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

# A TOWN HALL CONVERSATION

*We will begin at 1:30 p.m.*

HOUSTON Methodist
LEADING MEDICINE

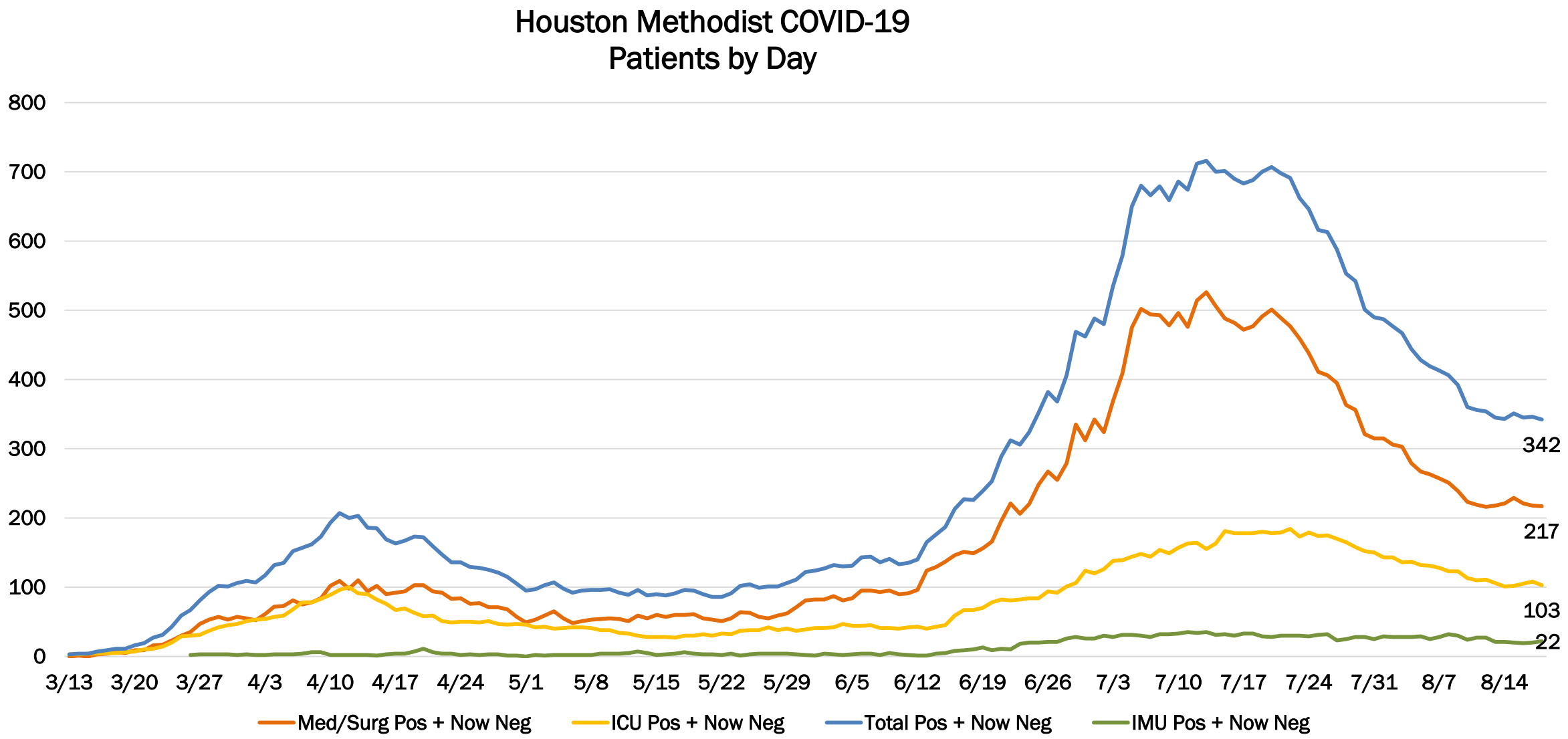
# Town Hall

**Faisal Masud MD, FCCP, FCCM**
Mary A. and M. Samuel Daffin, Sr. Centennial Chair in Anesthesia and Critical Care
Medical Director, Center for Critical Care, Houston Methodist Hospital
Professor of Clinical Anesthesiology, Weill Cornell Medical College

*August 19, 2020*

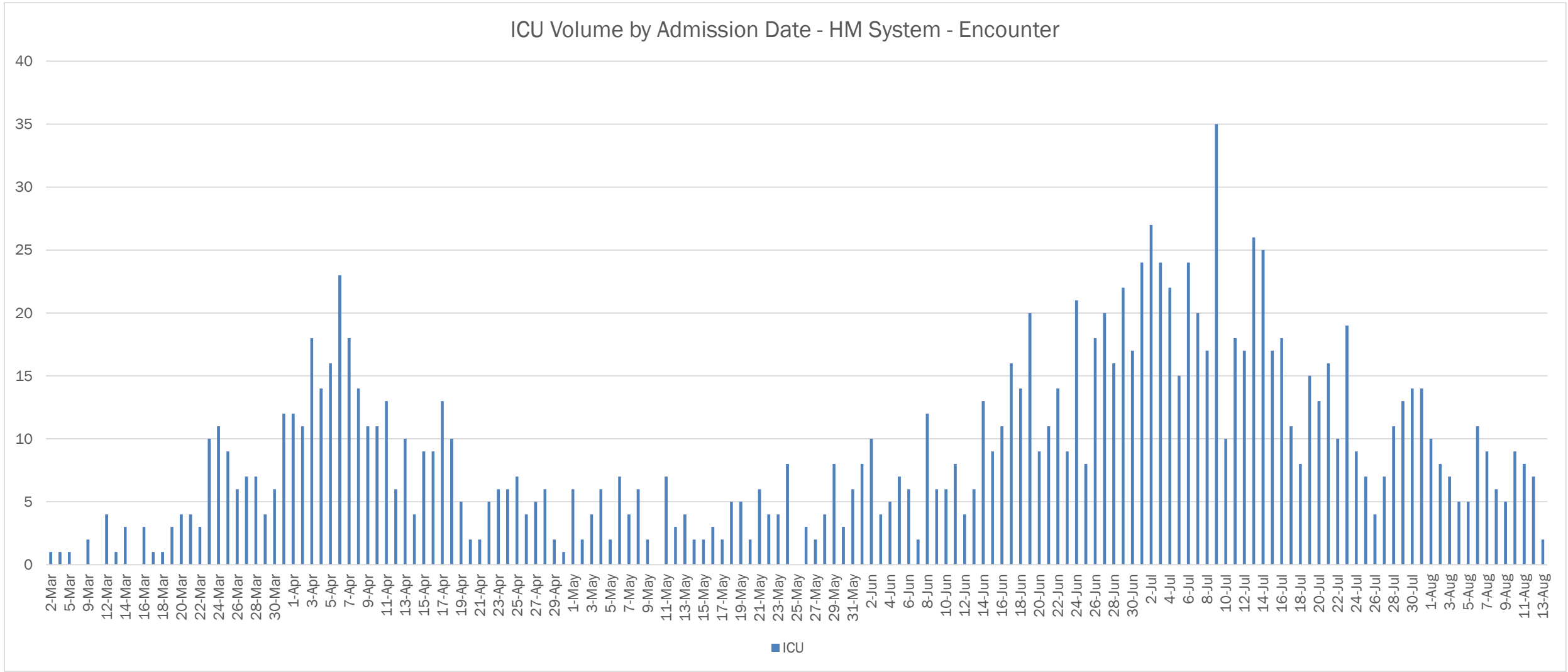
HOUSTON Methodist LEADING MEDICINE

# HM SYSTEM COVID-19 PATIENTS



# CLINICAL OUTCOMES

## HM SYSTEM ICU COVID-19 PATIENT VOLUME






Dashboard dates 03/07 – 08/13

# RAPID EXPANSION OF ICU AND IMU CAPACITY

- In June and July overall ICU capacity had to be increased across the system, IMU beds were added to meet the needs of all critically ill patients – COVID and Non-COVID combined. This was different from March and April
- Critical Care teams stretched to meet the demands the surge of patients presented
- Hi-flow units, more noninvasive ventilation and IMUs allowed us to manage a lot more critical patients than in March and April
- In August we are trending towards the New Normal for critically ill patients requiring ICU

# HM SYSTEM COLLABORATIONS

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## List of developed COVID-19 Patient Management:

Algorithms, Protocols, Processes, Guidelines

| | | | |
|---|---|---|---|
| Mechanical Ventilation in COVID-19 Patients | ECMO Guidelines, Criteria and Algorithm | Respiratory Management for Hypoxemia in COVID-19 | Bronchoscopy Guide for Confirmed COVID-19 Patients |
| COVID-19 ICU Insulin Drop Order Set for Target Blood Glucose | HM SARS-CoV-2/COVID-19 Anticoagulation Guidelines | SARS-CoV-2/COVID-19 Anticoagulation Algorithm for Admitted Patients with COVID-19 | ICU Proning Algorithm |
| Proning Pressure Injury Prevention Process | HM Aerosol Container User Guide | Transfer Out ICU COVID-19 Neg Patients | COVID-19 Rule Out ICU Patients: Transfer from ED/Acute Care |

# SOME OF THE INNOVATIONS

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## Continuous Glucose Monitor


## Tele-ICU

## IV Pumps Outside of the Rooms

## HM Aerosol Containers (HMACs)

## HMH CareSense Post ICU Communication

## Proning Cart


## IV hook and DIY pole (Tyler's bar) to keep IV lines above ground

## Aerosol Helmet

## Personal Protective Pod

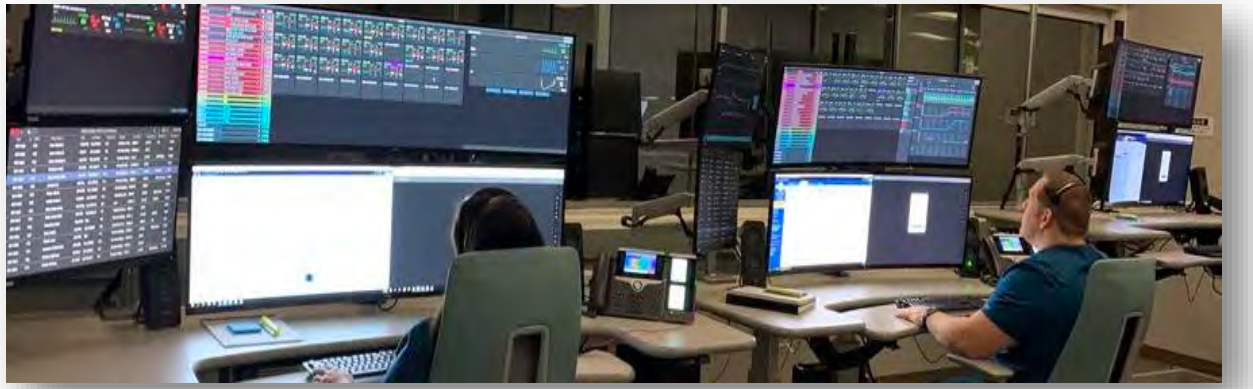
# OUR INNOVATIVE VIRTUAL ICU IMPACT

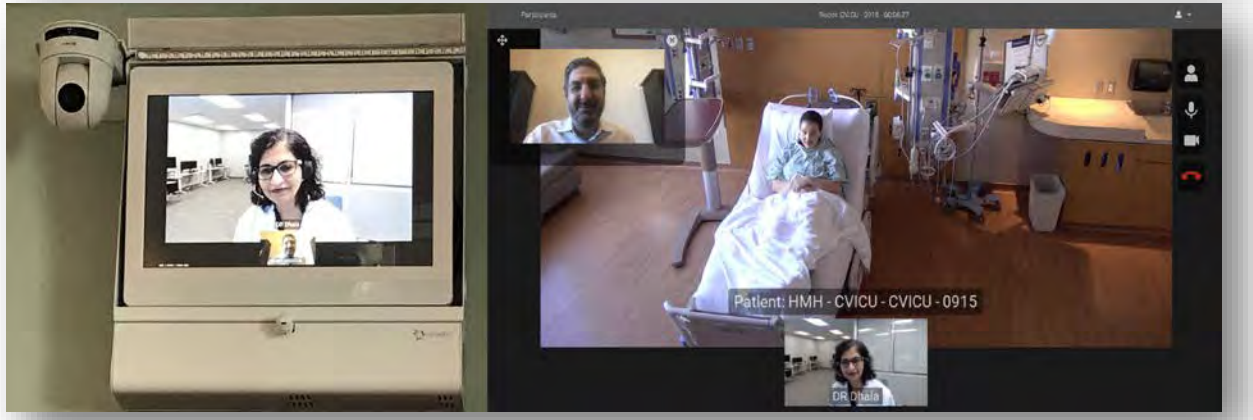
1. VICU Team is covering over 200 patients every night, in all main ICUs at HMH, our expansion ICU areas, COVID IMU areas and (using mobile cart fleet) starting in our system hospitals

2. **Save PPE**
   - local VICU/camera access via VICU enable laptops to bedside teams

3. **Clinical distancing**
   - Consultant bridge – for consultants and patient families
   - Diminished staff exposure

4. **Efficient allocation of critical care resources (Surge)**
   - Oversight for non-COVID units
   - Backstop for COVID units





# CARE FOR COVID AND NON-COVID ICU PATIENTS – BEING THEIR EXTENDED FAMILY

- One of the biggest challenges our team had to help navigate was bridging the connection of family members separated from their loved one in ICUs
- We had to become their extended family
- New innovative ways of communications; e.g., consultant bridge, FaceTime, iPads, virtual family meetings
- The *New York Times* published its latest story featuring Houston Methodist

  Inside the Fight to Save Houston's Most Vulnerable

  Our reporters and cameras were given exclusive access to the COVID medical I.C.U. at Houston Methodist Hospital. Meet five patients and watch as the staff works to heal them.

  By Sheri Fink, Emily Rhyne and Erin Schaff, August 10, 2020

  https://www.nytimes.com/interactive/2020/08/10/us/houston-hospital-coronavirus.html

# WHY PROLONGED SYMPTOMS WITH COVID-19? MULTI-SYSTEM INVOLVEMENT

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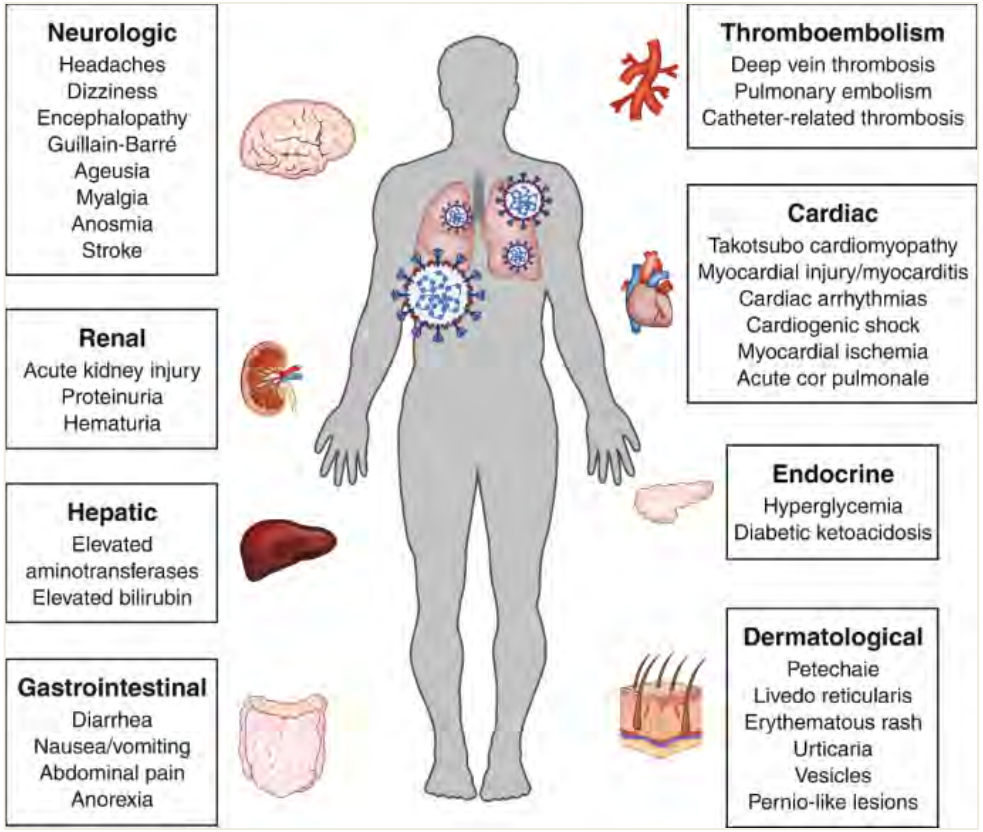
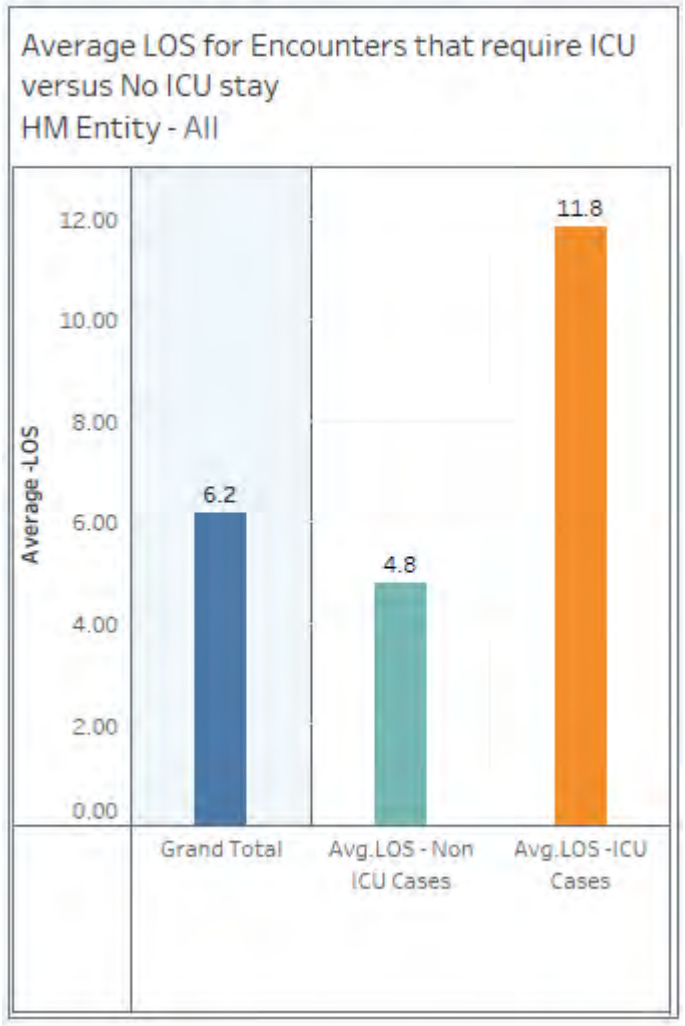
## Covid-19 can have ripple effects throughout the body, but the process is still unclear

While Covid-19 is a respiratory infection, it's become increasingly apparent in recent months that its effects can have cascading consequences throughout the body. Scientists are now piecing together the mechanisms behind these effects in hopes of stopping some of the worst outcomes and to get ahead of long-term problems.



