

Today's Agenda

Topic	Presenter(s)	Approximate Time
Welcome, Announcements, Introductions	Lachelle Smith, Director, ECHO Idaho	2 minutes
Idaho Epidemiology Curves and Public Health Updates	Carolyn Buxton Bridges, MD FACP	3 minutes
COVID-19 Projections in Idaho & Clinical Presentation	Andrea Christopher, MD MPH	15 minutes
Update on Medications for COVID-19	Cathy Oliphant, PharmD	5 minutes
Patient Case: Inpatient and Intensive Care Considerations	Jessica Evert, MD Mark McConnell, MD Andrea Christopher, MD MPH Megan Dunay, MD MPH	30 minutes
Closing, Announcements, Call to Action	Megan Dunay, MD MPH Lachelle Smith, Director, ECHO Idaho	5 minutes

COVID in Inpatient Settings: Acute and Intensive Care

April 3, 2020

Carolyn Buxton Bridges, MD
Andrea Christopher, MD, MPH
Megan Dunay, MD, MPH

Jessica Evert, MD
Mark McConnell, MD
Cathy Oliphant, PharmD

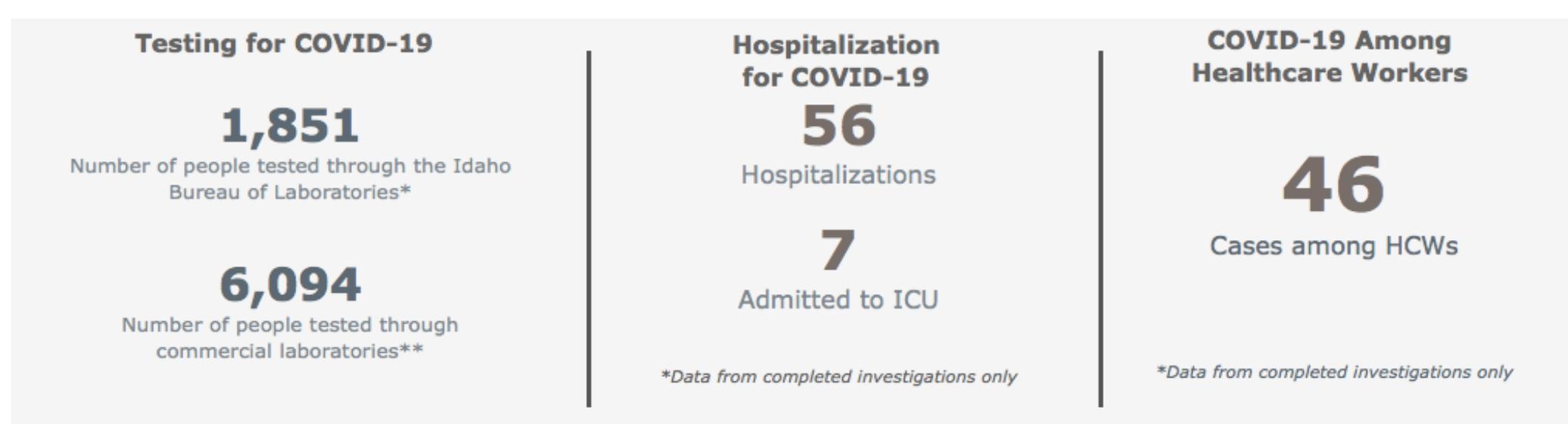
Idaho Epidemiology Curves and Public Health Updates

Carolyn Buxton Bridges, MD FACP

Governor's Coronavirus Working Group, Former CDC Public Health Physician and Researcher

COVID-19 in Idaho

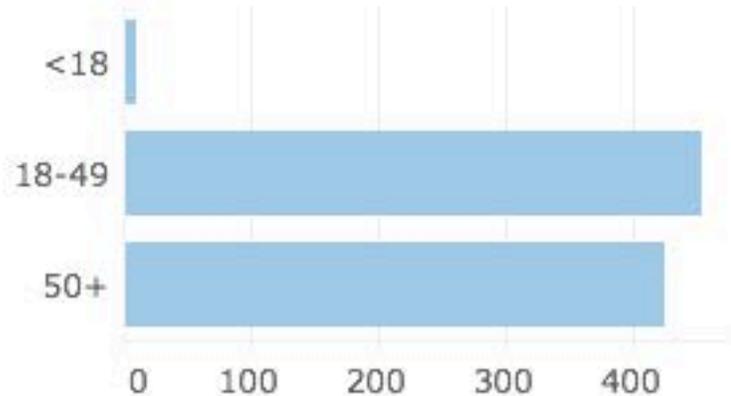
*Data updated at 5:00 p.m. MT, 4/02/2020. State-level data will be updated at 5 p.m. MT daily, based on surveillance system records provided by the health districts. Public health district data will be updated on their agency website at their discretion and may differ from data presented here. **Data are preliminary and subject to change.**



