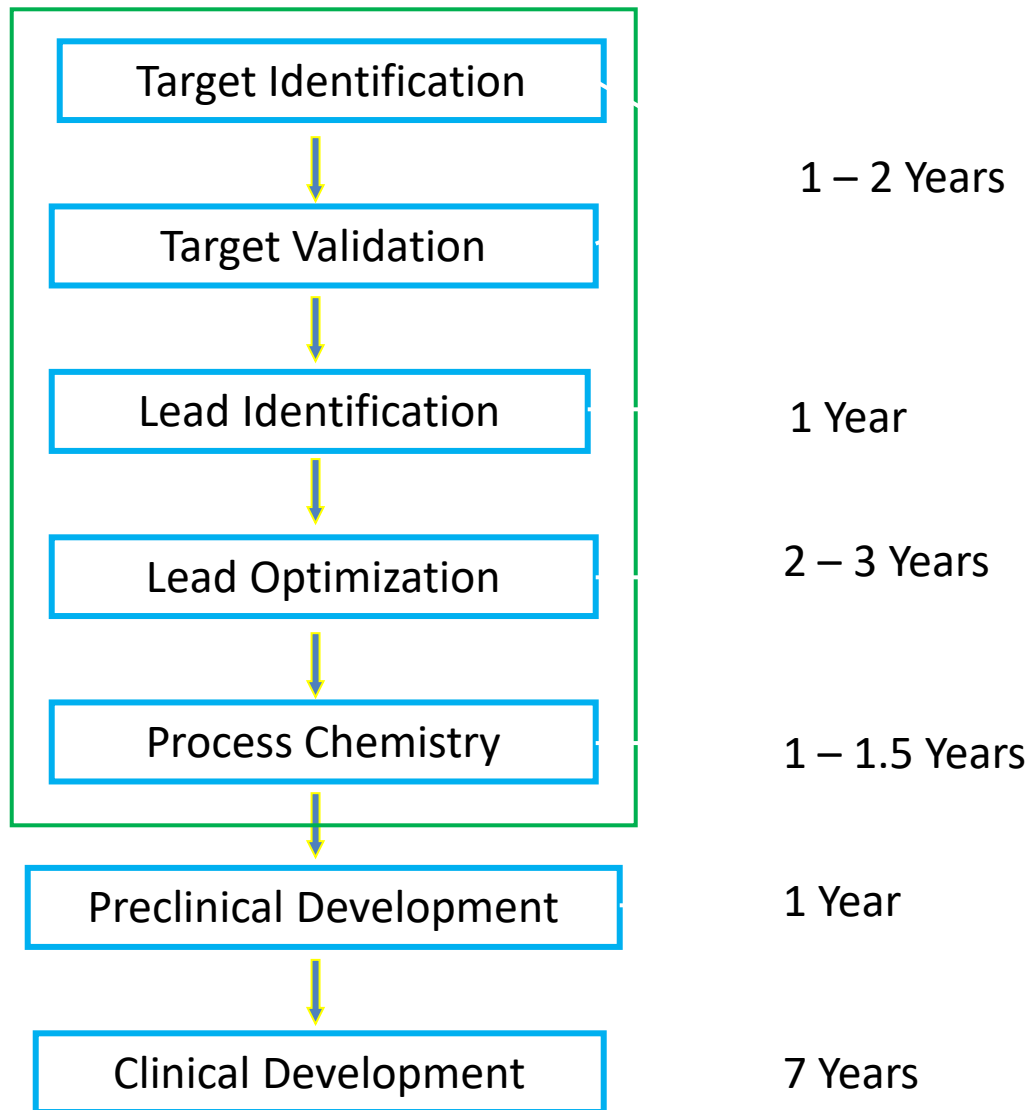
RBL Faculty, Graduate Students and Staff Engaged in COVID-19 Response