# COVID-19 PATIENTS AVERAGE LOS

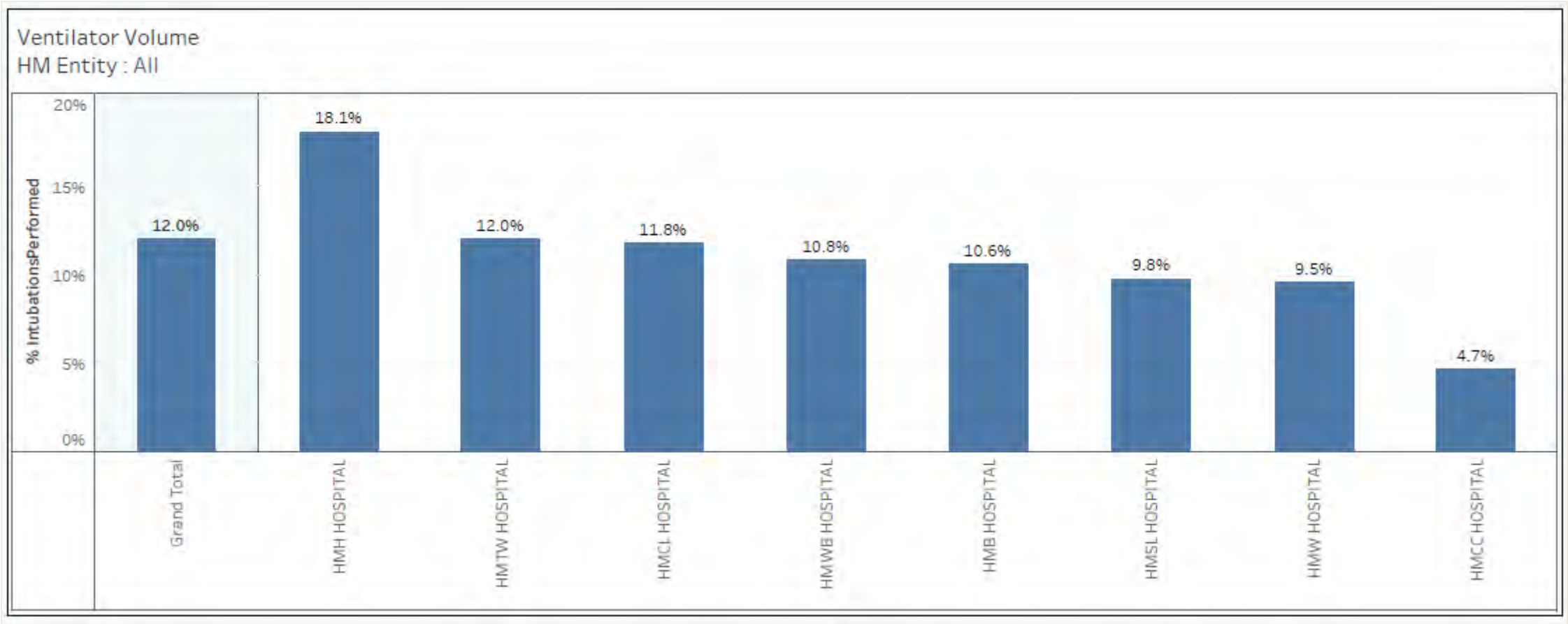



Average LOS for Encounters that require No ICU stay - HMH System



Dashboard dates 03/07 – 08/14

# CLINICAL OUTCOMES – VENTILATOR UTILIZATION COVID-19 PATIENTS



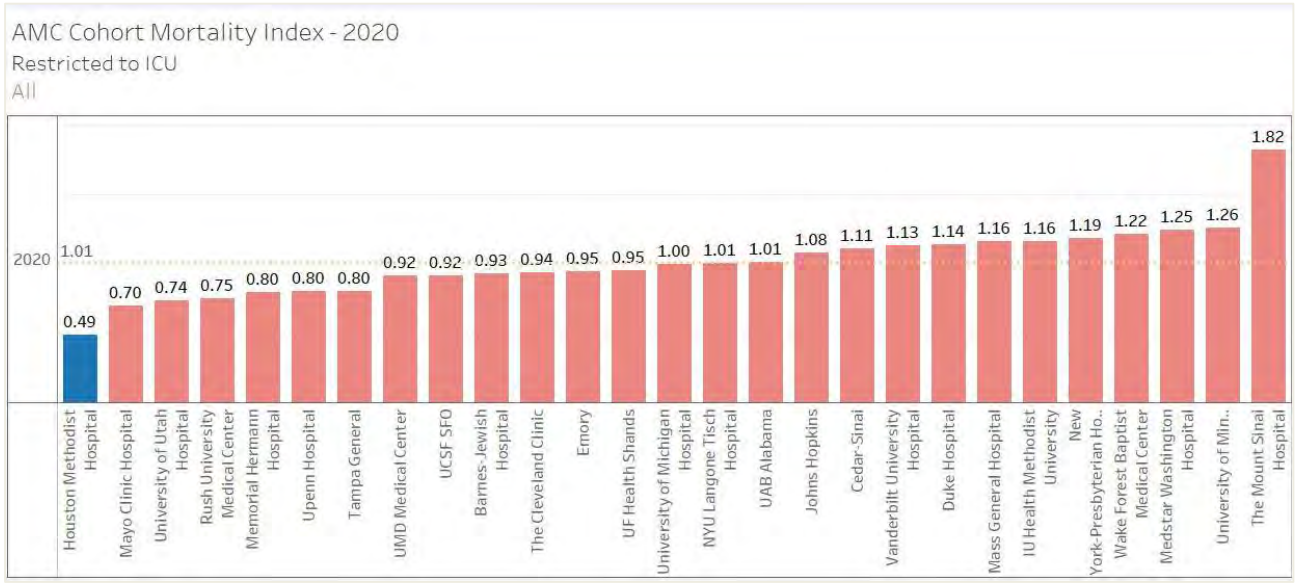

% Intubation Performed - HMH System

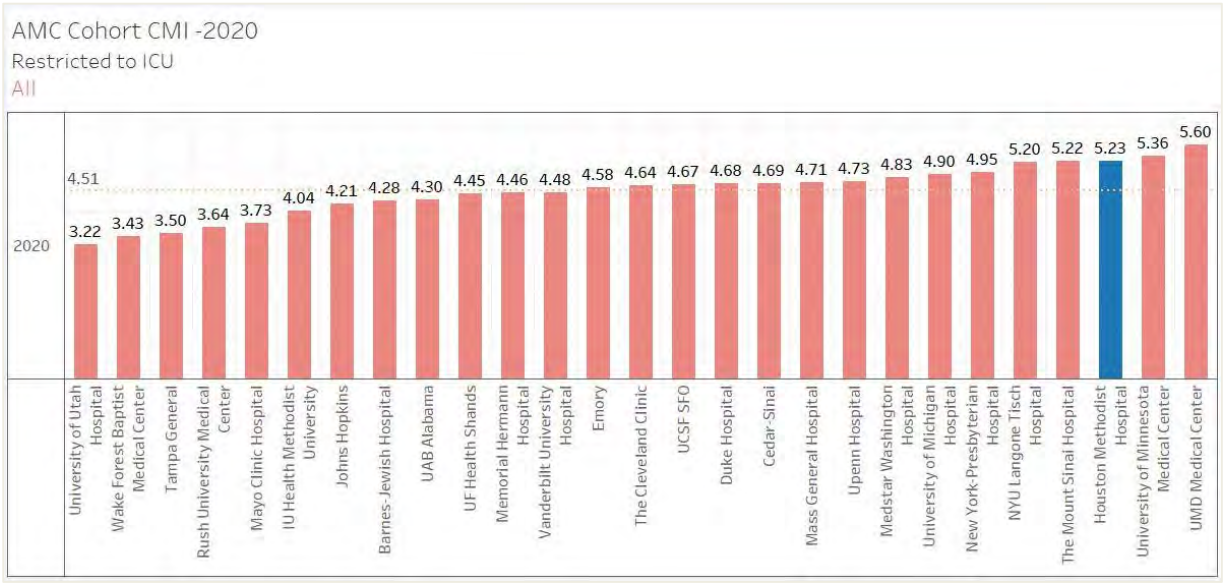


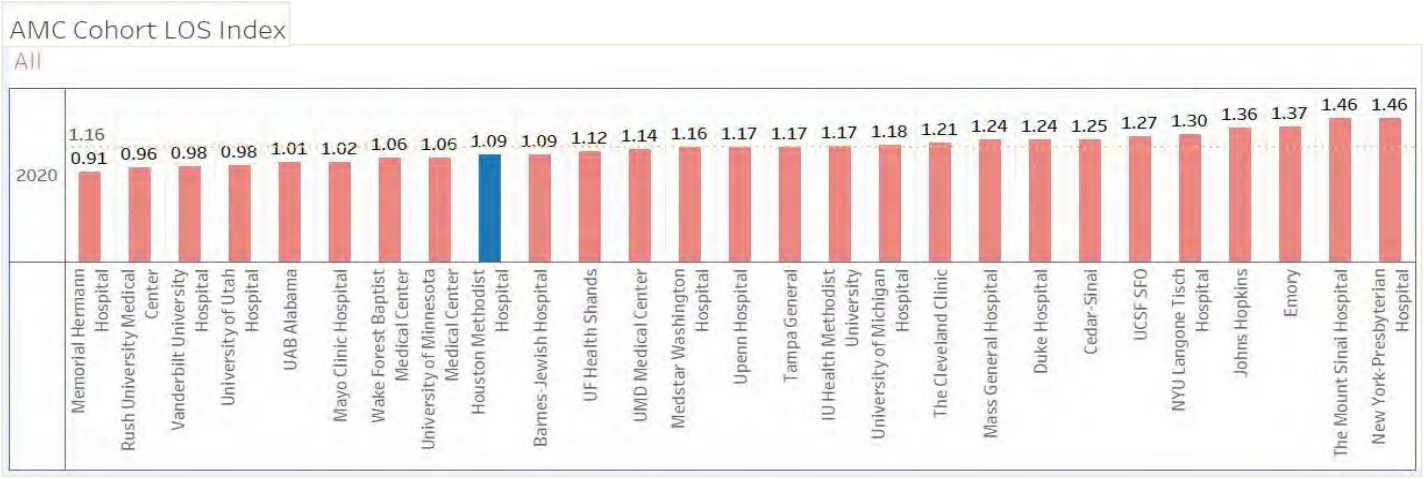
Dashboard dates 03/07 – 08/14

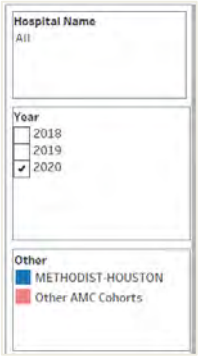
# CLINICAL OUTCOMES FOR COVID AND NON-COVID ICU PATIENTS

## Vizient HM ICU Outcomes




Includes data for Jan 2018 – June 2020

# ECMO in COVID-19

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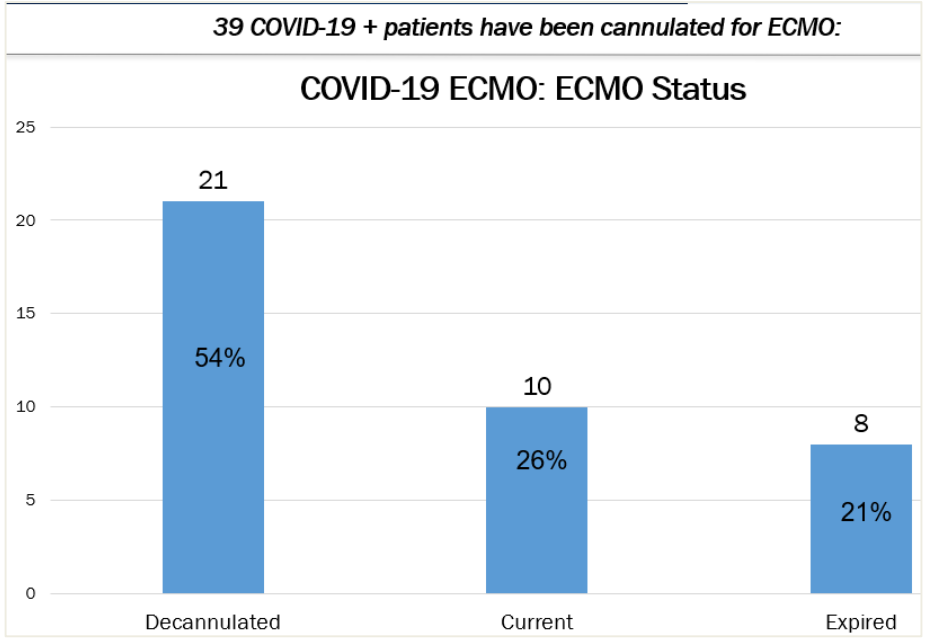
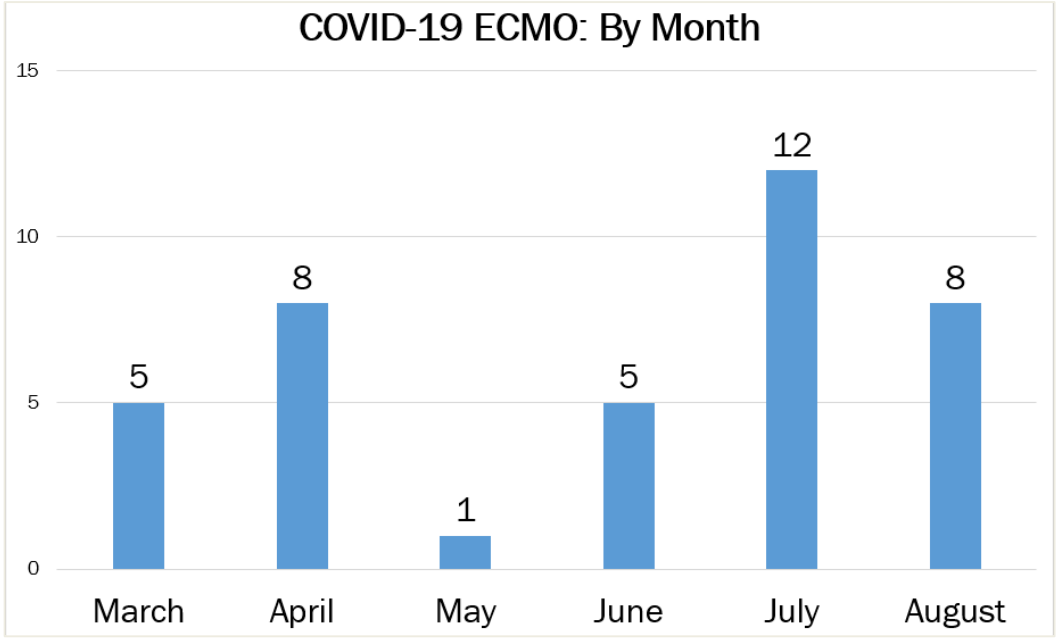
## Current ECMO Status/Final Discharge Disposition/Patients By Month (n=39)




As of 3:00pm 8/17

# RESEARCH AND GRANT ACTIVITY

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## COVID-19 CLINICAL TRIALS

| | |
|---|---|
| PRO00025079 | *Gilead Emergency Use of investigational antiviral Remdesivir for the treatment of COVID-19 : For Pregnancy and PediatricsA Phase 3 Randomized Study to Evaluate the Safety and Antiviral Activity of Remdesivir (GS-5734™) in Participants with Moderate COVID-19 Compared to Standard of Care Treatment* |
| PRO00025080 | *A Phase 3 Randomized Study to Evaluate the Safety and Antiviral Activity of Remdesivir (GS-5734™) in Participants with Severe COVID-19* |
| PRO00025145 | *Plasma Donation Convalescent COVID* |
| PRO00025121 | *Convalescent Plasma for the Treatment of Coronavirus Disease 2019 PRO00025121:1 IND Number: 19734* |
| PRO00025529 | *A Pilot Trial of Cord Blood Derived T-regulatory Cell Infusions (CK0802) in the Treatment of COVID-19 Induced Acute Respiratory Distress Syndrome (ARDS)* |
| PRO00025668 | *A Phase 1b/2, Randomized, Double-Blind, Placebo-Controlled, Multi-Center Study to Evaluate the Safety and Efficacy of TJ003234 in Subjects with Severe Coronavirus Disease 2019 (COVID-19)* |
| PRO00025760 | *Cytosorb Emergency Use Authorization* |
| PRO00025713 | *iNO Compassionate use* |
| PRO00025815 | *A Phase II, Open-Label, Randomized, Multicenter Study To Investigate The Pharmacodynamics, Pharmacokinetics, Safety, And Efficacy Of 8 Mg/Kg Or 4 Mg/Kg Intravenous Tocilizumab In Patients With Moderate To Severe Covid-19 Pneumonia* |
| PRO00025929 | *A Phase 3 Open-label, Randomized, Controlled Study to Evaluate the Efficacy and Safety of Intravenously Administered Ravulizumab Compared with Best Supportive Care in Patients with COVID-19 Severe Pneumonia, Acute Lung Injury, or Acute Respiratory Distress Syndrome* |