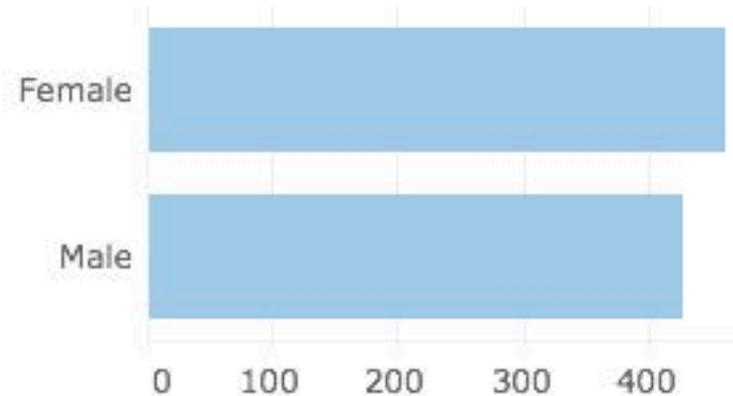
Current Idaho Cases by Date of Report, Age and Sex



COVID-19 by Age Group



COVID-19 by Sex



SARS-CoV-2 Testing in Idaho

- Substantial increase in testing at commercial labs.
 - Reminder of high priority
 - Hospitalized patients
 - Symptomatic healthcare workers
 - Symptomatic patients in long-term care facilities
 - Notify your local public health district within 24 hours of shipment for high priority specimens for IBL.

Number of people tested through the Idaho Bureau of Laboratories (IBL)*	3/30: 1,567 4/2: 1,851
Number of people tested through commercial laboratories**	3/30: 4,145 4/2: 6,094

PPE

- Guidance for optimizing use of available PPE at: <https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/index.html>.
- New guidance from CDC on use of UV-C for decontamination as part of “Crisis Standards of Care Decontamination Recommendations”
 - <https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/decontamination-reuse-respirators.html>.



COVID-19 Projections in Idaho & Clinical Presentation

Andrea Christopher, MD MPH

Internist, Boise VA; Associate Program Director for UW Boise Internal Medicine Residency

