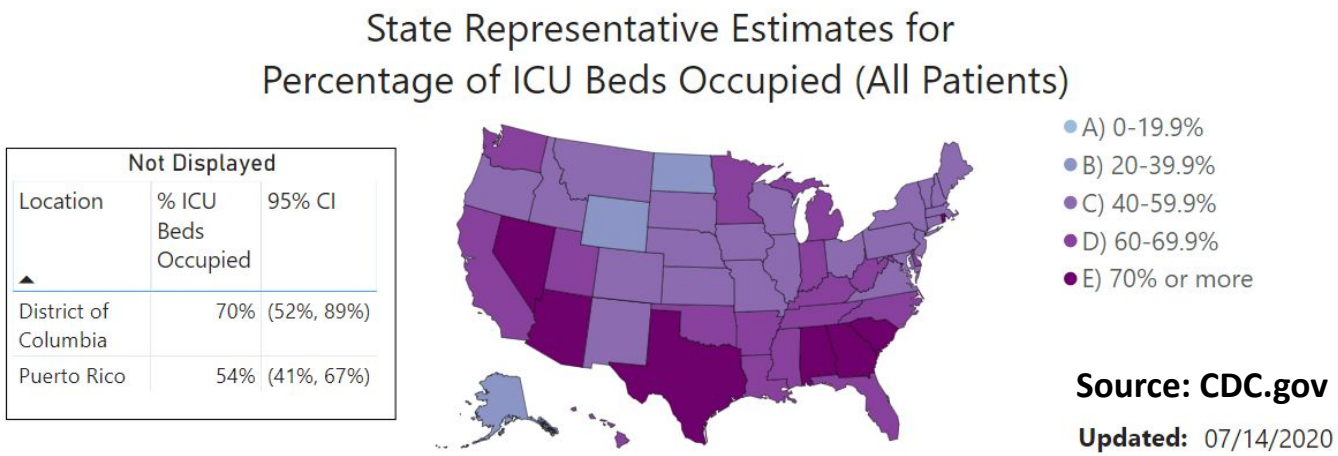
AI4ALL project summary: Clinical Project

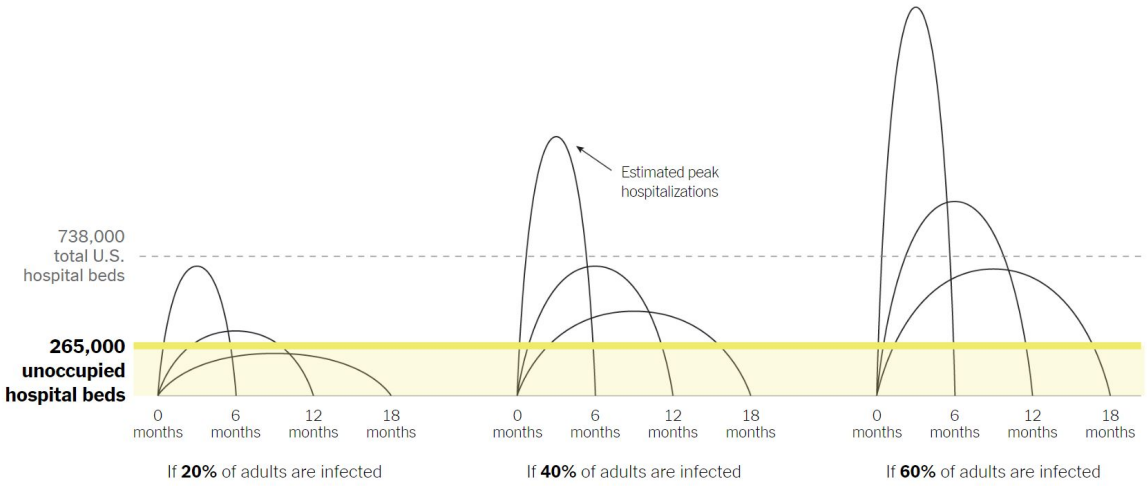
Bianca & Alice

A Bit About Us

Background & Overview

State Representative Estimates for Percentage of ICU Beds Occupied (All Patients)



