

Genomic surveillance of Mpox in Nebraska, from phylogenetic analysis to policy change

DONAHUE | CREIGHTON ID SYMPOSIUM | 4.22.23



DIVISION OF
PUBLIC HEALTH

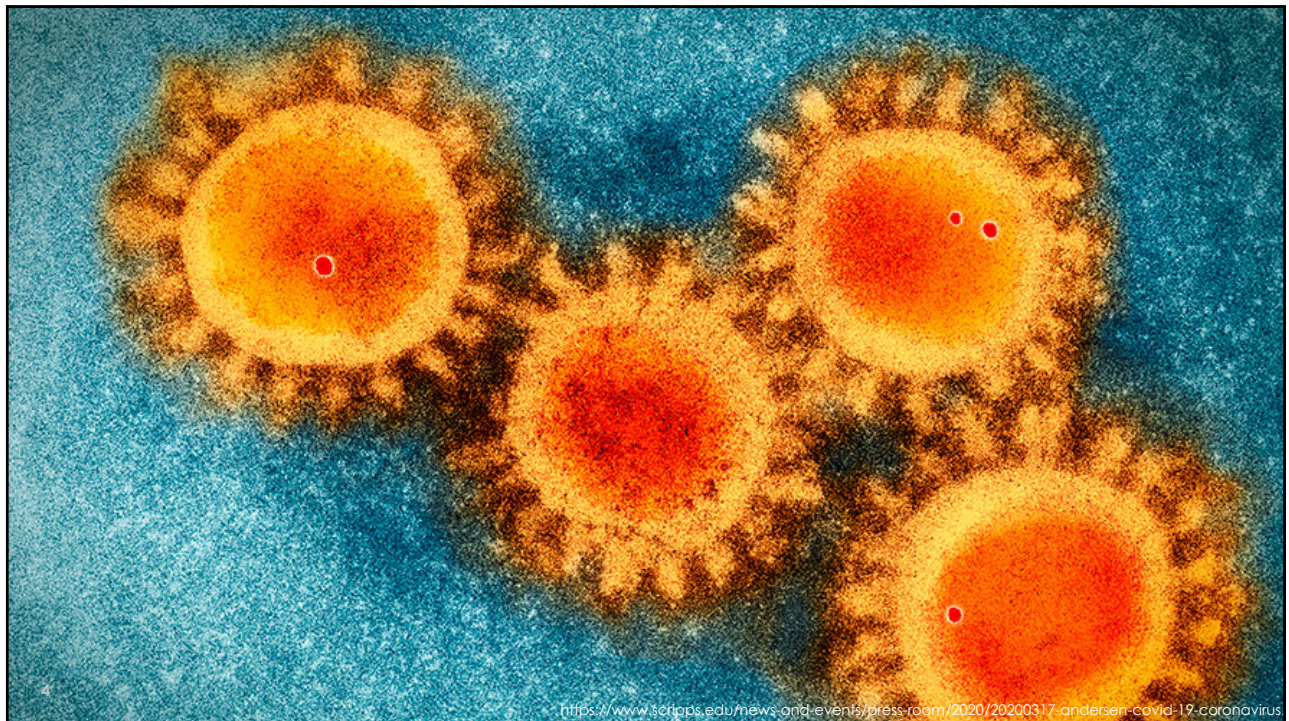
1

- I. MPOX**
- II. GENOMIC EPIDEMIOLOGY**
- III. PUTTING IT TOGETHER:** APPLIED [GENOMIC]
EPIDEMIOLOGY IN THE NEBRASKA MPOX RESPONSE

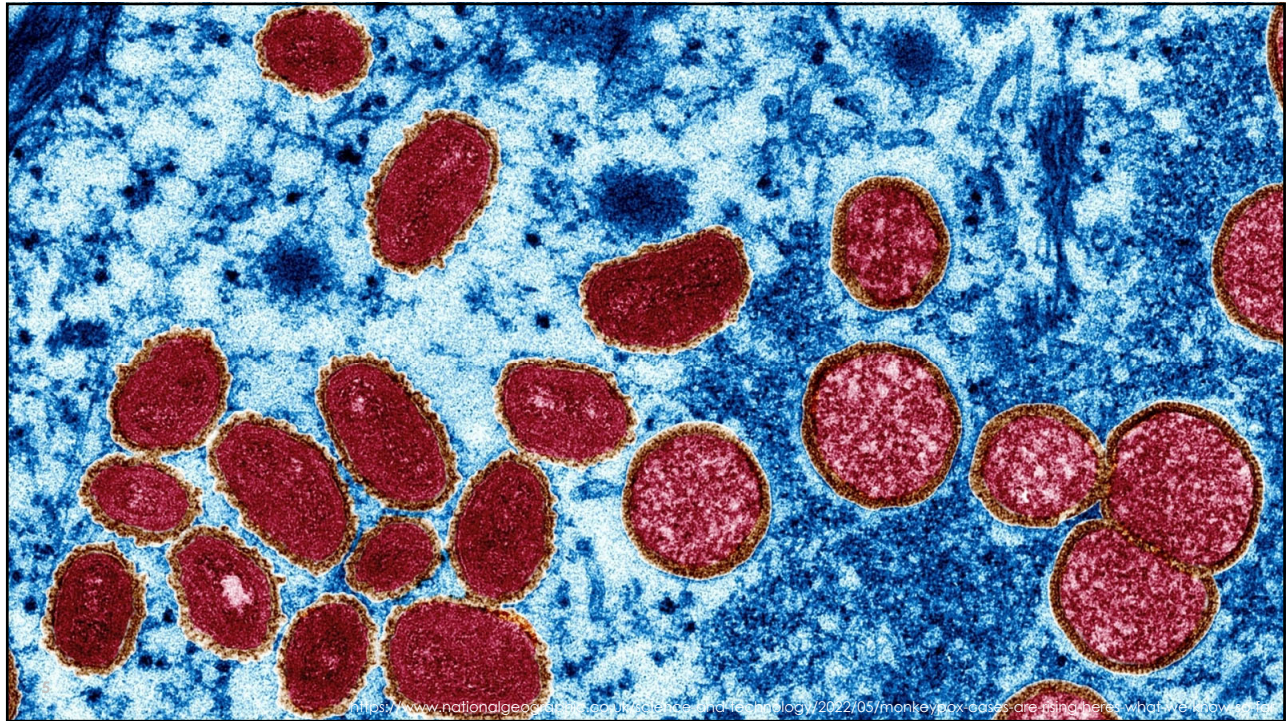
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I. MPOX

3



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5

FIRST OPINION

The next epidemic may be here. The U.S. isn't ready for it

By David C. Harvey June 28, 2022 [Reprints](#)



Colorized transmission electron micrograph of monkeypox virus particles. NIAID

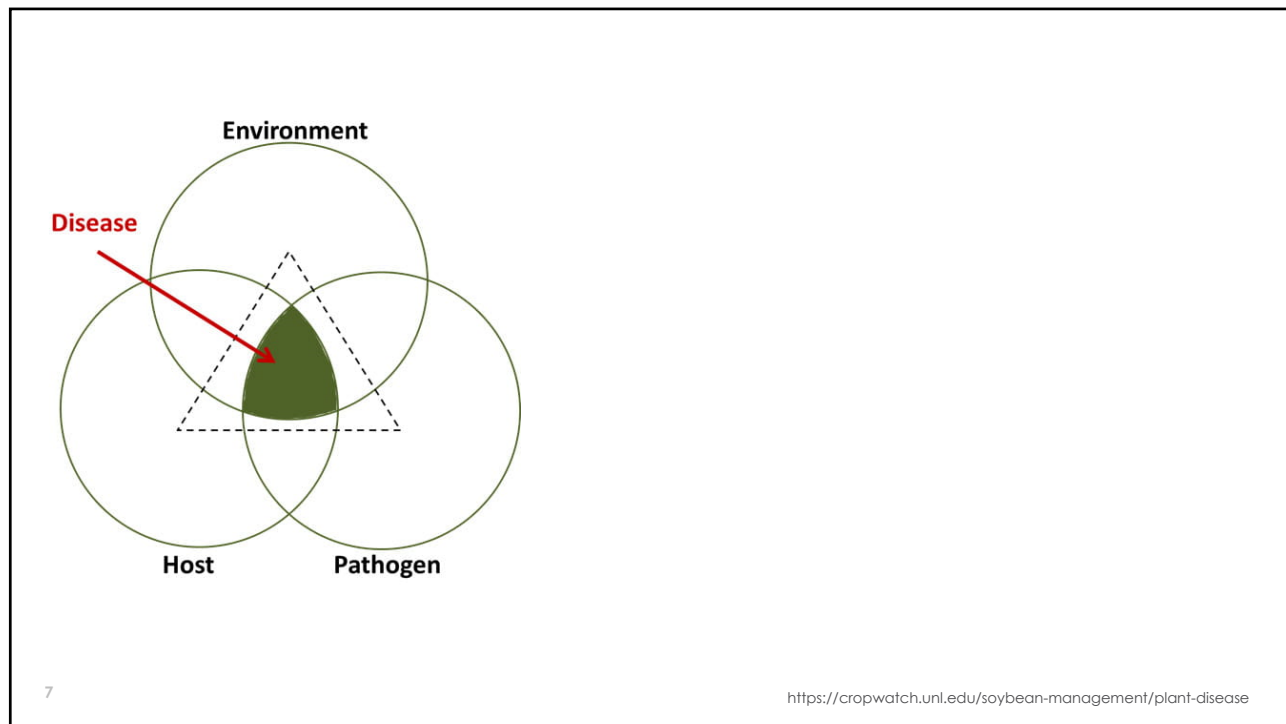
Biden on Monkeypox: Outbreak should concern 'everybody,' as health experts are baffled

POLITICS · Published May 22, 2022 4:59am EDT

The U.S. reported its first confirmed monkeypox case this week

6

6



7

Environment

Disease

Host

Pathogen

8

Expert: Monkeypox likely spread by sex at 2 raves in Europe
By MARIA CHENG May 23, 2022

<https://cropwatch.unl.edu/soybean-management/plant-disease>

8

Monkeypox: WHO declares highest alert over outbreak

© 23 July 2022



GETTY IMAGES

9

9

Commercial labs to ramp up monkeypox testing in 'coming weeks'

Published June 29, 2022



Elise Reuter
Reporter



Pablo Blazquez Dominguez via Getty Images

10

10

US in process of releasing monkeypox vaccine from national stockpile for 'high-risk' people, CDC says



By Jacqueline Howard and Virginia Langmaid, CNN
Updated 4:38 AM EDT, Tue May 24, 2022



US monkeypox outbreak: Demand for vaccines outstrips supply

© 16 July 2022



GETTY IMAGES
People queue for monkeypox vaccines in New York City

US health officials say they do not have enough monkeypox vaccines to cope with surging demand.

11

11

HEALTH

Monkeypox Caseload in U.S. Approaches World's Highest

Known cases exceed 3,500 in both the U.S. and Spain



The continuing spread of monkeypox has prompted the World Health Organization to declare a global health emergency. WSJ's Denise Roland explains what you need to know about the outbreak. Photo: Kena Betancur/AFP/Getty Images

By [Jon Kamp](#) [Follow](#)

Updated July 26, 2022 at 8:17 pm ET

12

12



Monkeypox vaccines are pictured. (Lea Suzuki/San Francisco Chronicle via AP)

HEALTH

In race for monkeypox vaccines, experts see repeat of COVID

BY ASSOCIATED PRESS | NATIONWIDE
PUBLISHED 9:13 AM ET JUL. 30, 2022

13

Home // Radio // On Point

The COVID lessons we didn't learn for the monkeypox outbreak

July 28, 2022 By John Ringer and Meahna Chakrabarti



A man waits in line to receive the Monkeypox vaccine before the opening of a new mass vaccination site at the Bushwick Education Campus in Brooklyn on July 17, 2022, in New York City - New York, on the US East Coast, has already either administered or scheduled 21,500 vaccines and hopes to speed up the process, promising more than 30,000 jabs for the whole state. (Photo by Kena Betancur / AFP) (Photo by KENA BETANCUR/AFP via Getty Images)

13

Window to control monkeypox may be closing in US

Stephanie Soucheray | News Reporter | CIDRAP News, July 18, 2022

Topics: [Mpox](#)

Opinion: This monkeypox outbreak didn't have to happen

Opinion by Syra Madad
Published 11:50 AM EDT, Fri July 22, 2022

[f](#) [t](#) [e](#) [l](#)

14

14

Monkeypox outbreak could be just 'the peak of the iceberg', WHO warns

Pandemic preparedness chief Sylvie Briand says 'unusual' spread of virus can be easily contained with the right measures



15

World Health Organization's Sylvie Briand has warned that the monkeypox outbreak could be 'the peak of the iceberg'. Photograph: Salvatore Di Nolfi/EPA

