How to Manage a Pandemic: Science, Public Health and Culture

William M. Valenti, MD

Professor of Clinical Medicine

University of Rochester School of Medicine and Dentistry

Co-Founder, Chief of Innovation, Staff Physician, Trillium Health

Rochester, NY

This activity is jointly provided by Physicians' Research Network and the Medical Society of the State of New York.

Objectives

- Describe the similarities and differences in public health responses between HIV, COVID-19, Mpox

- Discuss epidemiologic and other tools used to describe pandemics, epidemics, and outbreaks

- Review preparedness and responses to current and future pandemics, epidemics and outbreaks

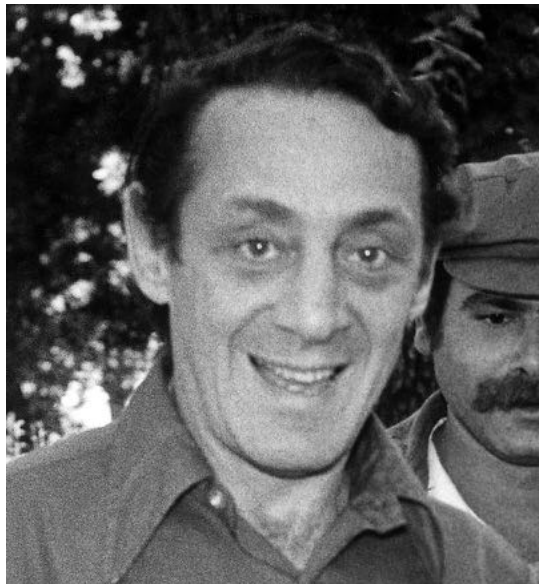
"What's Past is Prologue"

William Shakespeare – *The Tempest*

June 5, 1981
https://stacks.cdc.gov/view/cdc/1261

Decades of Conflict

Stonewall Rebellion 1969



Harvey Milk Assassination 1978

https://news.harvard.edu/gazette/story/2019/06/harvard-scholars-reflect-on-the-history-and-legacy-of-the-stonewall-riots/

AIDS Advocacy

www.drbillvalenti.com

https://www.history.com/topics/gay-rights/the-stonewall-riots#&gid=ci024a78ae40002649&pid=stonewall_nypl_1582276u

Lead, Follow,
or Get Out of the Way

General George S. Patton

World War II

Leadership

- Carly Fiorina
  - Challenge the status quo
  - Make change
  - Get results
  - Make some enemies in the process
- John Gardner
  - Effective leaders
    - Heighten motivation and confidence
    - Strengthen shared values
  - When these qualities are diminished
    - “Leaders have a hard time leading”

Carly Fiorina – https://business.catholic.edu/news/2017/11/carly-fiorina.html
John Gardner - https://www.pbs.org/johngardner/sections/writings_book_1.html

The Testing Wars: 1985

A Scorched Earth Strategy

"AIDS advocates deserve a major share of the credit for opening my eyes …

…that 'the movement' would have more horsepower as a medical/ community partnership."

