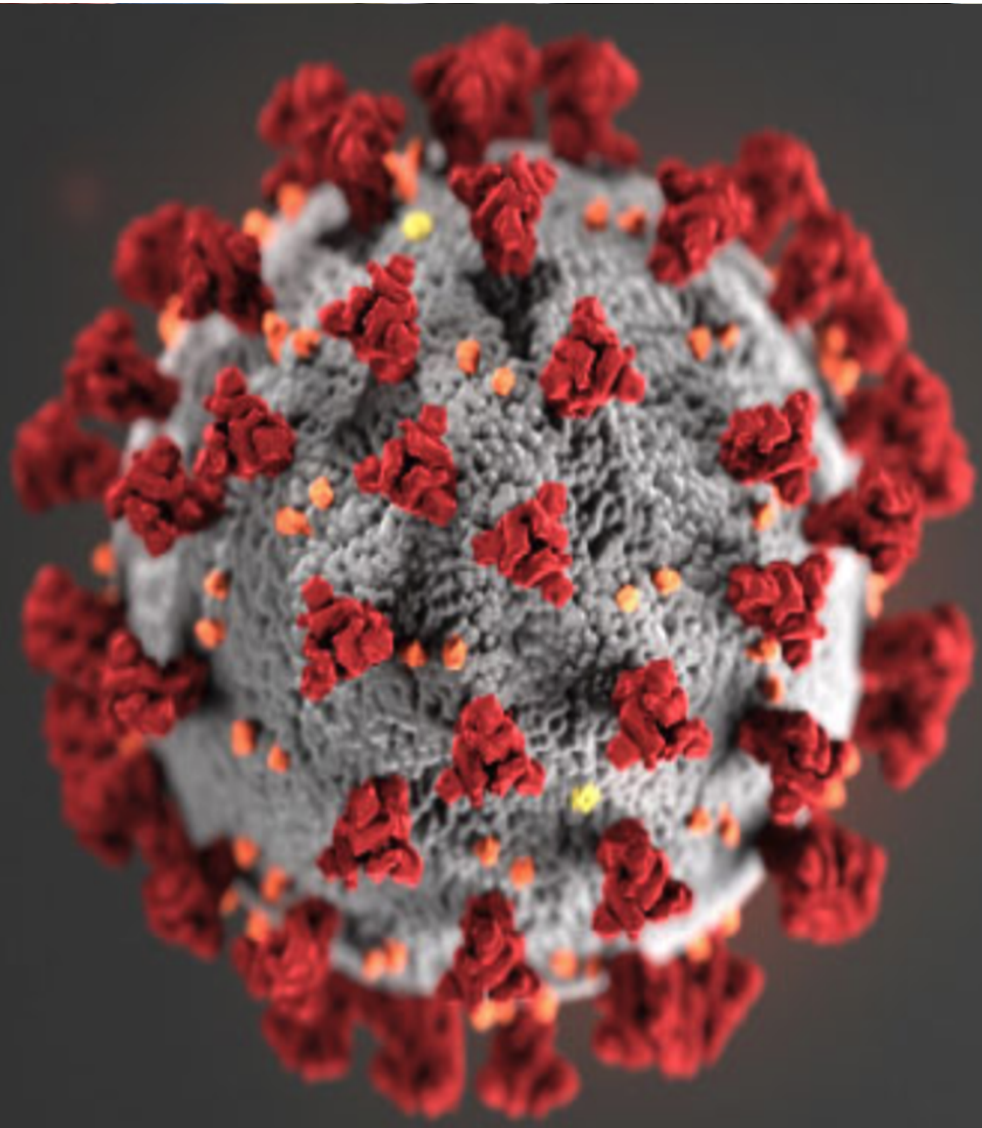


COVID-19 OVERVIEW AND LITERATURE REVIEW

Aliva De, MBBS, FAAP
Nooralam Rai, MD
Neha Patel, MD
Sophie Berger, MD

COLUMBIA | COLUMBIA UNIVERSITY IRVING MEDICAL CENTER

OUTLINE

- EPIDEMIOLOGY
- PATHOGENESIS
- CLINICAL COURSE
- DIAGNOSIS
- MANAGEMENT

EPIDEMIOLOGY

COVID-19. How did we get here?

December 2019: cluster of pneumonia of unknown etiology reported in Wuhan China

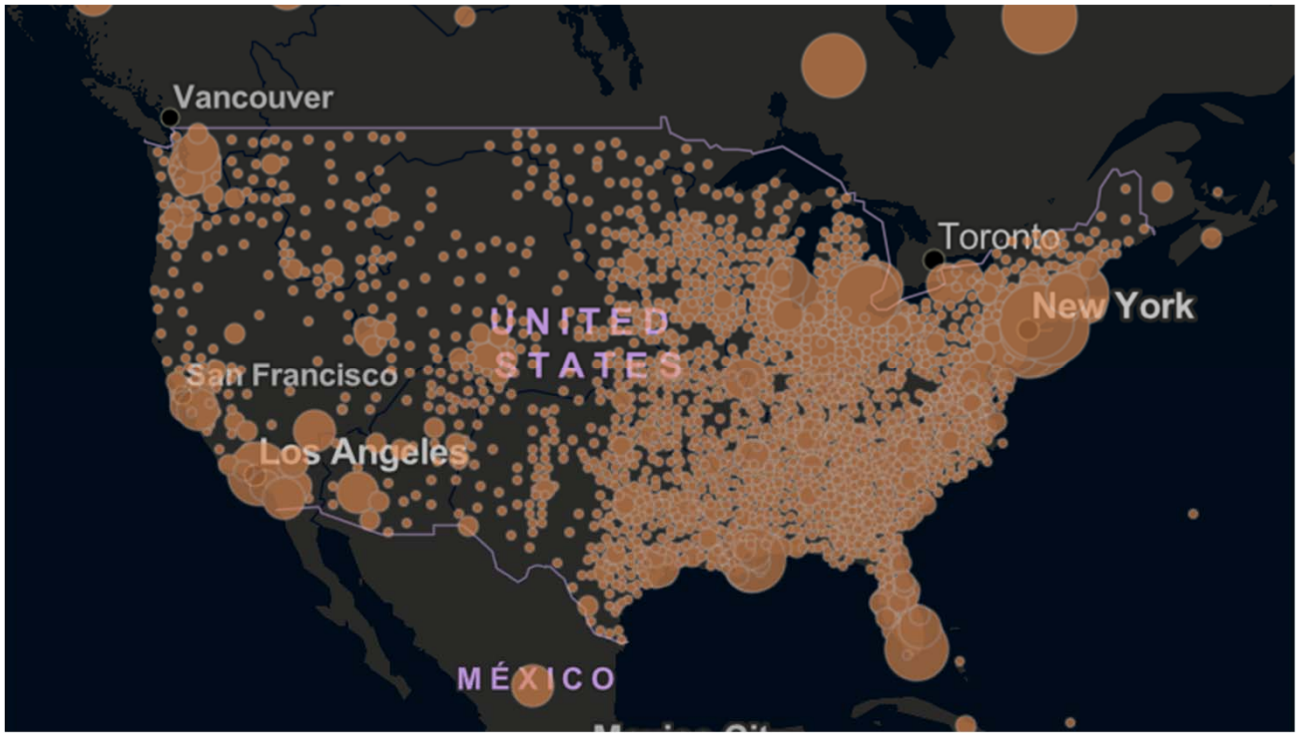
Early January: isolation of a new coronavirus, SARS-CoV-2. Disease named COVID-19

Initial association with the Seafood Market of Wuhan

Transmission to humans thought to be from bats with intermediate host (pangolin or turtles?)

