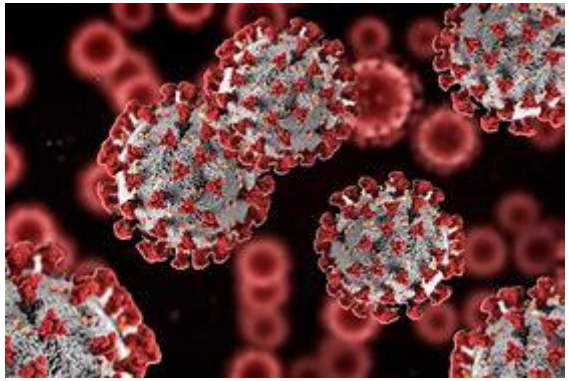

# COVID-19

## Update for the 23rd Annual Education Conference

Bureau of WORKERS' COMPENSATION

David M. Aronoff, MD,
James B. Talmage, M.D.
Robert B. Snyder, M.D.



# Current Information pertaining to Tennessee Worker's Compensation

Name, Position
Date

# Credit

- Session Key will be given toward the end

# Presenters

- David M. Aronoff, MD, FIDSA, FAAM
  *Professor & Addison B. Scoville Jr. Chair in Medicine*
  *Director, Division of Infectious Diseases*
  *Department of Medicine*
  *Vanderbilt University Medical Center*
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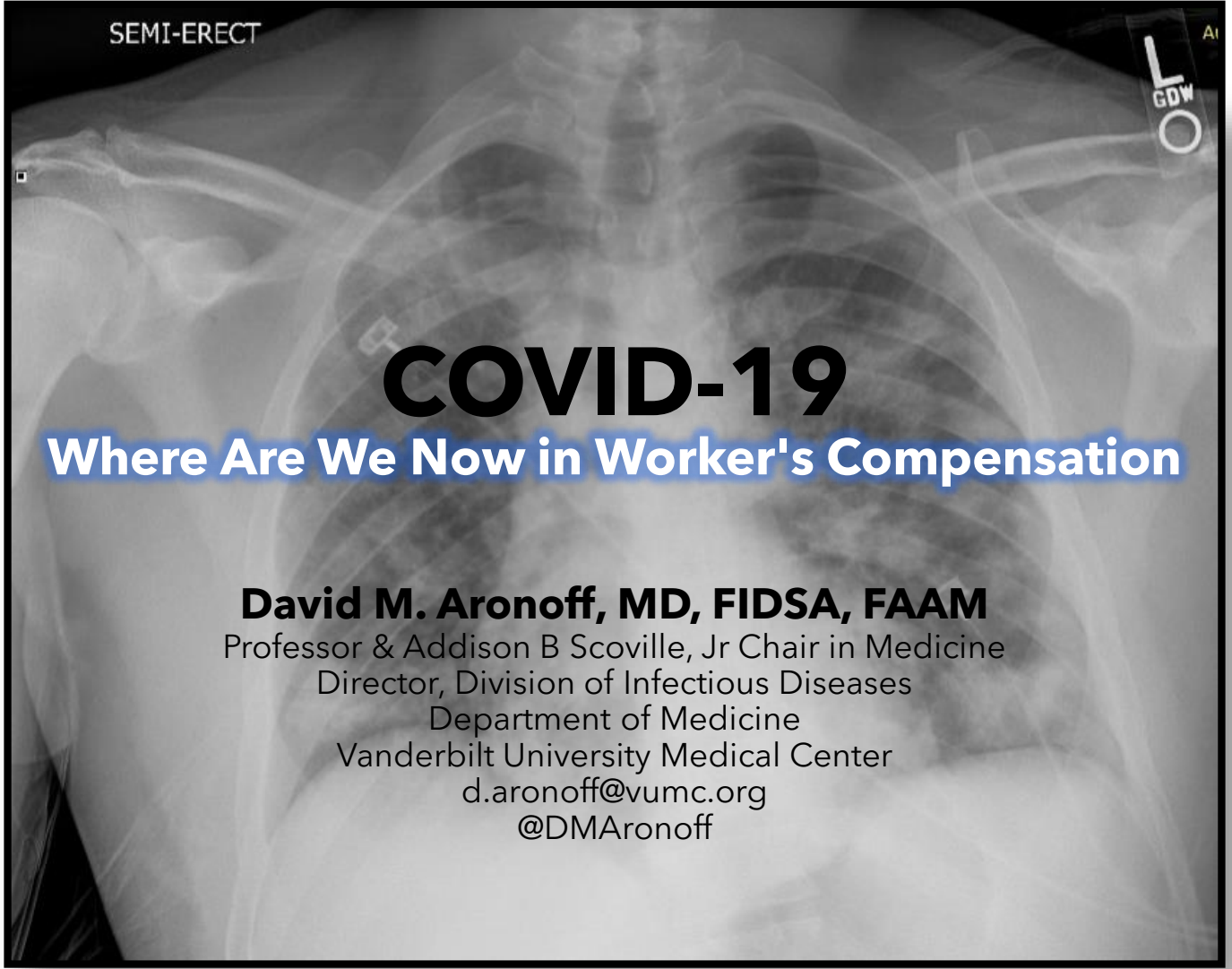
  *Assistant Medical Director, Bureau of Workers' Compensation*
  *Adjunct Associate Professor in the Division of Occupational Medicine,*
  *Department of Family and Community Medicine*
  *Meharry Medical College*
- Robert B. Snyder, M.D.
  *Medical Director, Bureau of Workers' Compensation*




# COVID-19

## Where Are We Now in Worker's Compensation

**David M. Aronoff, MD, FIDSA, FAAM**
Professor & Addison B Scoville, Jr Chair in Medicine
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# Outline

- Brief review of SARS-CoV-2
- Where we are today
- Clinical features of acute infection & timing related to exposure
- Transmission & protection from infection
- Diagnosis of acute & past infection
- Clinical features of post-infectious syndromes

# My Experience with COVID-19

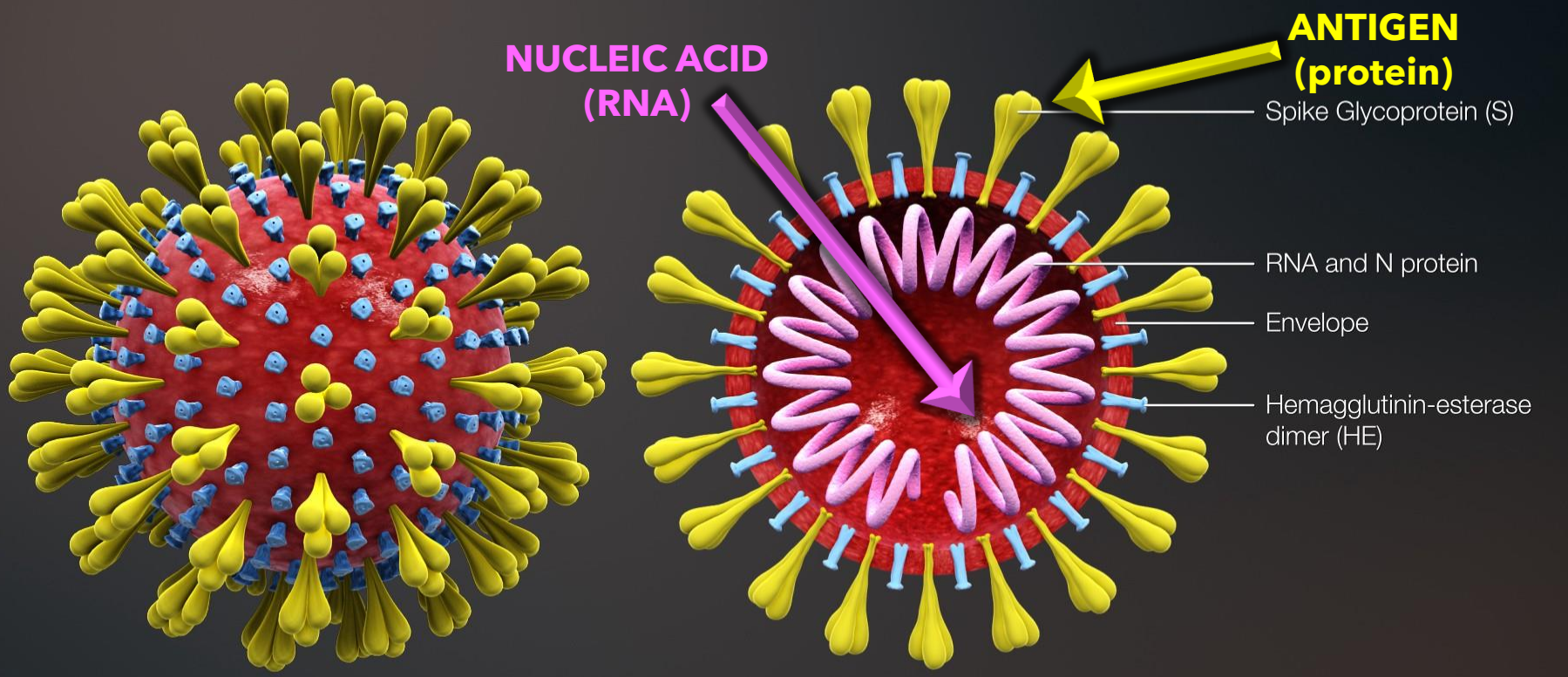
- Daily Zoom-based **multidisciplinary huddles** since March (7 days/week)
  - Involved in the care of all VUMC inpatients (>900)
- Lead **COVID-19 serology study** with TN Department of Health
- Multiple committees related to **diagnosis & treatment** of COVID-19
- Working with **businesses & schools** on reopening plans
- Active in **media communications** & public outreach

# Brief Review of SARS-CoV-2

# Coronavirus: COVID-19

- Infection due to newly discovered coronavirus
- **COVID-19**: **CO**rona**VI**rus **D**isease identified in 20**19**
- Due to **SARS-CoV-2** virus
- Other coronaviruses:
  - SARS-CoV-1 (SARS, absent since 2004) & MERS-CoV (MERS) that cause serious disease
  - Others that cause common colds
- New virus = no immunity (everyone is at some risk)
- Emerged in China, of bat origin