# CRITICAL CARE INNOVATION

- Enabling critical care innovations that will drive the future of healthcare in a post COVID-19 world:
  - RELIANT Innovation Fund

    Critical Care collaboration with EnMed program (education and training)
    - ❑ Critical Care focused program and projects
    - ❑ Collaboration with medical and academic institutions
    - ❑ Innovation
  - COVID-19 Caresense Program (patients)
    - ❑ Provides education
    - ❑ Monitors health and recovery – can help address PTSD
    - ❑ Provides key reminders to needed actions or taking of medication
    - ❑ Ensures resolution of patients' action items – direct line to clinician

# EDUCATION AND OUTREACH

## Internal

- **May 12, Medicine Grand Rounds** – Institutional Response to COVID-19: Lessons Learned
- **Apr 16, HMDHVC Grand Rounds** – Critical Care Management of COVID-19 Patients
- **Mar 31, DeBakey CV Live: Special Edition** – COVID-19 Let's Not Learn Alone

## External highlights

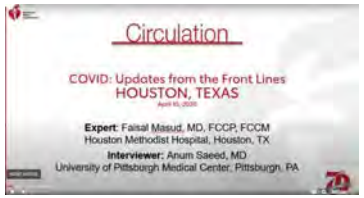
- **Jul 27, New York Times:** 'You Do the Right Things, and Still You Get It'
- **Jul 16, KHOU 11:** There is concern in the Texas Medical Center about the dramatic slope upward in COVID-19 cases
- **Jul 11, CNN:** Texas seeing record number of hospitalizations
- **Jul 7, NBC Today Show:** "knee deep in first wave" of coronavirus cases surge.
- **Jul 7, MSNBC:** Dr. Masud is interviewed to discuss the crisis
- **Jul 3, Barron's:** COVID-19 Close To Overwhelming Houston's Vast Healthcare Complex
- **Jun 27, Newsweek:** ICUs in California, Arizona and Texas Prepare for Surge in COVID-19 Cases
- **Jun 24, ABC World News Tonight with David Muir:** Surging Virus Infections – Dr. Masud is interviewed
- **May 6, ABC Good Morning America**: Public safety concerns as states ease restrictions
- **Apr 17, Houston Chronicle:** CDC adds 6 new COVID-19 symptoms, including loss of taste or smell, to list
- **Apr 16, Houston Chronicle:** Doctors treating COVID-19 at HM get inside giant plexiglass
- **Apr 11, Univision 45:** Dr. Masud is interviewed
- **Apr 7, KPRC 2**: HMH District takes new innovations to combat COVID-19 System Fights Coronavirus Pandemic Head-on






# RESEARCH AND PUBLICATIONS











- **BMJ Open Journal** – "Racial and Ethnic Disparities in SARS-CoV-2 Pandemic: Analysis of a COVID-19 Observational Registry for a Diverse U.S. Metropolitan Population"
- **Anesthesia & Analgesia Journal** – "Provider Burnout and Fatigue During the COVID-19 Pandemic: Lessons Learned From a High-Volume Intensive Care Unit"
- **AHA/ASA Journals** – "Circulation Video Series COVID: Updates from the Front Lines Houston, Texas" (Technology and Tele ICU potential)
- **American Journal of Pathology** – "Treatment of COVID-19 Patients with Convalescent Plasma"
- **Emergency Medicine Journal** – "Aerosol containment box to the rescue: extra protection for the frontline"
- **CHEST Journal** – "Impact of small-N studies during a pandemic"
- **JAMA Network** – Characteristics and Outcomes of COVID-19 Patients During Initial Peak and Resurgence in the Houston Metropolitan Area
- **JMIR Publications** – "Rapid Implementation and Innovative Applications of a Virtual ICU during the COVID-19 Pandemic: A Case Study"

# CHEST FOUNDATION AWARD

- Congrats to Dr. Deepa Gotur on being selected to receive the GlaxoSmithKline Distinguished Scholar in Respiratory Health in the amount of $150,000 for her project titled:

  ***"Cytokine release in SARS COV2 viral illness and Trends of inflammasome expression in Acute Respiratory Distress Syndrome manifestations and Management"***

# 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

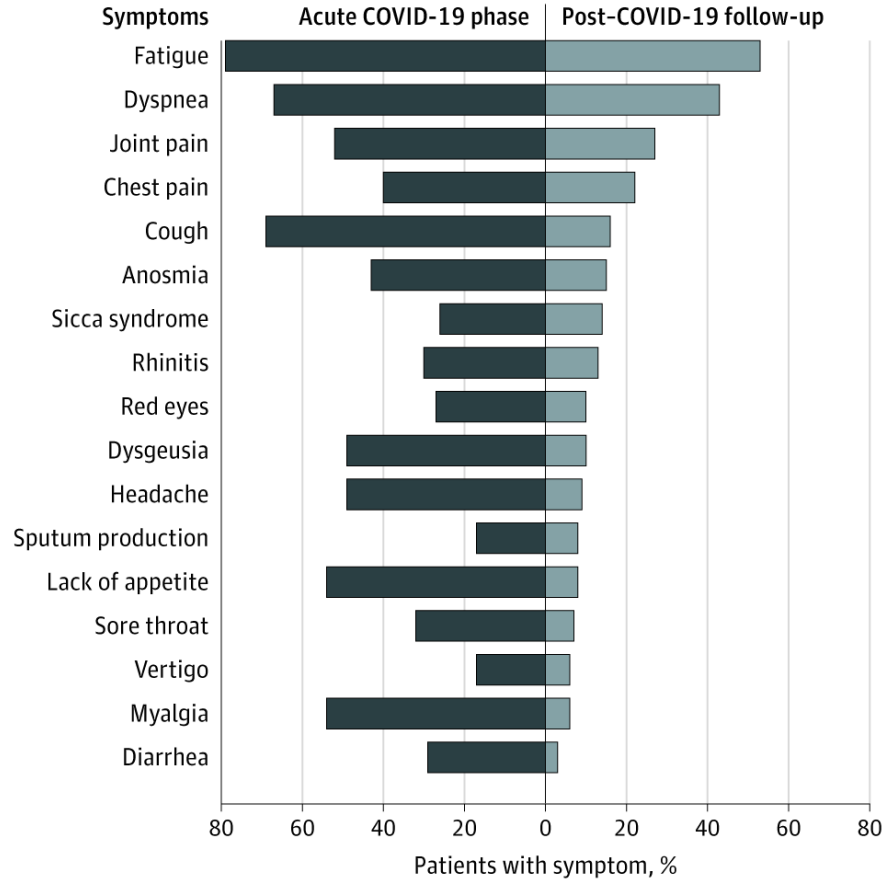
**143 Patients Admitted with COVID-19**

**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**



# NEXT PHASE

- Battle tested teams ready for next phase
- We all are still learning short term and long term impact of this disease
- There is a need to focus on how best to manage these patients in ICUs, how to prevent lung, heart, brain and kidney complications
- If we have better understanding of these disease processes then our treatments would be innovative, targeted and hopefully prevent short and long term complications
- Family and healthcare team well-being while caring for these complex patients


# Many Thanks!

to the nurses, respiratory therapists, pharmacy, physical therapists, PCA, physician assistants, nurse practitioners, supply chain, housekeeping, administration, virtual ICU team, ECMO team, physicians and OUR COMMUNITY.

All united in the fight against COVID-19! It has been exhausting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# Research in Treatments & Vaccines

H. Dirk Sostman, MD FACR

Town Hall August 19, 2020

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# HM Clinical Trials: Anti-Viral Antibodies

- Convalescent Plasma (351 patients treated)
  - Severe life-threatening COVID-19
  - HM data: reduces mortality (7.0% → 1.2%)
    - patients transfused **within 72 h of admission**
    - plasma with an anti-spike protein **titer of ≥ 1:1350**
  - Worldwide data: reduces mortality (25% → 13%)
- Monoclonal Antibodies
  - Regeneron – inpatient study recruiting, outpatient starting soon
  - Lilly –outpatient study recruiting, inpatient starting soon

Not randomized controlled trials

# HM Clinical Trials: ACTT3

- NIH sponsored RCT:  remdesivir + beta - interferon
  - Interferons are broad spectrum anti-viral proteins produced by the body
  - Also used to treat cancer, MS, hepatitis
  - COVID-19 seems to suppress this defense mechanism
- Previous trials of interferon
  - Synairgen trial:
    - Inhaled beta-interferon
    - 79% reduction in progression to severe disease
  - Hong Kong trial (Lancet 2020)
    - Kaletra, Ribavirin, interferon 1-beta
    - 7 days to viral clearance vs 12 days for controls

# HM Clinical Trials: RLF-100 (Aviptadil)

- Vasodilator (discovered in 1970)
  - Concentrated in the lung and seems to protect the type II lung cell
  - Enters a cell infected with SARS-CoV-2, may block viral replication, cytokine synthesis, and cell death
  - Also ? Anti-inflammatory ? Anti-platelet activity
  - No documented clinical usefulness yet
- Experience at Houston Methodist
  - 50 patients treated with some anecdotal successes
  - No real data available yet, but expected soon

# A Few Words About Immunity & Vaccines

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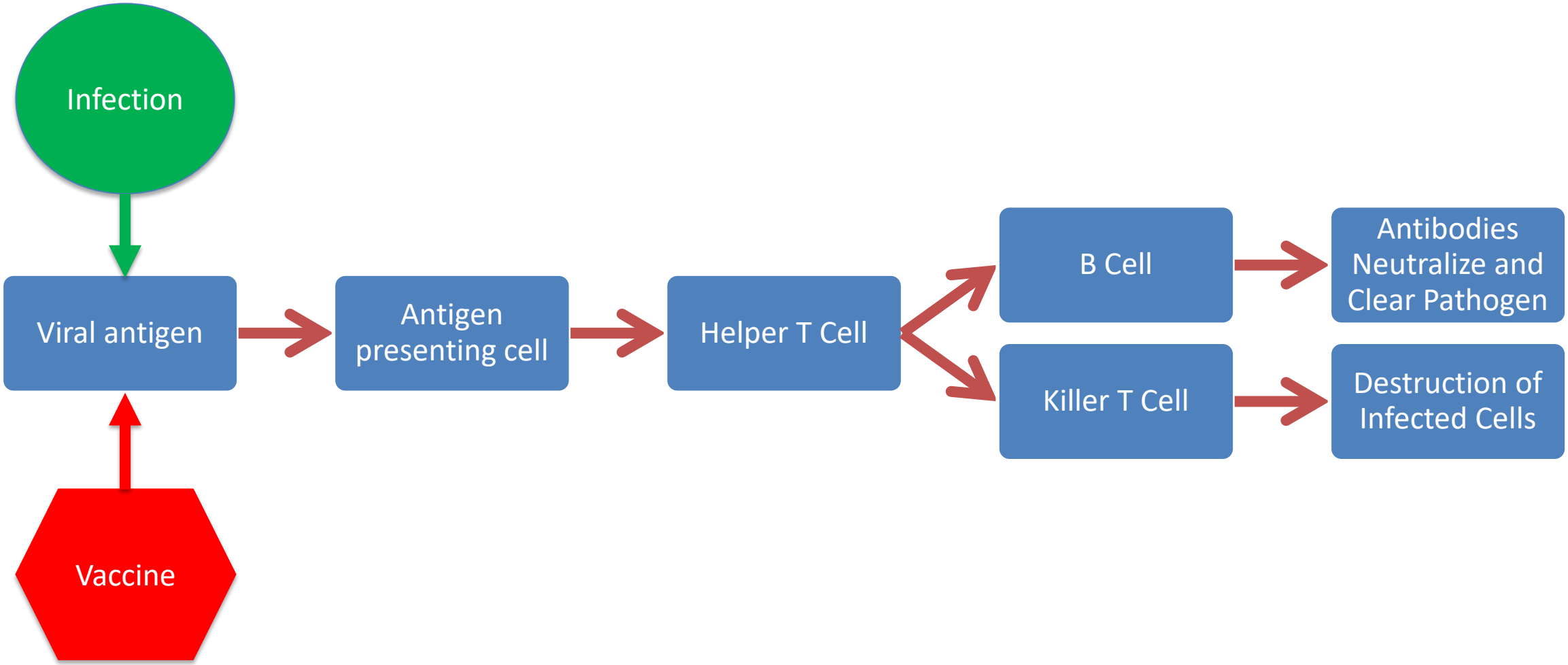
# How Immunity Develops



# Vaccines: Key Questions

1. Is it safe?
2. Does it raise an antibody immune response?
3. Does it raise a cellular immune response?
4. Does the immune response neutralize the virus?
5. Does it prevent infection – or disease?
6. How long does immunity last?
7. One dose or two?
8. Can vaccine be produced and distributed effectively?
9. Will people take it?

# Vaccine Progress – Antibody and T Cell Responses

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| Vaccine | Antibody Response | T Cell Response | Species | N of Doses | Protection (Monkeys) | EUA Target |
|---|---|---|---|---|---|---|
| Moderna | 100% (2x – 8X CP) | 100% | Human | 2 | Infection | December 2020 |
| Pfizer / BioNTech | 100% (5x – 30x CP) | 94% | Human | 2 | | October 2020 |
| J & J | 100% | 83% | Monkeys | 1 | Infection | Q1 2021 |
| Oxford / Astra Zeneca | 100% (= CP) | 100% | Human | 2 | Disease | September 2020 |

CP = convalescent plasma

# COVID-19 Vaccine Side Effects

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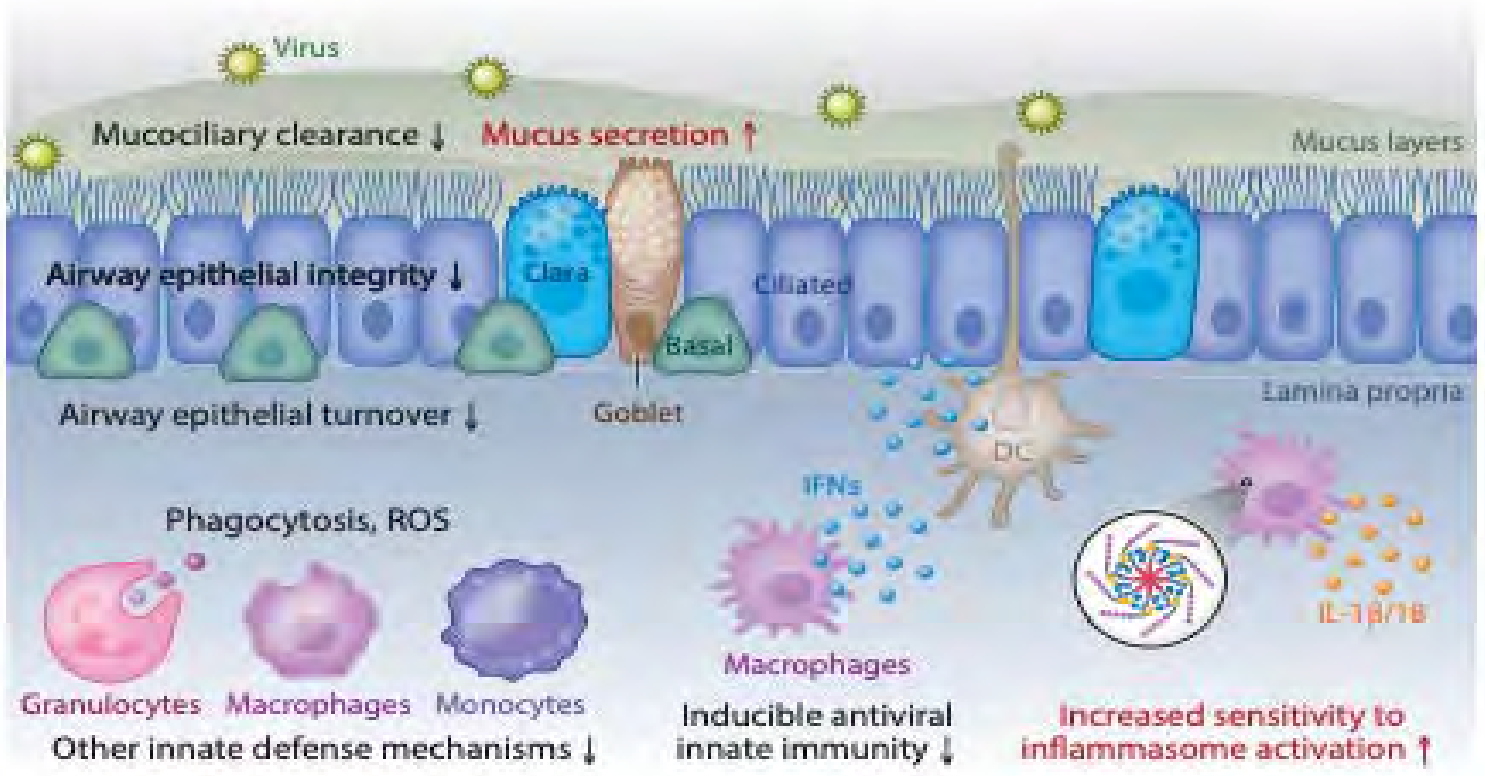
- Mild - to - moderate reactions in nearly 100%
  - Low grade fever & chills
  - Headache
  - Sore arm
  - Fatigue
- Severe reactions
  - Up to 10% (at doses higher than would be used clinically)
  - High fever > 100.4 degrees
  - Severe chills, muscle aches, etc.
- No evidence of potential rare side effects
  - Antibody dependent enhancement
  - Autoimmune reactions