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II. GENOMIC EPIDEMIOLOGY

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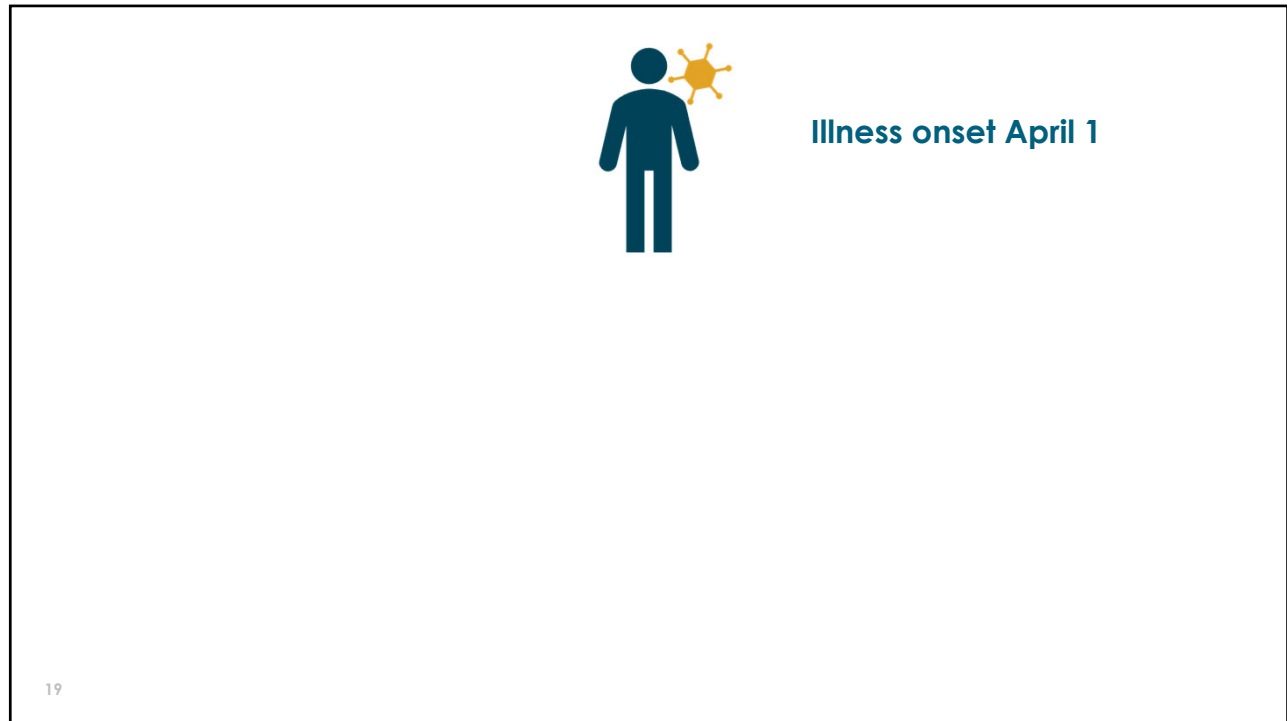
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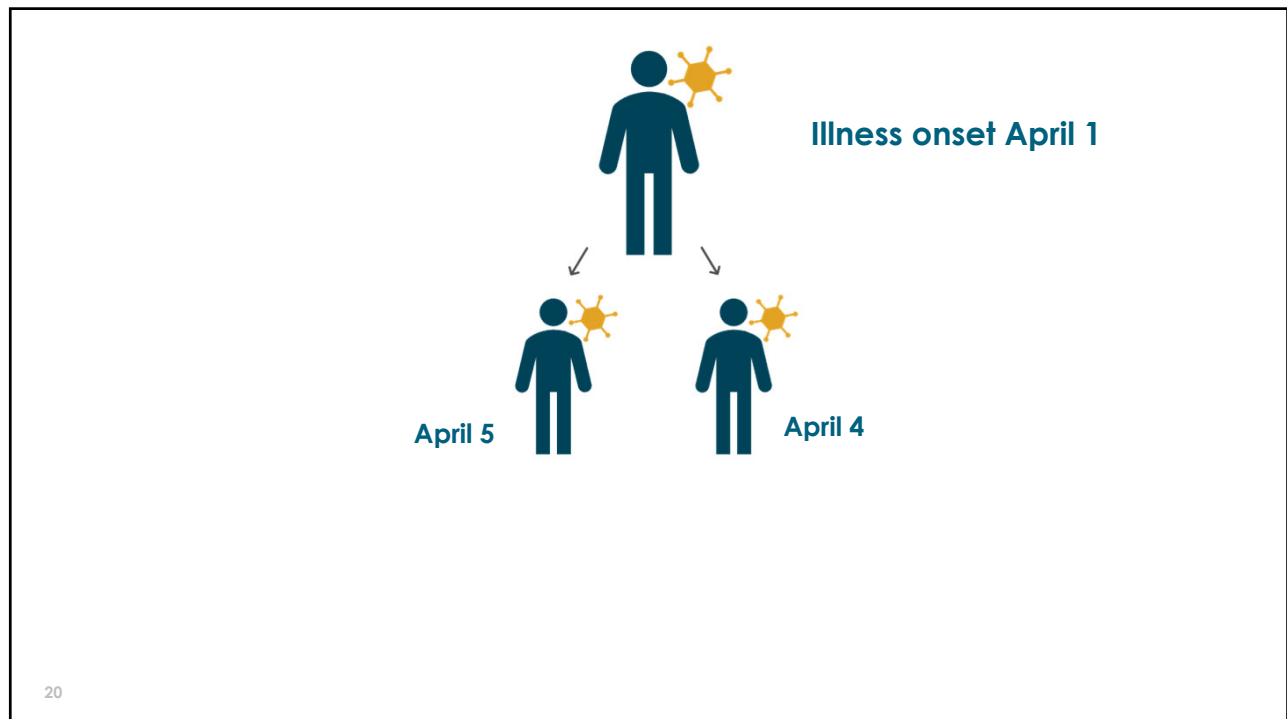