# SARS-CoV-2 Structure



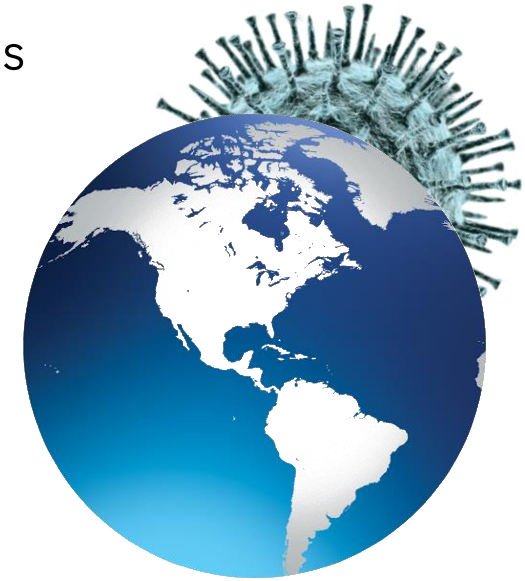

Single-strand, enveloped RNA virus
Corona, from Latin, meaning crown
(viral envelope has crown-like projections)

https://commons.wikimedia.org/wiki/File:3D_medical_animation_corona_virus.jpg

# Where We Are Today

# Where We Are Today

- World:  >31 million cases & >950,000 deaths
- America: >7 million cases total & >200,000 deaths
- Tennessee: >180,000 cases  & >2,200 deaths
  - We are currently the 9th most active state in the USA
- Nashville: >27,000 cases & >250 deaths



*(These data accessed on 09/19/2020)*

# Clinical Features of Acute Infection & Timing Related to Exposure

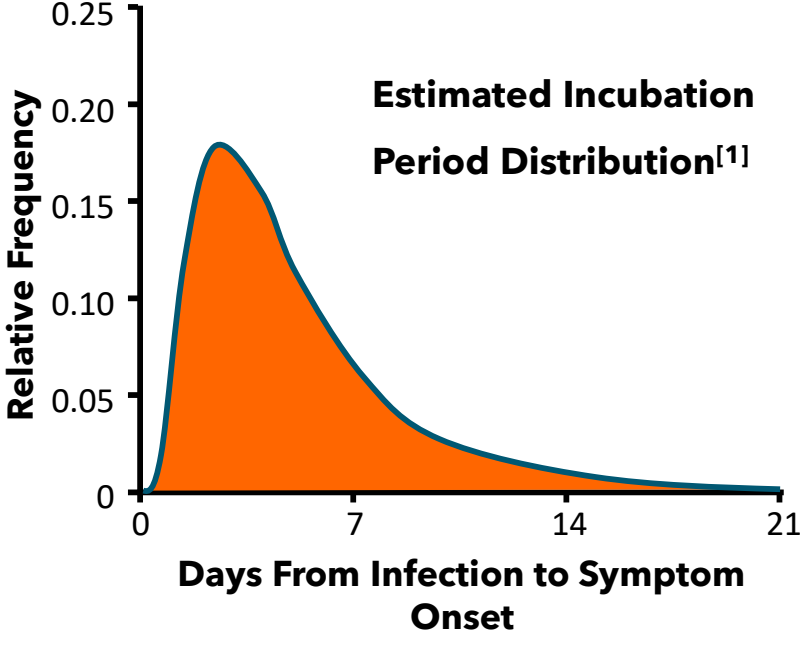
# COVID-19

## Who's at Risk?

- Anyone can become infected
- Some at higher risk for severe infections:
  - **Older age**
  - **Underlying comorbid illnesses (high blood pressure, diabetes, obesity)**
  - **Immunocompromised**
- Children with lower risk for clinical infection / hospitalization
  - Can have asymptomatic infection & spread disease

# COVID-19 Incubation: Infection to Illness Onset

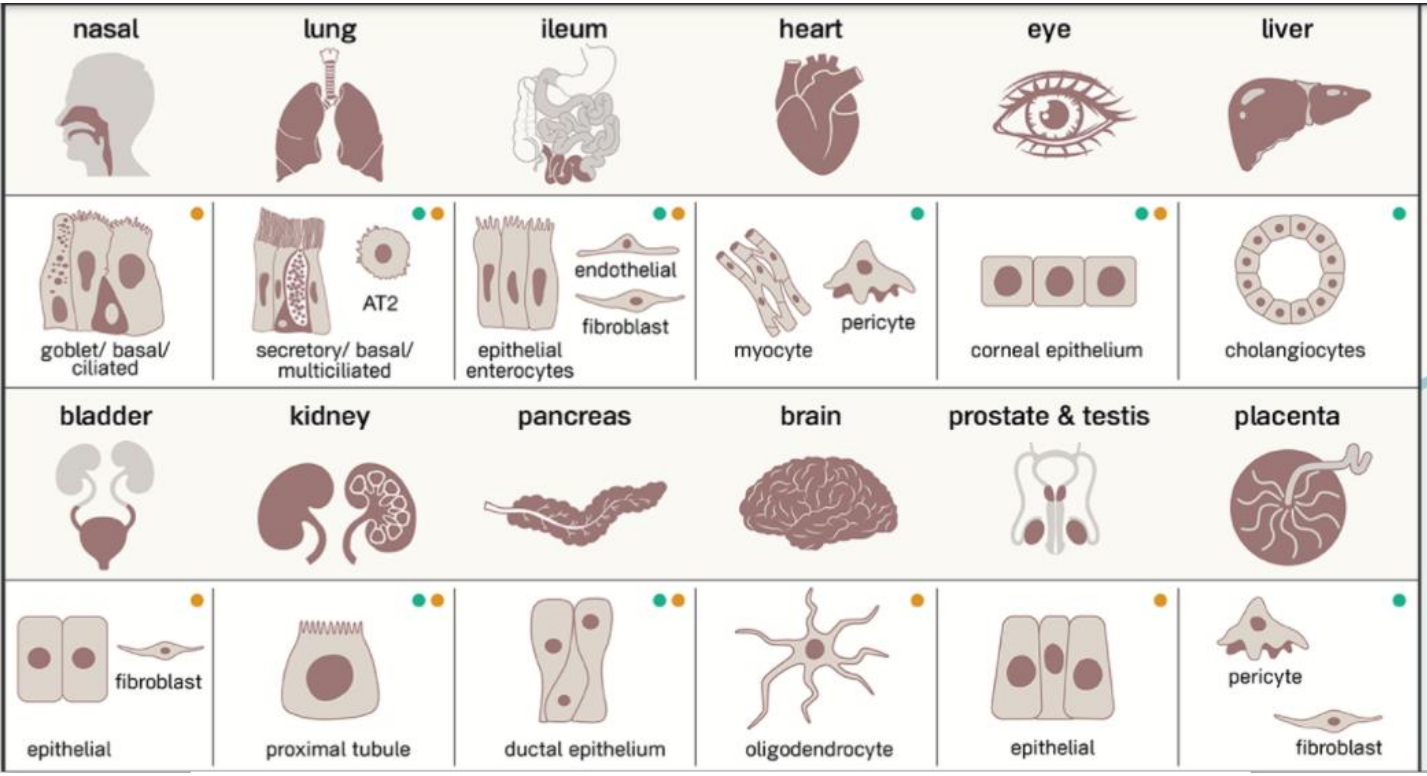
- Among 10 confirmed NCIP cases in Wuhan, Hubei province, China[1]
  - **Mean incubation: 5.2 days** (95% CI: 4.1-7.0)
- Among 181 confirmed SARS-CoV-2 infections occurring outside of Hubei province[2]
  - **Median incubation: 5.1 days** (95% CI: 4.5-5.8)
  - **Symptom onset by Day 11.5 of infection in 97.5% of persons**

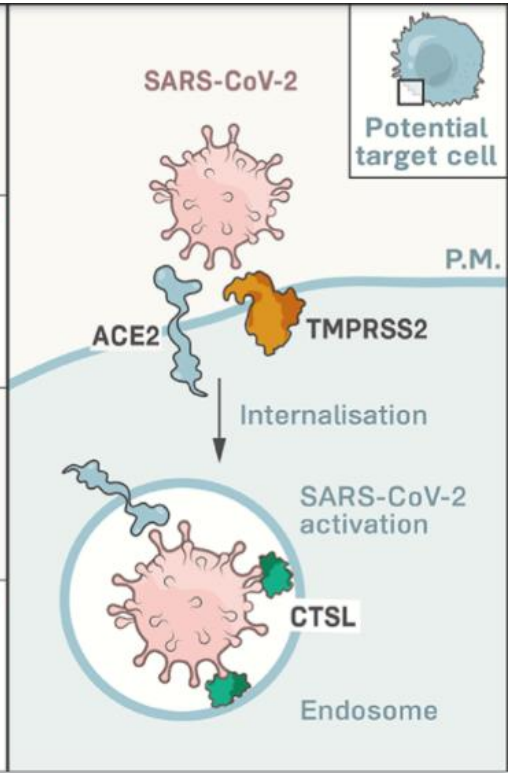



1. Li. NEJM. 2020;382:1199. 2. Lauer. Ann Intern Med. 2020;172:577.

Slide credit: adapted from clinicaloptions.com

# Distribution of Receptors for SARS-CoV-2

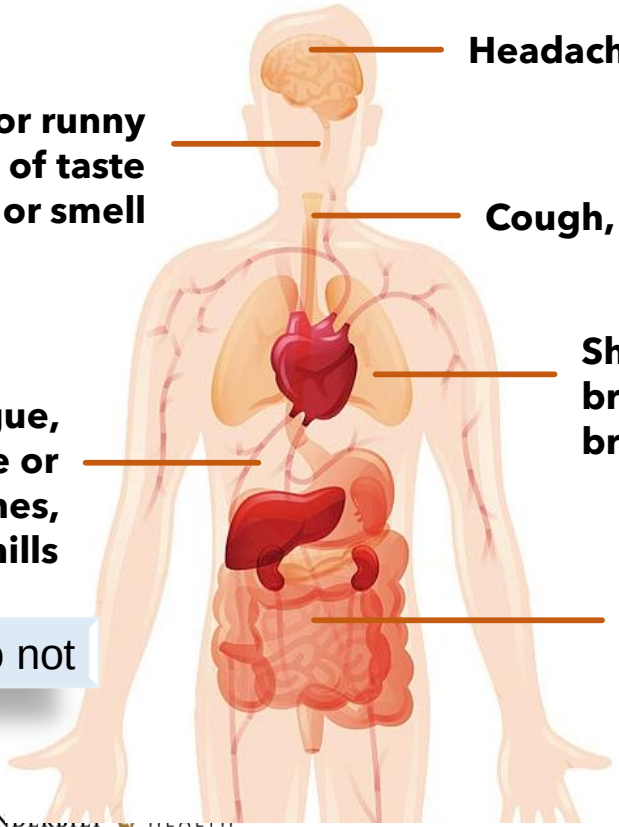



Baraniuk C, *The Scientist*, 04/29/2020

# Primary Symptoms of COVID-19

"Symptoms may appear **2-14 days after exposure** to the virus"




Most people get symptoms but **20-40%** do not

Li. J Med Virol. 2020;92:577.
https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html