Dr. Tony Fauci May 1990

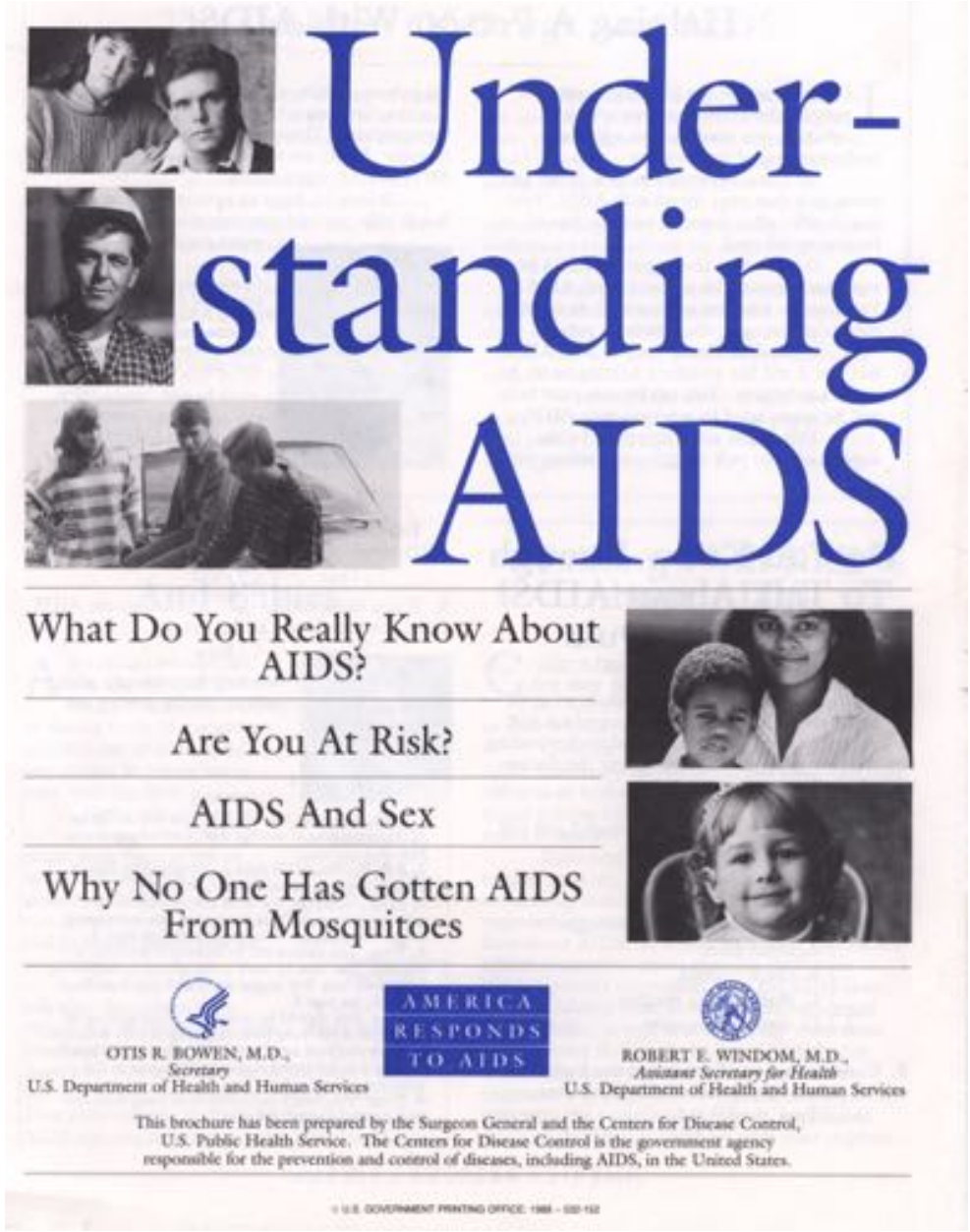
Dr J Sonnabend /Michael Callen

Dr. Tony Fauci https://www.washingtonpost.com/history/2020/05/20/fauci-aids-nih-coronavirus/

Heroes: C. Everett Koop, MD

US Surgeon General 1982-1989

1988 “*We are fighting a disease, not people*”



Dr. Nick Rango (1944-1993)

