While Science has a seat at the table, it is rarely the **only** seat at the table.
These slides focus only on the Science.
The global pandemic is not over.
In the beginning...

Data sources: OurWorldinData, Wikipedia (China before Jan 23)
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Covid19 Daily New Cases Per Million

- **China**: Lockdown
- **Italy**: Lockdown, >1,000 cases
- **United Kingdom**: WHO Pandemic
- **United States**:

Covid19 Daily New Deaths

- **China**: Lockdown
- **Italy**: Lockdown, 30 dead
- **United Kingdom**: WHO Pandemic
- **United States**:

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Historical data

- **56M** Smallpox, 1520
- **40-50M** Spanish Flu, 1918-1919
- **30-50M** Plague of Justinian, 541-542
- **2.7M** COVID-19, 2019-11-40AM PT, Mar 16, 2021 [ONGOING]
- **25-35M** HIV/AIDS, 1981-PRESENT
- **12M** The Third Plague, 1855
- **5M** Antonine Plague, 165-180
- **3M** 17th Century Great Plagues, 1600
- **1M** Asian Flu, 1957-1958
- **1M** Russian Flu, 1889-1890
- **1M** Hong Kong Flu, 1968-1970
- **1M** Cholera 6 outbreak, 1817-1923
- **1M** Japanese Smallpox Epidemic, 735-737
- **600K** 18th Century Great Plagues, 1700
- **200K** Swine Flu, 2009-2010
- **100-150K** Yellow Fever, LATE 1800s
- **11.3K** Ebola, 2014-2016
- **850** MERS, 2012-PRESENT
- **770** SARS, 2002-2003
Data Science challenges

- Extremely small samples
- Biased samples
- Low quality data
- Local variability
- Non Stationary
- Few historic precedents
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- Emergency
- Don’t want panic
- FP cost: huge & certain
- FN cost: large & uncertain
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- Ultra short attention span
- Lightning fast information diffusion
- Divided citizenry
Explosion of scientific papers & data analyses

8/13  7588 Articles

1/4  11,951 Articles

4/30  15,514 Articles

900 new articles per month

A snapshot of a pandemic: the interplay between social isolation and COVID-19 dynamics in Brazil
Ferreira, C. P., Marcondes, D., Melo, M. P., Oliva, S. M., Peixoto, C., Peixoto, P. S.

U.S. Regional Differences in Physical Distancing: Evaluating Racial and
PREVIEW
Science by Press Releases, Public Relations
How Long Do Covid-19 Vaccines Provide Immunity?

Pfizer, Moderna and Johnson & Johnson vaccines provide good protection against the virus that causes Covid. But how long does that last? Will you need a booster?

How long are we protected from getting Covid-19? Does the efficacy decline over time?

Recent data from Pfizer, the manufacturer of one of the three vaccines available in the U.S., indicates that protection lasts at least six months. The results showed minimal antibody decline. Recipients of the Moderna vaccine also had robust levels of antibodies more than six months later, according to a recent study published in NEJM.

Some people have incorrectly concluded that means that those vaccines offer only six months of protection, says Scott Hensley, a professor of microbiology at the University of Pennsylvania. “That’s false,” says Dr. Hensley. “We only have six months of data... Six months from now it’s likely we’ll learn we have one year of protection.”

What kind of study?

What is “minimal”? What is “robust”?
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What is “minimal”?

What is “robust”?

Letter to editor

n=33, divided into 3 groups

Prior WSJ article

Press release from Pfizer

Found 1 mention of “antibody”, about S. Africa & not about decline
The Research Zoo

Lab Experiments
- Vaccine antibodies
- Masks
- Variants
- Prevalence

Statistical Experiments
- Vaccine Trials
- Therapeutics Trials

Observational Studies
- Real-world studies of vaccines
- Sewage
- Parking lots

Models / Simulation
- Forecasts
- R0
- Interventions e.g. campus reopening, J&J pause
- Herd immunity
- Predicting infections

Exploratory Analyses
- Vaccine dose intervals
- Vaccine efficacy for subgroups
- Vaccine efficacy for deaths

Surveys
- Vaccine hesitancy
- Attitudes & behavior

Images:
- Octopus
- Crane
- Monkey
- Horse
- Peacock
Research Methods

The pandemic has sparked an explosion in research studies.

It’s important to know what research method produced the findings.

It’s important to assess the strengths & weaknesses of each method.

TO BE CONTINUED
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