COVID-19
Overview and Readiness
The symptoms of coronavirus disease [COVID-19]
The most common signs and symptoms of 55,924 laboratory confirmed cases of COVID-19, reported from China in the period up to February 22, 2020.

- Fever: 87.9%
- Dry cough: 67.7%
- Fatigue: 38.1%
- Sputum production: 33.4%
- Shortness of breath: 18.6%
- Muscle pain or joint pain: 14.8%
- Sore throat: 13.9%
- Headache: 13.6%
- Chills: 11.4%
- Nausea or vomiting: 5%
- Nasal congestion: 4.8%
- Diarrhoea: 3.7%

Many of the most common symptoms are shared with those of the flu or cold. So it is also good to know which common symptoms of the flu or the common cold are not symptoms of COVID-19. COVID-19 infection seems to rarely cause a runny nose.

Symptoms of COVID-19

Some symptoms of COVID-19 overlap with those of the common cold, allergies, and the flu, which can make it tricky to diagnose without a test.

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>COVID-19</th>
<th>COMMON COLD</th>
<th>FLU</th>
<th>ALLERGIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td>Common</td>
<td>Rare</td>
<td>Common</td>
<td>Sometimes</td>
</tr>
<tr>
<td>Dry cough</td>
<td>Common</td>
<td>Mild</td>
<td>Common</td>
<td>Sometimes</td>
</tr>
<tr>
<td>Shortness of breath</td>
<td>Common</td>
<td>No</td>
<td>No</td>
<td>Common</td>
</tr>
<tr>
<td>Headaches</td>
<td>Sometimes</td>
<td>Rare</td>
<td>Common</td>
<td>Sometimes</td>
</tr>
<tr>
<td>Aches and pains</td>
<td>Sometimes</td>
<td>Common</td>
<td>Common</td>
<td>No</td>
</tr>
<tr>
<td>Sore throat</td>
<td>Sometimes</td>
<td>Common</td>
<td>Common</td>
<td>No</td>
</tr>
<tr>
<td>Fatigue</td>
<td>Sometimes</td>
<td>Sometimes</td>
<td>Common</td>
<td>Sometimes</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>Rare</td>
<td>No</td>
<td>Sometimes*</td>
<td>No</td>
</tr>
<tr>
<td>Runny nose</td>
<td>Rare</td>
<td>Common</td>
<td>Sometimes</td>
<td>Common</td>
</tr>
<tr>
<td>Sneezing</td>
<td>No</td>
<td>Common</td>
<td>No</td>
<td>Common</td>
</tr>
</tbody>
</table>

*Sometimes for children

Sources: CDC, WHO, American College of Allergy, Asthma and Immunology
Four Features Of COVID-19 Combine To Create A Perfect Pandemic Storm

(And Why This Is Not The Common Cold Or Flu [Sic])

1. It’s highly contagious (more so than the flu, but less so than measles).

2. It’s new, so few people have immunity.

3. It causes infection without symptoms in some people, who can unknowingly infect others.

4. It can latch on to receptors in the lung, causing severe pneumonia much more frequently (perhaps 10 times more) than seasonal flu.
COVID-19 Outbreak

New coronavirus

Most estimates put the fatality rate below 3%, and the number of transmissions between 2 and 4.

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.
Case Fatality Rate vs. Infection Fatality Rate

CFR vs IFR for a Hypothetical Disease

30 PEOPLE INFECTED
10 detected cases (1 fatal)
20 undetected instances

Case Fatality Rate (CFR) = \( \frac{1}{10} = 10\% \)
Infection Fatality Rate (IFR) = \( \frac{1}{10+20} = 3.3\% \)

1. IFR defines a case as a person who would, if tested, be counted as infected and rendered (at least temporarily) immune, as usually demonstrated by seroconversion or other immune response\(^{13}\). Such cases may or may not be symptomatic.
2. sCFR defines a case as someone who is infected and shows certain symptoms.
COVID-19 Mortality Rates

Covid-19’s case fatality rate increases with age, according to China’s data

Estimated case fatality risk in Hubei, China, January-February 2020

**Case fatality ratio**

- <.01%
- .02%
- .09%
- .18%
- .40%
- 1.3%
- 4.6%
- 9.8%
- 18%

**Age group**

- 0-9
- 10-19
- 20-29
- 30-39
- 40-49
- 50-59
- 60-69
- 70-79
- 80+

*Among all symptomatic and asymptomatic infections

Source: Adjusted age-specific case fatality ratio during the Covid-19 epidemic in Hubei, China, January and February 2020, medRxiv
$P_{sym} = 0.50$, overall sCFR = 1.4% (0.9–2.1%)

$P_{sym} = 0.75$, overall sCFR = 1.3% (0.8–2.3%)

$P_{sym} = 0.95$, overall sCFR = 1.2% (0.7–1.9%)
Hospitalizations, ICU Admissions, and Deaths by Age Group

**FIGURE 2.** Coronavirus disease 2019 (COVID-19) hospitalizations, * intensive care unit (ICU) admissions, † and deaths, ‡ by age group — United States, February 12–March 16, 2020

* Hospitalization status missing or unknown for 1,514 cases.
† ICU status missing or unknown for 2,253 cases.
‡ Illness outcome or death missing or unknown for 2,001 cases.