As the outbreak progressed person to person transmission seemed to be the main mode of transmission

In the US: 367,507 cases, 10,908 deaths (April 6, 2020)

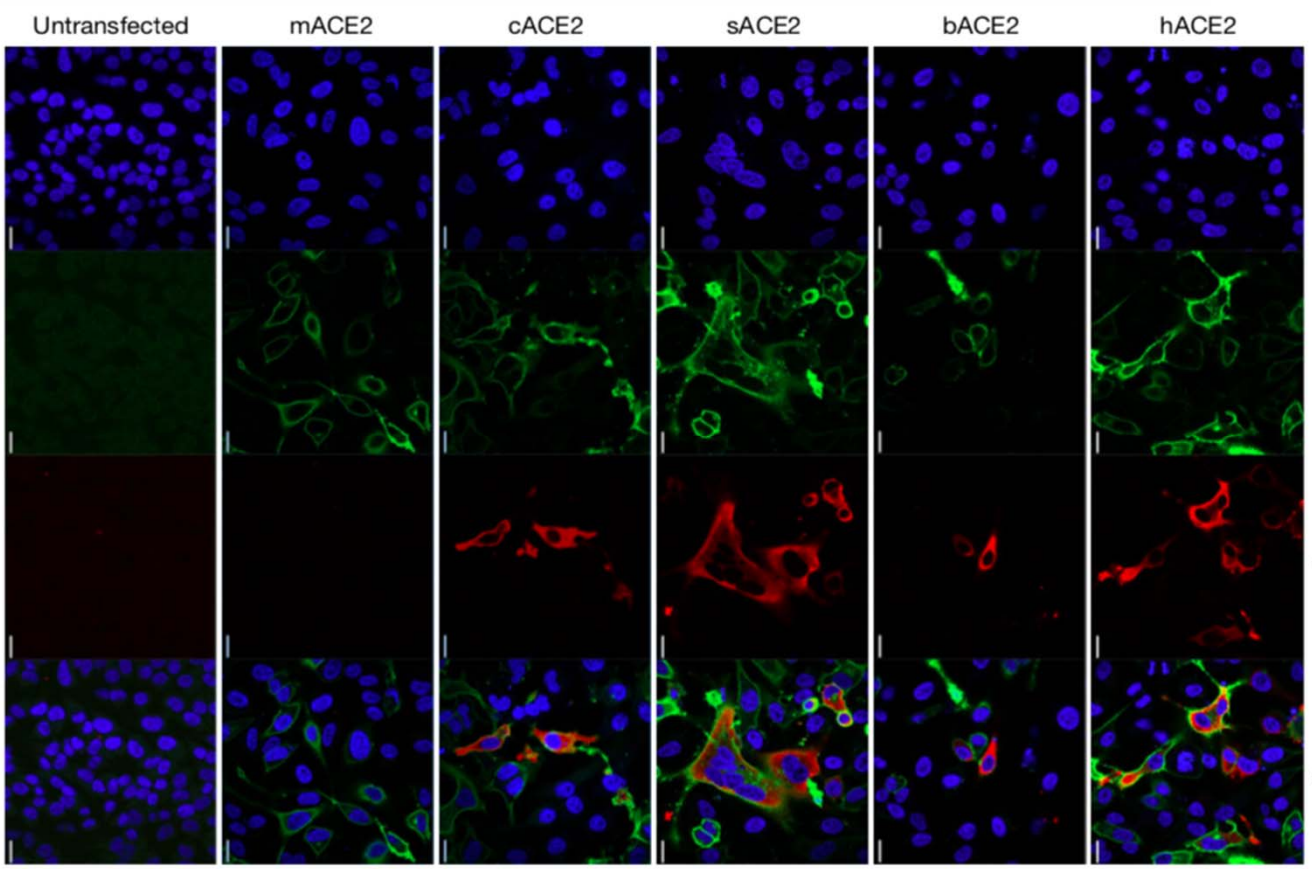


https://coronavirus.jhu.edu/map.html

PATHOGENESIS

Cell Entry

Like SARS-CoV, **SARS-CoV-2 uses ACE2** as an entry receptor to enter ACE2 expressing cells



Zhou, P., Yang, X., Wang, X. et al. A pneumonia outbreak associated with a new coronavirus of probable bat origin. Nature 579, 270–273 (2020). https://doi.org/10.1038/s41586-020-2012-7

Genetically Similar to SARS-CoV

4 genera of *Coronaviruses*: **α**, **β**, **γ**, **δ**.

α and **β** able to infect mammals while **γ** and **δ** tend to infect birds

Previously 6 *Coronaviruses* identified as human-susceptible, including **SARS-CoV** (2002-2003, 8000+ cases, 800 deaths - 10%) and **MERS-CoV** (2012, 850+ cases, 330+ deaths - 35%)

SARS-CoV-2 is also a **β**coronavirus. It shares 79.6% genome sequence identity to SARS-CoV and 50% idenity to MERS-CoV

Zhou, P., Yang, X., Wang, X. et al. A pneumonia outbreak associated with a new coronavirus of probable bat origin. Nature 579, 270–273 (2020). https://doi.org/10.1038/s41586-020-2012-7

Angiotensin Converting Enzyme 2 (ACE2)

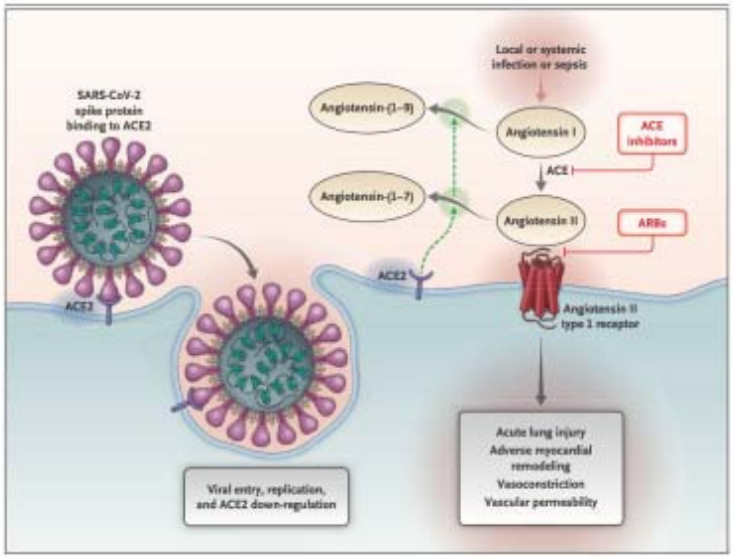
Expressed in the lung alveolar epithelial cells, also in heart and kidneys
Binding of the spike-protein to host cells results in the downregulation of ACE2