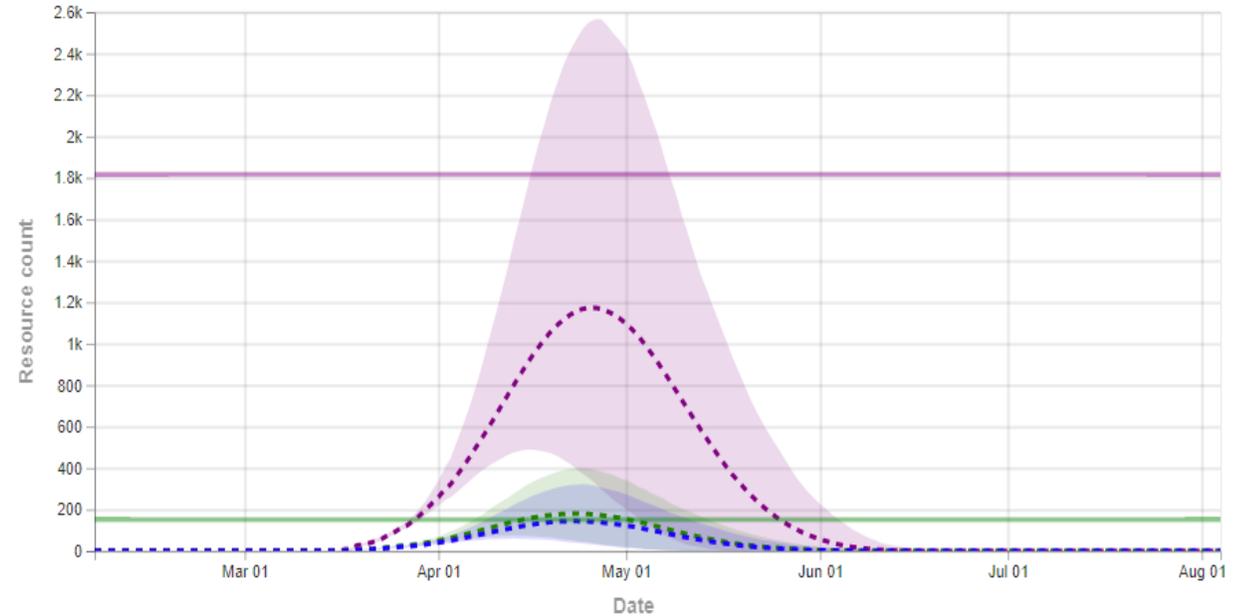
COVID19 Projections

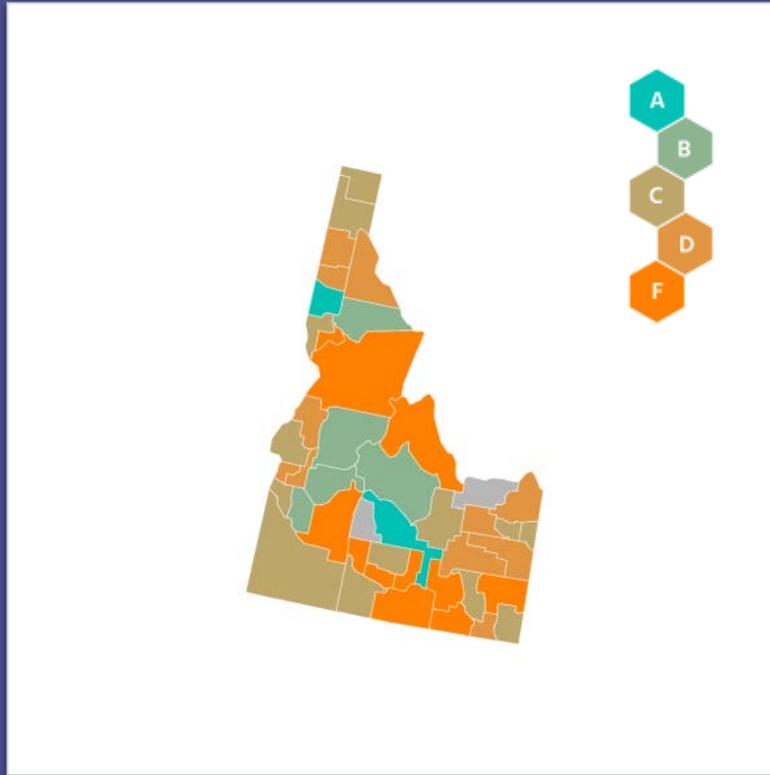
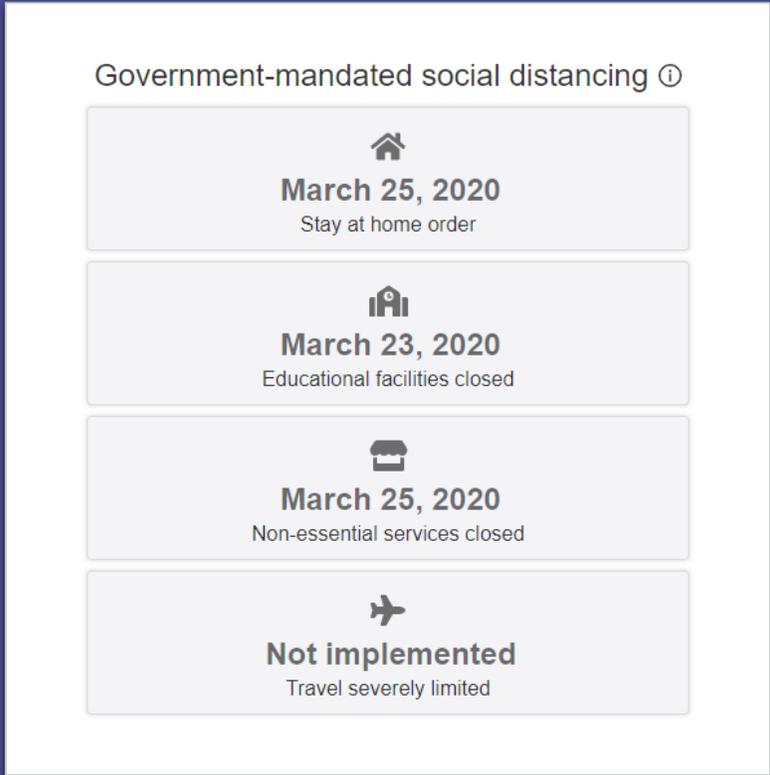
24 days until peak resource use on
April 26, 2020

Resources needed for COVID-19 patients on peak date

All beds needed 1,173 beds	→	All beds available 1,817 beds	→	Bed shortage 0 beds
ICU beds needed 176 beds	→	ICU beds available 151 beds	→	ICU bed shortage 25 beds
Invasive ventilators needed 140 ventilators				

397 COVID-19 deaths
projected by August 4, 2020





Social Distancing in Idaho

www.unacast.com/covid19/social-distancing-scoreboard



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Clinical Pearls: Clinical Presentation