Director, NYS DOH AIDS Institute
1987-1993

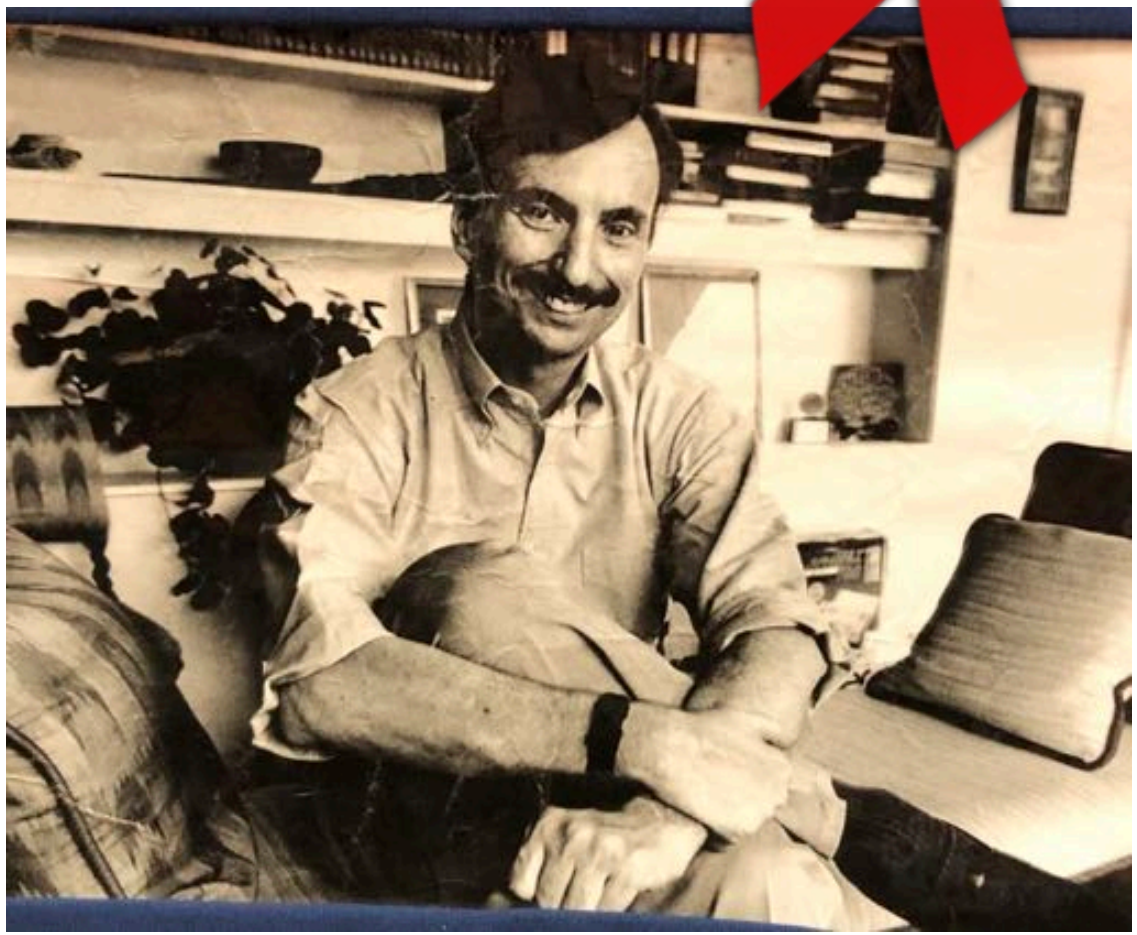
Living with HIV, he worked until the end of his life.

He often said, that because “the clock is ticking,” that there was no time to waste and he needed to make quick decisions.

Part bureaucrat, part academic and part activist, Dr. Rango was relentless to the point some called rude.. But his self-deprecating humor and his dedication typically repaired bridges even as they burned, said Dr. David Rogers, chairman of the state AIDS Advisory Council.

"He was an unrelenting scrapper," Rogers said. "His intense commitment to improving the lives of people with HIV just shone through even when he was being profoundly annoying."

.



http://www.columbia.edu/cu/gables/hiv/mem/rango.html

Dr. Linda Laubenstein (1947-1992)

Leadership Can Be Heroic

- *"A polio survivor, she made house calls in a wheelchair using public buses."*

New York Times. August 30, 1982


SWALLOW THIS


TiLT
THIS THURSDAY 6/29
18+
Host
Dee Dee Dubois
with SAMANTHA VEGA,
ANASTASIA MONTCLAIRE, JUSTIN STYLEZ + GUY FAUX
AND SPECIAL GUEST DJ ANNALYZE
EARLY NIGHT SMIRNOFF DRINK SPECIALS

AIDS vs COVID Advocacy

US 1985

US 2021

Shanghai 2022

https://www.frontiersin.org/articles/10.3389/fcomm.2022.941872/full
https://www.nbcnews.com/feature/nbc-out/how-survive-pandemic-hiv-experts-activists-lessons-learned-n1165016

