COVID-19 Update
PERT
Edward Ryan
Harvard University
Massachusetts General Hospital
• No COI
• Will point out off-label
Epidemiology: US Hot


Leer en español

TOTAL CASES
4.7 million+

DEATHS
155,935

Includes confirmed and probable cases where available
21 states now in the “red zone” — Alabama, Arizona, Arkansas, California, Florida, Georgia, Idaho, Iowa, Kansas, Louisiana, Mississippi, Missouri, Nevada, North Carolina, North Dakota, Oklahoma, South Carolina, Tennessee, Texas, Utah, and Wisconsin — (more than 100 new cases per 100,000 people in the past week).
Missed opportunity
Summer should have brought a 40% decrease in R0 (it did in North East)

Models suggest areas will now further increase

As schools reopen (august sept)
As temperature decreases (oct-nov)

Models suggest Dec thru March will have widespread transmission in absence of vaccine
Goal is to limit (1) deaths, (2) overwhelming hospital capacity (and that will cycle into lower death rate)

There is a direct link with overwhelmed hospitals and increased likelihood of dying of COVID (and non-COVID!)

Overwhelmed hospitals 20-70% death rate if ventilated

Non overwhelmed 10-15% death rate if ventilated
Shouldn’t we just “let this thing rip”

This is a very infectious virus (unchecked R0 of 4 or greater)

Death rate overall 0.1-0.5%

320 million Americans: 320,000 deaths – 1.6 million deaths.

We are already up to 150,000 deaths and we aren’t even through wave 1.
Estimates are 5-10 additional infected for every case detected currently, therefore about 25-45 million people have been infected in US; 8-16%

Models suggest we need to get to 50-70% infected (or vaccinated) to affect transmission
Where new cases are decreasing

Charts show daily cases per capita and are on the same scale. States are sorted by cases per capita for the most recent day. Tap a state to see detailed map page.

Note: States and territories are grouped according to how the seven-day average of new cases has changed from two weeks ago to today.
Where new cases are mostly the same

Charts show daily cases per capita and are on the same scale. States are sorted by cases per capita for the most recent day. Tap a state to see detailed map page.
Where new cases are increasing

Charts show daily cases per capita and are on the same scale. States are sorted by cases per capita for the most recent day. Tap a state to see detailed map page.
Deaths lag 3-6 weeks of cases, and they are increasing.
Rest of world


TOTAL CASES
18.3 million+

DEATHS
694,850

Includes confirmed and probable cases where available
In absence of vaccine, we will have 2-4 waves over 2-3 years

With vaccine, we can cycle out sooner

**Testing:** we are making progress, but no where close to where we need to be

National/repetitive shortages

We are testing about 750,000 tests a day in USA (with 7% positive!!)
Most models suggest we need at least 1-3 million tests a day to identify cases and track contacts/outbreaks etc
Will need to go to pool testing for screenings
Clinical:
Severity and mortality

Depends on age, comorbid conditions

Kids: MIS-C Multisystem inflammatory syndrome (Kawasaki like), rare but real
(150 in NYC, 1.8 million children in NYC; 20% exposed? 1 in 2500 (75 million under 18 in USA: 30,000 total

Under 45: maybe 1 in 1,000-10,000 severe illness (lungs fill up with fluid), ICU, death
170 million: 17,000-170,000 in USA

40-60 yoa: 1 in 100-1,000 severe illness (lungs fill up with fluid), ICU, death
80 million: 80,000-800,000 in USA

Over 60: 70 million 1-5 in 100; 700,000-3.5 million

Over 80: 12 million (mortality 10-20%) 1.2-2.4 million

DO NOT OVERWHELM HOSPITALS (we have a little under 1 million hospital beds in US), about 100 thousand ICU beds in USA
(MGH became a COVID Hospital and 45% of all COVID admits were ventilated)
Clinical illness:
Asymptomatic (25-50%?)
Symptomatic:
Mild, sore throat, to moderate flu like illness
Some people go severe; develop persistent fevers and then on days 5-10
Pneumonia/parenchymal inflammation-alveolar fluid/ARDS
The virus is detectable in blood stream
Affects lining of blood vessels
Hypercoagulable state; micro and macrothrombosis (DVTS, PEs)