# Will a Vaccine Be Used?

- 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

# Winter is Coming

# COVID-19 Transmission in Winter




# TIPS: COVID-19 in Winter

- Humidify indoor air (40% – 60% relative humidity at 70 – 75 F)
- Ventilation of indoor air
- Wear face mask to keep nose warm and moist
- Vitamin D supplements if levels low
- Wash hands to prevent indirect contact transmission
- Get plenty of sleep
- **Get your flu shot!**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# COVID-19 Update

August 19, 2020

HOUSTON Methodist LEADING MEDICINE

# TMC Early Warning Signs Dashboard

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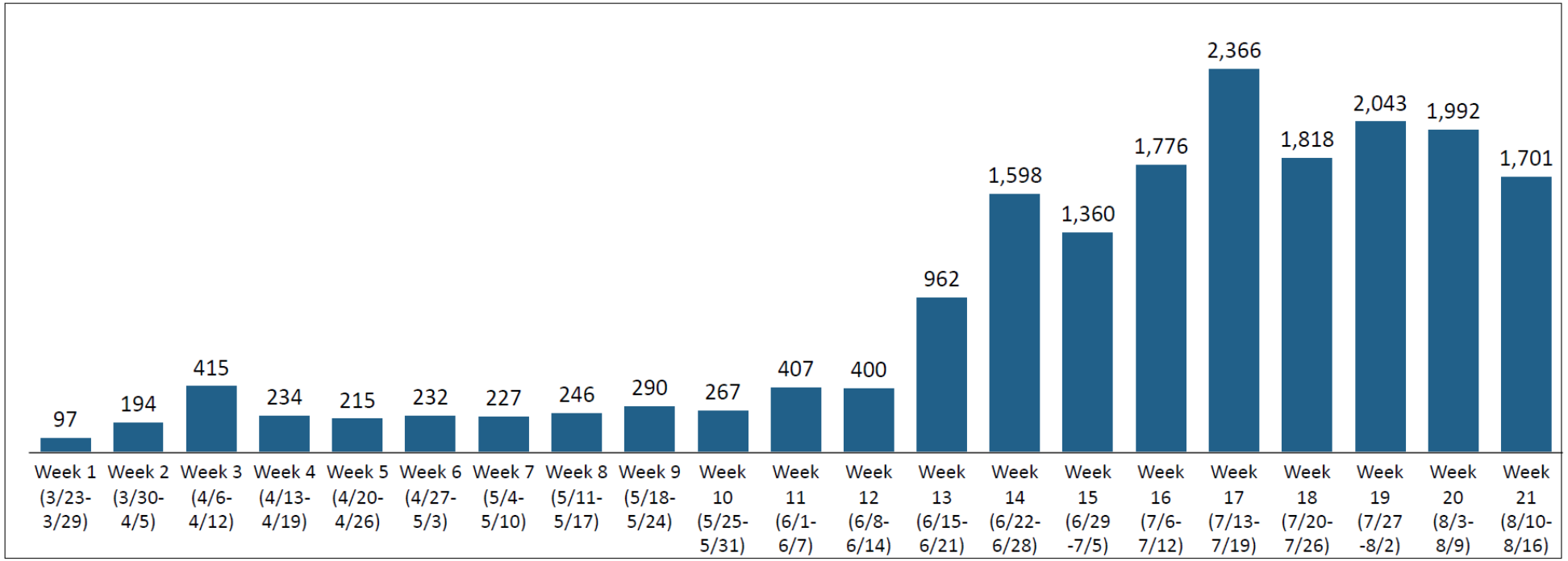
1 COVID-19 CASE GROWTH TREND

**August 17, 2020**

## AVERAGE DAILY NEW COVID-19 POSITIVE CASES BY WEEK (MONDAY-SUNDAY)

*# Daily average new cases in Greater Houston Area[1]*



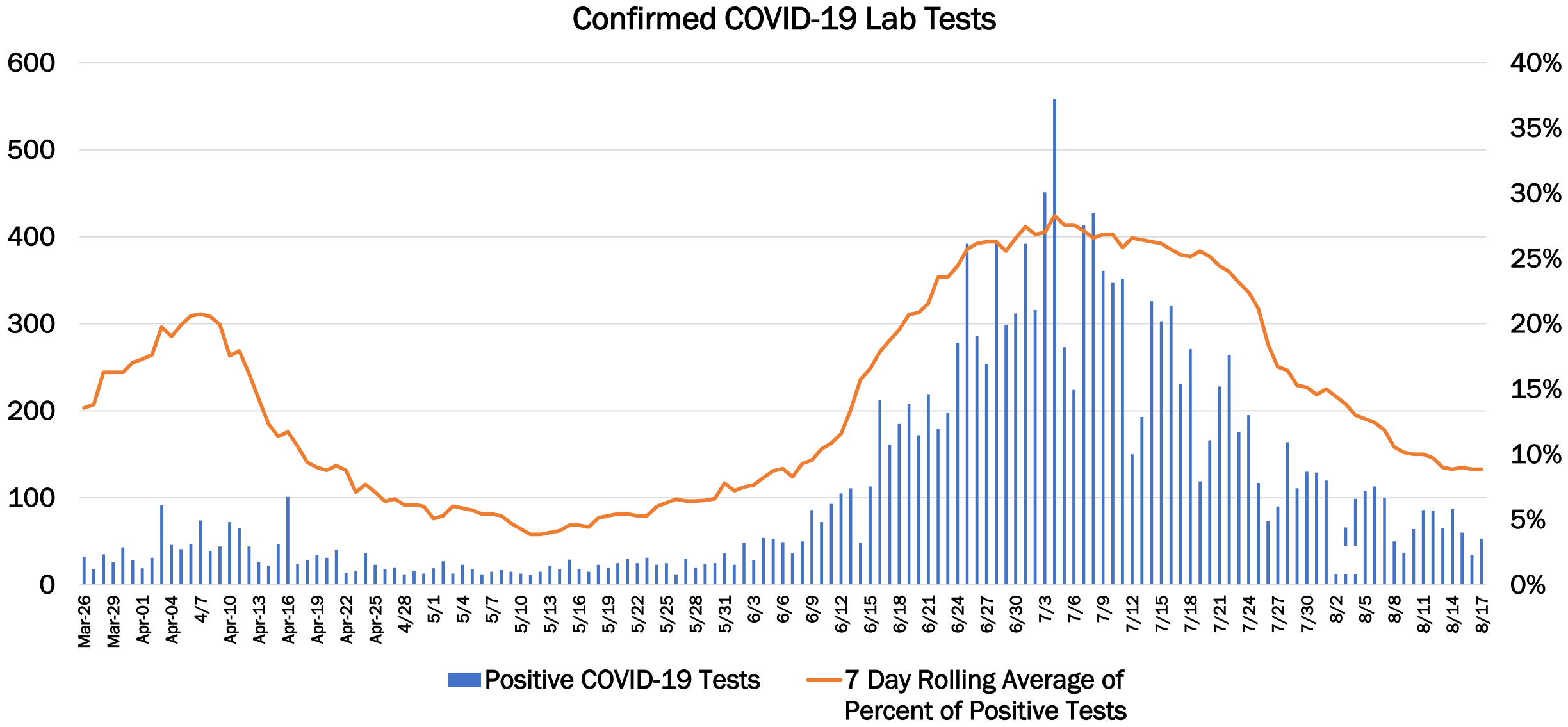

1. Austin, Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery and Waller

TMC | TEXAS MEDICAL CENTER

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

**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**

# Houston Methodist Testing Trend



# TMC Dashboards

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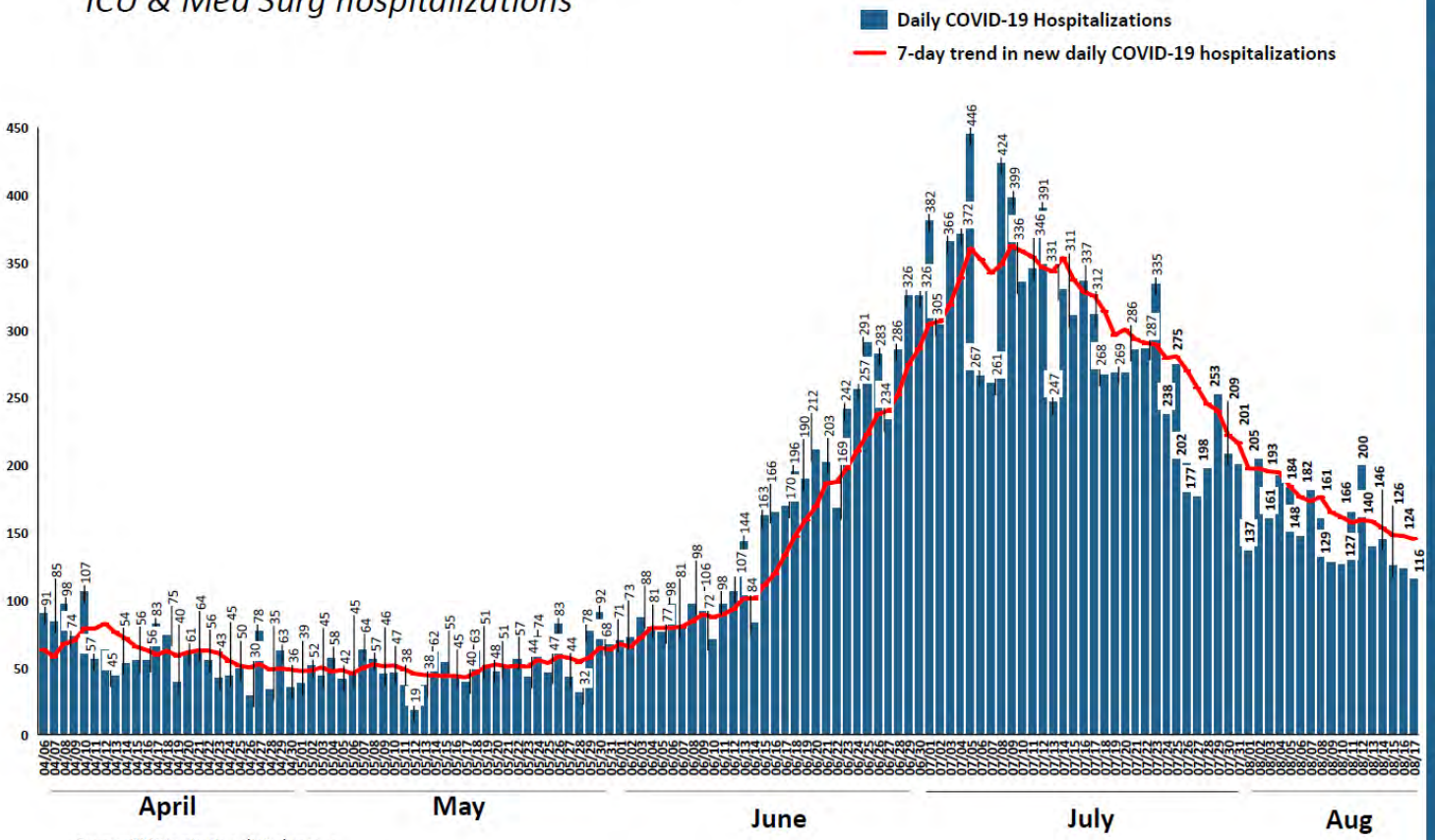
1 DAILY NEW COVID-19 CASES

## TMC DAILY NEW COVID-19 HOSPITALIZATIONS

*ICU & Med Surg hospitalizations*




Source: TMC institution clinical census

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

**August 17, 2020**

**Monitoring threshold:**

Threshold is exceeded by the occurrence of a positive daily growth rate, averaged over 7 days

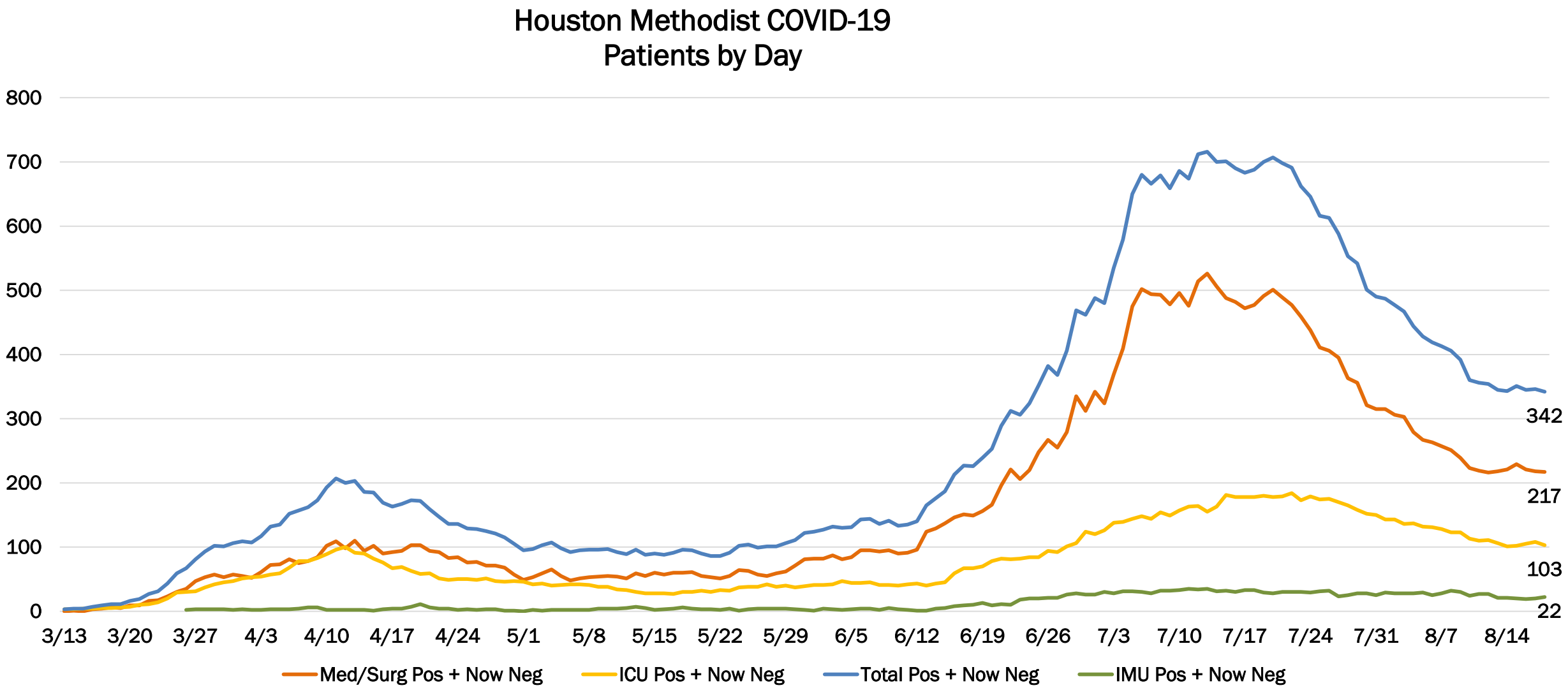
**Current status: -0.1% daily growth rate (averaged over 7 days)** in the COVID-19 daily hospital admissions trend

**Notes:**

While new daily cases may fluctuate for a variety of reasons (e.g., testing), the daily hospitalization trend shows an objective view of how COVID-19 impacts hospital systems

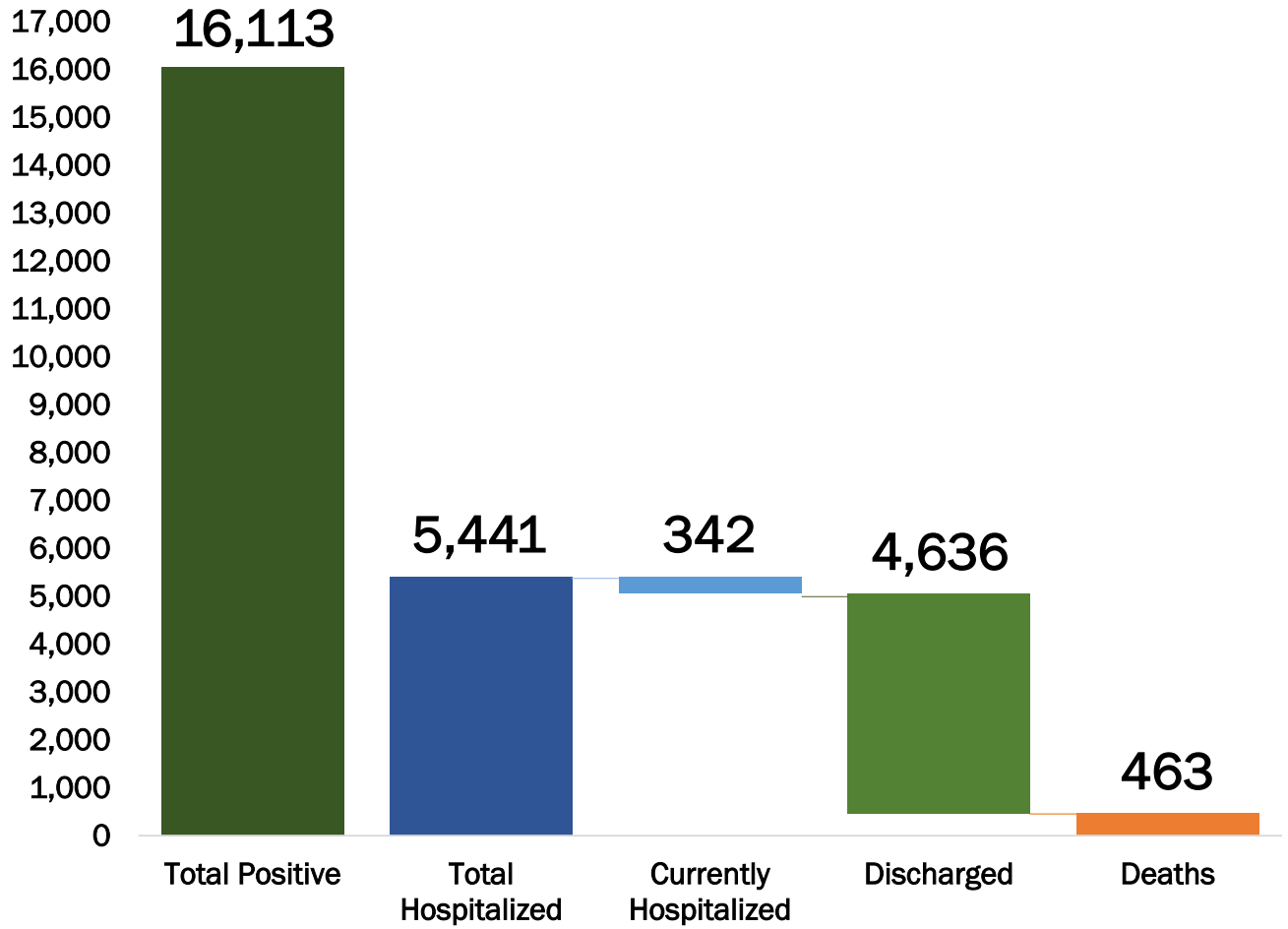
**This document is solely intended to share insights and best practices rather than specific recommendations. Individual institution data is shown as reported and has not been independently verified**

# Houston Methodist COVID-19 Cases by Day – August 18



# Houston Methodist Current COVID-19 Stats

## COVID-19 related patients through Houston Methodist as of August 18, 2020




### Key Messages

- Houston Methodist has served 5,441 COVID-19 related in-patients to date.
- 4,636 patients have been successfully discharged.