Advancing therapeutics
FDA regulatory change = AIDS Expanded Access

- Structure for use of drugs in advance of final approval
  - Combination ARV use
  - Studies continued
    - AZT dosing to 600 mg
  - Paves the way for combination therapies for other emerging infections
    - COVID
      - Combination antivirals
      - Role for monoclonal antibodies
  - Vaccine use
  - PrEP for COVID & Mpox

https://www.ncbi.nlm.nih.gov/books/NBK234129/
https://www.fda.gov/emergency-preparedness-and-response/mcm-legal-regulatory-and-policy-framework/emergency-use-authorization

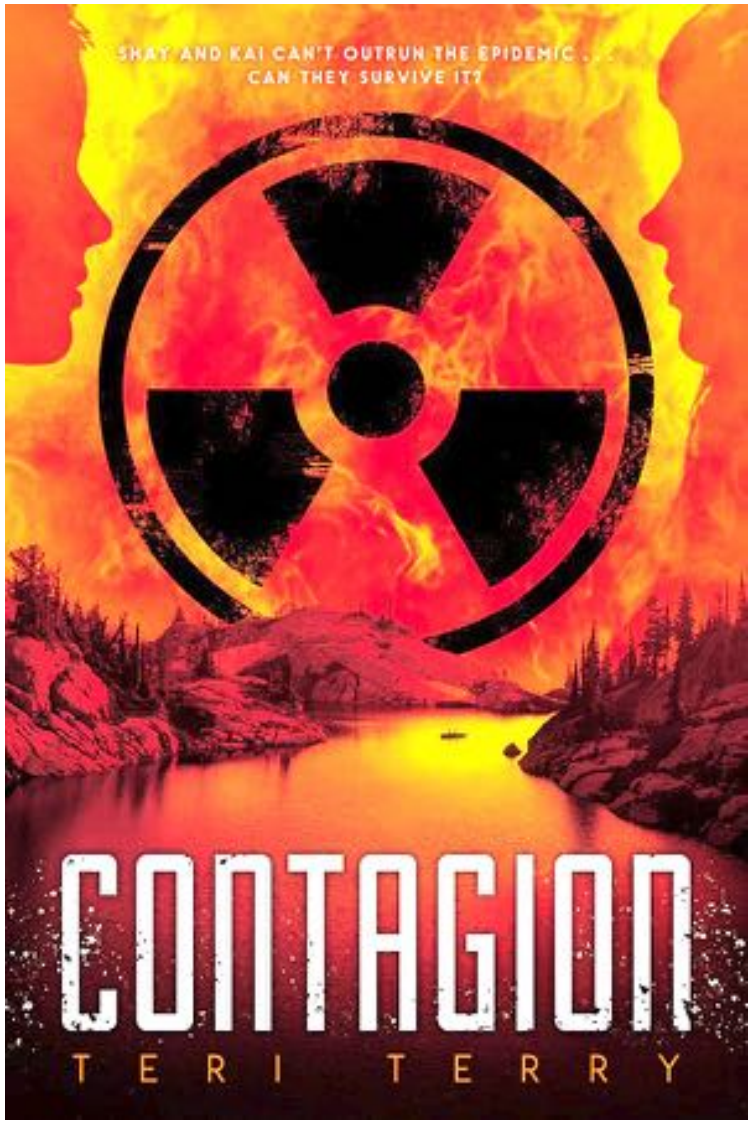
Advancing therapeutics
Emerged from the AIDS crisis

- **Full approval**
  - Standard
    - mRNA vaccines (from EUA)
    - Jynneos vaccine subcutaneous (2019)
      - Prevention of Smallpox and Mpox
    - ACAM 2000 (2007)
      - Prevention of smallpox
  - Fast track
    - Remdesivir inpatient or outpatient

- **Parallel track/ Early access**
  - EA – HIV compassionate use
    - AZT (1987)
    - ddI (1990)
  - EA- IND –
    - Tecoviromat for Mpox
    - ACAM 2000 for Mpox
- **EUA - public health emergency (2004)**
  - COVID antivirals
  - Jynneos intradermal - Mpox
  - Janssen/ Novavax