**Overall Outcomes:**
Hospitalizations - 12%
ICU Admissions - 3%
Mortality - 1%

https://www.cdc.gov/mmwr/volumes/69/wr/mm6912e2.htm#T1_down
New Cases Announced Each Day

New reported cases by day in the United States

Data as of April 2, 2020

## National Spread

Data as of April 2, 2020

<table>
<thead>
<tr>
<th>State</th>
<th>Cases</th>
<th>PER 100,000 PEOPLE</th>
<th>Deaths</th>
<th>PER 100,000 PEOPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td>92,381</td>
<td>470.9</td>
<td>2,468</td>
<td>12.6</td>
</tr>
<tr>
<td>New Jersey</td>
<td>25,590</td>
<td>288.1</td>
<td>537</td>
<td>6.0</td>
</tr>
<tr>
<td>California</td>
<td>9,816</td>
<td>25.1</td>
<td>212</td>
<td>0.5</td>
</tr>
<tr>
<td>Michigan</td>
<td>9,334</td>
<td>93.7</td>
<td>337</td>
<td>3.4</td>
</tr>
<tr>
<td>Louisiana</td>
<td>9,150</td>
<td>196.2</td>
<td>310</td>
<td>6.6</td>
</tr>
<tr>
<td>Florida</td>
<td>8,010</td>
<td>38.9</td>
<td>128</td>
<td>0.6</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>7,738</td>
<td>113.3</td>
<td>122</td>
<td>1.8</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>7,016</td>
<td>54.9</td>
<td>90</td>
<td>0.7</td>
</tr>
<tr>
<td>Illinois</td>
<td>6,980</td>
<td>54.4</td>
<td>146</td>
<td>1.1</td>
</tr>
<tr>
<td>Washington</td>
<td>5,984</td>
<td>82.0</td>
<td>249</td>
<td>3.4</td>
</tr>
<tr>
<td>Georgia</td>
<td>5,348</td>
<td>51.9</td>
<td>163</td>
<td>1.6</td>
</tr>
<tr>
<td>Texas</td>
<td>4,669</td>
<td>16.7</td>
<td>70</td>
<td>0.3</td>
</tr>
<tr>
<td>Connecticut</td>
<td>3,557</td>
<td>99.3</td>
<td>85</td>
<td>2.4</td>
</tr>
<tr>
<td>Colorado</td>
<td>3,346</td>
<td>60.5</td>
<td>80</td>
<td>1.4</td>
</tr>
</tbody>
</table>

National Spread: Where Cases Are Rising Fastest

Where cases are rising fastest
Cases currently doubling every ...

- 3 days
- 5 days
- 7 days
- Fewer than 20 cases
- No cases reported

Data as of April 2, 2020

Houston Region: Confirmed Cases

Coronavirus case increase in the Houston region

Officials in the eight-county Houston region have seen cases of COVID-19 begin to rise steeply as more are infected.

Source: Texas Department of State Health Services, Hearst Newspaper reporting

Data as of April 2, 2020

Flattening the Curve

Coronavirus: Upward Trajectory or Flattened Curve?

Cumulative confirmed COVID-19 cases in selected countries from day 1 to 40 after 100+ cases

- China
- Italy
- U.S.
- Spain
- Germany
- France
- South Korea
- UK

As of April 1, 2020
Source: Johns Hopkins University


Data as of April 2, 2020
Flattening the Curve

Flattening the curve

- Daily number of cases
- Delay outbreak peak
- Reduction in peak of outbreak
- Health care system capacity
- Time since first case

Cases without protective measures
Cases with protective measures

Source: CDC
Flattening the Curve

THE POWER OF SOCIAL DISTANCING

NOW

1 PERSON

INFECTS

5 DAYS

2.5 PEOPLE INFECTED

30 DAYS

406 PEOPLE INFECTED

50% LESS EXPOSURE

1 PERSON

INFECTS

5 DAYS

1.25 PEOPLE INFECTED

30 DAYS

15 PEOPLE INFECTED

75% LESS EXPOSURE

1 PERSON

INFECTS

5 DAYS

.625 PEOPLE INFECTED

30 DAYS

2.5 PEOPLE INFECTED

@SignerLab @garywarshaw
Chart 23: Model of Cumulative Cases of Coronavirus with Social Distancing Measures Taken One Day Apart

Cumulative cases

70,000
60,000
50,000
40,000
30,000
20,000
10,000

Number of days

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

Social distancing one day later (n+21)
Social distancing started on day n+20
No social distancing

+40%!