Questions

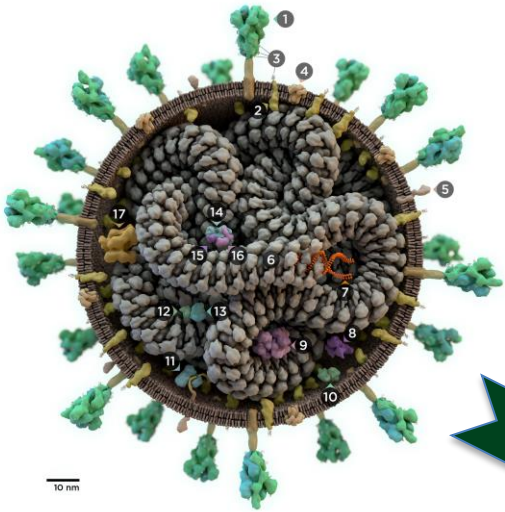
1. Are there any FDA approved molecules that can be repurposed for COVID-19?
2. If there are no FDA approved molecules, are there other antiviral leads?
3. What is (or are) the best small animal model for screening of treatments for COVID-19?
4. How can we DECON the N95 masks for reuse?
5. What are the SARS CoV-2 strains circulating in Memphis?
6. How does the host respond to infection with SARS CoV-2?
7. How can we tell if we have been infected with SARS CoV-2?
8. How do we know if we have recovered from SARS CoV-2 and have potential immunity?

1. Are there any FDA approved molecules that can be repurposed for COVID-19?
2. If there are no FDA approved molecules, are there other antiviral leads? If so, how can we accelerate?

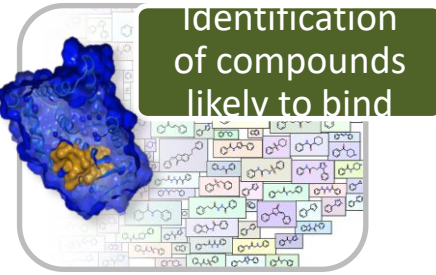


Critical issue #1:
Discovery & development pipeline can take 12- 14 years and the process may fail at any point

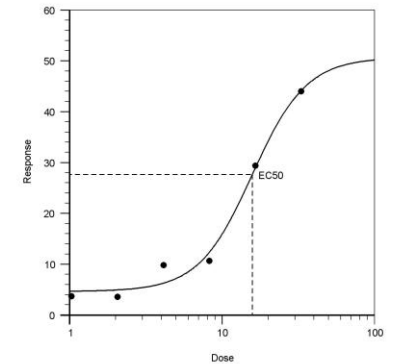
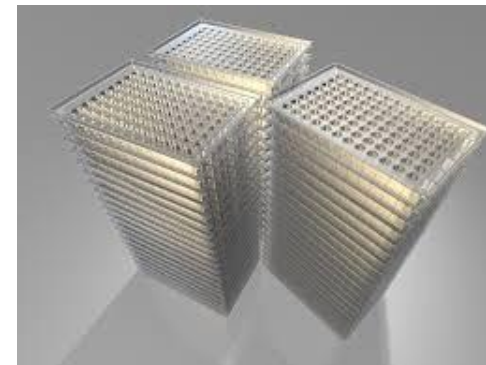
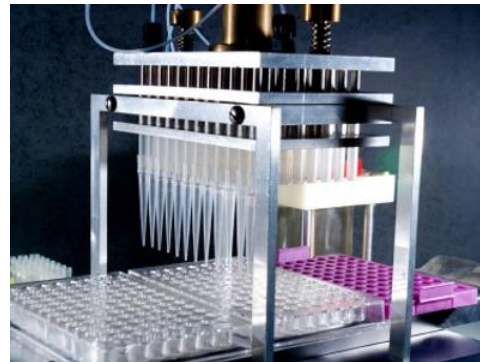
Accelerating the Pipeline with Virtual and Experimental HTS of FDA Compounds



- 1 Spike glycoprotein (S)
- 2 Membrane protein (M)
- 3 Nucleocapsid protein (N)
- 4 Envelope protein (E)
- 5 ORF7a accessory protein
- 6 Nucleocapsid (N)
- 7 single-stranded RNA
- 8 NSP13 (helicase)
- 9 NSP15 (NendoU)
- 10 NSP9 (RNA-replicase)
- 11 NSP5 (Main protease, M^{pro})
- 12 NSP10
- 13 NSP16
- 14 NSP12
- 15 NSP14
- 16 NSP11
- 17 NSP8



SUMMIT at ORNL
World's Most Powerful
Computer



3. What is (or are) the best small animal model for screening of treatments for COVID-19?

Critical issue #2: No currently available models for severe disease



4. How can we
DECON the N95 masks
for reuse?

Critical issue #3:
The supply of N95
is limited and
rapidly being
depleted

Step 1: Identify and validate decon
methods

1. Autoclave
 2. Ethylene oxide (ETO)
 3. Dry heat
- Validate with biological indicators
 - Evaluate N95 integrity with qualitative fit test post-decon