- **Spectrum of Disease:**

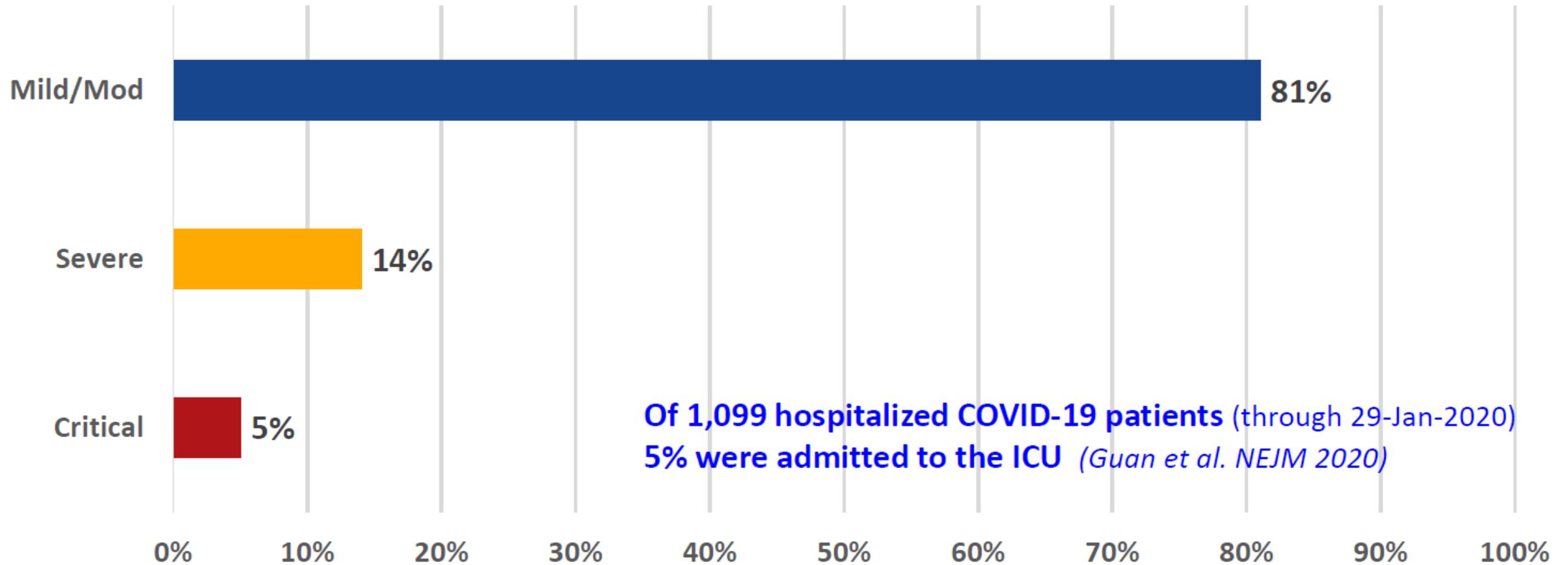
- Asymptomatic (up to 25% of those infected; asymptomatic spread accounts for 6.4-12.6% of infections)
- Mild illness – uncomplicated upper respiratory tract viral infection and/or diarrheal illness
- Moderate illness– pneumonia without need for supplemental oxygen
- Severe illness – pneumonia with dyspnea, respiratory distress, SPO₂<93% on room air, P/F ratio<300 (pO₂<60 mmHg)
- Critical illness – respiratory failure/ARDS, septic shock, cardiogenic shock, multiple organ dysfunction/failure

- **Comorbidities associated with highest mortality:**

- Cardiovascular disease
- Diabetes
- Chronic respiratory disease
- Cancer

Most patients had mild to moderate disease, but nearly 20% had severe or critical illness

COVID-19 - China through 11-Feb-2020 (N=44,415)



Of 1,099 hospitalized COVID-19 patients (through 29-Jan-2020)
5% were admitted to the ICU (Guan et al. NEJM 2020)



