COVID-19: Our Collective Preventative Approach as Christians

John F. Pohl MD
Professor of Pediatrics
University of Utah
Salt Lake City, Utah
@jfpothl
Disclosures

• INSPIRE (INternational Study group of Pediatric Pancreatitis: In Search for a CuRE) Consortium, NIH U01 DK108328-04
• Editorial Board, Practical Gastroenterology
• Speaker’s Bureau, Medical Education Resources, Inc.

No products or services produced by these entities are relevant to my presentation.
Disclosures

- I am not an infectious disease physician.
- I am not an epidemiologist.
- I am a pediatric gastroenterologist who works at an academic medical center and who has assisted with planning for the COVID-19 epidemic including crisis planning for safe and appropriate care for the vulnerable patient population at our children’s hospital.
- I also have been involved with planning safety mechanisms for at-risk faculty and staff (elderly, immune compromised, pregnancy).
What is COVID-19?

COVID-19 (coronavirus 2019)

- A novel coronavirus associated with severe acute respiratory syndrome, so also known as SARS-CoV-2.
- Started in Wuhan, China (first reported Dec 31, 2019)
- Potential animal-human transmission (bat, pangolin, civets, ferrets)
- Cross-species transmission is not rare (HIV, measles, influenza, Ebola, etc.).
The Virus: Infects mammals and birds

The virus has spikes ("corona" or crown)

The spike protein attaches to cell membrane (green)

The COVID-19 spike protein binds more effectively than other coronaviruses.

Binds to ACE2 receptor:
Lung
Heart
Kidney
Intestine
Why is coronavirus so contagious?

- The SARS-coronavirus (Severe Acute Respiratory Syndrome) was first identified in 2002 in south China and the first human infection was in 2003.
- **SARS-CoV-2** (COVID-19) has a spike that is 10-20X *more efficient* attaching to ACE2 compared to the 2002 virus.
- Person-to-person transmission (**droplet**) via cough, eyes (tears), stool.
- Symptoms: Influenza-like and include **fever**, **dry cough**, malaise, myalgia, headache, diarrhea, etc.
Why is coronavirus so contagious? \((R0)\)

- **Mathematical term**: How contagious is an infectious disease?*

- \(R0<1\): Each existing infection causes less than one new infection. The disease will decline/die out.

- \(R0=1\): Each existing infection causes one new infection. The disease will stay alive/be stable with no outbreak or an epidemic.

- \(R0>1\): Each existing infection causes more than one new infection. There may be an outbreak or epidemic.

*Caveat: As long as 1) no one has been vaccinated against it or 2) people are not immune to it in their community.*
Why is coronavirus so contagious? *(R0)*

- Influenza R0: 2 – 3
- Measles R0: 12 – 18 *(highly contagious but not as lethal)*
- RSV (respiratory syncytial virus) R0: 0.92 – 1.76
- **COVID-19**: 1.5 – 3.5 (perhaps as high as 5.7)
Variation of the Pandemic Per U.S. State

Typically, polymerase chain reaction (viral RNA - swab) or antibody (blood) testing is being performed.
Personal perspective

• My wife, Susan, is a family medicine physician and director of a large University of Utah clinic.

• Utah has had less COVID-19 infections compared to other states BUT:
  1. We have to keep up with CDC and Utah Department of Health guidelines / updates.
  2. We have to keep potential contaminated clothes out of the house. We keep our family isolated.
  3. We have conversations with physician friends in other states and worry about their circumstances (ex. New York).
  4. We pray for our friends in healthcare, our at-risk friends, and our friends in other states.
Daily COVID-19 cases confirmed by state or local public health laboratories, as well as those testing positive at the state or local public health laboratories and confirmed at CDC
How sick can someone get with coronavirus?

1. Respiratory failure
2. Heart failure
3. “Cytokine storm”
4. GI manifestations (diarrhea, abdominal pain)
5. Liver disease
6. Eye disease
7. Clotting issues?
https://coronavirus.jhu.edu/map.html
What happens to healthcare with increasing infections?

- **Conventional care**: The demand for care is less than the supply of resources. Level of care is consistent with daily practices in the institution.

- **Contingency care**: The demand for care surpasses conventional resource availability, but it is possible to maintain a functionally equivalent level of care by using contingency care strategies. The facility’s Emergency Operations Plan is activated.

- **Crisis care**: The demand for care surpasses resource supply despite contingency care strategies. The normal standard of care cannot be maintained.
Personal Perspective

• Susan and I are in meetings frequently with our divisions, departments, hospital, and university. We receive policy emails frequently with updates that we must address and implement.

• We have to plan ahead frequently. Who will not be coming to clinic for the day? Who cannot be on call? Have operating room protocols changed?

• We have to worry about / plan for faculty with pre-existing issues: age, chronic health issues, pregnancy, etc.