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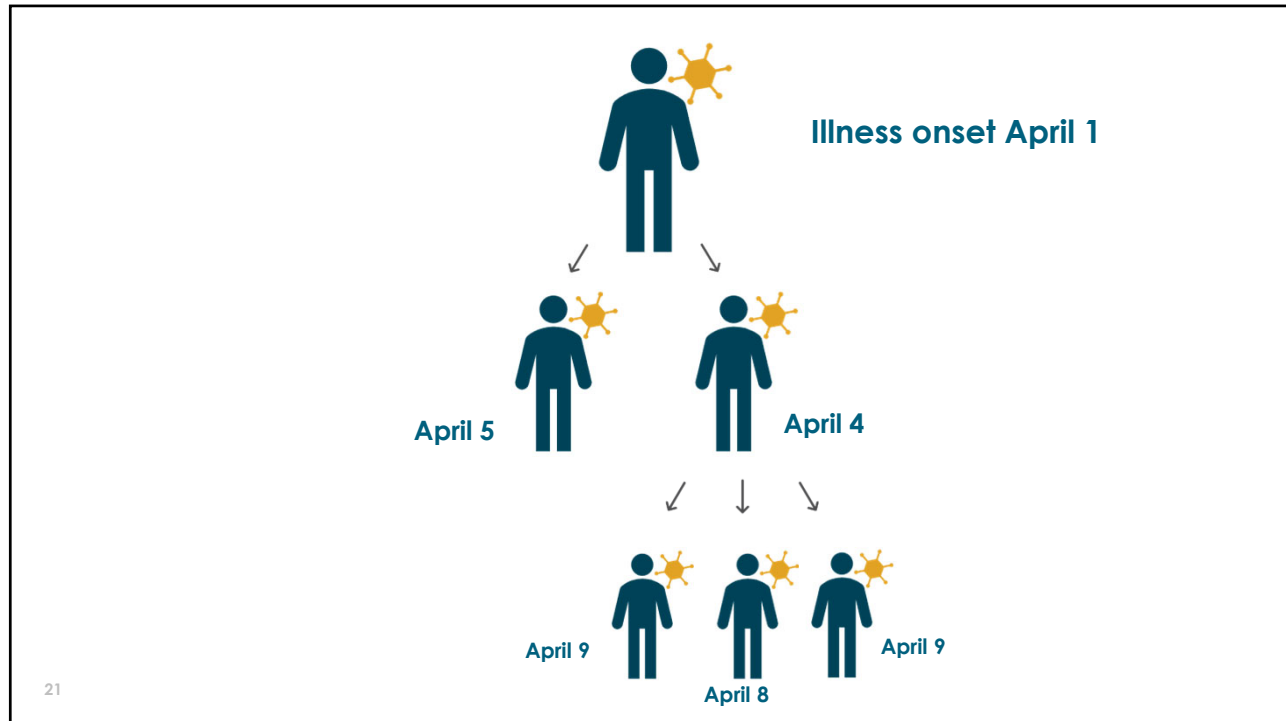
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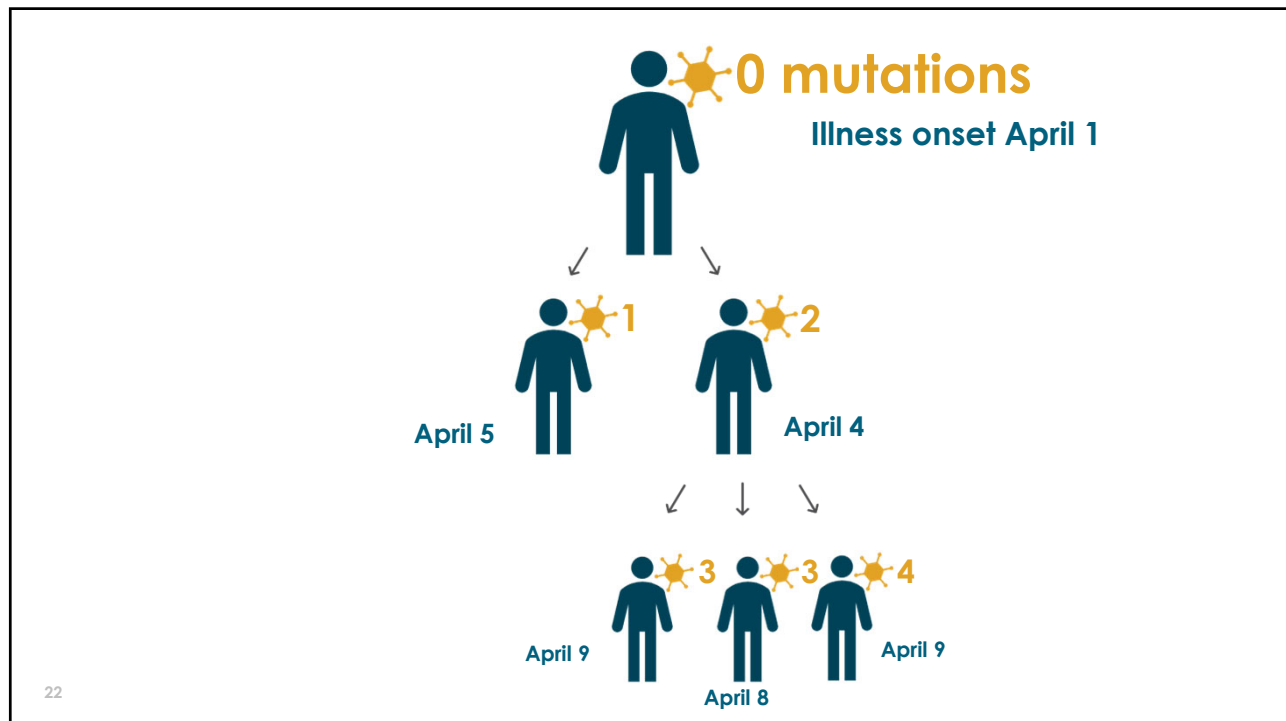
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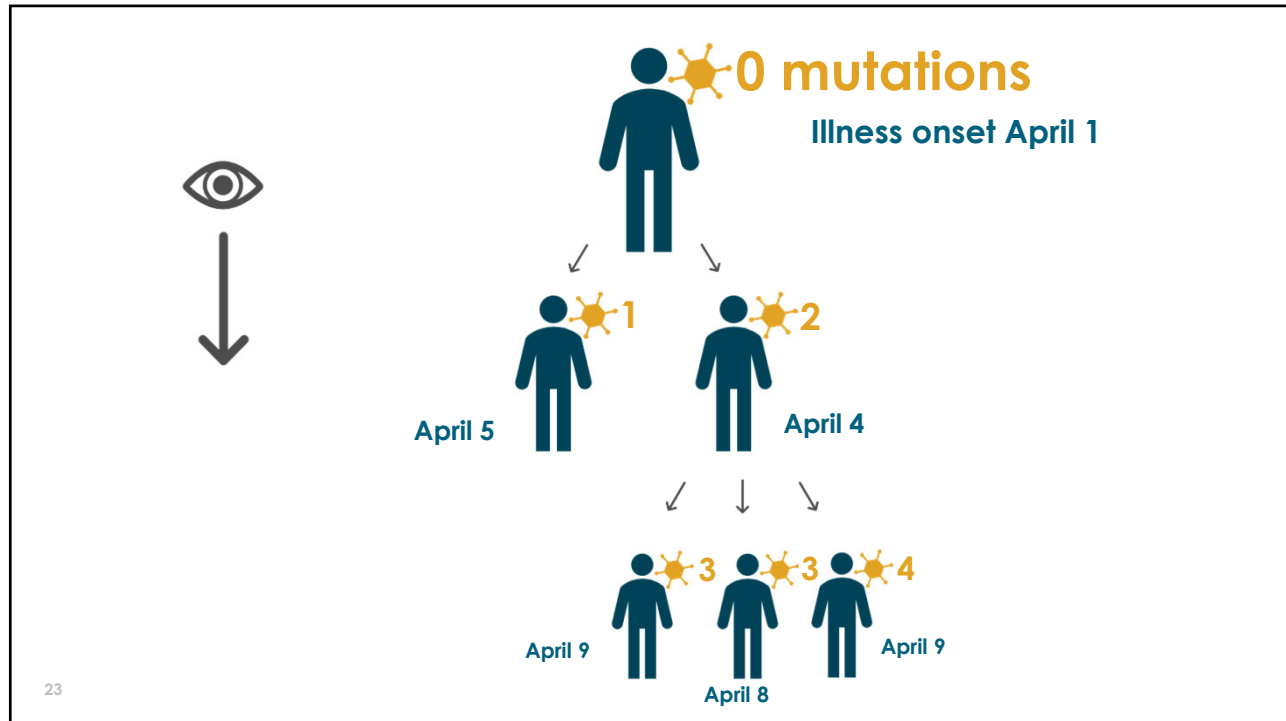
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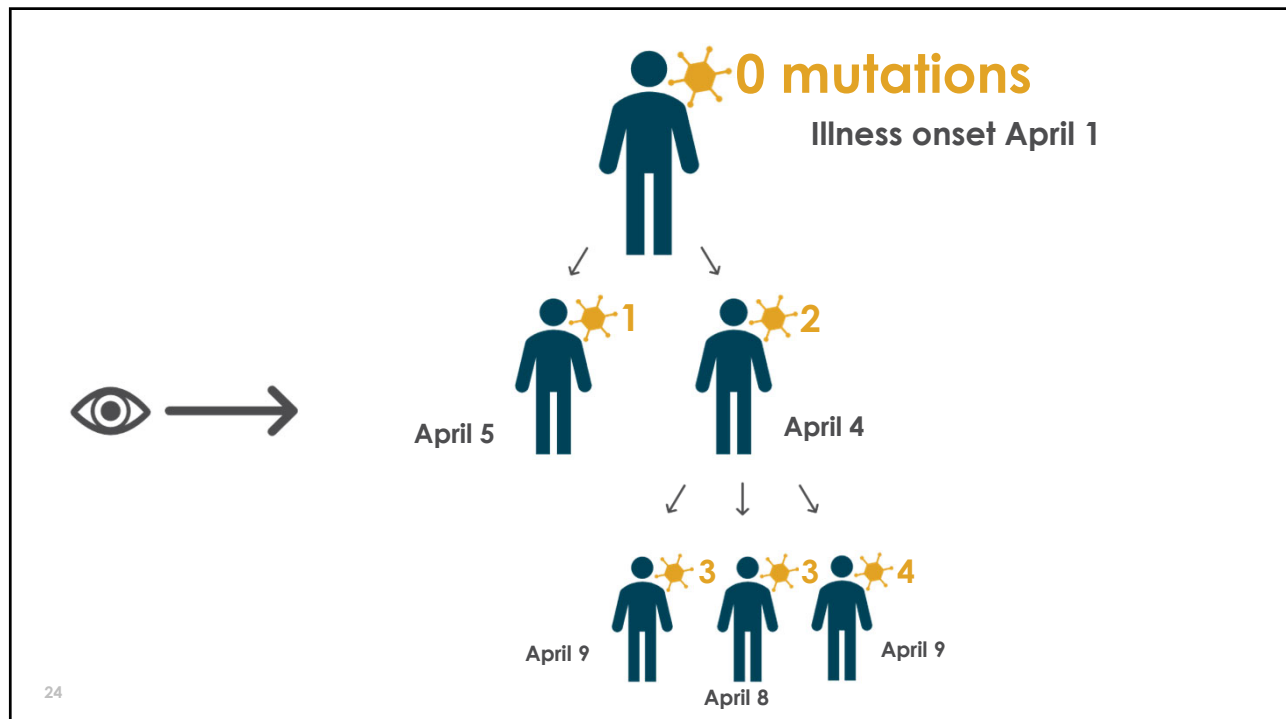
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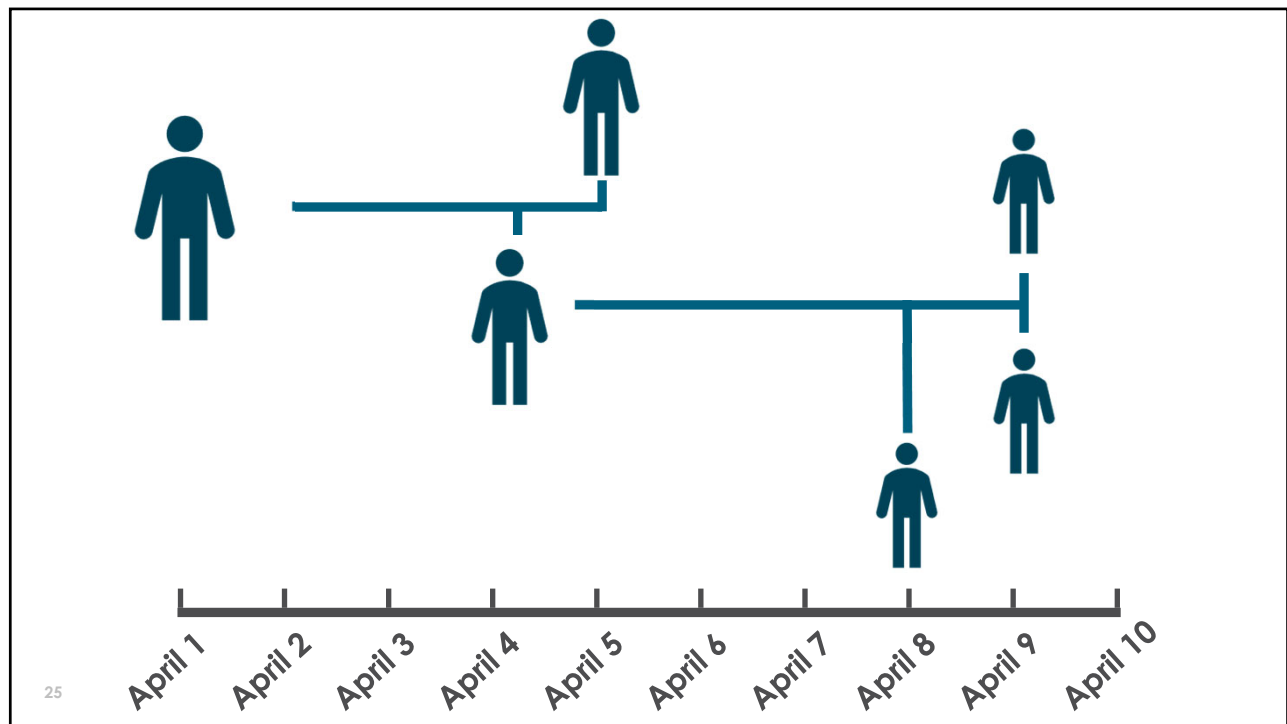