→ this mechanism may contribute to the severity of lung damage in SARS

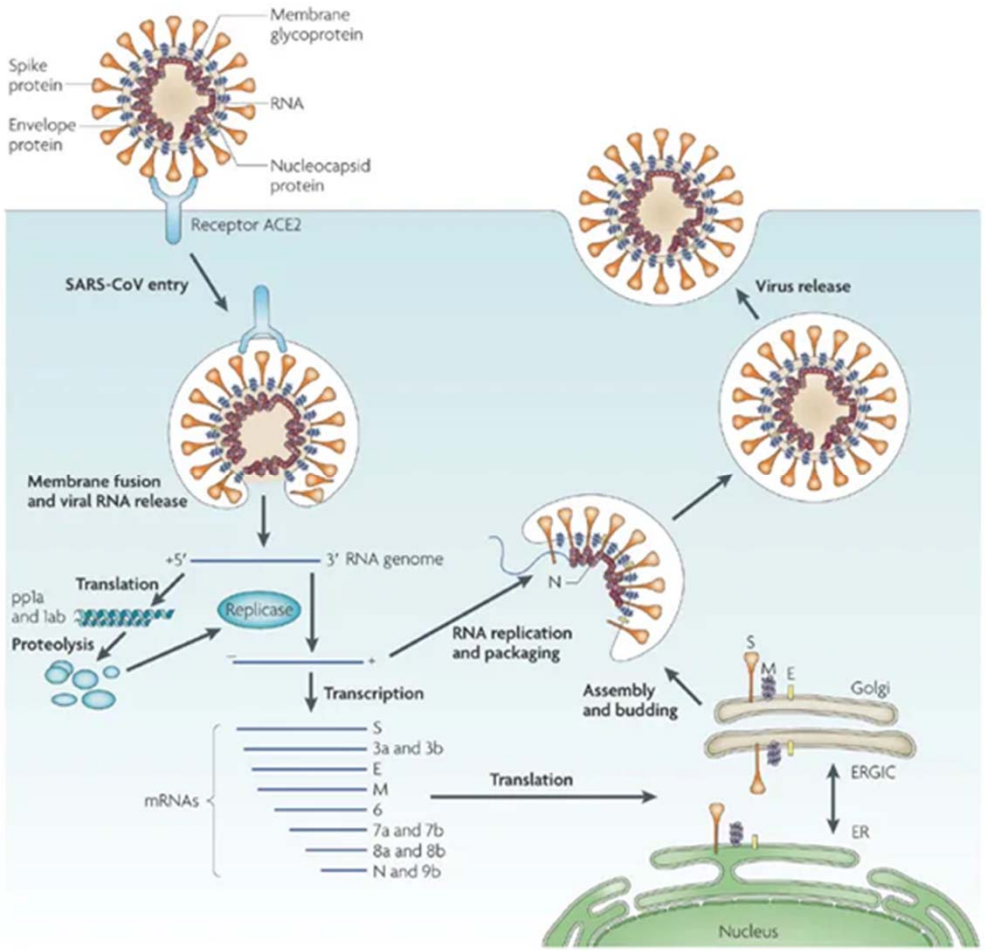
Main role = degradation of Ang II → results in formation of Ang 1-7, has role in regulating the balance of circulating AngII/Ang1-7 levels

Ang II induces pulmonary vasoconstriction in response to hypoxia

Ang II also increases vascular permeability facilitating pulmonary edema



Kuba, K., Imai, Y., Rao, S. et al. A crucial role of angiotensin converting enzyme 2 (ACE2) in SARS coronavirus–induced lung injury. Nat Med 11, 875–879 (2005).
Tikellis C., Thomas M. Angiotensin-converting enzyme 2 (ACE2) is a key modulator of the renin angiotensin system in health and disease. Int. J. Pept. 2012;2012:256–294
Vaduganathan M et al. Renin–Angiotensin–Aldosterone System Inhibitors in Patients with Covid-19. NEJM Special report. April 2020



1

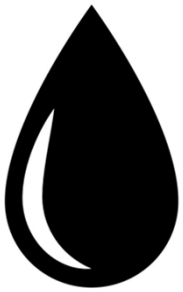
Invasion of the respiratory mucosa

2

Triggers a series of immune responses and the production of cytokine storm in the body

Li, W., Moore, M., Vasilieva, N. et al. Angiotensin-converting enzyme 2 is a functional receptor for the SARS coronavirus. Nature 426, 450–454 (2003). https://doi.org/10.1038/nature02145

Transmission



Droplets

Airborne?
$R_{0=}$ 2.2-3.6

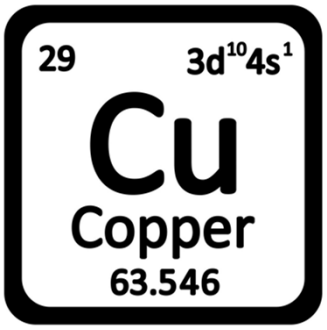
Infected surfaces

Fecal-oral?

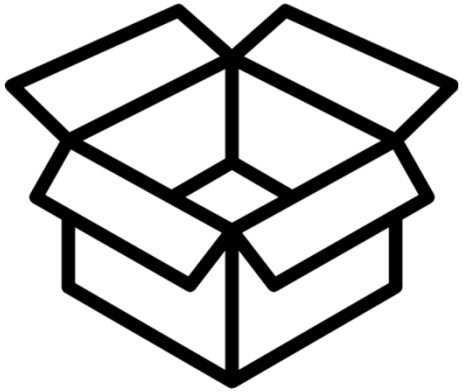
Xiao F, Tang M, Zheng X, Liu Y, Li X, Shan H, Evidence for gastrointestinal infection of SARS-CoV-2, Gastroenterology (2020), doi: https://doi.org/10.1053/j.gastro.2020.02.055

Surface Stability of SARS-CoV-2

3h



4h



24h

2-3d

N van Doremalen, et al. Aerosol and surface stability of HCoV-19 (SARS-CoV-2) compared to SARS-CoV-1. The New England Journal of Medicine. DOI: 10.1056/NEJMc2004973 (2020).

Pulmonary Function Tests: Advice from ATS

Potential for coughing, droplet formation during maneuvers

Difficult to screen patients because they often have respiratory symptoms from a variety of etiologies

Only do PFTs if essential for immediate treatment decisions

PPE measures: protection against aerosolized droplets for staff, wiping surfaces, discuss with infection control team

https://www.thoracic.org/professionals/clinical-resources/disease-related-resources/pulmonary-function-laboratories.php

Infection Prevention and Control Strategies

Suspected/positive cases should be on contact and droplet isolation in AIIR

Symptomatic patients who are waiting for a room should wear a surgical facemask and stay 6 feet away from others

Caregivers and visitors limited

Caregivers should wear gown, gloves, surgical mask with facemask

Aerosol generating procedures: intubation, CPR, bronchoscopy → need N95 respirator mask

Incubation Period

Median incubation period: 5.1 days

97.5% of those who develop symptoms will do it by Day 12

Lauer SA, Grantz KH, Bi Q, et al. The Incubation Period of Coronavirus Disease 2019 (COVID-19) From Publicly Reported Confirmed Cases: Estimation and Application. Ann Intern Med. 2020; [Epub ahead of print 10 March 2020]. doi: https://doi.org/10.7326/M20-0504

CLINICAL COURSE

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Clinical Features in Adults

Fever in 98%

Cough in 76%

Dyspnea in 55%

Fatigue or myalgia in 44%

Sputum production in 28%

Diarrhea in 3%

Huang et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet. Published Online January 24, 2020 https://doi.org/10.1016/ S0140- 6736(20)30183-5

Severity Classification

Based on largest case series to date involving 72,314 cases (from Chinese Center of Disease Control and Prevention)

Mild (81%): no pneumonia or mild pneumonia

Severe (14%): dyspnea, RR >30/min, SO2 $\leq$ 93%, PF ratio < 300, and/or lung infiltrates > 50% within 24-48 hours

Critical (5%): respiratory failure, septic shock, and/or multiple organ dysfunction

Wu, Z. and McGoogan, J., 2020. Characteristics of and Important Lessons From the Coronavirus Disease 2019 (COVID-19) Outbreak in China. JAMA.