Slide credit: adapted from clinicaloptions.com

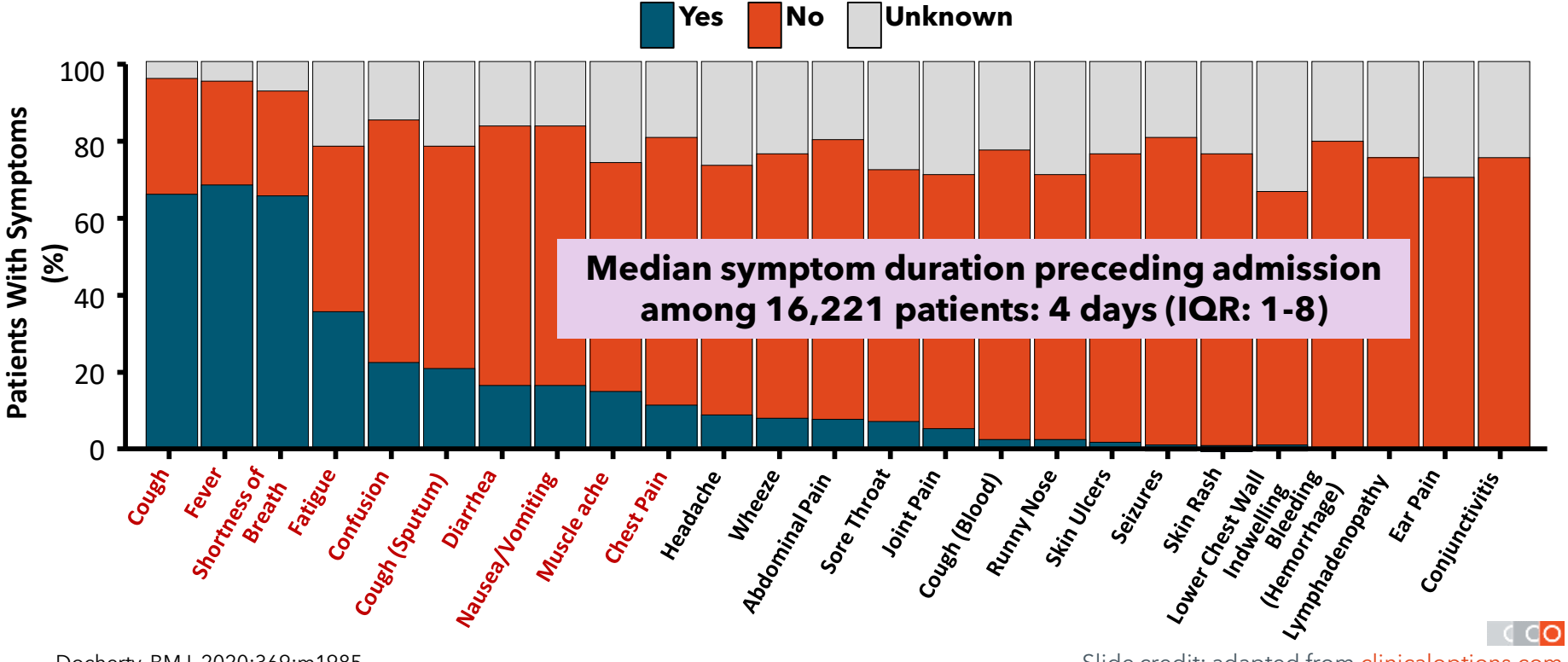
# COVID-19 Clinical Presentation May Vary by Age, Sex

- Observational study of Europeans with mild-to-moderate COVID-19 (ie, no ICU admission) via standardized questionnaire (N = 1420)[1]
  - **Mean duration of symptoms** (n = 264): **11.5 ± 5.7 days**
  - Ear, nose, throat complaints more common in **young patients**; fever, fatigue, loss of appetite, diarrhea in **elderly patients** ($P < .01$)
  - Loss of smell, headache, nasal obstruction, throat pain, fatigue more common in **women**; cough, fever in **men** ($P < .001$)
- Among 17 fatal COVID-19 cases detailed by the China National Health Commission, **median time from first symptom to death**: **14 days** (range: 6-41)[2]
  - Numerically faster in **older patients**: 11.5 days if ≥ 70 yrs vs 20 days if < 70 yrs ($P = .033$)

1. Lechien. J Intern Med. 2020;[Epub]. 2. Wang. J Med Virol. 2020;92:441.

Slide credit: adapted from clinicaloptions.com

# Frequency of Presenting Symptoms Among COVID-19–Positive Hospitalized Patients in the UK




Docherty. BMJ. 2020;369:m1985.

Slide credit: adapted from clinicaloptions.com

# Outcomes of SARS-CoV-2 Infection

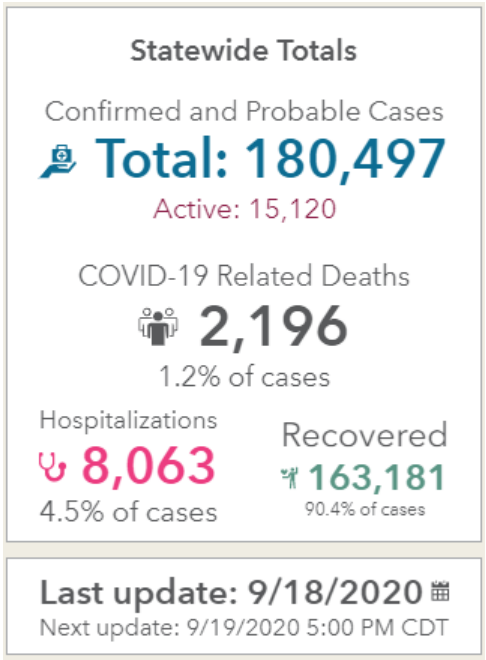
| Asymptomatic | Mild / moderate[1] | Severe[2] | Critical[3] | Death[4] |
|---|---|---|---|---|
| 20-40% | 80% | 15% | <5% | 1-3% |

1. Mild to moderate = mild symptoms up to mild pneumonia
2. Severe = shortness of breath, hypoxia, or >50% lung involvement on imaging
3. Critical = Respiratory failure, shock, or multiorgan system dysfunction
4. Deaths = case fatality rate; proportion of diagnosed cases that died



https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-guidance-management-patients.html

# Outcomes of SARS-CoV-2 Infection in TN




VANDERBILT HEALTH

https://myutk.maps.arcgis.com/apps/opsdashboard/index.html#/72ce9fd4bee241f28c2f4f70f338a4e4

# COVID-19
## Different than Influenza

### COVID-19

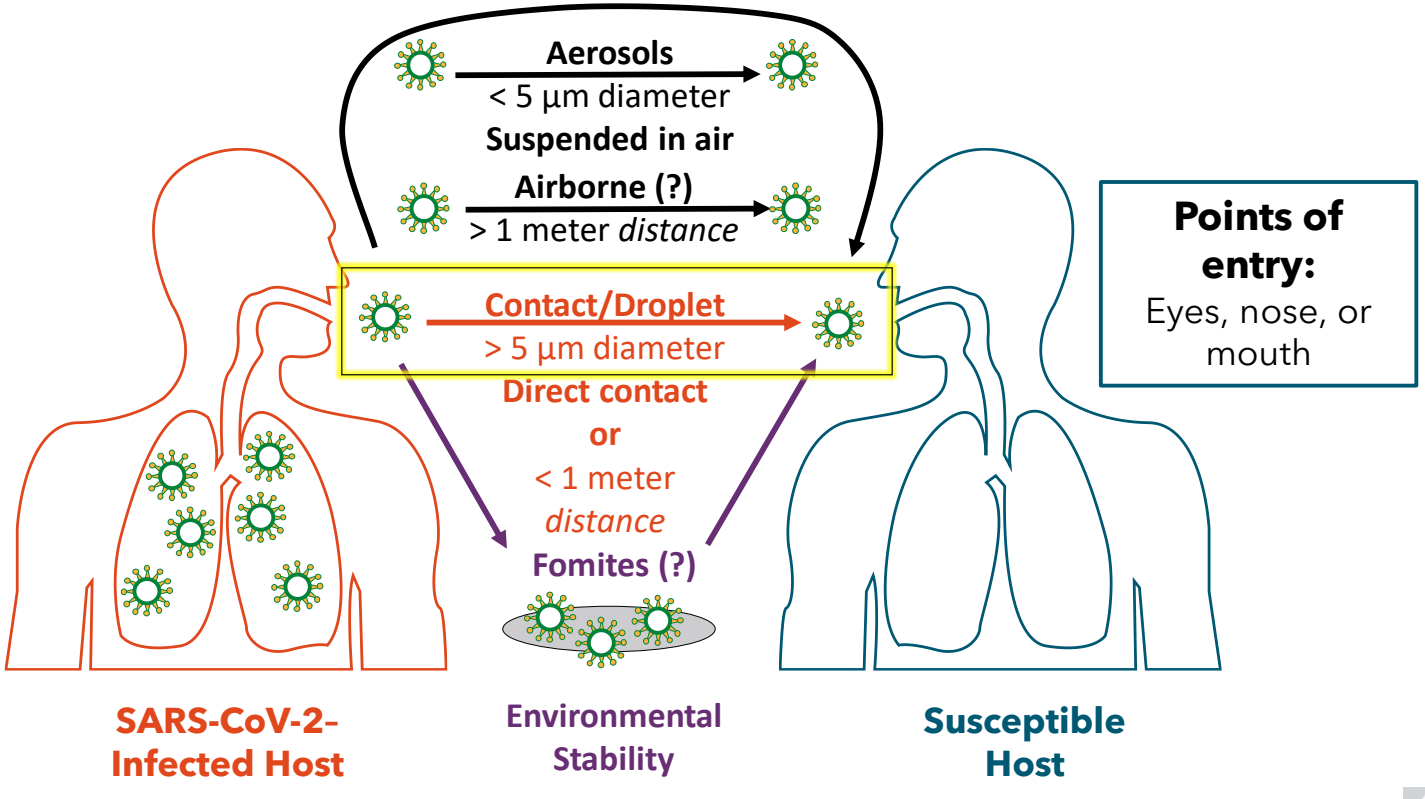
- No underlying immunity
- More prolonged period of asymptomatic/ pre-symptomatic infection (perhaps up to 10-12 days prior to symptoms)
- Fatality rates ~ 10-fold higher

### Seasonal Influenza

- Vaccine available
- Prior infection protection
- Some asymptomatic & pre-symptomatic detection of virus (but shorter time, ~1 day)

# Transmission & Protection from Infection

# Proposed Routes of SARS-CoV-2 Transmission




Galbadage. *Front Public Health*. 2020;8:163. WHO. *Scientific Brief*. July 9, 2020.