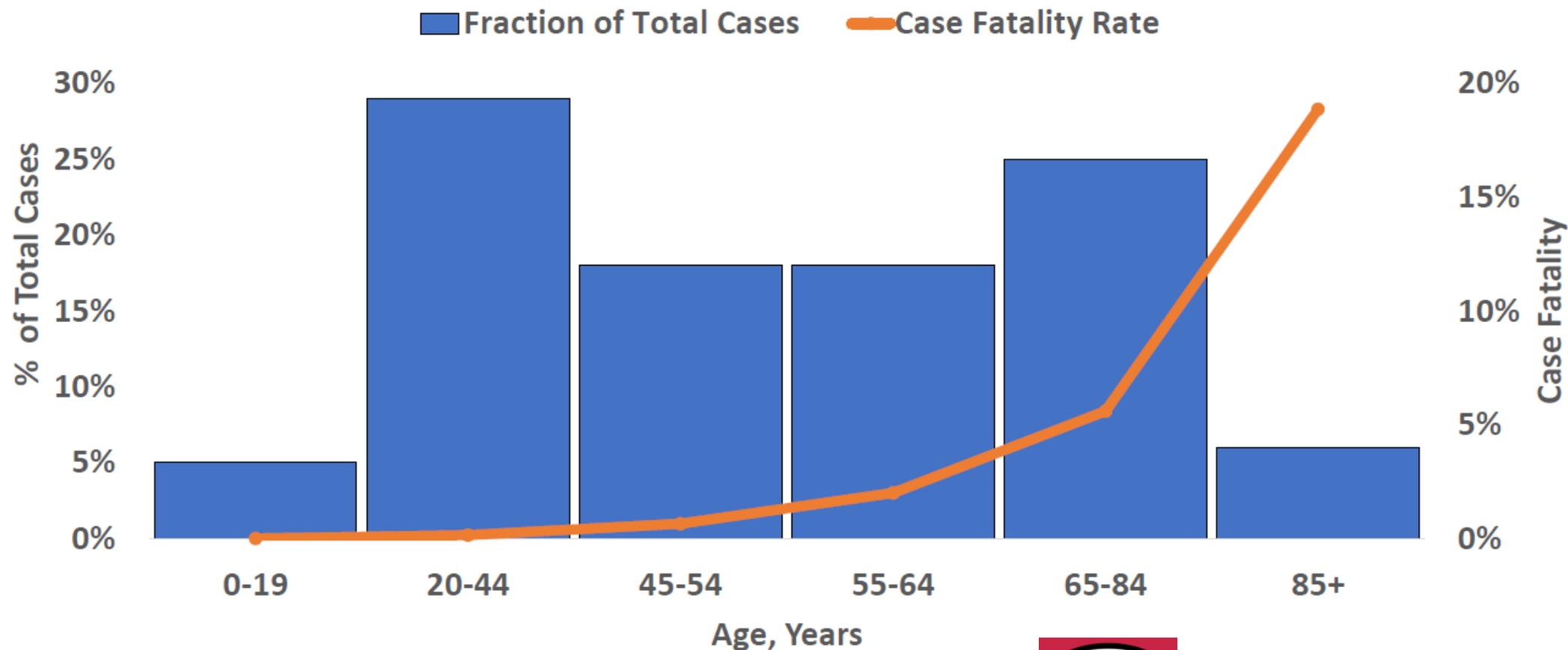
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Links: [Wu JAMA 2020](#)

But the case-fatality is disproportionately higher among older adults

COVID-19 - United States, February 12–March 16, 2020 (N = 4,226)



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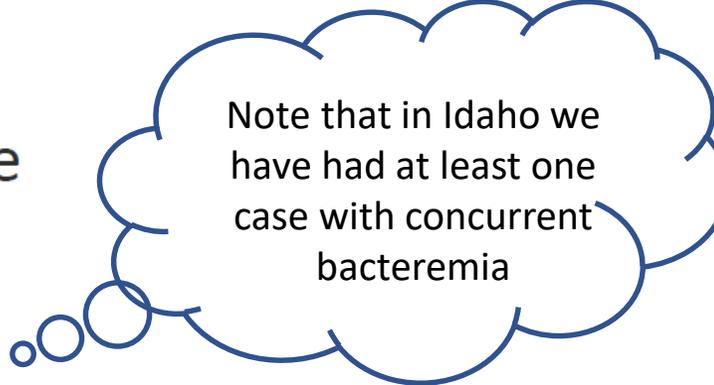
Links: [MMWR 2020](#)

Clinical Pearls:

Laboratory Abnormalities on Presentation

Laboratory findings at hospital admission

- **Lymphopenia (83%)**
 - Thrombocytopenia (36%)
 - Leukopenia (34%)
 - C-reactive protein ≥ 10 mg/L: (61%)
 - Elevated AST, ALT: (20-39%) - higher with severe disease
 - Procalcitonin - typically normal on admission
- **Co-infections:**
 - Sporadic viral co-infections reported (e.g., influenza, parainfluenza)
 - Community-acquired secondary bacterial infection not reported in published case series (blood cultures: negative)



Note that in Idaho we have had at least one case with concurrent bacteremia



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Link: [CDC Clinical Guidance 2020](#)

Laboratory abnormalities in severe disease

- **Associated with severe or critical illness:**

- ↓ lymphocytes, ↑ neutrophils

- ↑ alanine aminotransferase and ↑ aspartate aminotransferase levels

- ↑ lactate dehydrogenase, ↑ PCT, ↑ CRP, ↑ ferritin levels

- ↑ serum levels of pro-inflammatory cytokines and chemokines

- Evidence of immune dysregulation: Higher plasma levels of pro-inflammatory cytokines (TNF α , IL-1, IL-6) and chemokines (IL-8) in severe/critically ill patients vs less severely ill patients

- **Associated with mortality: ↑ D-dimers and lymphopenia**



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Link: [Qin CID 2020](#); [Huang Lancet 2020](#); [Wang JAMA 2020](#); [Yang Lancet 2020](#); [Arentz JAMA 2020](#)

