Welcome to the Front Lines
of the Fight Against COVID-19

A TOWN HALL CONVERSATION

We will begin at 10 a.m.

HOUSTON Methodist
LEADING MEDICINE

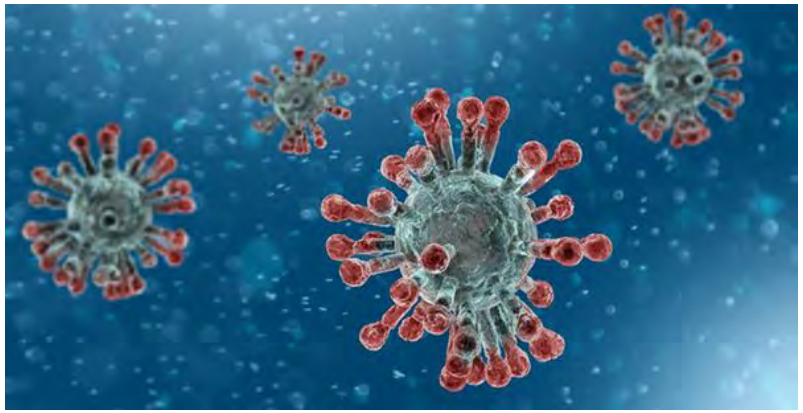
COVID-19
Effect on the Heart & Vessels

William A. Zoghbi MD, MACC
Professor and Chairman, Department of Cardiology
Elkins Family Distinguished Chair in Cardiac Health
Houston Methodist Hospital

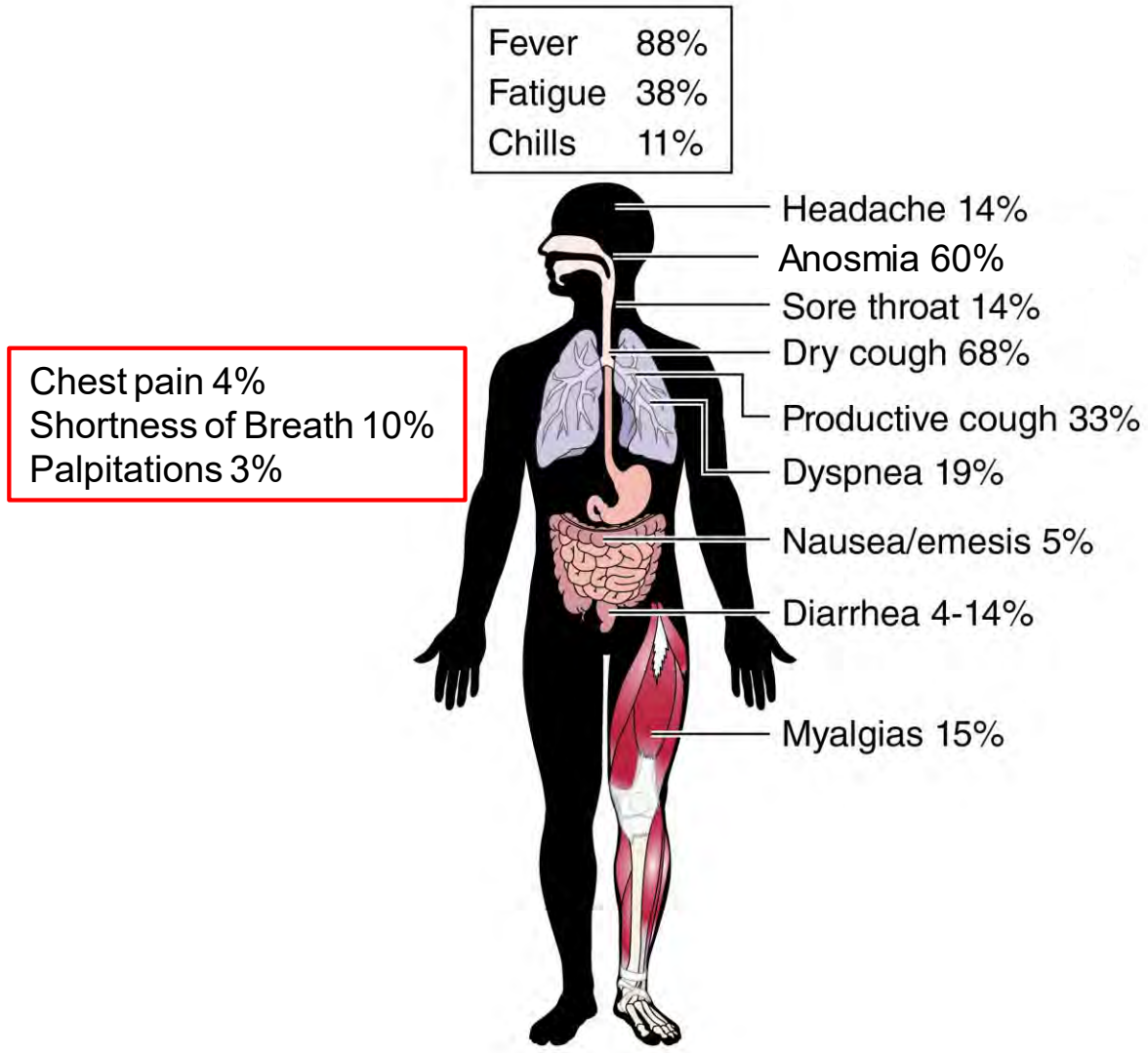
HOUSTON Methodist
DEBAKEY HEART & VASCULAR CENTER

SARS-CoV-2 Symptoms
Involve most Organ Systems

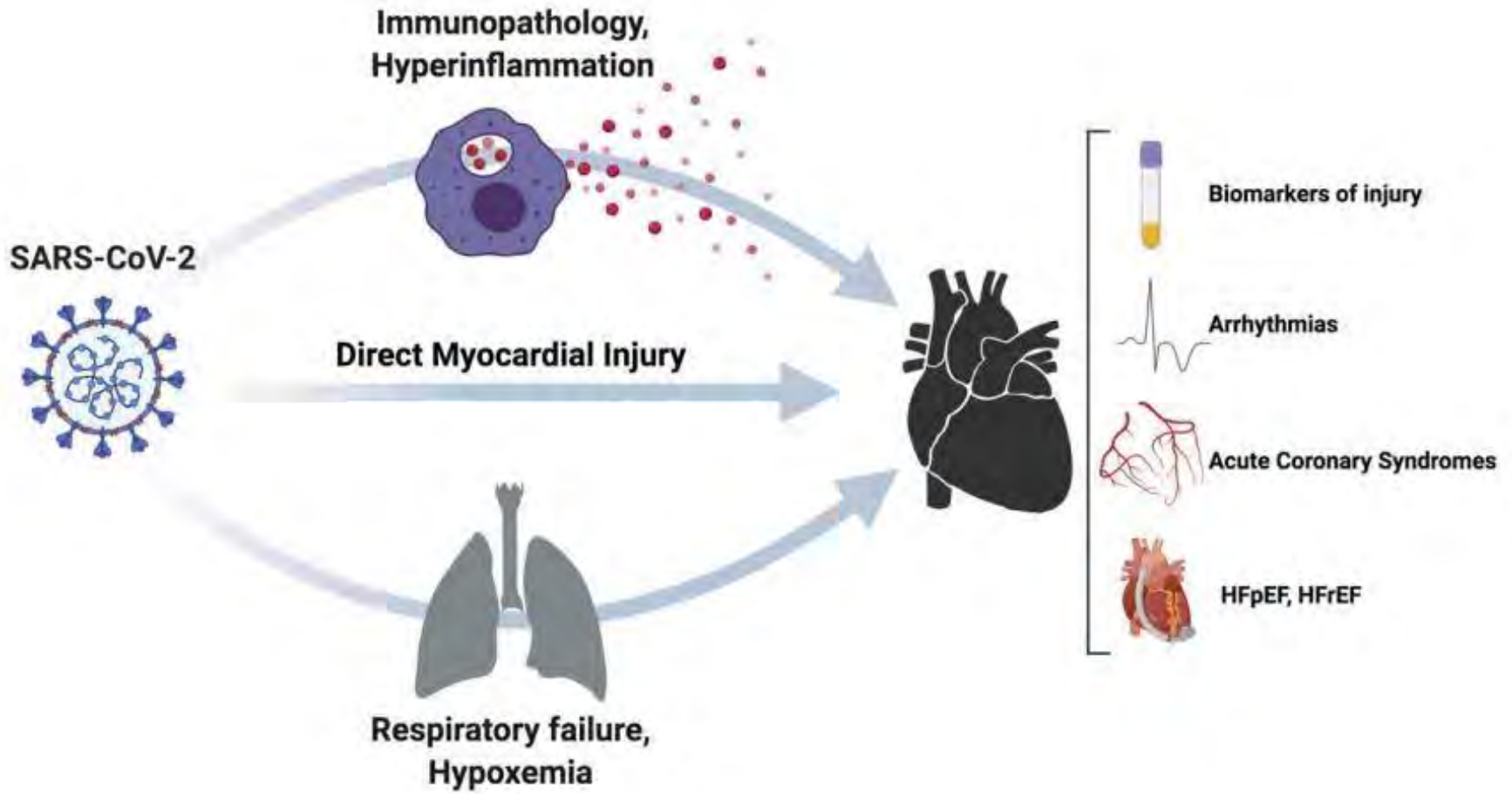
HOUSTON Methodist LEADING MEDICINE



25% Asymptomatic
50% Mild symptoms
15% Moderate symptoms



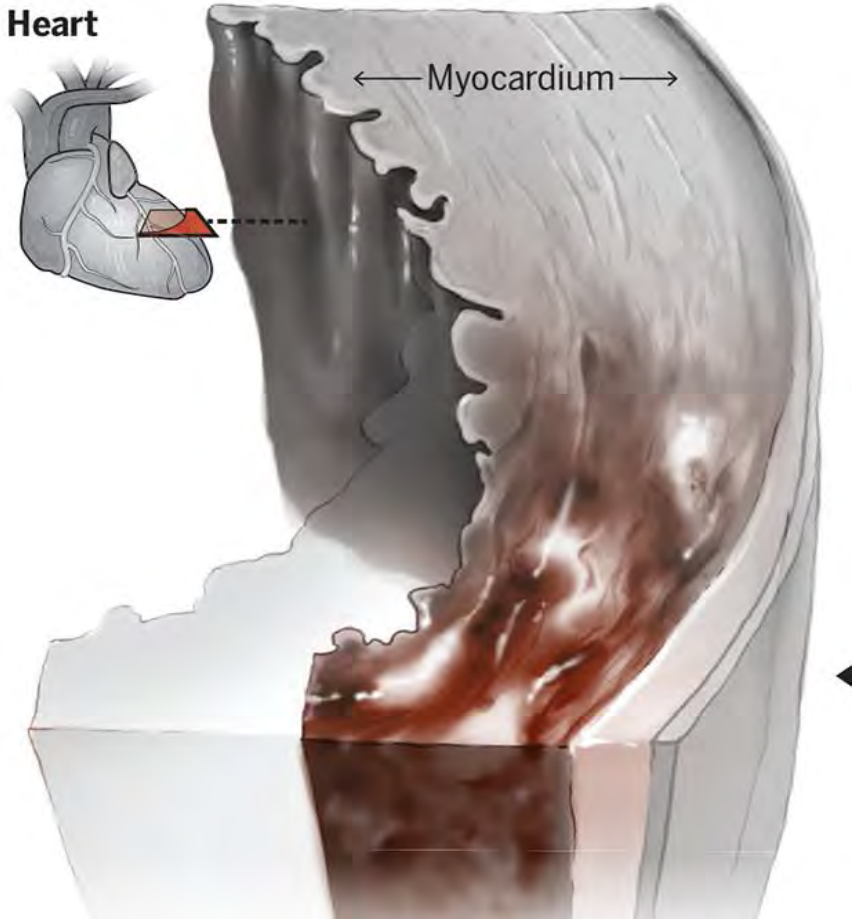
Cardiac Involvement

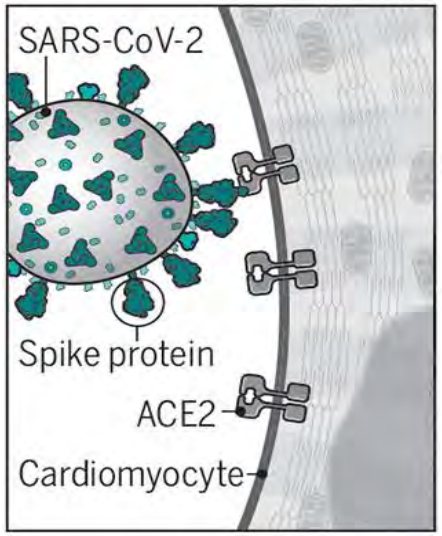


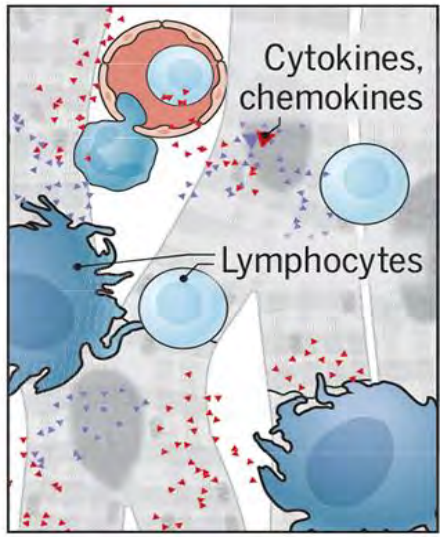
Circulation Research 7 Apr 2020https://doi.org/10.1161/CIRCRESAHA.120.317055

Damaging the heart

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection has the potential to directly and indirectly induce cardiac damage.







The Spike protein can bind with ACE2 receptors in vessels throughout the body, enhancing clot formation

Eric J. Topol Science 2020;370:408-409

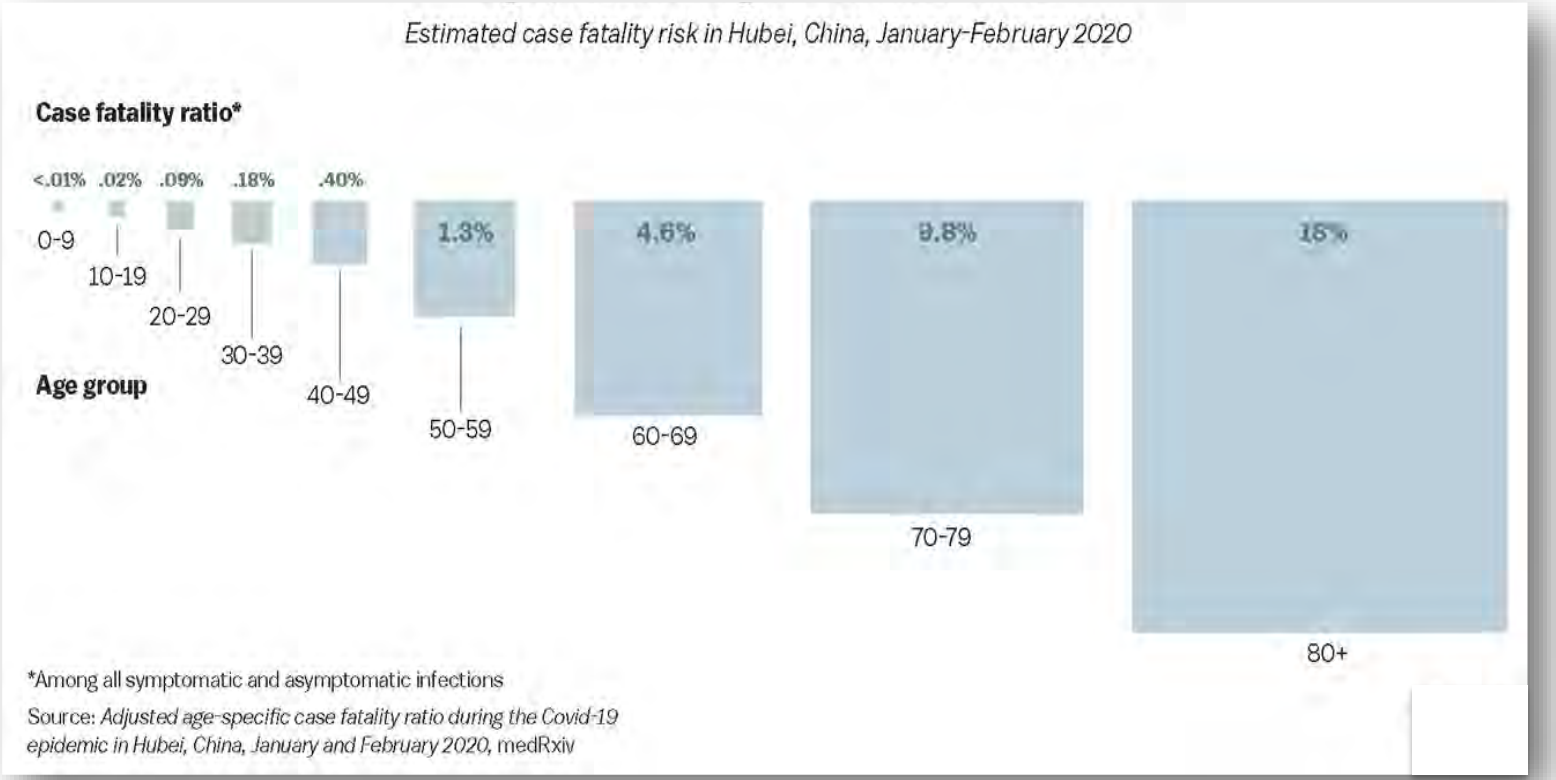
Science AAAS

Risk Factors & Mortality in COVID-19

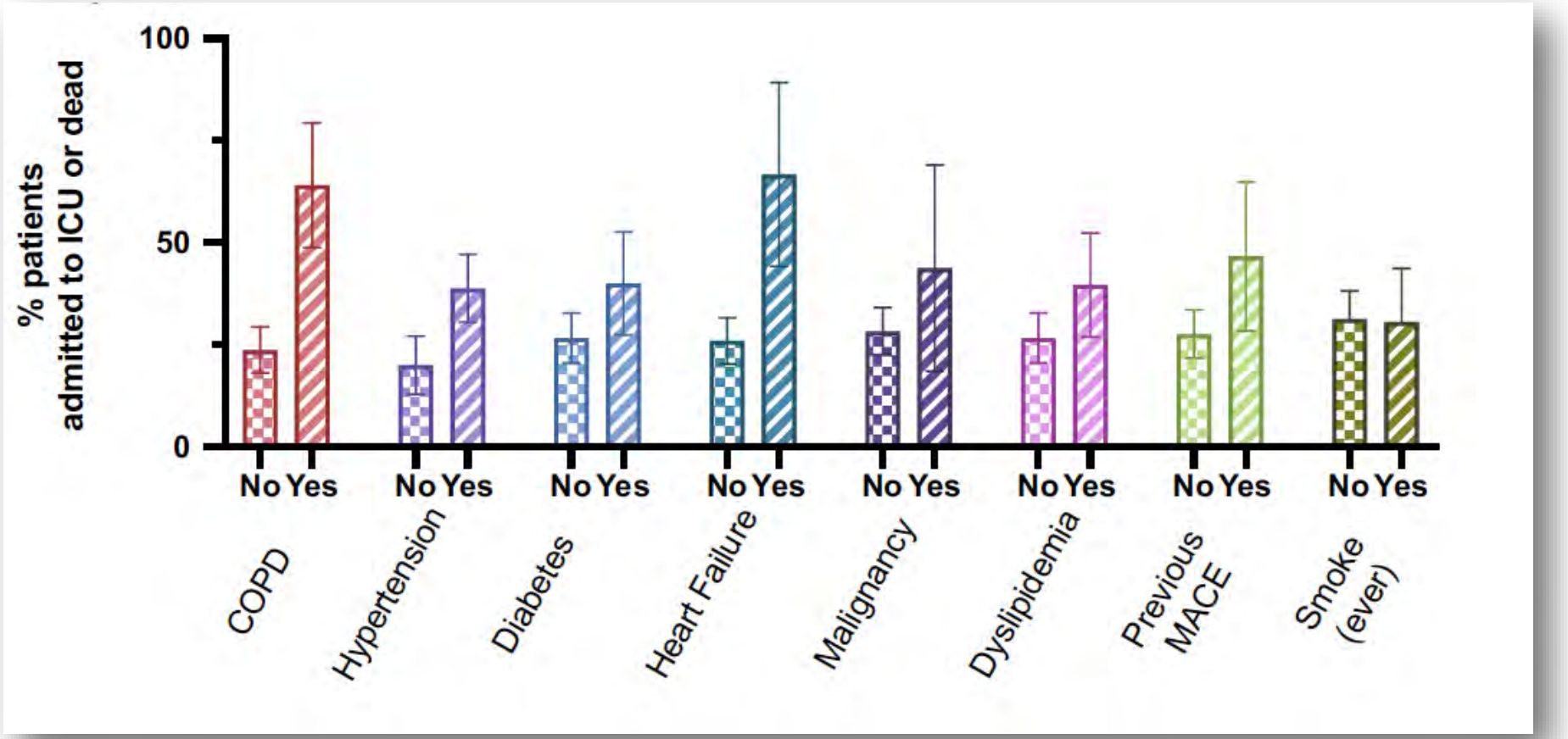
Risk Factors:

- Age
- High Blood pressure
- Diabetes
- Heart Disease
- Obesity
- Lung disease
- Other co-Morbidities

Case Fatality Rate Increases with Age



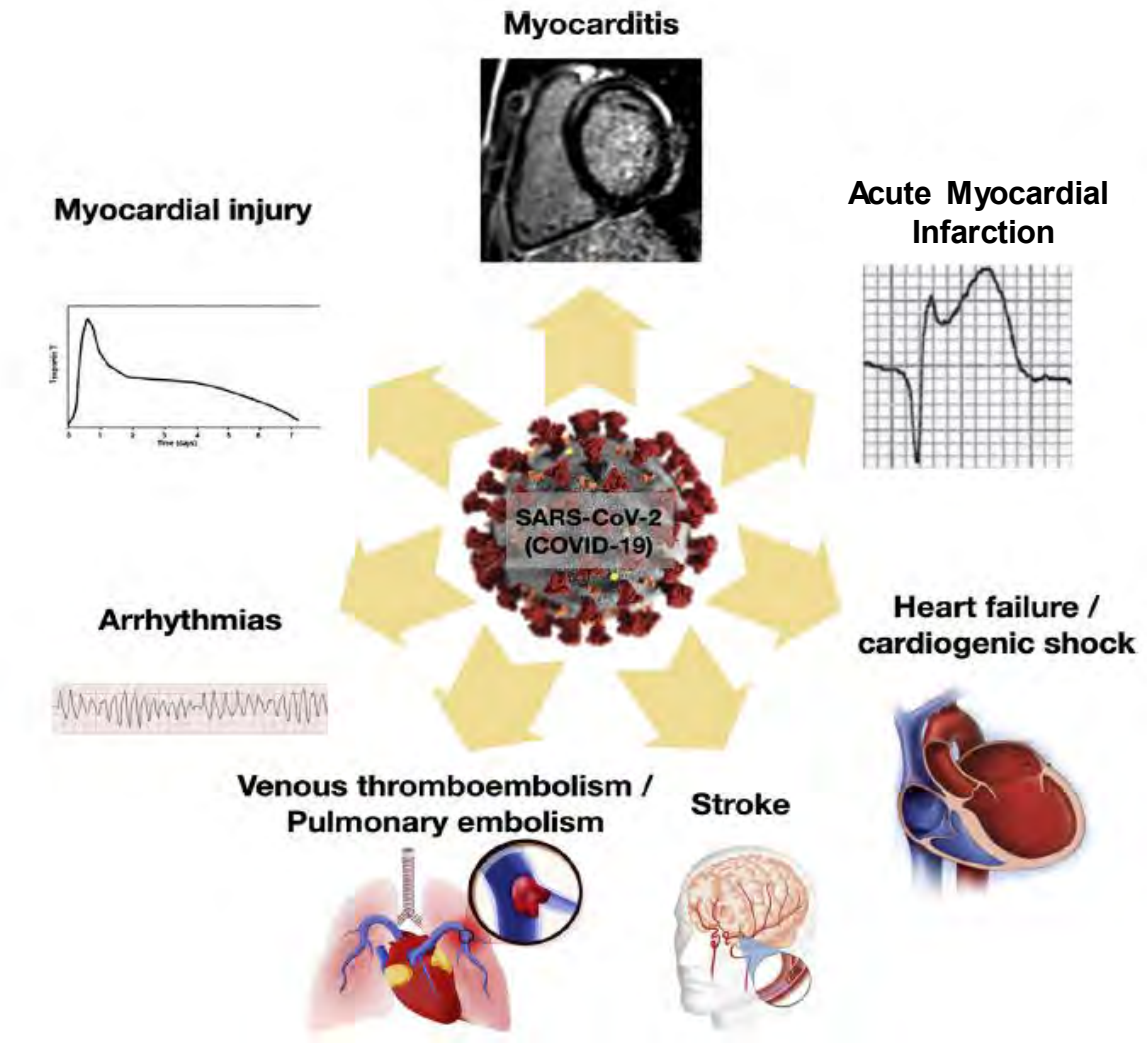
Risk Factors in COVID-19 Associated with Worse Outcome



Maddaloni Circ 2020

Involvement of The Heart and Vessels in COVID-19

HOUSTON Methodist DEBAKEY HEART & VASCULAR CENTER



Canadian Journal of Cardiology 36 (2020) 1068e1080

Echocardiograms- Heart Function

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DEBAKEY HEART & VASCULAR CENTER

Normal

COVID-19
Heart Failure

CARDIAC DYSFUNCTION
LEFT vs RIGHT VENTRICLE INVOLVEMENT?

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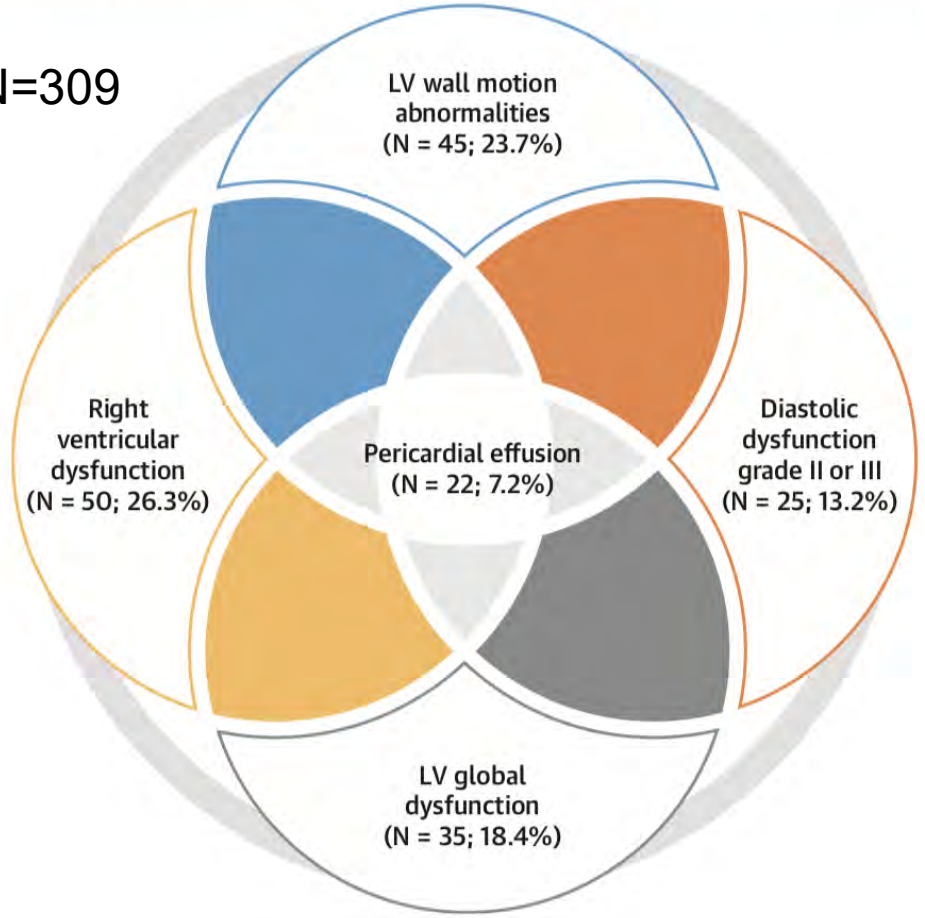
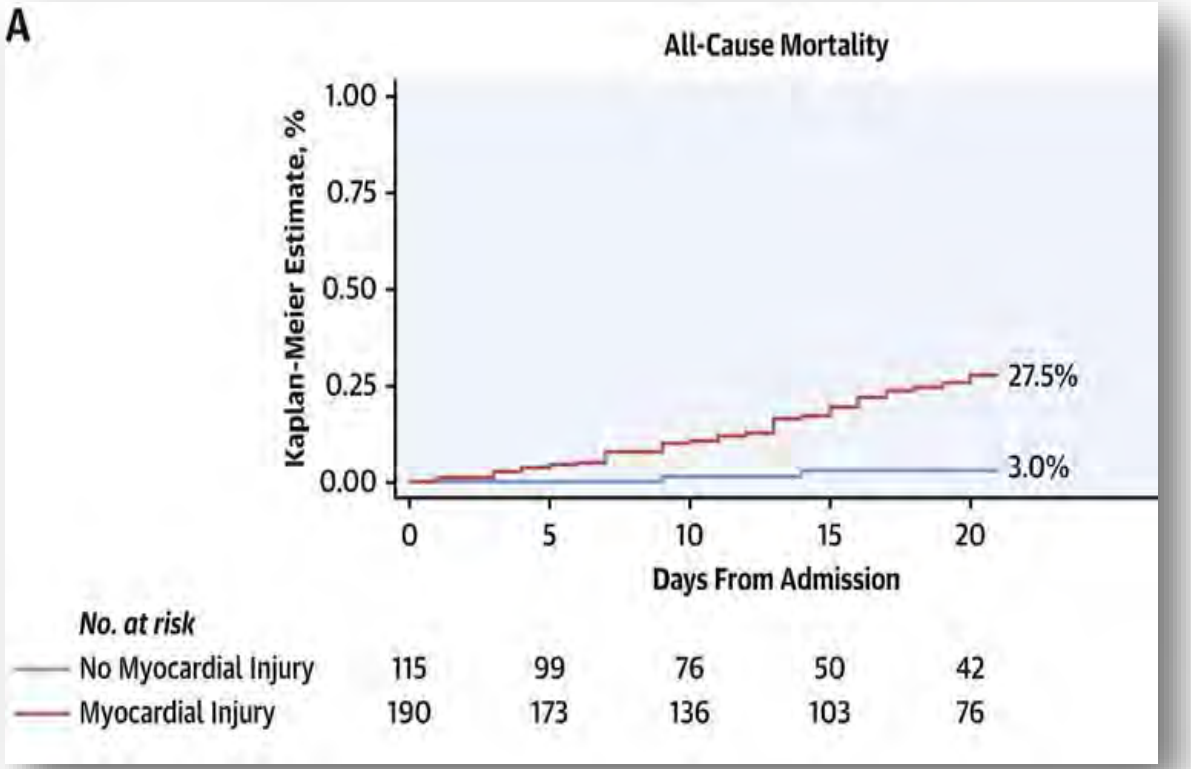
Spectrum of Major Echocardiographic Abnormalities in Patients With Myocardial Injury and COVID-19

N=309





Giustino G et al. JACC 2020; 76(18):2043-2055.

Cardiac MRI in Recovered COVID-19 Patients

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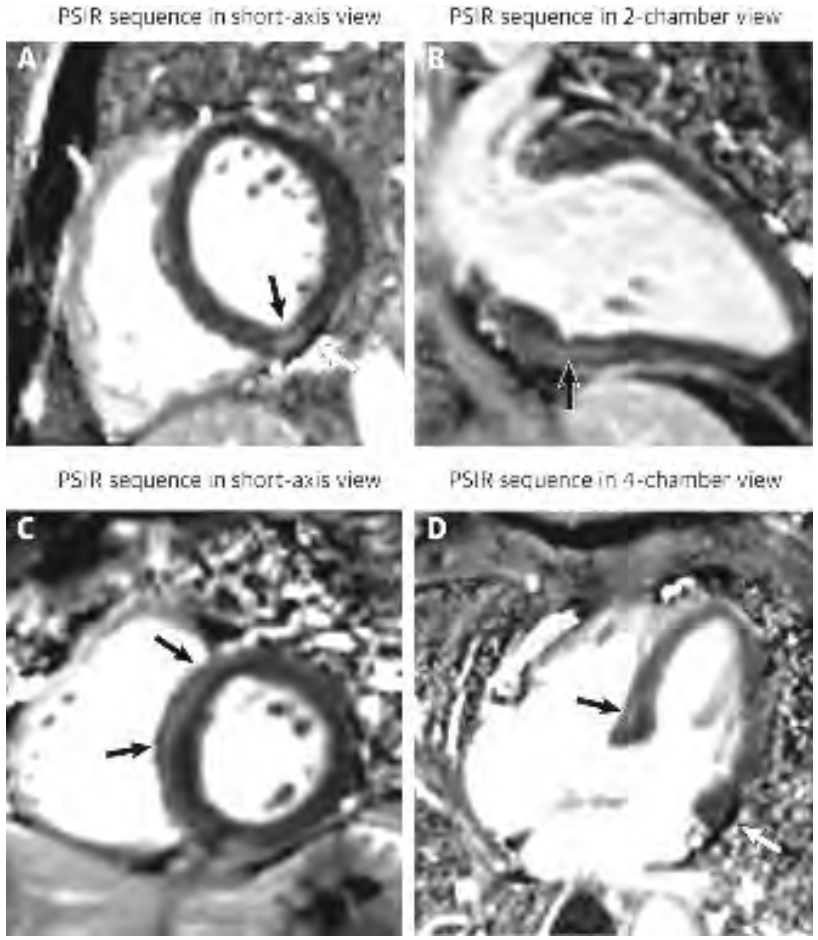
26 patients underwent CMR- median 47 days after COVID-19 symptoms onset

Reported cardiac symptoms (chest pain/palpitations) after recovering from COVID-19

Abnormal CMR- 58%

Myocardial edema- 54%

Focal fibrosis- Late gadolinium enhancement (LGE)- 31%



Huang L, et al. JACC Img. 2020; 13: 2330-2339

CARDIAC INVOLVEMENT in YOUNG ATHLETES?

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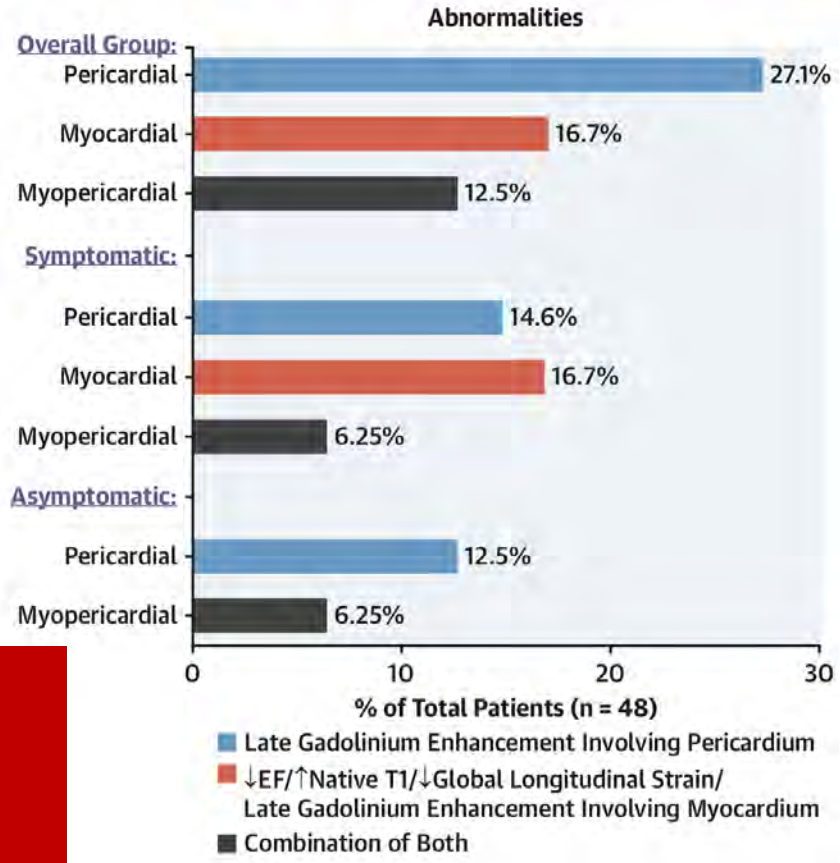
JACC: CARDIOVASCULAR IMAGING
VOL. ■, NO. ■

CLINICAL RESEARCH

High Prevalence of Pericardial Involvement in College Student Athletes Recovering From COVID-19

Daniel Brito, MD,[a,*] Scott Meester, MD,[b,*] Naveena Yanamala, MS, PhD,[a,*] Heenaben B. Patel, MBBS,[a] Brenden J. Balcik, MD,[b] Grace Casaclang-Verzosa, MD,[a] Karthik Seetharam, MD,[a] Diego Riveros, MD,[b] Robert James Beto II, MD,[a] Sudarshan Balla, MD,[a] Aaron J. Monseau, MD,[b] Partho P. Sengupta, MD, DM[a]

CENTRAL ILLUSTRATION Abnormal Findings of Pericardial, Myocardial, and Myopericardial Involvement in Mild Symptomatic and Asymptomatic Athletes With Coronavirus Disease 2019



54 consecutive student athletes with COVID
66% moderate COVID-19 related symptoms
40% athletes with pericardial late enhancements with associated pericardial effusion.
Of the individuals with pericardial enhancements, 6 (12.5%) had reduced global longitudinal strain and/or an increased native T_1

ARRHYTHMIAS IN COVID-19

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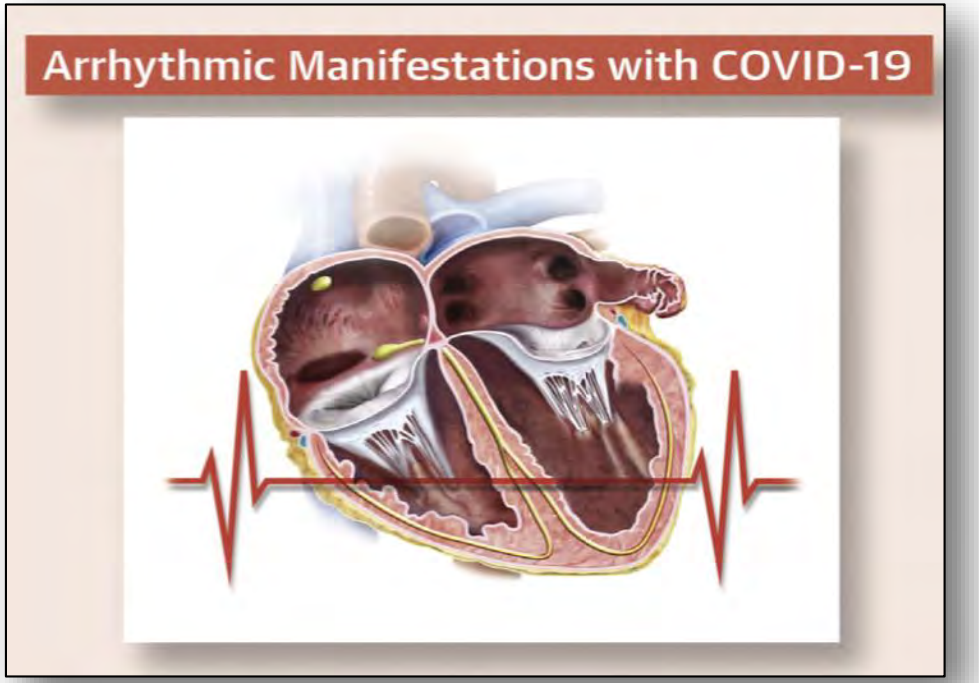
Accompany Severity of the Illness & Cardiac Involvement

- Atrial Fibrillation
- Tachycardia
- Heart Block
- Ventricular Tachycardia
- Cardiac Arrest



ADULT CONGENTIAL HEART DISEASE?