Slide credit: clinicaloptions.com

# Key Considerations on Modes of SARS-CoV-2 Transmission

- Person-to-person considered predominant mode of transmission, likely via respiratory droplets from **coughing, sneezing, or talking**[1,2]
  - High-level viral shedding evident in upper respiratory tract[3,4]
  - Airborne transmission *suggested* by multiple studies, but frequency unclear in absence of aerosol-generating procedures in healthcare settings[2]
- Virus **rarely cultured in respiratory samples > 9 days after symptom onset**, especially in patients with mild disease[5]
- Multiple studies describe a correlation between **reduced infectivity with decreases in viral loads** and rises in neutralizing antibodies[5]

1. https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads.html 2. WHO. Scientific Brief. July 9, 2020.
3. Wölfel. Nature. 2020;581:465. 4. Zou. NEJM. 2020;382:1177. 5. WHO. Scientific Brief. June 17, 2020.

# The Importance of Silent Transmission

"Nobody wants to think of themselves as being infected with the SARS-CoV-2 virus, capable of killing somebody, especially when they feel normal and have zero symptoms of infection," Aronoff said. "**Silent transmission events are fueling this pandemic**."

-*LA Times*, July 25, 2020

*Proceedings of the National Academy of Sciences* (July 28, 2020)

BRIEF REPORT

## The implications of silent transmission for the control of COVID-19 outbreaks

Seyed M. Moghadas[a,1], Meagan C. Fitzpatrick[b,c,1], Pratha Sah[b], Abhishek Pandey[b], Affan Shoukat[b], Burton H. Singer[d,2], and Alison P. Galvani[b,2]

[a]Agent-Based Modelling Laboratory, York University, Toronto, ON M3J 1P3, Canada; [b]Center for Infectious Disease Modeling and Analysis, Yale School of Public Health, New Haven, CT 06510; [c]Center for Vaccine Development and Global Health, University of Maryland School of Medicine, Baltimore, MD 21201; and [d]Emerging Pathogens Institute, University of Florida, Gainesville, FL 32610

Edited by Mary E. Power, University of California, Berkeley, CA, and approved June 23, 2020 (received for review April 30, 2020)

**Since the emergence of coronavirus disease 2019 (COVID-19), unprecedented movement restrictions and social distancing measures have been implemented worldwide. The socioeconomic repercussions have fueled calls to lift these measures. In the absence of population-wide restrictions, isolation of infected individuals is key to curtailing trans-**

**Results**

Translating clinical data on infectiousness and symptoms (1) to population-level epidemiological impact, our results indicate that the majority of transmission is attributable to people who are not exhibiting symptoms, either because they are still in the


Dr. Camilla Rothe's team was among the first to warn about asymptomatic transmission. Laetitia Vancon for The New York Times

Symptomless transmission makes the coronavirus far harder to fight. But health officials dismissed the risk for months, pushing misleading and contradictory claims in the face of mounting evidence.

By Matt Apuzzo, Selam Gebrekidan and David D. Kirkpatrick

June 27, 2020

MUNICH — Dr. Camilla Rothe was about to leave for dinner when the government laboratory called with the surprising test result.

*New York Times* (June 27, 2020)

# Timing of SARS-CoV-2 Transmission Based on Symptoms

- Prospective study of lab-confirmed COVID-19 cases (n = 100) & their close contacts (n = 2761) in Taiwan[1]
  - Transmission occurred more frequently with exposure **just before or within 5 days of symptom onset** vs later
- **Pre-symptomatic infections**
  - Accounted for 6.4% of locally acquired infections in a study in Singapore (N = 157)[2]
  - Modelling study of transmission in China (n = 154) estimated that **44% of transmissions may have occurred just before symptoms appeared**[3]
- A recent systematic review & meta-analysis estimated that the proportion of total infections that are **truly asymptomatic range from 6% to 41% (pooled estimate of 15%)**[4]
  - Asymptomatic transmission rates ranged from 0% to 2.2% vs symptomatic transmission rates of 0.8% to 15.4%
  - 3 studies reported that the estimated viral load did not differ between symptomatic & asymptomatic individuals

1. Cheng. JAMA Intern Med. 2020;[Epub]. 2. Wei. MMWR. 2020;69:411.
3. He. Nature Medicine. 2020;26:672. 4. Byambasuren. MedRxiv. 2020;[Preprint]

Slide credit: adapted from clinicaloptions.com

# Nonpharmacologic Preventative Interventions

| Recommended Prevention Strategies[1,2] |
| --- |
| Identify & quickly test suspect cases with subsequent isolation of infected individuals |
| Quarantine close contacts of infected individuals |
| Wash hands often with soap & water, sanitizer |
| Maintain social distance (~ 6 feet) |
| Wear cloth face cover in public[3,4] |
| Practice respiratory etiquette |
| Disinfect frequent-touch surfaces regularly |
| Avoid crowds, close-contact settings, and poorly ventilated spaces |

1. https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html 2. WHO. Scientific Brief. July 9, 2020.
3. Leung. Nat Med. 2020;26:676. 4. Chu. Lancet. 2020;395:1973.

# FACE COVERINGS WORK

KeAi CHINESE ROOTS GLOBAL IMPACT

Infectious Disease Modelling

journal homepage: www.keaipublishing.com/idm

## To mask or not to mask: Modeling the potential for face mask use by the general public to curtail the COVID-19 pandemic

Steffen E. Eikenberry, Marina Mancuso, Enahoro Iboi, Tin Phan, Keenan Eikenberry, Yang Kuang, Eric Kostelich, Abba B. Gumel*

*School of Mathematical and Statistical Sciences, Arizona State University, Tempe, AZ, 85287, USA*

ARTICLE INFO

ABSTRACT

PROCEEDINGS A

royalsocietypublishing.org/journal/rspa

## A modelling framework to assess the likely effectiveness of facemasks in combination with 'lock-down' in managing the COVID-19 pandemic

Research

**Cite this article:** Stutt ROJH, Retkute R, Bradley M, Gilligan CA, Colvin J. 2020 A modelling framework to assess the likely effectiveness of facemasks in combination with 'lock-down' in managing the COVID-19 pandemic. *Proc. R. Soc. A* **476**: 20200376. http://dx.doi.org/10.1098/rspa.2020.0376

Received: 30 April 2020
Accepted: 18 May 2020

Richard O. J. H. Stutt[1], Renata Retkute[1], Michael Bradley[2], Christopher A. Gilligan[1] and John Colvin[3]

[1]Epidemiology and Modelling Group, Department of Plant Sciences, University of Cambridge, Downing Street, Cambridge CB2 3EA, UK
[2]The Wolfson Centre for Bulk Solids Handling Technology, and
[3]Natural Resources Institute, University of Greenwich, Chatham Maritime ME4 4TB, UK

RESEARCH LETTER

## Association Between Universal Masking in a Health Care System and SARS-CoV-2 Positivity Among Health Care Workers

The coronavirus disease 2019 (COVID-19) pandemic, caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has severely affected health care workers (HCWs).[1] As a result, hos-

pital

## Masks Do More Than Protect Others During COVID-19: Reducing the Inoculum of SARS-CoV-2 to Protect the Wearer

Check for updates

*Monica Gandhi, MD, MPH[1], Chris Beyrer, MD, MPH[2], and Eric Goosby, MD[1]*

[1]Department of Medicine, Division of HIV, Infectious Diseases and Global Medicine, University of California, San Francisco (UCSF) San Francisco, CA, USA; [2]Desmond M. Tutu Professor of Public Health and Human Rights, Johns Hopkins Bloomberg School of Public Health Baltimore, MD, USA.

Although the benefit of population-level public facial

On April 3, 2020, the Centers for Disease Control and

Menu The Seattle Times Health Log In | Subscribe | Search

## Mask myths busted: Yes, they work. No, you won't suffocate. Here's what you should know.

(Illustrations by Jennifer Luxton / The Seattle Times)

By Jennifer Luxton

Original research

BMJ Global Health

## Reduction of secondary transmission of SARS-CoV-2 in households by face mask use, disinfection and social distancing: a cohort study in Beijing, China

Yu Wang,[1] Huaiyu Tian,[2] Li Zhang,[1] Man Zhang,[3] Dandan Guo,[4] Wenting Wu,[1] Xingxing Zhang,[3] Ge Lin Kan,[5] Lei Jia,[1] Da Huo,[1] Baiwei Liu,[1] Xiaoli Wang,[1] Ying Sun,[1] Quanyi Wang,[1] Peng Yang,[3] C. Raina MacIntyre[6,7]



## Face Masks Considerably Reduce Covid-19 Cases in Germany

### A synthetic control method approach

Timo Mitze[(a)], Reinhold Kosfeld[(b)], Johannes Rode[(c)] and Klaus Wälde[(d),1]

(a) University of Southern Denmark, RWI and RCEA, (b) University of Kassel, (c) TU Darmstadt
(d) Johannes Gutenberg University Mainz, CESifo and Visiting Research Fellow IZA

3 June 2020



## Association of country-wide coronavirus mortality with demographics, testing, lockdowns, and public wearing of masks (Update July 2, 2020).

Christopher T. Leffler, MD, MPH.[1,2] *

Edsel Ing MD, MPH, CPH, MIAD.[3]

Joseph D. Lykins V, MD.[4,5]

Matthew C. Hogan, MS, MPH.[6]

Craig A. McKeown, MD.[7]

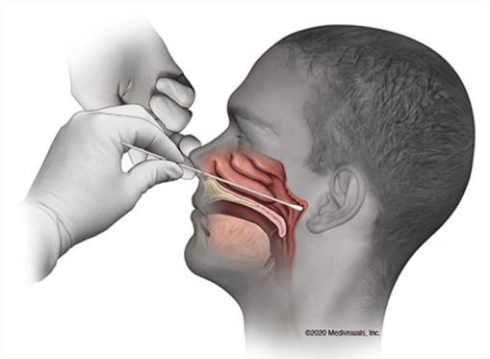
Andrzej Grzybowski, MD, PhD, MBA.[8,9]

1. Department of Ophthalmology. Virginia Commonwealth University. Richmond, VA 23298. chrisleffermd@gmail.com

# Diagnosis of Acute & Past Infection

# A Word on Sampling

Nasal




Nasopharyngeal

Saliva

Figures from https://www.sciencemag.org/news/2020/08/new-drool-based-tests-are-replacing-dreaded-coronavirus-nasal-swab;
https://www.infectiousdiseaseadvisor.com/home/topics/respiratory/influenza/accurate-influenza-testing-possible-with-midturbinate-nasal-swabs/
https://health.ucdavis.edu/coronavirus/coronavirus-testing.html