Complications

ARDS

Pneumonia

Acute cardiac injury

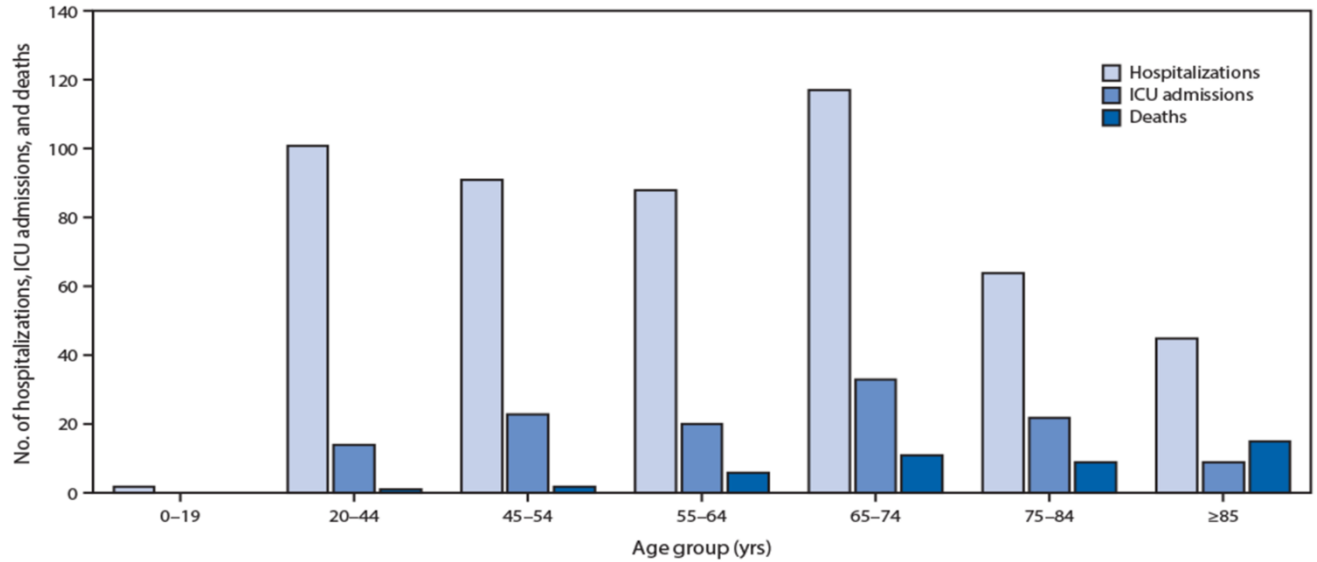
Acute kidney injury

Secondary infection

Shock

Disease Severity By Age

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



* Hospitalization status missing or unknown for 1,514 cases.

† ICU status missing or unknown for 2,253 cases.

§ Illness outcome or death missing or unknown for 2,001 cases.

Severe Outcomes Among Patients with Coronavirus Disease 2019 (COVID-19) — United States, February 12–March 16, 2020. MMWR Morb Mortal Wkly Rep. ePub: 18 March 2020.

Adults: Comorbidities and COVID-19

	Total (n=191)	Non-survivor (n=54)	Survivor (n=137)	p value
Demographics and clinical characteristics				
Age, years	56·0 (46·0–67·0)	69·0 (63·0–76·0)	52·0 (45·0–58·0)	<0·0001
Sex	..	..	..	0·15
Female	72 (38%)	16 (30%)	56 (41%)	..
Male	119 (62%)	38 (70%)	81 (59%)	..
Exposure history	73 (38%)	14 (26%)	59 (43%)	0·028
Current smoker	11 (6%)	5 (9%)	6 (4%)	0·21
Comorbidity	91 (48%)	36 (67%)	55 (40%)	0·0010
Hypertension	58 (30%)	26 (48%)	32 (23%)	0·0008
Diabetes	36 (19%)	17 (31%)	19 (14%)	0·0051
Coronary heart disease	15 (8%)	13 (24%)	2 (1%)	<0·0001
Chronic obstructive lung disease	6 (3%)	4 (7%)	2 (1%)	0·047
Carcinoma	2 (1%)	0	2 (1%)	0·37
Chronic kidney disease	2 (1%)	2 (4%)	0	0·024
Other	22 (12%)	11 (20%)	11 (8%)	0·016

Zhou, F., Yu, T., Du, R., Fan, G., Liu, Y., Liu, Z., Xiang, J., Wang, Y., Song, B., Gu, X., Guan, L., Wei, Y., Li, H., Wu, X., Xu, J., Tu, S., Zhang, Y., Chen, H. and Cao, B., 2020. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. The Lancet, 395(10229), pp.1054-1062.

Clinical Features in the Neonatal Period

Cohort study in Wuhan China describes clinical features of 33 newborns of mothers with COVID-19 pneumonia

4 of 33 (12%) had shortness of breath

3 of 33 (9%) were SARS-CoV-2 positive on NP and anal swabs

No deaths

All samples (amniotic fluid, cord blood, and breast milk) negative for SARS-COV-2

Zeng, L., Xia, S., Yuan, W., Yan, K., Xiao, F., Shao, J. and Zhou, W., 2020. Neonatal Early-Onset Infection With SARS-CoV-2 in 33 Neonates Born to Mothers With COVID-19 in Wuhan, China. JAMA Pediatrics,.

Clinical Features of Neonates

Table. General Information and Clinical Features of 33 Newborns With Mothers With COVID-19 Pneumonia

Variable	Neonates with SARS-CoV-2, No. (%)		Patients with SARS-CoV-2		
	No (n = 30)	Yes (n = 3)	Patient 1	Patient 2	Patient 3
Male	16 (53)	3 (100)	Yes	Yes	Yes
Preterm	3 (10)	1 (33)	GA: 40 wk	GA: 40 wk + 4 d	GA: 31 wk + 2 d
Small for gestational age	2 (7)	1 (33)	No; 3250 g	No; 3360 g	No; 1580 g
Asphyxia	1 (3)	1 (33)	No	No	Yes
Symptoms and complications					
Fever	0	2 (67)	Yes	Yes	No
Pneumonia	0	3 (100)	Yes	Yes	Yes
Respiratory distress syndrome	3 (10)	1 (33)	No	No	Yes
Shortness of breath	3 (10)	1 (33)	No	No	Yes
Cyanosis	2 (7)	1 (33)	No	No	Yes
Feeding intolerance	2 (7)	1 (33)	No	No	Yes

Zeng, L., Xia, S., Yuan, W., Yan, K., Xiao, F., Shao, J. and Zhou, W., 2020. Neonatal Early-Onset Infection With SARS-CoV-2 in 33 Neonates Born to Mothers With COVID-19 in Wuhan, China. JAMA Pediatrics,.