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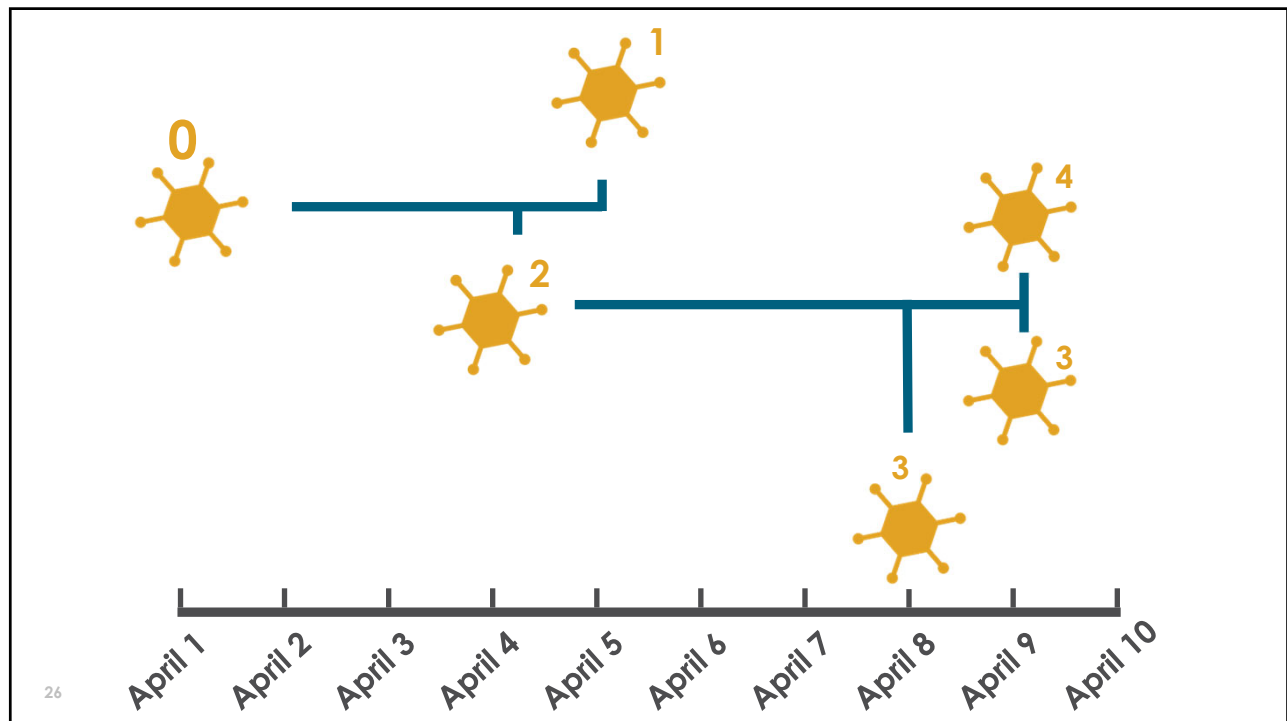
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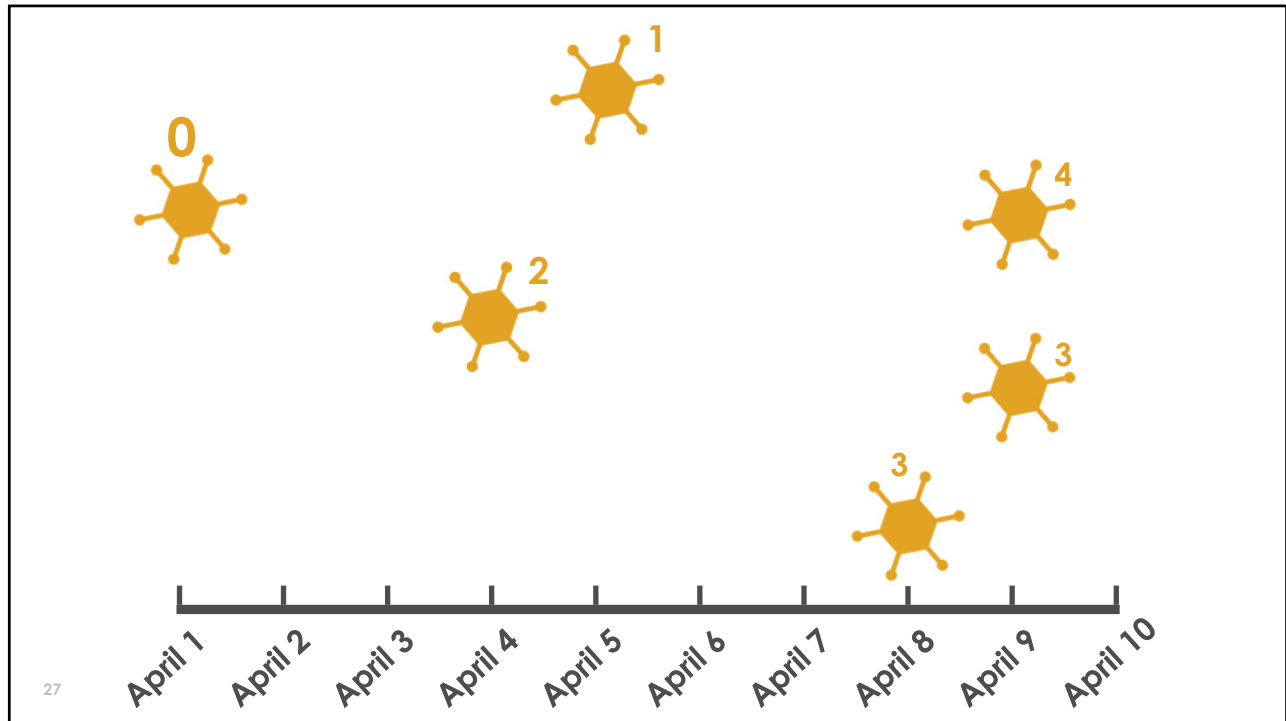
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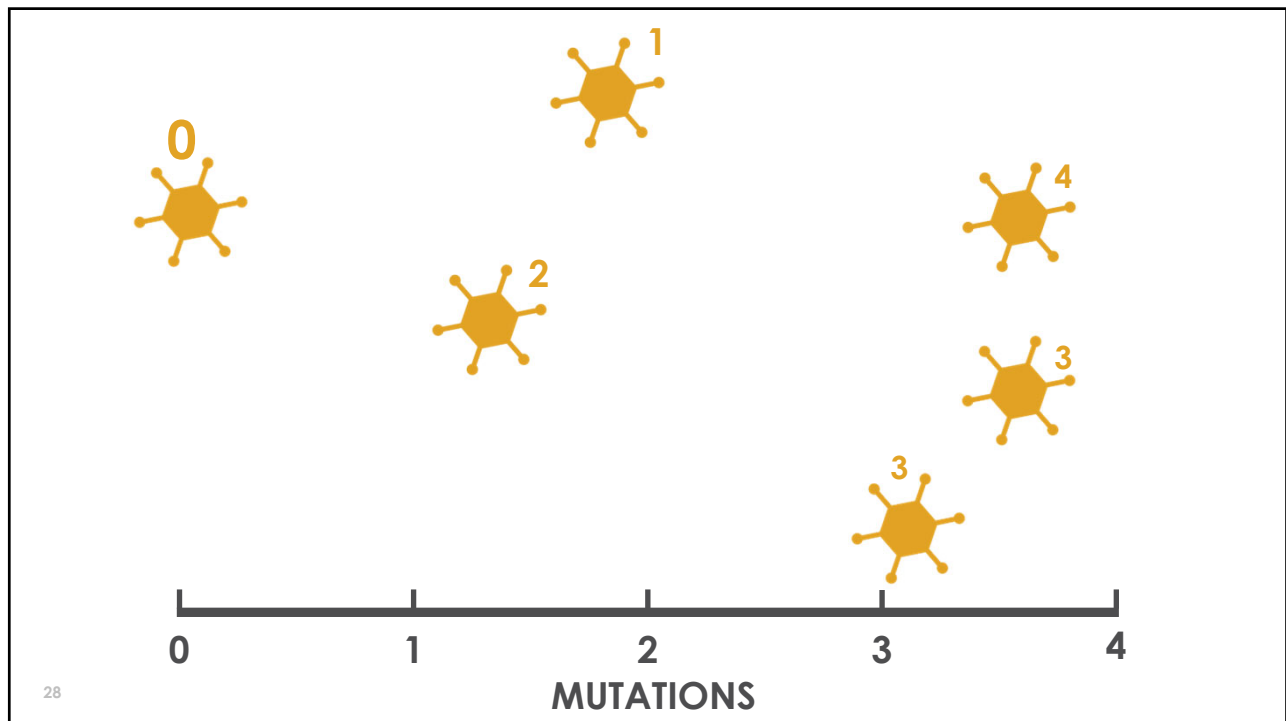
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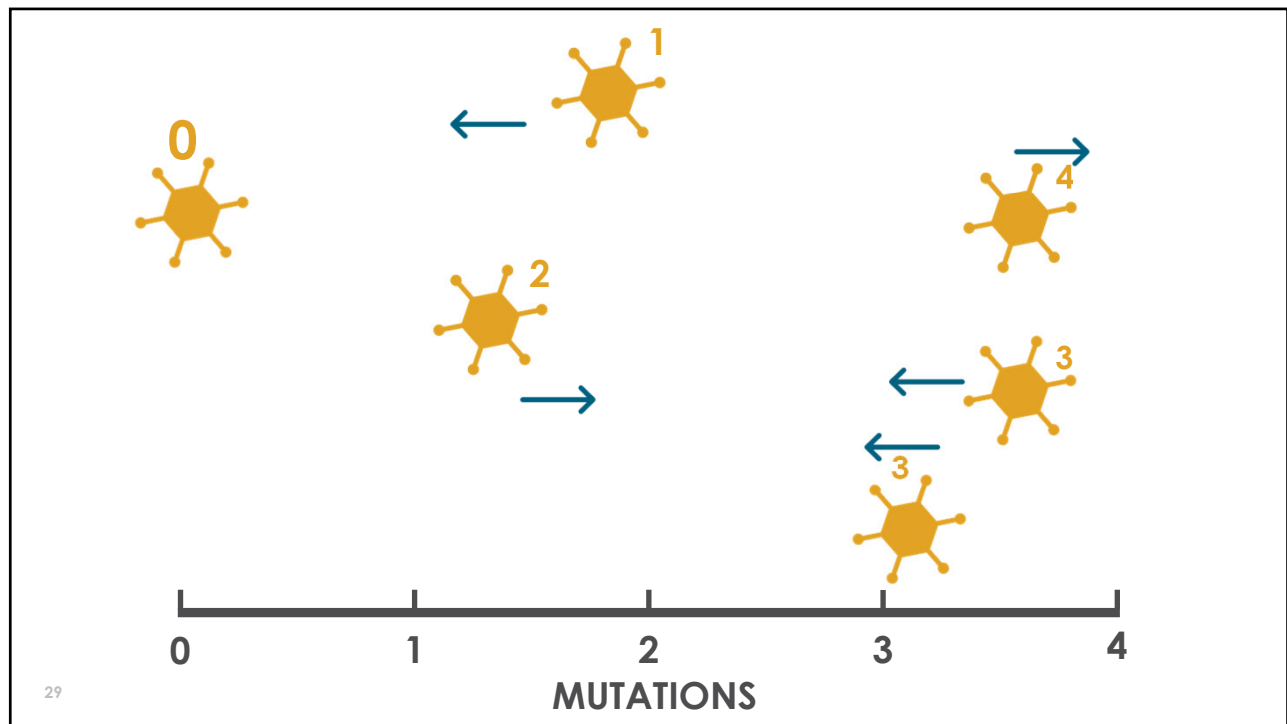
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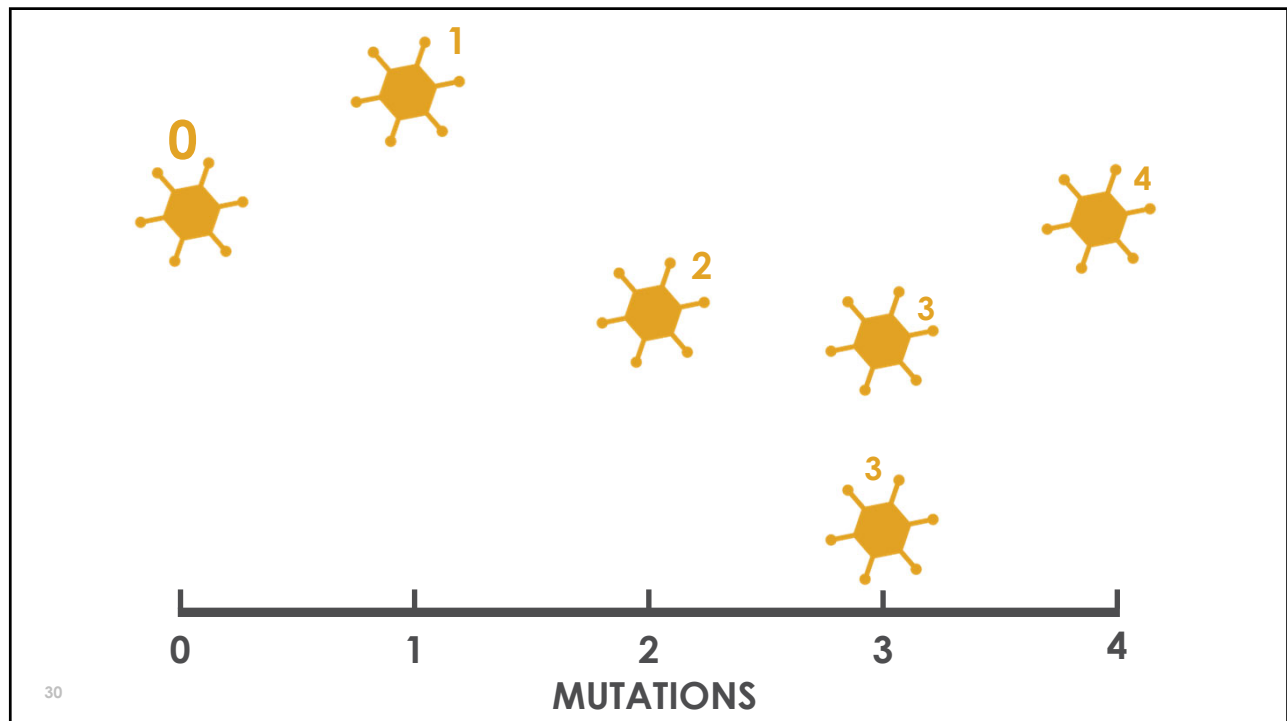