Moderate/Severe COVID-19 Infection Associated with:

- Genetic Syndrome
- ACHD Physiologic Stage C
- Pulmonary Hypertension
- Obesity

MYOCARDIAL DAMAGE AMONG COVID PTS
PREVALENCE AND RISK

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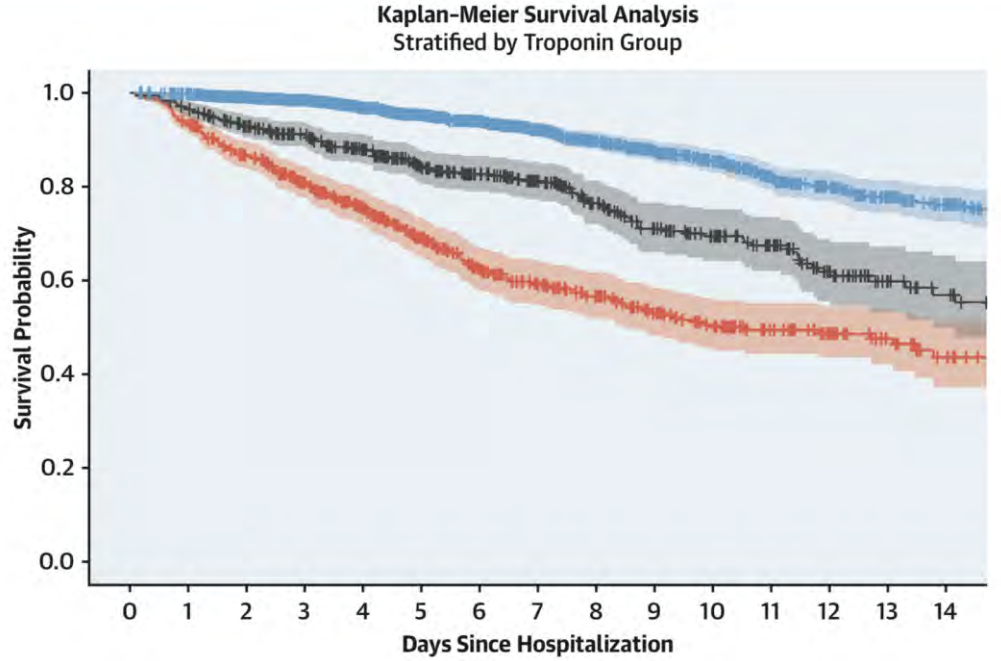
JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY
PUBLISHED BY ELSEVIER ON BEHALF OF THE AMERICAN
COLLEGE OF CARDIOLOGY FOUNDATION

VOL. 76, NO. 5, 2020

Prevalence and Impact of Myocardial Injury in Patients Hospitalized With COVID-19 Infection

Anuradha Lala, MD,[a,b,*] Kipp W. Johnson, PhD,[c,d,*] James L. Januzzi, MD,[e,f] Adam J. Russak, MD,[c,g] Ishan Paranjpe, BS,[c] Felix Richter, PhD,[c,d] Shan Zhao, MD, PhD,[c,h] Sulaiman Somani, BS,[c] Tielman Van Vleck, PhD,[i] Akhil Vaid, MD,[c,d] Fayzan Chaudhry, MS,[c] Jessica K. De Freitas, BS,[c,d] Zahi A. Fayad, PhD,[j,k] Sean P. Pinney, MD,[a] Matthew Levin, MD,[b,d,l,m] Alexander Charney, MD, PhD,[d,n,o] Emilia Bagiella, PhD,[a,b] Jagat Narula, MD, PhD,[a] Benjamin S. Glicksberg, PhD,[c,d,j] Girish Nadkarni, MD, MPH,[c,g,j] Donna M. Mancini, MD,[a,b,†] Valentin Fuster, MD, PhD,[a,†] on behalf of the Mount Sinai COVID Informatics Center



2736 COVID patients

506 (19%) patients died during hospitalization

985 (36%) elevated troponin within 24 hours

Mild Elevation >0.03-0.09
HR 1.75; 95% CI: 1.37 to 2.24

High Elevation>0.09 ng/dl
HR: 3.03; 95% CI: 2.42 to 3.80

What we know about the long term consequences of getting COVID-19

MAJORITY OF HOSPITALIZED PATIENTS DON'T RECOVER IN 2 MONTHS

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Persistent Symptoms in Patients After Acute COVID-19

JAMA. Published online July 09, 2020. doi:10.1001/jama.2020.12603

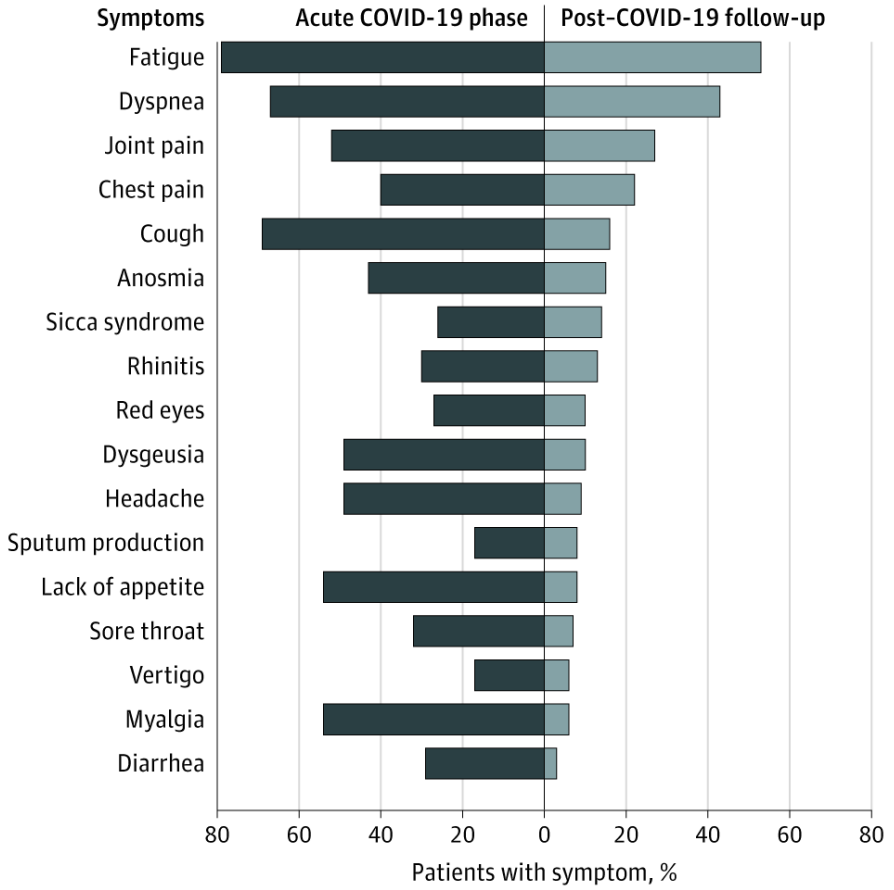
143 Patients Admitted with COVID-19

72% with PNA

2 Week LOS

2 Months post discharge

- **12% completely free of any COVID-19–related symptoms**
- **32% had 1-2 symptoms**
- **55% had 3 or more symptoms**



WHY PROLONGED SYMPTOMS WITH COVID-19?

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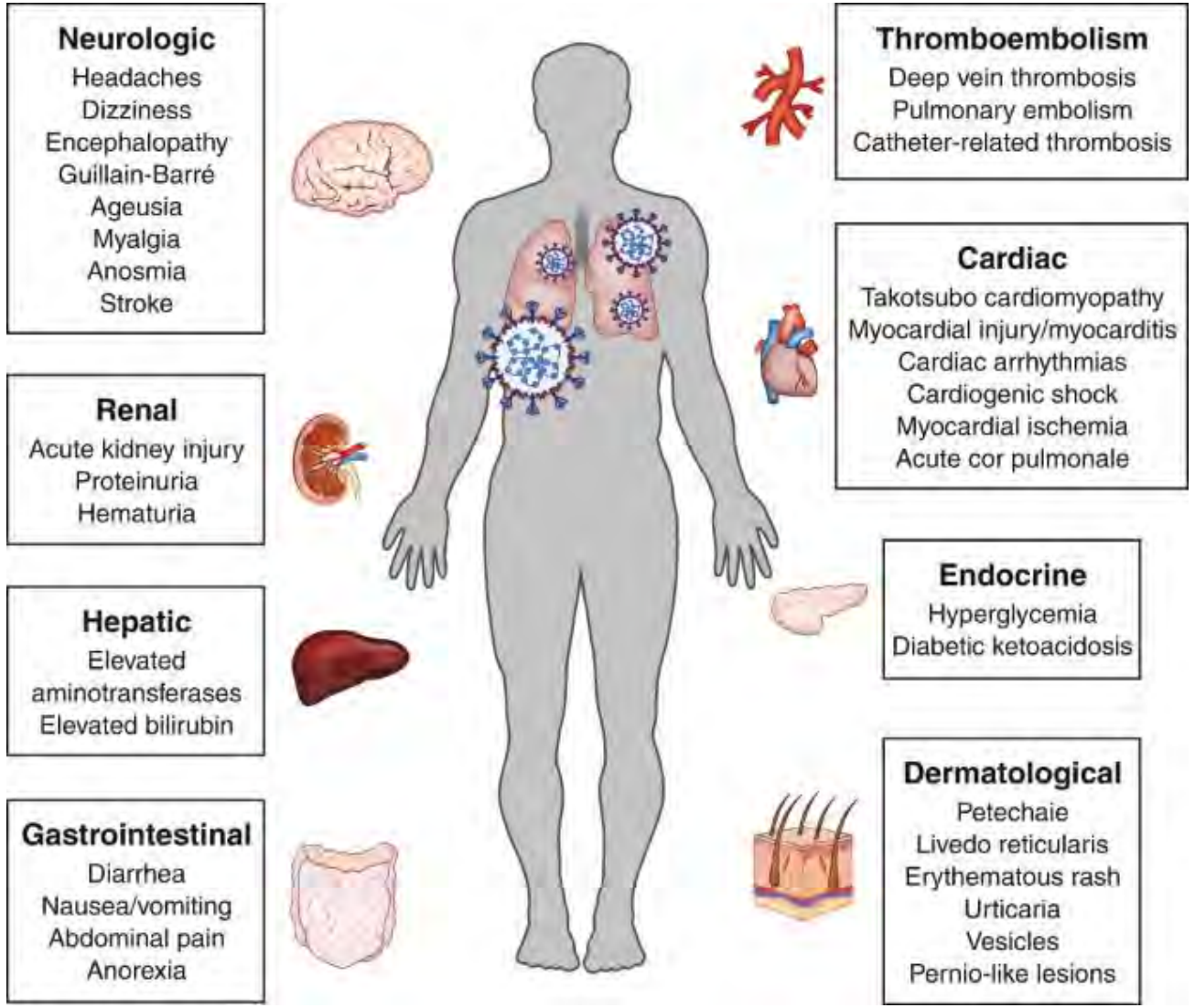
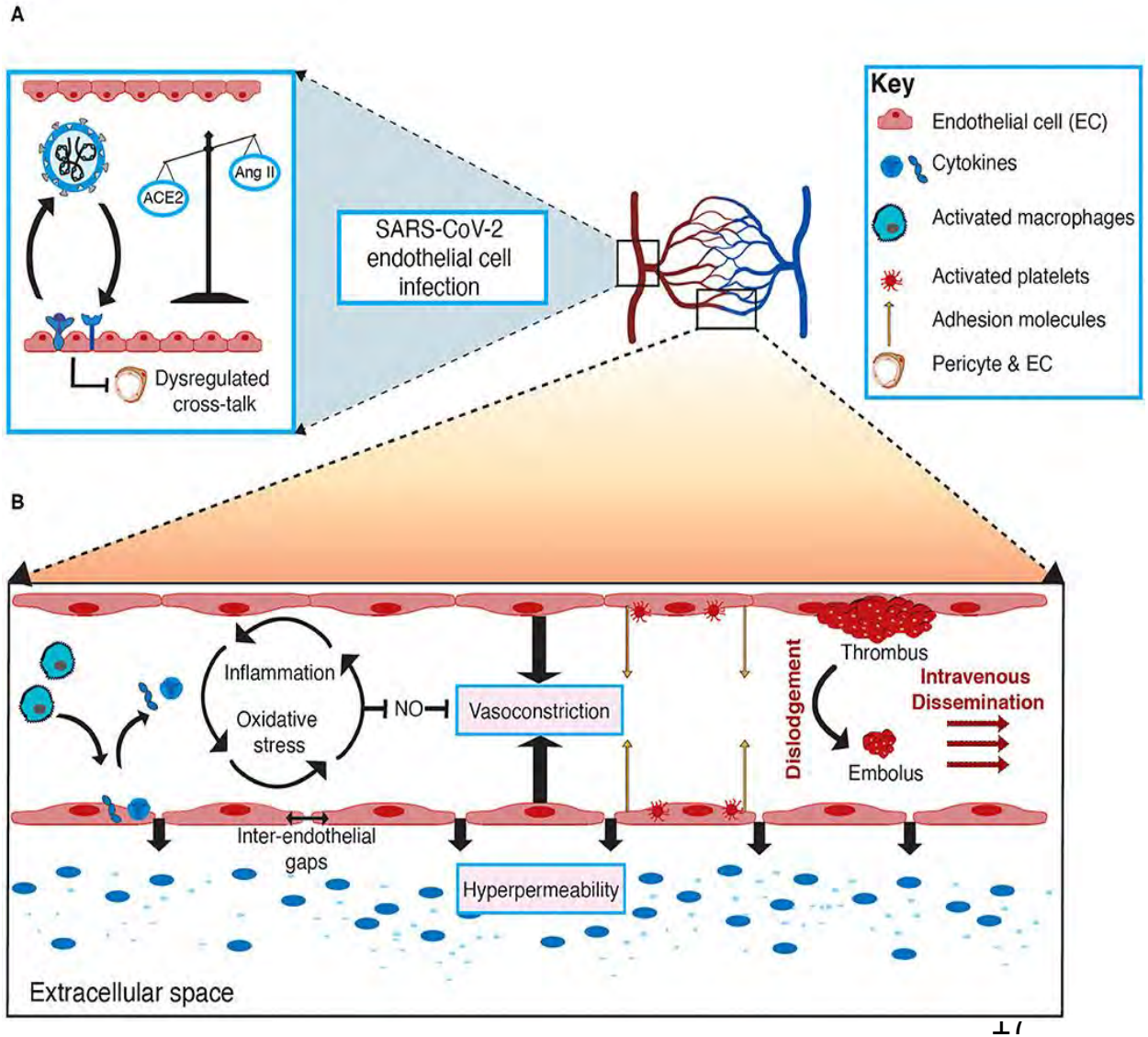


Vascular Manifestations- Endothelial dysfunction and thrombosis

- SARS-CoV-2 infects endothelial cells through binding to ACE2 receptor
- Vascular inflammation
- Can lead to vasoconstriction
- Activation of platelets can lead to thrombosis and potential emboli (4-8%)



Roberts KA, et al. Front Cardiovasc Med 2020; 7: 1-13

COVID-19 Effect on the Heart & Vessels

HOUSTON Methodist LEADING MEDICINE

- SARS-CoV-2 can cause heart damage either directly, through an inflammatory process, microthrombi or indirectly because of severe lung damage
- COVID-19 can be associated with myocardial infarction, heart failure, pericarditis or arrhythmias
- Vascular thrombosis (arterial and venous) is seen in COVID-19
- Prognosis is worse in patients where the heart and other organs are more severely affected
- Long term prognosis awaits further observational studies

We are following COVID-19 patients in the CURATOR Registry in the Houston Methodist System with acute and long term comprehensive studies.