• We pray frequently to keep our stress under control.
Treatment

• Poorly defined at this point

*Hydroxychloroquine and azithromycin*
• Very small study
• Lots of drop out
• Patients still went to ICU. 1 died.
• Retraction Watch

**ALSO:** *Bad* side effects of combination (cardiac/death)

*Hydroxychloroquine and azithromycin induces body’s anti-viral immune processes (IL-6, TNF-α, etc.)*
Treatment

**Remdesivir** (currently under investigation)

- Adenosine analogue → incorporates into RNA of virus and terminates polymerase proofreading (stops viral RNA production)
- Has been used in Ebola virus
- May have effect on other coronaviruses (SARS, MERS)
- In clinical trials
Treatment

Remdesivir (currently under investigation)

Issues: High mortality rate of intubated/ventilated patients (18%), no placebo arm, pharma study
Treatment (Prevention)

**Vaccine: A long term solution**
- Polio vaccine: 15 years of research to clinical use
- Measles vaccine: 6 years

**Issues:**
Is it a one-time vaccine?
Is it seasonal (like influenza)?
Does it require a booster?
Prevention

“Flattening the curve”
Public health interventions and epidemic intensity during the 1918 influenza pandemic

Richard J. Hatchett**, Carter E. Mecher†, and Marc Lipsitch‡

“Liberty Parade” for WWI bonds

Fig. 1. Excess P&I mortality over 1913–1917 baseline in Philadelphia and St. Louis, September 8–December 28, 1918. Data are derived from ref. 10.
Personal Perspective

• Susan and I give thanks to God for medical science.
• We spend much time explaining to patients and families why certain treatments may work / may not work.
• We spend even more time explaining the concept of social distancing (church attendance, social gatherings).
• Our church has leadership who are in the field of medicine so social distancing is a priority.
• As Christians, we need to spread the importance of social distancing to other Christians when it comes to church attendance (on-line church) or social gatherings (Zoom meetings).
How to flatten the curve?
Wash Your Hands

• At least 20 seconds
• 60% alcohol cleaning solution (or soap and water)
• Don’t touch mouth, eyes, face
• Don’t shake hands. Use elbows, if you must.
• If you use gloves, use them properly.
• BUT save gloves for healthcare workers.
• Clean and disinfect frequently touched surfaces every day.
Avoid close contact

• **Stay home. Stay home. Stay home. Stay home.** [unless essential personnel]
• Put distance between yourself and others.
• COVID-19 spreads via people coughing, sneezing, or talking.
• Spreads via **droplet**. So use droplet precautions...6 feet apart.
• Stay away from at-risk people (the elderly, people with chronic health conditions).
• Go shopping for at-risk people.
Cover your mouth / nose with a face cover

• Prevents spreading the illness to others.
• Don’t use in children less than 2 years.
• Keep 6 feet away.
• Don’t use masks reserved for healthcare workers.
Personal Perspective


2. We do church services through Facebook.

3. We do meet-ups with friends and work meetings through Zoom, Microsoft Teams, WebEx, etc.

4. We try to help those in need (healthcare workers, the elderly, those with chronic health care needs).

5. Pray. We should always pray.

2. We do church services through Facebook.

3. We do meet-ups with friends and meetings through Zoom, Microsoft Teams, etc.

4. We try to help those in need (healthcare workers, the elderly, those with chronic health care needs, shut-ins).

5. Pray. We should always pray.

My weakness: I get very angry with people who spread these falsehoods. It is a weakness that I pray about.
My Advice to Patients

God gave us brains

Brains gave us science

Science is a GIFT FROM GOD

Give thanks to God!
Matthew 25: 35-36
• “For I was hungry and you gave me something to eat, I was thirsty and you gave me something to drink, I was a stranger and you invited me in, I needed clothes and you clothed me, I was sick and you looked after me, I was in prison and you came to visit me.”

Matthew 25: 40
• “…’Truly I tell you, whatever you did for one of the least of these brothers and sisters of mine, you did for me.”
Matthew 25: 35-36

• “For I was hungry and you brought me food at a safe distance because I was old or ill, I was thirsty and you brought me something to drink using correct social distancing, I was a stranger and you made sure you didn’t get me sick by wearing a face mask, I needed a face mask and you made me a clean face mask, I was sick and you saved resources for healthcare workers and practiced social distancing, I was isolated at home and you visited by phone or video teleconferencing.”

Matthew 25: 40

• “…‘Truly I tell you, whatever you did for one of the least of these brothers and sisters of mine, you did for me.”
Resources

• [https://www.cdc.gov/](https://www.cdc.gov/)
• [https://health.utah.gov/](https://health.utah.gov/) (use your state health department as a resource)
• NEJM Catalyst ([https://catalyst.nejm.org/](https://catalyst.nejm.org/))
• Johns Hopkins Coronavirus Resource Center ([https://coronavirus.jhu.edu/map.html](https://coronavirus.jhu.edu/map.html))

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Thank you

Social distancing by putting flowers on the cross (drive-by only)

Social distancing by taking a walk in the mountains.