Step 2: Validate each method using
respirator material with SARS-CoV-2
applied to surface

- Elute virus from material and
determine virus viability post-decon

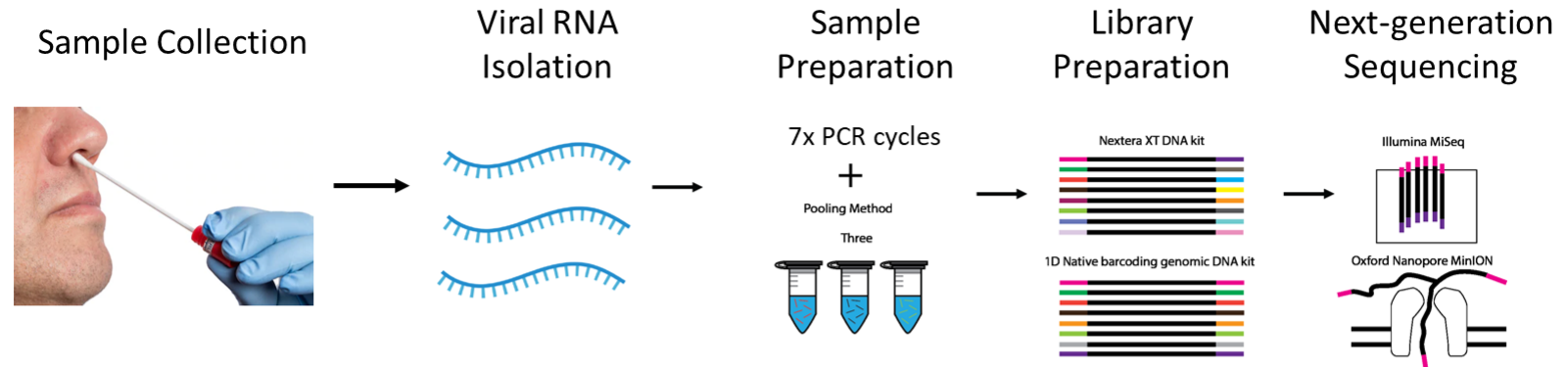
Step 3: Determine the number of decon
cycles that can be used for each method
while maintaining integrity of the N95

- Perform quantitative fit testing after each
decon cycle

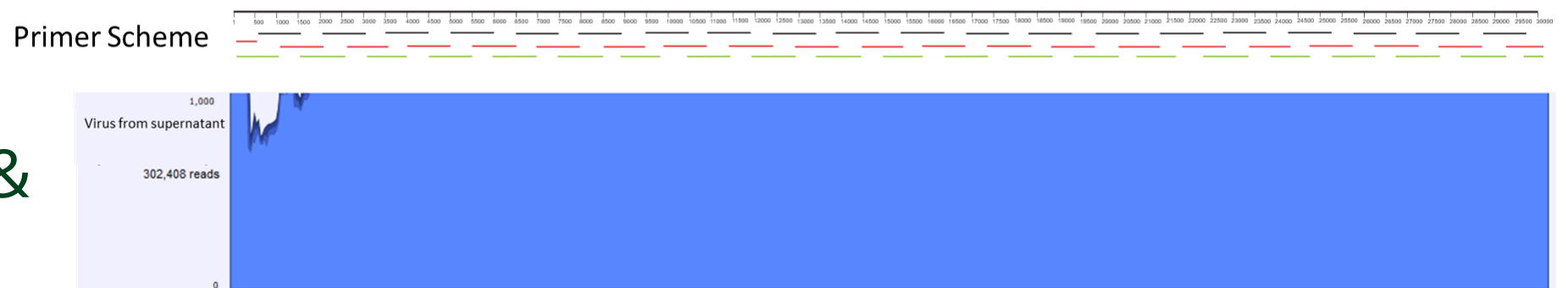


5. What are the SARS CoV-2 strains circulating in Memphis?

Critical issue #4:
Are any new variants emerging? We need sensitive & Robust NGS methods



Using our established RNA virus workflow, we expect to identify the genetic diversity of strains circulating throughout the city of Memphis

