Theories of a Pandemic
Lessons repeated but not learned

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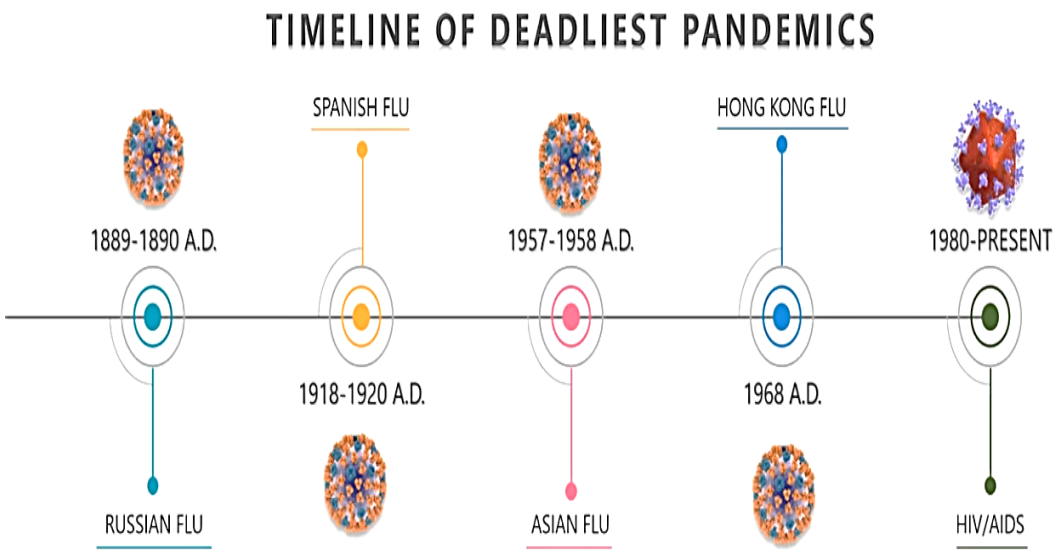
Disclosures

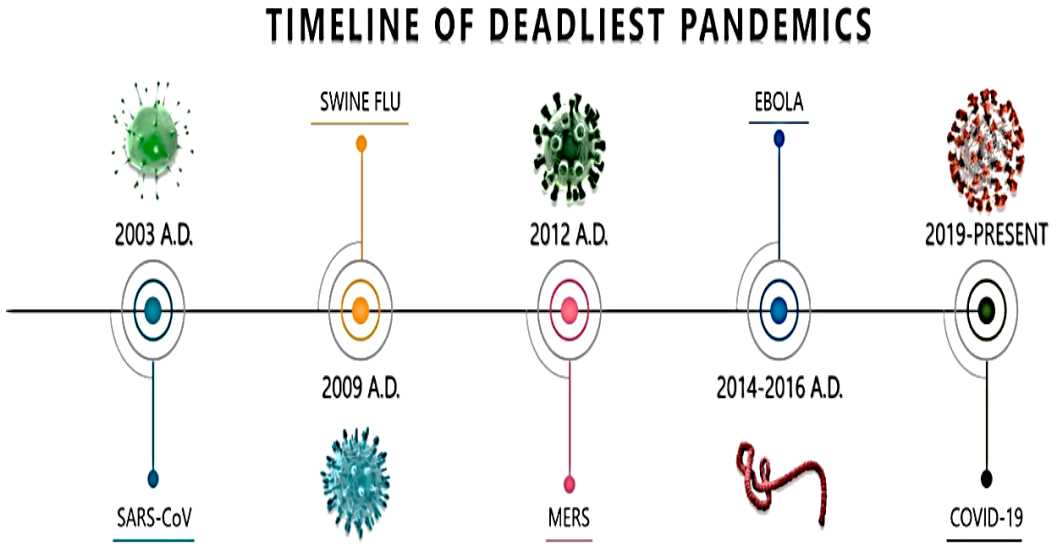
- **I have no disclosures to report**
- **I’m always conflicted**
- **I had “fog” even before I had CoVID**

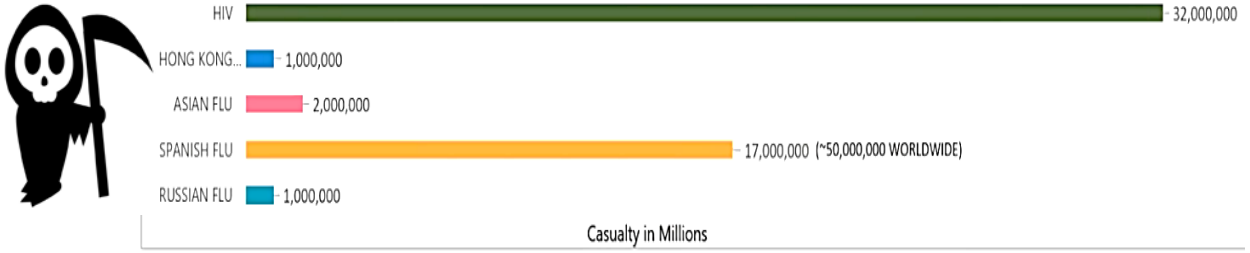
Learning Objectives

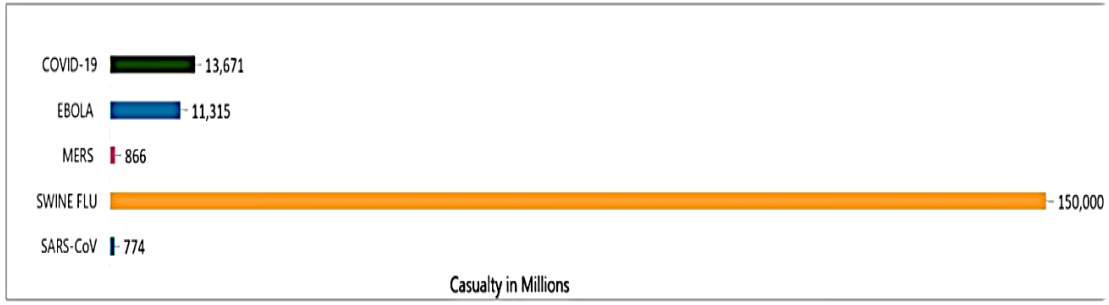
- Understand the historical aspects of a pandemic
- Review how the history of pandemics remain constant and how it effects our ability to change care
- Briefly discuss my ICU experience and management /outcomes with CoVID19

Pandemic/Epidemics are not new





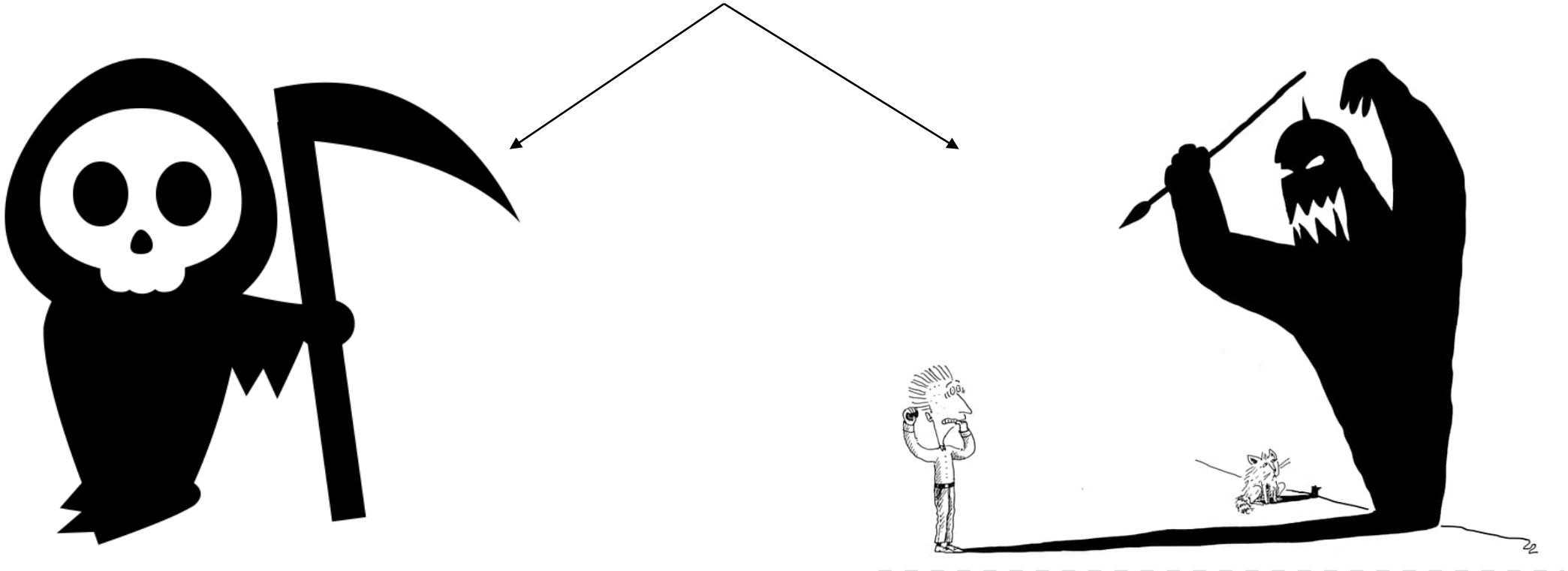




Currently: US 30.9 million cases and 556,000 deaths as of 4/7/2021

What is an epidemic?

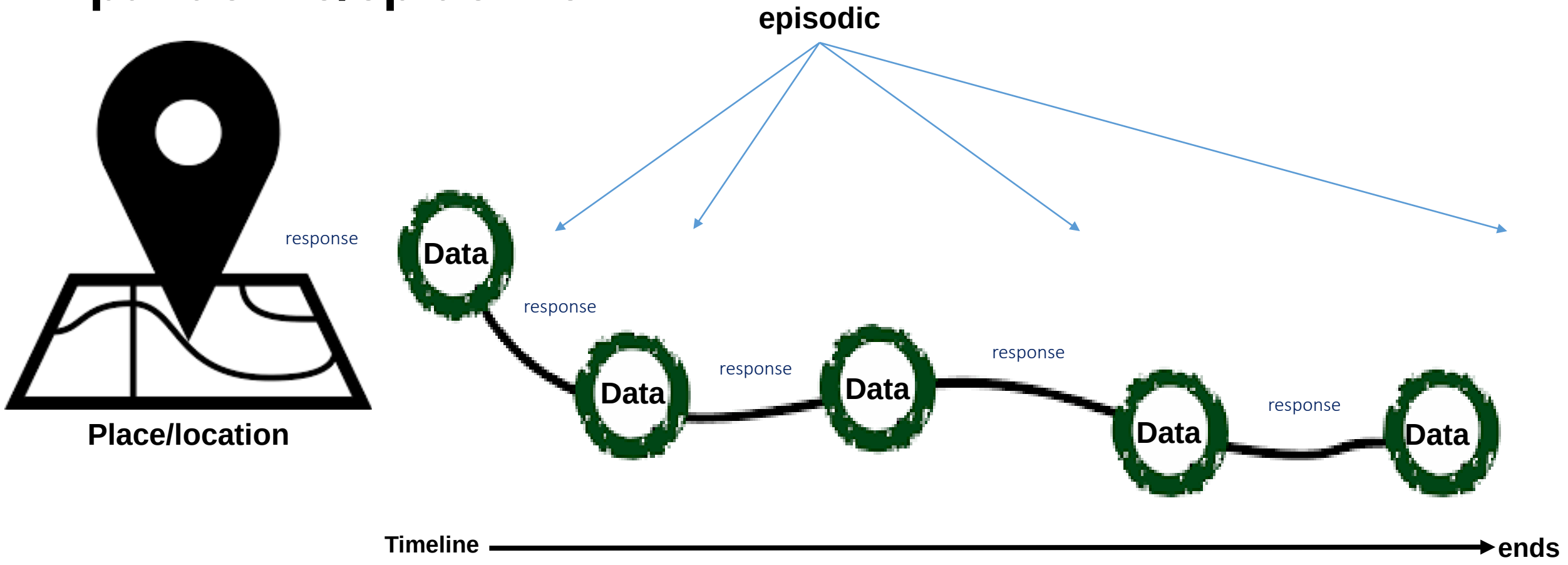
A term used in a variety of ways with the intent to clothe certain undesirable social events and produce a sense of emotional urgency



Death

Fear

What criteria are needed to define a pandemic/epidemic?

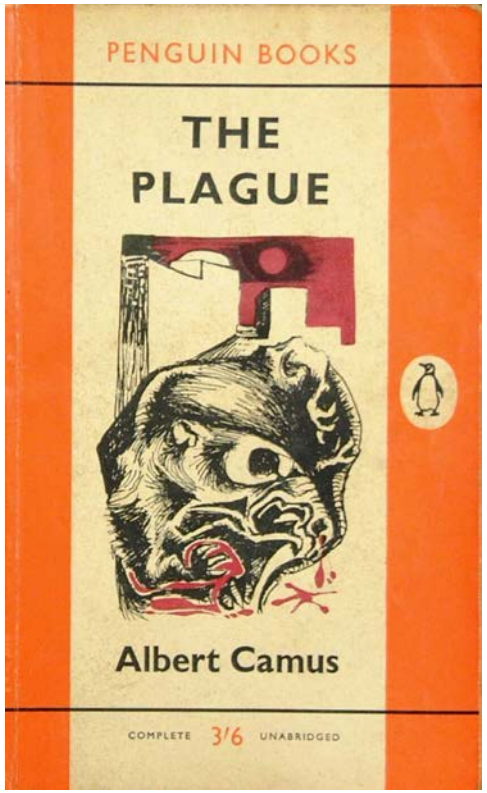


The data is increasing incidence with objective data measured in time, in a population, with a specified case definition

Epidemics/pandemic succeed each other in a predictable narrative sequence

Albert Camus

Incident



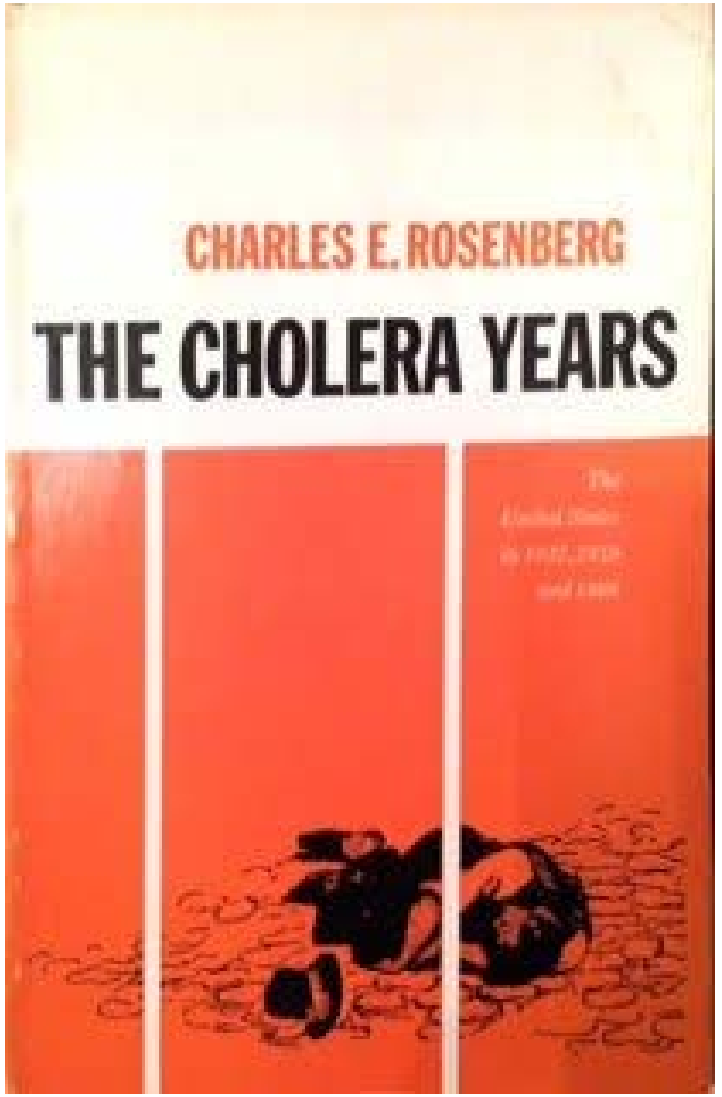
Perception

Interpretation

Response

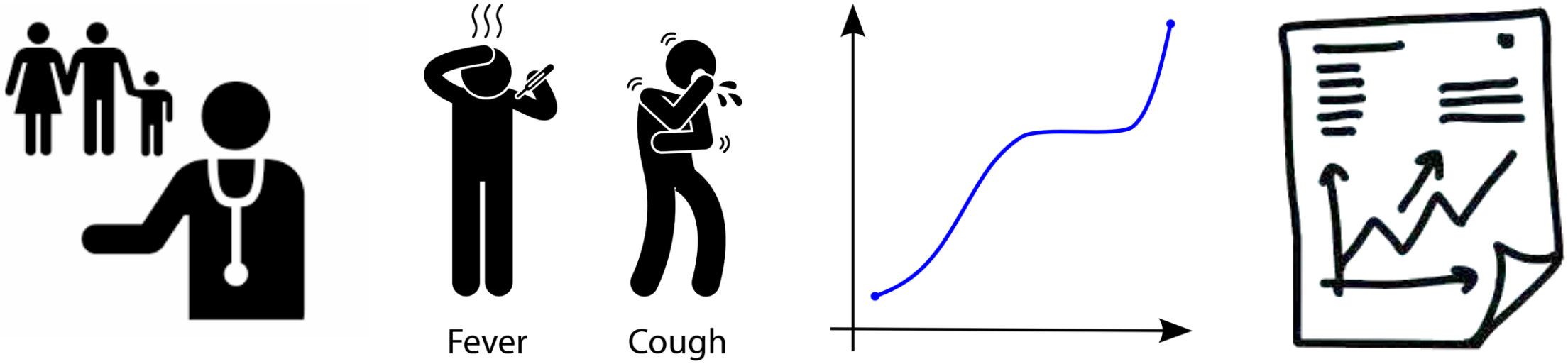
Epidemics/pandemic succeed each other in predictable narrative sequence

- **ACT I** **Progressive revelation**
- **ACT II** **Managing randomness**
- **ACT III** **Negotiation public response**



Rosenberg, Charles E. “What is an Epidemic: AIDS in Historical Perspective.” In Explaining Epidemics and Other Studies in the History of Medicine. New York: Cambridge University Press, 1992, 278-292.