Nationwide Appeal from the American College of Cardiology

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HOUSTON
Methodist
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COVID-19 Impact on Surgical Services

Dr. A. Osama Gaber

Chair, Department of Surgery

Houston Methodist Hospital

HOUSTON Methodist LEADING MEDICINE

Surgery Faces the Coronavirus

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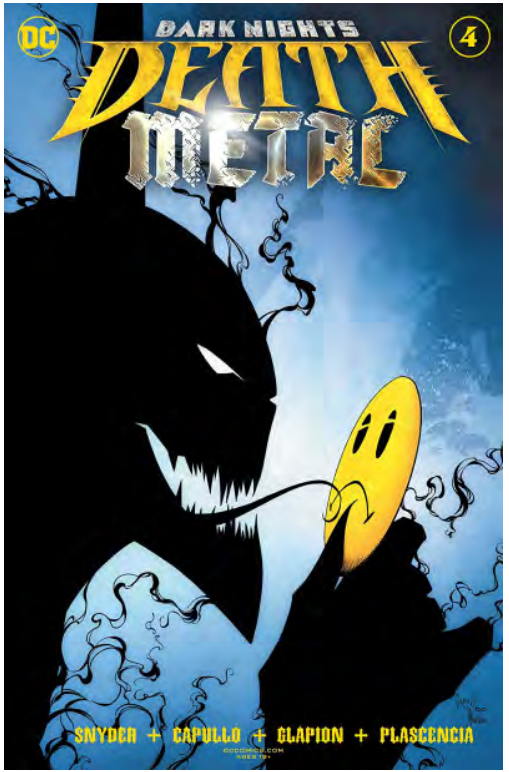
- In early 2020 the Coronavirus started spreading into the United States
- In March 2020 our community cancelled part of the Houston Rodeo to limit the spread of the disease



We Faced Amazing Challenges

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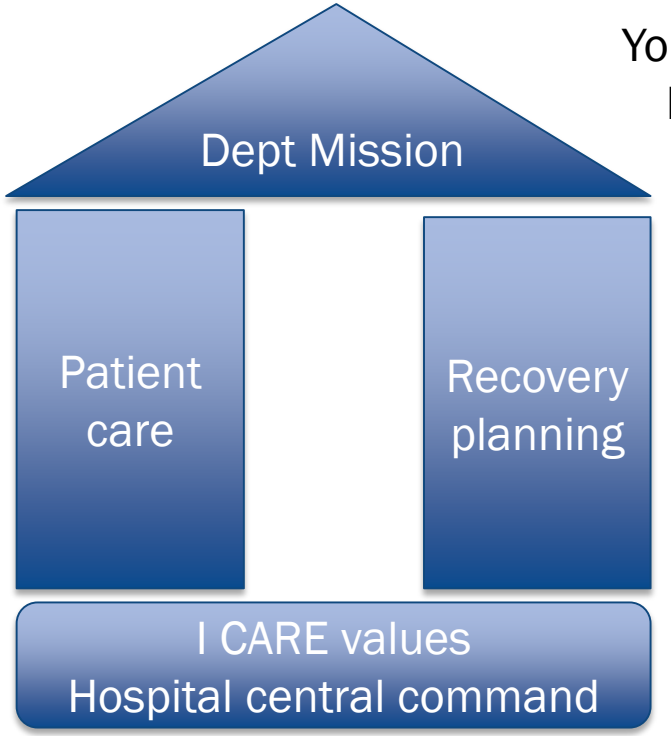
- Supplies and testing
  - Respiratory supplies
  - Laboratory reagents and supplies
  - Price gouging
  - Disinfectant wipes
- Knowledge gaps
  - Transmission and structure of the virus
  - Droplet or aerosol
  - Intubation and operation and transmission
- Patient / staff care challenges
  - Delay in diagnosis
  - Virtual care
  - Keeping a healthy staff
- Operational challenges
  - Finances, through put, protection of families

- **The Governor's Executive Order**
- All licensed health care professionals and all licensed health care facilities shall postpone all surgeries and procedures that are not medically necessary to diagnose or correct a serious medical condition of, or to preserve the life of, a patient who without timely performance of the surgery or procedure would be at risk for serious adverse medical consequences or death, as determined by the patient's physician

The Long Road to Recovery



You do not have to be great to start,
but you have to start to be great

HMH SURGERY VISION & MISSION

HOUSTON Methodist LEADING MEDICINE

Vision:
To become the leading academic surgical department in the region

Mission:
To lead research and innovation in surgical expertize while providing unparrelled care to our patients, and education for the next generation of surgeons.

Strategic Priorities

Organizational Excellence	Education & Professional Development	Discovery & Research	Clinical Excellence	Collaboration & Community Integration
• Evolve care delivery into centers rather than practices • Integrate surgical services across system • Expand service offerings • Re-examine departmental resources and revenue streams	• Integrate residents/fellows into department productivity • Capitalize on EnMed • Emphasize faculty development • Explore expanding educational offerings in MITIE	• Create a division of surgical sciences • Increase research funding • Recruit research faculty • Enhance research opportunities within department	• Grow robotic surgery • Recruit and retain clinical faculty • Optimize APP utilization • Enhance Patient experience • Create competitive advantage for centers of excellence	• Establish deeper collaboration with non-PO physicians and programs • Grow philanthropic support • Enhance department's national and international reputation

We as surgeons share the belief that all human life is sacred. We are devoted to saving, preserving, and improving life regardless of race, color, creed, gender, sexual orientation, and/or place of origin. We also embrace diversity in education, research, employment and every other human endeavor. Racism needs to be recognized & eradicated.

DEPARTMENT ASSETS, SPECIALTIES AND FACULTY

HOUSTON Methodist LEADING MEDICINE

- **Bariatrics/MIS**
  - Vadim Sherman
  - Nabil Tariq
  - Patrick Reardon
  - Lee Morris
  - Debra Harvey (PCP)
- **ACS/Critical Care**
  - Sylvia Martinez
  - Daniel Bonville
  - Hina Faisal
  - Atiya Dhala
  - Rodolfo Oviedo
  - Nicole Tapia (Dec 7)
- **Thoracic Surgery**
  - Min Kim
  - Ray Chihara
  - Edward Chan
- **General Surgery/Surgical Oncology**
  - Wade Rosenberg
  - Sherry Lim
  - Michael Reader
  - Nestor Esnaola
  - Feibi Zheng
  - Gilchrist Jackson
  - Alexander Stark
  - Richard Caplan
- **Transplant**
  - Osama Gaber
  - Richard Knight
  - Stephanie Yi
  - Hemangshu Podder
  - Mark Hobeika
  - Mark Ghobrial
  - Ashish Saharia
  - Constance Mobley
  - Robert McMillan
- **Plastics**
  - Jeffrey Friedman
  - Tue Dinh
  - Michael Klebuc
  - Aldona Spiegel
  - Pierre Chevray
  - Eugene Alford
  - Evan Collins
  - Amy S. Xue
  - Matthew Kaufman

Baytown

- Laura Choi
- Robert Ochoa
- Shawn Tittle
- Esther Dubrovsky
- Boutros Kahla
- Ziad Kronfol
- Kendall Sowards

Sugarland

- Timothy Opperman
- Ali Mahmood
- Sandra Templeton
- Michael O'Shea
- Michael Yaakovian
- Kathleen Baxter
- Lisa Haubert

Woodlands

- Steven "Ben" Albright
- Steven Gordon

Willowbrook

- Liza Thalheimer
- Todd Worley
- Diego Carlos Marines
- Anthony Echo
- John Shuck

Clearlake

- Kyle Stephens
- David Laron Mason
- Jitesh Joshi
- Gabe Rodriguez

West

- SueEllen Arentz
- Carla Braxton
- Minh Nguyen
- Van-Hien Tran
- Laura Choi
- Warren Ellsworth Rodger Brown

HM Affiliated Surgeons

- Joshua Coursey
- Eric Haas
- Jean Paul Lefave
- Rachel Ellsworth
- Matthew Weaver
- Randolph Bailey
- Marianne Cusick
- Bidhan Das
- Michael Snyder
- Jeffrey Van Eps

Research Faculty

- Xian Chang Li
- Luping Huang
- Malgorzata Kloc Stepkowska
- Omaima Sabek
- Stefano Casarin
- Xiang Xiao
- Bin He
- Jin Wang
- Wenhao Chen
- Zhiqiang Zhang
- Linda Moore
- Joshua Swan
- Stephen Jones

ASSETS: QUALITY METRICS

Mortality, LOS and Readmission

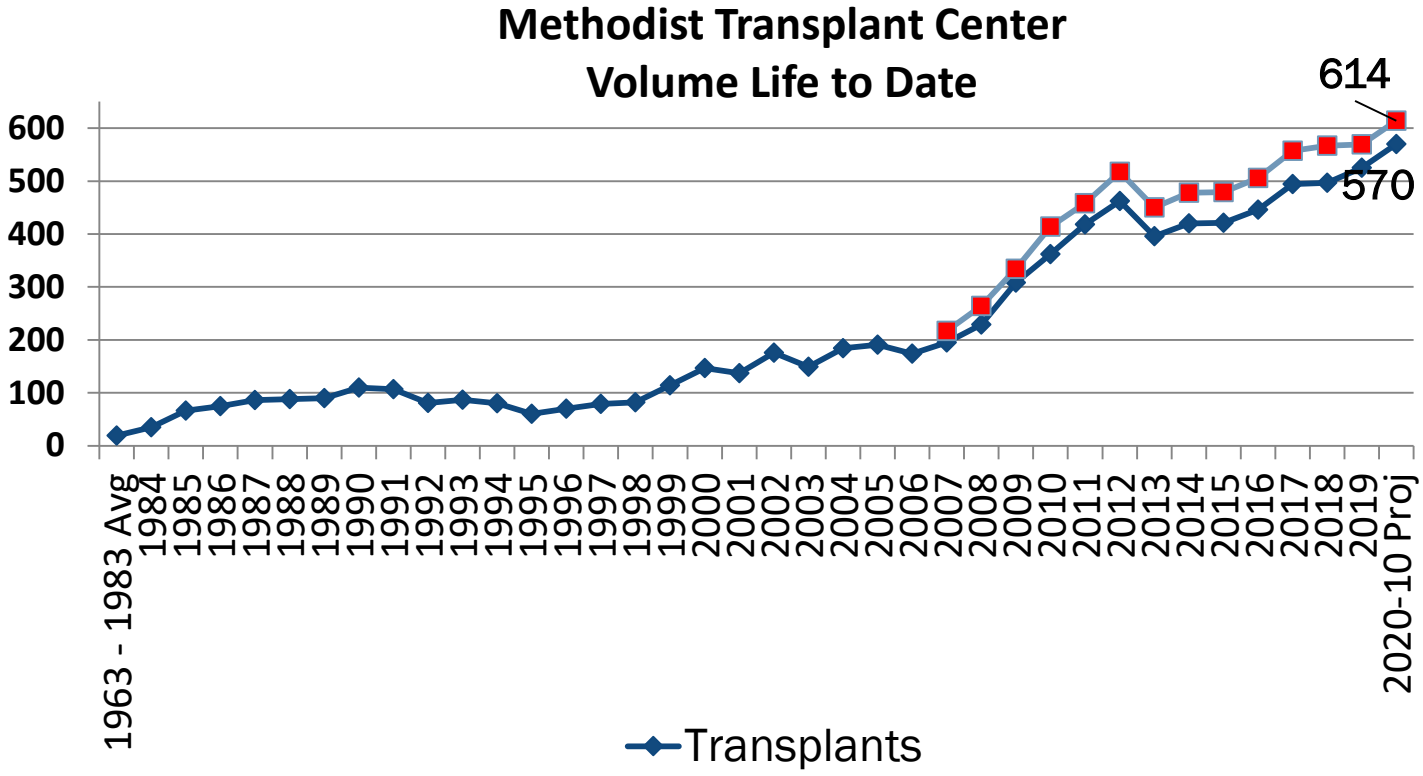
May 2020 YTD, April 2020 Observed*

HOUSTON Methodist LEADING MEDICINE

General Surgery Services	2018 3617	2019 3901	2020 YTD May 1162	2020 Goals
Mortality Index	.43 (52)	.43 (56)	.29 (30)	.62 (95th percentile)
LOS Index	.90	.85	.81	.87 (80th percentile)
Readmission	11.67%	11.4%	12.3 %*	10.3% (50th percentile)
Thoracic Surgery Services	**2018 223**	**2019 299**	**2020 YTD May 94**	**2020 Goals**
Mortality Index	0.43 (3)	0.25 (2)	.29 (1)	0.17 (90th percentile)
LOS Index	.78	.87	.75	.82 (80th percentile)
Readmission	6.76%	8.1%	10.8%*	6.5% 50th percentile)

Source: HMH Quality Matrix, May 2020 YTD DW

ASSETS: TRANSPLANT



We went to work

- Provide top quality surgical care to COVID and non-COVID patients
- Become part of the solution for COVID infections
- Execute on our mission, in care, innovation, education, research and community relations

2020 COVID-19 ACCOMPLISHMENTS

HOUSTON Methodist LEADING MEDICINE

Ongoing Surgery – Transplant – Hepatology Clinical Trials

Title/Topic	PI name	Target/Mechanism of Action	COVID Stage	Inpt or Outpt?
RLF-100 for the Prevention and Treatment of Acute Lung Injury/Acute Respiratory Distress Syndrome in COVID-19 (NeuroRX)	Youssef	Vasoactive Intestinal Polypeptide (VIP)	Severe	Inpatient
Clazakizumab E_IND request: Anti IL6 for use in COVID Patients	Huang	IL-6	Moderate	Inpatient
A Randomized, Double-blind, Placebo-Controlled, Phase 2 Study to Evaluate the Efficacy and Safety of LY3819253 in Participants with Mild to Moderate COVID-19 Illness	Huang	anti-SARS-CoV2 IgG1 antibody	Mild/Moderate	Outpatient
A prospective, controlled, randomized study to compare the efficacy of a chloroquine analog (GNS561) versus standard of care in patients with advanced or metastatic cancer and SARS-CoV-2 (COVID-19) infection	Abdelrahim	Anti-Viral (PPT-1 modulator/inhibitor)	Mild/Moderate	Outpatient

2019 and 2020 METRICS

Grants		Applied for amount or awarded
Grants submitted 2019	39	$19,467,446.48
Grants awarded 2019	12	**$2,829,123.00**
Grants submitted 2020	20	$17,759,003.98
Grants awarded 2020	10	**$1,577,890.00**
Clinical Trials	2019	2020
Surgery	43	**49**

➡ **Payments for Clinical Trials Received to Date 2020: $660,374.87**

FELLOWSHIP PROGRAMS

HOUSTON Methodist LEADING MEDICINE

Surgical Critical Care Fellowship

- Current Status: Initial Accreditation with ACGME
- First fellow graduation in July 2020
- One year program with 2 fellows
- Program Director: Constance Mobley, MD, PhD, FACS

Advanced GI/MIS Bariatric Fellowship

- Current Status: Continued Accreditation with MIS Fellowship Council
- Began in 1996
- One year program with 2 fellows
- Program Director: Patrick Reardon, MD, FACS

Multi-Organ Abdominal Transplantation Fellowship

- Current Status: Continued Accreditation with ASTS
- Began in 2014
- Two year program with one fellow per year
- Program Director: Osama Gaber, MD, FACS, FAST

AGCME SURVEY RESULTS

HOUSTON Methodist LEADING MEDICINE

2018-2019 Survey Results *(2019-2020 results not yet received)*

Evaluation Category	Program Average	National Average
Clinical and Educational Work	4.7	4.8
Faculty	4.3	4.3
Evaluation	4.5	4.5
Educational Content	4.5	4.4
Resources	4.4	4.4
Patient Safety/Teamwork	4.6	4.4

- At or above national average in 5 categories
- 89% of residents reported an overall positive or very positive evaluation of the program

ACHIEVEMENTS

HOUSTON Methodist LEADING MEDICINE

Scholarly Activities

Increased number of publications

- 2018 65 publications
- 2019 70 publications
- 2020 exceeded 70 publications already

Finances and Revenue

- Almost back to 2019 activity levels in surgery, and expect to exceed them by the end of December
- Maintaining the budget very close to planned with a small (1-2%) variance

DEPARTMENT CONTRIBUTIONS TO THE SYSTEM

HOUSTON Methodist LEADING MEDICINE

- *Our critical care intensivists worked 24/7 to cover hospital COVID units while our general surgeons with critical care credentials picked up extra shifts to cover the SLICU*
- *Our ambulatory/outpatient Advanced Practice Providers signed up for extra shifts or transferred to the inpatient units to provide much needed staffing coverage (despite not having worked inpatient units in years)*
- *Non-clinical staff joined the Labor Pool to assist with screening and other functions while others flexed their hours to allow the department to continue operations, minimizing financial impact*

FACULTY AWARDS AND ACCOLADES 2020

HOUSTON Methodist LEADING MEDICINE

HM System Quality & Patient Safety – Unparalleled Quality Award

Outstanding Service Faculty Teaching Award

I CARE Gold Badge

ASTS Health Disparities Research Education Program (HDREP) Scholar Award

I CARE Gold Badge

Exemplary Service Faculty Teaching Award

New Faculty Appointment
Mei Rui, PhD

- BA, Yale University
- MM, Yale School of Music
- AD, Yale School of Music
- DMA, Stony Brook University
- Artist in Residence: Yellowbarn, Putney, VT
- Research Scientist at Center for Performing Arts Medicine
- MUSICARE support video message and a Mozart duet

Joshua T. Swan, PharmD, MPH, FCCM, BCPS

- Associate Professor in Surgery on the Investigative Track
- BS, University of Mississippi
- PharmD, University of Mississippi
- MPH Epidemiology, UT Health Sciences

Nicole Tapia, MD

- Trauma and Surgical Critical Care Director, HCA Houston Healthcare Kingwood
- BA, UT Austin
- MD, UT San Antonio
- Residency and Critical Care Fellowship, Baylor College of Medicine

Rodolfo J. Oviedo, MD, FACS, FASMBS

HOUSTON Methodist LEADING MEDICINE

- Fellow of the American College of Surgeons
- Fellow of the American Society for Metabolic and Bariatric Surgery
- Diplomate of the American Board of Surgery

We Continue to Battle the Coronavirus

HOUSTON Methodist LEADING MEDICINE


HOUSTON
Methodist
LEADING MEDICINE

COVID-19 Update

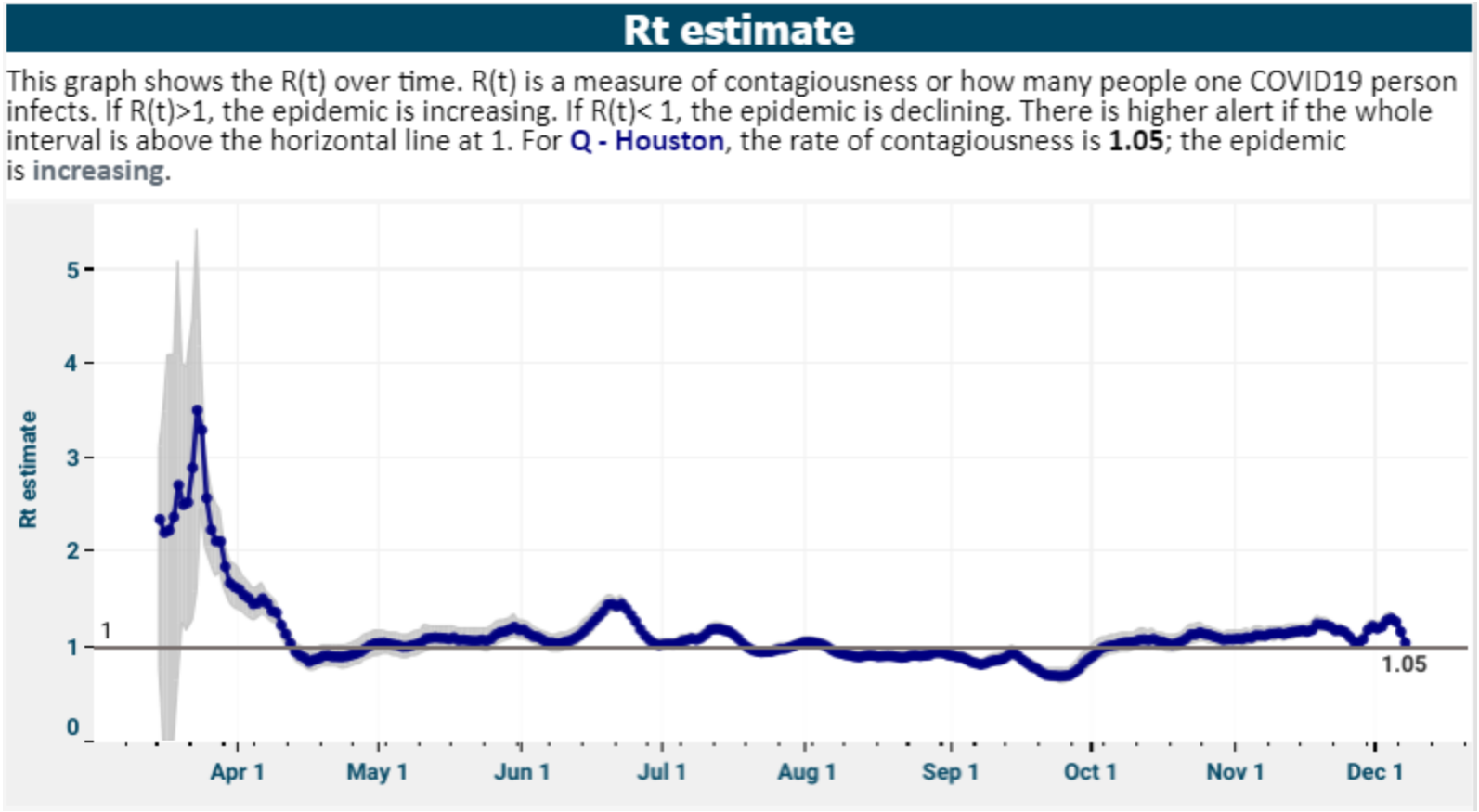
December 10, 2020

HOUSTON Methodist
LEADING MEDICINE

What is the current rate of COVID transmission in Houston?