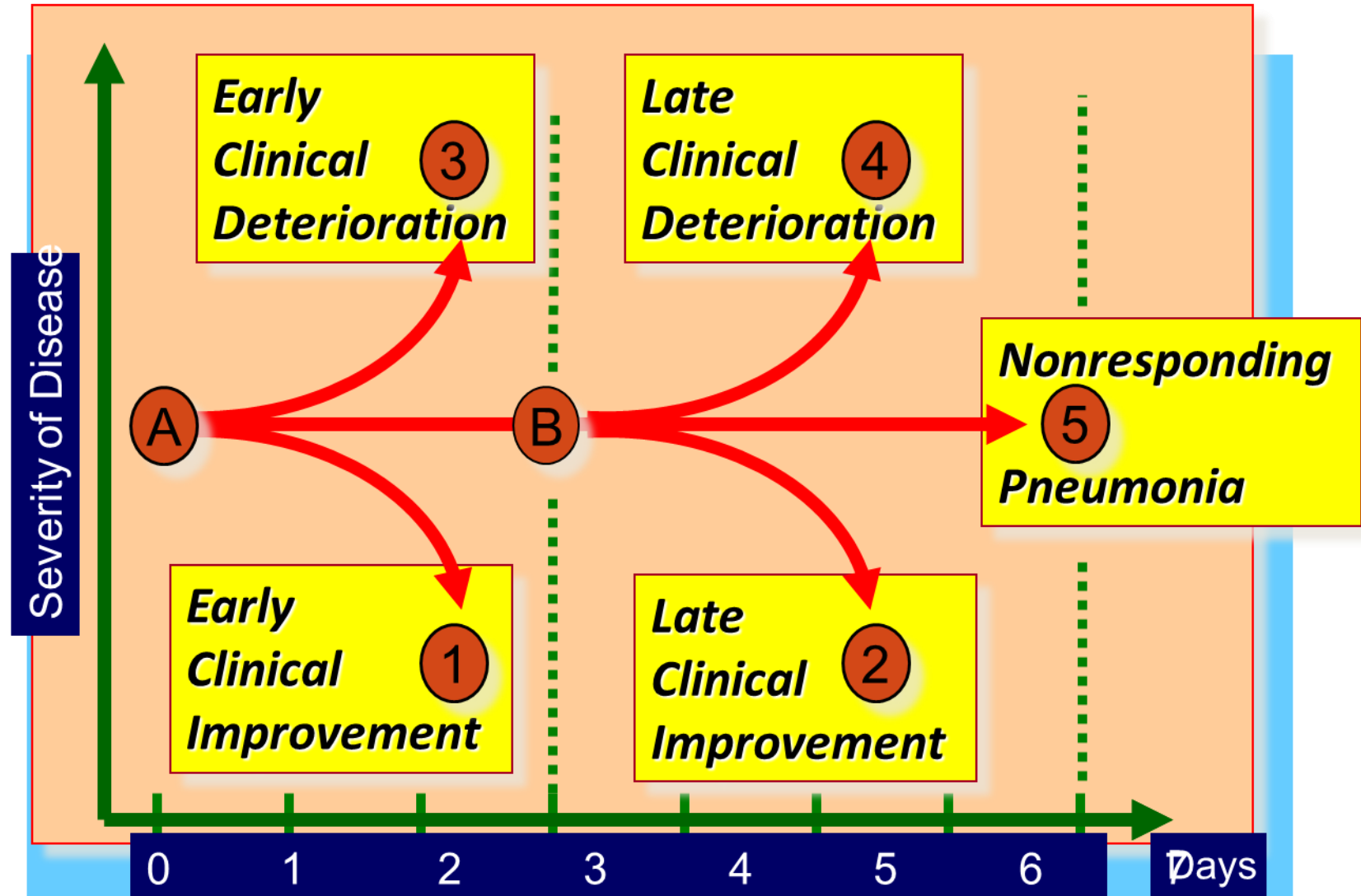


Our workflow should provide ~1000x depth of coverage across the genome

6. How does the host respond to infection with SARS CoV-2?

Critical issue #5:

We need biomarkers to provide direction on potential severity of symptoms to enable efficient utilization of hospital resources.



From Dr. Julio Ramirez, Chief, Infectious Diseases, U Louisville

6. How does the host respond to infection with SARS CoV-2?

Critical issue #5:

We need biomarkers to provide direction on potential severity of symptoms to enable efficient utilization of hospital resources.