ACT I Progressive revelation



Suspicious case related signs/symptoms

Increasing cases

“Calling it” Institutional Control

Time

What are some of the reasons ACT I occurs ? (before someone names an “epidemic”)

Rosenberg risk = Hard to admit the presence of an epidemic was to risk the concept of “dissolution”

ACT II Managing Randomness

Religion morality

Theological imprudence

Materialism

Population control

Change in habits

Data /Science

Policy / solutions

Institutionalism

Organization of medicine/hospitals

Government responsibility

Social Construction of Disease

Epidemics /pandemics demand the creation of a framework within which disease needs to be managed.

Rosenberg, Charles E. The Cholera Years: The United States in 1832, 1849 and 1866, please read: Chapter 1:The Epidemic, pp.13-39.

ACT III Negotiation
Public Response

- Recognition implies collective action
- “Measures to interdict an epidemic constitute rituals, collective rites integrating cognitive and emotion elements”

Slack's view of negotiation public response

- **The growth of medical anthropology and the social history of medicine have contributed massively to the understanding of disease and health**

- **Epidemics are susceptible to comparative study because they are common to all continents and cultures**

  - **Supports, tests, undermine or reshape religious, social and political assumptions and attitudes**

Ranger, Terence, and Paul Slack, eds. "Introduction." In Epidemics and Ideas: Essays on the Historical Perception of Pestilence. New York: Cambridge University Press, 1995, 1- 20.
Treichler, Paula A. How to Have Theory in an Epidemic: Cultural Chronicles of AIDS. Durham: Duke University Press, 1999.

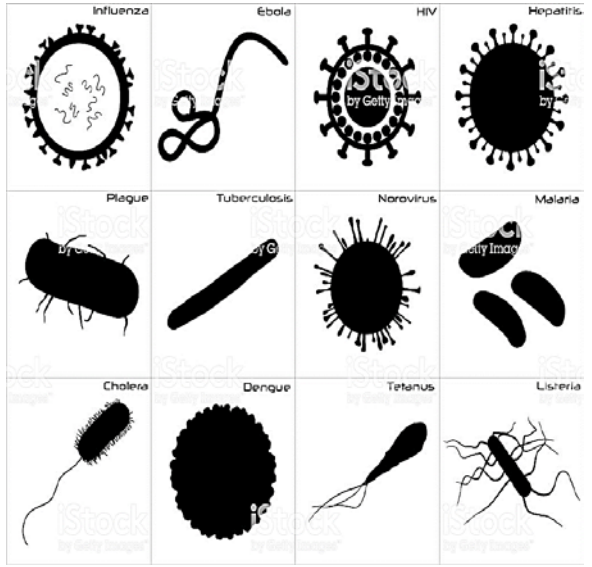
Slack's states that all epidemics elicit a very similar response in different history and geographical context

- What did he mean by this connotation, as it relates to key variables?

Social Condition

Violence

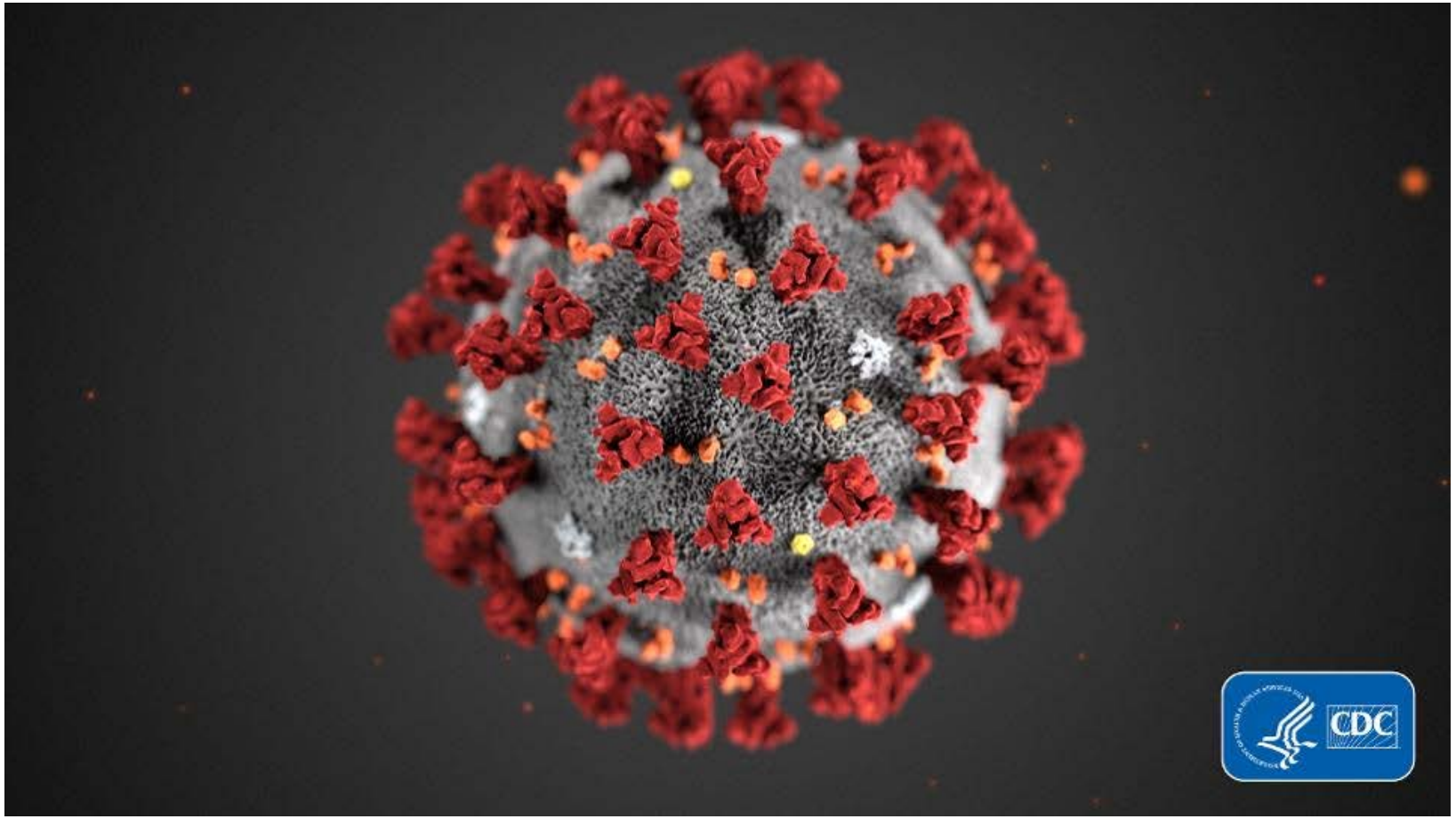
Geographical
Social incidence



Individually
of disease entity

Ranger, Terence, and Paul Slack, eds. "Introduction." In Epidemics and Ideas: Essays on the Historical Perception of Pestilence. New York: Cambridge University Press, 1995, 1- 20.
Treichler, Paula A. How to Have Theory in an Epidemic: Cultural Chronicles of AIDS. Durham: Duke University Press, 1999.

ACT I Progressive Revelation: Coronavirus Disease 2019



SARS-CoV-2: the virus
Coronavirus Disease 2019 (COVID-19): the disease of people

ACT I: Progressive Revelation

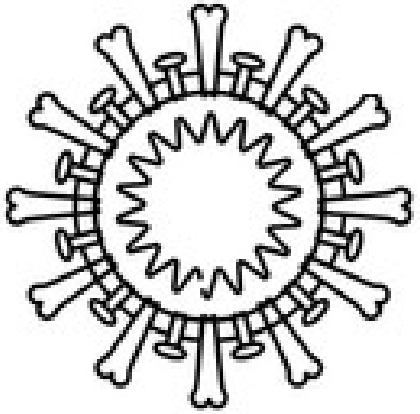
Suspicious case related signs/symptoms

Increasing cases

"Calling it" Institutional Control

Time

Coronavirus Wuhan Pneumonia 2019 n-CoV

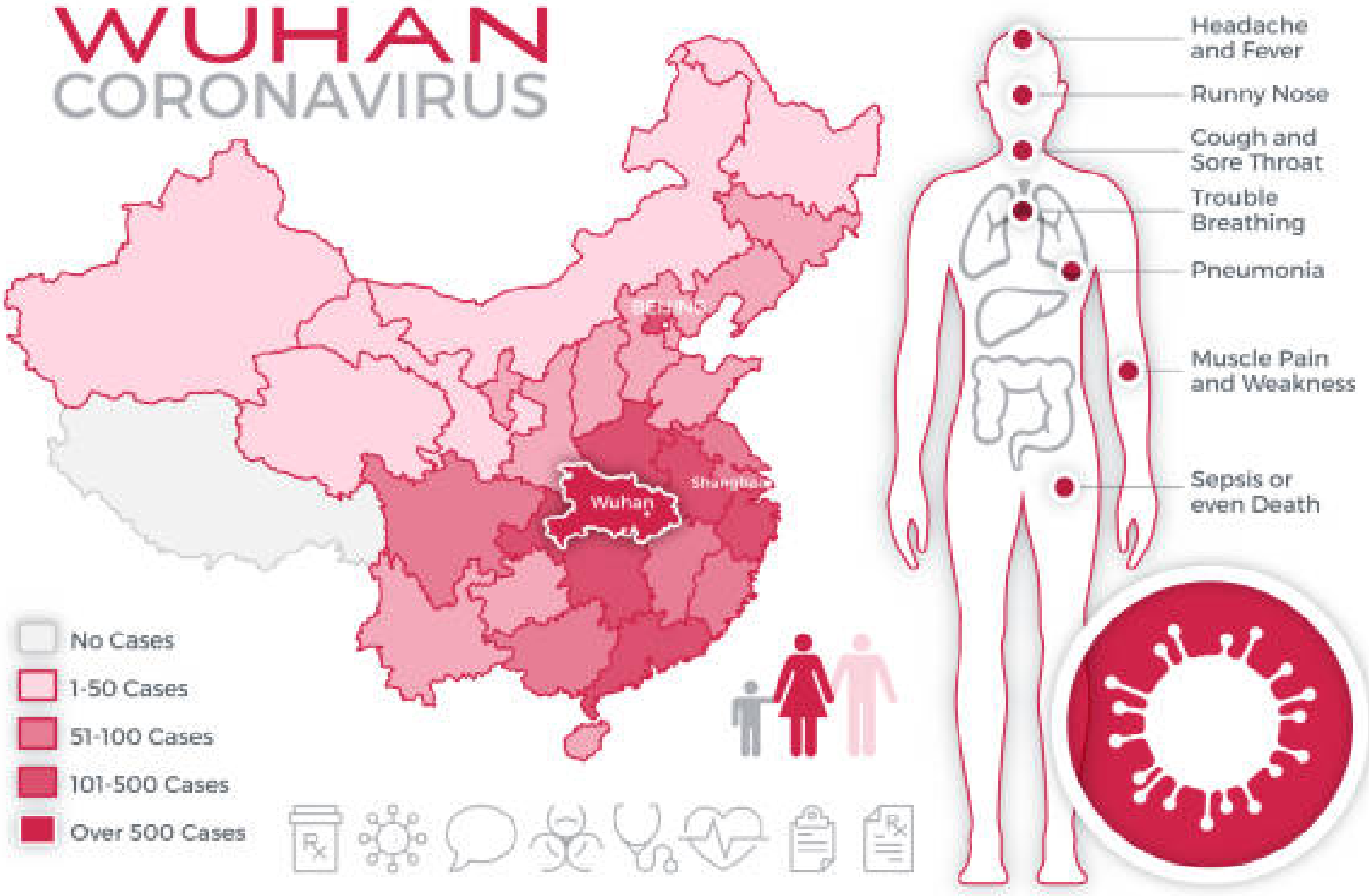


DECEMBER

DEC 31:

China probes pneumonia outbreak in Wuhan for SARS links: State media

First news report covering the outbreak, at the time thought to be similar to SARS



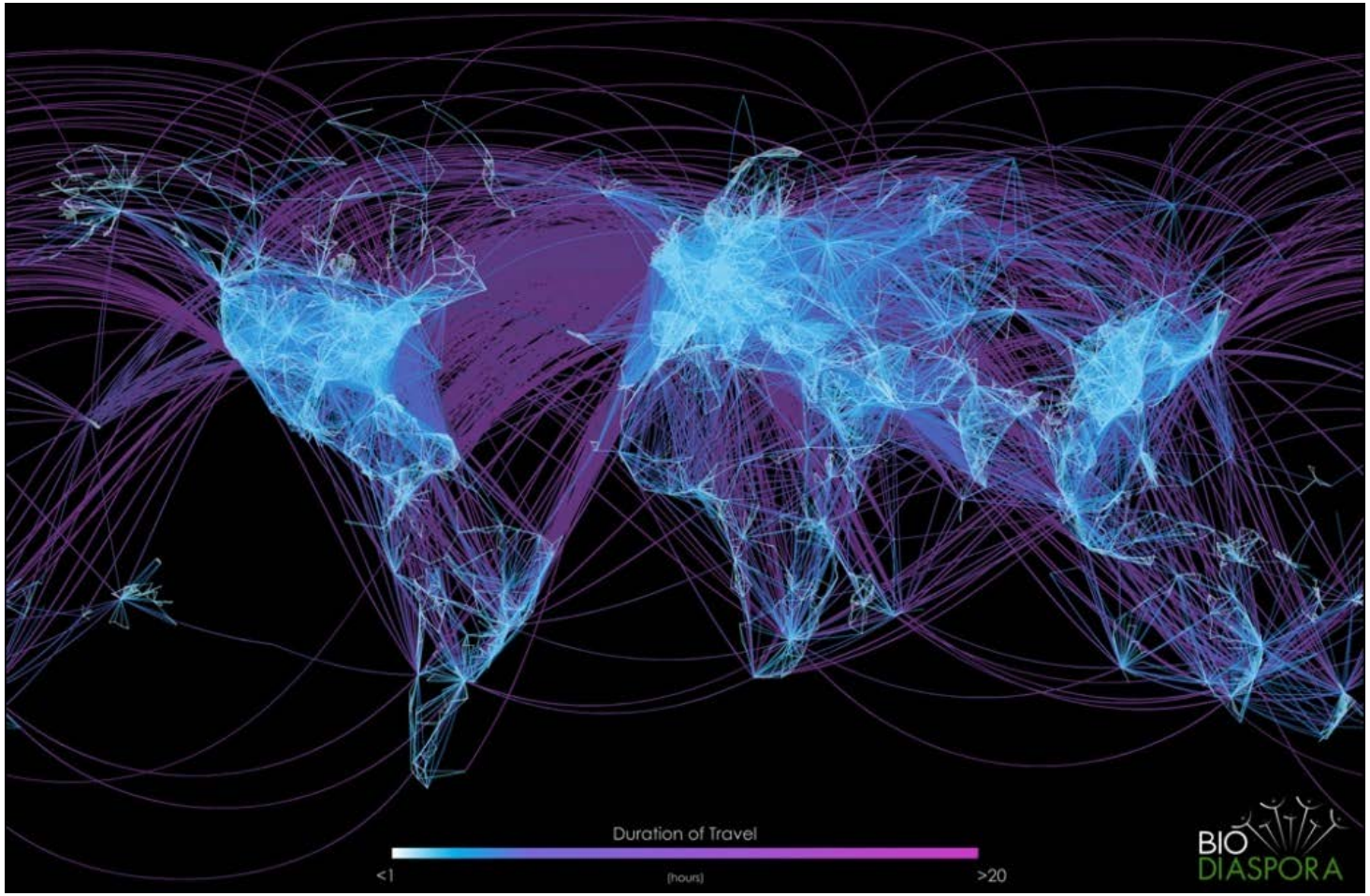
ACT I

ACT I Progressive Revelation

Suspicious case related signs/symptoms → Increasing cases → "Calling it" Institutional Control