Houston Area Rt Estimate Trend

HOUSTON Methodist LEADING MEDICINE



https://sph.uth.edu/dept/bads/covid19-dashboard; similar BCM site: https://ictr.github.io/covid-19-county-R0/

TMC Dashboards

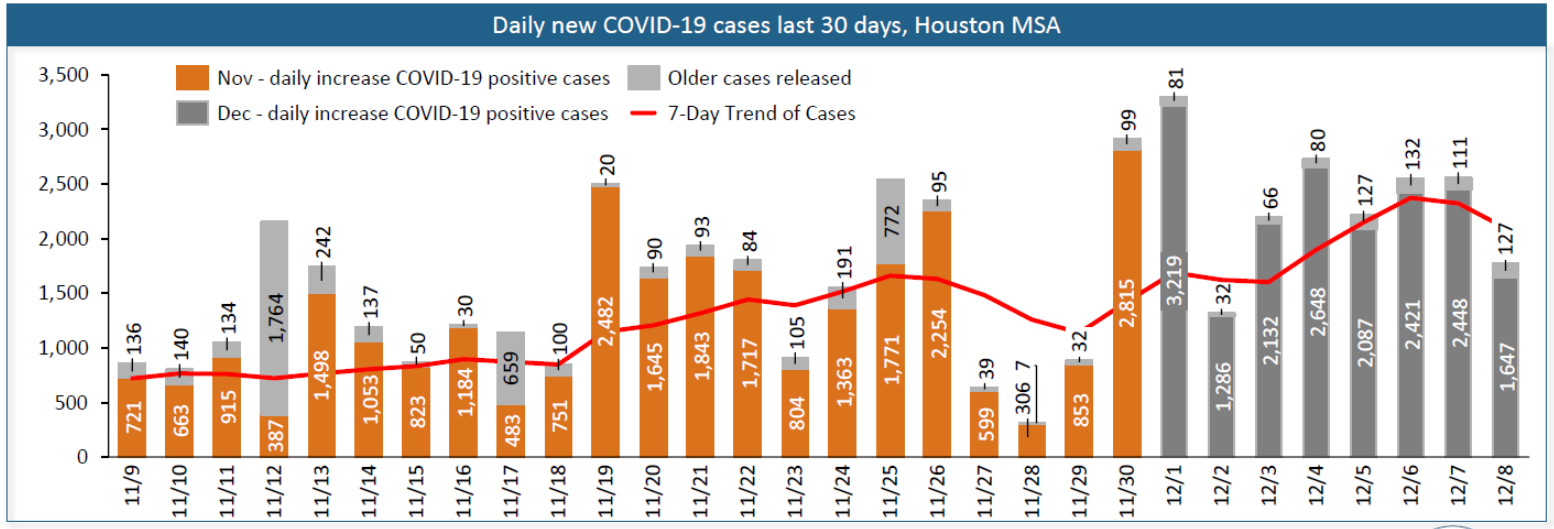
HOUSTON Methodist LEADING MEDICINE

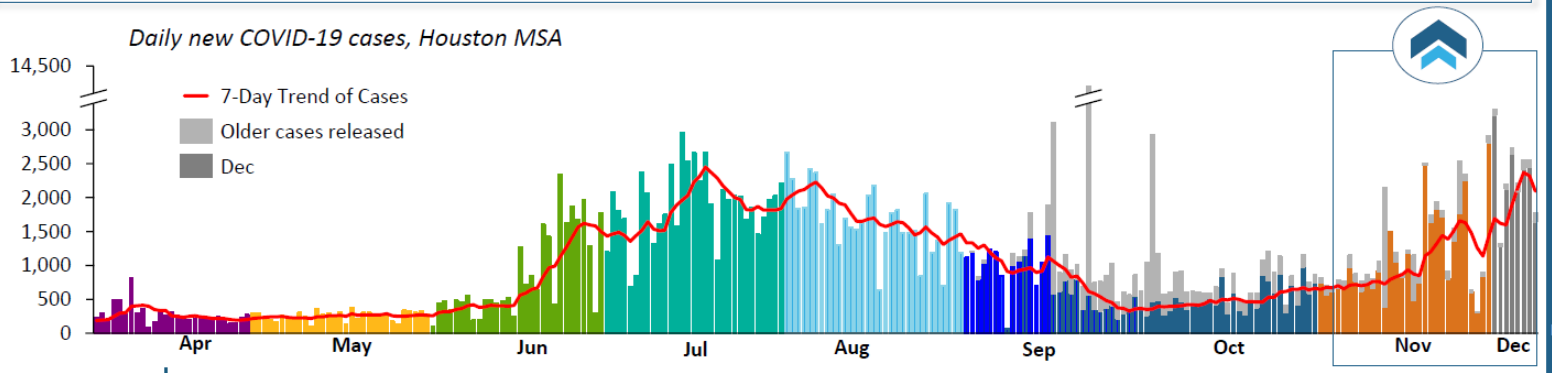
3 COVID-19 CASE TRENDS

DAILY NEW COVID-19 POSITIVE CASES

Greater Houston Area[1]

Note: On 11/19 Montgomery County batch released cases from previous 2 weeks following database transfer





TMC | TEXAS MEDICAL CENTER

"TMC" refers to the group of systems that make up Texas Medical Center

Source: TX Health and Human Services (https://www.dshs.texas.gov/coronavirus/)

December 8, 2020

Monitoring threshold:

Threshold is exceeded by the occurrence of a positive daily growth rate (averaged over 7 days) in the new daily case trend

Current status:

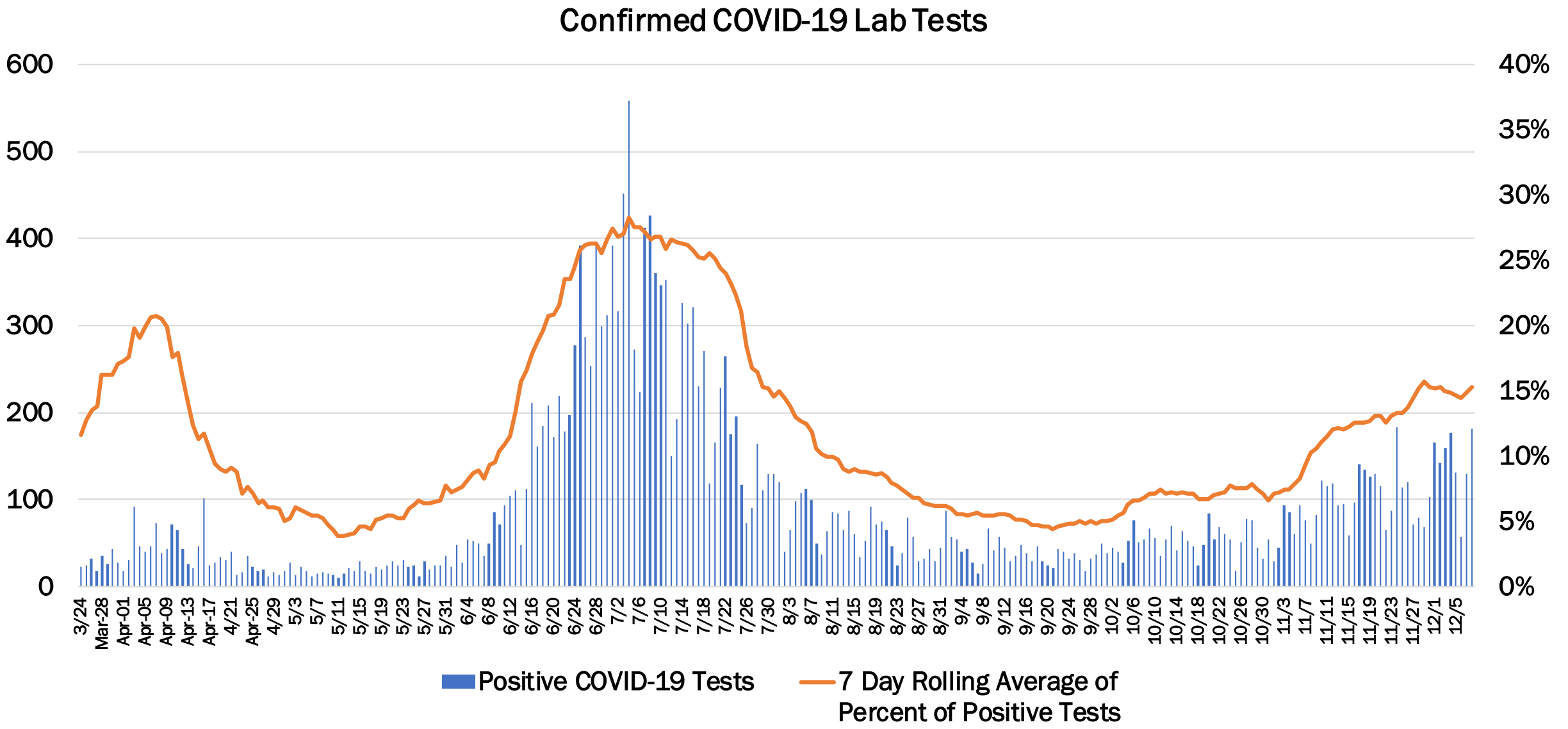
9 days of positive daily growth rate (averaged over 7 days) in the new daily case trend

Note: Data for MHHS current as of 12/7 pending update

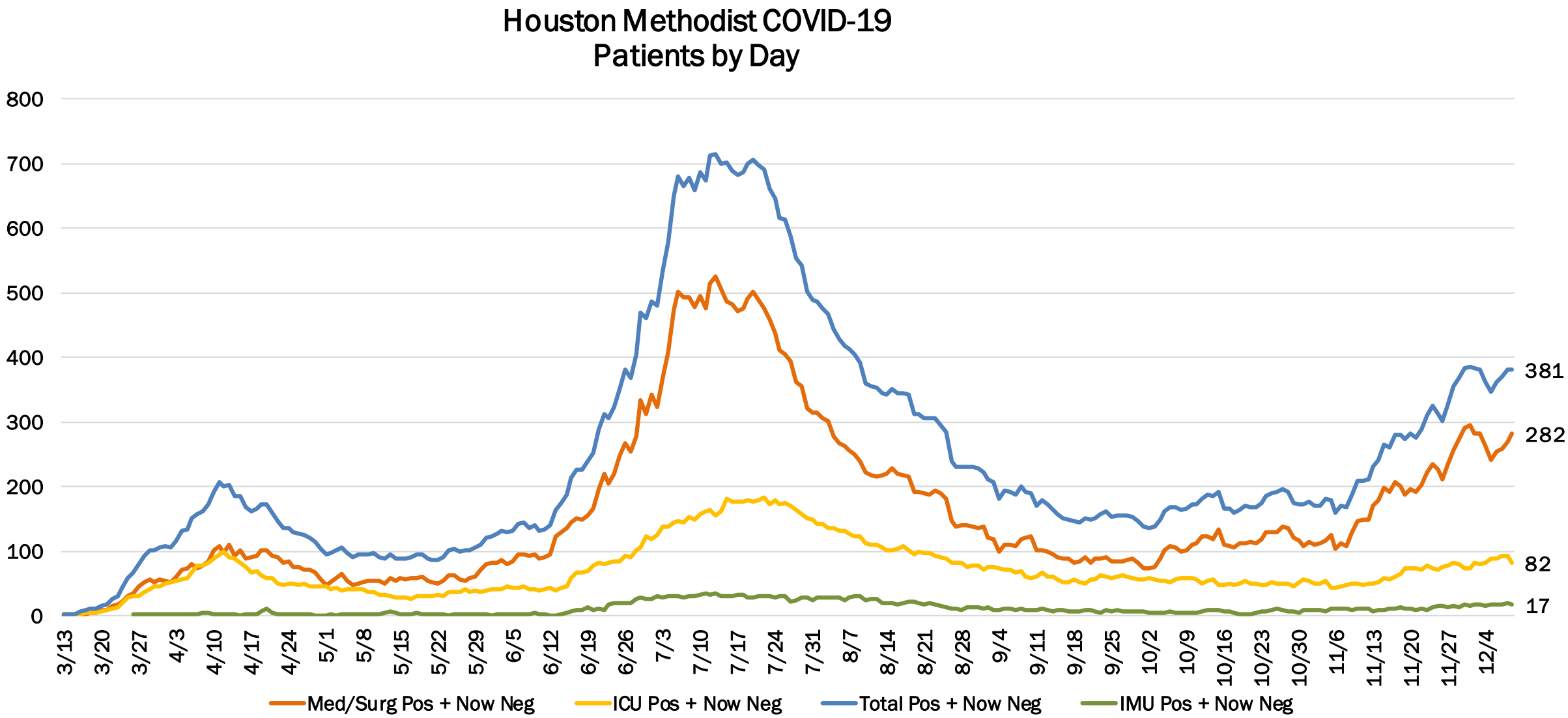
This document is solely intended to share insights and best practices rather than specific recommendations. Individual institution data is shown as reported and has not been independently verified

8

Houston Methodist Testing Trend



Houston Methodist COVID-19 Cases by Day

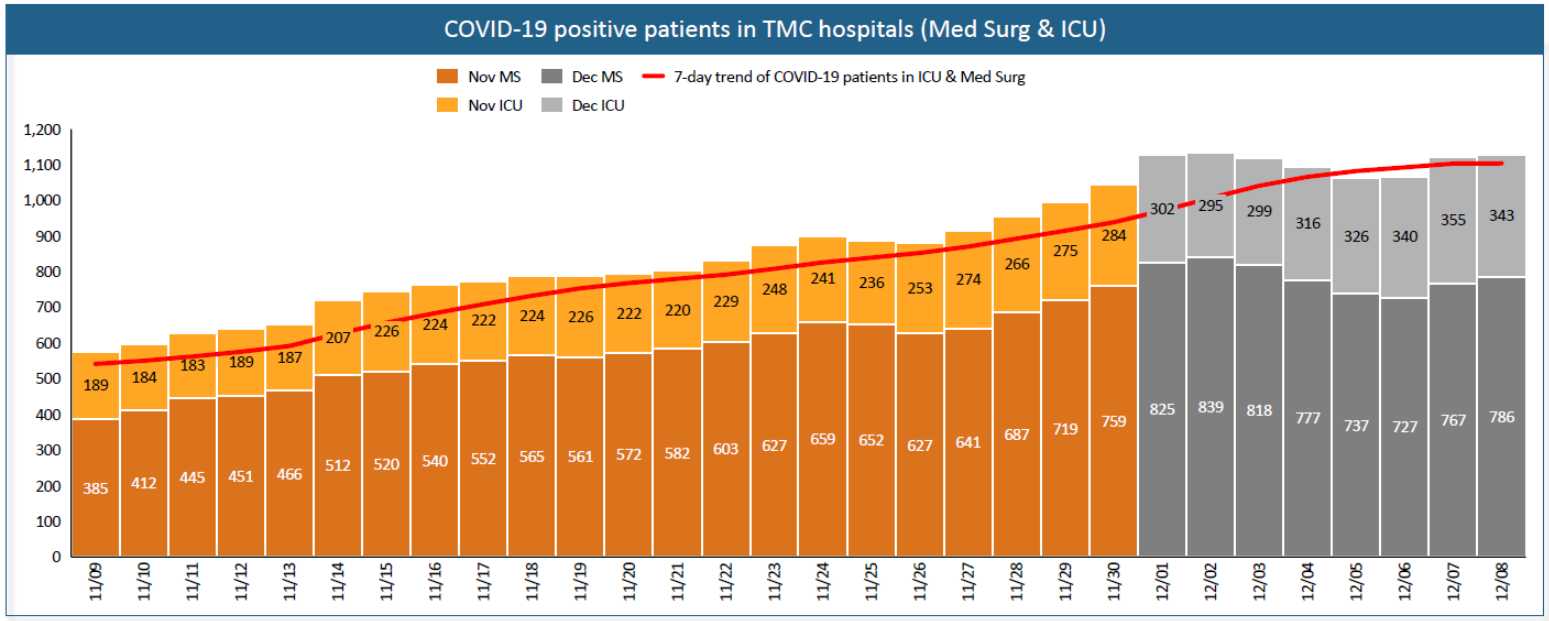


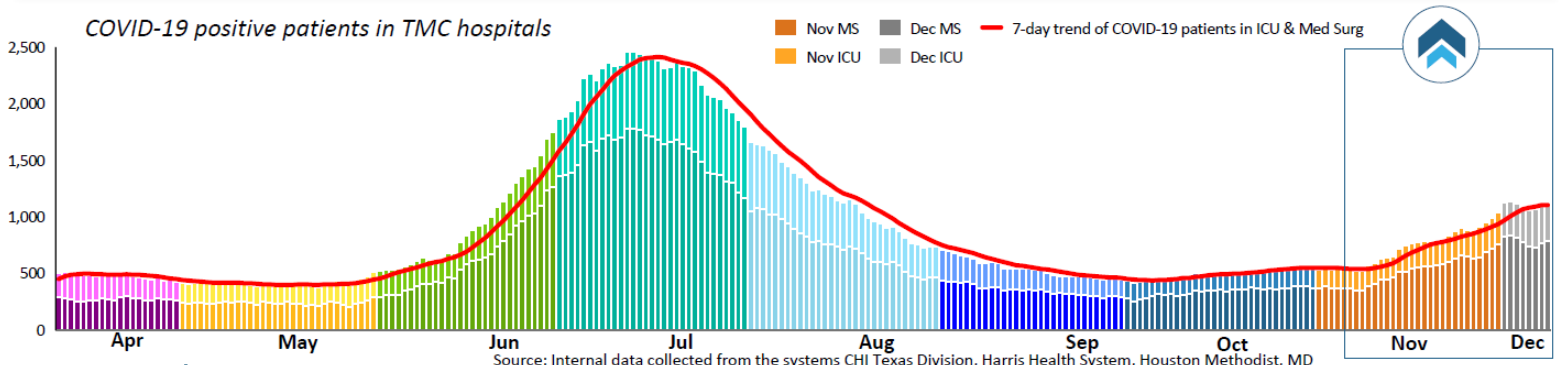
TMC Dashboards

HOUSTON Methodist LEADING MEDICINE

4 COVID-19 TMC HOSPITALIZATION

TOTAL TMC COVID-19 POSITIVE PATIENTS IN HOSPITAL





TMC | TEXAS MEDICAL CENTER

Source: Internal data collected from the systems CHI Texas Division, Harris Health System, Houston Methodist, MD Anderson Cancer Center, Memorial Hermann, Texas Children's Hospital, UTMB