Source: Tomas Pueyo
United States
204,457 confirmed cases

40 - 55% Change in Average Mobility
(Based on Distance Traveled)

60 - 65% Change in Non-Essential Visits.

Data as of April 2, 2020
## Social Distancing Scorecard - Texas

**Data as of April 2, 2020**

<table>
<thead>
<tr>
<th>County</th>
<th>Social Distancing Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazoria</td>
<td>C-</td>
</tr>
<tr>
<td>Chambers</td>
<td>D-</td>
</tr>
<tr>
<td>Fort Bend</td>
<td>B-</td>
</tr>
<tr>
<td>Galveston</td>
<td>C-</td>
</tr>
<tr>
<td>Harris</td>
<td>C</td>
</tr>
<tr>
<td>Liberty</td>
<td>D-</td>
</tr>
<tr>
<td>Montgomery</td>
<td>C</td>
</tr>
<tr>
<td>Waller</td>
<td>D-</td>
</tr>
</tbody>
</table>

[https://www.unacast.com/covid19/social-distancing-scoreboard](https://www.unacast.com/covid19/social-distancing-scoreboard)
COVID-19 Outbreak: Texas Modeling - IHME

34 days until peak resource use on May 6, 2020

Resources needed for COVID-19 patients on peak date

- All beds needed: 17,221 beds
- ICU beds needed: 2,568 beds

- All beds available: 28,633 beds
- ICU beds available: 2,259 beds

- Bed shortage: 0 beds
- ICU bed shortage: 309 beds

Invasive ventilators needed: 2,055 ventilators

Data as of April 2, 2020

https://covid19.healthdata.org/
Role of Telemedicine in Covid-19 Response

HOUSTON METHODIST VIRTUAL URGENT CARE
See our providers for non-emergency, urgent care needs via video visit — 24/7, from wherever you are.

SEE A PROVIDER

Coronavirus update:
Whether you are experiencing COVID-19 symptoms or want to avoid spreading or catching germs, you can speak to a Virtual Urgent Care provider 24/7. The provider will be able to help you determine if testing is needed and advise you on where you should go.

Accessing Houston Methodist just got easier.
Next time you get sick, skip the drive and the waiting room. Connect to a board-certified provider from wherever you are, no appointment needed. Houston Methodist’s expert care is now available for your entire family, from wherever you can access the internet. Simply:
Acute Priority
• Gilead / Remdesivir (Grimes)
  • Community Participation
  • eIND vs Clinical Trial

Approved
• Gilead Remdesivir (mod / severe)
• Management & Outcomes (Data)
• Biologic Specimens
• Cytosorb
• Convalescent Plasma

In Progress
• Mesenchymal Stem Cells

Proposed Research
• Virtual ICU
• Metabolic Outcomes
Methodist first to use experimental therapy

NEW BLOOD: Hospital tries out transfusion from recovered donor

By Todd Ackerman
STAFF WRITER

Houston Methodist Hospital doctors were all ready to go, but even they were a bit surprised late Saturday afternoon when word came down from the Food and Drug Administration.

They could transfuse the blood from a former COVID-19 patient into one severely ill at the moment.

The Methodist team sprang into action, using just-donated blood from a Houston-area individual whose symptoms had gone away weeks ago but whose antibodies to the coronavirus were now at optimal levels. By Saturday night, the blood was coursing through not just one but two COVID-19 patients in intensive care at Methodist.

With that, the Houston hospital became the nation’s first to enlist convalescent serum therapy, a century-old idea, against the virus. Methodist transfused the patients less than a week after the FDA announced it would facilitate use of the experimental therapy because of the expanding public health crisis, an approach some researchers in recent weeks have been pushing.

Methodist continues on A12
Figure 1. Schematic of the use of convalescent sera for COVID-19. An individual who is sick with COVID-19 and recovers has blood drawn and screened for virus-neutralizing antibodies. Following identification of those with high titers of neutralizing antibody, serum containing these virus-neutralizing antibodies can be administered in a prophylactic manner to prevent infection in high-risk cases, such as vulnerable individuals with underlying medical conditions, health care providers, and individuals with exposure to confirmed cases of COVID-19. Additionally, convalescent serum could potentially be used in individuals with clinical disease to reduce symptoms and mortality. The efficacy of these approaches is not known, but historical experience suggests that convalescent sera may be more effective in preventing disease than in the treatment of established disease.
The Frontlines...