Time

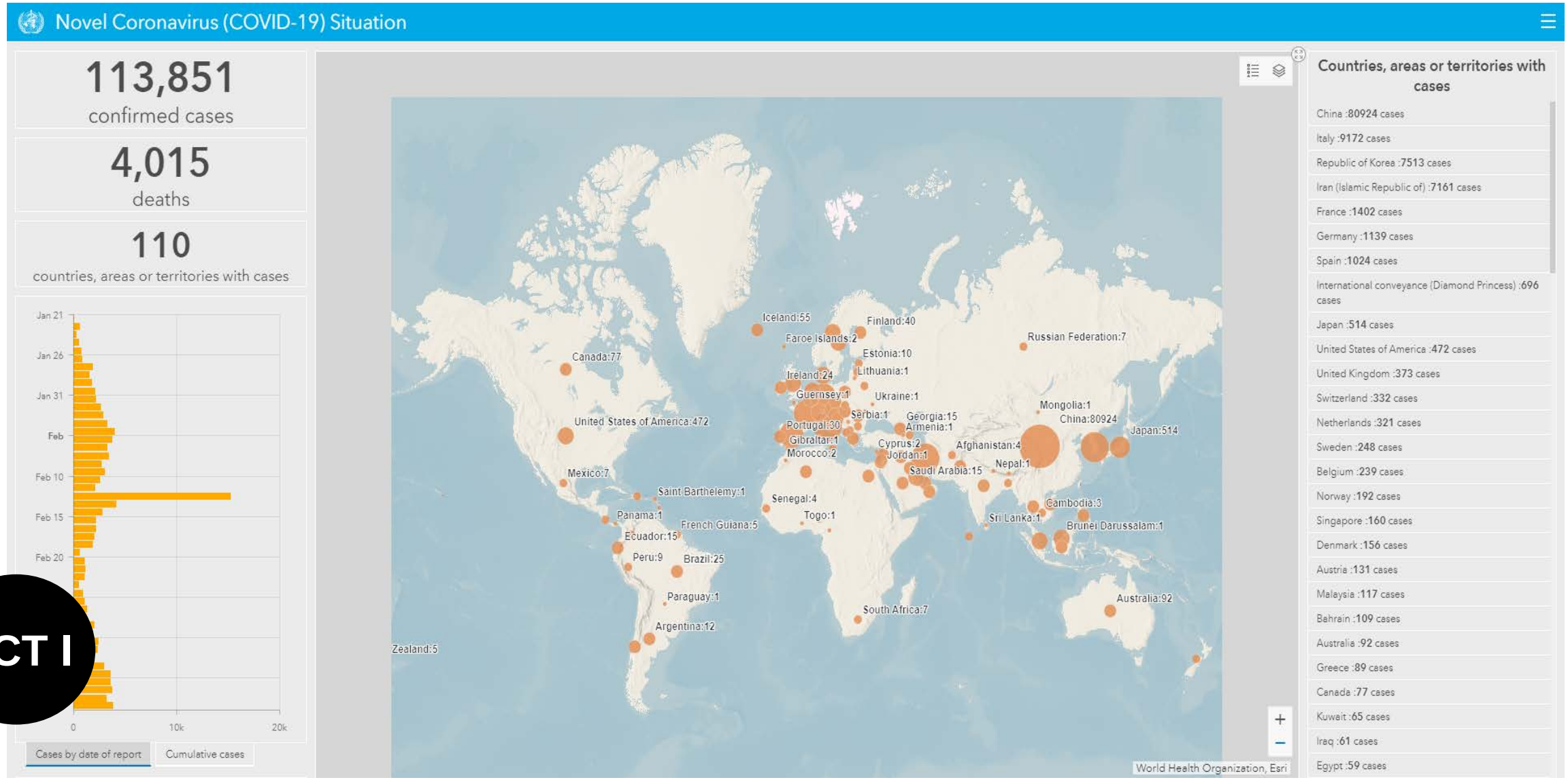
Our urban and global society increases opportunities for dissemination.



ACT I

https://bluedot.global/

COVID-19 detected on 6 continents.

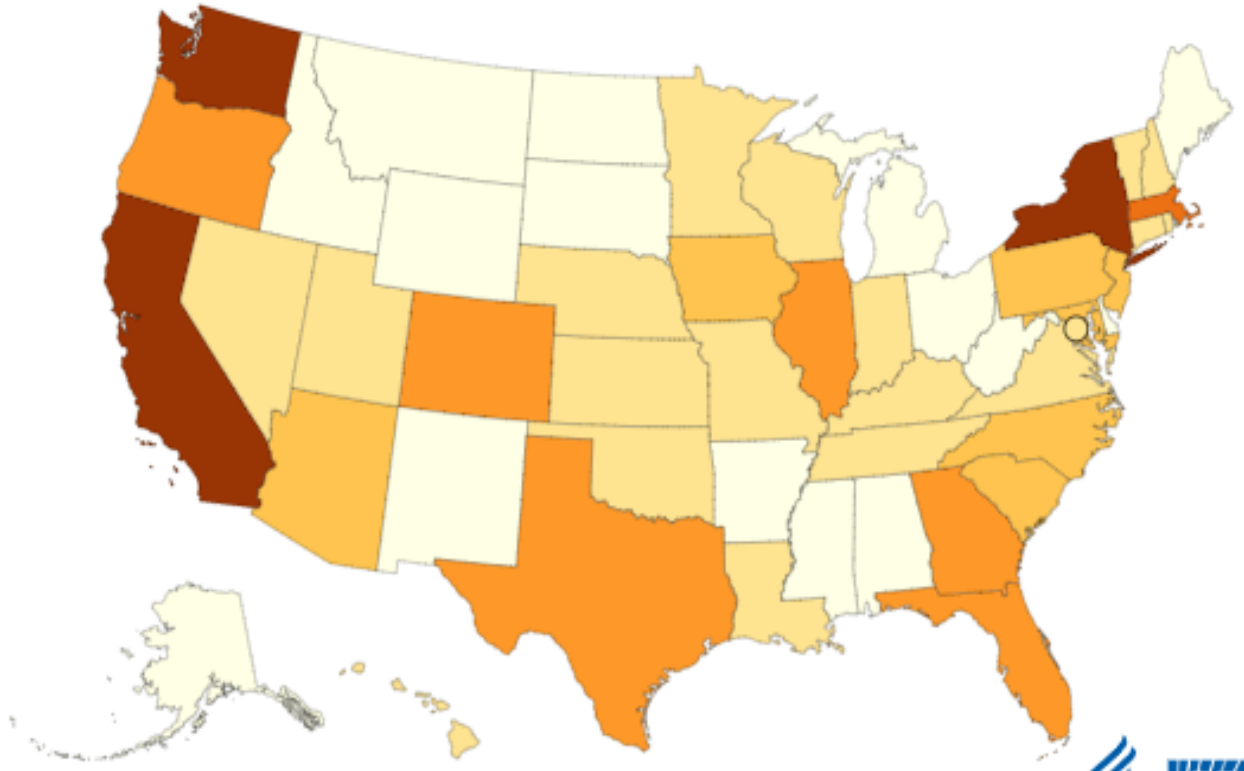


ACT I

https://experience.arcgis.com/experience/685d0ace521648f8a5beeeee1b9125cd

Community transmission of SARS-CoV-2 is increasing in the U.S.

States Reporting Cases of COVID-19 to CDC*



Reported Cases

- None
- 1 to 5
- 6 to 10
- 11 to 20
- 21 to 50
- 101 to 200

Territories AS GU MH FM MP PW PR VI

ACT I

December/January: Was your hospital preparing for CoVID?

Boardroom

Healthcare Team

Healthcare Providers

The Vindicator

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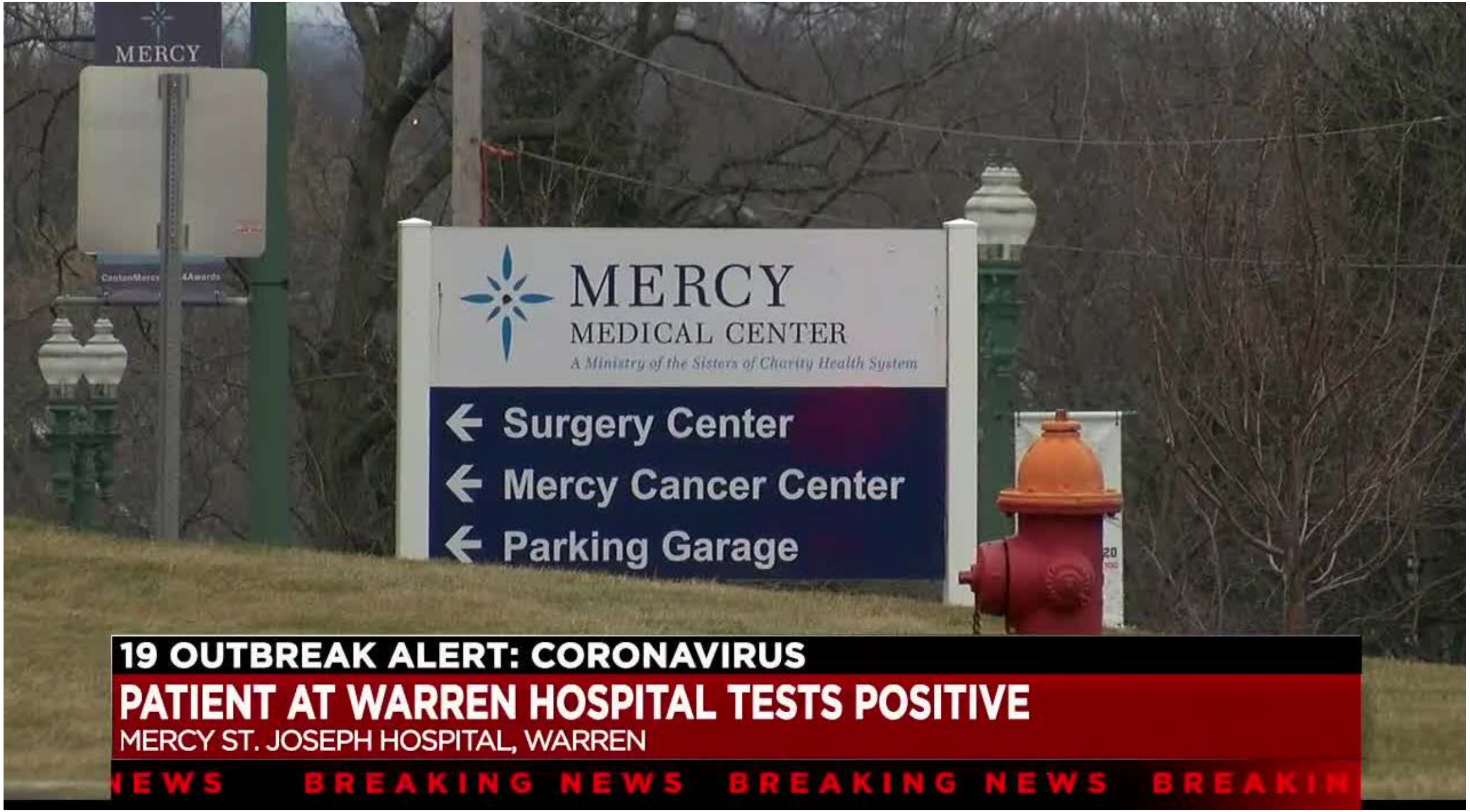
2nd Trumbull virus case is confirmed

First patient recovering, not out of woods yet

ubmitted photo Kevin Harris, 55, of Warren sits up in bed at St. Joseph Warren Hospital as he is treated for COVID-19, or novel coronavirus. Harris posted the photo to his Instagram Saturday with the caption "I can sit up without crying like a baby now." The first of Trumbull County's onfirmed cases, Harris said Saturday he was able to stand up after days of feeling like he was going to die.


MERCY
MERCY
MEDICAL CENTER
A Ministry of the Sisters of Charity Health System
Surgery Center
Mercy Cancer Center
Parking Garage
19 OUTBREAK ALERT: CORONAVIRUS
PATIENT AT WARREN HOSPITAL TESTS POSITIVE
MERCY ST. JOSEPH HOSPITAL, WARREN
NEWS BREAKING NEWS BREAKING NEWS BREAKIN

ACT I Progressive Relavation:COVID-19 Timeline

Date	Event
December 8, 2019	First case in China
December 30, 2019	BAL samples collected from which the virus wa first isolated
January 7, 2020	Novel virus identified
January 16, 2020	First case reported outside of China
January 30, 2020	WHO declares a “**Public Health Emergency c International Concern”**
February 29, 2020	First death in US
March 7, 2020	Ohio Governor declares a State of Emergency
March 10, 2020	Youngstown in Wave I of CoVID19

“Calling it”

ACT I

ACT II Managing Randomness

Religion morality

Theological imprudence

Materialism

Population control

Change in habits

Data /Science

Policy / solutions

Institutionalism

Organization of medicine/hospitals

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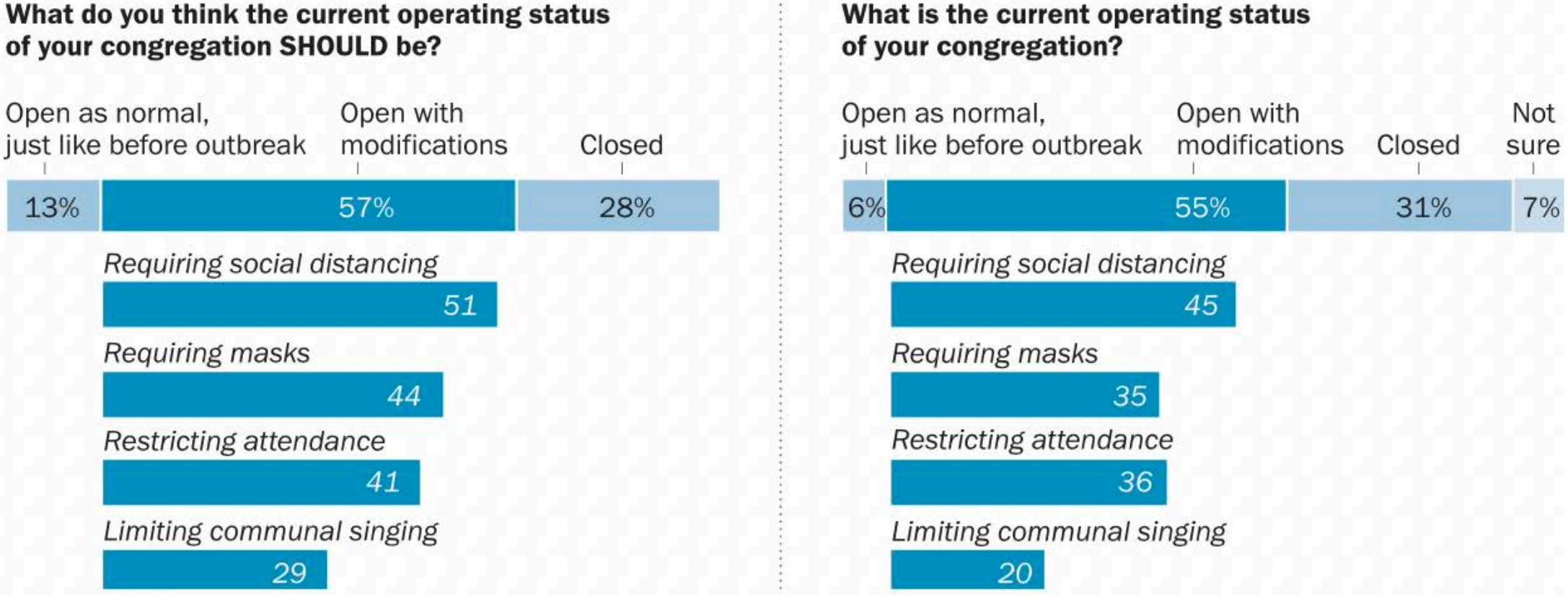
Social Construction of Disease

Epidemics /pandemics demand the creation of a framework within which need to be managed.

Rosenberg, Charles E. The Cholera Years: The United States in 1832, 1849 and 1866, please read: Chapter 1:The Epidemic, pp.13-39.