"TMC" refers to the group of systems that make up Texas Medical Center

All guidelines should be in accordance with CDC guidelines

December 8, 2020

Current status:

0.6% total daily growth rate (averaged over 7 days) in COVID-19 patients TMC hospitals

- **2.5% ICU daily growth rate**
- **-0.2% Med Surg daily growth rate**

Notes:

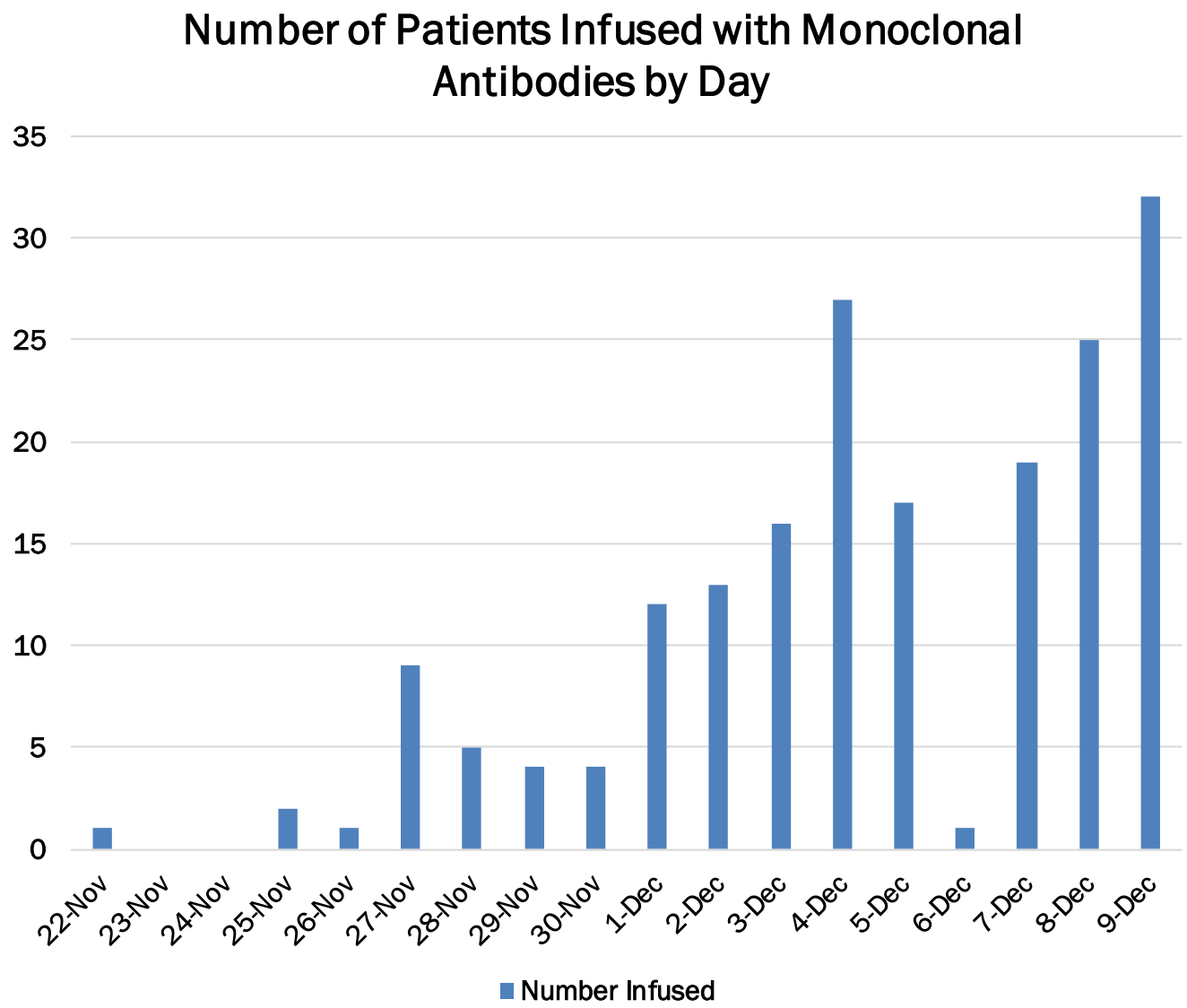
While new daily cases may fluctuate for a variety of reasons (e.g., testing), the number of COVID-19 positive patients being treated in med surg and ICU shows an objective view of how COVID-19 impacts hospital systems

Note: Data for MHHS current as of 12/7 pending update

This document is solely intended to share insights and best practices rather than specific recommendations. Individual institution data is shown as reported and has not been independently verified

13

Monoclonal Antibody Treatment



Emergency Use Authorization Criteria

- Positive SARS-CoV-2 viral test
- Mild to moderate symptoms
- At increased risk for progression to severe COVID-19 and/or hospitalization
  - BMI>=35
  - Chronic kidney disease
  - Diabetes
  - Immunosuppressive disease and/or treatment
  - Age>=65
  - Age>=55 AND cardiovascular disease, hypertension, and COPD/chronic respiratory disease
- Within 10 days of symptom onset

I HAVE BEEN FOLLOWING SWEDEN IN THE NEWS. WHAT DO YOU THINK ABOUT THEIR APPROACH TO CONTROLLING THE VIRUS?

Sweden Imposes Mandatory COVID-19 Measures

HOUSTON Methodist LEADING MEDICINE

THE WALL STREET JOURNAL.

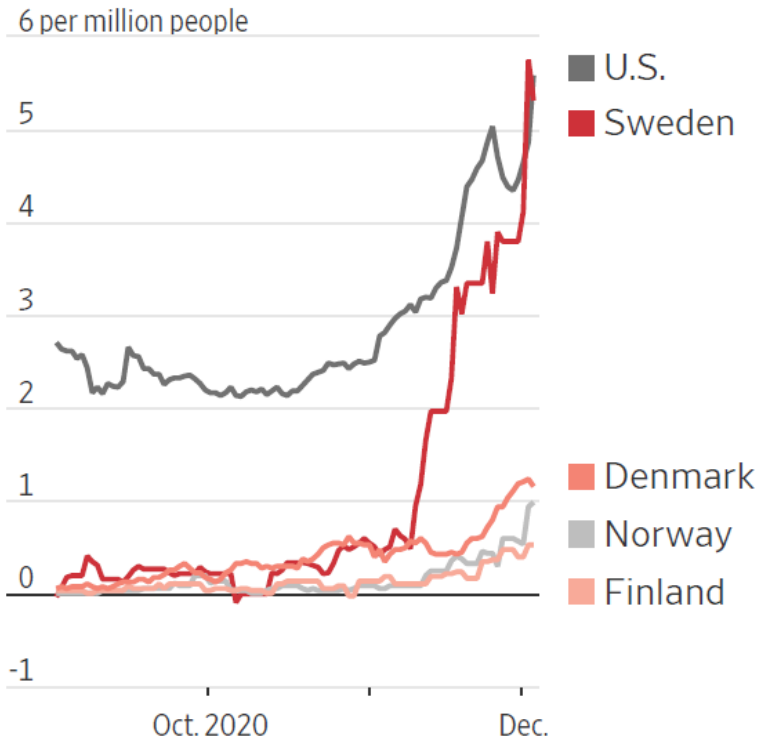
Sweden toughens up on COVID-19 restrictions as cases surge

By Jackie Salo

December 6, 2020 | 12:05pm | Updated

Passengers are crammed into a packed subway car in the middle of the ongoing COVID-19 pandemic in Stockholm

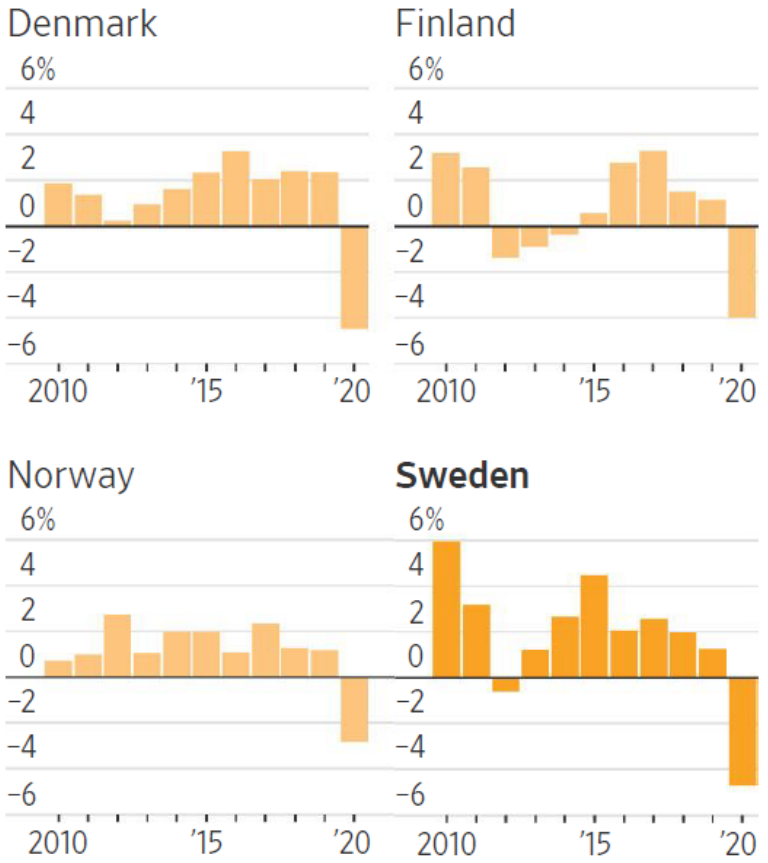
Daily confirmed Covid-19 deaths, seven-day rolling average



Economic Downturn

Sweden's gross domestic product and unemployment rate have reached the worst levels in a decade.

Percent change in gross domestic product



https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/at-home/in-home-services.html/

A number of medical observers have suggested that in fact the number of infected individuals is as much as 8x the number in the official counts, given the very large number of asymptomatic or very mild cases. Do you have a view on this? If it were the case, what are the implications for how we are dealing with the pandemic?

Estimate of un-Diagnosed COVID-19

HOUSTON Methodist LEADING MEDICINE

nature COMMUNICATIONS

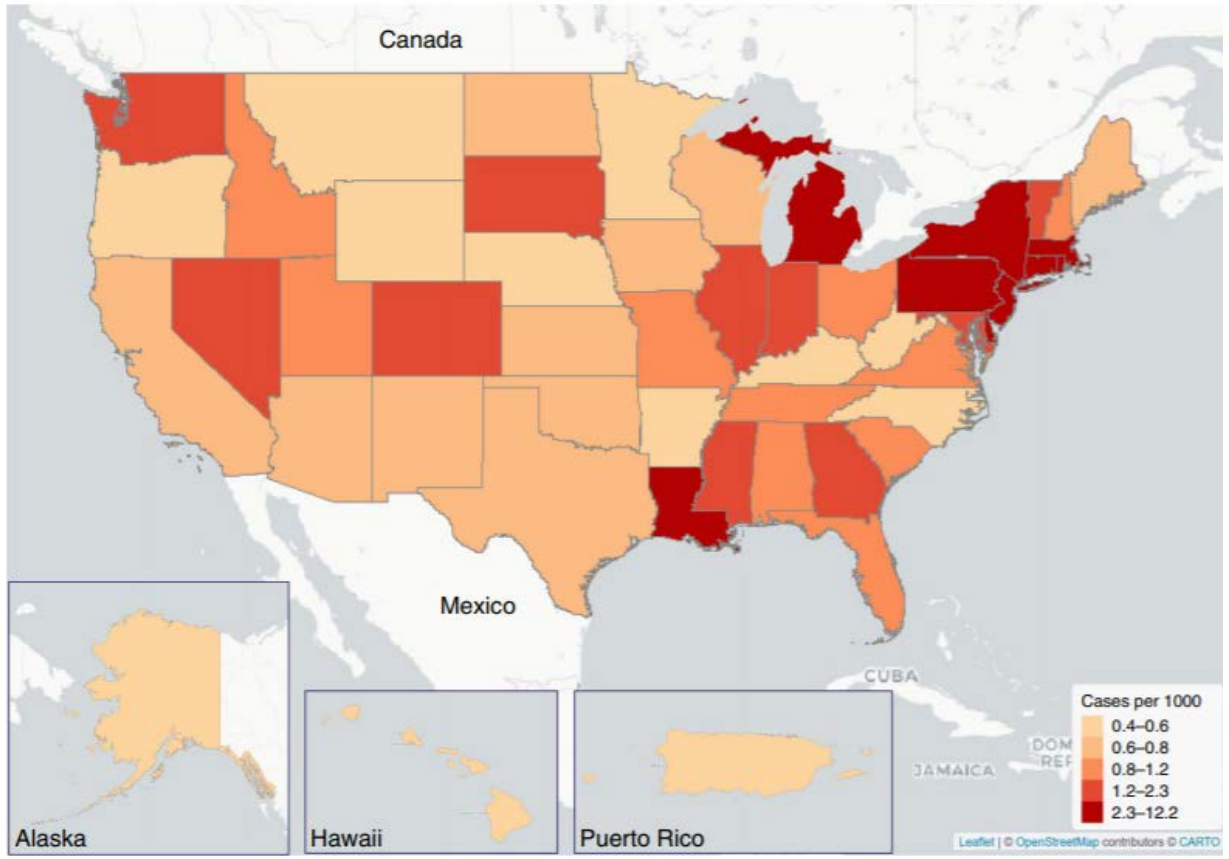
ARTICLE

https://doi.org/10.1038/s41467-020-18272-4 OPEN

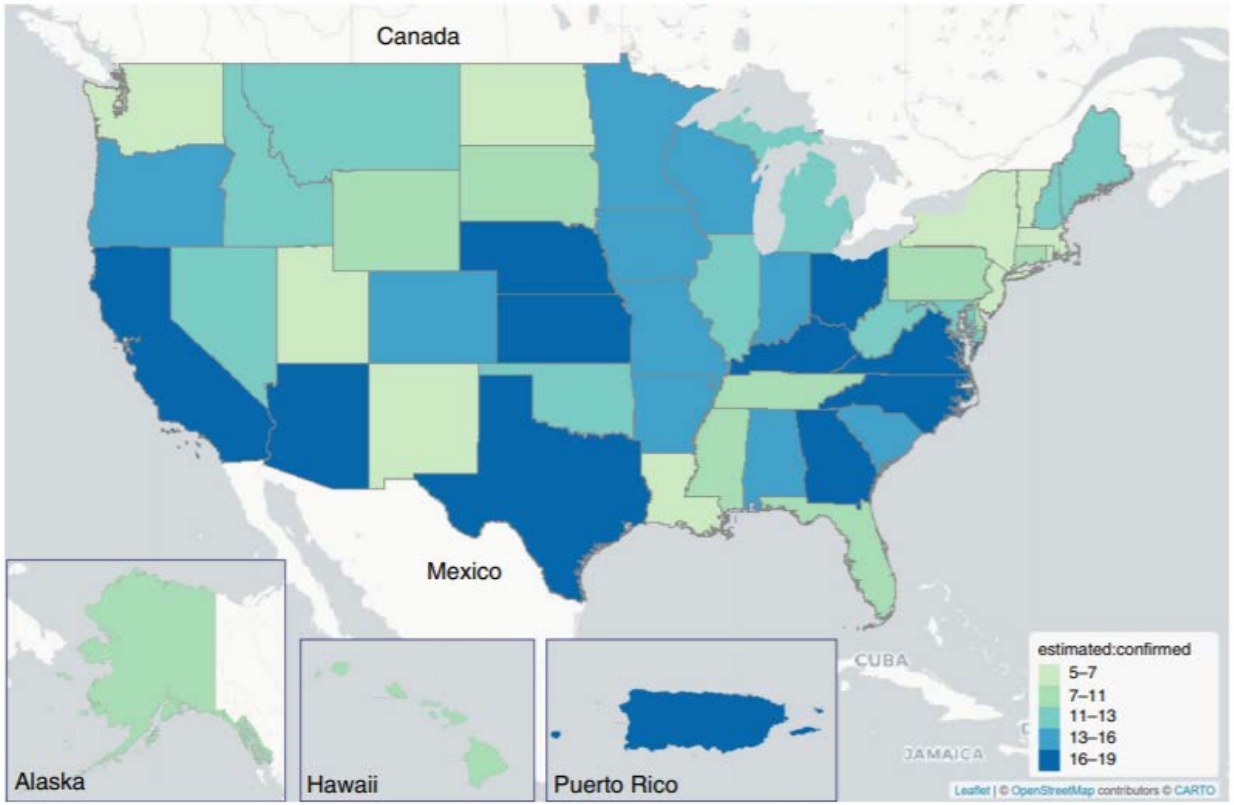
Check for updates

Substantial underestimation of SARS-CoV-2 infection in the United States

a Cumulative confirmed COVID-19 cases per 1000



b Ratio of cumulative estimated infections to confirmed COVID-19 cases



Is holiday travel safe?

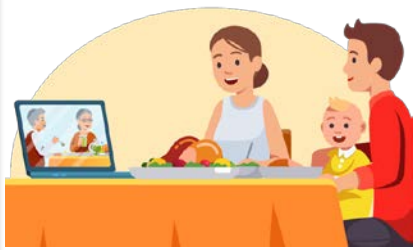
How long should adult working children quarantine before they visit elderly parents over Christmas?