Vertical Transmission

Inconclusive

Possible as suggested by IgM detection in three neonates with severe SARS-COV-2 infection

Need more information

Kimberlin DW, Stagno S. Can SARS-CoV-2 Infection Be Acquired In Utero? More Definitive Evidence Is Needed. JAMA. Published online March 26, 2020. doi:10.1001/jama.2020.4868

Clinical Features in Children

2143 children in China reported to CDC from Jan 16- Feb 8 2020

65.9% suspected cases

34.1% laboratory confirmed cases

13% of virologically confirmed cases had asymptomatic infection

5% had dyspnea or hypoxemia

0.6% progressed to ARDS

Dong Y, Mo X, Hu Y et al. Epidemiological Characteristics of 2143 Pediatric Patients With 2019 Coronavirus Disease in China. Pediatrics. 2020:e20200702. doi:10.1542/peds.2020-0702

Age Distribution of Severity Amongst Children

Table 2 Different Severity of Illness by Age Group

Age group*	Asymptomatic	Mild	Moderate	Severe	Critical	Total
<1	7(7.4)	205(18.8)	127(15.3)	33(29.5)	7(53.8)	379(17.7)
1-5	15(16.0)	245(22.5)	197(23.7)	34(30.4)	2(15.4)	493(23.0)
6-10	30(31.9)	278(25.5)	191(23.0)	22(19.6)	0(0)	521(24.3)
11-15	27(28.7)	199(18.2)	170(20.5)	14(12.5)	3(23.1)	413(19.3)
>15	15(16.0)	164(15.0)	146(17.5)	9(8.0)	1(7.7)	335(15.7)
Total	94	1091	831	112	13	2141(100)

Data were presented with number and percent (%);*Two cases had missing values.

Dong Y, Mo X, Hu Y et al. Epidemiological Characteristics of 2143 Pediatric Patients With 2019 Coronavirus Disease in China. Pediatrics. 2020:e20200702. doi:10.1542/peds.2020-0702

Summary of Clinical Features

Fever and respiratory symptoms are the most common symptoms

Patients with HTN, diabetes mellitus, and CAD are at greatest risk for worse outcomes

Individuals > 65 years, preschool children and infants less than 1 year old are at higher risk for worsening outcomes

Children are mostly asymptomatic

Perinatal transmission is not well understood

Hong H et al., Clinical characteristics of novel coronavirus disease 2019 (COVID-19) in newborns, infants and children, Pediatrics and Neonatology, https://doi.org/10.1016/j.pedneo.2020.03.001

DIAGNOSIS

Diagnosis

Nasopharyngeal swab (RT PCR) detects viral nucleic acids – turnaround time (TAT) ~ 24 hours

Rapid diagnostic tests – immunoassays to detect viral antigen, TAT~45 minutes
Commercially available, some are FDA approved

Rapid IgM-IgG antibody blood test – immunoassay to detect human antibody – CE Mark (Europe)

- 88.66% sensitivity
- 90.63% specificity

Li, Z., Yi, Y., Luo, X.,et all, 2020. Development and Clinical Application of A Rapid IgM-IgG Combined Antibody Test for SARS-CoV-2 Infection Diagnosis. Journal of Medical Virology, Feb 2020
Biotechnology N. Fast, portable tests come online to curb coronavirus pandemic. Nature.com. https://www.nature.com/articles/d41587-020-00010-2. Published 2020. Accessed April 6, 2020.

Sensitivity of RT-PCR Testing in Different Specimens

Bronchoalveolar lavage (14/15) 93%

Sputum (72 of 104) 72%

Nasal swabs: 5 of 8 (63%)

Fiberoptic brush biopsy (6 of 13) 46%

Pharyngeal swabs (126 of 398) 32%

Feces (44 of 153) 29%

Wang, W., Xu, Y., Gao, R., Lu, R., Han, K., Wu, G. and Tan, W., 2020. Detection of SARS-CoV-2 in Different Types of Clinical Specimens. JAMA,.

Specimens

CDC

- Upper respiratory tract specimens (**nasopharyngeal swab**)
- Recommends testing lower respiratory tract specimens, **if available**.
- For patients who develop a productive cough, sputum should be collected and tested for COVID-19. **The induction of sputum is not recommended**.
- For patients for whom it is clinically indicated (e.g., those receiving invasive mechanical ventilation), a lower respiratory tract aspirate or bronchoalveolar lavage sample should be collected and tested as a lower respiratory tract specimen

WHO

- At minimum, respiratory material should be collected:- upper respiratory specimens: **nasopharyngeal** and oropharyngeal swab or wash in ambulatory patients
- And/or lower respiratory specimens: sputum **(if produced)**
- And/or endotracheal aspirate or bronchoalveolar lavage in patients with more severe respiratory disease. (Note high risk of aerosolization; adhere strictly to infection prevention and control procedures).

Testing Results

Accuracy and predictive values have not been studied yet

Best time to test is a few days after symptom onset

- RNA positive rates peaked in upper respiratory tract specimens at 7-10 days after symptom onset, steadily declined after

Positive confirms COVID-19

Negative test does not rule out COVID-19

- If initial test is negative but suspicion is high, WHO recommends resampling and testing from multiple respiratory tract sites

Diagnosis: Who Should Be Tested?

New York State Guidance

- Prioritize testing for **hospitalized patients**
- Outpatient testing must not be encouraged, promoted or advertised
- Instruct people with COVID-like illness not requiring hospitalization to **stay home.**

CDC Guidance

- **Hospitalized** patients who have signs and symptoms compatible with COVID-19 in order to inform decisions related to infection control
- Other **symptomatic** individuals such as, older adults and individuals with chronic medical conditions and/or an immunocompromised state that may put them at higher risk for poor outcomes (e.g., diabetes, heart disease, receiving immunosuppressive medications, chronic lung disease, chronic kidney disease)
- Any persons including healthcare personnel, who within 14 days of symptom onset had close contact with a suspect or laboratory-confirmed COVID-19 patient, or who have a history of travel from affected geographic areas within 14 days of their symptom onset.