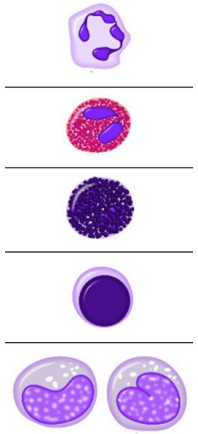


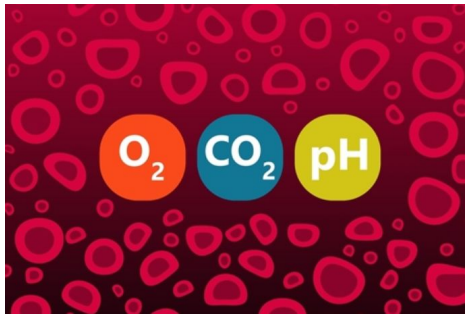
Source: NY Times. Harvard Global Health Institute.

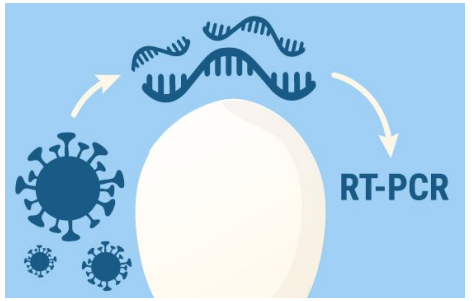
- Exponential increase in COVID-19 cases risk overwhelming healthcare resources worldwide, and ICU bed capacity needs can reach beyond existing capacity.
- Testing every SARS-CoV-2 case would be impractical and slow in context of overwhelmed health system.
- There is a need for alternative ways to 1) determine COVID status and 2) predict the severity of COVID infections.

Data

- Brazil recorded the first case of SARS-CoV-2 on February 26, and the virus transmission evolved from imported cases only, to local and finally community transmission very rapidly, with the federal government declaring nationwide community transmission on March 20.
- https://www.kaggle.com/einsteindata4u/covid19
- Includes: COVID result, blood tests, blood cell counts, blood gas, viral panels, and more.

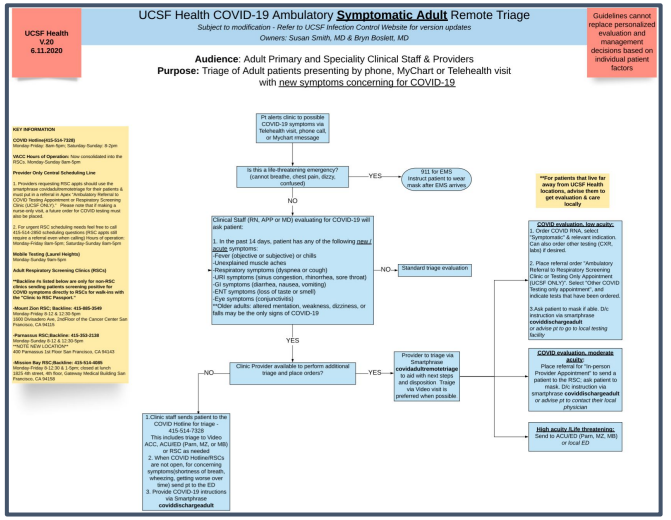






Questions

- Can we use clinical data to predict whether a patient is COVID positive or negative?
- Which clinical data is most useful?
  - Minimum tests needed to predict COVID?
  - Cost/consequences of false positives and false negatives?
  - From these results, can we generate an algorithm for healthcare systems to use?
    - Can compare/"update" with the existing UCSF algorithm
- Can we use clinical data to predict the severity of the COVID infection?
- How does COVID infection rates compare between groups? (e.g. age, pre-existing conditions, nutritional status, etc.)
  - What groups have higher severity rates? Why?



Example UCSF Algorithm

Analysis

- Visualizing and cleaning up original data
- Creating figures
- Implementing a ML algorithm to predict COVID status
- Implementing a ML algorithm to predict COVID severity
- Covariate analysis as f/u to answer scientific questions
- How to apply these findings to translational applications
- Follow-up questions: designing follow-up studies, treatment ideas, prevention ideas
- Presenting findings in an awesome way