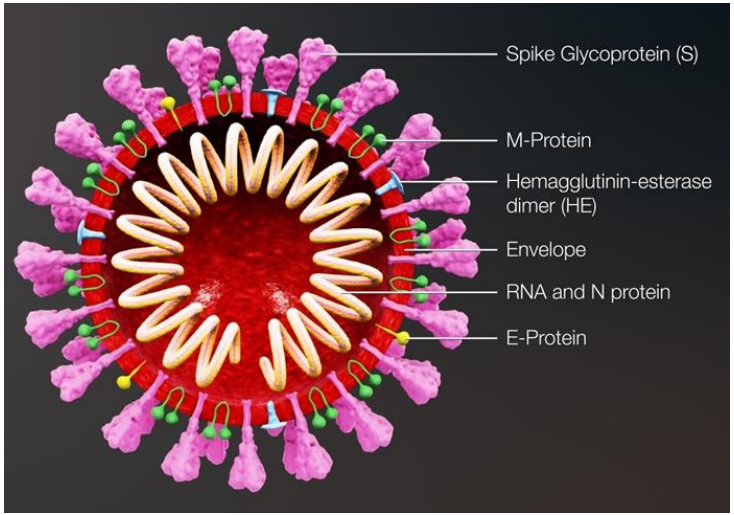
# Different Types of Coronavirus Tests

| | Molecular Test | Antigen Test | Antibody Test |
|---|---|---|---|
| **Also known as...** | Diagnostic test, viral test, molecular test, nucleic acid amplification test (NAAT), RT-PCR test, LAMP test | Rapid diagnostic test<br>(Some molecular tests are also rapid tests.) | Serological test, serology, blood test, serology test |
| **How the sample is taken...** | Nasal or throat swab (most tests)<br>Saliva (a few tests) | Nasal or throat swab | Finger stick or blood draw |
| **How long it takes to get results...** | Same day (some locations)<br>or up to a week | One hour or less | Same day (many locations)<br>or 1-3 days |
| **Is another test needed...** | This test is typically highly accurate and usually does not need to be repeated. | Positive results are usually highly accurate but negative results may need to be confirmed with a molecular test. | Sometimes a second antibody test is needed for accurate results. |

https://www.fda.gov/consumers/consumer-updates/coronavirus-testing-basics

# Molecular Detection (NAAT*, RNA-based)

- Detects viral RNA
- Uses an AMPLIFICATION step that makes it very sensitive
- Can be done on nasopharyngeal, nasal or saliva samples
- Requires special reagents & instrumentation
- Highly accurate but false negatives can occur, particularly early after infection
- There are ~150 FDA-authorized/EUA tests available




*NAAT = nucleic acid amplification test

https://www.fda.gov/medical-devices/coronavirus-disease-2019-covid-19-emergency-use-authorizations-medical-devices/vitro-diagnostics-euas#individual-antigen

# RNA-based Tests

## Advantages & Disadvantages

### ADVANTAGES

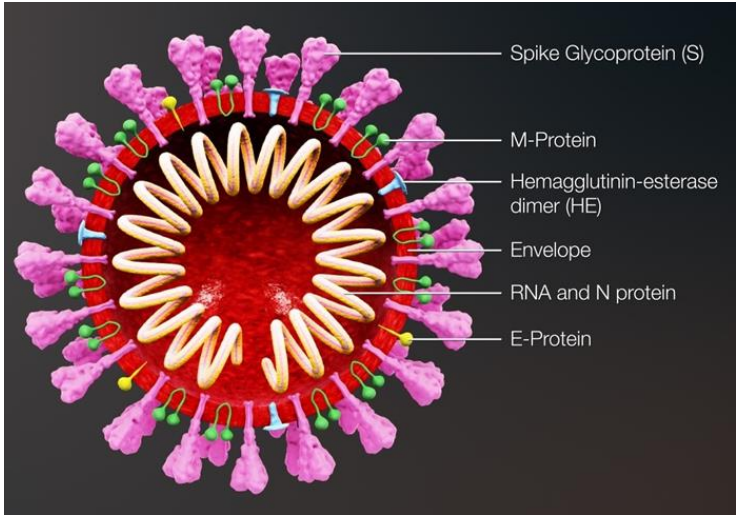
- Accurate
- Often can increase throughput (many tests per run/day)
- Very sensitive

### DISADVANTAGES

- Machinery & reagents
- Supply chain
- Throughput can be limiting with point-of-care (PoC) platforms
- Detects RNA NOT infectious virus, so does NOT inform about infectivity (contagiousness)
  - Viral RNA can be detected long after recovery / not contagious

# Antigen Detection (Protein)

- Detects viral structural protein
- Can be done on nasopharyngeal, nasal or saliva samples
- Amenable to rapid, POC testing
- Not as sensitive as NAATs*
- Inexpensive




*NAAT = nucleic acid amplification test

https://www.fda.gov/medical-devices/coronavirus-disease-2019-covid-19-emergency-use-authorizations-medical-devices/vitro-diagnostics-euas#individual-antigen

# Antigen Tests

## Advantages & Disadvantages

### ADVANTAGES

- Rapid
- Cheap
- POC use

### DISADVANTAGES

Sensitivity not as good as NAAT*

- Must be shedding a LOT of virus to be detected

- Maybe false positive issues
- Not as much experience with these
  - Performance in the real world not entirely clear

*NAAT = nucleic acid amplification test

# Antigen Tests with FDA EUA

## Individual EUAs for Antigen Diagnostic Tests for SARS-CoV-2

This table includes information about authorized SARS-CoV-2 antigen diagnostic tests that have been authorized individually. These EUAs have been issued for each individual test with certain conditions of authorization required of the manufacturer and authorized laboratories.

| Date EUA Issued | Manufacturer | Diagnostic (Letter of Authorization) | Technology | Authorized Setting(s)[1] | Authorization Documents[2] |
|---|---|---|---|---|---|
| 08/26/2020 | Abbott Diagnostics Scarborough, Inc. | BinaxNOW COVID-19 Ag Card | Antigen | H, M, W | HCP, Patients, IFU |
| 08/18/2020 | LumiraDx UK Ltd. | LumiraDx SARS-CoV-2 Ag Test | Antigen | H, M, W | HCP, Patients, IFU |
| 07/02/2020 | Becton, Dickinson and Company (BD) | BD Veritor System for Rapid Detection of SARS-CoV-2 | Antigen | H, M, W | HCP, Patients, IFU |
| 05/08/2020 | Quidel Corporation | Sofia SARS Antigen FIA | Antigen | H, M, W | HCP, Patients, IFU |

https://www.fda.gov/medical-devices/coronavirus-disease-2019-covid-19-emergency-use-authorizations-medical-devices/vitro-diagnostics-euas#individual-antigen

# Antibody Tests for Past Infection

- Measurable, circulating antibodies in the blood develop in many, but not all patients after infection
- These are typically IgG or IgM antibodies that can be reliably detected using blood tests (not fingerstick tests yet)
- Tests become positive about 3-4 weeks after infection but can be negative, especially if illness very mild or asymptomatic (false negative result)
- Antibodies can fall below detectable levels within a few months (false negative result)

# Antibody Tests

## Advantages & Disadvantages

### ADVANTAGES

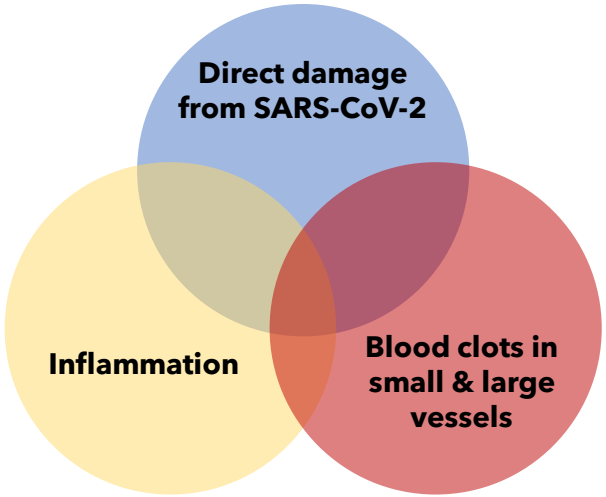
- Suggest past infection, especially if typical symptoms occurred
- Can be used to estimate prevalence of disease in the population (at least within the past 3+ weeks)

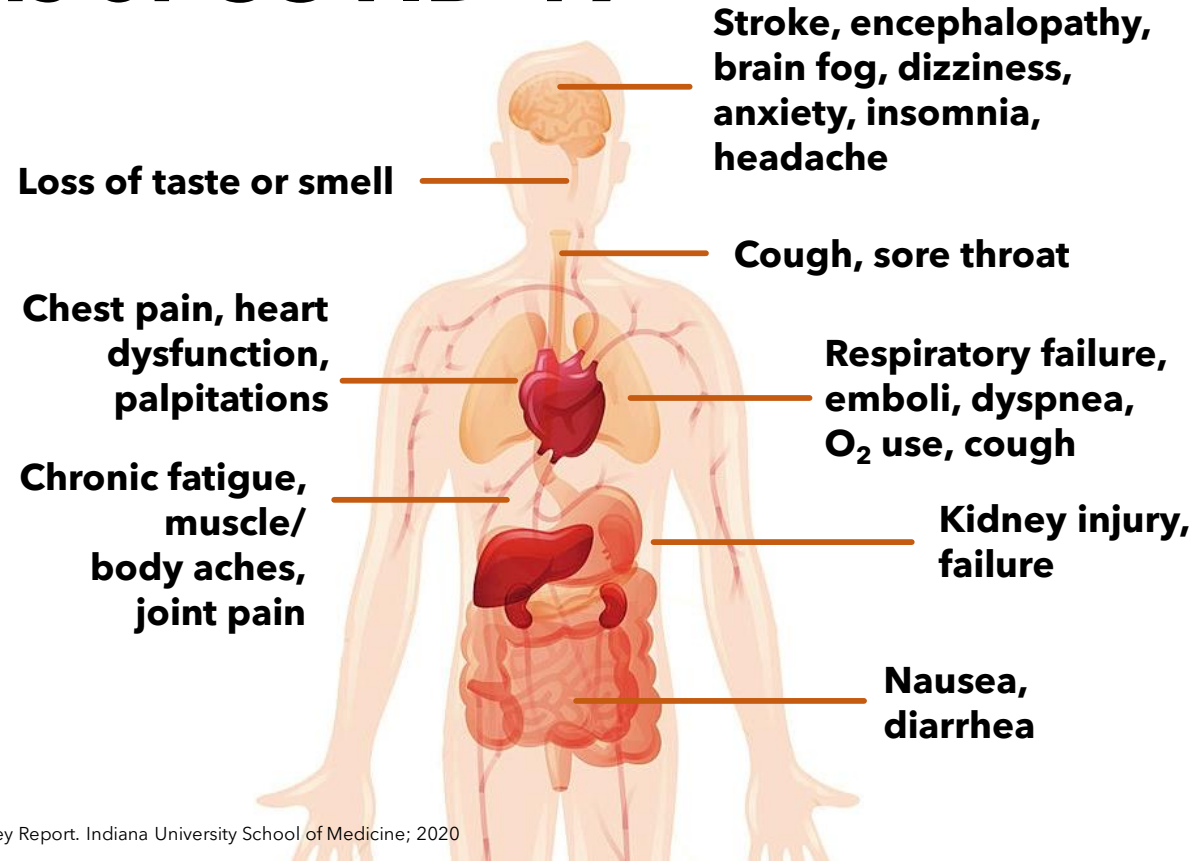
### DISADVANTAGES

- False negatives can occur
- Positive test does not mean a person is protected from getting reinfected
    - Though hopefully protected against severe infection