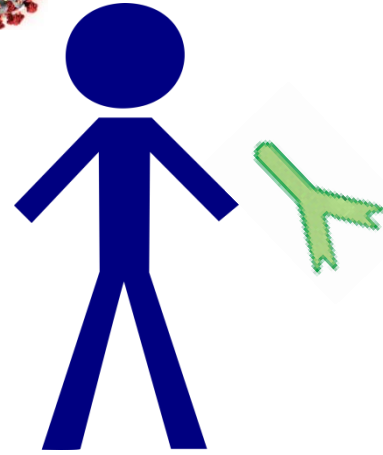
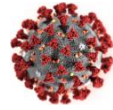


 **iSHPS**

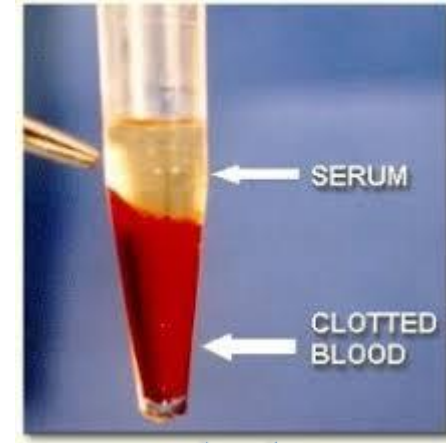
Charting
Host-Pathogen
Interactions

7. How can we tell if we have been infected with SARS CoV-2? 8. How do we know if we have recovered from SARS CoV-2 and have potential immunity?

Critical issue #6: We need IFA and ELISA tests to measure IgM, IgG, neutralizing Ab



Anti-SARS Cov2 IgG



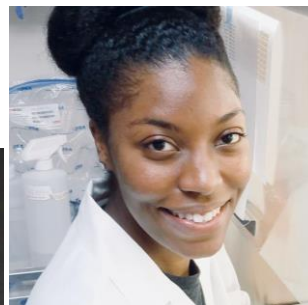
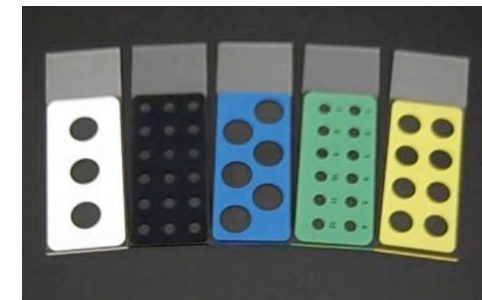
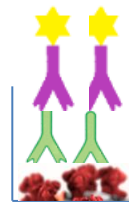
SERUM

CLOTTED BLOOD



Individual recovered from SARS CoV-2 infection will have IgG antibodies against the virus in their blood

SARS CoV-2 proteins

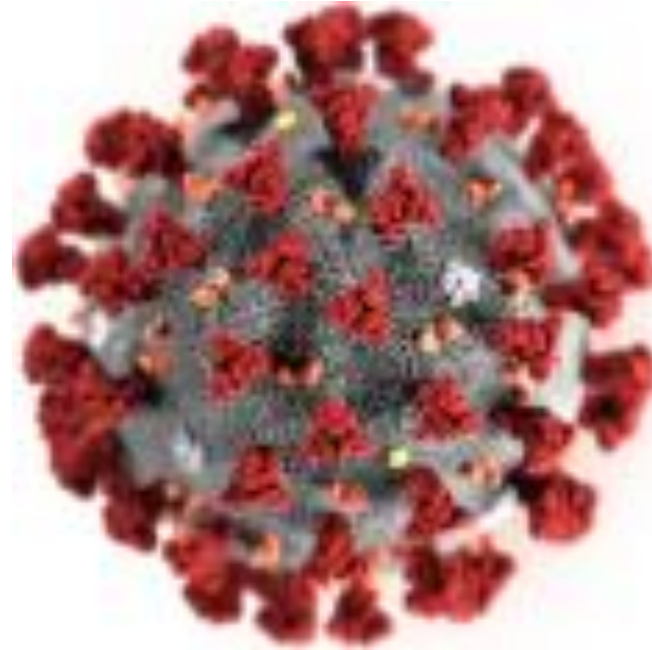


Biorepository

Diagnostic
Tests

Antiviral
Screening

Small Animal
Models



Molecular
Epidemiology

Biomarker
Discovery

Pathogenesis

“For myself I am an optimist – it does not seem to be much use to be anything else.” – **Winston Churchill**

Question and Answer Panel