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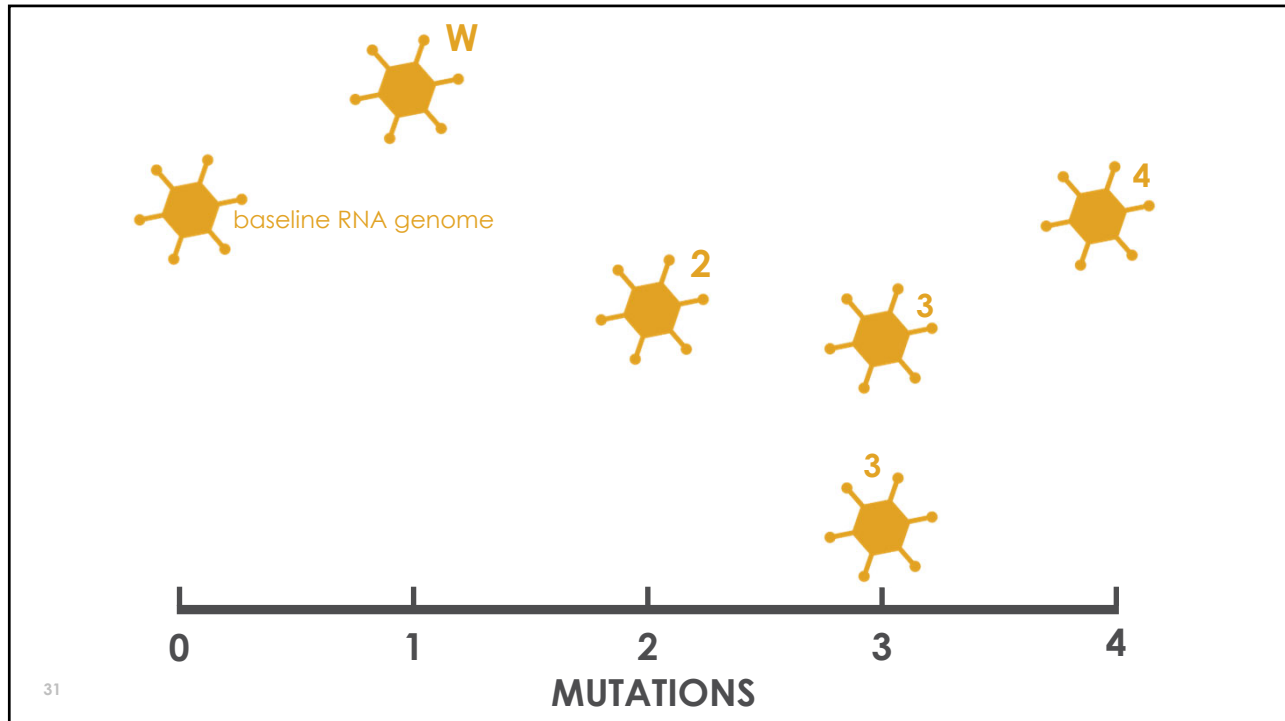
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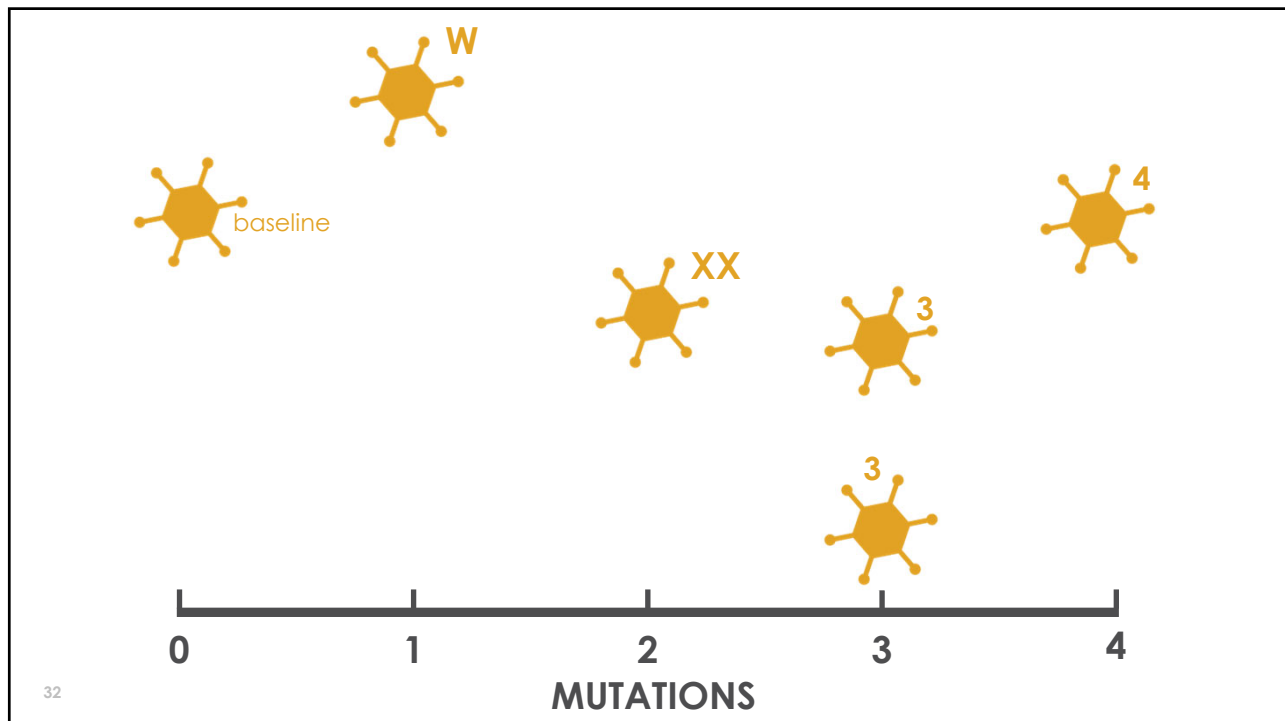
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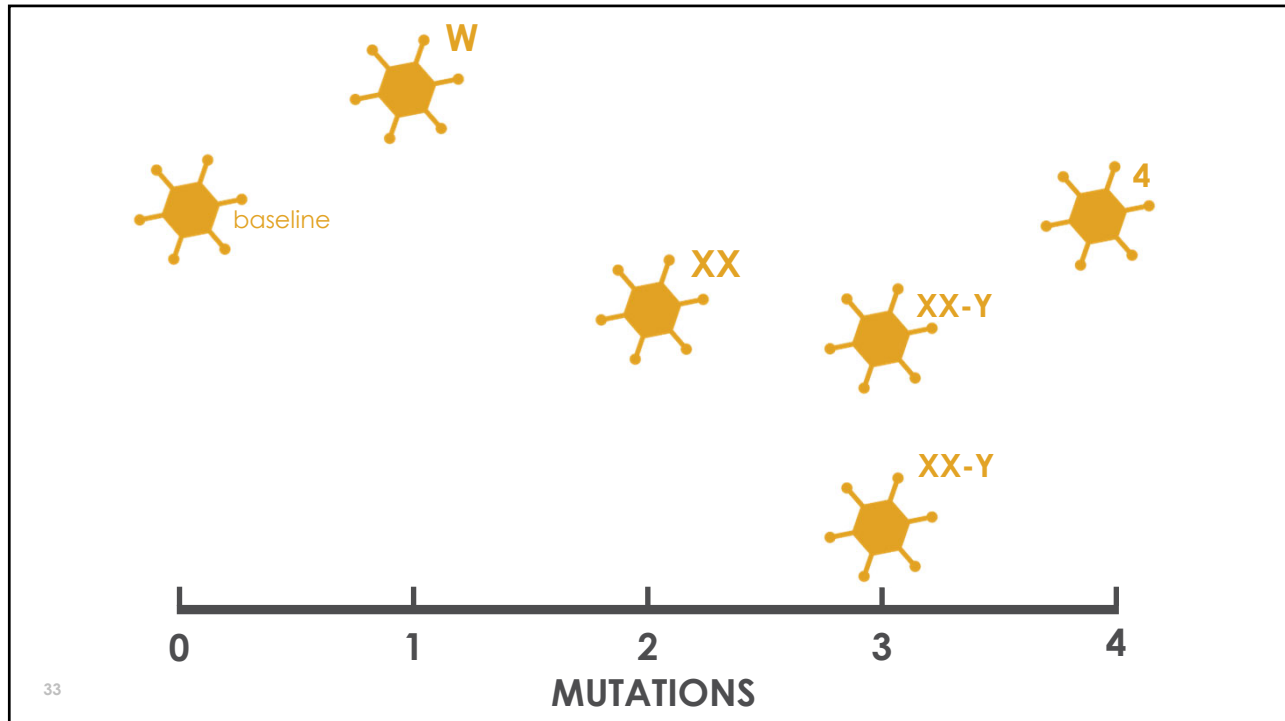
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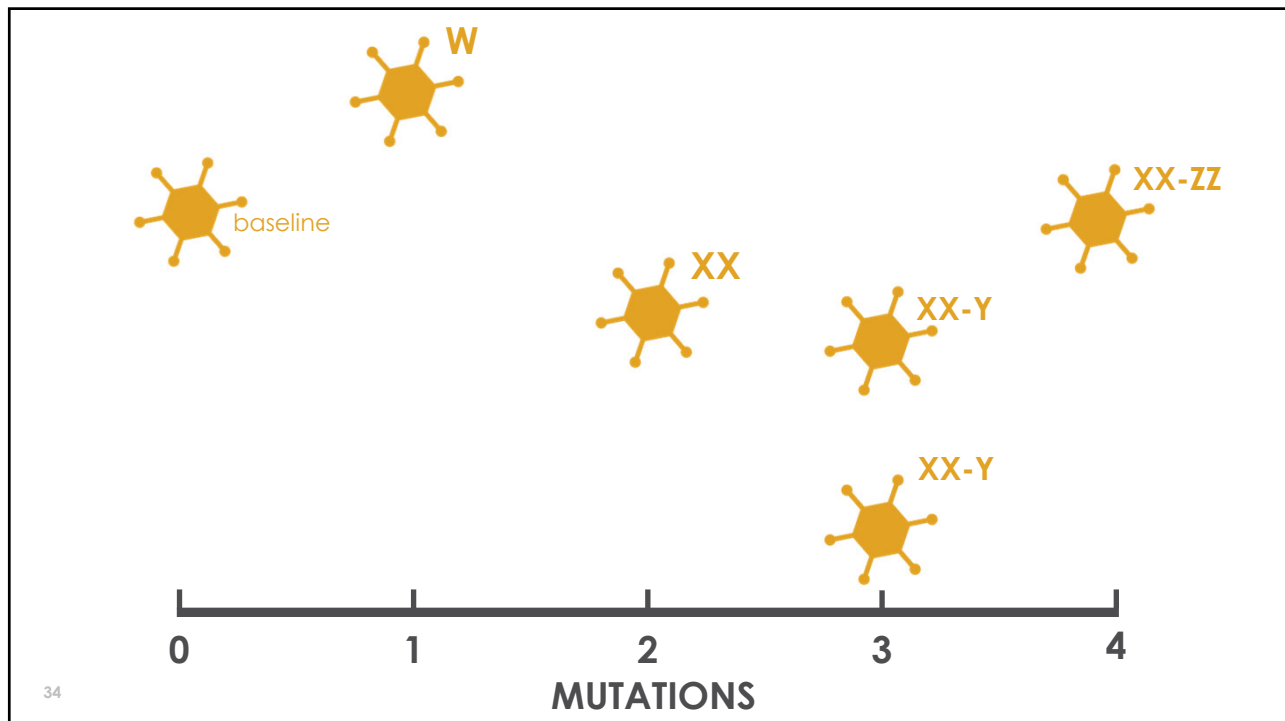
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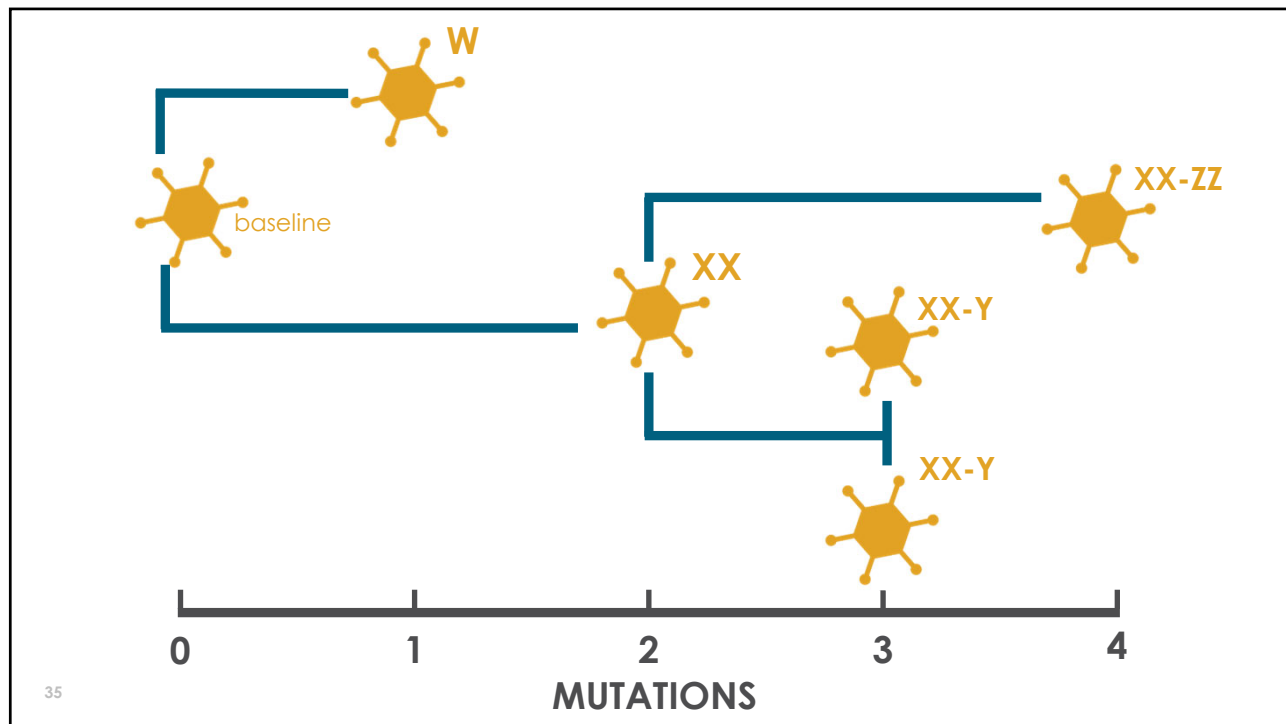