Among U.S. adults who regularly attend religious services, most think their house of worship should be open with modifications as a result of COVID-19

Based on U.S. adults who typically attend religious services at least monthly or attended in person in the last month



ACT II

Religion morality

Theological imprudence

ACT II

Materialism

Population control

Change in habits

Data /Science


ACT II
KIRKLAND
Bath Tissue
30 ROLLS
425
Charmin
Ultra Soft
MORE CUSHION
PREMIUM
Towel
Now Stronger
12 ROLLS
160
SCENTED KITCHEN
Bags
FLEX-TECH
13 GALLON
200 BAGS
NEW

Transmission of SARS-CoV-2 is largely by close person-to-person transmission

- **Respiratory droplets (primary) contact**
- **Airborne transmission over long distances is thought not to be likely**
- **Estimated reproduction number (r_o): ~2 - 2.5**

ACT II

Materialism

Population control

Change in habits

Data /Science

Zou et al, NEJM 2020; DOI: 10.1056/NEJMc2001737
Peiris et al, Lancet 2003; 361: 1767-72
Tsang et al, J Infect Dis 2015; 212; 1420-28

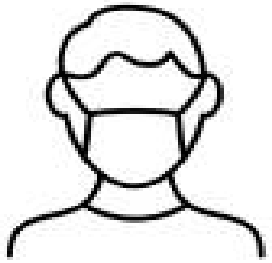
BMJ

WHO WE ARE WHAT WE DO PRODUCTS & SERVICES NEWSROOM WORK AT BMJ CONTACT US

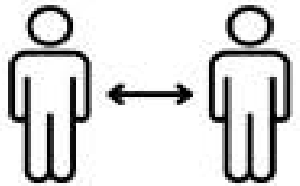
Wearing face masks at home might help ward off COVID-19 spread among family members

BMJ / Newsroom / Newsroom / Wearing face masks at home might help ward off COVID-19 spread among family members

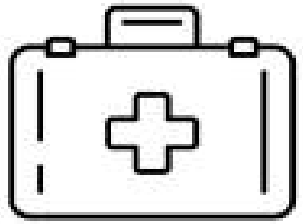
HAND WASHING



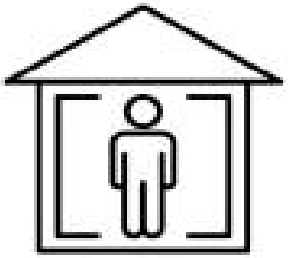
RESPIRATOR MASK



SOCIAL DISTANCING



MEDICAL CARE



SELF-ISOLATING

RESPIRATORY HYGIENE

HEALTHY EATING

INCREASE IMMUNITY

ACT II

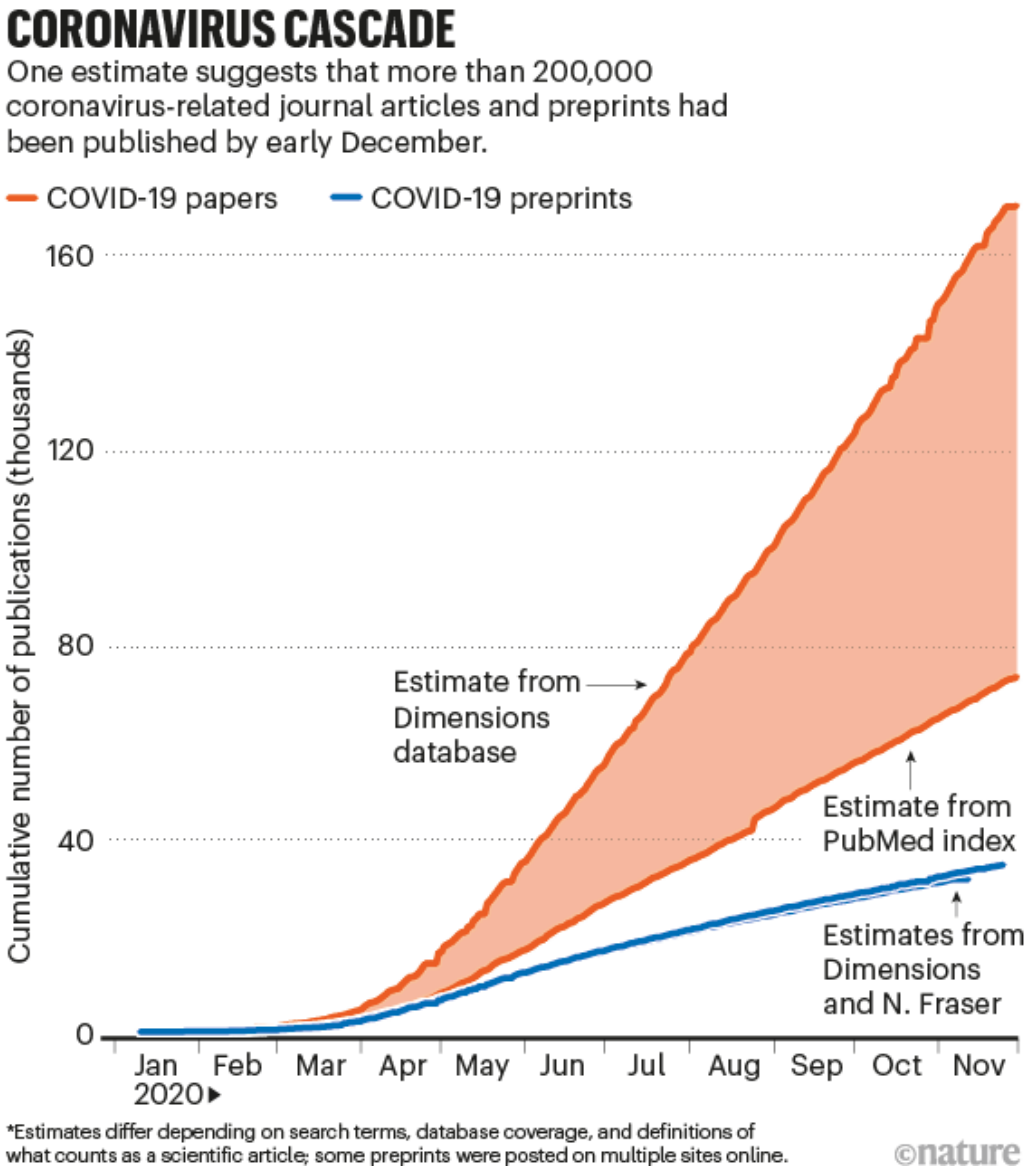
Population control

Change in habits

ACT II

Managing Randomness

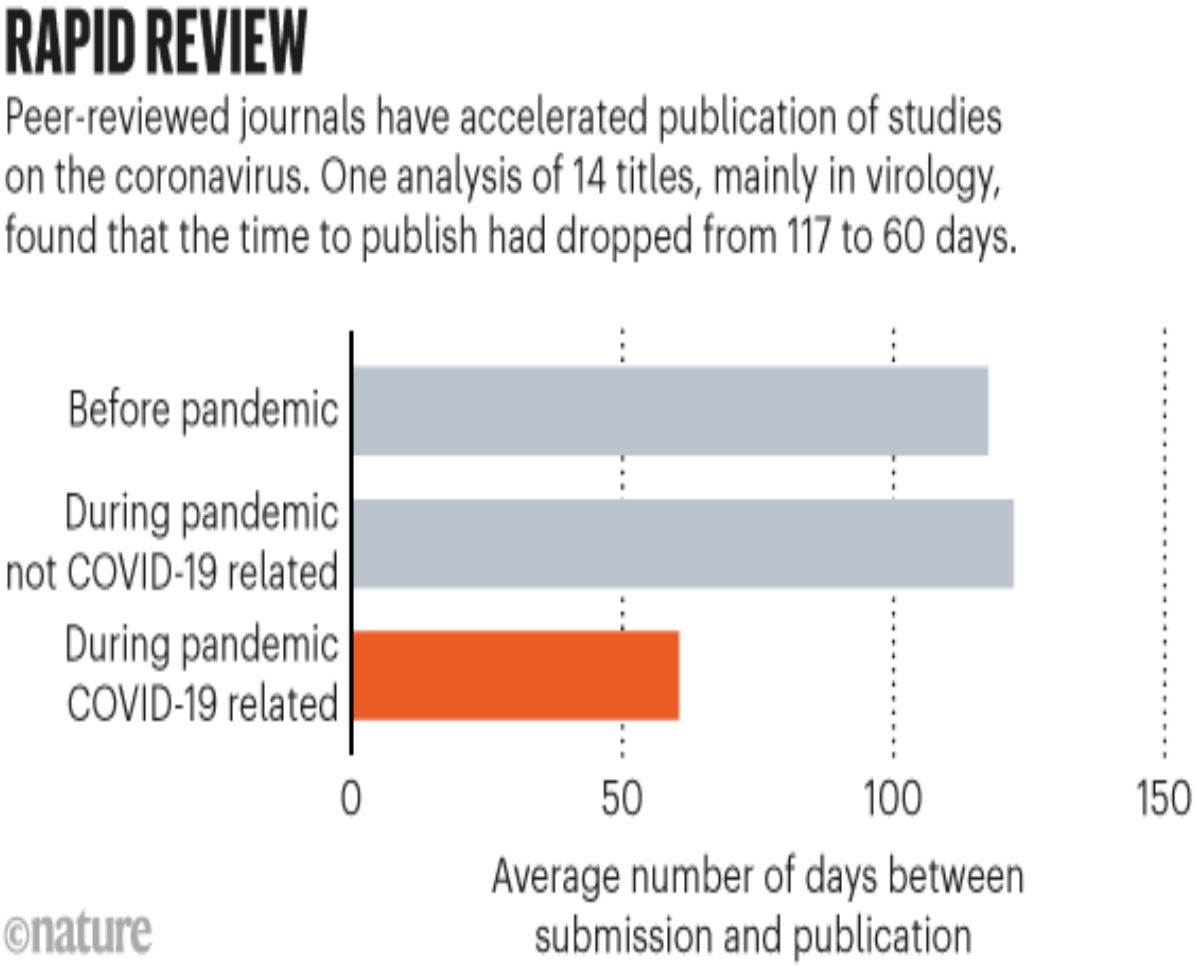
- **Data and Science**



ACT II

Managing Randomness

- **Data and Science**
- **The rapid publication of data was amazing, however:**
  - **Little was helpful**
  - **Most was not peer reviewed**
  - **Most was single center or isolated personal experience**
  - **Most studies were not RCT**



Hospitalizations were 6 times higher and deaths 12 times higher for COVID-19 patients with reported underlying conditions*

MOST FREQUENTLY REPORTED UNDERLYING CONDITIONS

CARDIOVASCULAR DISEASE

DIABETES

CHRONIC LUNG DISEASE

*compared to those with no reported underlying health conditions

CDC.GOV bit.ly/MMWR61520 MMWR

ACT II

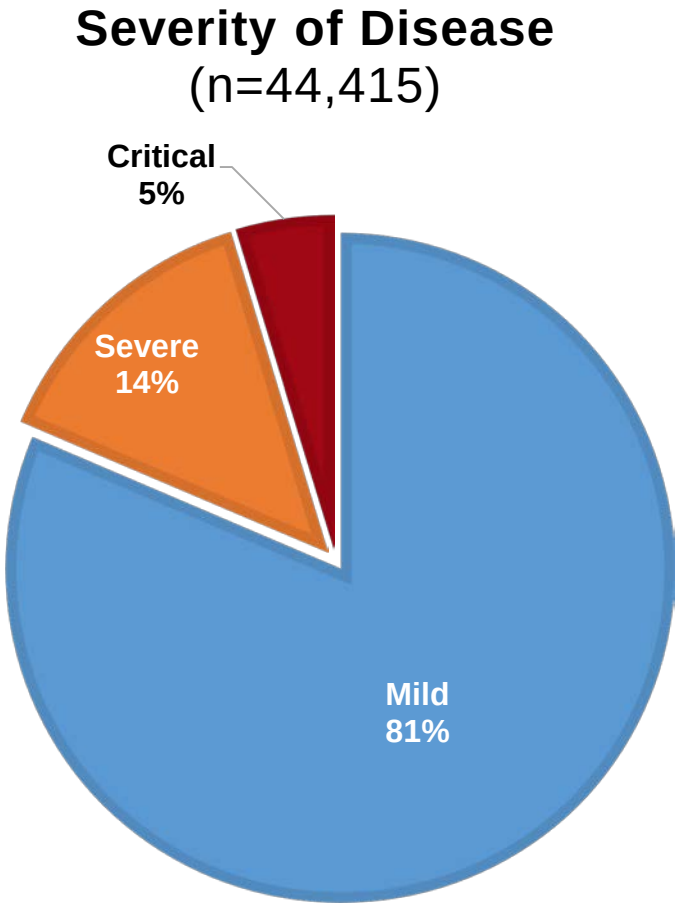
ACT II Managing Randomness: Data
Epidemiological characteristics of COVID-19 in China

72,314 cases in China

- **Confirmed: 44,672 (62%)**

Age distribution

- **>80 years: 3%**
- **30-79 years: 87%**
- **20-29 years: 8%**
- **10-19: 1%**
- **<10 year 1%**



Wu Z, McGoogan JM. Characteristics of and Important Lessons From the Coronavirus Disease 2019 (COVID-19) Outbreak in China: Summary of a Report of 72 314 Cases From the Chinese Center for Disease Control and Prevention. *JAMA.* 2020;323(13):1239–1242.

ACT II Managing Randomness: Epidemiological characteristics of COVID-19

Characteristic		1099 COVID-19 Cases
Incubation period (median (IQR)		4 (2-7)
Symptoms		
	Fever on admission	43.8%
	Fever during hospitalization	**88.7%**
	Cough	**67.8%**
	Sputum production	**33.7%**
	Shortness of breath	**18.7%**
	Myalgia	14.9%
	Sore throat	13.9%
	Headache	13.6%
	Chills/rigors	11.5%
	Nausea or vomiting	5%
	Diarrhea	3.8%
	Rhinorrhea	4.8%

www.thelancet.com Published online June 3, 2015 http://dx.doi.org/10.1016/S0140-6736(15)60454-8

ACT II Managing Randomness: Data Epidemiological Characteristics of COVID-19 in China

Lab/imaging finding	1,099 COVID-19 Cases
Any CXR abnormalities	59.1%
Any CT abnormalities	86.2%
WBC count (median (IQR))	4700 (3500-6000)
WBC count >10,000	5.9%
Lymphocyte count (median (IQR))	1000 (700-1300)
Lymphocytopenia <1500 per mm^3	83.2%
Thrombocytopenia < 150,000	36.2%
LDH >250 U/liter	41%
Procalcitonin elevated >0.5 ng/ml	5.5%
AST/ALT >40 U/liter	21-22%

Laboratory and imaging findings

Guan W-J et al. N Engl J Med 2020;382:1708-1720

CT findings include rounded ground glass opacities to progressive airspace opacities

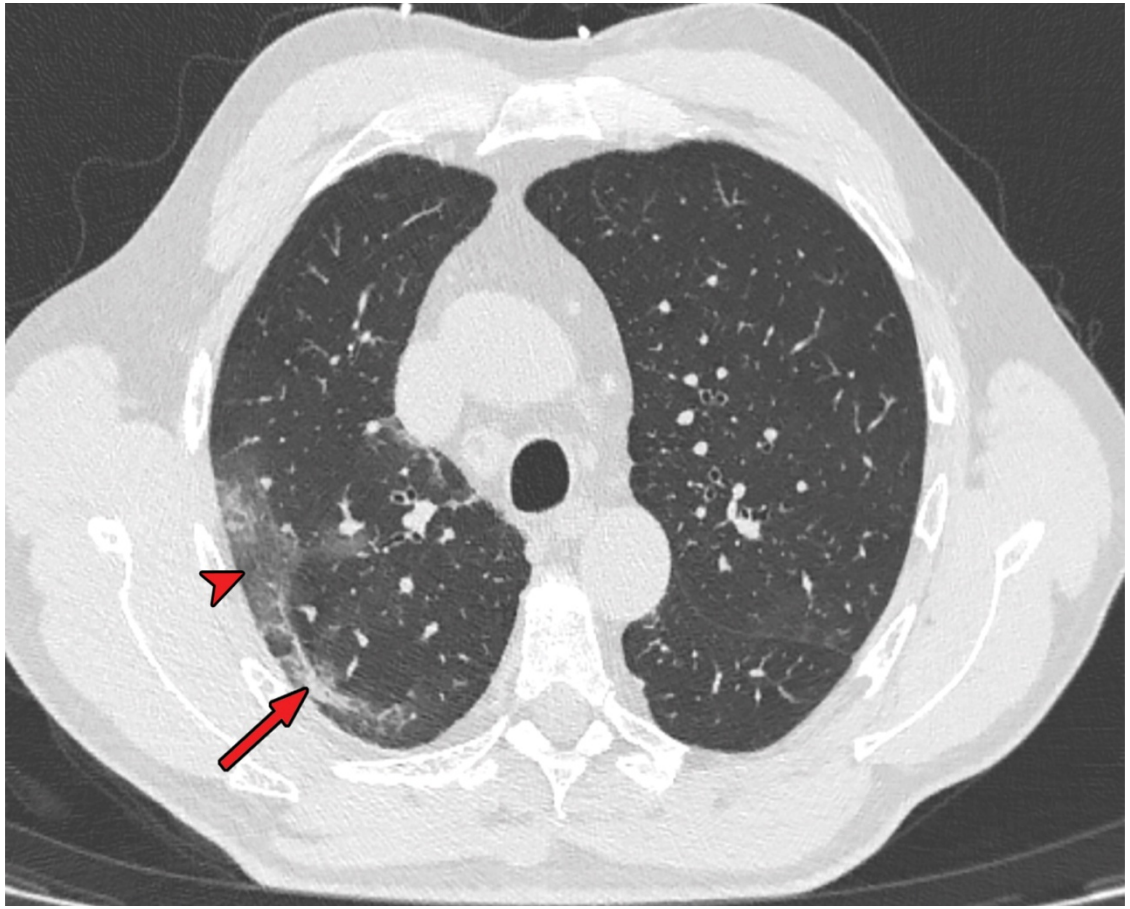
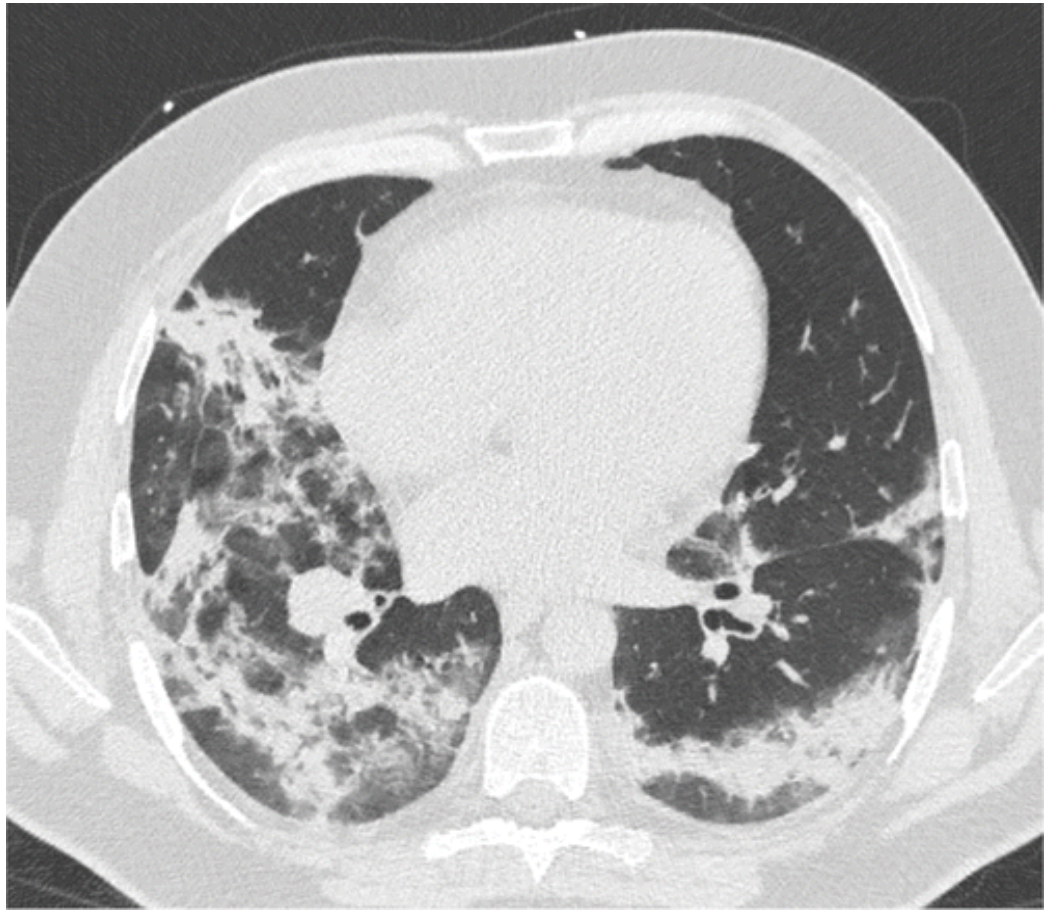