COVID-19 Precautions – Holiday Safety

HOUSTON Methodist LEADING MEDICINE

The safest way to celebrate the holidays this year is to celebrate with people in your household. If you do plan to spend the holidays with people outside your household, take steps to make your celebration safer.

Safest Options ← → **Least Safe Options**



- Gather only with those in your household
- Host a virtual celebration

- Create a "holiday bubble" using social distancing and testing
- Bubble is only as strong as the weakest link

- Gather with individuals outside your "bubble"
- At a minimum, follow CDC recommendations

https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/holidays/thanksgiving.html

COVID-19 Precautions – Spread of COVID-19 After a Gathering

https://www.cdc.gov/mmwr/volumes/69/wr/mm6945a5.htm/

What are your recommendations for how to safely invite people into my home to do necessary repairs during the pandemic?

In addition to opening windows, etc. while the repairs are ongoing, should I do any special cleaning afterward?

COVID-19 Precautions – In-Home Services or Repairs

What you need to know

- Ask the service provider to wear a mask.
- You and other household members should wear masks.
- Stay at least 6 feet from the service provider, and limit interactions between the service provider and other household members and pets.
- After the service is completed, clean and disinfect any surfaces in your home that may have been touched by the service provider.

https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/at-home/in-home-services.html/

HOW LONG ARE YOU CONTAGIOUS TO OTHERS AFTER YOU TEST POSITIVE FOR COVID?

COVID-19 Precautions – How Long Are You Contagious?

HOUSTON Methodist LEADING MEDICINE

SARS-CoV-2, SARS-CoV, and MERS-CoV viral load dynamics, duration of viral shedding, and infectiousness: a systematic review and meta-analysis

Muge Cevik, Matthew Tate, Ollie Lloyd, Alberto Enrico Maraolo, Jenna Schafers, Antonia Ho

Summary

Background Viral load kinetics and duration of viral shedding are important determinants for disease transmission. We aimed to characterise viral load dynamics, duration of viral RNA shedding, and viable virus shedding of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in various body fluids, and to compare SARS-CoV-2, SARS-CoV, and Middle East respiratory syndrome coronavirus (MERS-CoV) viral dynamics.

Methods In this systematic review and meta-analysis, we searched databases, including MEDLINE, Embase, Europe PubMed Central, *medRxiv*, and *bioRxiv*, and the grey literature, for research articles published between Jan 1, 2003, and June 6, 2020. We included case series (with five or more participants), cohort studies, and randomised controlled trials that reported SARS-CoV-2, SARS-CoV, or MERS-CoV infection, and reported viral load kinetics, duration of viral shedding, or viable virus. Two authors independently extracted data from published studies, or contacted authors to request data, and assessed study quality and risk of bias using the Joanna Briggs Institute Critical Appraisal Checklist tools. We calculated the mean duration of viral shedding and 95% CIs for every study included and applied the random-effects model to estimate a pooled effect size. We used a weighted meta-regression with an unrestricted maximum likelihood model to assess the effect of potential moderators on the pooled effect size. This study is registered with PROSPERO, CRD42020181914.

Findings 79 studies (5340 individuals) on SARS-CoV-2, eight studies (1858 individuals) on SARS-CoV, and 11 studies (799 individuals) on MERS-CoV were included. Mean duration of SARS-CoV-2 RNA shedding was 17·0 days (95% CI 15·5–18·6; 43 studies, 3229 individuals) in upper respiratory tract, 14·6 days (9·3–20·0; seven studies, 260 individuals) in lower respiratory tract, 17·2 days (14·4–20·1; 13 studies, 586 individuals) in stool, and 16·6 days (3·6–29·7; two studies, 108 individuals) in serum samples. Maximum shedding duration was 83 days in the upper respiratory tract, 59 days in the lower respiratory tract, 126 days in stools, and 60 days in serum. Pooled mean SARS-CoV-2 shedding duration was positively associated with age (slope 0·304 [95% CI 0·115–0·493]; p=0·0016). No study detected live virus beyond day 9 of illness, despite persistently high viral loads, which were inferred from cycle threshold values. SARS-CoV-2 viral load in the upper respiratory tract appeared to peak in the first week of illness, whereas that of SARS-CoV peaked at days 10–14 and that of MERS-CoV peaked at days 7–10.

Interpretation Although SARS-CoV-2 RNA shedding in respiratory and stool samples can be prolonged, duration of viable virus is relatively short-lived. SARS-CoV-2 titres in the upper respiratory tract peak in the first week of illness. Early case finding and isolation, and public education on the spectrum of illness and period of infectiousness are key to the effective containment of SARS-CoV-2.

Funding None.

Lancet Microbe 2020
Published Online November 19, 2020 https://doi.org/10.1016/S2666-5247(20)30172-5

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Correspondence to: Dr Muge Cevik, Division of Infection and Global Health Research, School of Medicine, University of St Andrews, Fife KY16 9TF, UK
mc349@st-andrews.ac.uk

Introduction

Viral load kinetics and the duration of viral shedding are important determinants for disease transmission. They determine the duration of infectiousness, which is a critical parameter to inform effective control measures and disease modelling. Although several studies have evaluated severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) shedding, viral load dynamics and duration of viral shedding reported across studies so far have been heterogeneous.[1] In several case series with serial respiratory sampling, peak viral load was observed just before, or at the time of, symptom onset.[2–4] Viral RNA shedding was reported to be persistent in the upper respiratory tract and in faeces for more than 1 month after illness onset.[1] However, the duration of SARS-CoV-2 RNA detection has not been well characterised. A comprehensive understanding of viral load dynamics, length of viral shedding, and how these measures relate to other factors, such as age and disease severity, is lacking.

We aimed to characterise the viral load dynamics of SARS-CoV-2, duration of viral RNA shedding by RT-PCR, and viable virus shedding in various body fluids,

	Classification of illness severity	Median (IQR*) duration of SARS-CoV-2 positivity in cohort, days	Viral dynamics in patients with severe illness vs those with non-severe illness	p value
Chen et al (2020)[25]	ICU vs non-ICU patients	11 (95% CI 10–12)	Median time to viral clearance significantly longer in ICU vs non-ICU patients (HR 3·17, 95% CI 2·29–4·37)	Only HR provided
Chen et al (2020)[26]	China CDC guideline (version 7)	12 (8–16)	Shedding duration varies by severity: asymptomatic 6 days; mild 10 days; moderate 12 days; serious 14 days; critical 32 days	<0·0001
Tan et al (2020)[17]	China CDC guideline (version 6)	Nasopharyngeal swab: 12 (range 3–38); any sample: 22 (range 3–38)	Viral shedding significantly longer in patients with severe illness: any sample 23 days vs 20 days (note that nasopharyngeal swab 14 vs 11 days was non-significant)	0·023 (any sample)
Xu et al (2020)[16]	WHO criteria	17 (13–32)	Higher proportion of patients with severe illness had shedding >15 days (34·2% vs 16·2%)	0·049
Yan et al (2020)[27]	China CDC guideline (version 6)	23 (18–32)	No difference in shedding duration (general illness 23 days vs severe illness 26 days vs critical illness 28 days)	0·51
Zheng et al (2020)[23]	China CDC guideline (version 6)	Respiratory sample: 18 (13–29)	Shedding duration significantly longer in patients with severe illness (21 vs 14 days) in respiratory samples; no difference in shedding duration in stool or serum samples	0·04

CDC=Center for Disease Control and Prevention. HR=hazard ratio. ICU=intensive care unit. SARS-CoV-2=severe acute respiratory syndrome coronavirus 2. *IQR unless otherwise stated.

Table 1: **Severity of illness and viral dynamics**

"Although SARS-CoV-2 RNA shedding in respiratory and stool samples can be prolonged, duration of viable virus is relatively short-lived. SARS-CoV-2 titres in the upper respiratory tract peak in the first week of illness."

https://www.thelancet.com/journals/lanmic/article/PIIS2666-5247(20)30172-5/fulltext

Do you agree with the updated CDC quarantine guidelines?

COVID-19 Precautions – Quarantine Guidelines

HOUSTON Methodist LEADING MEDICINE

The efficacy of quarantine to reduce the transmission of infectious disease depends on how compliant people are. Is a shorter quarantine time with higher compliance more effective than the "gold standard" with lower compliance?

Length of Quarantine	Estimated Post-Quarantine Residual Transmission Risk
14 days	0-3%
10 days	1-10%
7 days w/ negative test	5-12%

"If we can increase compliance with quarantine but also make sure we have a quarantine policy that allows us to catch as many cases as we can, that's the best of both worlds." - Assn. Public Health Officials

"The current recommended 14-day quarantine period is the most conservative regimen and should be maintained whenever possible." – Greater Houston Area Public Health Authority

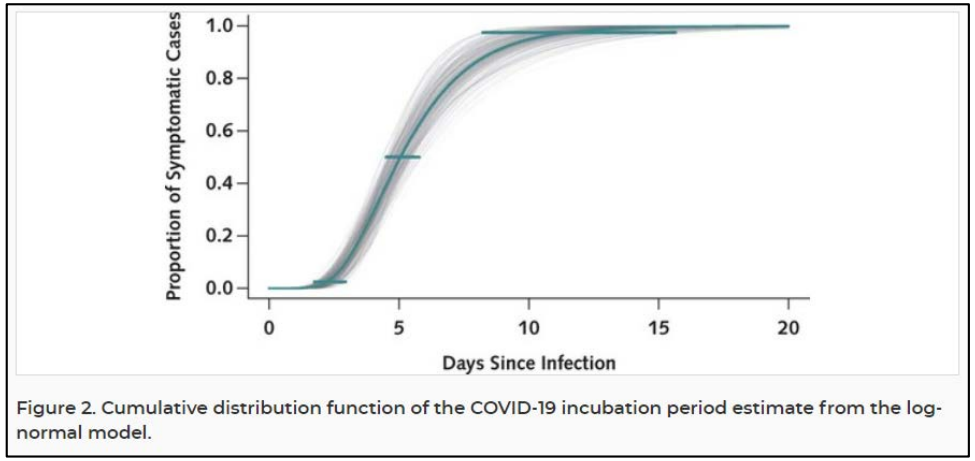


Figure 2. Cumulative distribution function of the COVID-19 incubation period estimate from the log-normal model.

https://www.wsj.com/articles/countries-try-shorter-covid-19-quarantines-in-bid-to-boost-compliance-11603791001; https://www.acpjournals.org/doi/10.7326/M20-0504

Any new recommendations for schools? Any updates to transmission of the virus among teens? Is contact tracing among teens fruitful? Are quarantine times appropriate?

What is the impact of COVID on toddlers – risk of sending young children to small school settings? What is the likelihood of children transferring COVID to elder family members?

AAMC Report: Kids, Schools and COVID-19: What we know – and what we don't

- The virus spreads in schools — but schools are rarely superspreaders
- School outbreaks typically come from the community — not vice versa
  - Many school outbreaks have been tied to social gatherings among school children outside of school
- Children transmit the virus — but not as often as adults do
  - Children carry large amounts of the virus in their respiratory systems, they transmit the virus, but not as effectively as adults
- Behavioral challenges matter — sometimes as much as biology
  - Mask compliance, washing hands and maintaining distance

https://www.aamc.org/news-insights/kids-school-and-covid-19-what-we-know-and-what-we-don-t

Actively engaged in Physical Therapy at Methodist Orthopedic, nothing urgent, should I stop going to that and anything involving a gym until the Spring of next year?

Actively engaged in Physical Therapy at Methodist Orthopedic, nothing urgent, should I stop going to that and anything involving a gym until the Spring of next year?

It is necessary to continue to receive any medical treatments, preventive and therapeutic. Houston Methodist is safe and you should continue to access medical care when you need it!


HOUSTON
Methodist
SM
LEADING MEDICINE

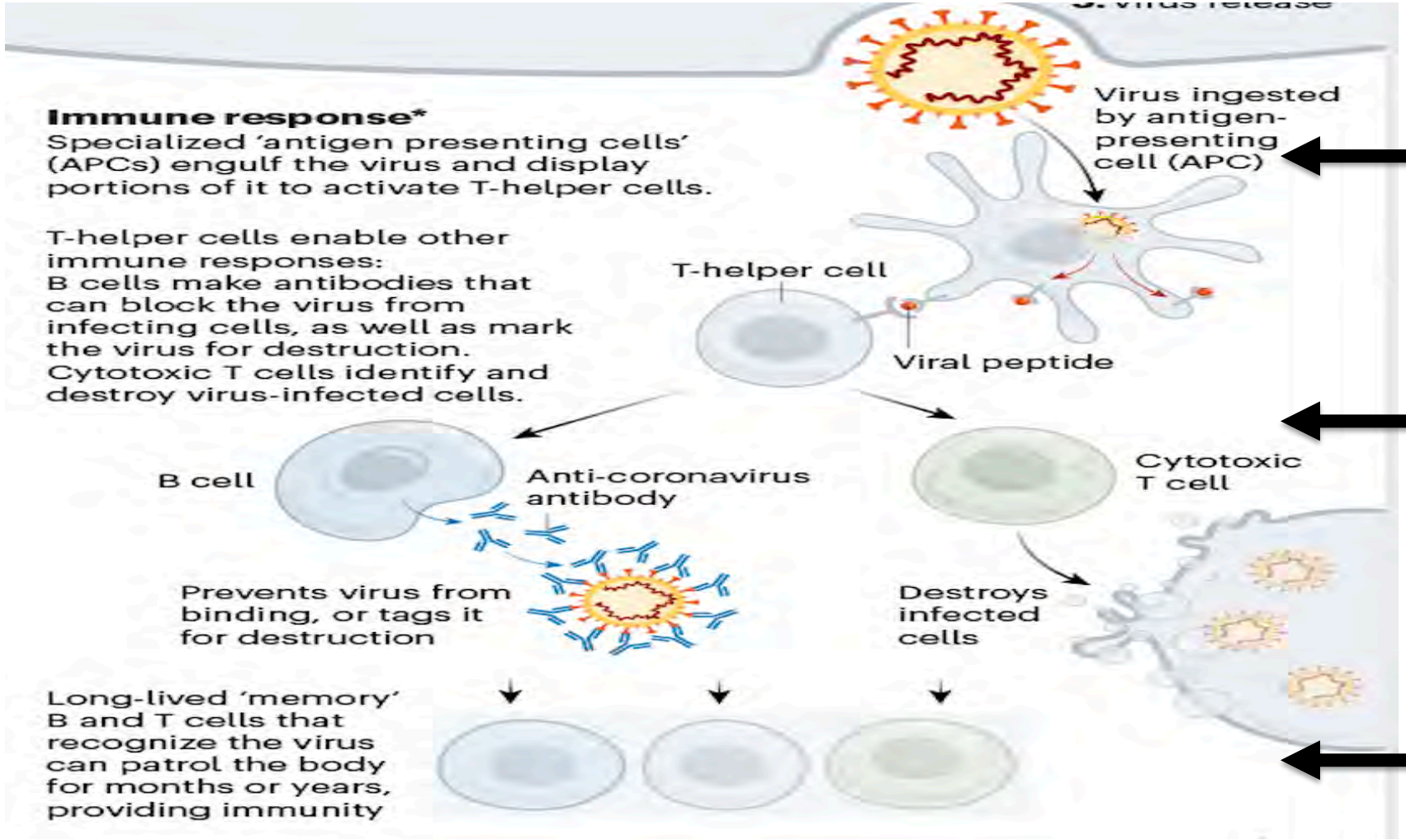
COVID-19 Vaccines – Update

Town Hall December 10, 2020

H. Dirk Sostman, MD FACR

HOUSTON Methodist
LEADING MEDICINE

How Immunity Develops



Innate immune system

Adaptive immune system

Long-lasting immune "memory"

Vaccine Progress: Frontrunners

Vaccine	Antibody Response (Phase 1 - 2)	T Cell Response (Phase 1 – 2)	Technology	N of Doses	EUA Target
Moderna	100% (2x – 8x CP)	100%	mRNA	2	December 17, 2020
Pfizer / BioNTech	100% (5x – 30x CP)	94%	mRNA	2	December 10, 2020 *Granted in UK December 1 & in Canada December 9*

CP = convalescent plasma

Vaccine Progress: Second Wave

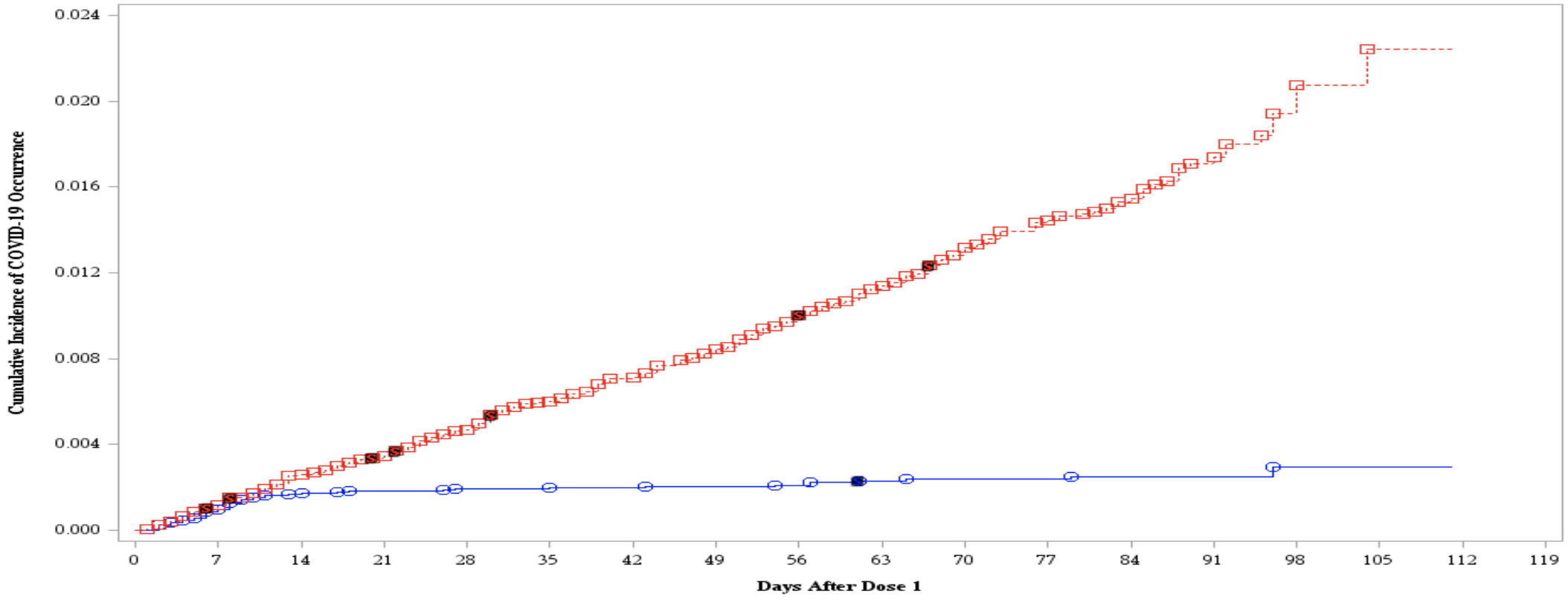
Vaccine	Antibody Response	T Cell Response	N of Doses	Technology	EUA Target
Oxford / Astra Zeneca	100% (= CP)	100%	2	Adenovirus Ad5 vector	December 2020 (UK) Q1 2021 (US)
Novavax	100% (2x CP)	100% (subgroup)	2	Peptide / nanoparticle	Q1 2021
J & J	100%	82%	1	Adenovirus Ad26 vector	Q1 2021
Inovio	94% overall	94% overall	2	DNA + electroporation	Q1 2021?
COVAXX				Synthetic peptide multi-epitope	Still in Phase 1
COVI-Vac				Intranasal live attenuated vaccine	Starting Phase 1
And many others, e.g.:	Sputnik V ICL	CanSino Sanofi, GSK	CNBG1 CNBG2	Novartis Medicago	Curevac Sinovac

https://www.nytimes.com/interactive/2020/science/coronavirus-vaccine-tracker

Vaccine Updates

- Pfizer
  - 43,538 enrolled and randomized to vaccine or placebo
  - 170 infections so far, 162 in placebo group → 95% protection
  - 10 severe cases, 9 in placebo group → 90% protection
  - Appears to be effective in all age and ethnic groups
  - Unknowns
    - Prevents infection or only symptomatic illness? (key issue for transmission)
    - Duration of protection?
  - Safety profile appears excellent
    - Reactogenic effects
    - Two allergic reactions in UK?
  - Logistics: Two doses & extreme cold chain (stable for 6 mos at -70^{o} C, 5 days at 2-8^{o} C, 2 hrs at 25^{o} C)