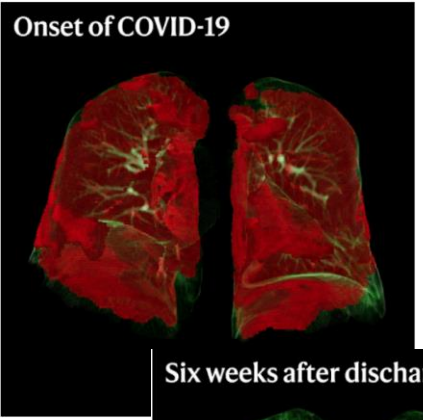
# Clinical Features of Post-Infectious Syndromes

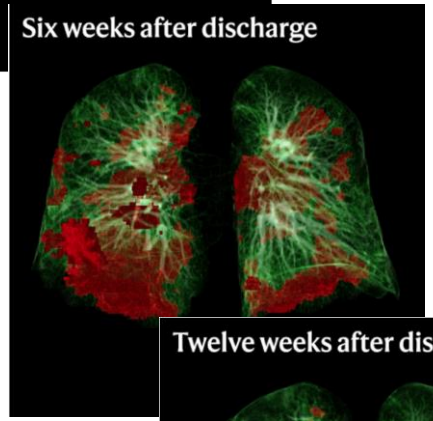
# Complications of COVID-19

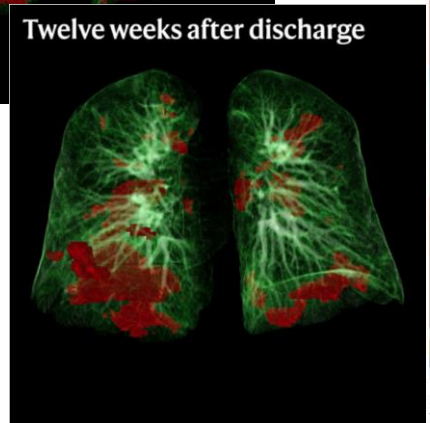



Yong, E. *The Atlantic*. 08/19/2020
Lambert, N. J. & Survivor Corps. COVID-19 "Long Hauler" Symptoms Survey Report. Indiana University School of Medicine; 2020
https://www.eatthis.com/covid-main-symptoms/






NEWS FEATURE · 14 SEPTEMBER 2020

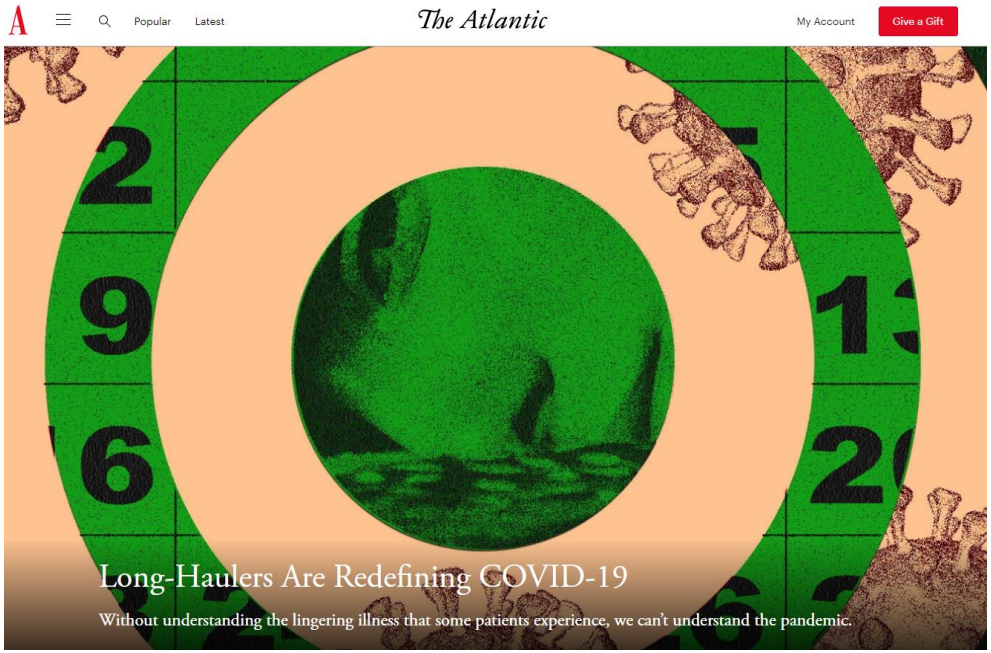
# The lasting misery of coronavirus long-haulers

Months after infection with SARS-CoV-2, some people are still battling crushing fatigue, lung damage and other symptoms of 'long COVID'.

Michael Marshall

A person who has recovered from COVID-19 takes part in a rehabilitation programme in Genoa, Italy. Credit: Marco Di Lauro/Getty

# Long-term Symptoms of COVID-19




- Patients are reporting long term sequelae of COVID-19
- Women > men
- Young & previously fit & healthy
- "Many long-haulers start feeling better in their fourth or fifth month, but recovery is tentative, variable, and not guaranteed"

Yong, E. *The Atlantic*. 08/19/2020
Also see Lambert, N. J. & Survivor Corps. COVID-19 "Long Hauler" Symptoms Survey Report. Indiana University School of Medicine; 2020
https://www.eatthis.com/covid-main-symptoms/

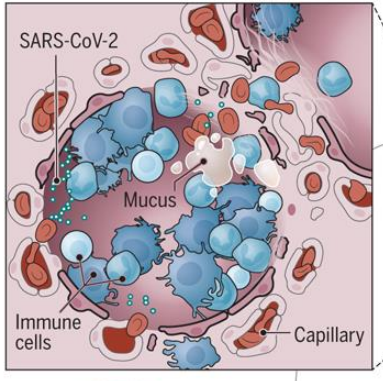

Thanks to all the providers at VUMC, the patients & their families

d.aronoff@vumc.org
@DMAronoff

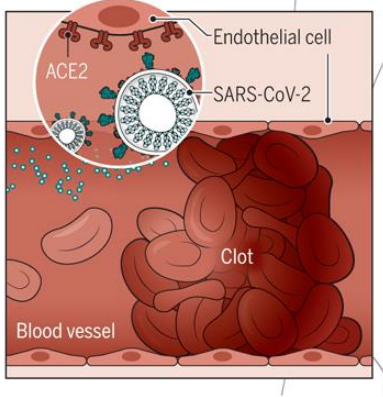
# An invader's impact

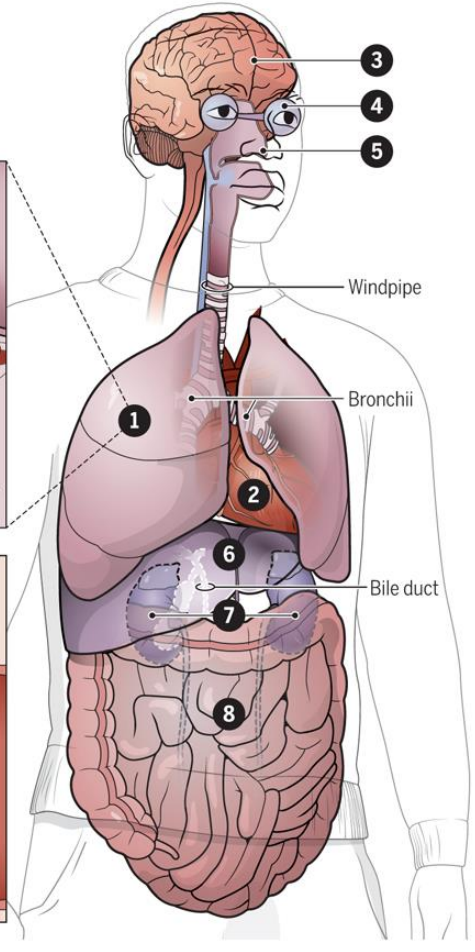
In serious cases, SARS-CoV-2 lands in the lungs and can do deep damage there. But the virus, or the body's response to it, can injure many other organs. Scientists are just beginning to probe the scope and nature of that harm.

**1 Lungs**
A cross section shows immune cells crowding an inflamed alveolus, or air sac, whose walls break down during attack by the virus, diminishing oxygen uptake. Patients cough, fevers rise, and breathing becomes labored.




**2 Heart and blood vessels**
The virus (teal) enters cells, likely including those lining blood vessels, by binding to angiotensin-converting enzyme 2 (ACE2) receptors on the cell surface. Infection can also promote blood clots, heart attacks, and cardiac inflammation.




**3 Brain**
Some COVID-19 patients have strokes, seizures, confusion, and brain inflammation. Doctors are trying to understand which are directly caused by the virus.

**4 Eyes**
Conjunctivitis, inflammation of the membrane that lines the front of the eye and inner eyelid, is more common in the sickest patients.

**5 Nose**
Some patients lose their sense of smell. Scientists speculate that the virus may move up the nose's nerve endings and damage cells.

**6 Liver**
Up to half of hospitalized patients have enzyme levels that signal a struggling liver. An immune system in overdrive and drugs given to fight the virus may be causing the damage.

**7 Kidneys**
Kidney damage is common in severe cases and makes death more likely. The virus may attack the kidneys directly, or kidney failure may be part of whole-body events like plummeting blood pressure.

**8 Intestines**
Patient reports and biopsy data suggest the virus can infect the lower gastrointestinal tract, which is rich in ACE2 receptors. Some 20% or more of patients have diarrhea.