Update on Medications for COVID-19

Cathy Oliphant, PharmD

Infectious Disease, Professor and Interim Chair, ISU College of Pharmacy

Investigational Therapies for COVID-19

- Hydroxychloroquine (or chloroquine) +/- azithromycin
- Remdesivir
- Lopinavir/ritonavir (Kaletra) +/- interferon-beta
- Favipiravir
- Convalescent plasma
 - Collected from COVID-19 survivors
- Interleukin-6 Inhibitors
 - Tocilizumab (Actemra)
 - Sarilumab (Kevzara)
 - Cytokine release (IL, TNF α and other inflammatory mediators) causes severe lung damage in serious COVID-19 infections

* Hydroxychloroquine (Plaquenil)/Chloroquine

- Use/Rationale
 - Antimalarial with activity against SARS-CoV-2 & immunomodulatory effects
 - May block virus entry into cells
- Clinical Experience
 - China
 - Reduced duration of symptoms
 - Another study did not demonstrate a difference in recovery rates
 - France – hydroxychloroquine +/- azithromycin
 - Several studies have demonstrated reductions in nasopharyngeal viral load
 - Weak evidence:
 - Small sample sizes
 - Low disease acuity/asymptomatic pts
 - Lack of control group
 - Late drug administration
 - Non-homogeneous groups
 - Other methodological flaws
- Dosage - Treatment
 - Hydroxychloroquine (+/- azithromycin)
 - Better tolerated than chloroquine
 - 400 mg BID day 1 then 200 mg BID days 2-5
 - When to initiate therapy
 - Chloroquine
 - 500 mg BID x 10 days
- Drug Interactions
- Adverse Effects
 - Cardiac toxicity
 - QT prolongation (AE of azithromycin too)
 - Use with caution if baseline QTc > 500
 - Use with caution if hypokalemia, uncontrolled diabetes, known G6PD deficiency, renal impairment, myasthenia gravis
 - GI – N/V/D
 - CNS – headache, dizziness, irritability, nightmares

<https://www.ashp.org/Pharmacy-Practice/Resource-Centers/Coronavirus>; <https://www.cdc.gov/coronavirus/2019>;

<https://www.who.int/emergencies/diseases/novel-coronavirus-2019>; <https://www.sccm.org/SurvivingSepsisCampaign/Guidelines/COVID-19>



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Remdesivir

- Use/Rationale:

- Antiviral agent with activity against SARS-CoV-2
- Likely inhibits an RNA polymerase, reducing viral replication
- Previously studied in Ebola, SARS-CoV and MERS-CoV

- Clinical Experience

- Limited in SARS-CoV-2
- Promising results in patients who have received remdesivir

- Dosage

- * Expanded access and clinical trials (moderate to severe COVID-19)
- 200 mg IV day 1, then 100 mg IV daily on days 2-5 or days 2-10 (depending on trial)

- Adverse Effects

- GI
- Elevated ALT/AST

Guidelines for the Management of Patients with COVID-19

- [Interim Guidance on Clinical management of severe acute respiratory infection when novel coronavirus \(nCoV\) infection is suspected \(WHO\)](#)
 - [https://www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-\(ncov\)-infection-is-suspected](https://www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-(ncov)-infection-is-suspected)
- [Surviving Sepsis Campaign: Guidelines on the Management of Critically Ill Adults with Coronavirus Disease 2019 \(COVID-19\)](#)
 - <https://www.sccm.org/getattachment/Disaster/SSC-COVID19-Critical-Care-Guidelines.pdf>

Clinical Trials/Websites

- Remdesivir
 - <https://rdvcu.gilead.com/>
- [ClinicalTrials.gov](https://clinicaltrials.gov)
 - <https://clinicaltrials.gov/ct2/results?cond=COVID-19>
- [SOLIDARITY Trial – WHO](#)

Patient Case: Inpatient and Intensive Care Considerations

Jessica Evert, MD, Family Medicine and Hospice and Palliative Medicine, St. Luke's Nampa

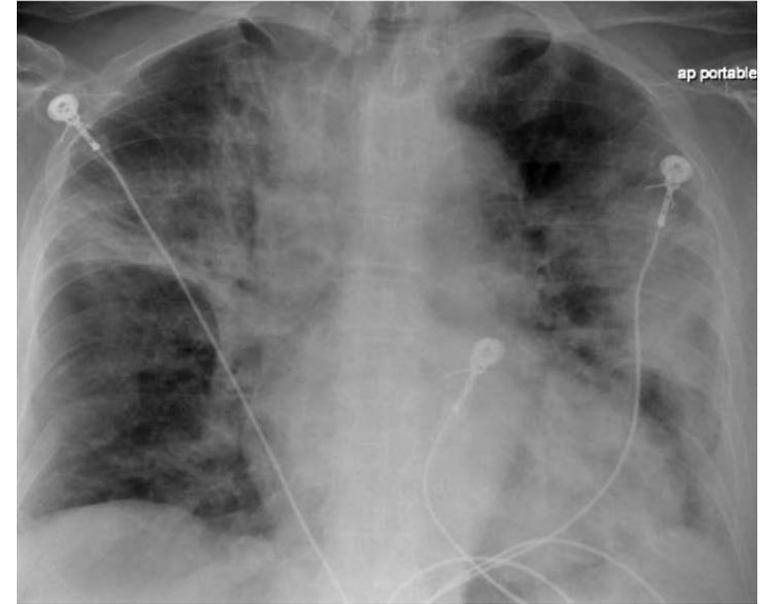
Mark McConnell, MD, Board Certified in Pediatrics, Internal Medicine, Pediatric Critical Care, and Adult Critical Care Medicine