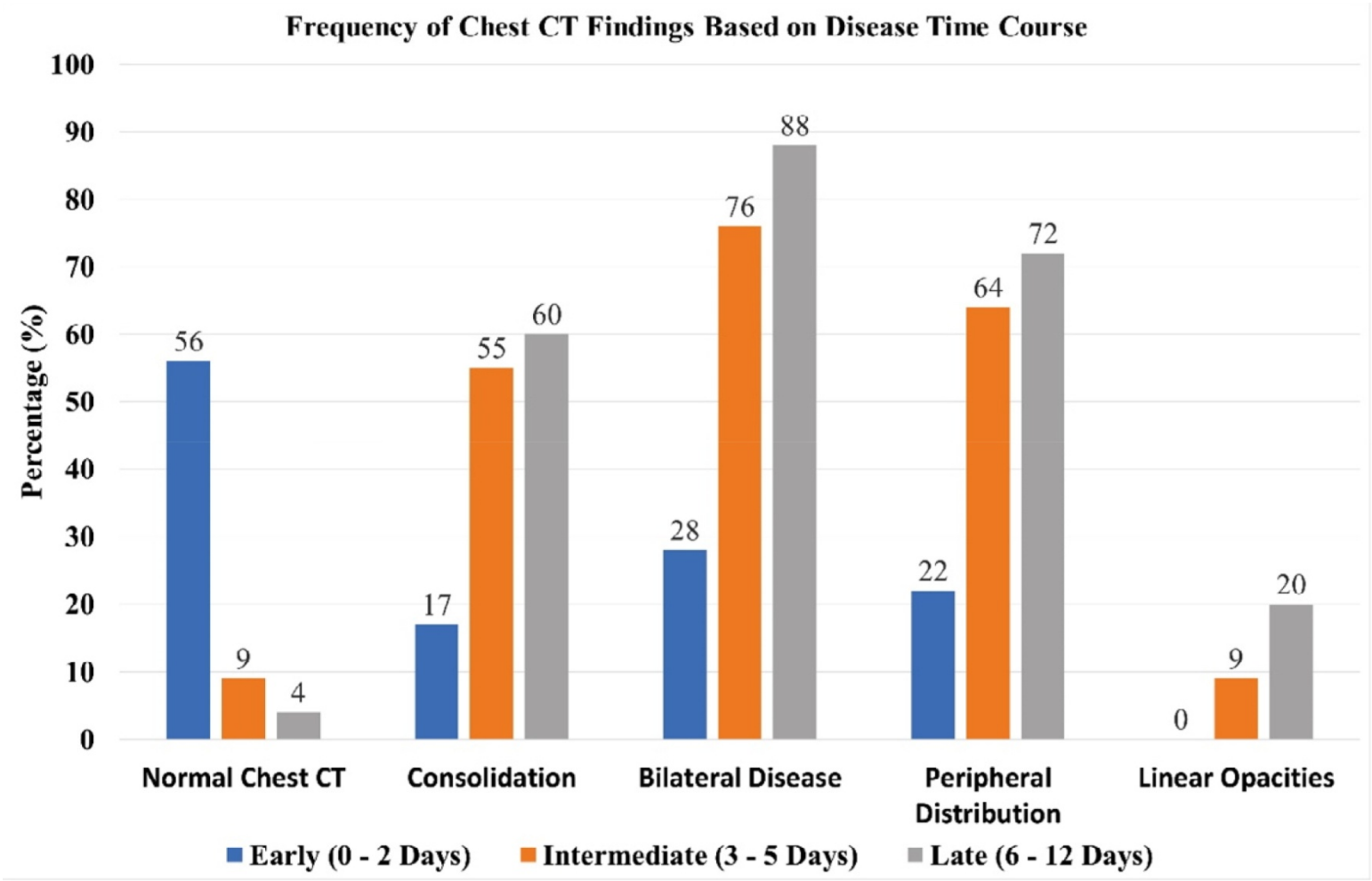
Figure. A 63-year-old man with positive RT-PCR test results for SARS-CoV-2. Axial nonenhanced chest CT image shows a subpleural curvilinear opacity (arrow) and an area of ground-glass opacity (arrowhead) in the right upper lobe.



Axial contrast-enhanced chest CT image (lung window) obtained after 7 days shows progression from ground-glass opacities to multifocal organizing consolidation.

Bernheim A Radiology 2020

Progression of CT abnormalities in 121 symptomatic patients with COVID-19



Chest CT Findings in Coronavirus Disease-19 (COVID-19): Relationship to Duration of Infection
Adam Bernheim, Xueyan Mei, Mingqian Huang, et al. Radiology 2020 295:3

Complications of COVID-19

Complication	1,099 COVID-19 Cases
Septic shock	1.1%
ARDS	3.4%
Acute kidney injury	0.5%
Non-invasive mechanical ventilation	5.1%
Invasive mechanical ventilation	2.3%
Use of extracorporeal membrane oxygenation	0.5%
Death	1.4%

Kordzadeh-Kermani E, Khalili H, Karimzadeh I. Pathogenesis, clinical manifestations and complications of coronavirus disease 2019 (COVID-19). *Future Microbiol*. 2020;15:1287-1305. doi:10.2217/fmb-2020-0110

BON SECOURS MERCY HEALTH

Infectious Disease In-Patient Treatment Algorithm for Patient's with Suspected and Confirmed CoVID-19

OTHER CONSIDERATIONS:

1. The following therapies are not recommended for treatment of CoVID-19:
   - Tamiflu
   - Steroids, unless a second indication warrants use (i.e. shock)
   - NSAIDs
2. Hydroxychloroquine Half Life = **40 days**
   - Monitor electrolytes. Consider obtaining an EKG at baseline, and every 48 hours.
3. Address medications that have the potential to increase LFT's (**i.e. Statins**) or prolong QTc (**i.e. Zofran**)
4. Protease Inhibitors/Ritonavir:
   - **Contraindicated** if a patient is taking Amiodarone, Dronedarone, Flecainide, or Ticagrelor
   - **Relatively Contraindicated** if a patient is taking Apixaban, Metronidazole, Nimodipine, Rivaroxaban, or Statins. Consider alternate therapies or holding the aforementioned medications.

**This is not a complete list of contraindications, but may be the most common one's seen in practice*

Duration of Therapy:

Agent	Duration
Azithromycin	5 day
Hydroxychloroquine	10 days
Protease Inhibitor	10 days
Ribavirin	5 days

Suspected CoVID-19*

Infection control *RT-PCR* done

CoVID Specific Labs:

1. **Baseline** : CBC with diff (lymphopenia), LDH, ferritin, LFT's D-Dimer, troponin, fibrinogen, PT/PTT, EKG, urinalysis
2. Draw labs at least every 24 - 48 hours
3. Consider ABG follow saturation and Pa/FiO2

Fever, hypoxia, or significant lung involvement on imaging

No

Initiate Mild/Moderate Treatment

Hydroxychloroquine

May consider adding Azithromycin

Intravenous Azithromycin will be limited to Intubated Patients

Hydroxychloroquine 400 mg BID x2 doses followed by 200 mg BID
Azithromycin 500 mg x1 followed by 250 mg daily

Yes

Above + gas exchange problems

CT Scan: Any GGO, bilateral multifocal patchy opacities, crazy paven pattern, any peripheral sub-pleural distribution changes, reticular or inter-lobar pattern changes

Worsening Symptoms

Initiate Moderate/Severe Treatment
*Below Therapies restricted to ID**

Hydroxychloroquine
+/- Azithromycin
† **Risk of QTc Prolongation**

+/-

Protease Inhibitor*
+/- Ribavirin* pending availability

Atazanavir 300** or 400 mg daily
† Kaletra PO 400/100 mg daily
Prezcobix 800/150 mg daily

***Atazanavir 300 mg must be dosed with Ritonavir 100 mg daily for boosting effects*

Ribavirin PO 600 mg BID
***Contraindications**: CrCl<50 ml/min, hepatic decompensation, significant/history of cardiovascular disease*
***BBW:** Hemolytic Anemia*

ARDS

Manage as indicated per current guidelines and procedures

Consider Tocilizumab* 400 mg x1 dose
Indication: Patient must have a Positive COVID-19 PCR result, **and** signs of Cytokine Releasing. Obtain informed consent

Dosing recommendations provided are based on patients who have normal renal and liver function and would not otherwise need further dose adjustments .

•**Remdesivir** is an IV anti-viral agent that has been shown to be effective against SARS-CoV and MERS-CoV. Currently, this is not commercially available, but efforts are being maintained to determine if this can be secured within our system.

•**Ribavirin**: Results are mixed, and studies have not been evaluated for use in COVID-19. Risk for significant adverse effect profile may outweigh the benefit.

•**Acetaminophen** is preferred over Ibuprofen for symptom management for patients with suspected CoVID-19. (*Day, M. March 17,2020. The* BMJ)

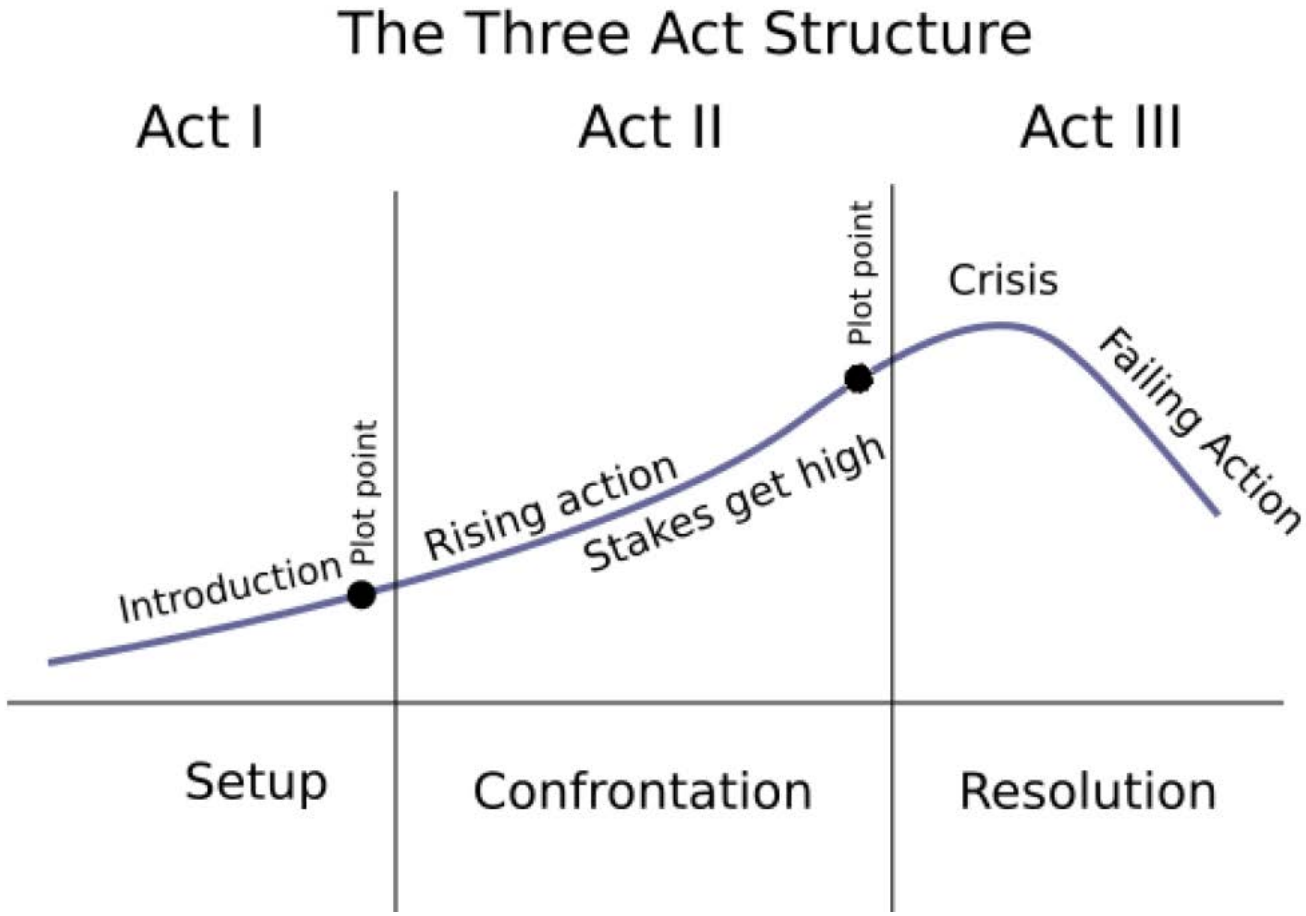
•**Azithromycin**[5]: Based on a very small study, in combination with Hydroxychloroquine may be more efficient for virus elimination. Consider reserving for patients with severe pneumonia or patient's refractory to alternative treatments. Dosing as per the standard Z-Pak. †**Additive risk for QTc Prolongation/Torsade's when used in combination with Hydroxychloroquine or Kaletra. Obtain baseline EKG.**

Clinical Management and Treatment or CoVID19 infection

	CDC	WHO
Treatment	• No COVID specific treatment • **Supportive** management including advanced organ support	• No COVID specific treatment • Several pages of management recommendations **supportive care**
Systemic Corticosteroids	• **Avoid** unless indicated for other reasons like septic shock or COPD	• **Do not routinely give for treatment of viral pneumonia or ARDS outside of clinical trials** unless indicated for another reason.
Investigational	• No RCT data to recommend any specific therapy yet	• No current evidence from RCTs to recommend any specific [treatment] • Unlicensed treatments should be administered thru ethically-approved clinical trials or the Monitored Emergency Use of Unregistered Interventions Framework with strict monitoring