Meredith Wadman *et al*. *Science* 2020;368:356-360

# Topics

- Clinical Update
- Current Bureau Statistics
- Presumptions
- Causation
- MMI
- Impairment Ratings
- Return-to-Work Guidelines
- Worker and Business Observations
- Q&A

# Bureau Statistics

- Total claims filed are 15% lower than 2019
- COVID-19 Claims are < 6% total claims filed so far for the year
- Filed COVID-19 Cases:
  - September 13: **133** (peak 194-July 26)
  - Denied **44**
- Cumulative

| | |
|---|---|
| Total | **2616** |
| Denied | **1201** |

# Analysis

- The claims not denied may still be investigated or pending (2-week period)
- NCCI has not yet sent us the industry codes to tell us where the claims are coming from
- The data on the reason for denials is not captured accurately with the forms that are filed with the Bureau
- No disputes (denied claims) filed with the court (CWCC)
  - so far not through mandatory mediation

# Presumptions

- Types
  - Limited
    - first responders
    - healthcare workers
  - Broad
    - if proof of work exposure
- Other states
  - Broad
  - Limited
  - None-Tennessee
  - Washington State
- Process
  - Laws
  - Executive Orders

# CAUSATION

- High rate “Infection” in asymptomatic persons
- Thus, becoming INFECTED by

Contact with the General Public, OR **Co-Workers**, IS **POSSIBLE**


**Asymptomatic novel coronavirus cases**

Summary of testing studies from around the world showing the share of people who tested positive for the coronavirus but had no symptoms

| COHORT | TESTED | PERCENT POSITIVE | SHARE OF INFECTIONS THAT WERE ASYMPTOMATIC |
|---|---|---|---|
| Diamond Princess cruise ship passengers and crew | 3,711 | 19.2% | 46.5% |
| Boston homeless shelter occupants | 408 | 36.0 | 87.8 |
| New York City obstetric patients | 214 | 15.4 | 87.9 |
| USS Theodore Roosevelt aircraft carrier crew | 4,954 | 17.3 | 58.4 |
| Japanese citizens evacuated from Wuhan, China | 565 | 2.3 | 30.8 |
| Charles de Gaulle aircraft carrier crew | 1,760 | 59.4 | 47.8 |
| Los Angeles homeless shelter occupants | 178 | 24.2 | 62.8 |
| King County, Wash., nursing facility residents | 76 | 63.2 | 6.3 |
| Arkansas, North Carolina, Ohio and Virginia inmates | 4,693 | 69.8 | 96.0 |
| New Jersey university and hospital employees | 829 | 4.9 | 65.9 |
| Indiana residents | 4,611 | 1.7 | 44.8 |
| Argentine cruise ship passengers and crew | 217 | 59.0 | 81.3 |
| San Francisco residents | 4,160 | 1.8 | 52.7 |
| Tyson Foods Springdale, Ark. | 3,748 | 12.8 | 94.6 |

Sources: Annals of Internal Medicine, Tyson Foods

THE WASHINGTON POST

# CAUSATION

- **When** is Covid-19 a "Work Compensable Illness"?
- Dr. Snyder's Update on Current # of Claims, # of Denials, and the status of "Presumption" Laws and Orders.
- DECISION on Compensability is the Insurer's
  - **Or, If Appealed, the Judge in CWCC-**
  - Just as in any other claim for injury or illness.
- Guidance from the TN Bureau of Workers" Compensation
  - https://www.tn.gov/content/dam/tn/workforce/documents/injuries/ AdMIR_SUMMER_2020.pdf [AdMIRable Review]

# CAUSATION

- To Assist Employees who wish to File a Claim
  - Include a copy of Test Result for the Virus
  - Include copies of Medical Records of ALL Treatment Providers
    - ER, Urgent Care, PCP, Hospital
  - Include a statement from Employee of
    - Date of His/Her Symptom Onset and How he/she was Exposed at work
    - Date of Onset of Symptomatic Illness [IF Any] in those working with or living with the employee
  - Employer Should ADD
    - Job Description
    - Employee attendance records for pertinent interval.
      - 1 week BEFORE Symptom Onset until Stable RTW occurred

# CAUSATION

- "MISTAKE AVAILABLE TO BE MADE"
- Be AWARE: MD's or NP's diagnosing and treating Covid-19 patients may NOT be used to, or familiar with, the TN Workers' Compensation system requirements for documenting facts need for causation DECISIONS.
- Or Aware of what Employers REQUIRE *before* RTW
- Or Aware of Concepts of MMI and PPI.

# CAUSATION

- Employer/Insurer Due Diligence
  - In circumstances where an **employer relies on its own interpretation of medical evidence without seeking an expert medical opinion** to support its interpretation, fails to take reasonable steps to investigate a claim before denying it, fails to consider evidence in favor of the injured worker, and/or declines to reconsider its denial of a claim in the face of newly-discovered countervailing evidence, an interlocutory award of fees may be appropriate.
  - *Travis v. Carter Express, Inc.*, 2019 TN Workers' Compensation Appeals Board. LEXIS 25, at *14 (June 24, 2019).
  - *Thompson v. Comcast Corp*., No. 2017-05-0639, 2018 TN Wrk. Comp. App. Bd. LEXIS 1 (Tenn. Workers' Comp. App. Bd. January 30, 2018)

# HINT

- IF MD/NP treating an Employee for Covid-19 is NOT Aware of:
  - EEOC/CDC rules/guidance on RTW
  - Workers' Compensation Concepts of Causation MMI, PPI, etc.
- And since the MDs who usually treat Injured Worders for more serious conditions [Orthopaedists, Neurosurgeons, etc.]
  - Will not be comfortable with Causation, MMI, PPI, etc. in Covid-19
  - Consider Occupational Medicine or PM&R doctors for these decisions.
    - https://acoem.org/find-a-provider
    - https://members.aapmr.org/AAPMR/AAPMR_FINDER.aspx

# Maximal Medical Improvement (MMI)

- In Workers' Compensation in General, Permanent Impairment Rating and Case Closure REQUIRE the individual to be "AT MMI".
- Maximum Medical Improvement (MMI): The point at which a condition has stabilized and is unlikely to change (improve or worsen) substantially in the next year, with or without treatment.
- While symptoms and signs of the condition may wax and wane over time, further overall recovery or deterioration is not anticipated.
  - AMA *Guides to the Evaluation of Permanent Impairment, 6th Edition*, Glossary. P 612

# Maximal Medical Improvement (MMI)

Guidance on MMI & PPI:

TN BWC Ad*MIR*able Review

- https://www.tn.gov/content/dam/tn/workforce/documents/injuries/AdMIR_SUMMER_2020.pdf
- Republished: AMA "*Guides Newsletter*", July – Aug 2020; Vol 25, Issue 4
- https://commerce.ama-assn.org/store/ui/catalog/productDetail?product_id=prod1240005&navAction=push
- MODIFIED to include rating PPI in AMA *Guides, 5th Edition* states

*Journal of Occupational and Environmental Medicine* – Open Access

September 2020 Issue - https://journals.lww.com/joem/pages/default.aspx then

file:///C:/Users/DrT/Downloads/Evaluating_Covid_19_Injury_Claims_With_a_Focus_on.5%20(3).pdf

# Aside

- If You Wish to Receive the BWC Quarterly Newsletter on Workers' Compensation Medical & Legal Topics,
  - Ad*MIR*able Newsletter
  - E-mail Jay.Blaisdell@tn.gov, and Ask to be added to his e-mail list

# MMI - SCENARIOS

| SCENARIO Positive Test or MD Diagnosis | MMI |
|---|---|
| Never had symptoms | Out of quarantine &10 days after positive test |
| Pre-Symptomatic when tested | See Below |
| Mildly ill, recover at home | Asymptomatic, Back to Work, 2-3 weeks after symptoms have resolved, but if pneumonia was documented 4-8 weeks is typical * |
| Severe Disease, Hospitalized | Multiple studies,<br>on other viruses with ICU treatment for ARDS,<br>50% of survivors have returned to work within 1 YEAR. |
| * = "Long Covid" was not well publicized at the time of the writing of these publications. | |

# RETURN TO WORK ?

U.S. Equal Employment Opportunity Commission

Search terms...

About EEOC | Employees & Job Applicants | Employers / Small Business | Federal Sector | Contact Us | Translate / Traducir

https://www.eeoc.gov/laws/guidance/pandemic-preparedness-workplace-and-americans-disabilities-act

## Pandemic Preparedness in the Workplace and the Americans with Disabilities Act

*UPDATED IN RESPONSE TO COVID-19 PANDEMIC - March 21, 2020

BWC Bureau of WORKERS' COMPENSATION

# EEOC WEB SITE

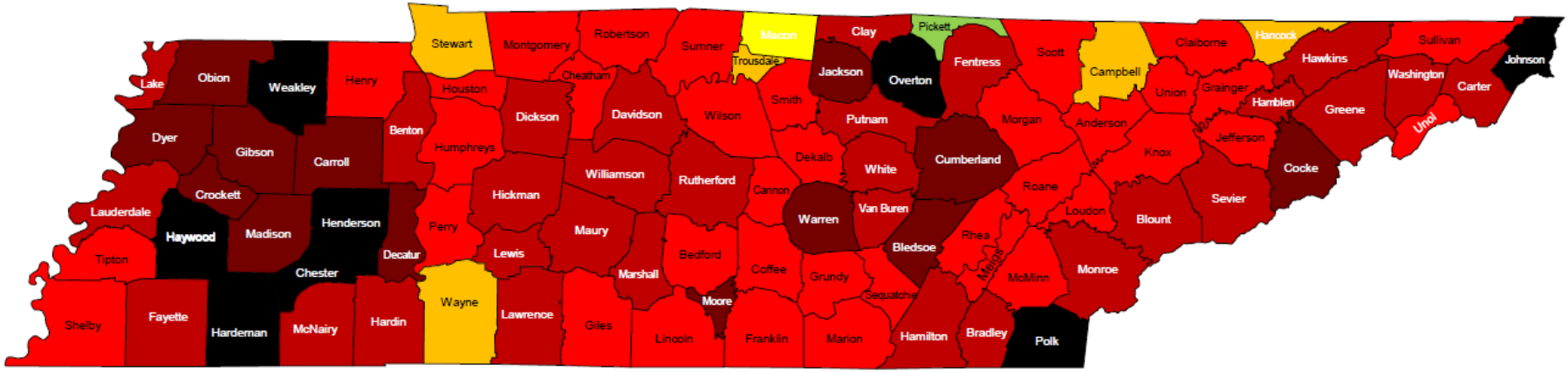
- Answered 20 Commonly Asked Questions, Including:
  - ***On March 11, 2020, the coronavirus disease (COVID-19) was also declared a pandemic. – Special Exemptions NOW Apply**
  - ***Based on guidance of the CDC and public health authorities as of March 2020, the COVID-19 pandemic meets the direct threat standard.**

# Tennessee Coronavirus

August 18, 2020

New Cases/Day/100,000 Population (Averaged over prior 7 days)

Statewide: 22.92 new cases/100,000 population/day




- Black: over 50 new cases/100,000 population/day
- Darkest Red: over 30 new cases/100,000 population/day
- Darker Red: over 20 new cases/100,000 population/day
- Red: 10-20 new cases/100,000 population/day
- Orange: 5-10 new cases/100,000 population/day
- Yellow: 1-5 new cases/100,000 population/day
- Green: Less than 1 new case/100,000 population/day

BWC Bureau of WORKERS' COMPENSATION

# EEOC WEB SITE

- 11. During a pandemic, may an employer require its employees to adopt infection-control practices, such as regular hand washing, at the workplace?
  - Yes.
- 12. During a pandemic, may an employer require its employees to wear personal protective equipment (e.g., face masks, gloves, or gowns) designed to reduce the transmission of pandemic infection?
  - Yes. An employer may require employees to wear personal protective equipment during a pandemic. However, where an employee with a disability needs a related reasonable accommodation under the ADA (e.g., non-latex gloves, or gowns designed for individuals who use wheelchairs), the employer should provide these, absent undue hardship.