Testing Summary

Prioritize testing for hospitalized patients and symptomatic healthcare workers

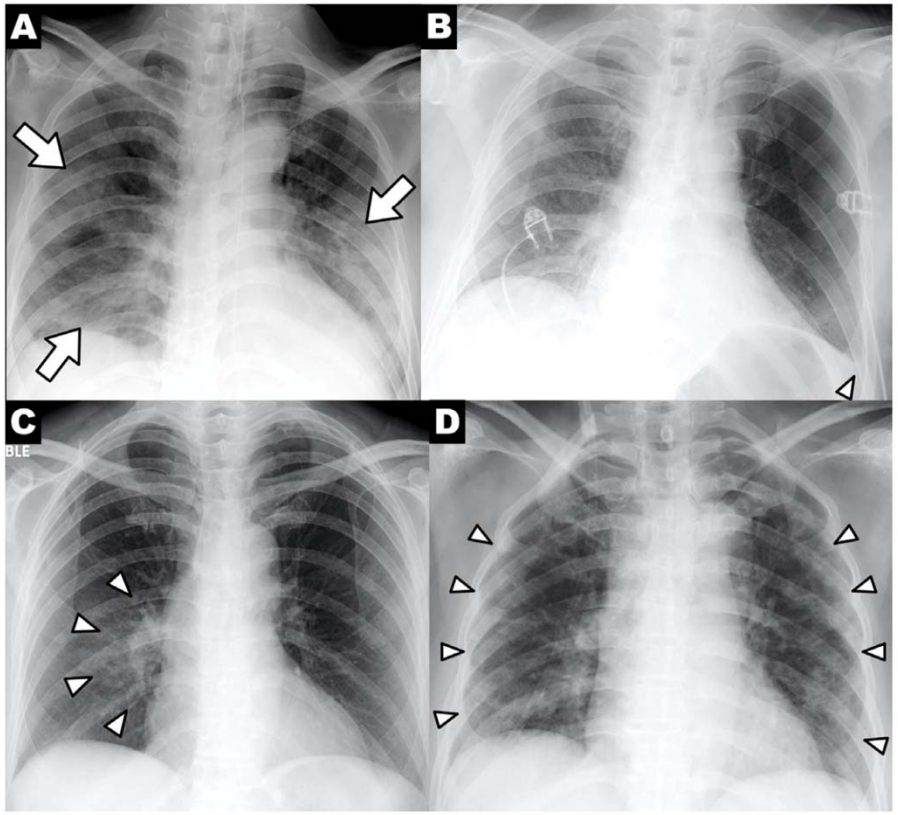
Timing of test and obtaining a good sample is important

Positive and negative predictive values still being studies

IMAGING AND LABORATORY FINDINGS

Chest Radiographic Findings in COVID-19

Patchy consolidation`	Pleural effusion
Perihilar distribution	Peripheral distribution



Wong H, Lam H, Fong A et al. Frequency and Distribution of Chest Radiographic Findings in COVID-19 Positive Patients. Radiology. 2019:201160. doi:10.1148/radiol.2020201160

CT Chest in findings COVID-19

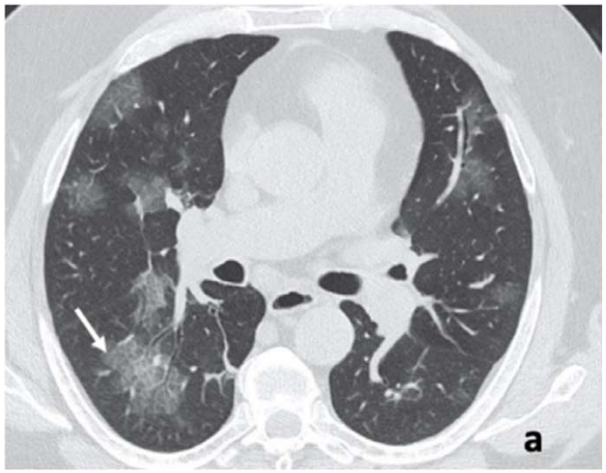
Typical findings:

Prospective study from Rome compared accuracy of CT with RT-PCR for diagnosis

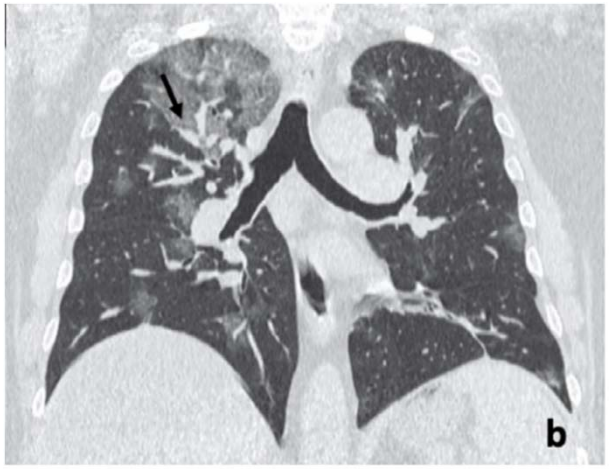
- 158 patients, mean age 57 years
- Sensitivity: 97% (95% CI 88-99%)
- Specificity: 56% (95% CI 45-66%)

In those with COVID-19 based on RT PCR, most common findings:
-Peripheral, bilateral multilobe GGO
-Subsegmental vessel enlargement
-Bronchiectasis was seen in 41% of their sample

Caruso D, Zerunian M, Polici M et al. Chest CT Features of COVID-19 in Rome, Italy. Radiology. 2020:201237. doi:10.1148/radiol.2020201237



Rounded
GGO



Apical GGO, enlarged
blood vessels

Caruso D, Zerunian M, Polici M et al. Chest CT Features of COVID-19 in Rome, Italy. Radiology. 2020:201237. doi:10.1148/radiol.2020201237

Laboratory Findings

WBC can vary

Leukopenia, leukocytosis, and lymphopenia have been reported, although lymphopenia appears most common

Elevated lactate dehydrogenase and ferritin levels

Elevated aminotransferase

Lymphopenia and d-dimer levels associated with mortality

Chen G, Wu D, Guo W et al. Clinical and immunologic features in severe and moderate Coronavirus Disease 2019. Journal of Clinical Investigation. 2020. doi:10.1172/jci137244

MANAGEMENT

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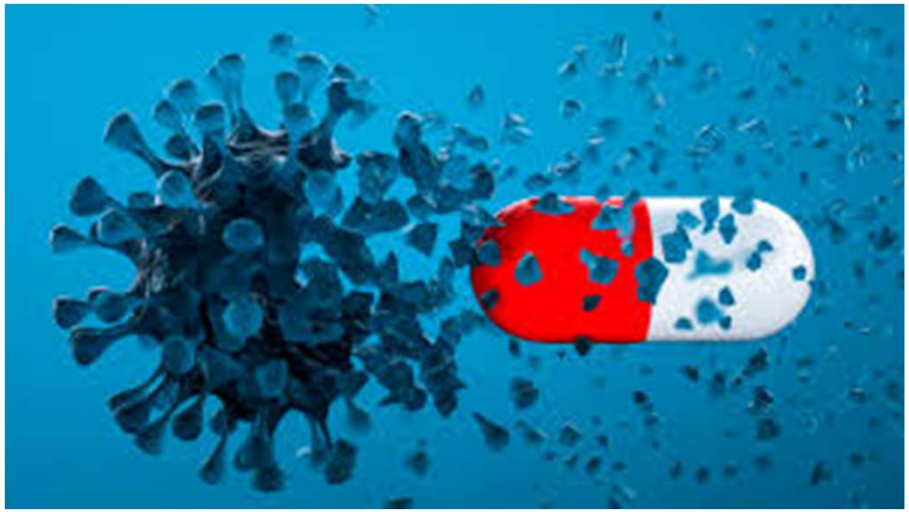
Management