Vaccine Updates



No. with events/No. at risk

A:	0/21314	21/21230	37/21054	39/20481	41/19314	42/18377	42/17702	43/17186	44/15464	47/14038	48/12169	48/9591	49/6403	49/3374	50/1463	50/398	50/0
B:	0/21258	25/21170	55/20970	73/20366	97/19209	123/18218	143/17578	166/17025	192/15290	212/13876	235/11994	249/9471	257/6294	267/3301	274/1449	275/398	275/0

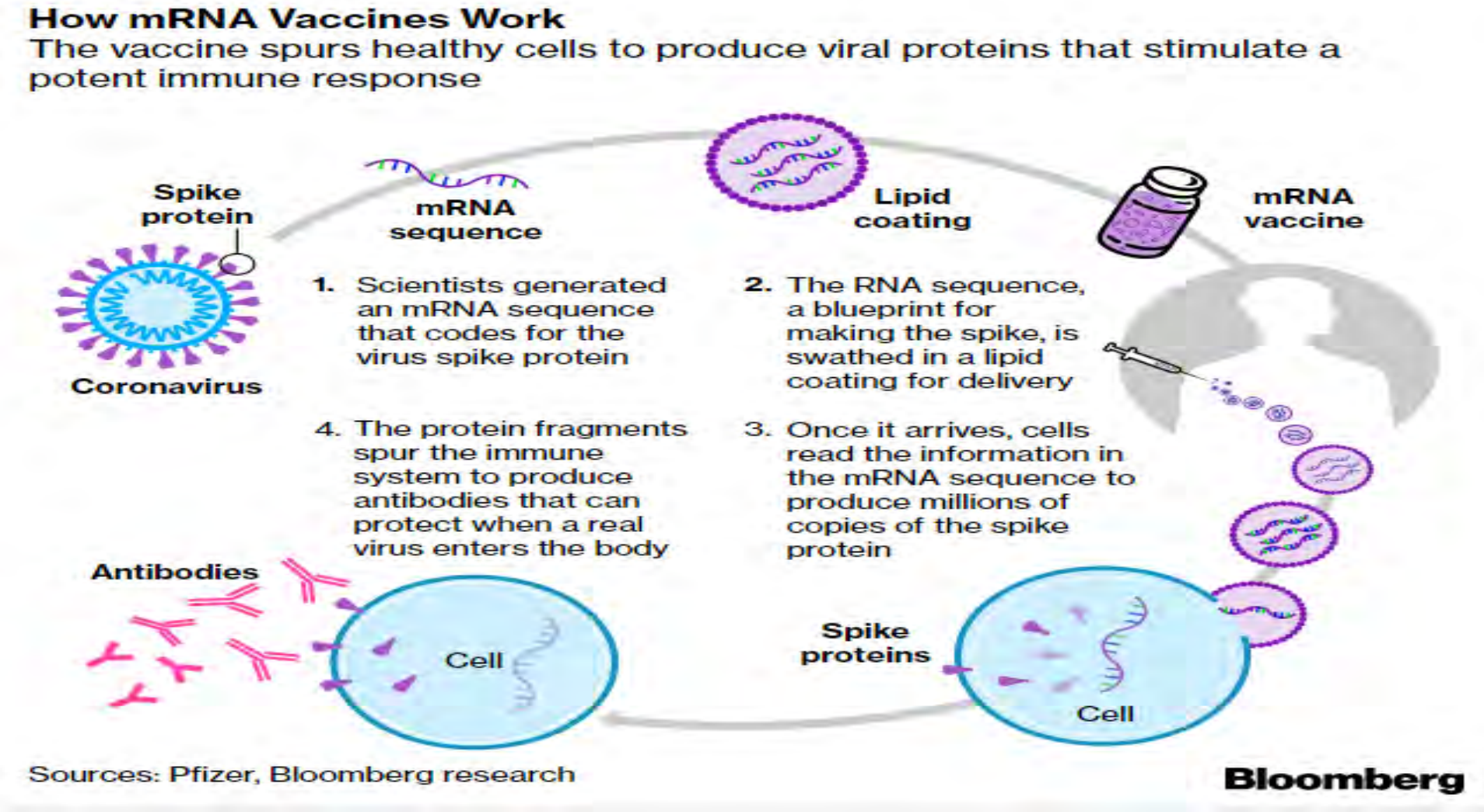
A: BNT162b2 (30 µg) B: Placebo

Note: "S" indicates subjects with severe COVID-19 or COVID-19 leading to hospitalization.
PFIZER CONFIDENTIAL SDTM Creation: 17NOV2020 (10:49) Source Data: adc19ef Table Generation: 17NOV2020 (21:40)
(Cutoff Date: 14NOV2020, Snapshot Date: 16NOV2020) Output File: ./nda2_unblinded/C4591001_Efficacy_FA_164/adc19ef_f001_km_d1_aai

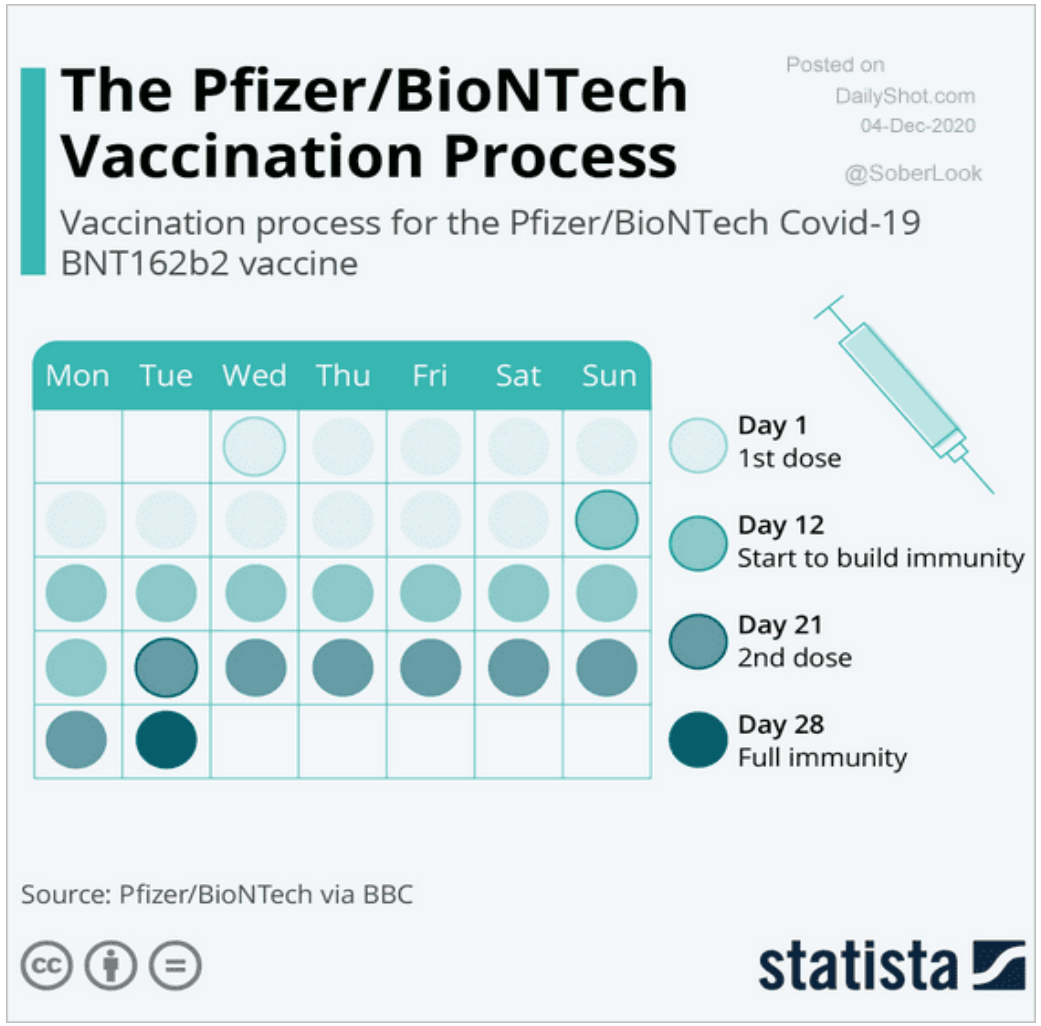
Vaccine Updates

- Moderna
  - > 30,000 enrolled and randomized to vaccine or placebo
  - 196 infections so far, 185 in placebo group → 94.1% protection
  - 30 severe cases, all in placebo group → 100% protection
  - Similar efficacy in all groups (preliminary review)
  - Unknowns
    - Prevents infection or only symptomatic illness? (key issue for transmission)
    - Duration of protection?
  - Safety profile appears excellent (few details yet)
  - Logistics: Two doses & cold chain needed (stable in freezer for 6 mos, refrigerator for 30 days, room temp for 12 hrs)

Vaccine Updates



Vaccine Updates: Pfizer



Margaret Keenan, 91 yo,
first clinical Pfizer vaccination

Adverse Reactions: Severe "Reactogenic" Effects

- More likely after second dose
- Controllable with anti-inflammatories (Tylenol, Motrin, etc.)
- High fever (39 – 40º C) in 2%
- Pfizer (company press release November 18, 2020)
  - Fatigue (3.8%)
  - Headache (2%)
- Moderna (company press release November 16, 2020)
  - Fatigue (9.7%)
  - Muscle pain (8.9%)
  - Joint pain (5.2%)
  - Headache (4.5%)

Pfizer Vaccine
FDA Safety Overview

Adverse Effect (AE)	Vaccine Group	Placebo Group
Solicited inject site AE	73%	11%
Solicited systemic AE	70%	34%
Unsolicited non-serious AE	27%	13%
Serious AE	0.6%	0.5%
Withdrawal for AE	0.6%	0.5%
Allergic reaction	0.6%	0.5%
Death	2	4

Pfizer Vaccine 18 – 55 yo Group
Mild – Moderate "Reactogenic" Effects

Adverse Effect	Vaccine Group	Placebo Group
Fever < 39° C	14%	0.3%
Fatigue	55%	22%
Headache	49%	23%
Chills	33%	4%
GI	12%	10%
Myalgia	35%	8%
Arthralgia	21%	5%
Pain / Anti-inflammatory Medication	45%	13%

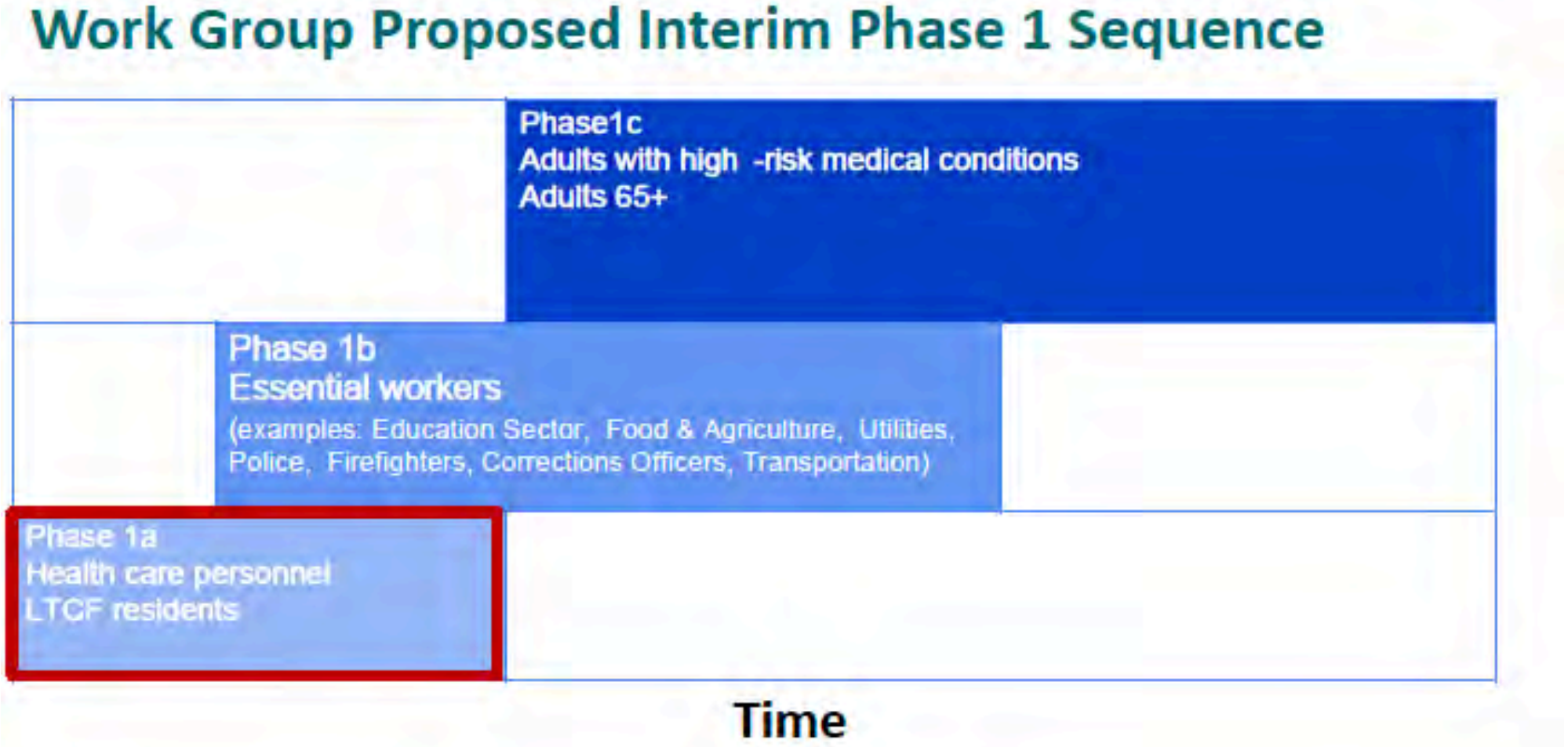
Pfizer Vaccine > 55 yo Group
Mild – Moderate "Reactogenic" Effects

Adverse Effect	Vaccine Group	Placebo Group
Fever < 39° C	11%	0.2%
Fatigue	48%	17%
Headache	38%	14%
Chills	22%	3%
GI	9%	6%
Myalgia	28%	5%
Arthralgia	18%	4%
Pain / Anti-inflammatory Medication	38%	10%

Vaccination Priority

ACIP Report to CDC

HOUSTON Methodist LEADING MEDICINE



Vaccination Priority

UK Government

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The first phase of the programme

Offer vaccination

1	Residents in a care home for older adults and their carers
2	All those 80 years of age and over. Frontline health and social care workers
3	All those 75 years of age and over
4	All those 70 years of age and over. Clinically extremely vulnerable individuals
5	All those 65 years of age and over
6	All individuals aged 16 years to 64 years with underlying health conditions which put them at higher risk of serious disease and mortality
7	All those 60 years of age and over
8	All those 55 years of age and over
9	All those 50 years of age and over

Vaccination Priority

Texas State Criteria

- **Protecting health care workers** who fill a critical role in caring for and preserving the lives of COVID-19 patients and maintaining the health care infrastructure for all who need it.
- **Protecting frontline workers** who are at greater risk of contracting COVID-19 due to the nature of their work providing critical services and preserving the economy.
- **Protecting vulnerable populations** who are at greater risk of severe disease and death if they contract COVID-19.
- **Mitigating health inequities** due to factors such as demographics, poverty, insurance status and geography.
- **Data-driven allocations** using the best available scientific evidence and epidemiology at the time, allowing for flexibility for local conditions.
- **Geographic diversity** through a balanced approach that considers access in urban and rural communities and in affected ZIP codes.
- **Transparency** through sharing allocations with the public and seeking public feedback.

Vaccination Priority

Houston Methodist

- Vaccine Scientific Committee advice on priority tiers
  - Tier 1:
    - Health care workers with high-risk exposure (3 sub-tiers)
    - Government mandates (e.g., Long Term Care, first responders)
  - Tier 2:
    - Health care workers with moderate-risk exposure
  - Tier 3:
    - Health care workers with low-risk exposure and general population
      - HCWs likely will be prioritized for reasons of operational efficiency
  - Within Tiers, if vaccine is limited, prioritize based on health risks (age & co-existing conditions)

Obstacles?

- Reluctance to accept vaccination
  - Political issues
  - Concerns about potential side effects
- Logistics challenges
  - Supplies (borosilicate glass vials, needles, syringes, etc.)
  - Cold chain of refrigeration
  - Air freight capacity (8,000 jumbo jets)
  - Paperwork, customs, health regulations, etc.
  - Organizing administration sites, records, personnel
  - Monitoring safety, side effects

When Will We Get Back to Normal?

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- If we want things to remain the same, some things will have to change:
  - Masks and preventive measures needed until population is immune and transmission controlled
  - Even then, masks in flu season or high-risk situations will still be advisable
- If all goes well, population immunity is likely by end of Q2 or Q3:
  - A big “IF”
  - Schools return in the fall
  - Travel and leisure gradually return to something resembling antebellum “normal”
- Learning from our mistakes – we must:
  - Rebuild early warning / early response capabilities
  - Invest in vaccine and infectious disease research
  - Repair communication among government, health care and public
  - Seek dialogue and consensus about health priorities and social contracts
  - Foster trust in science and understanding of people’s needs and work


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THANK YOU FOR ATTENDING OUR TOWN HALL CONVERSATION

If you would like more information about the Houston Methodist DeBakey Heart & Vascular Center, the Department of Surgery or The Society for Leading Medicine, please contact foundation@houstonmethodist.org

Take care and be well

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