ACT III Negotiation Public Response

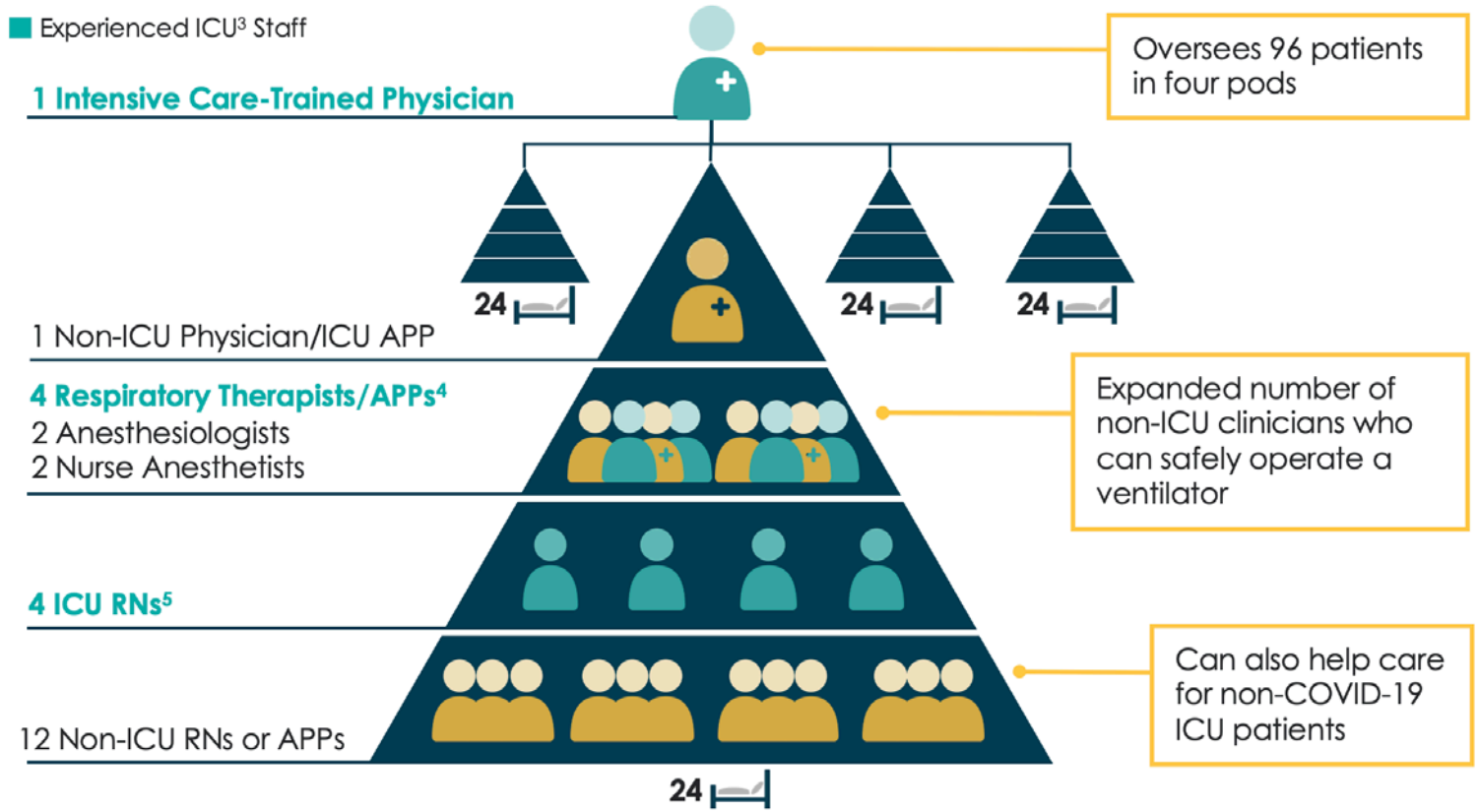
- **In this phase**
  - **Policy / solutions**
  - **Institutionalism**
  - **Organization of medicine/hospitals**
  - **Government responsibility**



Rethinking Critical Care Staffing for the COVID-19 Crisis

Tiered Staffing Strategy Greatly Augments Limited Number of Ventilator-Trained Clinicians

Society of Critical Care Medicine Guidelines for Pandemic-Level[1] Intensive Care Unit Staffing[2]



Current Respiratory Therapist Staffing Insufficient

36K-162K Estimated number of patients that can be ventilated nationally in a conventional staffing model

90K-324K Estimated number of patients that can be ventilated nationally in a modified staffing model[6]

1. Pandemic requiring significant mechanical ventilation.
2. Guidelines state each hospital will need to adjust both demands for critical care and available supply of personnel.
3. Intensive care unit.
4. Advanced practice provider.
5. Registered nurses.
6. Includes adding non-ICU staff, increasing patient to clinician ratios, and expanding staffed bed availability 20% to 60%.

Source: Ajao, Adebola, et al. "Assessing the Capacity of the US Health Care System to Use Additional Mechanical Ventilators During a Large-Scale Public Health Emergency." *Disaster Medicine and Public Health Preparedness*. U.S. National Library of Medicine, Dec. 2015. Web. 20 Mar. 2020; Halpern, Neil A. et al. "U.S. ICU Resource Availability for COVID-19." Society of Critical Care Medicine. 13 Mar. 2020. Web. 18 Mar. 2020; Gist Healthcare analysis.


their temperatures check prior to start of your shift.
Please report to one of the following locations to have your temperature checked.
Park Ave. Entrance
Available All Hours
Belmont Entrance
6:30am - 7:30am
2:30pm - 3:30pm

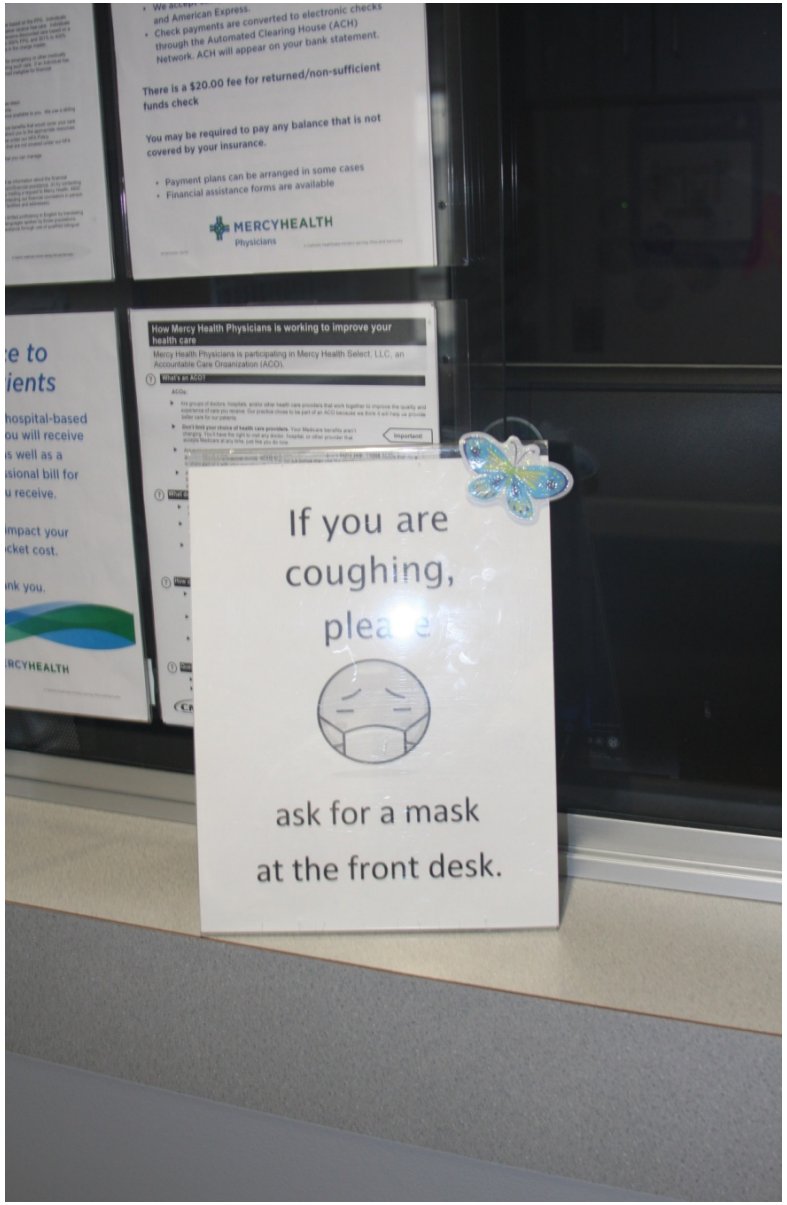
Transmission can be prevented in healthcare-settings.

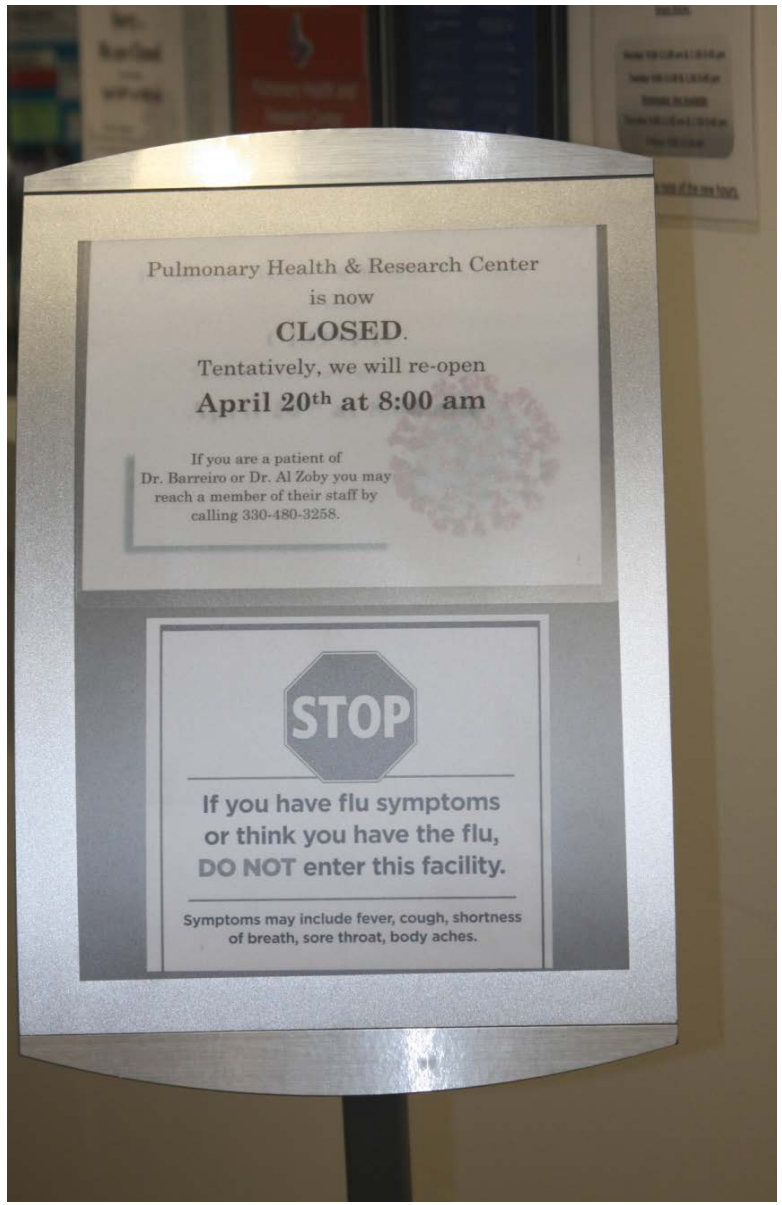
Minimize risk of exposure

- **Before arrival**
- **Upon arrival/during visit: implement source control measures immediately**
  - **Visual alerts**
  - **Supplies (hand hygiene, masks)**
  - **Screening for signs/symptoms**
  - **Physical separation from others**
    - **Single room with door closed (partitions, distance)**
- **Limit/restrict visitors, limit staff entering room**

https://www.cdc.gov/coronavirus/2019-ncov/infection-control/control-recommendations.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fhcp%2Finfection-control.html

Visual Alerts


and American Express.
Check payments are converted to electronic checks through the Automated Clearing House (ACH) Network. ACH will appear on your bank statement.
There is a $20.00 fee for returned/non-sufficient funds check
You may be required to pay any balance that is not covered by your insurance.
Payment plans can be arranged in some cases
Financial assistance forms are available
MERCYHEALTH
Physicians
How Mercy Health Physicians is working to improve your health care
Mercy Health Physicians is participating in Mercy Health Select, LLC, an Accountable Care Organization (ACO).
If you are coughing, please
ask for a mask at the front desk.


Pulmonary Health & Research Center
is now
CLOSED.
Tentatively, we will re-open
April 20th at 8:00 am
If you are a patient of Dr. Barreiro or Dr. Al Zoby you may reach a member of their staff by calling 330-480-3258.
STOP
If you have flu symptoms or think you have the flu, DO NOT enter this facility.
Symptoms may include fever, cough, shortness of breath, sore throat, body aches.


Droplet Plus Isolation
(Droplet + Contact + Face Shield)
PPE Required on entry to patient room
Procedure mask or N95/CAPR/PAPR
N95/CAPR/PAPR recommended for aerosolizing procedures & specimen collection
Gown
Gloves
Goggles or Face Shield
Single-person room with the door closed with dedicated bathroom
*Airborne Isolation Room (AIIR) recommended for aerosolizing procedures
Always keep door closed
Dedicated Equipment: Thermometer, Blood Pressure Cuff and Stethoscope Should Remain in Room
Items leaving room require intermediate level disinfection with hospital approved disinfectant
Perform Hand Hygiene with each room entry and exit
Visitors MUST check in with nurse prior to room entry.
4423
ALL VISITO
No food or drin
permitted in pati
rooms.
Please wash hands


CAUTION
CAUTION
CAUTION


CAUTION
CAUTION
CAUTION
CAUTION

Transmission can be prevented in healthcare-settings

Standard and transmission-based precautions

- **Hand hygiene**
- **Equipment, environment cleaning and disinfection**
- **Personal protective equipment (PPE) for HCP**
  - **Droplet precautions (mask with eye protection)**
  - **Contact precautions (gown and gloves)**
  - **Aerosol-generating procedures: N95 respirator**

https://www.cdc.gov/coronavirus/2019-ncov/infection-control/control-recommendations.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fhcp%2Finfection-control.html

Reporting of Results

Procedure	Result	Ref Range
SARS-CoV-2-RT-PCR	**Not Detected**	**Not Detected**

Interpretation: SARS-CoV-2 RNA not detected. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), previously known as 2019 novel coronavirus (2019-nCoV), not detected results indicate no measurable level of SARS-CoV-2 nucleic acid is present. Not detected results do not preclude SARS-CoV-2 infection and should not be used as the sole basis for treatment or other patient management decisions. Negative results must be combined with clinical observations, patient history, and epidemiological information. Optimum specimen types and timing for peak viral levels during infections caused by SARS-CoV-2 have not been determined. Collection of multiple specimens from the same patient may be necessary to detect the virus. The possibility of a false negative result should especially be considered if the patient's recent exposures or clinical presentation suggest that SARS-CoV-2 infection is possible, and diagnostic tests for other causes of illness e.g., other respiratory illness, are negative. If SARS-CoV-2 infection is still suspected, re-testing should be considered in consultation with public health authorities. This test has been validated but FDA's independent review of this validation is pending.

Procedure	Result	Ref Range
SARS-CoV-2-RT-PCR	**Detected***	**Not Detected**

Interpretation: SARS-CoV-2 RNA detected. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), previously known as 2019 novel coronavirus (2019-nCoV), presumptive positive result indicates an active infection with SARS-CoV-2, but does not rule out bacterial infection or coinfection with other viruses. The agent detected may not be the definite cause of disease. Results must be combined with clinical observations, patient history, and epidemiological information for patient management decisions. This test has been validated but FDA's independent review of this validation is pending.

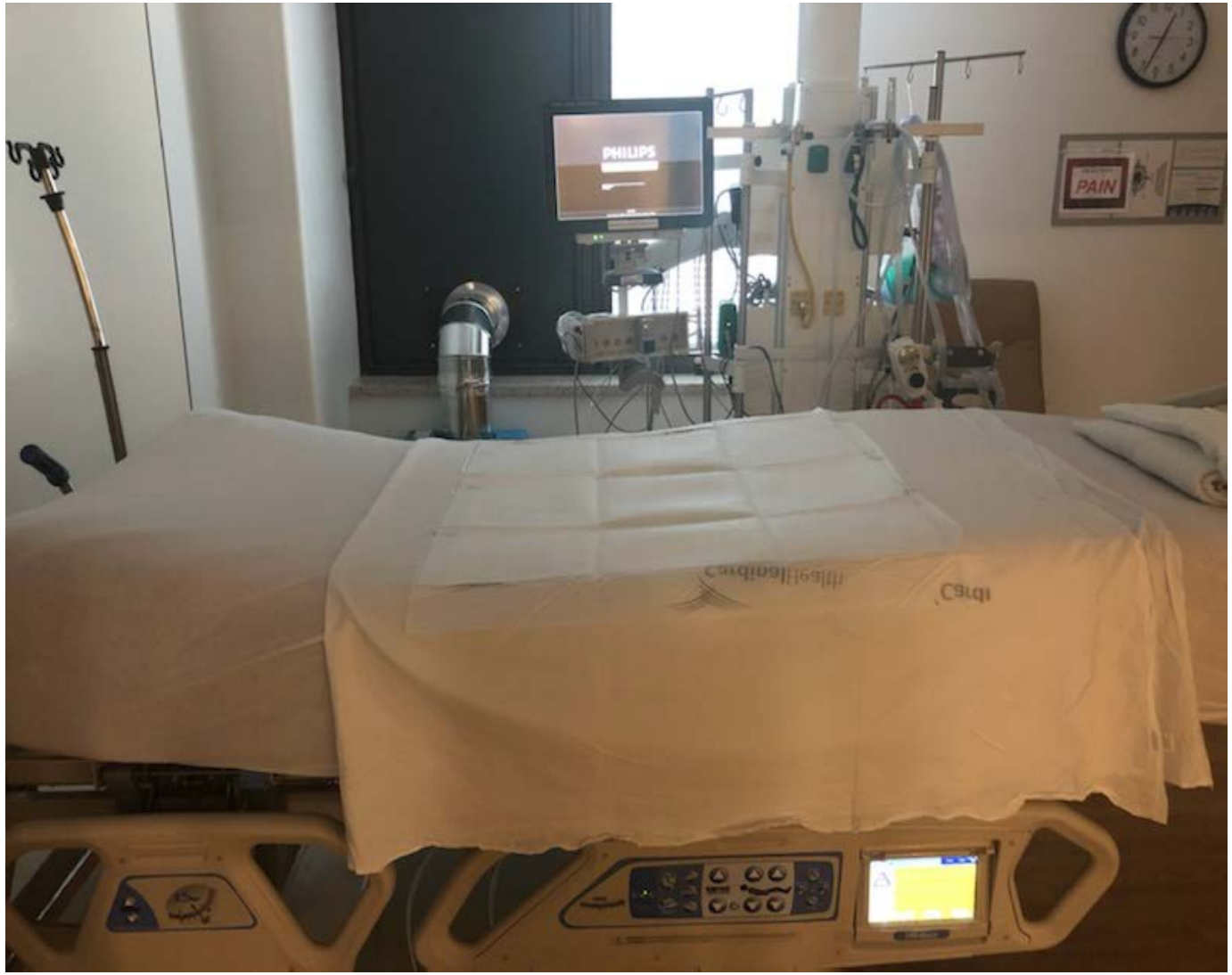
Procedure	Result	Ref Range
SARS-CoV-2-RT-PCR	**Indeterminate***	**Not Detected**

Interpretation: Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), previously known as 2019 novel coronavirus (2019-nCoV) indeterminate, may be due to inhibitory PCR. Please submit new sample.