# Special Virus

- Distance of spread may be further than first thought

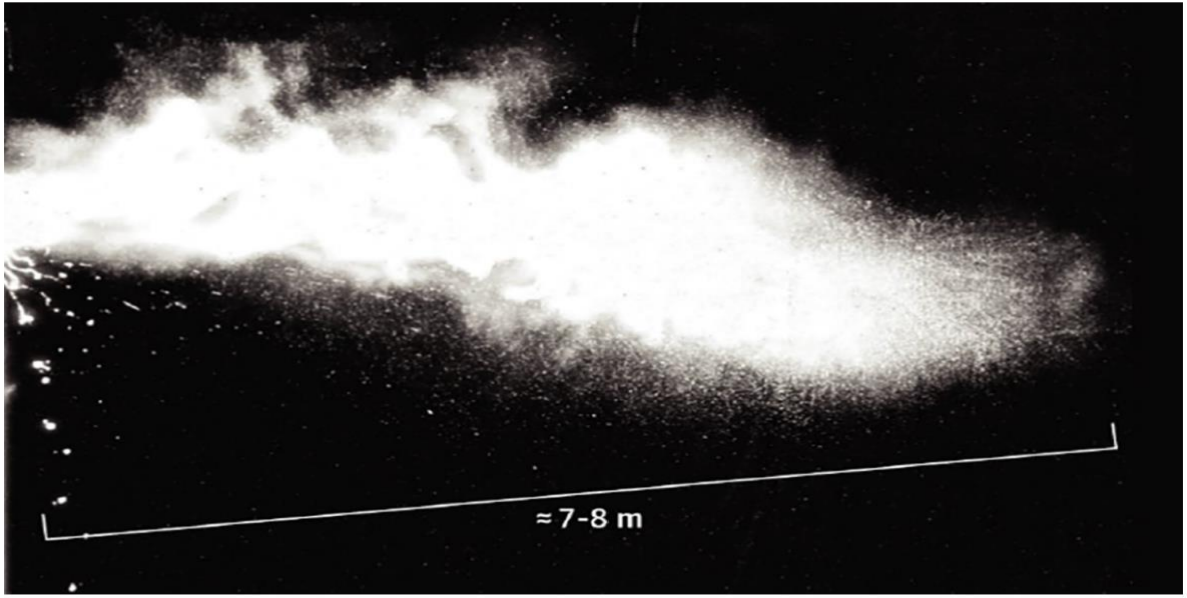



Fig 2 | Long range video imaging over 8 m of the multiphase turbulent cloud (gas cloud containing liquid droplets of all sizes) from natural human violent emission such as a sneeze, revealing a range of the cloud, and its droplet concentrated payload, of up to 7-8 m. Reproduced with permission from Bourouiba[2]

# Masks


Do Your Part:
WEAR A MASK
MY Mask
Protects YOU
YOUR Mask
Protects ME

# NEWEST EEOC GUIDANCE – 09/08/20

- https://www.eeoc.gov/wysk/what-you-should-know-about-covid-19-and-ada-rehabilitation-act-and-other-eeo-laws

# EEOC – What You Should Know

- A.1. How much information may an employer request from an employee who calls in sick, in order to protect the rest of its workforce during the COVID-19 pandemic? *(3/17/20)*
  - During a pandemic, ADA-covered employers **may** ask such employees if they are experiencing symptoms of the pandemic virus.
  - A2. Employers should rely on the CDC, other public health authorities, and reputable medical sources for guidance on emerging symptoms associated with the disease.

# EEOC – What You Should Know

- A.3. When may an ADA-covered employer take the body temperature of employees during the COVID-19 pandemic? *(3/17/20)*
- Generally, measuring an employee's body temperature is a medical examination. Because the CDC and state/local health authorities have acknowledged community spread of COVID-19 and issued attendant precautions, employers may measure employees' body temperature. However, employers should be aware that some people with COVID-19 do not have a fever.

# EEOC – What You Should Know

- A.4. Does the ADA allow employers to require employees to stay home if they have symptoms of the COVID-19? *(3/17/20)*
  - **Yes.**
- A.5. When employees return to work, does the ADA allow employers to require a doctor's note certifying fitness for duty? *(3/17/20)*
  - **Yes.**

# EEOC – What You Should Know

- **A.6. May an employer administer a COVID-19 test (a test to detect the presence of the COVID-19 virus) when evaluating an employee's initial or continued presence in the workplace?** *(4/23/20; updated 9/8/20 to address stakeholder questions about updates to CDC guidance)*
- The ADA requires that any mandatory medical test of employees be "job related and consistent with business necessity." Applying this standard to the current circumstances of the COVID-19 pandemic, employers may take screening steps to determine if employees entering the workplace have COVID-19 because an individual with the virus will pose a direct threat to the health of others. Therefore an employer may choose to administer COVID-19 testing to employees before initially permitting them to enter the workplace and/or periodically to determine if their presence in the workplace poses a direct threat to others.

# A6 Continued

- The ADA does not interfere with employers following recommendations by the CDC or other public health authorities regarding whether, when, and for whom testing or other screening is appropriate. Testing administered by employers consistent with current CDC guidance will meet the ADA's "business necessity" standard.
  - **Hint: Ask you Employment Attorney**
- Consistent with the ADA standard, employers should ensure that the tests are considered accurate and reliable.

# EEOC – What You Should Know

- A.7. CDC said in its Interim Guidelines that antibody test results "should not be used to make decisions about returning persons to the workplace." In light of this CDC guidance, under the ADA may an employer require **antibody** testing before permitting employees to re-enter the workplace? *(6/17/20)*
  - **No**. An antibody test constitutes a medical examination under the ADA. In light of CDC's Interim Guidelines that antibody test results "should **not** be used to make decisions about returning persons to the workplace," an antibody test at this time does not meet the ADA's "job related and consistent with business necessity" standard for medical examinations or inquiries for current employees.

# EEOC – What You Should Know

- A.8. May employers **ask** all employees physically entering the workplace if they have been **diagnosed** with or **tested for** COVID-19? *(9/8/20; adapted from 3/27/20 Webinar Question 1)*
  - Yes.
- A.10. May an employer **ask** an employee who is physically coming into the workplace whether they have family members who have COVID-19 or symptoms associated with COVID-19? *(9/8/20; adapted from 3/27/20 Webinar Question 4)*
  - **No**. The Genetic Information Nondiscrimination Act (GINA) prohibits employers from asking employees medical questions about family members. GINA, however, does not prohibit an employer from asking employees whether they have had contact with **anyone** diagnosed with COVID-19 or who may have symptoms associated with the disease.

# EEOC – What You Should Know

- A.11. What may an employer do under the ADA if an employee refuses to permit the employer to take his temperature or refuses to answer questions about whether he has COVID-19, has symptoms associated with COVID-19, or has been tested for COVID-19? *(9/8/20; adapted from 3/27/20 Webinar Question 2)*
  - Under the circumstances existing currently, the ADA allows an employer to **bar** an employee from physical presence in the workplace if he refuses to have his temperature taken or refuses to answer questions about whether he has COVID-19, has symptoms associated with COVID-19, or has been tested for COVID-19.

# ADDITIONAL RESOURCE: CDC

- https://www.cdc.gov/coronavirus/2019-ncov/community/general-business-faq.html#Reducing-the-Spread-of-COVID-19-in-Workplaces
- Answers MANY Questions
- When is it SAFE for Employees – NOT in Health Care Settings (i.e. Hospitals, etc.)
  - to **Discontinue Isolation** and
  - Return to Work?
  - **SAME Criteria for BOTH**

# CDC: Criteria to Discontinue Isolation & RTW

- **Updates as of July 20, 2020**
- A test-based strategy is no longer recommended to determine when to discontinue home isolation, except in certain circumstances.
- **Symptom-based criteria** were modified as follows:
  - Changed from "at least 72 hours" to "at least 24 hours" have passed *since last* fever without the use of fever-reducing medications.
  - Changed from "improvement in respiratory symptoms" to "improvement in symptoms" to address expanding list of symptoms associated with COVID-19.
- For patients with severe illness, duration of isolation for up to 20 days after symptom onset may be warranted. Consider consultation with infection control experts.
- For persons who never develop symptoms, isolation and other precautions can be discontinued 10 days after the date of their first positive RT-PCR test for SARS-CoV-2 RNA.

# CDC Guidelines for Health Care Workers

- https://www.cdc.gov/coronavirus/2019-ncov/hcp/return-to-work.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fhealthcare-facilities%2Fhcp-return-work.html

# Effect on Workers

- Education
  - Lower level-more affected
- Equipment: they do not have or would not help in their job
  - Internet access
  - Smartphone, computer
- Environment
  - Service industries, manufacturing
  - Food processing and distribution
  - Healthcare
- Disproportionate Impact
  - Poor
  - Geographic effect
  - Clusters
  - Medical Conditions
  - Age

# For Workers' Compensation

- Medical Benefits
  - responsible for treatment
- Indemnity
  - responsible for lost time-temporary disability (partial or total)
    - Isolation
      - Exposure, self-imposed
    - Quarantine
      - Tested positive or directed by doctor or Health Official
  - permanent impairment (partial or total)

# Worker Protections

- Presumptions
  - Limited and specific
- Healthcare
  - Coverage
  - Medicaid-Tenncare
  - Telehealth
- Unemployment
  - Eligibility and access to unemployment insurance and the “CARES” Act funds
- Leave
  - Coverage for quarantine or isolation
- Essential workers
  - Childcare
- Coercion
  - Forced return to work

# Businesses

- Liability Protection (PC0001ES2)-businesses, “persons”, employees
  - Comply with “CDC Guidelines”
  - Protect against “Frivolous” suits-
    - ”clear and convincing evidence…”
    - Gross negligence
    - Willful misconduct
    - Dismiss with prejudice
- Personal Protective Equipment (PPE)
  - Required
  - Supplied
  - Exposure and risk
- Mandates or Employer Requirements
  - Working conditions-exposure of employees, public
  - PPE
- Coercion
  - Forced to work

# Session Key

- XXXX

**Mission:**
"Fulfilling the Promise of Workers' Compensation…today and tomorrow."

**Vision:**
"To be the most effective Workers' Compensation Regulatory Agency in the United States."

**Values:**
Integrity, Excellence, Innovation, Transparency and Respect.

# Thank You

- Questions
  - Live
  - Follow up