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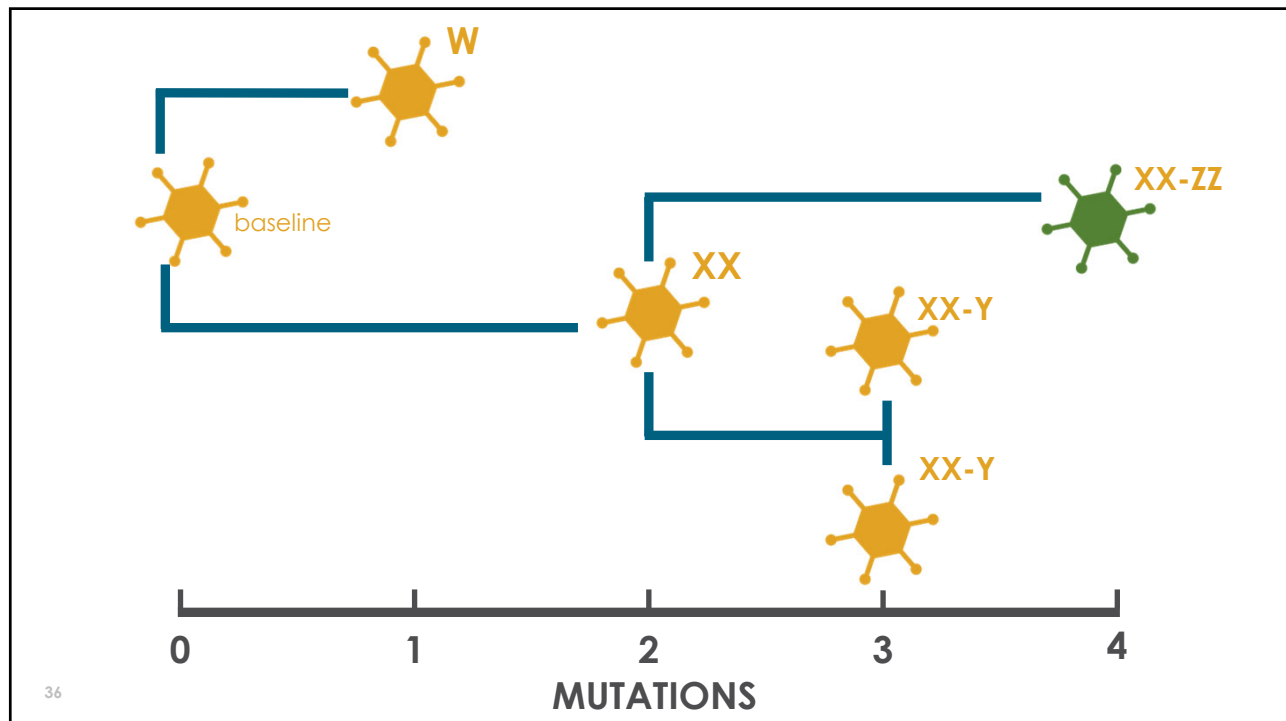
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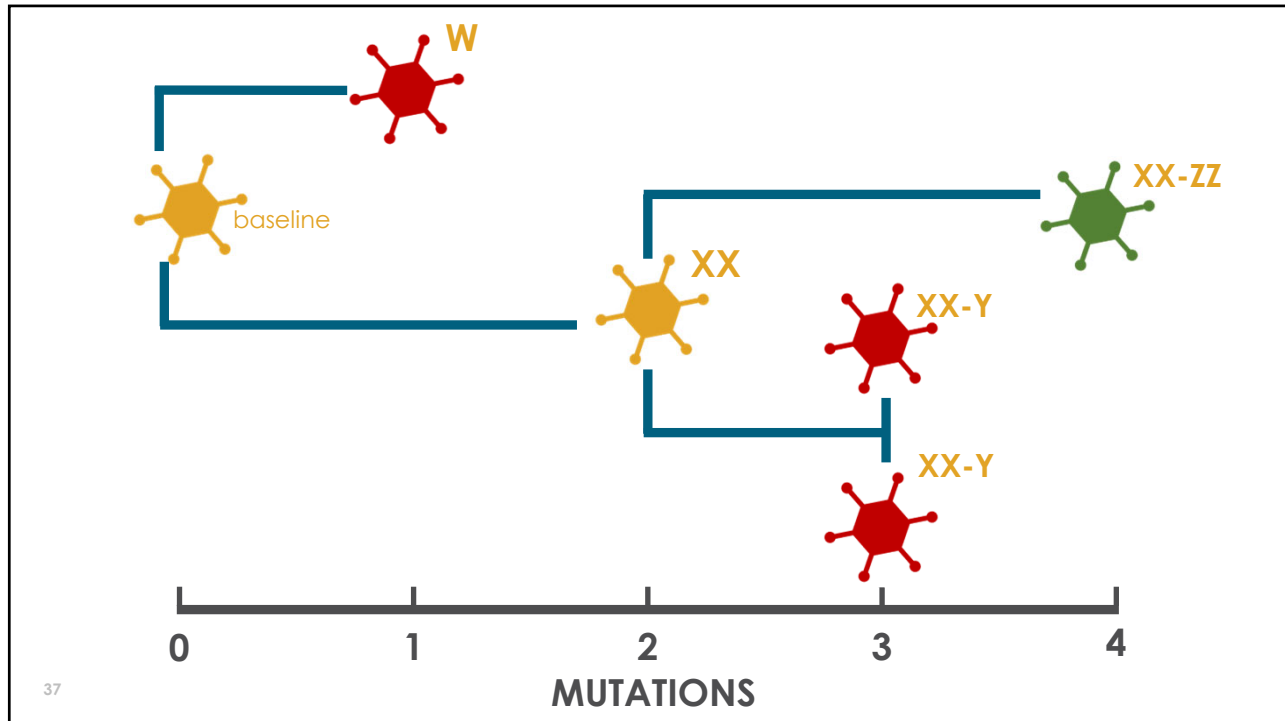
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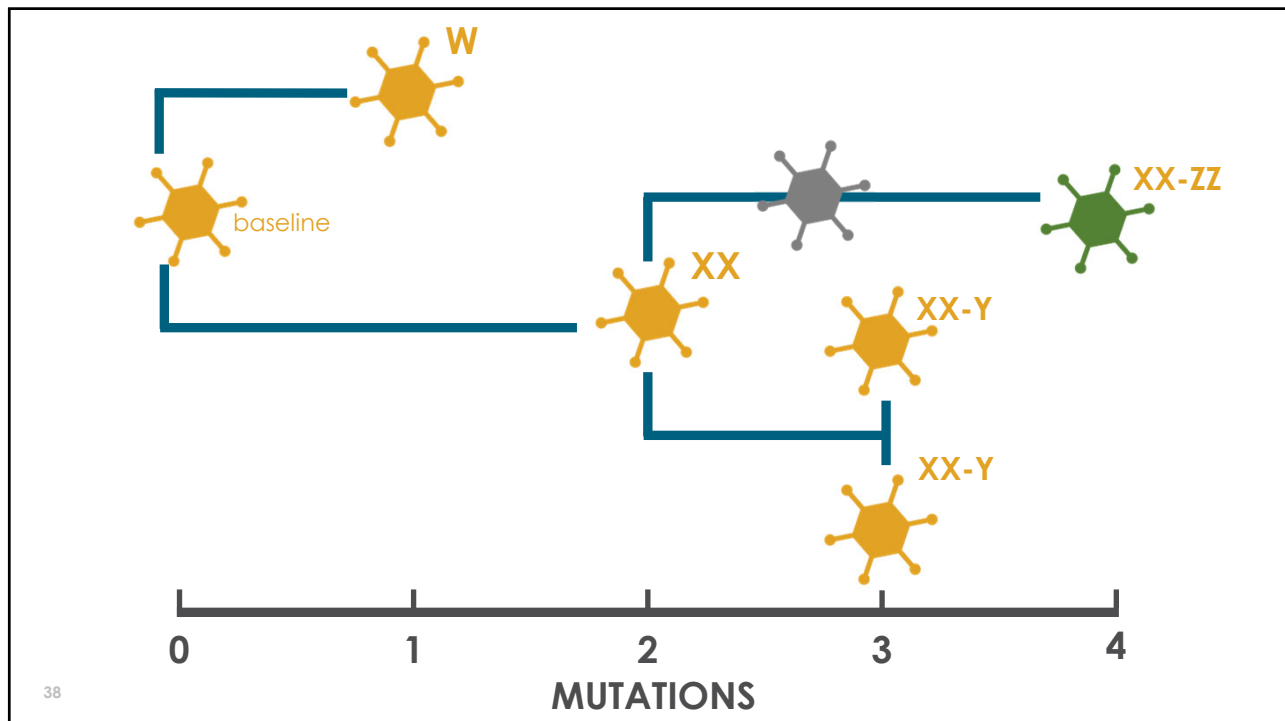
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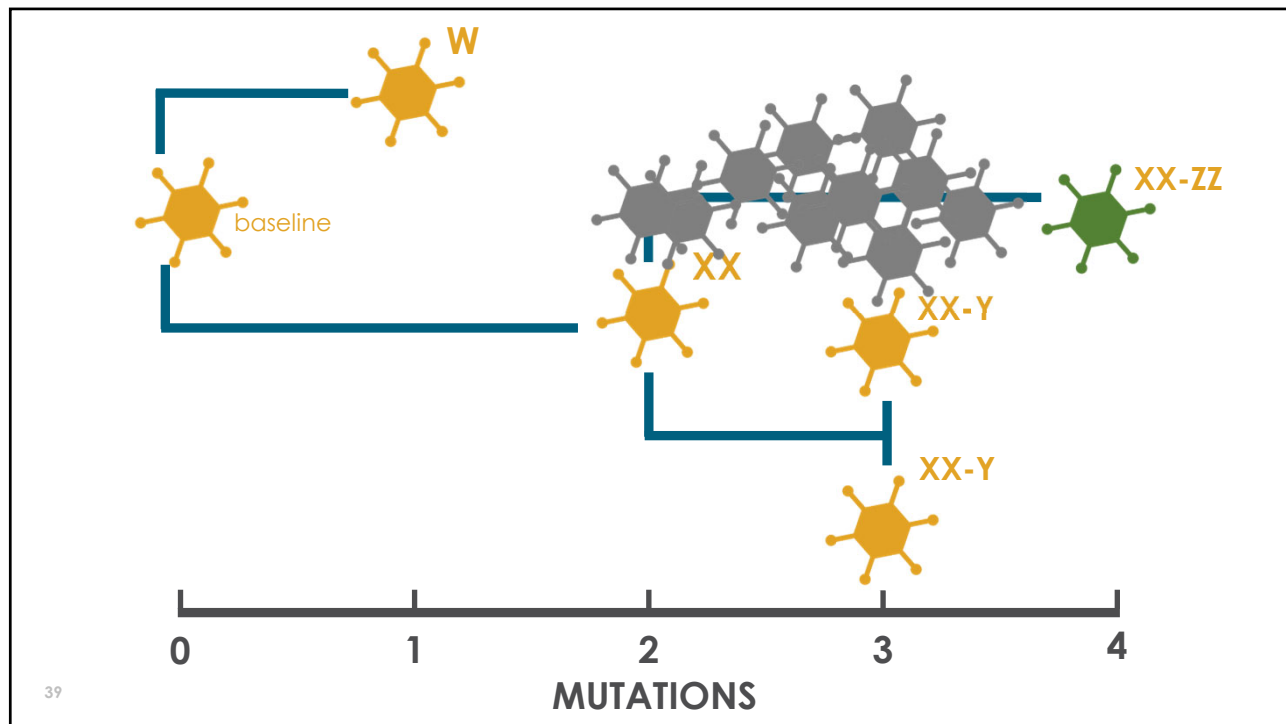
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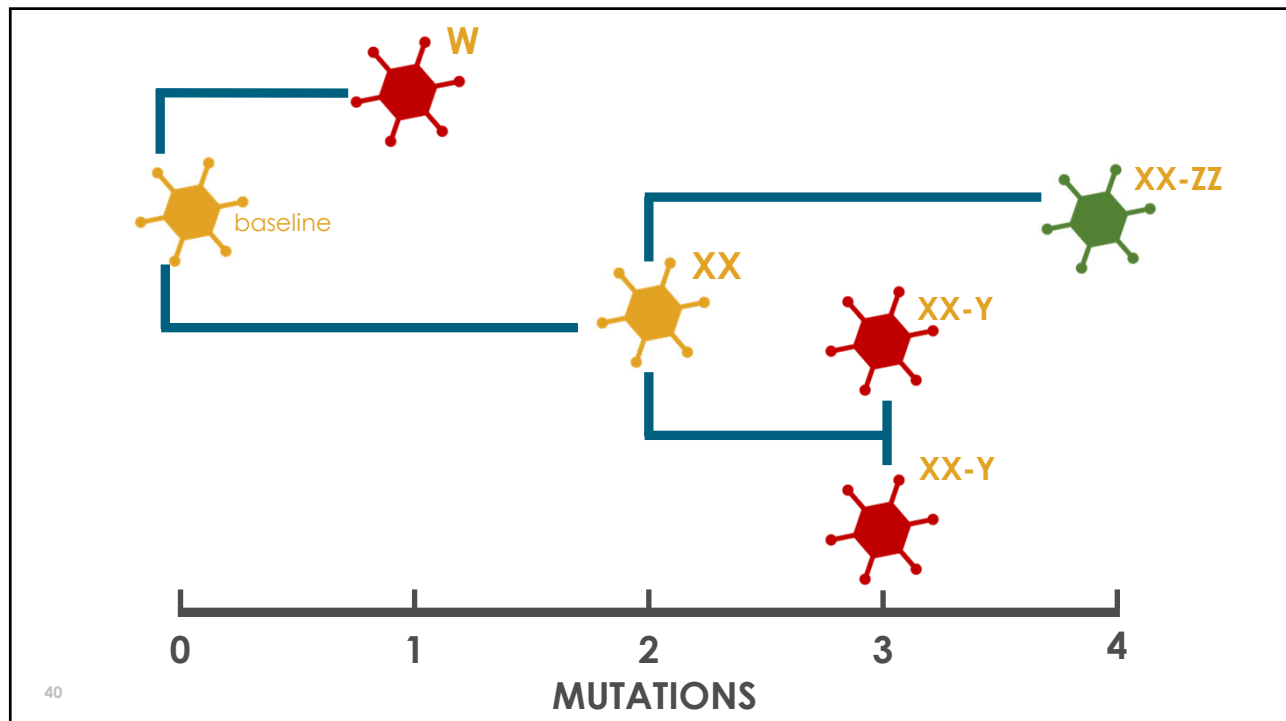