History https://www.ncbi.nlm.nih.gov/books/NBK234129/
https://www.yalemedicine.org/news/what-does-eua-mean COVID
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8344772/

Stop Virus Spread



Signals: Epidemics of Public Health Importance

	HIV 1981-Oct 2021	COVID 2020 - Nov 2022	Mpox May –Nov 2022
Transmission	Sex, blood, needles	Respiratory	Close/personal contact
Total US cases	2.2 mil	99 mil	28,881
Total deaths	700,000+	1.09 mil	---
Trends	30,634 2015-2019 8% decrease	•BQ.1/1.1 emerge • Nov 2022 22,000 inpatients • bebtelovomab EUA withdrawl	---
Vaccine Trends	---	•One dose – 267 m •Primary -227 m •Bivalent – 31 m	Total Vaccines 1,067,367

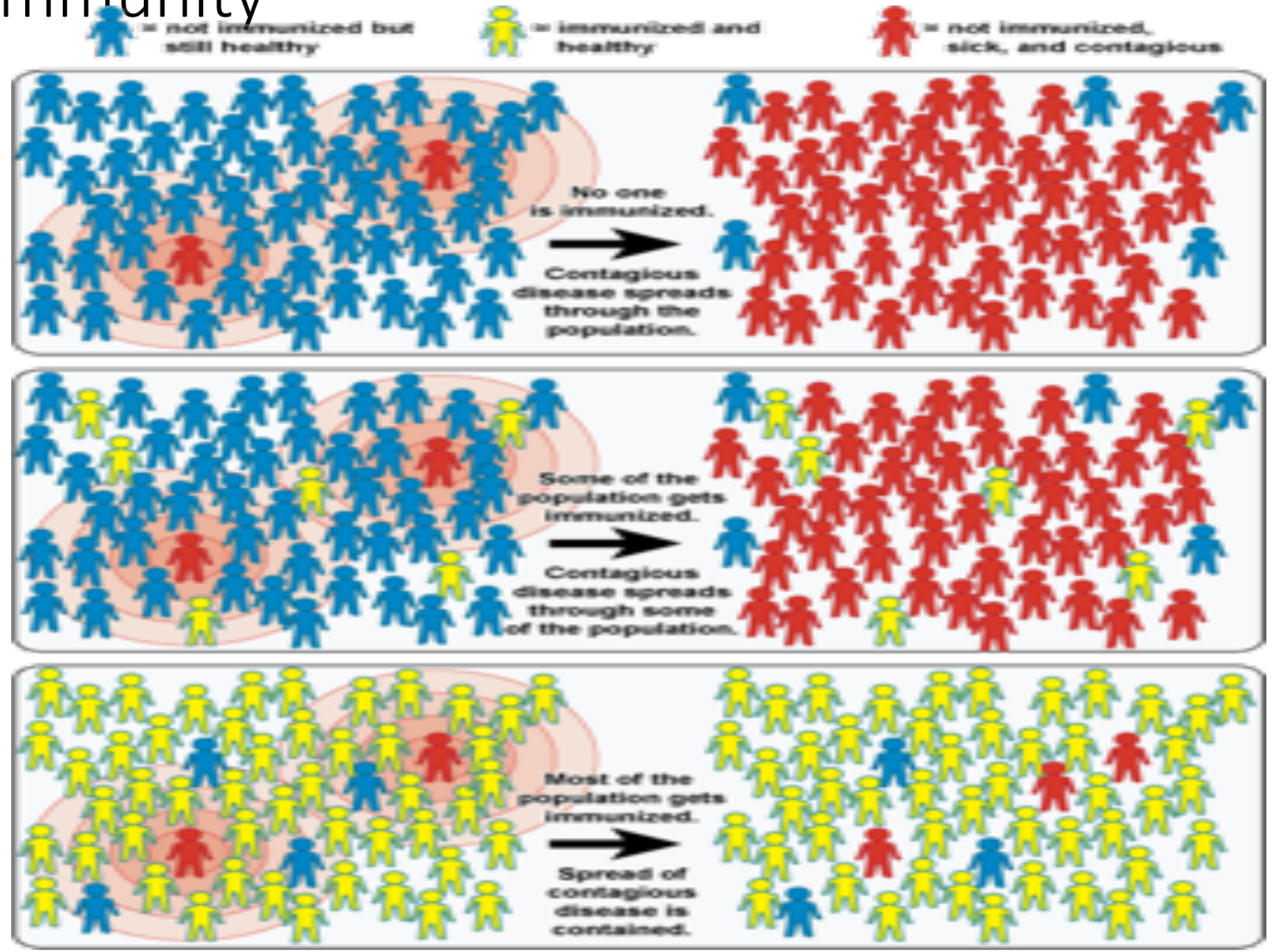
https://www.hiv.gov/hiv-basics/overview/data-and-trends/statistics
https://dgalerts.docguide.com/ncov-home/article/covid-19-case-count-in-us-stands-at-close-to-98-million