Andrea Christopher, MD MPH, Internist, Boise VA; Associate Program Director for UW Boise Internal Medicine Residency

Megan Dunay, MD MPH, Geriatrician, Boise VA and Medical Director for Geriatrics and Extended Care for VA Pacific Northwest Region

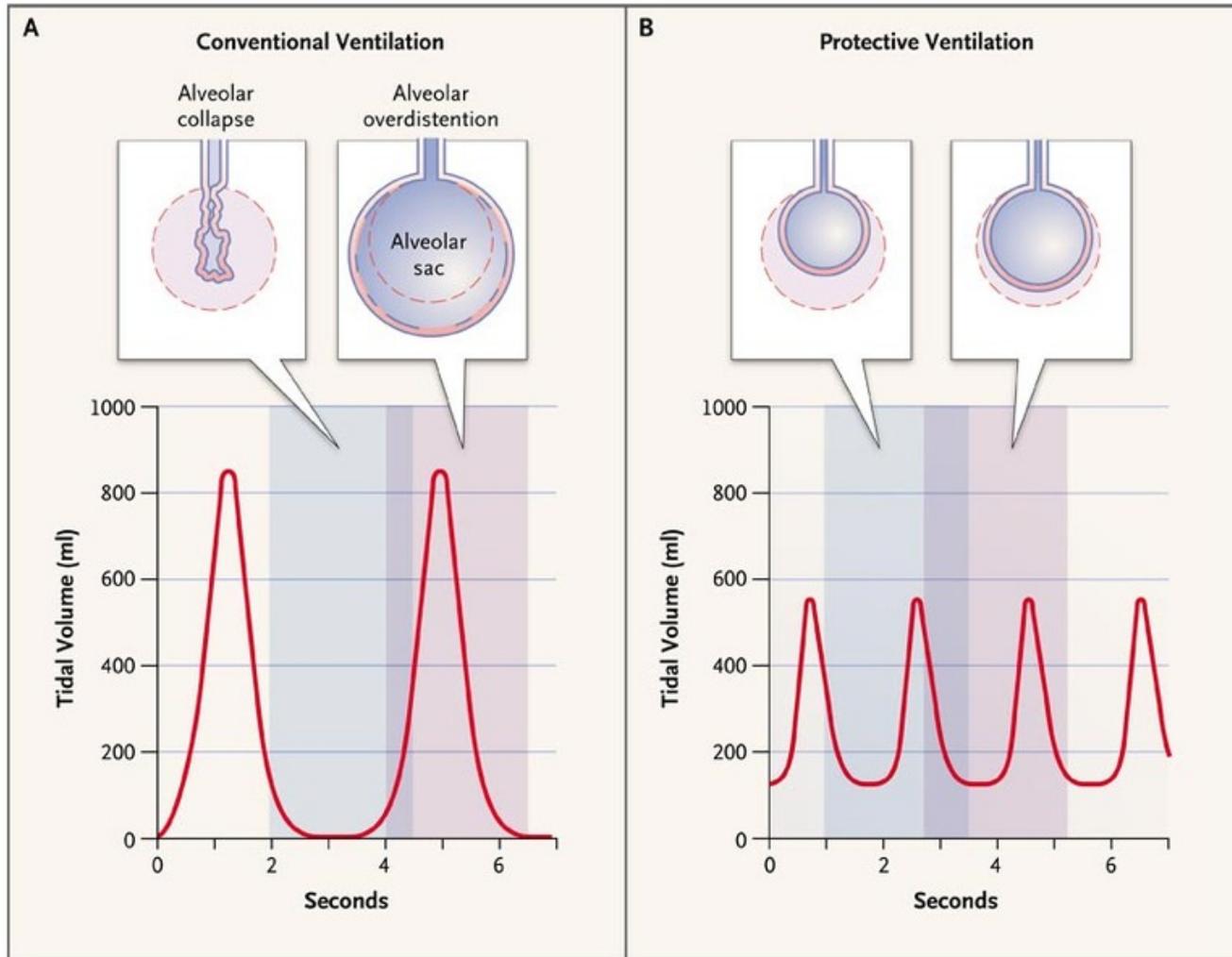
89 yo F DM, HTN, OSA on CPAP, current UTI undergoing treatment with macrobid presents with diarrhea and fatigue. Found to have mild hypoxemia when vitals done in ED. Placed on Ceftriaxone and Azithromycin for possible CAP.