Houston Methodist Hospital, Baytown, Clear Lake, Continuing Care, Sugar Land, West, Willowbrook, Woodlands

*Data as of August 18, 2020 at 7:00 pm*

# Outcomes and Characteristics
# First Wave vs. Second Wave

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Letters

RESEARCH LETTER

**Characteristics and Outcomes of COVID-19 Patients During Initial Peak and Resurgence in the Houston Metropolitan Area**

Texas is experiencing resurgence of coronavirus disease 2019 (COVID-19). We report sociodemographic, clinical, and outcome differences across the first and second surges of COVID-19 hospitalizations at Houston Methodist, an 8-hospital health care system in Houston, Texas.[1]

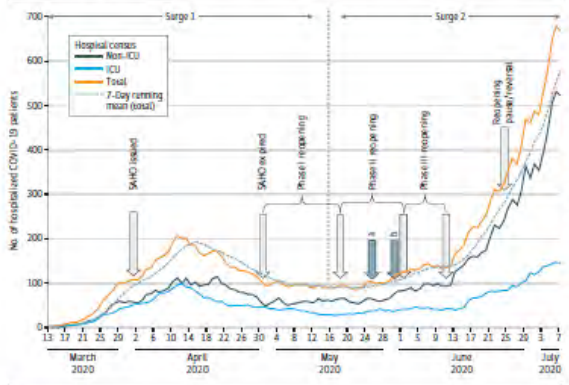
**Methods** | From electronic health records, we identified patients with positive reverse transcriptase–polymerase chain reaction (RT-PCR) nasopharyngeal swab test results for severe acute respiratory syndrome coronavirus 2. We extracted age, sex, race/ethnicity, comorbidity, medication, intensive care unit (ICU) admission, and mortality information. The assessment of race/ethnicity was driven by prior analyses of our data that demonstrated higher SARS-CoV-2 infection rates among racial and ethnic minorities.[2] We tracked daily total, ICU, and non-ICU (medical/surgical units) hospital census across the reporting period. We categorized patients into surge 1 for admissions between March 13 and May 15, 2020, and surge 2 between May 16 and July 7, 2020. Surge 2 started 2 weeks after a phased statewide reopening.[3]

We provided summary statistics as means or medians and proportions for various sociodemographic, clinical, and outcome characteristics of hospitalized COVID-19 patients. Proportional differences with 95% CIs are provided for bivariable comparisons across surges 1 and 2. Extraction and reporting of these data were not deemed human subjects research by the Houston Methodist Institutional Review Board. Analyses were performed with Stata version 16. *P* values were 2 sided, with statistical significance set at $P < .05$.

**Results** | As of July 7, 2020, 2904 unique COVID-19 patients had been hospitalized, representing 774 and 2130 patients during surge 1 and 2, respectively. The **Figure** presents total, ICU, and non-ICU daily hospital census along with a 7-day mean across the study period. Dates corresponding to various phases of statewide reopening are also highlighted. Patients in surge 2 (vs surge 1) were younger (mean age, 57.3 vs 59.9 years; difference, −2.62 years; 95% CI, −4.04 to −1.20 years), the proportion identifying as Hispanic was higher (43.3% vs 25.7%; difference, 17.64%; 95% CI, 13.89%-28.79%), and the median zip code–based income was lower ($60 765 vs $65 805; difference, −$5040; 95% CI, −$7641 to −$2439). Surge 2 patients had a significantly lower burden of overall and specific comorbidities such as diabetes, hypertension, and obesity (**Table**).

A greater proportion of surge 2 patients received remdesivir and enoxaparin. A smaller proportion of surge 2 patients were admitted to the ICU (20.1% vs 38.1%; difference, −18.07%; 95% CI, −21.89% to −14.25%). Length of hospital stay was less (4.8 vs 7.1 days; difference, −2.31 days; 95%

Figure. Daily Hospital Census of Total, Intensive Care Unit, and Non-Intensive Care Unit COVID-19 Patients Across Houston Methodist




Daily hospital census of coronavirus disease 2019 patients across all Houston Methodist hospitals is provided for total, intensive care unit (ICU), and medical/surgical (non-ICU) units. The dashed gray line represents a running 7-day mean total hospital census. SAHO indicates stay-at-home order. Various timeline markers correspond to statewide gubernatorial reopening plan: phase 1, opening of retail stores, malls, restaurants, and nail salons at 25% capacity; phase 2, opening of child care centers, massage parlors, youth clubs, bars, and nightclubs, with phase 1 reopening expanded to 50%; and phase 3, bars allowed to operate at 50% capacity.

[a] Memorial Day holiday weekend.

[b] Large public rallies in Houston.



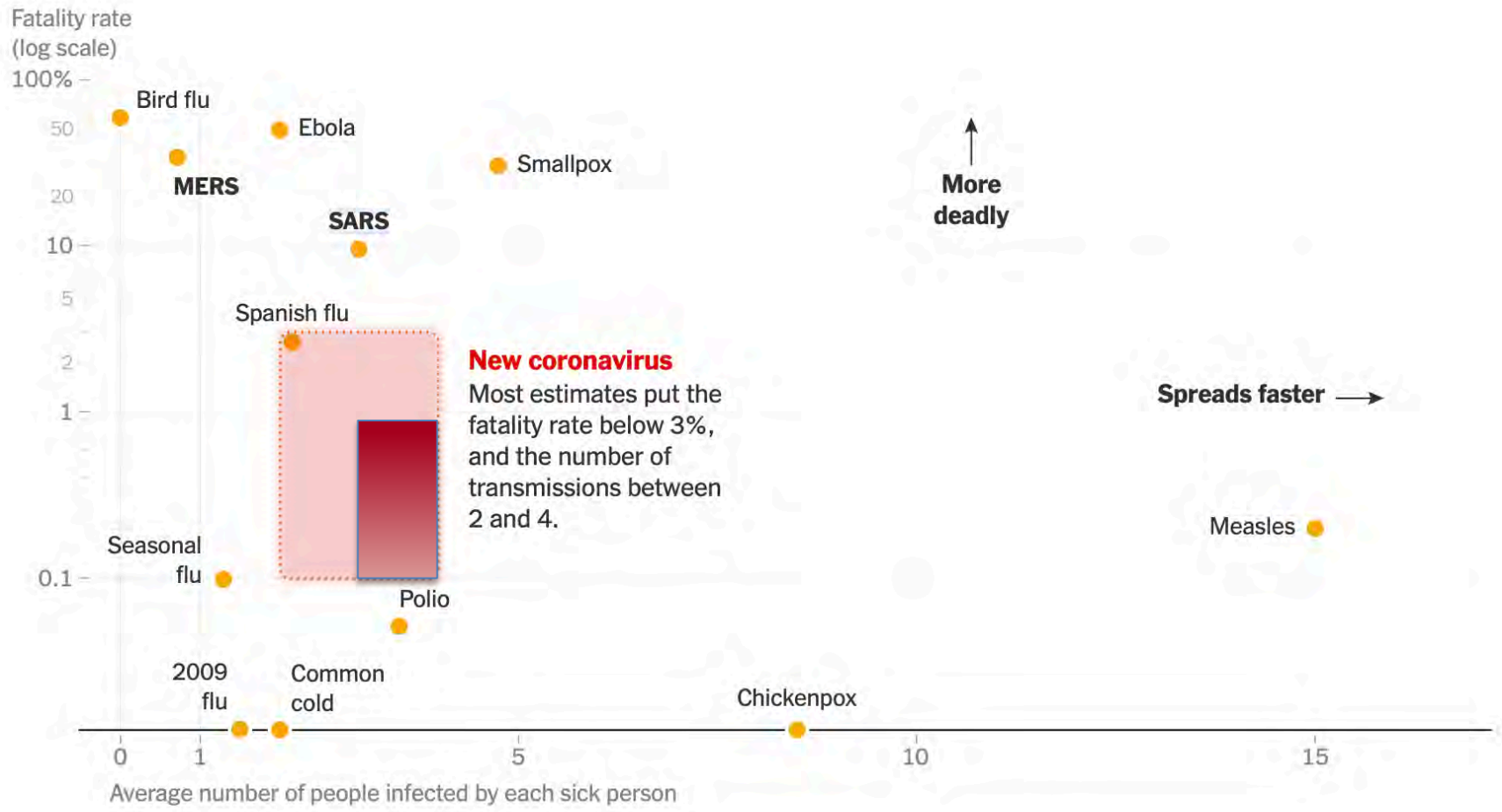


JAMA The Journal of the American Medical Association

| | Surge 1 3/13-5/15 | Surge 2 5/16-7/7 | P value |
|---|---|---|---|
| Average Age | 59.9 | 57.3 | <.001 |
| Age ≤ 50 | 208 (26.9%) | 736 (34.6%) | <.001 |
| Hispanic / Latino | 196 (25.7%) | 910 (43.3%) | <.001 |
| Self-Pay | 88 (11.4%) | 423 (19.9%) | <.001 |
| Diabetes | 312 (40.3%) | 475 (32%) | <.001 |
| Hypertension | 427 (55.3%) | 583 (38.8%) | <.001 |
| Obesity (BMI≥30) | 261 (33.9%) | 383 (25.7%) | <.001 |

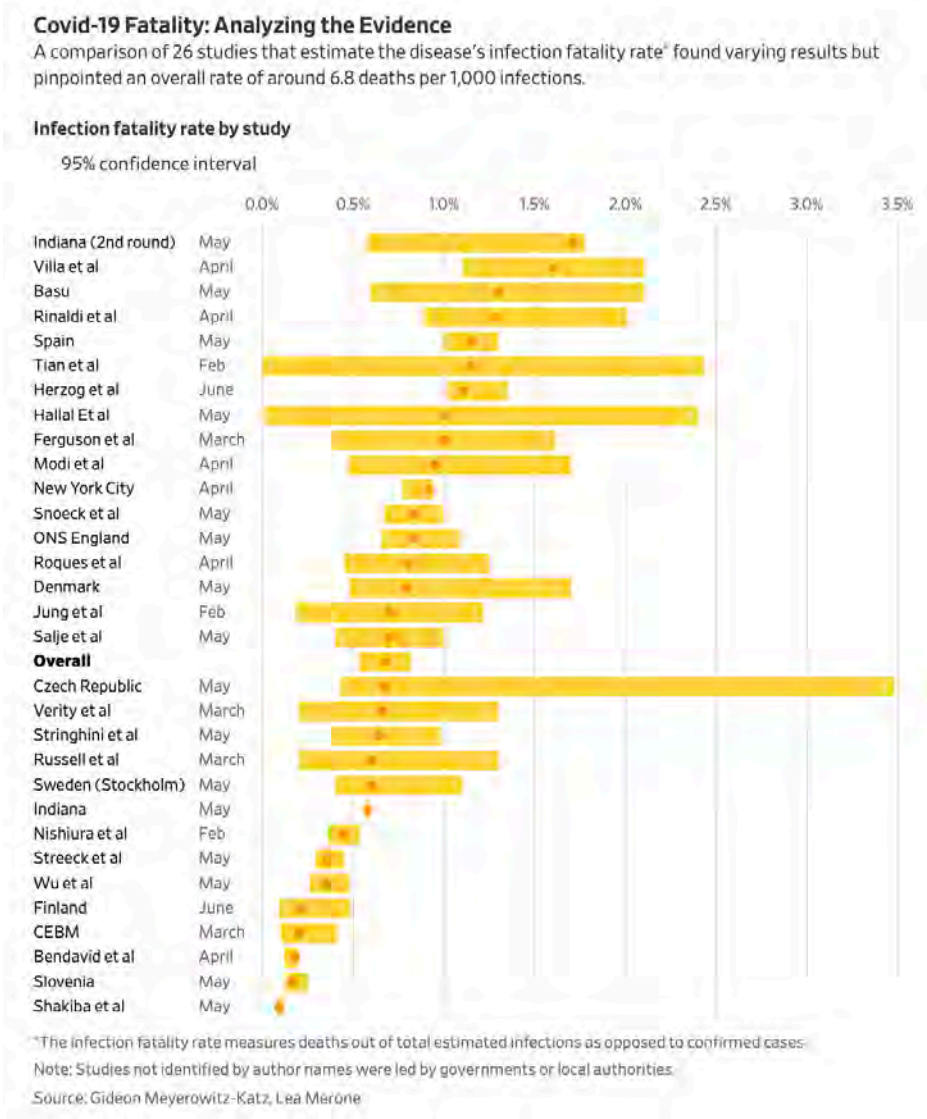
# ISN'T THIS JUST THE FLU?

# COVID-19 Outbreak




Note: Average case-fatality rates and transmission numbers are shown. Estimates of case-fatality rates can vary, and numbers for the new coronavirus are preliminary estimates.

# Infection Fatality Rate




**A systematic review and meta-analysis of published research data on COVID-19 infection-fatality rates**

Gideon Meyerowitz-Katz, Lea Merone
**doi:** https://doi.org/10.1101/2020.05.03.20089854
**This article is a preprint and has not been peer-reviewed [what does this mean?]. It reports new medical research that has yet to be evaluated and so should *not* be used to guide clinical practice.**

Abstract

**Abstract**

An important unknown during the COVID-19 pandemic has been the infection-fatality rate (IFR). This differs from the case-fatality rate (CFR) as an estimate of the number of deaths as a proportion of the total number of cases, including those who are mild and asymptomatic. While the CFR is extremely valuable for experts, IFR is increasingly being called for by policy-makers and the lay public as an estimate of the overall mortality from COVID-19. Methods Pubmed, Medline, SSRN, and Medrxiv were searched using a set of terms and Boolean operators on 25/04/2020 and re-searched 14/05/2020, 21/05/2020, and 18/06/2020. Articles were screened for inclusion by both authors. Meta-analysis was performed in Stata 15.1 using the metan command, based on IFR and confidence intervals extracted from each study. Google/Google Scholar was used to assess the grey literature relating to government reports. Results After exclusions, there were 26 estimates of IFR included in the final meta-analysis, from a wide range of countries, published between February and June 2020. The meta-analysis demonstrated a point-estimate of IFR of 0.68% (0.53-0.82%) with high

IFR 0.68%

**The infection fatality rate of COVID-19 inferred from seroprevalence data**

John Ioannidis
**doi:** https://doi.org/10.1101/2020.05.13.20101253
**This article is a preprint and has not been peer-reviewed [what does this mean?]. It reports new medical research that has yet to be evaluated and so should *not* be used to guide clinical practice.**

Abstract

**Abstract**

Objective To estimate the infection fatality rate of coronavirus disease 2019 (COVID-19) from data of seroprevalence studies. Methods Population studies with sample size of at least 500 and published as peer-reviewed papers or preprints as of July 11, 2020 were retrieved from PubMed, preprint servers, and communications with experts. Studies on blood donors were included, but studies on healthcare workers were excluded. The studies were assessed for design features and seroprevalence estimates. Infection fatality rate was estimated from each study dividing the number of COVID-19 deaths at a relevant time point by the number of estimated people infected in each relevant region. Correction was also attempted accounting for the types of antibodies assessed. Secondarily, results from national studies were also examined from preliminary press releases and reports whenever a country had no other data presented in full papers of preprints. Results 36 studies (43 estimates) were identified with