End the HIV Epidemic (EtE 2024)

FAST-TRACK

ENDING THE AIDS EPIDEMIC BY 2030

Herd Immunity



Test & Treat: An Elusive Concept

- Model the way
  - HIV rapid start ARV
  - Influenza
  - COVID-19
  - Mpox

Strategies to stop virus spread

Characterizing the Infection

Viral load testing

Characterizing the infection
Stops virus spread

- HIV – illness first, virus identification later
  - Undetectable viral load – U=U
  - HIV PrEP
- COVID-19 – virus identified early, illness characterized later
  - Evolution in precautions (masking, distancing, testing, vaccine vs ”Zero COVID”)
  - Vaccine and treatments available
    - COVID PrEP
  - Viral load and transmission TBD
- Mpox – old virus, newly identified transmission mode
  - Vaccine for treatment and Mpox PrEP
  - Antivirals
  - Behavior change
  - Asymptomatic shedding still under investigation

COVID PCR & viral load simplified
The cycle threshold (Ct)

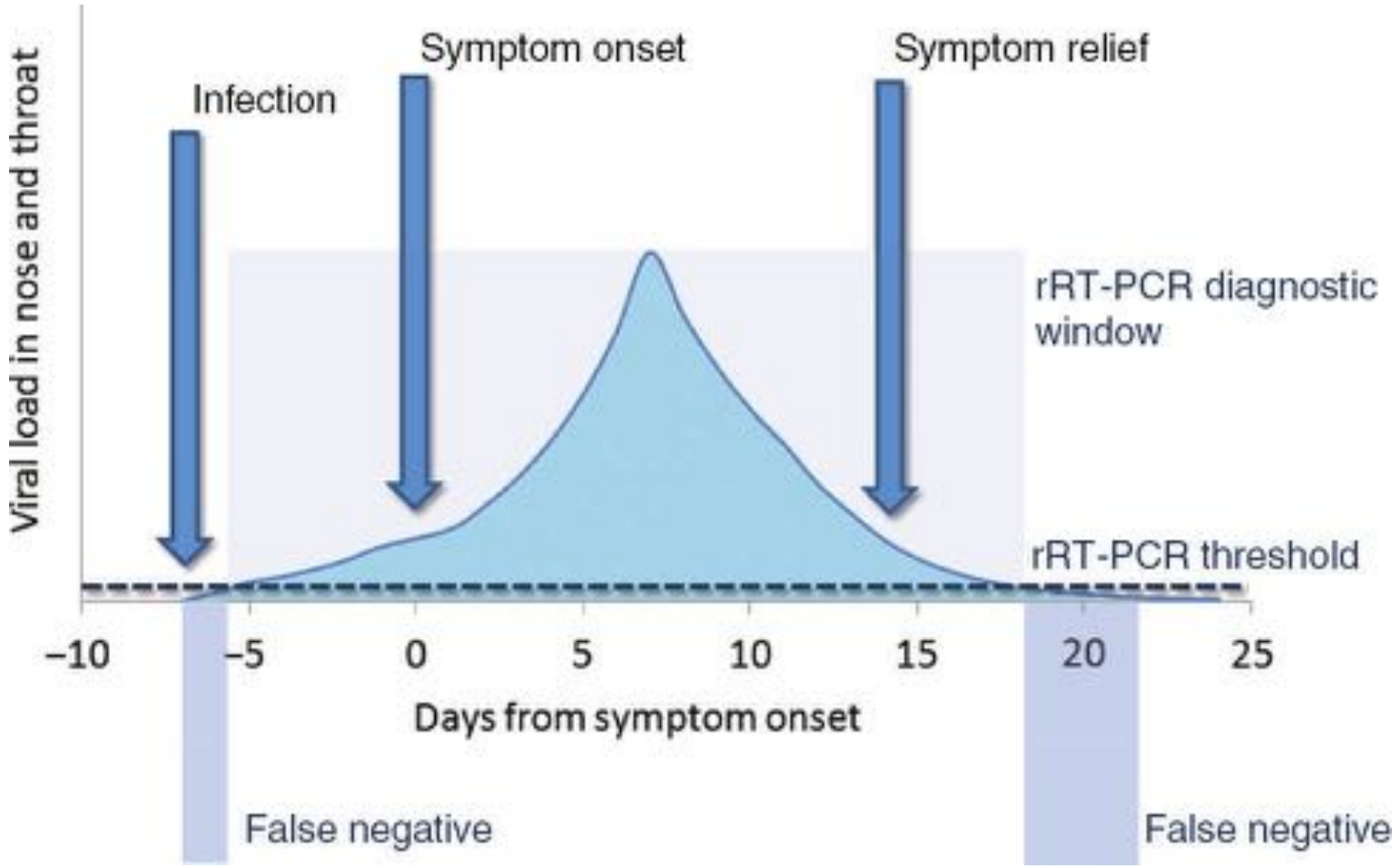
- Genetic material in the sample is extracted
- Prepared for the PCR machine
- PCR works by running many cycles of heating and cooling
  - Each cycle doubles the genetic material present in the original sample.
- If genetic material from SARS-CoV-2 is present
  - millions more copies made
  - positive test result

https://directorsblog.nih.gov/tag/cycle-threshold/
https://logicalbiological.com/sars-cov-2-the-value-of-ct-values/

COVID viral load
Test results

- Quantitative
  - how much coronavirus is present in a positive sample
  - based on the number of cycles required to make enough copies of its genetic material to get the “yes” result = detectable.
- This measure is the “cycle threshold,” or Ct value
  - Lower cycle threshold associated with higher levels of virus
  - Higher cycle threshold associated with lower levels of virus

Undetectable = Untransmittable?



https://logicalbiological.com/sars-cov-2-the-value-of-ct-values/
Clinical application - https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4237902

Quantitative COVID viral load key points

- When validated, viral load may prove useful for
  - Determining contagion/ release from isolation in hospitals
  - Targeted use of antivirals and other therapies
  - Determination of treatment efficacy
  - Monitor breakthrough infections
  - Further study of variants
  - Serve as basis for COVID testing/ diagnostic

https://www.frontiersin.org/articles/10.3389/fmed.2021.836826/full
https://www.frontiersin.org/files/Articles/836826/fmed-08-836826-HTML/image_m/fmed-08-836826-g001.jpg
https://www.science.org/content/article/one-number-could-help-reveal-how-infectious-covid-19-patient-should-test-results