Mainly supportive

Antivirals

Repurposed Drugs

Convalescent Sera



Supportive Care: Home

Home care for patients with COVID-19 presenting with mild symptoms and management of their contacts
Interim guidance
17 March 2020
World Health Organization

If stable not requiring hospitalization, isolate at home

Discontinuing home isolation:

-3 days without fever and improvement in respiratory symptoms, and 7 days since first symptoms (CDC)

-Resolution of fever, improvement in respiratory symptoms, and two negative specimens 24 hours apart

https://www.cdc.gov/coronavirus/2019-ncov/hcp/disposition-in-home-patients.html

Supportive Care: Hospitalized

Most common and severe complication: ARDS

Initially, supplemental oxygen via nasal cannula, mask

HFNC and NIPPV have higher risk of aerosolization and pathogen spread compared with invasive ventilation

Recommending earlier intubation

Invasive Ventilation

Clinical management of severe acute respiratory infection (SARI) when COVID-19 disease is suspected
Interim guidance
13 March 2020
World Health Organization

Follow ARDS treatment guidelines

Lung protective ventilation: low tidal volume (4-8 ml/kg), maintain plateau pressures ≤ 30 mmHg, maintain So2 88-95% by adjusting FiO2 and PEEP

Children: use lower plateau pressure ≤ 28 mmHg, tidal volume adapted to severity and respiratory system compliance

Systemic steroids are not recommended

Prone ventilation 12-16 hrs/day

ECMO- role is unclear, multiorgan failure

Antiviral Drugs: Remdesivir

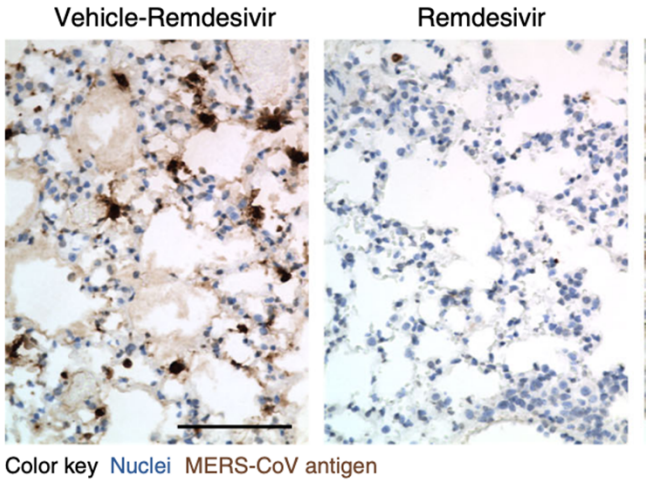
Broad spectrum antiviral inhibits RNA dependent RNA polymerase

Tested in RCT for Ebola

Improves pulmonary function and reduces viral load in mice with MERS[1]

Inhibits SARS and MERS replication in human AEC cultures[2]

Phase 3 clinical trials sponsored by Gilead Sciences, IV remdesivir vs standard of care, recruiting



[1]*Sheahan T, Sims A, Leist S et al. Comparative therapeutic efficacy of remdesivir and combination lopinavir, ritonavir, and interferon beta against MERS-CoV. Nat Commun. 2020;11(1). doi:10.1038/s41467-019-13940-6*
[2]*Sheahan T, Sims A, Graham R et al. Broad-spectrum antiviral GS-5734 inhibits both epidemic and zoonotic coronaviruses. Sci Transl Med. 2017;9(396):eaal3653. doi:10.1126/scitranslmed.aal3653*

Antiviral Drugs: Lopinavir-Ritonavir

HIV protease inhibitor, in vitro inhibitory activity against SARS-CoV

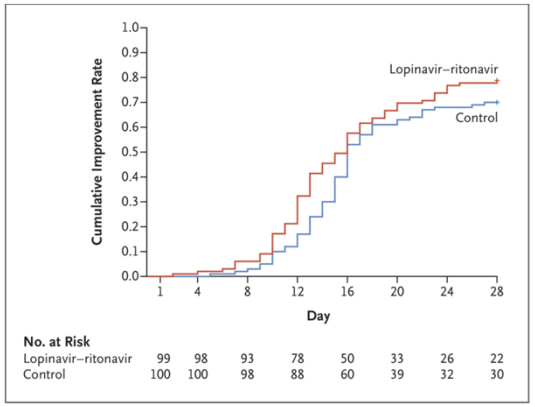
Randomized controlled open label trial completed, published by Cao et al

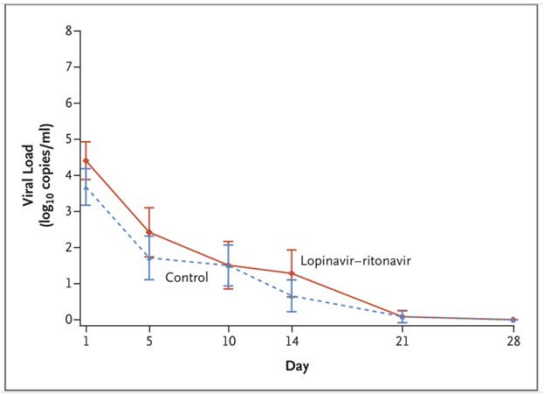
Population: 199 adults hospitalized with COVID 19, SO2 94% or less in RA or P:F ratio < 300

Arms: L-R x 14 days + standard care (99) or standard care alone (100)

Primary end point: time to clinical improvement

Result: time to clinical improvement and 28 day mortality similar





Cao B et al. A Trial of Lopinavir-Ritonavir in Adults Hospitalized with Severe Covid-19. NEJM. March 2020.

Hydroxychloroquine

Antiviral mechanism is not known

In vitro activity against SARS-CoV-2, HCQ > CQ

RCT in China (Chen et al) with 62 patients:-shortened time to recovery, temperature recovery time and the cough remission time in HCQ group -a larger proportion of patients with improved pneumonia in the HCQ group (80.6%, 25 of 31) compared with the control group (54.8%, 17 of 31)

3/30/20: FDA issued emergency use authorization

Chen Z et al. 2020. Efficacy of hydroxychloroquine in patients with COVID-19: results of a randomized clinical trial. medRxiv preprint doi: https://doi.org/10.1101/2020.03.22.20040758

Zinc and Potential Anti-viral Mechanism

No clinical data for Zn supplementation and SARS-CoV-2

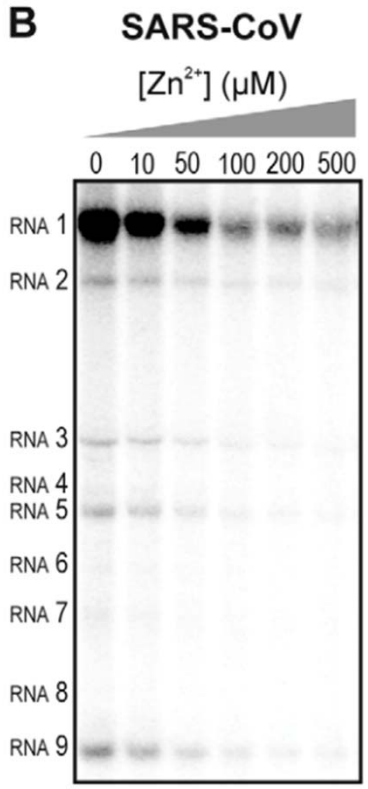
In-vitro studies with Vero-E6 cells cultured with SARS-CoV (2003 SARS virus) show that increasing Zn concentrations in cell media