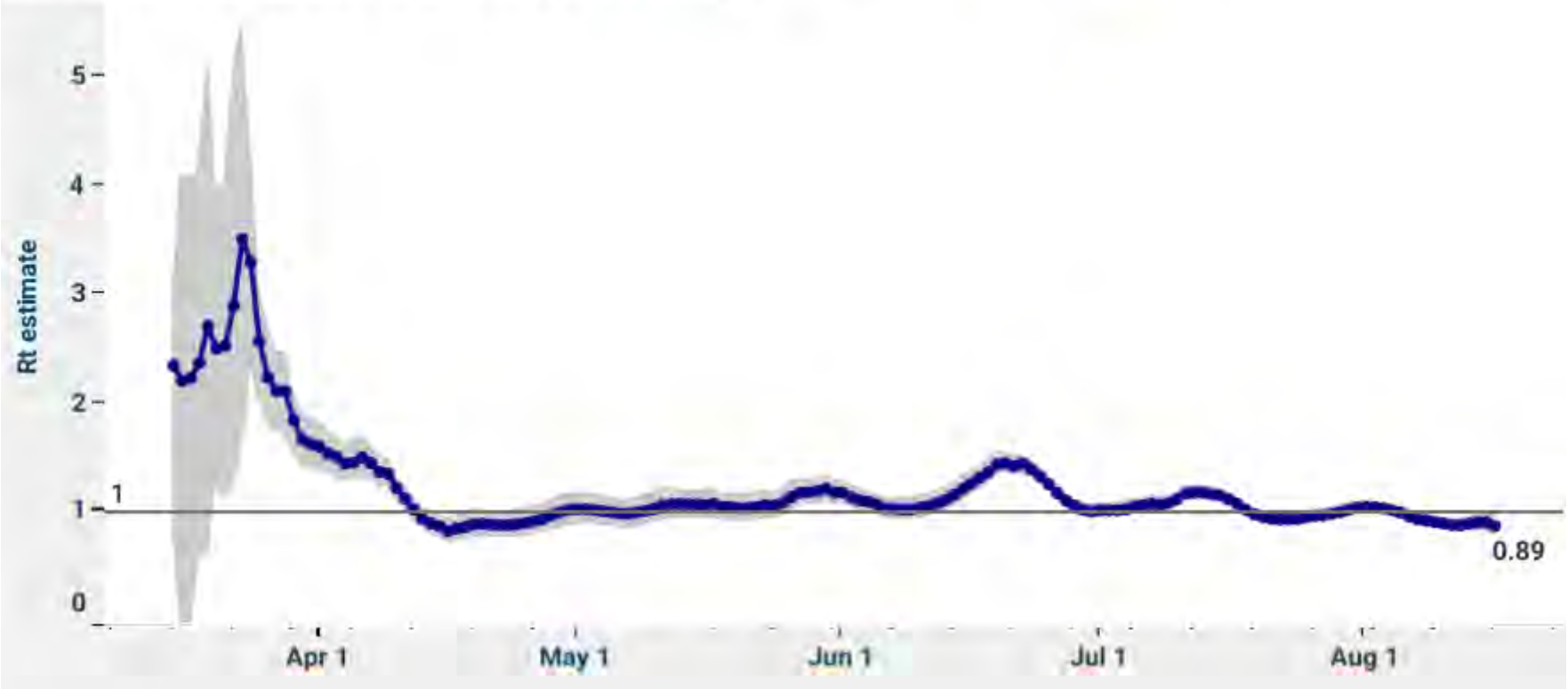
IFR
0.1-0.9%

https://www.wsj.com/articles/how-deadly-is-covid-19-researchers-are-getting-closer-to-an-answer-11595323801;
https://www.medrxiv.org/content/10.1101/2020.05.03.20089854v4; https://www.medrxiv.org/content/10.1101/2020.05.13.20101253v3#disqus_thread

# Houston Area R(t) Estimate Trend

## Rt estimate

This graph shows the R(t) over time. R(t) is a measure of contagiousness or how many people one COVID19 person infects. If R(t)>1, the epidemic is increasing. If R(t)< 1, the epidemic is declining. There is higher alert if the whole interval is above the horizontal line at 1. For **Q - Houston**, the rate of contagiousness is **0.89**; the epidemic is **decreasing**.




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

*Data as of August 18, 2020*

# Historical Influenza Mortality vs. COVID-19 Mortality

| Reporting Period | Influenza Hospitalizations | Influenza Mortality Cases | % Influenza Mortality |
|---|---|---|---|
| 2017 Sep - 2018 Apr | 2,034 | 51 | 2.5% |
| 2018 Sep - 2019 Apr | 851 | 13 | 1.5% |
| 2019 Sep - 2020 Apr | 1,066* | 22** | 2.1% |
| Cumulative | 3,951 | 86 | 2.2% |

| Reporting Period | COVID-19 Hospitalizations | COVID-19 Mortality Cases | % COVID-19 Mortality |
|---|---|---|---|
| 03.01.20 - 08.18.20 | 5,441*** | 463 | 9.1% |

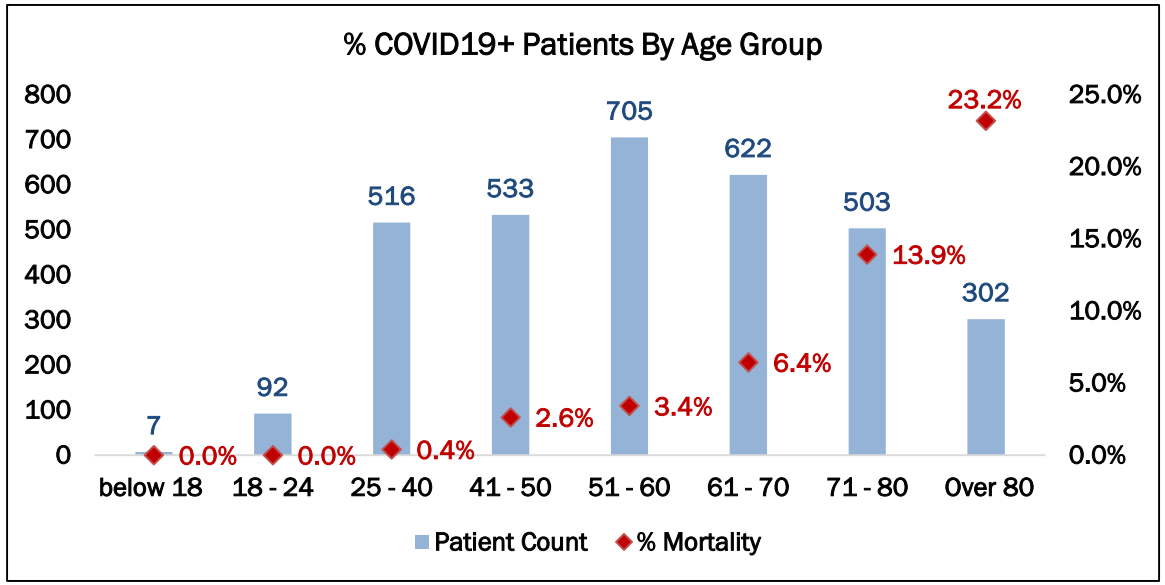
* In the 2019 – 2020 flu season, 9 patients were also COVID-19+
**In the 2019 – 2020 flu season, 4 mortalities were also COVID-19+
***Outcomes known for first 5,099 patients