Hospital Day #2, increasing hypoxia, work of breathing, increasing oxygen requirement (placed on facemask 15L and NC 6L to avoid high flow oxygen. Physician places patient on “Enhanced Droplet Precautions” and sent COVID test to Idaho State Lab. Patient started on Hydroxchloroquine, while continued on azithromycin and CTX.

Clinical Pearls: Hypoxemia Management



-Early discussion of code status and setting expectations (particularly for patients over 65 yo)

-Early, controlled intubation (if requiring greater than 6L O₂, or rapidly escalating oxygen requirement, allow for 15L NRB without humidification)

-Preoxygenate with NRB prior to intubation (do not bag if can avoid it)

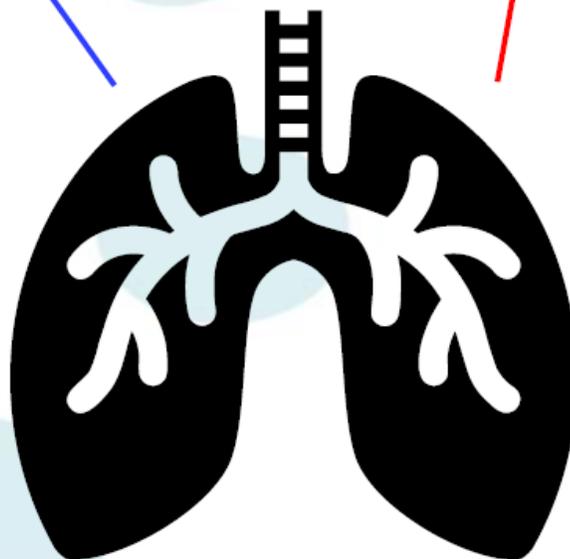
-Avoid High Flow Oxygen, Positive Pressure Ventilation (CPAP/BIPAP)

-May start on traditional vent settings, Low Tidal Volume Lung Protective Ventilation (6ml/kg + High PEEP)

-Consider risk v. benefit of proning/paralytics, consider iNO

we **suggest** using a higher PEEP strategy

we **suggest** using a conservative, over a liberal, fluid strategy.



We **recommend** using low Vt (4-8 mL/kg) and Targeting Pplat <30 cmH₂O

Mod-Severe ARDS

Back to our 89 yo patient....

- COVID results positive, CTX stopped, Hydroxychloroquine/Azithro continued (QTc monitored daily while on continuous tele)
- Continues to have high oxygenation needs
- Is in ICU and develops hypoactive delirium
- Not seen by speech/PT/OT due to COVID infection
- Decision to transfer to floor to try to address delirium
- Patient not allowed to have any visitors; she cannot eat because she cannot be cleared by swallow and has too high of an oxygen need
- Mental status slightly improves, patient asks to eat
- In discussion with patient and family, decision made to have patient do home hospice given high likelihood of death and wanting to avoid her dying alone. Patient smiles and nods yes when asked if she wants to go home.
- Able to transfer home on 6L and comfortably passes surrounded by family

Clinical Pearls: Critical Care

- **Prone Ventilation:** Risk v. Benefit, Consider for 12-16 hrs, over no prone ventilation
- **Corticosteroids:**
 - Suggest against routine use of systemic corticosteroids
 - For mechanically ventilated adults with COVID19 & ARDS, suggest systemic corticosteroids (weak recommendation)
- **Neuromuscular blockade:**
 - Suggest as needed intermittent bolus over continuous infusion
 - In case of persistent ventilator dyssynchrony, requirement of ongoing deep sedation, prone ventilation, or persistently high P_{plt} : suggest continuous NMBA infusion for up to 48 hrs
- **Hemodynamic Support:**
 - Suggest conservative fluid strategy (eg bolus over continuous infusion); Dobutamine or milrinone to decrease pressor support with cardiomyopathy or myocarditis

Clinical Pearls: Critical Care

- **Antibiotics:**

- Suggest empiric antimicrobials/antibacterial agents for mechanically ventilated patients with COVID19
- Assess for de-escalation daily based on microbiology results & clinical status

- **Therapy:**

- Suggest AGAINST routine use of: intravenous immunoglobulins, convalescent plasma, lopinavir/ritonavir
- Insufficient evidence to support: antivirals, immunomodulators

More to come...

- Tuesday, April 7 (*tentative*) – Microbiology of COVID-19 and the Infectious Disease Clinical Perspective
- Friday, April 10 (*tentative*) – Goals of Care: Difficult Conversations and Clinical Palliative Care for COVID-Positive Patients

Opioid Addiction and Treatment Series

- Thursday, April 9 – Managing Common Psychiatric Conditions and Substance Use Disorder through COVID-19