High Zn concentrations appear to impair RNA synthesis by the SARS-CoV virus[1]

Separate in-vitro oncology studies using human carcinoma cells investigating chloroquine's ability to induce apoptosis in malignant cells showed that chloroquine is a Zn ionophore and increases intracellular Zn[2]

Synergistic role for Zn and chloroquine speculated

Need more research to determine efficacy



High concentrations of Zn associated with less RNA synthesis[1]

[1]*te Velthuis A, van den Worm S, Sims A, Baric R, Snijder E, van Hemert M. Zn2+ Inhibits Coronavirus and Arterivirus RNA Polymerase Activity In Vitro and Zinc Ionophores Block the Replication of These Viruses in Cell Culture. PLoS Pathog. 2010;6(11):e1001176. doi:10.1371/journal.ppat.1001176*

[2]*Xue J, Moyer A, Peng B, Wu J, Hannafon B, Ding W. Chloroquine Is a Zinc Ionophore. PLoS ONE. 2014;9(10):e109180. doi:10.1371/journal.pone.0109180*

Tocilizumab

IL-6 receptor antagonist

Used in RA, JIA

”cytokine storm” in severe illness with COVID 19, correlates with disease severity

Recent launch of phase III trial in Italy for adults with severe COVID-19

FDA approved US clinical trial to start recruiting patients in April

Gong J et al. Correlation Analysis Between Disease Severity and Inflammation-related Parameters in Patients with COVID-19 Pneumonia. medRxiv preprint doi: https://doi.org/10.1101/2020.02.25.20025643.

Convalescent Plasma

Small case series show clinical improvement with plasma from individuals who have recovered from COVID-19

Has been used in other viral epidemics (SARS, MERS, Ebola, Influenza)

4/3/2020: FDA opened expanded access protocol, and allows single patient emergency IND. Encouraging requests for clinical trials

Shen C, Wang Z, Zhao F et al. Treatment of 5 Critically Ill Patients With COVID-19 With Convalescent Plasma. JAMA. 2020. doi:10.1001/jama.2020.4783
Zhang B et al. Treatment with Convalescent Plasma for Critically Ill Patients with SARS-CoV-2 Infection. Chest pre-print doi.org/10.1016/j.chest.2020.03.039

Coming Up

Solidarity trial (WHO): remdesivir, CQ and HCQ, ritonavir/lopinavir, ritonavir/lopinavir + interferon-beta

Vaccine: phase 1 clinical trial for investigational vaccine (mRNA-1273) at KP Washington Health Research Institute

Summary

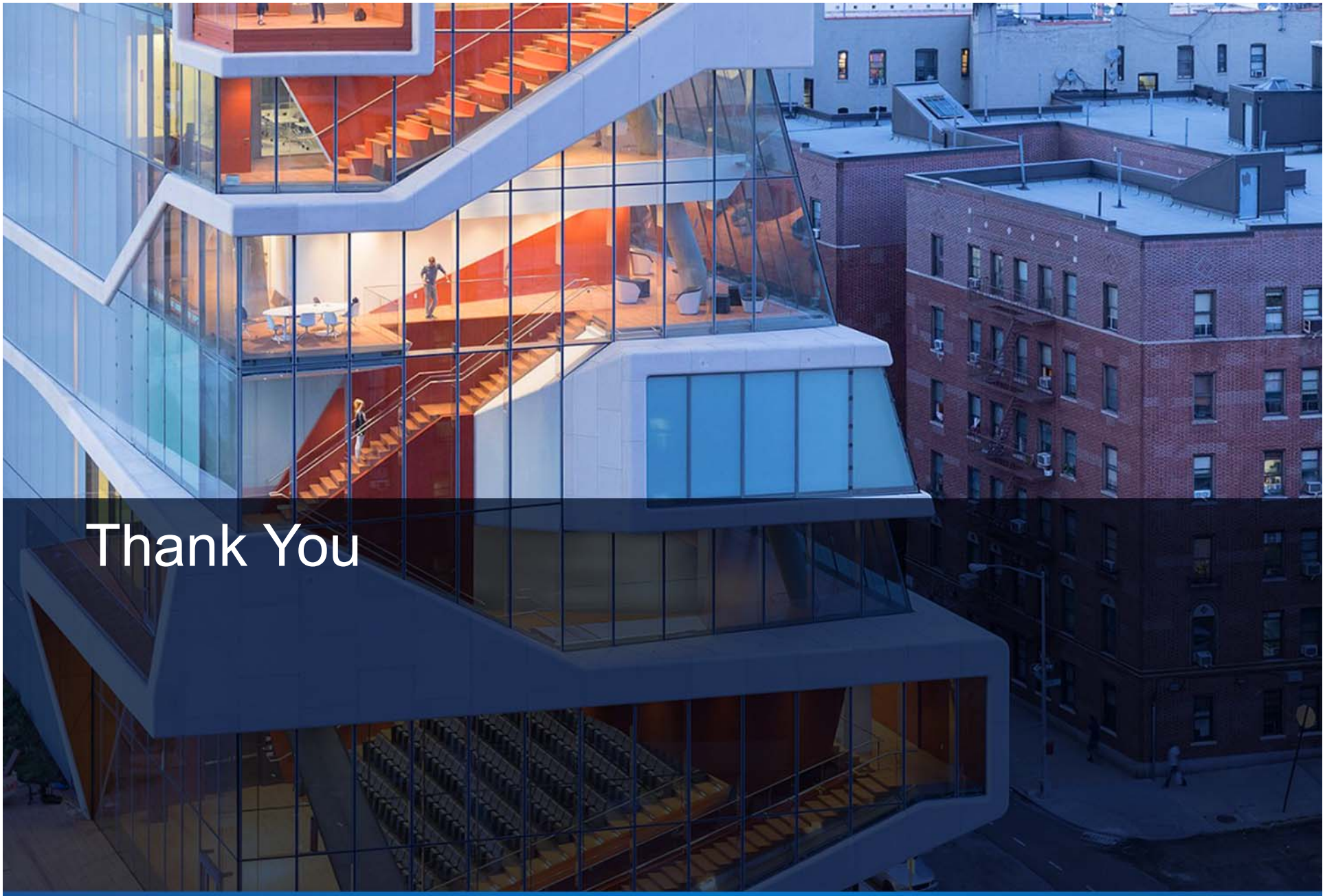
COVID-19 is now a global pandemic, and the situation is rapidly evolving

Like SARS-CoV, SARS-CoV-2 uses ACE2 as a key entry receptor

Clinical course depends on age with older population, infants, and preschool children more affected

Testing should be prioritized for hospitalized patients

Management is largely supportive. We need more data to determine effective treatment options



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