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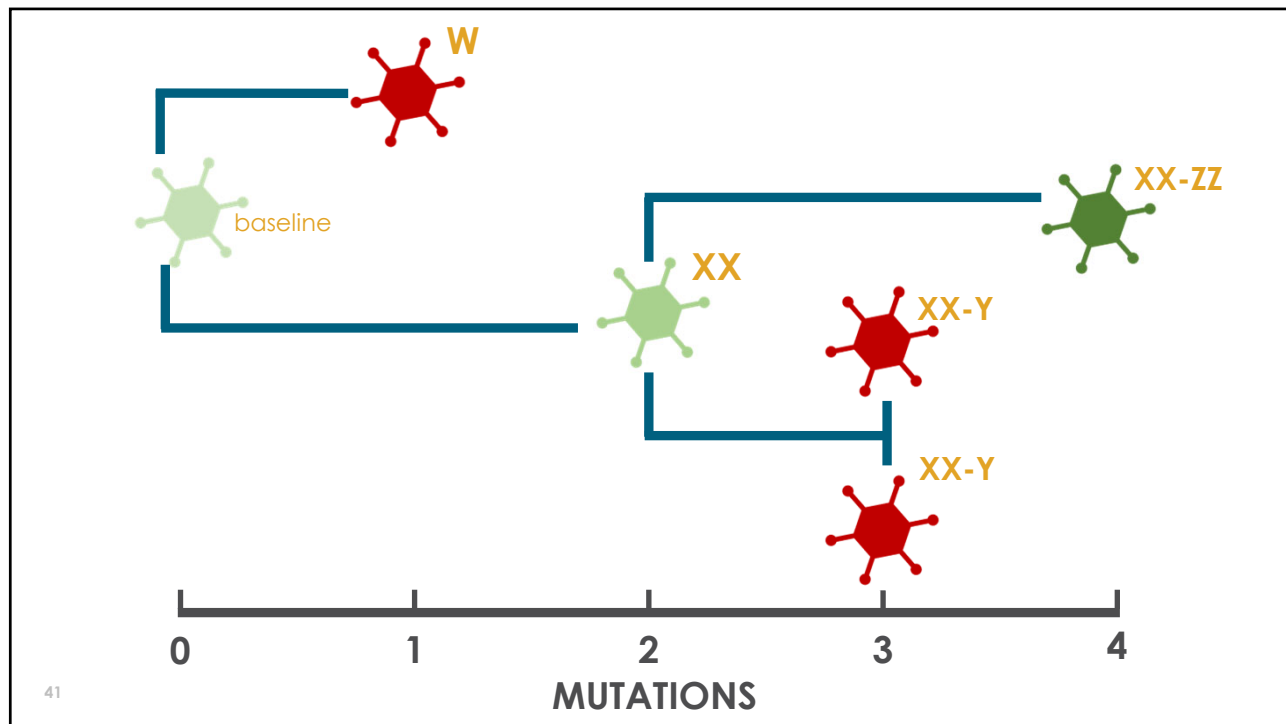
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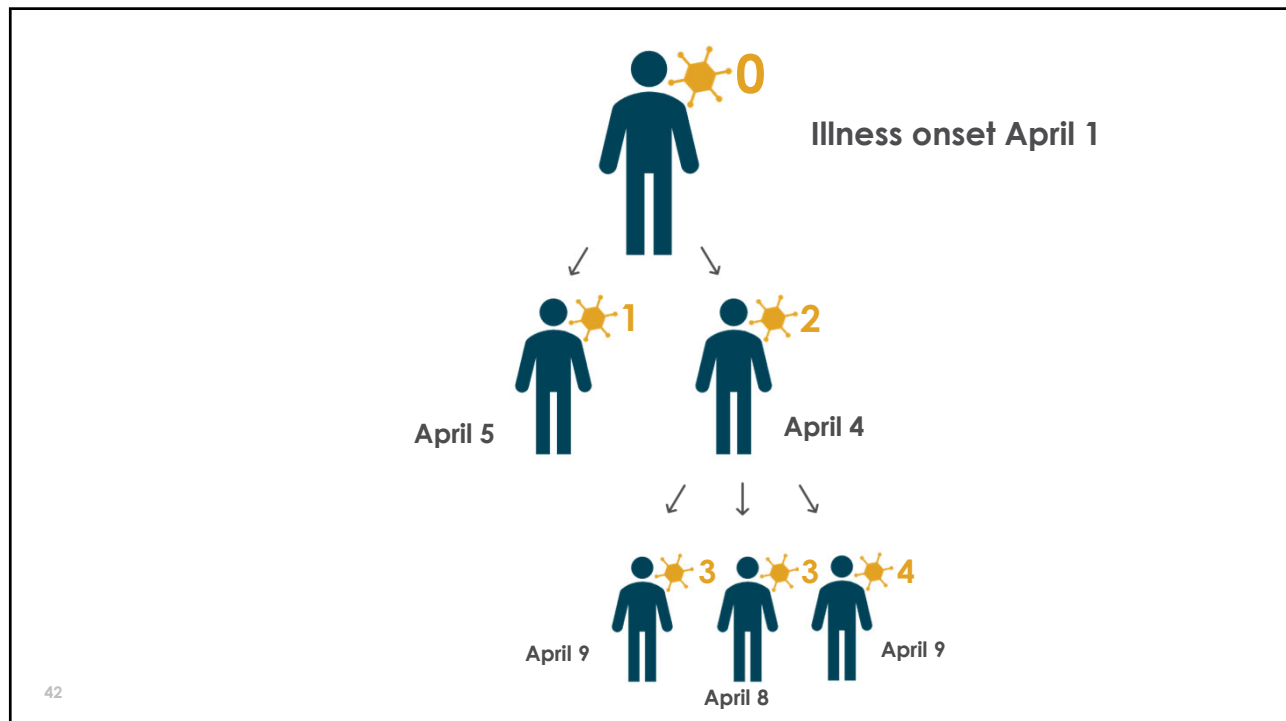
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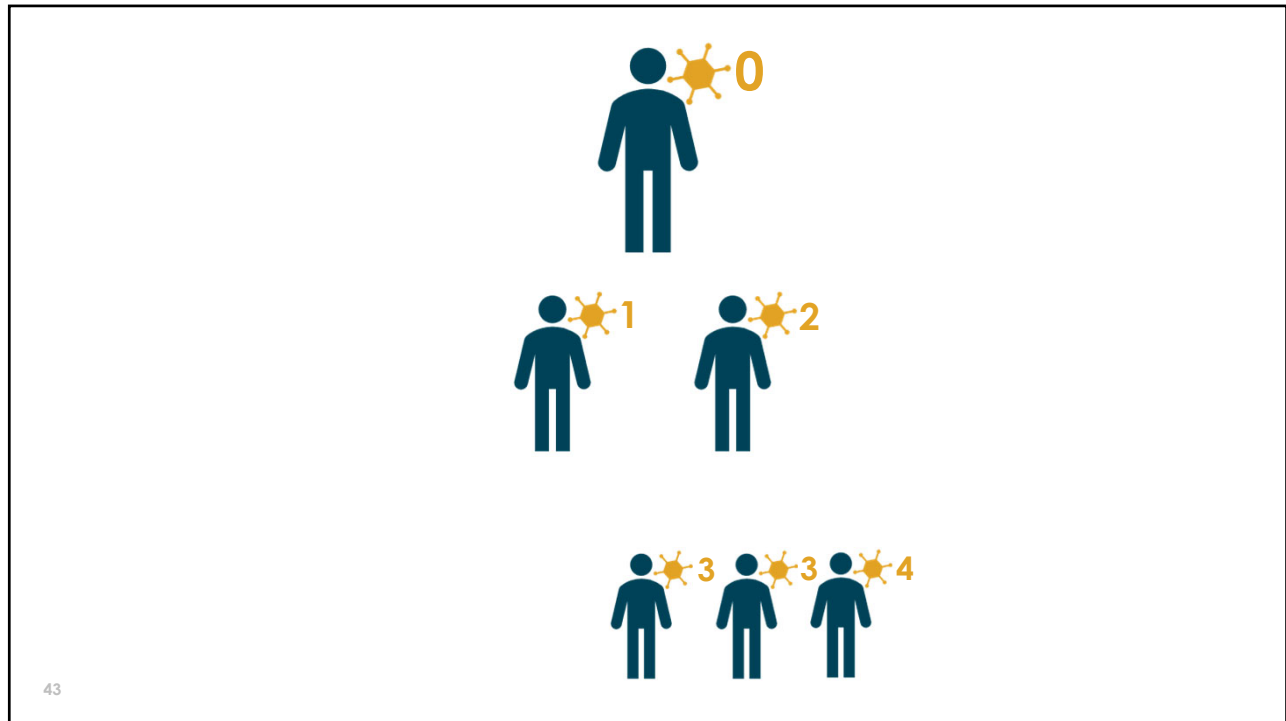
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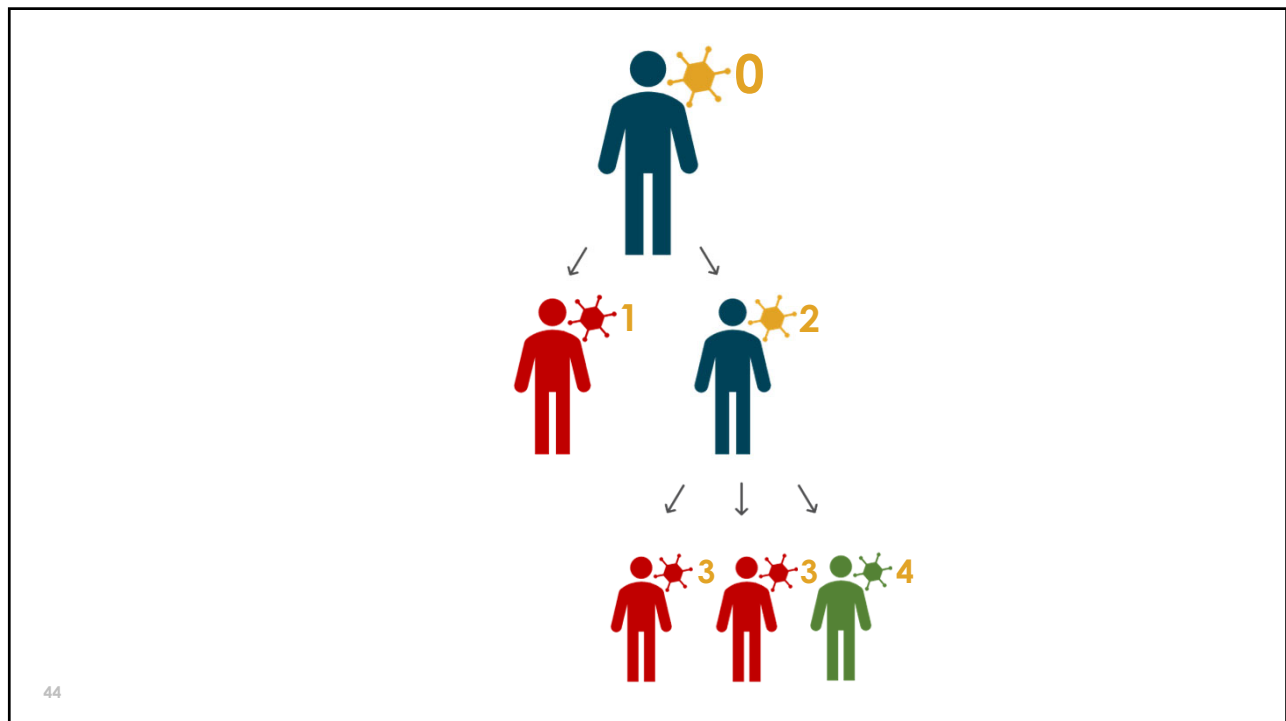
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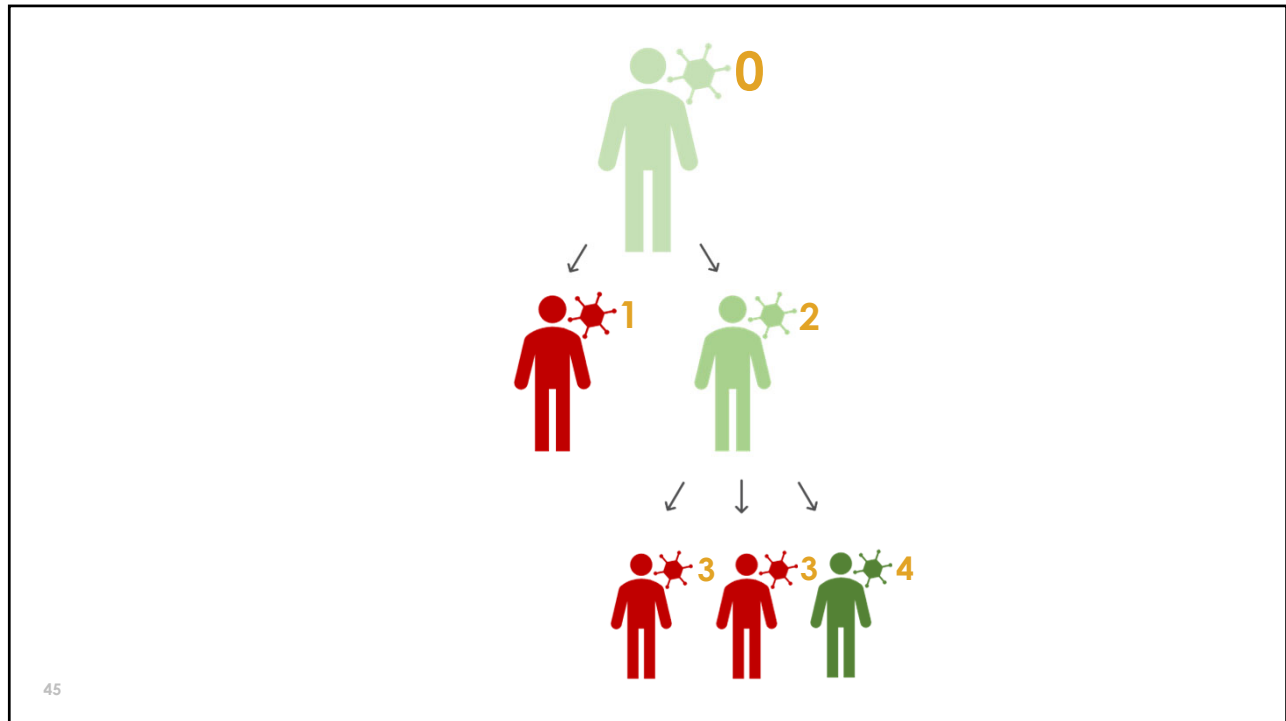
42