Even in mild disease people, growing body of evidence of long term effects (perhaps due to microclots?; unknown?)
Decreased exercise tolerance
Get winded
Cardiac edema
Treatment

**Basic things:**
Prone positioning.
Ventilators
ECMO

EXPERTISE (the 1000 little things). Mortality rate in US increases 3 fold if you are hospitalized at a facility with fewer than 50 critical care beds.

We’ve gotten death rate down globally by a third for ICU patients since March
# Treatments Considered for COVID-19
(Updated July 28, 2020)

The table below lists pertinent evidence on the clinical effectiveness and safety of some drugs and other therapies being considered for COVID-19. Most authorities recommend use of these drugs only in the setting of a clinical trial or when access via clinical trial is not available. **Inclusion in this table is not a recommendation for use for treatment of COVID-19.** The information on these drugs is evolving rapidly and The Medical Letter does not warrant that all the material in this publication is current, accurate, or complete in every respect.

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Going after virus
Remdesivir (shortened hospitalization)

Being tested (in vitro or animals; human pending):
Favipiravir
EIDD-2801
Recombinant ACE-2 proteins

Did not work:
Lopinavir and ritonavir; hydroxychloroquine and chloroquine
Going after immune response:

Assist or Rev things up
Convalescent sera (would need to be early)
Monoclonal antiviral antibodies
Interferons (including inhaled)

Damp things down
Dexamethasone (decreased deaths from 40%!! by a third; and very high starting rate) in severely ill, but worsened those not severely ill

Cytokine inhibitors (example anti IL6R, IL1R), anti-CD6, JAK inhibitors

Filtering cytokines
Taking care of damage:
CVVH/AVVH (clotting catheters)
Early data has linked the use of anticoagulants to survival among Covid-19 patients, and clinical trials teasing out this relationship are now underway.
Clots and AC will be focus in this webinar from panel
The end game here is: Vaccines

Coronavirus Vaccine Tracker

By Jonathan Corum, Denise Grady, Sui-Lee Wee and Carl Zimmer  Updated August 3, 2020

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- Vaccines not yet in human trials
- Vaccines testing safety and dosage
- Vaccines in expanded safety trials
- Vaccines in large-scale efficacy tests
- Vaccine approved for limited use
Entering Phase 3
Warp speed (300 million doses of safe, effective [50%] vaccine by January 21
14 to 7; range of technologies

mRNA
July 27th Moderna (30K people); placebo; 2 doses 28 days apart; mRNA; 1BUSD

Pfizer and BioNTech, Fosun; $2 Billion for 100 million US doses by Jan 21 (1.3B globally by then); mRNA

Vector DNA
Pzifer, Oxford-AstraZeneca adenovirus (chimp) DNA: $1.2B (10 k already immunized in UK, Brazil, RSA) 30k to enroll in US; best responses with booster in N=60, 10 with booster; “300 million diseases by oct?”

Johnson and Johnson/BIDMC
Adenovirus 26 (Ebola), $0.5B, launched phase ½ in july in Belgium and Boston

Subunits
Adjuvanted subunit vaccines Sanofi GSK; $2b; “early 2021”
Soon Novavax; protein ($1B)

Killed viral vaccines (Sinopharm-UAE and Sinovac-Brazil); both phase 3

Chinese CanSino Biologics: adenovirus (human) vector DNA (Ad5), 500 people, not very immunogenic; vector immunity; Phase 1 and 2; Now being used in Chinese Military (no phase 3)

Russian Gamaleya Institute 2 adenoviruses (Ad5, 26): Phase 1 done in June: registering for country wide in Oct