Vaccinology 1757:
Dr. Jenner invents vaccine science

Conspiratorial Thinking - Psychology & Drivers

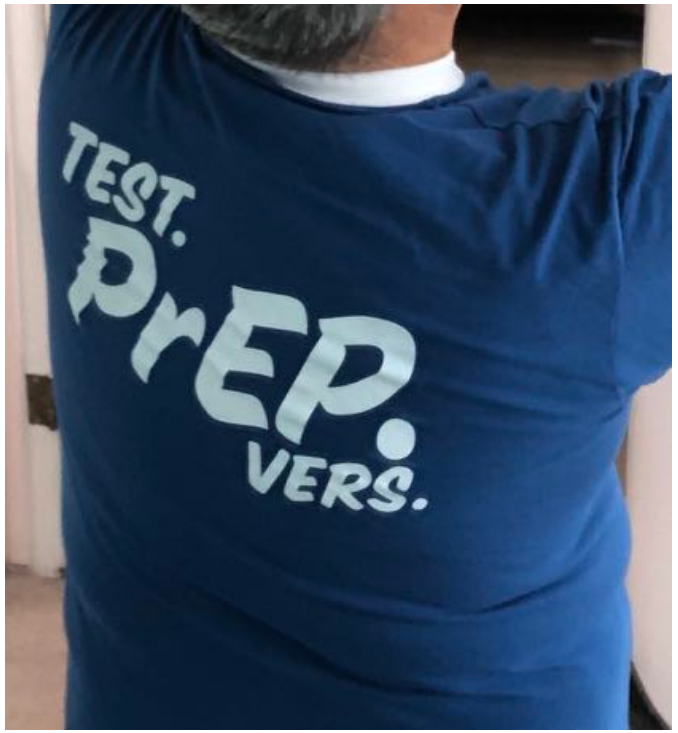
- Conspiratorial worldview
  - distrust in sources of authority
  - they claim insider knowledge that makes the believer feel valuable
  - knowledge includes a secret plan to defeat the forces of evil

- Themes
  - fear and anxiety about the future
  - a desire for a simple explanation for complex or seemingly random events
  - social support provided by conspiratorial communities
  - social media as a driver

https://www.npr.org/sections/health-shots/2022/04/24/1089786147/covid-conspiracy-theories

Stigma

- Negative attitudes and beliefs toward people, places, or things.
  - Fear and anxiety about a disease can lead to social stigma
  - Can lead to labeling, stereotyping, discrimination, and other negative behaviors toward others



Messaging

- Simple
- Widely understood/ easily repeated
- No stigma
  - Mpox vs Monkeypox
- Sex positive
  - What body parts do you use for sex?
- Examples
  - “Trying to stop virus spread”
  - “COVID is very contagious - it makes people sick”
  - “I’ve been vaccinated”

Symbols: The Art of Keith Haring

Symbols: The AIDS Memorial Quilt – 1985

50,000,panels; 100,000 people

Themes

- Science
  - Vaccinology is not a new science
  - Drugs/ testing
  - Test & Treat
  - Viral load
- Public Health stops virus spread
  - Characterize and quantify
  - R number
  - Herd immunity
  - Regulation
  - Messaging
- Culture
  - Advocacy
  - Politics
  - Stigma/ denial
  - Conspiracy

The End
Stop Virus Spread


Thank You for Your Attendance!
Please visit us at:
www.prn.org

Additional Resources

- PANORAMIC Study
- https://www.merck.com/news/merck-and-ridgeback-biotherapeutics-provide-update-on-new-clinical-and-non-clinical-studies-of-lagevrio-molnupiravir/
- https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4237902

- Stigma
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7384410/
- https://www.science.org/content/article/how-stigmatizing-disease-covid-19-hiv-creates-vicious-cycle-sickness
- HIV and COVID - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7197953/

Dr. Anthony Fauci

- https://www.washingtonpost.com/history/2020/05/20/fauci-aids-nih-coronavirus/
- COVID moments - https://www.politico.com/video/2022/11/22/a-look-at-faucis-memorable-moments-during-the-pandemic-776585
- NY Times 12/10/2022 - https://www.nytimes.com/2022/12/10/opinion/anthony-fauci-retirement.html

HIV Reproductive number

- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2848261/
- https://sph.umich.edu/pursuit/2020posts/how-scientists-quantify-outbreaks.html
- https://journals.lww.com/aidsonline/fulltext/2015/06010/concurrency_can_drive_an_hiv_epidemic_by_moving_r0.15.aspx
- Mpox – HIV - https://www.medscape.com/viewarticle/978856
- Herd immunity and reproductive number
  - https://plus.maths.org/content/maths-minute-r0-and-herd-immunity