Droplet Plus Isolation
(Droplet + Contact + Face Shield)
PPE Required on entry to patient room
✓ Procedure mask or N95/CAPR/PAPR
• N95/CAPR/PAPR recommended for aerosolizing procedures & specimen collection
✓ Gown
✓ Gloves
✓ Goggles or Face Shield
• Single-person room with the door closed with dedicated bathroom
• Airborne Isolation Room (AIIR) recommended for aerosolizing procedures
• Always keep door closed
• Dedicated Equipment: Thermometer, Blood Pressure Cuff and Stethoscope Should Remain in Room
• Items leaving room require intermediate level disinfection with hospital approved disinfectant
• Perform Hand Hygiene with each room entry and exit
Visitors MUST check in with nurse prior to room entry.


Please keep this device on at all times
InTouch Health
Click menu to interact
INTOUCH HEALTH


2020
NSIC
LOS GOAL
0.76
MUST have an order
written
TRANSFER TO ICU
LEVEL OF CARE.


PHILIPS
PAIN


EXIT


CRRT
Vent
ETT - V'CAC
Q 6hr Blood sugars


31
32

Recruitment of resources: Don’t say not to anyone

- **Orthopedic surgeons = Proning teams**
- **Outpatient Nurse Practitioners= CVVH support**
- **Anesthesia= procedure team (Airway, CVL, A-line, HD line, OG tube)**
- **ENT/Intervention Pulmonary = Tracheostomy Team**
- **Psych/Palliative Care = Family contact team**
- **Students = “Write up papers” team**

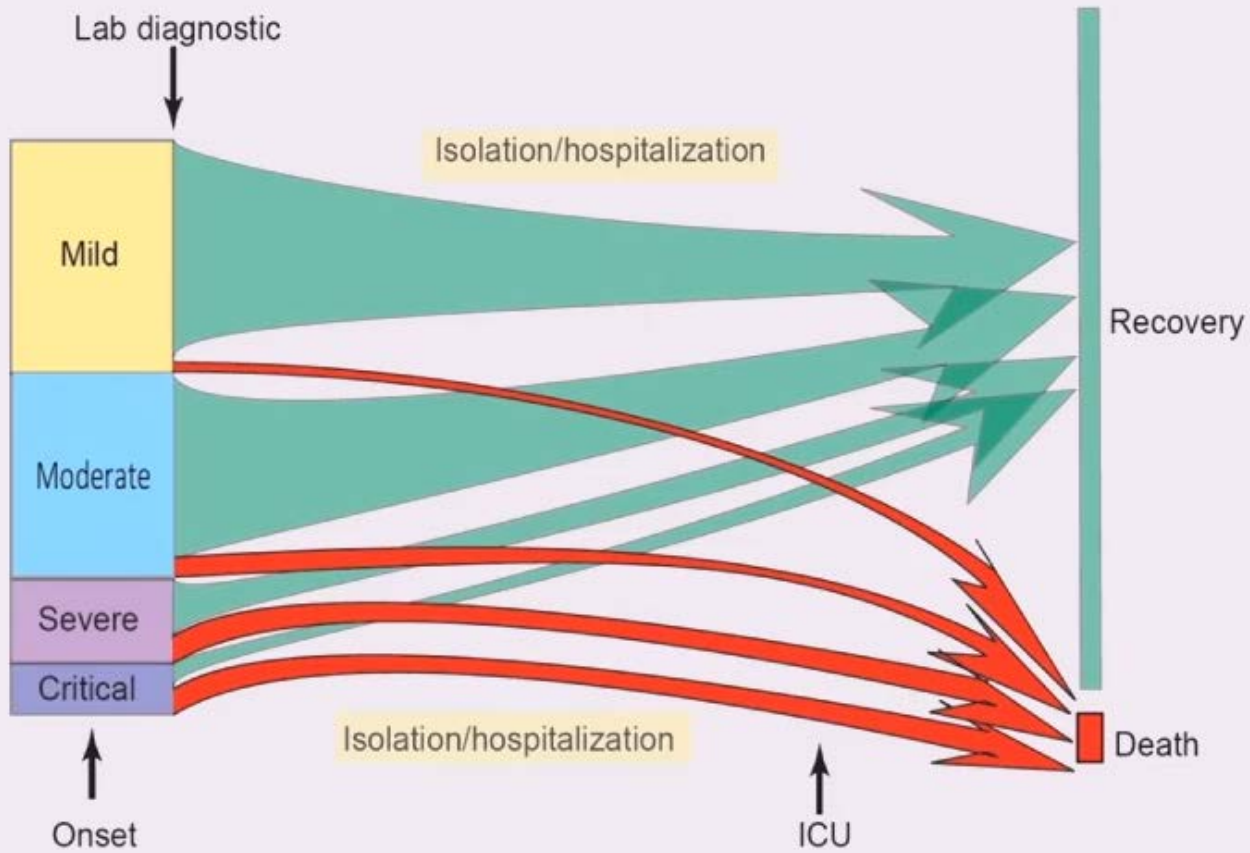
Crisis Communication

Communicating Through the Coronavirus Crisis

by Paul A. Argenti

March 13, 2020

Clinical prognosis and recovery



Aylward B et al, WHO-China Mission, 2020

The Day Message Boards, Resource allocation

Vents	SEYH	SEBH	SJWH	Market
Total Traditional in use	**20**	**5**	**7**	**32**
Total in Use	20	5	7	32
COVID +	1	2	2	5
COVID R/O	0	0	0	0
Non COVID	19	3	5	27
Broken	0	0	0	0
Total Traditional vents available	**30**	**22**	**6**	**58**
Total Available (Possible ventilation)	34	28	9	75
980/840 Normal ICU Vent	30	22	6	58
NECO (LTV1200, Eagle) True Vents able to vent all patients	0	0	0	0
HT-70's/Crossvent /Drager - Transport vent also used for ED/Trauma	7	4	2	
Trilogy Need Ward Type Care Setting & Non-chemical Paralyzed PTs	0	0	0	
IC2A Transport only	0	1	1	
ParaPac Transport only	1	1	0	
OR Anesthesia Machines				
V60 Need Ward Type Care Setting & Non-chemical Paralyzed PTs	0	0	0	

BON SECOURS MERCY HEALTH

Influenza testing,
Respiratory Array
NATT or PCR Testing

Suspected
CoVID-19*

Any of the following:

Fever > 100.4,
Recent travel or close contact,
Myalgia/fatigue, or
Diarrhea 3 day prior to fever

Yes

Admit to Hospitalist
PPE Strict Isolation

Initiate Treatment

CoVID Specific Labs:
EPIC: CoVID Focus

Baseline to order : CBC with differential, LDH, ferritin, LFT's, D-Dimer, troponin, Procalcitonin, fibrinogen, PT/PTT, baseline - EKG, urinalysis, Lactate level, BC x2, please add IL-6 level
Draw labs at least every 48 hours
Consider ABG follow saturation and Pa/FiO2

*** Classic CT Scan Δ :**

Hypoxia, or significant lung involvement on imaging

***CT Scan:** Any GGO, bilateral multifocal patchy opacities, crazy paven pattern, any peripheral sub-pleural distribution changes, reticular or inter-lobar pattern changes

Consider Tocilizumab* 400 mg x1 dose
Redemesivir for 5 days (Don't use in renal failure or LFTs elevated
Decadron 6 mg po/iV daily for 10 days (if in shock change to Hydrocortisone 100 IV Q8)
ARD protocol if intubated
Keep Plt pressure <30

Evidently Cochrane

Sharing health evidence you can trust

Chapman S. "Convalescent plasma to treat people with COVID-19: the evidence so far". Evidently Cochrane blog, 15 May 2020, last updated 12 October 2020. https://www.evidentlycochrane.net/convalescent-plasma

"Convalescent plasma to treat people with COVID-19: the evidence so far"

Take-home points

- A Cochrane rapid review with 19 studies, including two small randomized controlled trials, shows that the effectiveness and safety of convalescent plasma for people with COVID-19 are uncertain.
- The review authors identified 138 ongoing studies, including 73 randomized trials.
- This review is being regularly updated as a 'living systematic review', based on monthly searches for new evidence, and the results are likely to change.

Clinical Management and Treatment of CoVID Reimagined

	CDC	WHO
Treatment	• **Supportive** management including advanced organ support	Remdesivir (investigational) Developed and tested to treat Ebola Safety database in >500 individuals *in vitro* antiviral activity against SARS CoV-2 Activity against MERS-CoV in macaque model Outcompetes proofreading ability of exonuclease
Systemic Corticosteroids		• **Do not routinely give for treatment of viral pneumonia or ARDS outside of clinical trials** unless indicated for another reason.
Investigational	• No RCT data to recommend any specific therapy yet	• No current evidence from RCTs to recommend any specific [treatment] • Unlicensed treatments should be administered thru ethically-approved clinical trials or the Monitored Emergency Use of Unregistered Interventions Framework with strict monitoring

Male sex 7,539 (62%)
Age 66
Days since symptom onset (median) 8

Respiratory support

No oxygen required	(25%)
Supplemental oxygen	(62%)
Ventilation/ECMO	(13%)

Prior disease:

Diabetes	(27%)
Cardiovascular disease	(28%)
Chronic lung disease	(22%)

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 FEBRUARY 25, 2021 VOL. 384 NO. 8

Dexamethasone in Hospitalized Patients with Covid-19

The RECOVERY Collaborative Group*

ABSTRACT

BACKGROUND

Coronavirus disease 2019 (Covid-19) is associated with diffuse lung damage. Glucocorticoids may modulate inflammation-mediated lung injury and thereby reduce progression to respiratory failure and death.

METHODS

In this controlled, open-label trial comparing a range of possible treatments in patients who were hospitalized with Covid-19, we randomly assigned patients to receive oral or intravenous dexamethasone (at a dose of 6 mg once daily) for up to 10 days or to receive usual care alone. The primary outcome was 28-day mortality. Here, we report the final results of this assessment.

RESULTS

A total of 2104 patients were assigned to receive dexamethasone and 4321 to receive usual care. Overall, 482 patients (22.9%) in the dexamethasone group and 1110 patients (25.7%) in the usual care group died within 28 days after randomization (age-adjusted rate ratio, 0.83; 95% confidence interval [CI], 0.75 to 0.93; P<0.001). The proportional and absolute between-group differences in mortality varied considerably according to the level of respiratory support that the patients were receiving at the time of randomization. In the dexamethasone group, the incidence of death was lower than that in the usual care group among patients receiving invasive mechanical ventilation (29.3% vs. 41.4%; rate ratio, 0.64; 95% CI, 0.51 to 0.81) and among those receiving oxygen without invasive mechanical ventilation (23.3% vs. 26.2%; rate ratio, 0.82; 95% CI, 0.72 to 0.94) but not among those who were receiving no respiratory support at randomization (17.8% vs. 14.0%; rate ratio, 1.19; 95% CI, 0.92 to 1.55).

CONCLUSIONS

In patients hospitalized with Covid-19, the use of dexamethasone resulted in lower 28-day mortality among those who were receiving either invasive mechanical ventilation or oxygen alone at randomization but not among those receiving no respiratory support. (Funded by the Medical Research Council and National Institute for Health Research and others; RECOVERY ClinicalTrials.gov number, NCT04381936; ISRCTN number, 50189673.)

The members of the writing committee (Peter Horby, F.R.C.P., Wei Shen Lim, F.R.C.P., Jonathan R. Emberson, Ph.D., Marion Mafham, M.D., Jennifer L. Bell, M.Sc., Louise Linsell, D.Phil., Natalie Staplin, Ph.D., Christopher Brightling, F.Med.Sci., Andrew Ustianowski, Ph.D., Einas Elmahi, M.Phil., Benjamin Prudon, F.R.C.P., Christopher Green, D.Phil., Timothy Felton, Ph.D., David Chadwick, Ph.D., Kanchan Rege, F.R.C.Path., Christopher Fegan, M.D., Lucy C. Chappell, Ph.D., Saul N. Faust, F.R.C.P.C.H., Thomas Jaki, Ph.D., Katie Jeffery, Ph.D., Alan Montgomery, Ph.D., Kathryn Rowan, Ph.D., Edmund Juszczak, M.Sc., J. Kenneth Baillie, M.D., Ph.D., Richard Haynes, D.M., and Martin J. Landray, F.R.C.P.) assume responsibility for the overall content and integrity of this article.

The affiliations of the members of the writing committee are listed in the Appendix. Address reprint requests to Drs. Horby and Landray at RECOVERY Central Coordinating Office, Richard Doll Bldg., Old Road Campus, Roosevelt Dr., Oxford OX3 7LF, United Kingdom, or at recoverytrial@ndph.ox.ac.uk.

*A complete list of collaborators in the RECOVERY trial is provided in the Supplementary Appendix, available at NEJM.org.

Drs. Horby, Lim, and Emberson and Drs. Haynes and Landray contributed equally to this article.

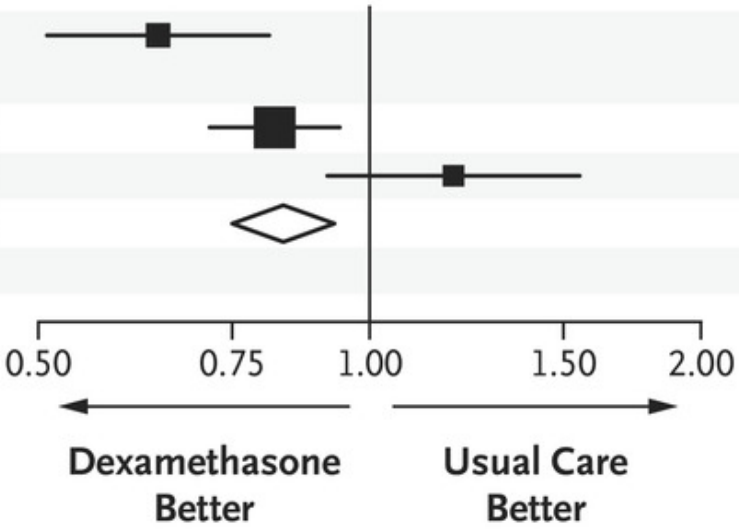
A preliminary version of this article was published on July 17, 2020, at NEJM.org.

N Engl J Med 2021;384:693-704.
DOI: 10.1056/NEJMoa2021436

Effect of Dexamethasone on 28-Day Mortality, According to Respiratory Support at Randomization

Respiratory Support at Randomization	Dexamethasone	Usual Care	Rate Ratio (95% CI)
	no. of events/total no. (%)		
Invasive mechanical ventilation	95/324 (29.3)	283/683 (41.4)	0.64 (0.51–0.81)
Oxygen only	298/1279 (23.3)	682/2604 (26.2)	0.82 (0.72–0.94)
No oxygen received	89/501 (17.8)	145/1034 (14.0)	1.19 (0.92–1.55)
All Patients	**482/2104 (22.9)**	**1110/4321 (25.7)**	**0.83 (0.75–0.93)**
			P<0.001

Chi-square trend across three categories: 11.6



The RECOVERY Collaborative Group. N Engl J Med 2021;384:693-704.