# HM Patients and Outcomes by Age: COVID-19 vs. Influenza

HOUSTON Methodist LEADING MEDICINE

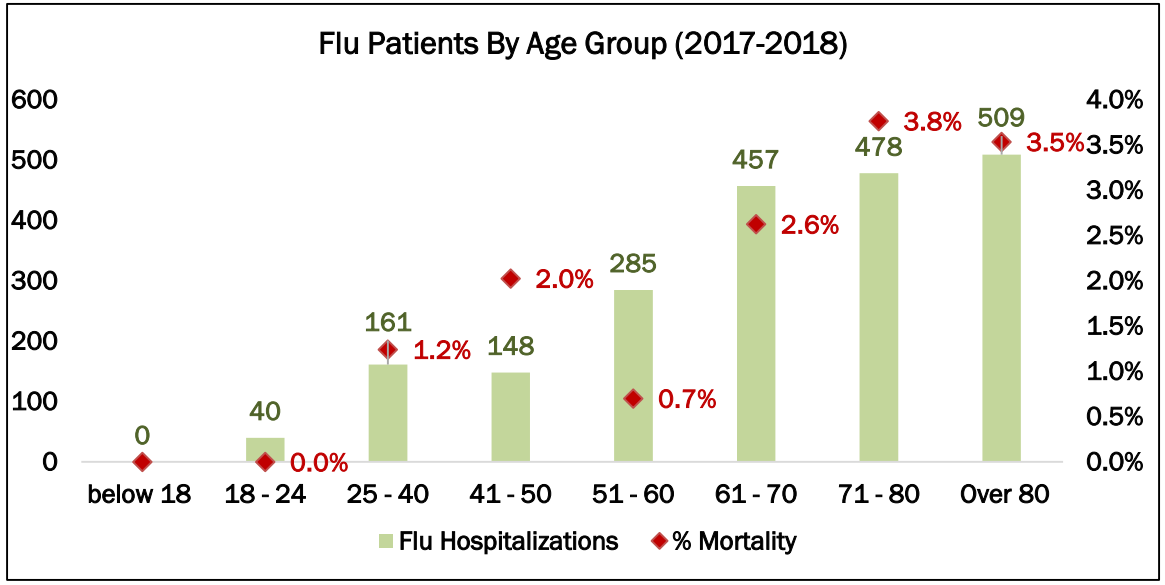
**Cumulative Mortality for COVID-19:**

**9.1%**

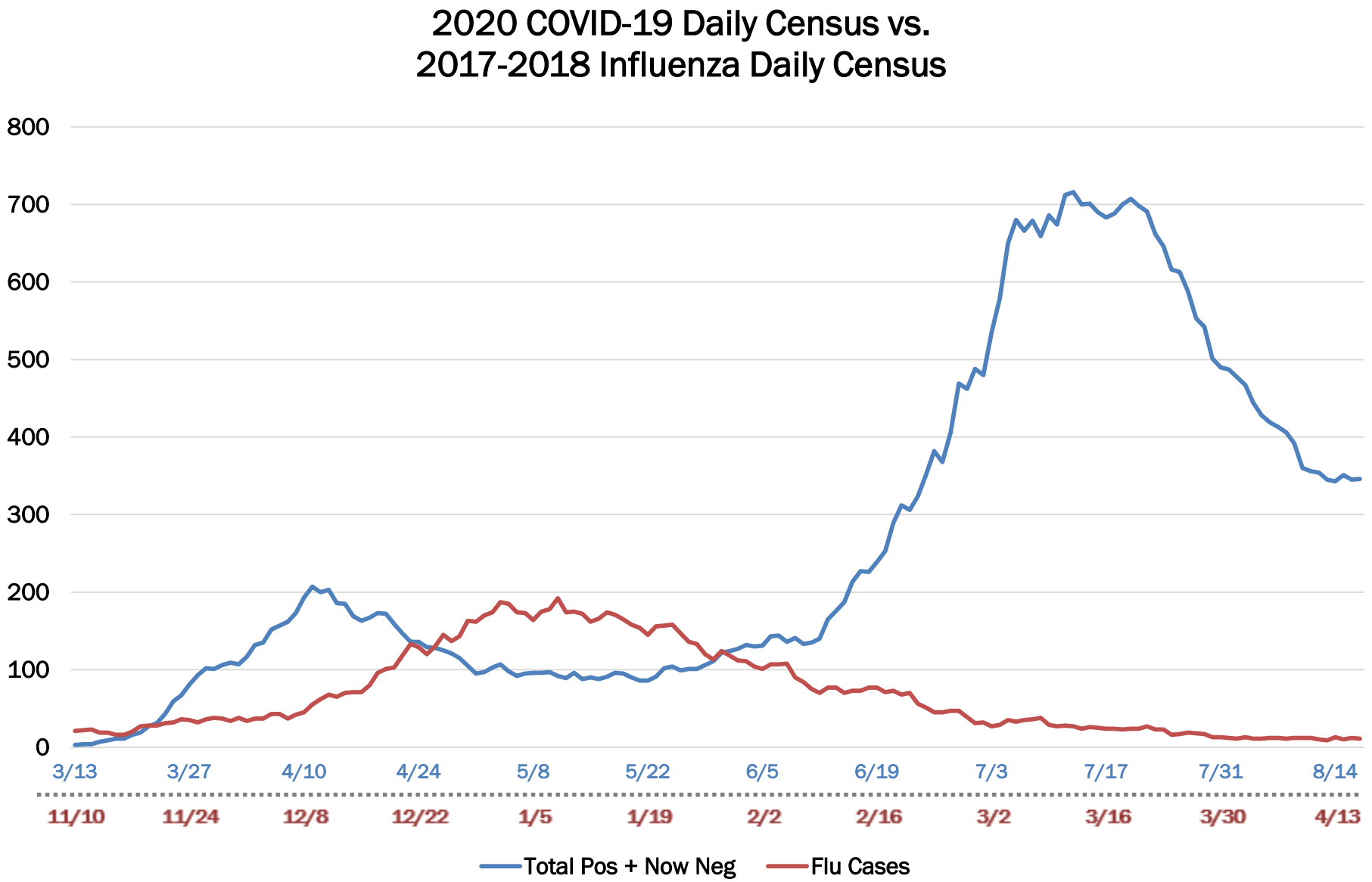



**Cumulative Mortality for Flu:**

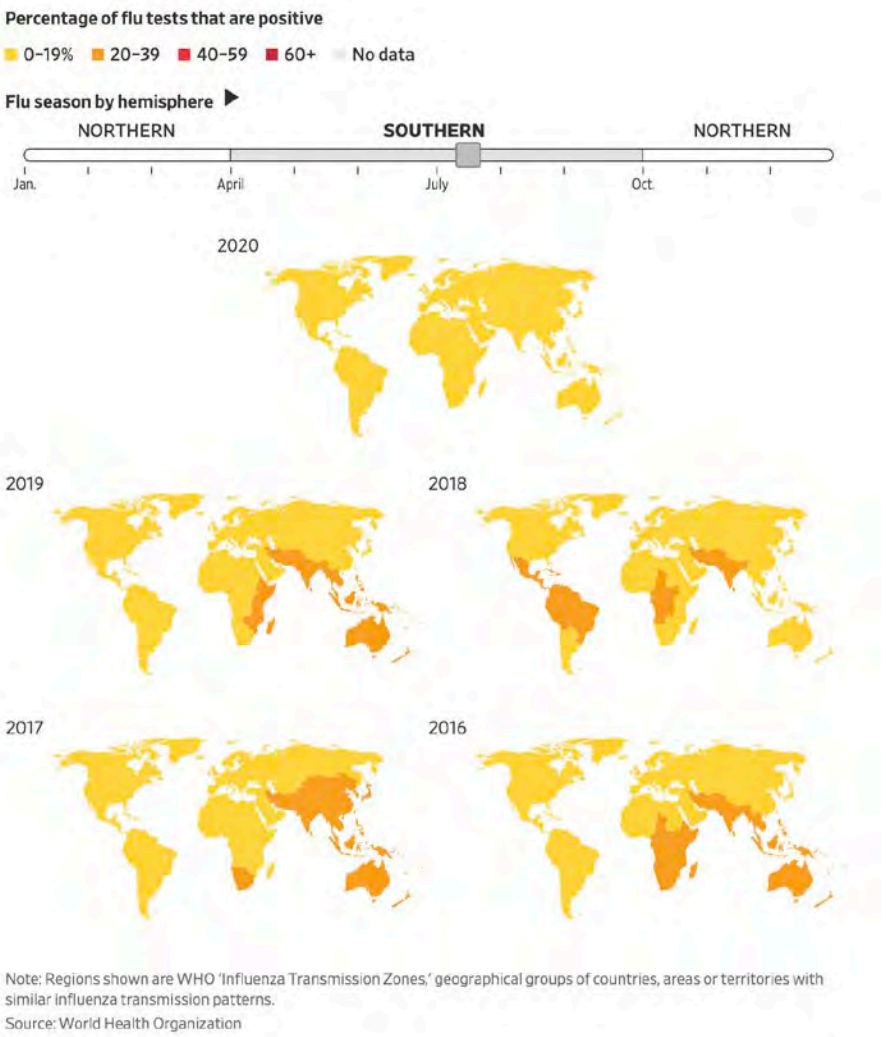
**2.2%**

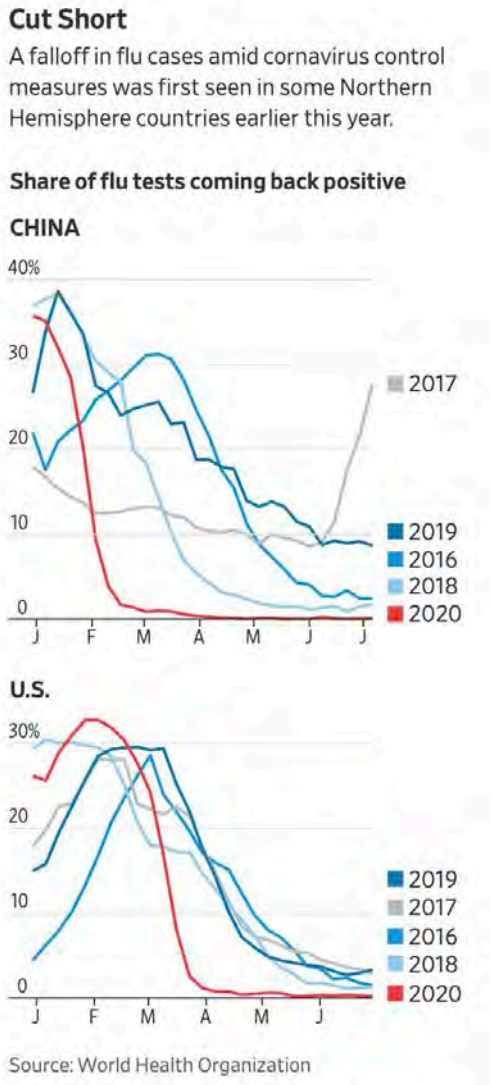


# Houston Methodist COVID-19 Cases by Day vs. Influenza



# Impact on Flu 2020

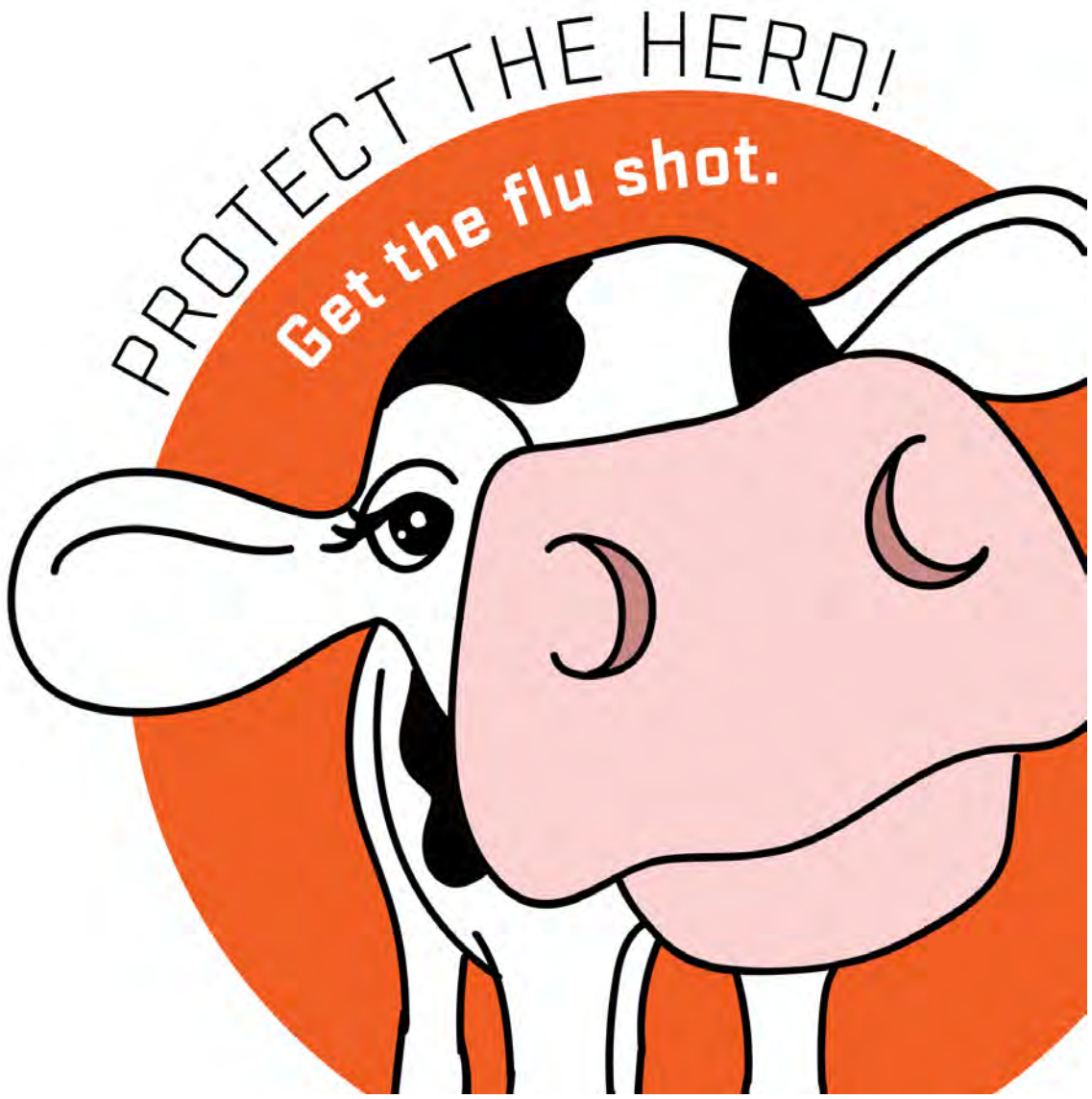



https://www.wsj.com/articles/covid-19-measures-have-all-but-wiped-out-the-flu-in-the-southern-hemisphere-11595440682

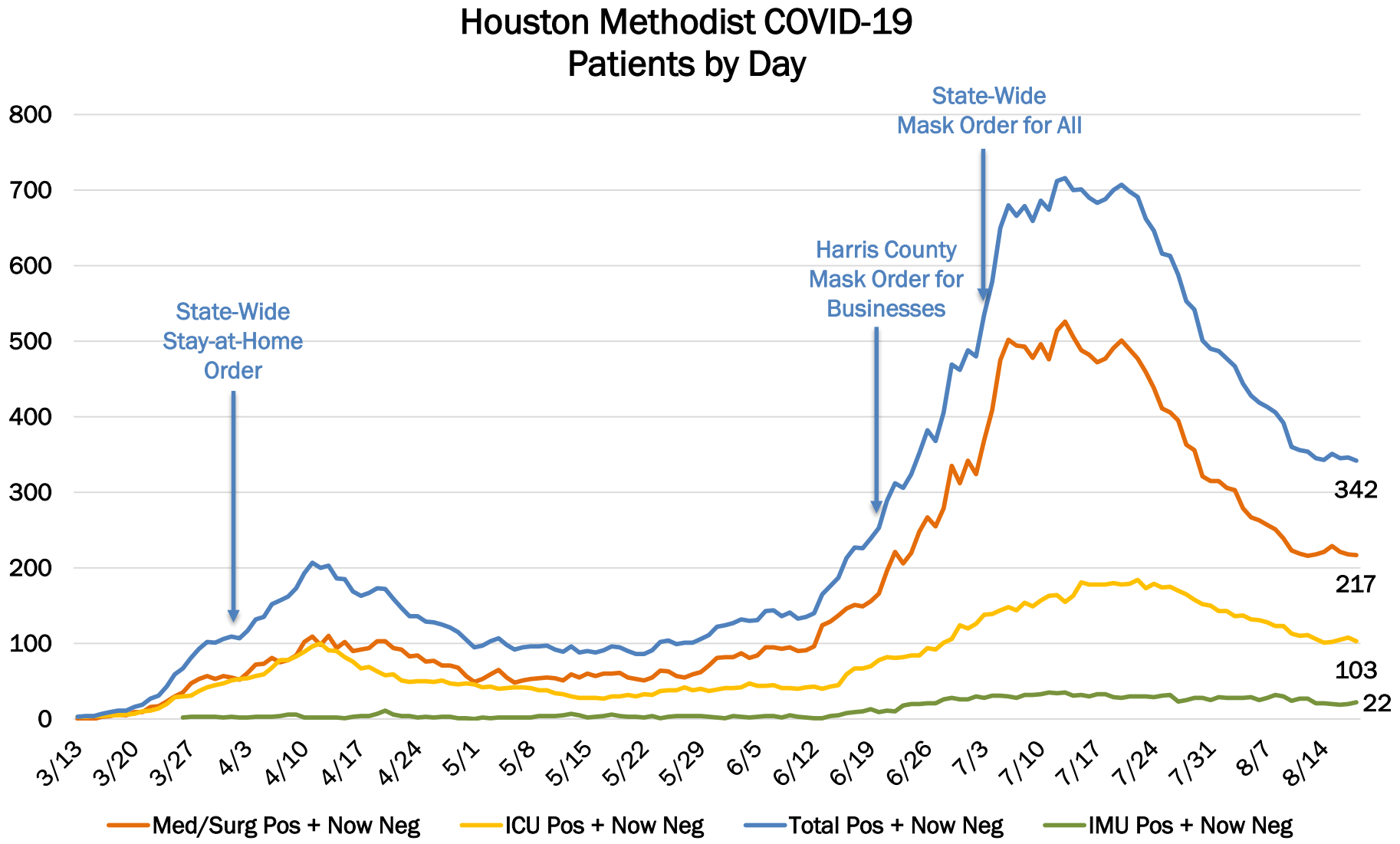
# GET YOUR FLU SHOT!!!!!

HOUSTON Methodist LEADING MEDICINE





# Houston Methodist COVID-19 Cases by Day – August 17



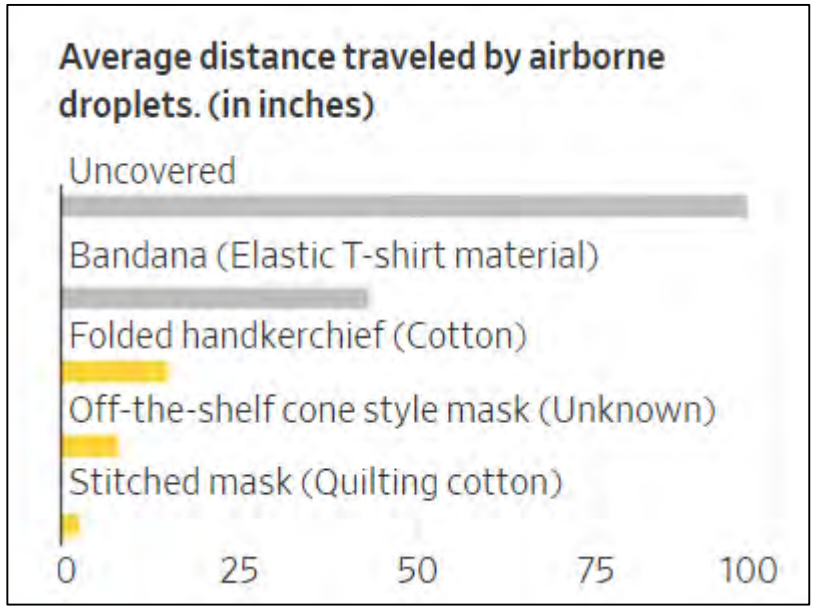
# Efficacy of Masks

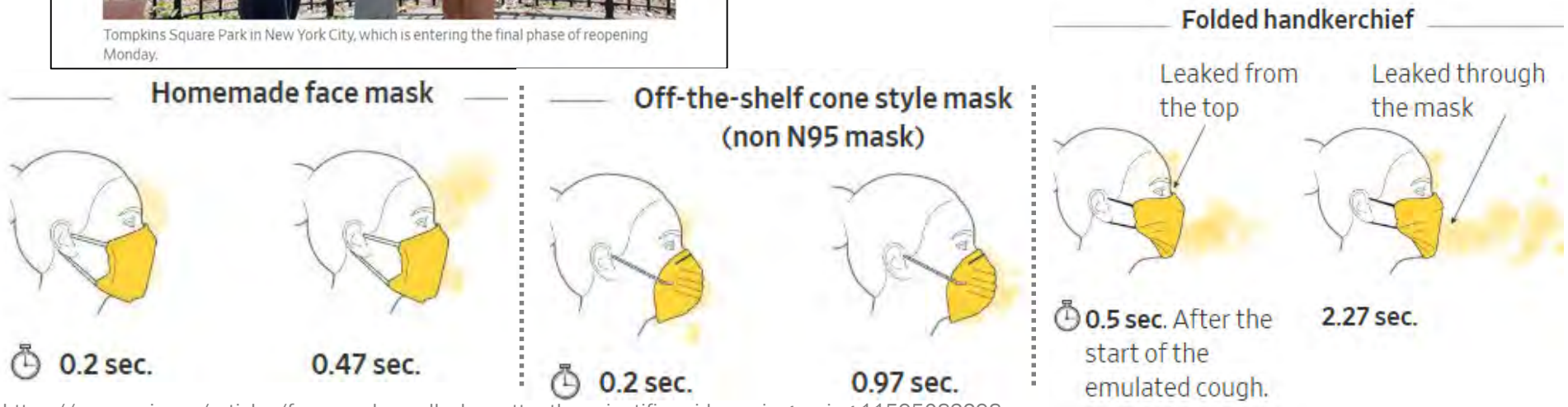
THE WALL STREET JOURNAL.

## Face Masks Really Do Matter. The Scientific Evidence Is Growing.

New research suggests that face coverings help reduce the transmission of droplets, though some masks are more protective than others

Tompkins Square Park in New York City, which is entering the final phase of reopening Monday.



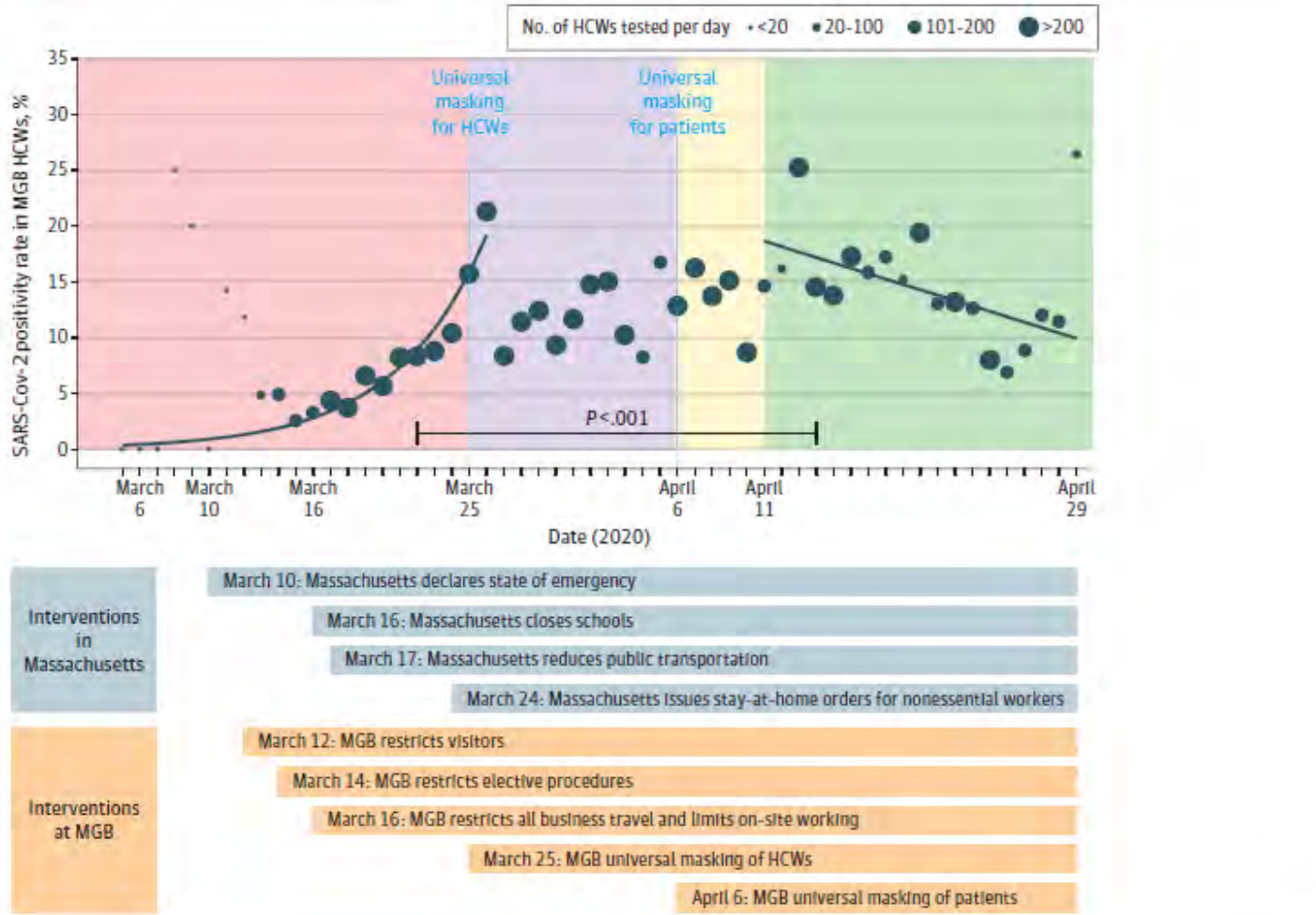




https://www.wsj.com/articles/face-masks-really-do-matter-the-scientific-evidence-is-growing-11595083298

# Impact of Universal Masking

HOUSTON Methodist LEADING MEDICINE

**Figure. Temporal Trend in Percentage Positivity of SARS-CoV-2 Testing Among HCWs**




https://jamanetwork.com/journals/jama/fullarticle/2768533

# Goldman Sachs: Face Masks and GDP

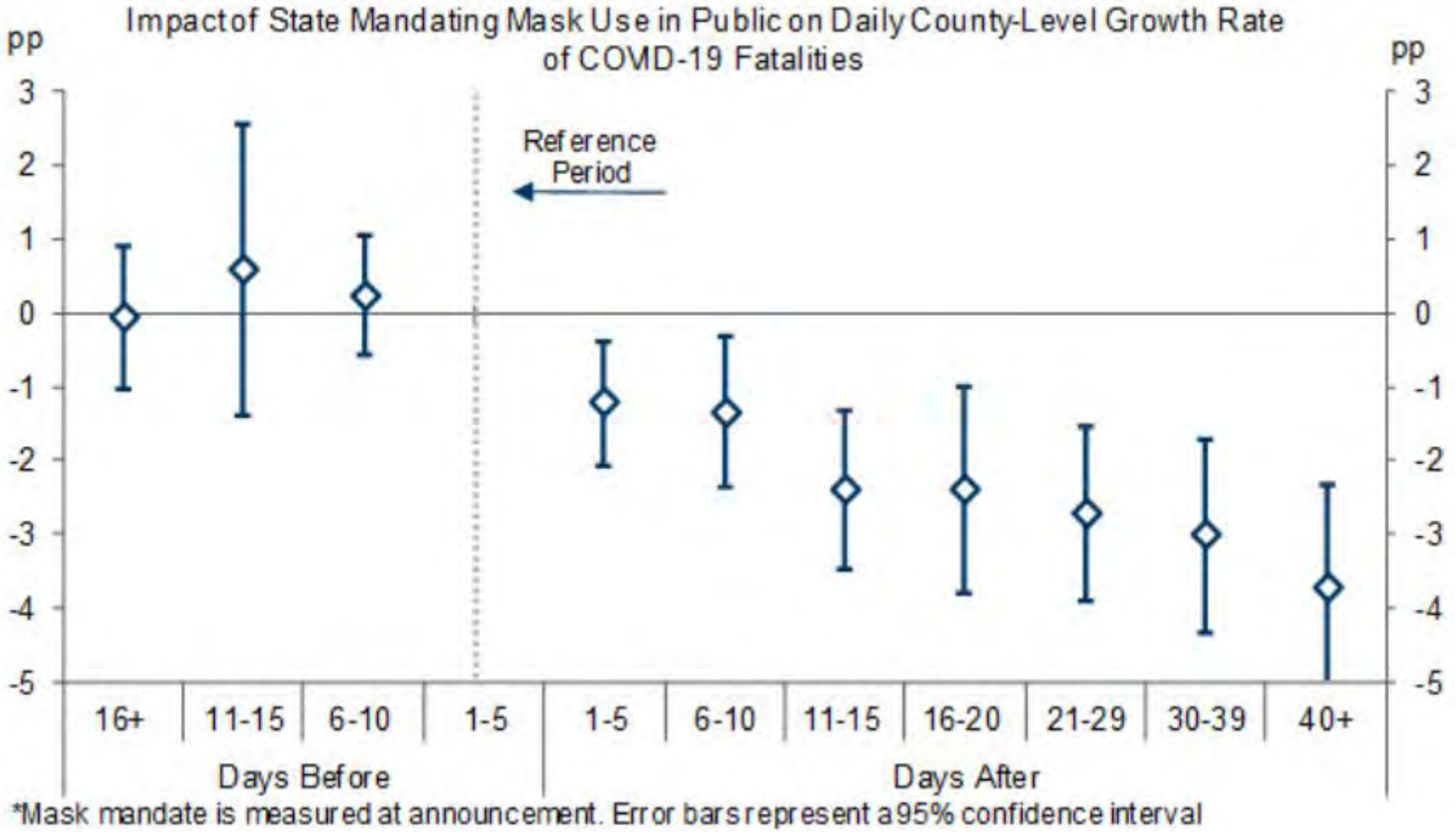

- "A national face mask mandate could partially substitute for renewed lockdowns. We start by showing that a national mandate would likely increase face mask usage meaningfully, especially in states such as Florida and Texas where masks remain largely voluntary to date."
- "Our baseline estimate is that a national mandate could raise the percentage of people who wear masks by 15pp and cut the daily growth rate of confirmed cases by 1.0pp to 0.6%."
- "Finally, we translate our results into GDP terms by asking how much our Effective Lockdown Index (ELI) would need to increase in order to cut infections by as much as a national mask mandate, and then converting the ELI impact into a GDP impact using the estimated cross-country relationship between the two. These calculations imply that a face mask mandate could potentially substitute for lockdowns that would otherwise subtract nearly 5% from GDP."

https://www.goldmansachs.com/insights/pages/face-masks-and-gdp.html

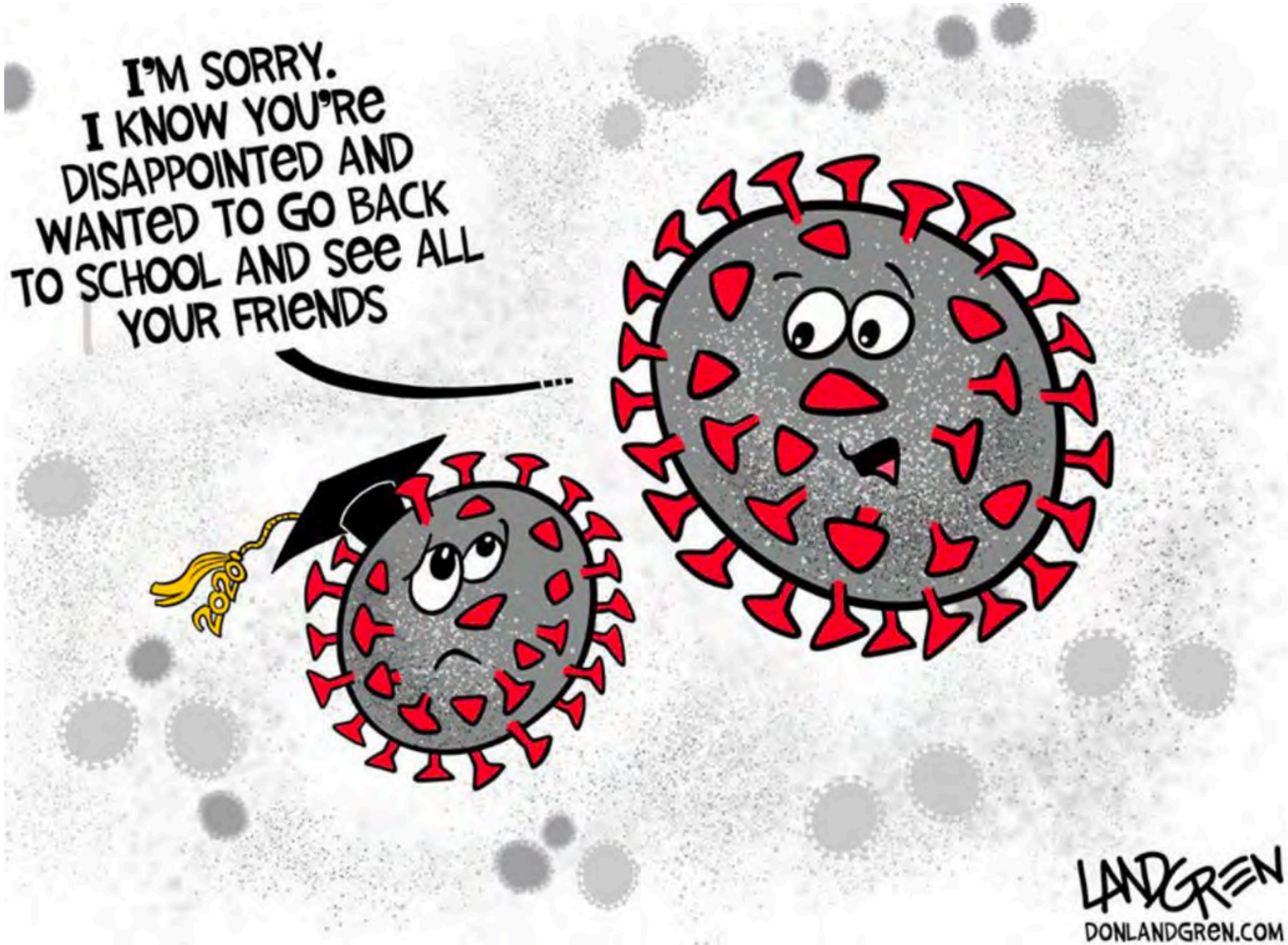
# Impact of State-Level Mask Mandates

HOUSTON Methodist LEADING MEDICINE

**Exhibit 5: Mask Mandates Are Associated with Large Declines in COVID-19 Case and Fatality Growth**




https://www.goldmansachs.com/insights/pages/face-masks-and-gdp.html


I'M SORRY.
I KNOW YOU'RE
DISAPPOINTED AND
WANTED TO GO BACK
TO SCHOOL AND SEE ALL
YOUR FRIENDS
2020
LANDGREN
DONLANDGREN.COM

Are we crazy to reopen schools?

Why shouldn't schools reopen since children are at very low risk and they appear to be more damaged by being out of school than by the virus?

How do you think schools should approach opening?

What are your thoughts on children returning to school and do you expect this to produce another spike in COVID cases?

Do you feel it is safe to send high school students back to school (private school that has taken all precautions) today? Other ages back to school? What metrics would you look at to make that decision?

# Returning To School

HOUSTON Methodist LEADING MEDICINE

## COVID-19 Planning Considerations: Guidance for School Re-entry

**Critical Updates on COVID-19** / **Clinical Guidance** / COVID-19 Planning Considerations: Guidance for School Re-entry

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

"...the AAP strongly advocates that all policy considerations for the coming school year should start with a goal of having students physically present in school."

When and under what conditions do you think it will be safe for middle school and high school students to return to in-person instruction in Houston?

What do you estimate to be a reasonable daily case count that would allow children to return to school safely without causing an outbreak?

# When Is It Safe To Reopen Schools?

HOUSTON Methodist LEADING MEDICINE

## When Is It Safe to Reopen?

Covid-19 prevalence in 13 countries at the time they reopened schools shows a much lower rate than in the U.S., which has about 170 daily cases per 1 million population.

| COUNTRY | REOPEN DATE | DAILY CASES/ MILLION |
|---|---|---|
| Taiwan | Feb. 25 | 0 |
| Denmark | April 15 | 35.5 |
| Norway | April 20 | 17.2 |
| Japan | April 24 | 3.5 |
| Israel | May 3 | 14.6 |
| Germany | May 4 | 13.6 |
| France | May 11 | 17.0 |
| Switzerland | May 11 | 6.6 |
| New Zealand | May 14 | 0.2 |
| Belgium | May 18 | 25.1 |
| Vietnam | May 18 | 0 |
| Greece | June 1 | 0.5 |
| S. Korea | June 8 | 0.9 |

A number of schools overseas have reopened with little incident, but outbreaks occurred in some places. Social-distancing screens separated students in Bangkok on Aug. 7.

PHOTO: ANDRE MALERBA/ZUMA PRESS

**As of Aug. 17, Greater Houston has 243 daily cases per million people***

*Daily cases is a 7-day average in daily cases

https://www.wsj.com/articles/latest-research-points-to-children-carrying-transmitting-coronavirus-11596978001

# TMC Control Metrics

## THREE METRICS TO GAUGE OUR PROGRESS

August 17, 2020

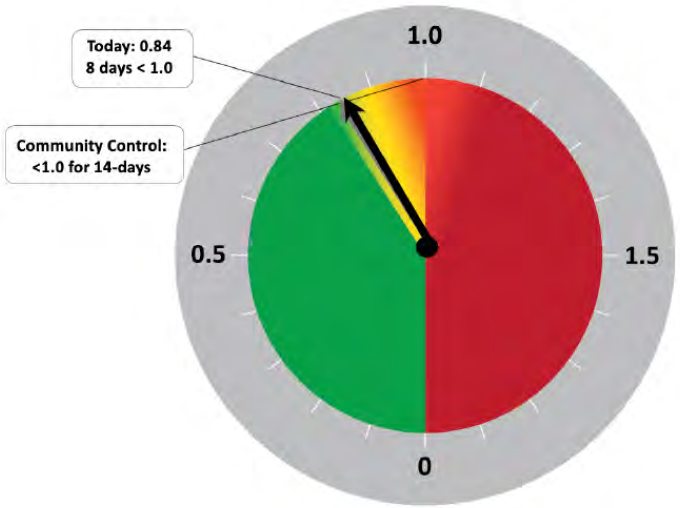
Community Control for 14-days

Community Spread

Indicates Last Week's Position

### R(t): Effective Reproduction Rate[1]

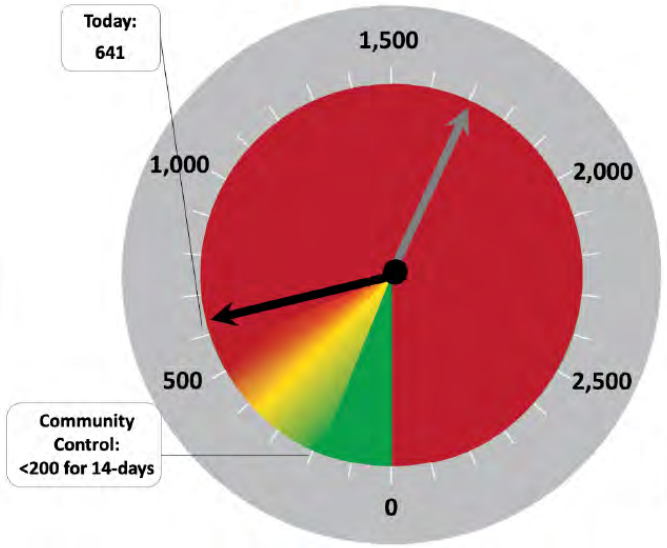
Harris County




Rt measures how effective our collective behaviors (e.g., social distancing and mask wearing) are in slowing the growth of the virus. If R(t) is above 1.0, the virus spread is increasing; if R(t) is below 1.0, the virus spread is slowing.

**Community Control: R(t) < 1.0 for 14-days**

### Daily New Cases[2]

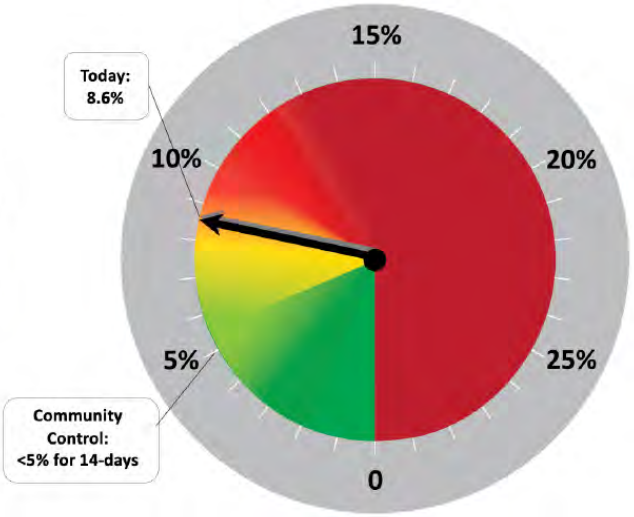



When the number of new daily cases is over 200, it is difficult to effectively trace and help isolate further spread of the virus.

**Community Control: < 200 cases/day for 14-days**

### Test Positivity Rate (%)[3]

TMC Hospital Systems




A low positivity rate may indicate declining spread of the virus.

**Community Control: < 5% for 14-days**

TMC | TEXAS MEDICAL CENTER

1. https://sph.uth.edu/dept/bads/covid19-dashboard
2. Source: TX Health and Human Services (https://www.dshs.texas.gov/coronavirus/): Austin, Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery and Waller
3. Testing data includes: CHI Texas Division, Harris Health System, Houston Methodist, MD Anderson Cancer Center, Memorial Hermann, and UT Health

# What do you advise schools to do if they have an outbreak during the school year? Should everyone who came in close contact with the infected individuals quarantine for 2 weeks?

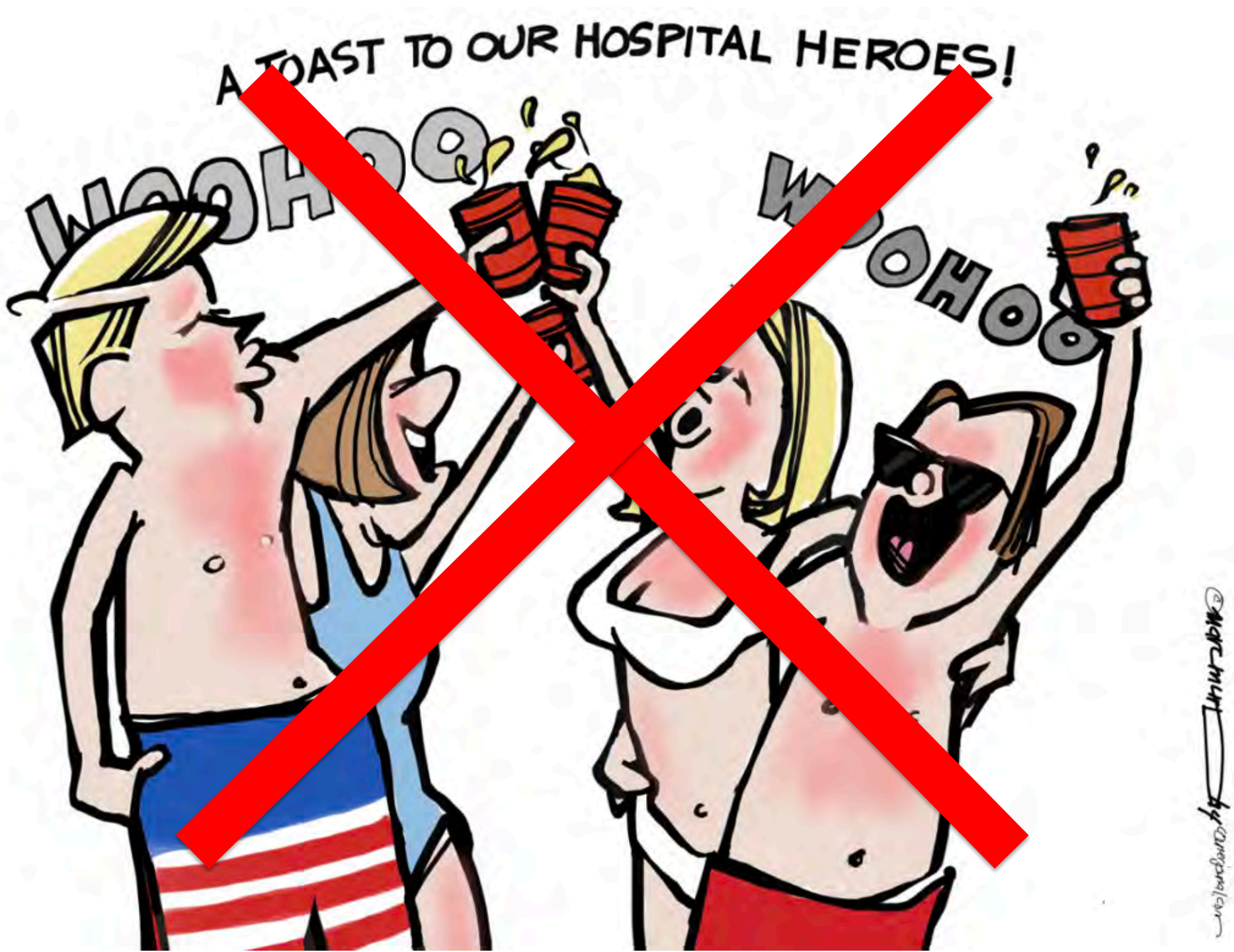
What are your thoughts on participating in outdoor sports this fall? Can kids safely participate and what precautions can be taken to help them stay safe?

Thoughts on youth sports?

What are your thoughts on high school football moving forward?

# THANK YOU TO OUR HEROES

HOUSTON Methodist LEADING MEDICINE


A TOAST TO OUR HOSPITAL HEROES!
WOOHOO
WOOHOO

# UNITY

HOUSTON Methodist LEADING MEDICINE


HOUSTON
Methodist
SM
LEADING MEDICINE

# THANK YOU FOR ATTENDING OUR TOWN HALL CONVERSATION

To continue the conversation, please reach out to foundation@houstonmethodist.org

*Take care and be well*

HOUSTON Methodist®
LEADING MEDICINE