Evaluate Existing Antivirals: RNA-dependent-polymerases

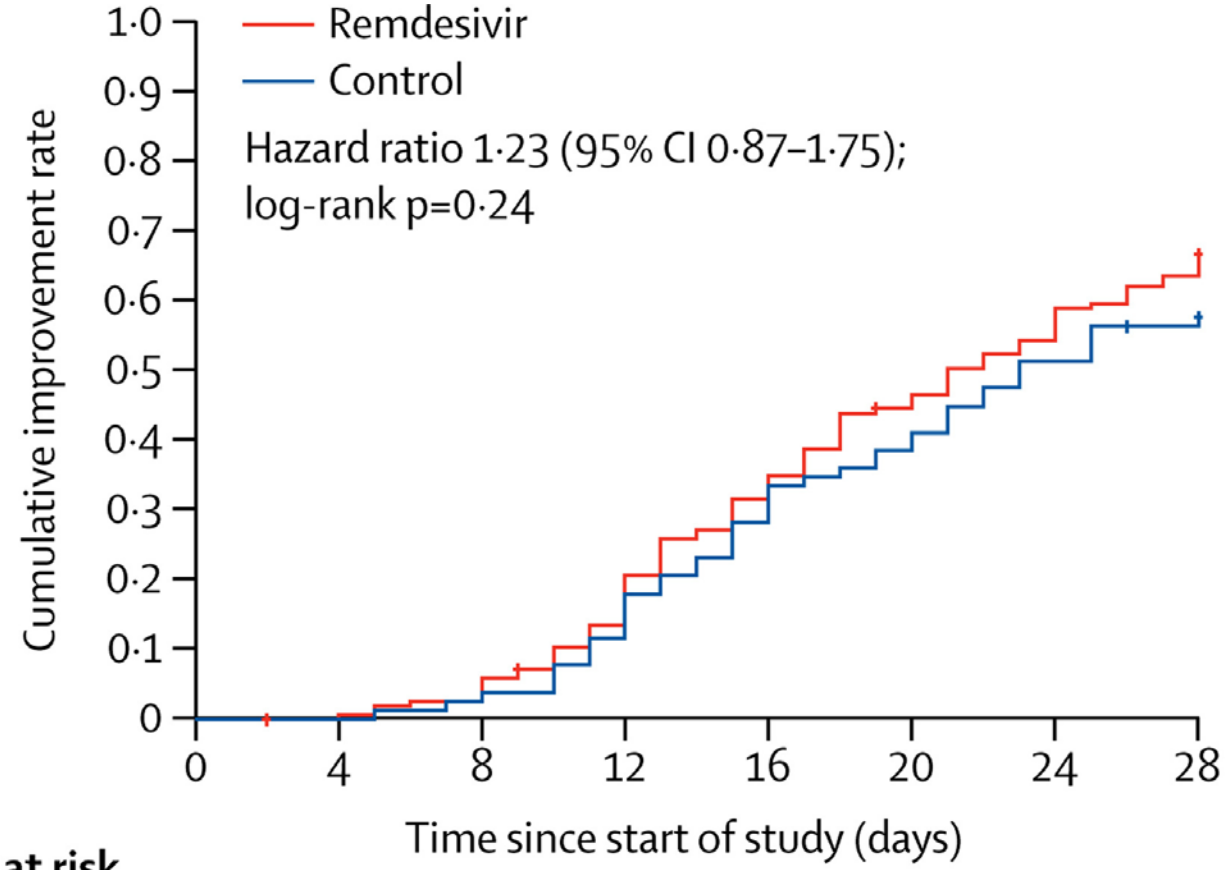
- **Remdesivir**
  - **Developed and tested to treat Ebola**
    - **Safety database in >500 individuals**
  - ***in vitro* antiviral activity against SARS CoV-2**
  - **Activity against MERS-CoV in macaque model**
  - **Outcompetes proofreading ability of exonuclease**

Li & De Clerq. Nature Reviews Drug Discovery, 2020
Wang, M. et al. *Cell Res*. 2020
Agostini et al. mBio, 2018
Holshue, NEJM 2020

Remdesivir for COVID-19 Infection

- **Mechanism = adenosine nucleoside analog**
- **Activity against viruses including Ebola, SARS, MERS, and COVID-19**
- **Found to be ineffective in Ebola, but safe in > 500 individuals treated**
- **Two phase III trials ongoing for mild/moderate and severe COVID-19**
  - **200 mg IV loading dose on Day 1 followed by 100 mg IV once daily to complete 10 days**
    - **Currently enrolling cruise ship passengers**

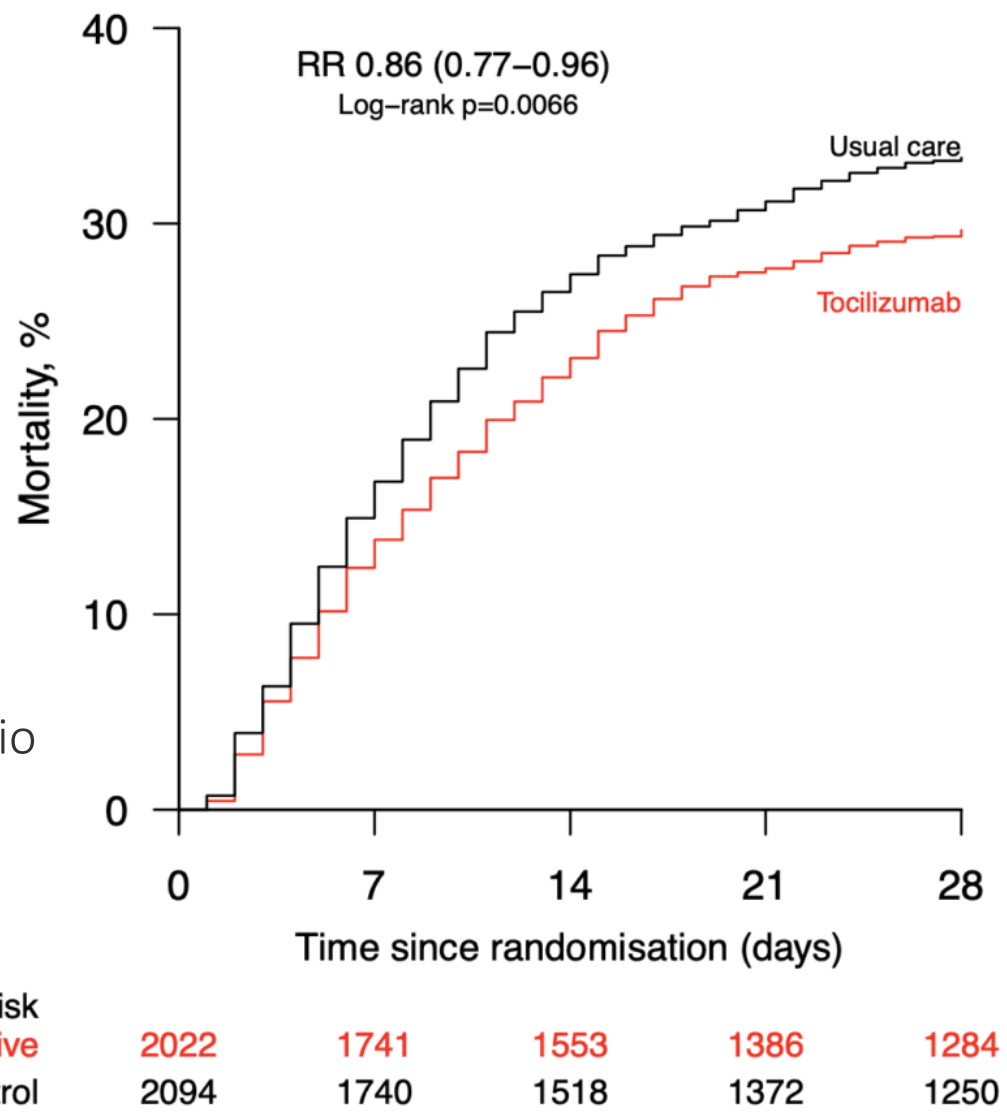
Li & De Clerq. Nature Reviews Drug Discovery, 2020
Wang, M. et al. *Cell Res*. 2020
Agostini et al. mBio, 2018
Holshue, NEJM 2020



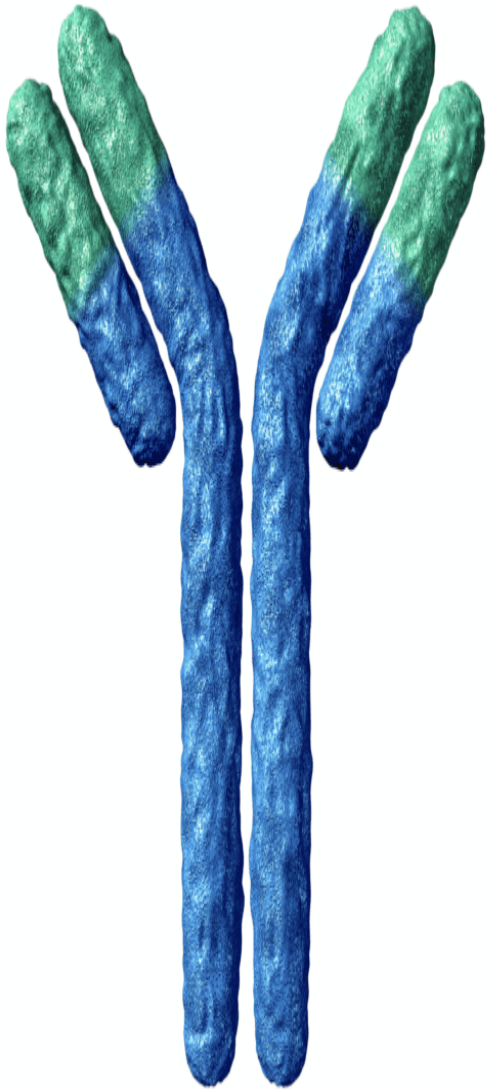
Number at risk (number censored)								
Remdesivir	158	155	147	123	101	82	63	25
	(0)	(2)	(0)	(1)	(0)	(1)	(0)	(26*)
Control	78	78	75	64	52	46	38	17
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(16*)

The Lancet 2020 3951569-1578DOI: (10.1016/S0140-6736(20)31022-9)

The RECOVERY Trial: Tocilizumab

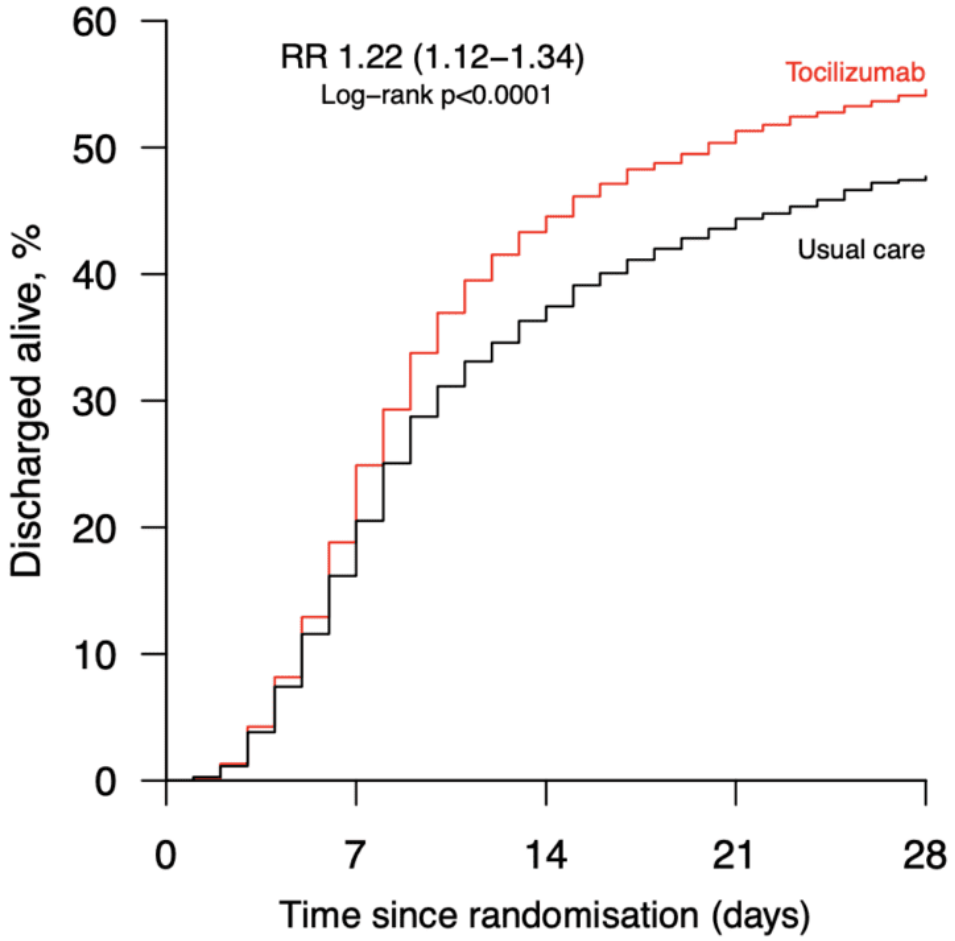


- An additional clear mortality benefit was seen in those receiving systemic corticosteroids (27% vs 33%; Risk Ratio 0.80; 95% CI 0.70 to 0.90)
- This mortality benefit was not seen in tocilizumab monotherapy (i.e. those not getting steroids)



The RECOVERY Trial: Tocilizumab

REBEL COVID-19



Number at risk					
Active	2022	1517	1120	911	787
Control	2094	1662	1308	1096	954

Coronavirus Treatment Summary

- **To date no specific drug/drug combo with proven efficacy against coronavirus**
- **Mainstay is supportive management including advanced organ support for patients with severe disease**
- **Both novel and repurposed therapies under investigation**
- **Different therapies may be beneficial for different phases and presentations of COVID-19 illness**

Coronavirus Coagulopathy

- **Septic inflammation and DIC common SARS and MERS†**
  - **Acute Phase Reactants: fibrinogen, factor VIII, thrombocytosis**
  - **Disseminated Intravascular Coagulation (DIC): clotting and lysing**
    - **Low fibrinogen & platelets**
    - **Elevated PT/PTT/d-dimer**
- **Coagulopathy is common in sick COVID-19 patients**
  - **50% of non-survivors; 7% of survivors‡**
  - **DIC: 71% non-survivors; 0.4% of survivorsΔ**
- **Clotted fingers/toes without high dose pressors**

‡Zhou F, et al. "Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study." The Lancet (2020).
ΔWang D, Hu B, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus–infected pneumonia in Wuhan, China. *Jama*. 2020 Feb 7.
†Giannis D, Ziogas IA, Giannic P. Coagulation disorders in coronavirus infected patients: COVID-19, SARS-CoV-1, MERS-CoV and lessons from the past. J Clin Virology.

Society COVID Recommendations

Limited data to alter generic ICU ppx

ASA Critical Care Committee Member Experience

- Full range of tx

International Society on Thrombosis and Hemostasis

- All COVID without contraindications: ppx LMWH

American Society of Hematology

- Monitor for DIC
- LMWH ppx hospitalized COVID (unless low plt/ fibrinogen)
  - ***Dose adjustment for obesity and renal failure***
- Full anticoagulation only for documented thrombus

Romi SANTIAGO SKP
MANILA BULLETIN
FEBRUARY 26, 2020

COVID-19 Vaccine Hesitancy is Common

National Poll on Healthy Aging report, University of Michigan (November, 2020)

Malani P, Singer D, Solway E, Kirch M, Kullgren J. Older Adults' Perspectives on a COVID-19 Vaccine. University of Michigan National Poll on Healthy Aging. November 2020. Available at: http://hdl.handle.net/2027.42/163523

COVID-19 vaccines that have received FDA Emergency Use Authorizations

- **Two vaccines have received FDA Emergency Use Authorizations (EUAs) :**
  - **Pfizer/BioNTech (BNT162b2) – 95% effective (manufacturer data)**
  - **Moderna (mRNA-1273) – 94.5% effective (manufacturer data)**
- **Both are mRNA vaccines with a 2-dose schedule. People being vaccinated should complete the two-dose series with the same vaccine product.**
- **Duration of protection is not yet known.**
- **For the latest information about authorized vaccines, visit www.fda.gov/emergency-preparedness-and-response/coronavirus-disease-2019-covid-19/covid-19-vaccines.**

Sources: https://www.pfizer.com/news/press-release/press-release-detail/pfizer-and-biontech-conclude-phase-3-study-covid-19-vaccine
https://investors.modernatx.com/news-releases/news-release-details/modernas-covid-19-vaccine-candidate-meets-its-primary-efficacy

COVID-19 vaccine trials by the numbers

Pfizer/BioNTech

- **45,302** enrolled
  - **43,125** received 2nd dose
- **150** clinical sites
  - 39 U.S. states
- Racial/ethnic distribution
  - **13% -** Hispanic
  - **10% -** African American
  - **6% -** Asian
  - **1% -** Native American
- **40%** ages 56-85

Moderna

- **30,000** enrolled
  - **25,654** received 2nd dose
- **89** clinical sites
  - 32 U.S. states
- Racial/ethnic distribution
  - **63%** - White
  - **20% -** Hispanic
  - **10% -** African American/Black
  - **4% -** Asian
  - **3% -** All others
- **64%** ages 45 and older
  - **39%** ages 45-64
  - **25%** ages 65+

Sources: https://www.pfizer.com/science/coronavirus/vaccine; https://www.modernatx.com/cove-study

For more information, visit www.clinicaltrials.gov

“In some ways Epidemics like diseases does not exist until we have agreed that it does, by perceiving, naming, and responding to it.”

Charles Rosenberg, Framing Disease, Illness, Society and History (1992)

Rosenberg, Charles E. “What is an Epidemic: AIDS in Historical Perspective.” In Explaining Epidemics and Other Studies in the History of Medicine. New York: Cambridge University Press, 1992, 278-292.
Ranger, Terence, and Paul Slack, eds. "Introduction." In Epidemics and Ideas: Essays on the Historical Perception of Pestilence. New York: Cambridge University Press, 1995, 1- 20.
Treichler, Paula A. How to Have Theory in an Epidemic: Cultural Chronicles of AIDS. Durham: Duke University Press, 1999.

Conclusions

- **History writes the story of pandemic and epidemics but we can learn the natural history of the events and make better choices**
- **We (health care providers) need to be better steward of this understanding and be united**
- **Prepare now as this infection and pandemic will not be the last in our life time**