43



44



45

INVESTIGATIONS

Epidemiologic links
Illness onset dates
Travel dates

46

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46



INVESTIGATIONS

Epidemiologic links

Illness onset dates

Travel dates

More difficult in emerging public health emergencies within vulnerable communities in the setting of existing distrust

47

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47



INVESTIGATIONS

Epidemiologic links

Illness onset dates

Travel dates

More difficult in emerging public health emergencies within vulnerable communities in the setting of existing distrust

48



GENOMICS

CAN more definitively say who is NOT related to who
CANNOT say who infected who

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48



INVESTIGATIONS

Epidemiologic links
Illness onset dates
Travel dates

More difficult in emerging public health emergencies within vulnerable communities in the setting of existing distrust

49



GENOMICS

CAN more definitively say who is NOT related to who
CANNOT say who infected who

MIGHT play a critical role in acute outbreak response

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49

III. APPLIED [GENOMIC] EPIDEMIOLOGY IN THE NEBRASKA MPOX RESPONSE



50

MPOX NEBRASKA TIMELINE

GLOBAL & NATIONAL OUTLOOK
CLINICAL DESCRIPTION
EPI PARAMETERS FOR CICT
POTENTIAL INTERVENTIONS

NE RESPONSE

5.31.2022

51

MPOX NEBRASKA TIMELINE

GLOBAL & NATIONAL OUTLOOK
CLINICAL DESCRIPTION
EPI PARAMETERS FOR CICT
POTENTIAL INTERVENTIONS

NE RESPONSE

5.31.2022

6.5.2022

CASE DEFINITION EXPANDS

BUT...
PREP AVAILABLE FOR LABORATORIES &
HEALTHCARE WORKERS ONLY
PEP AVAILABLE WITHIN 4 DAYS OF
IDENTIFIED EXPOSURE

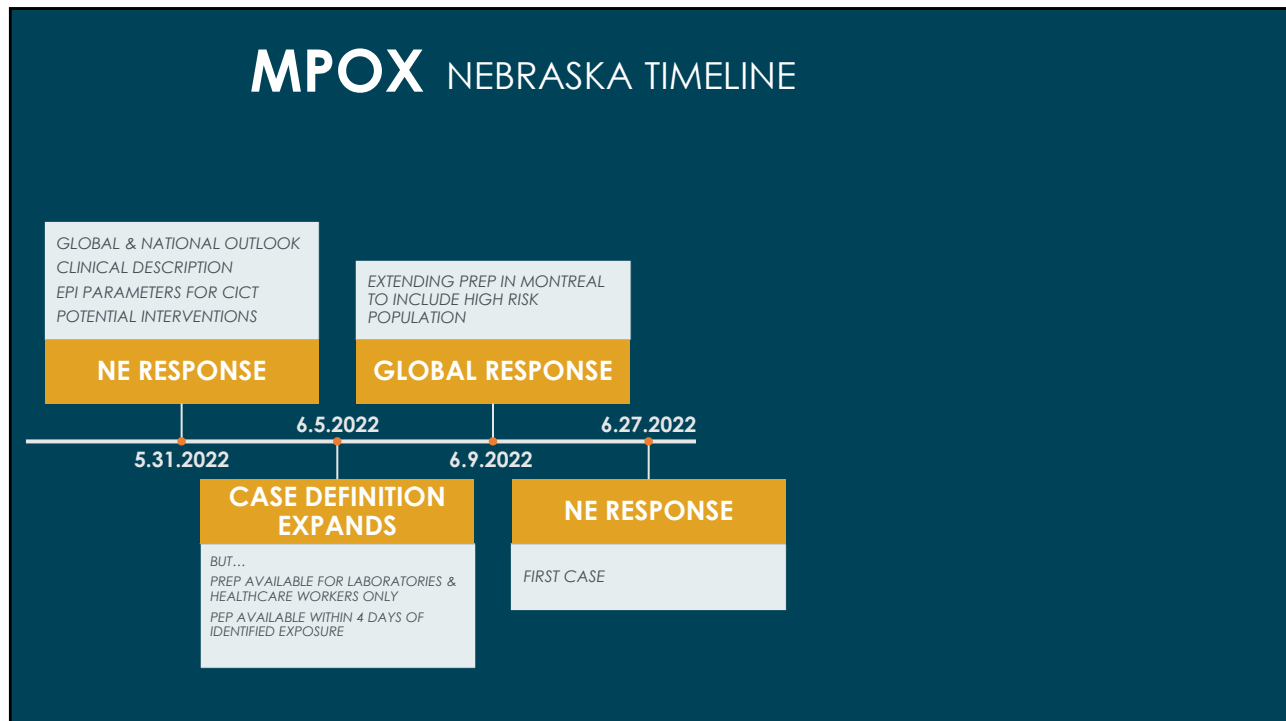
52

MPOX NEBRASKA TIMELINE

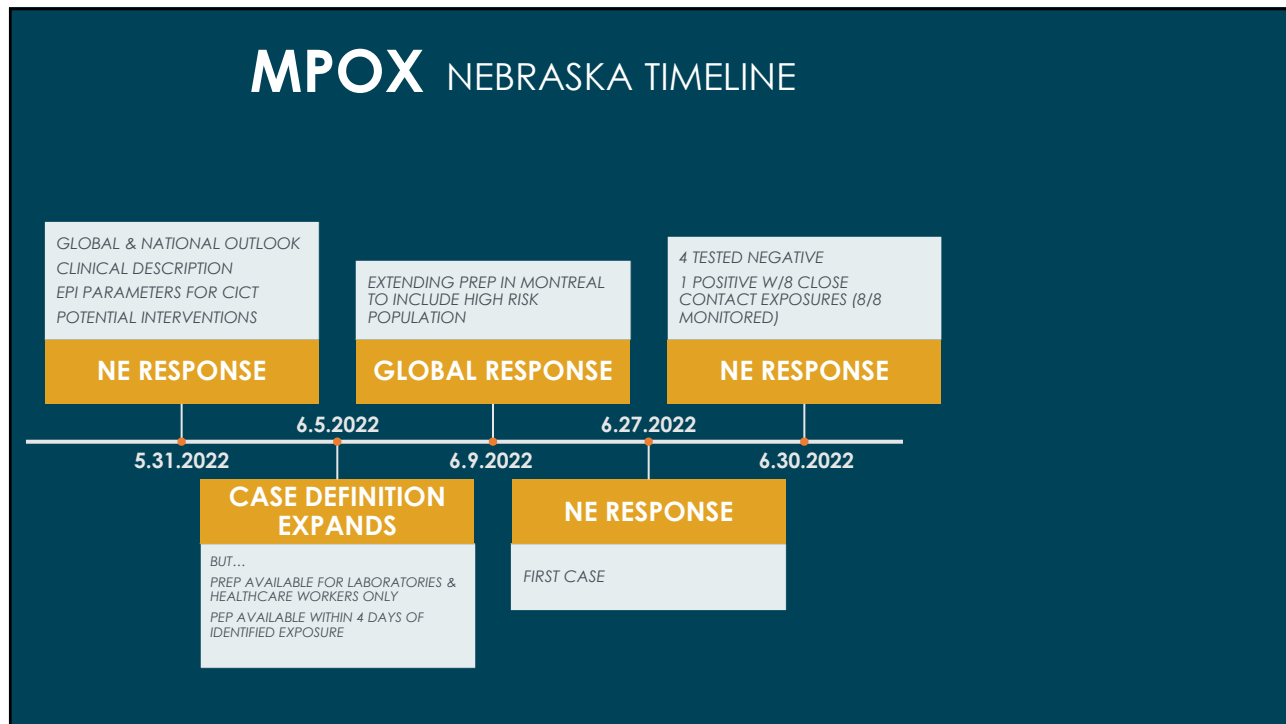


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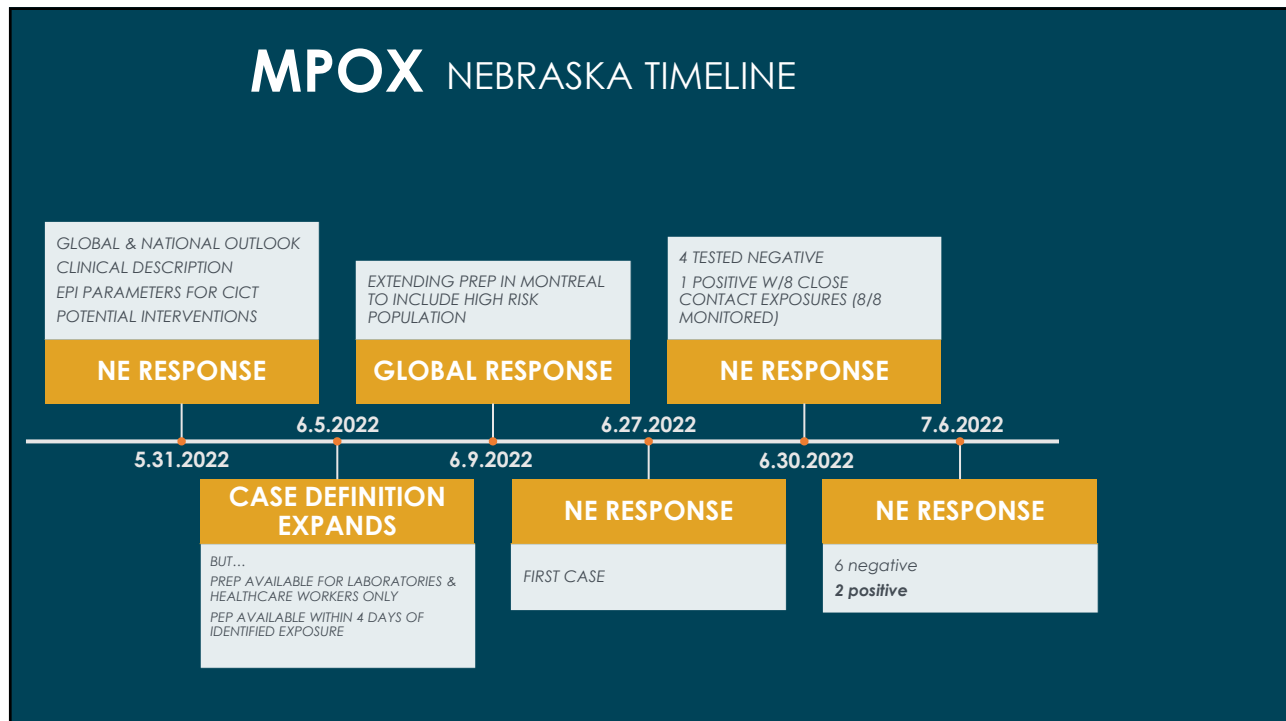
MPOX NEBRASKA TIMELINE



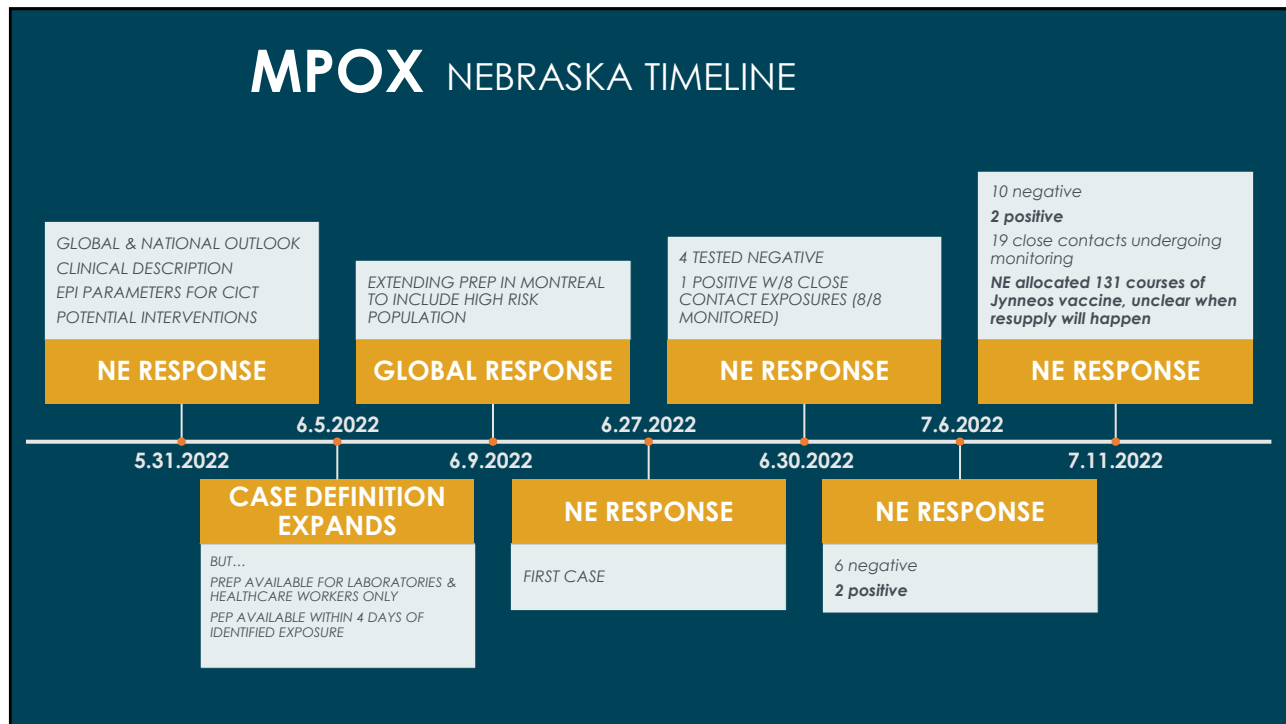
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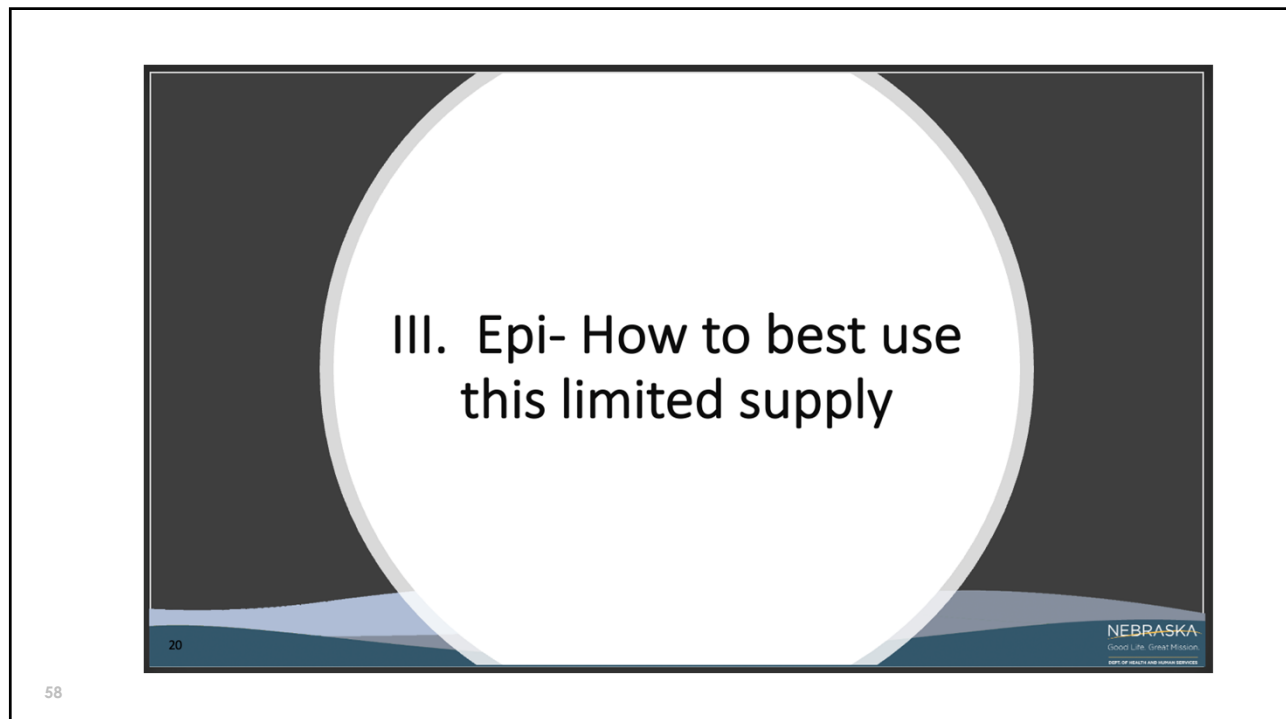
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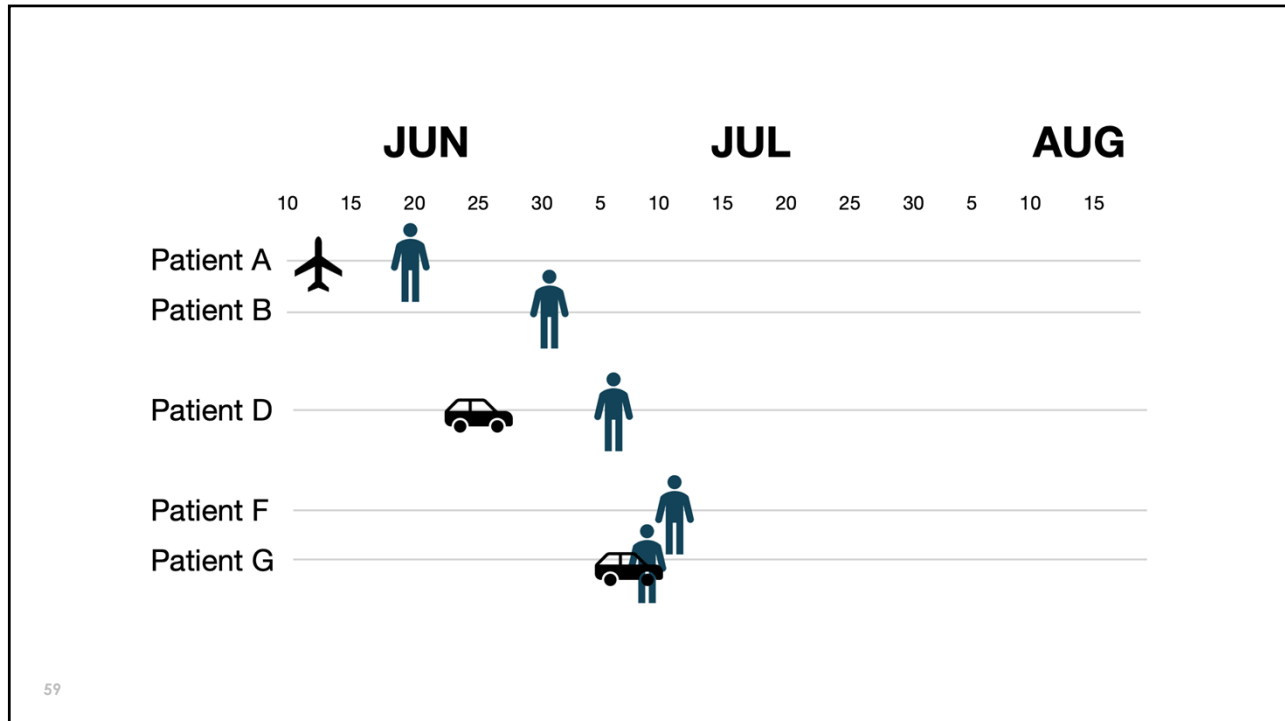


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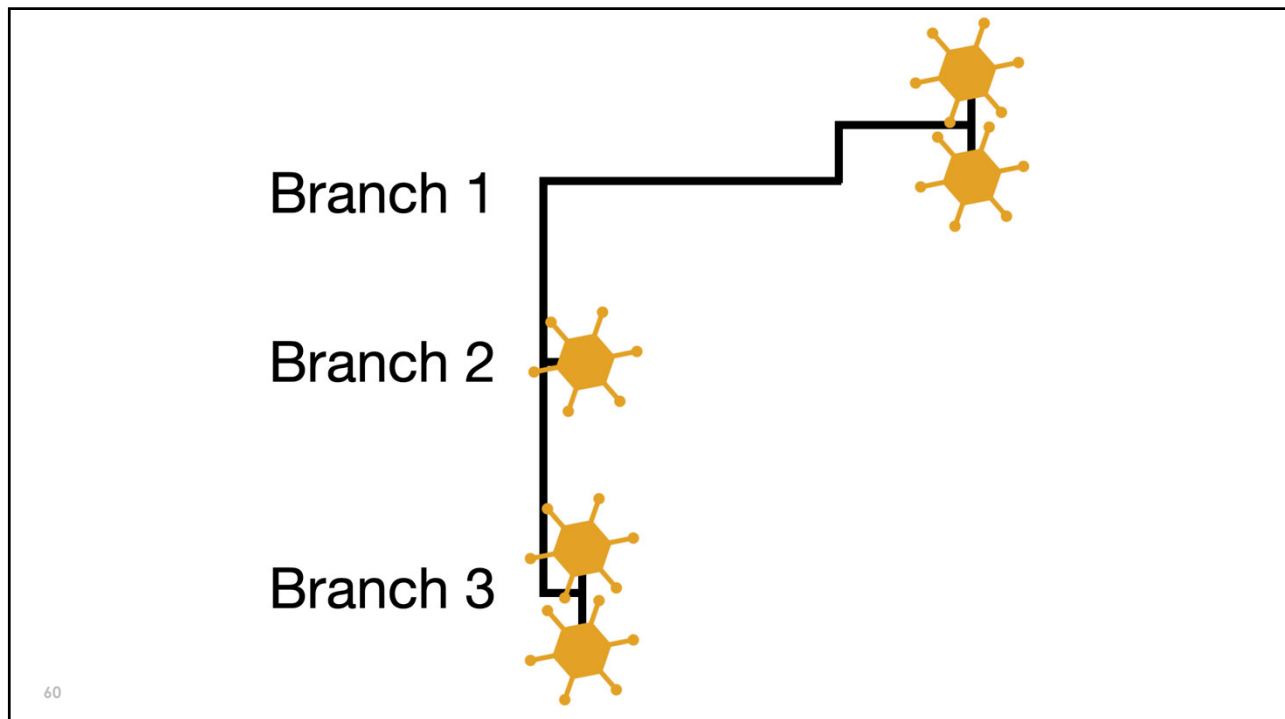


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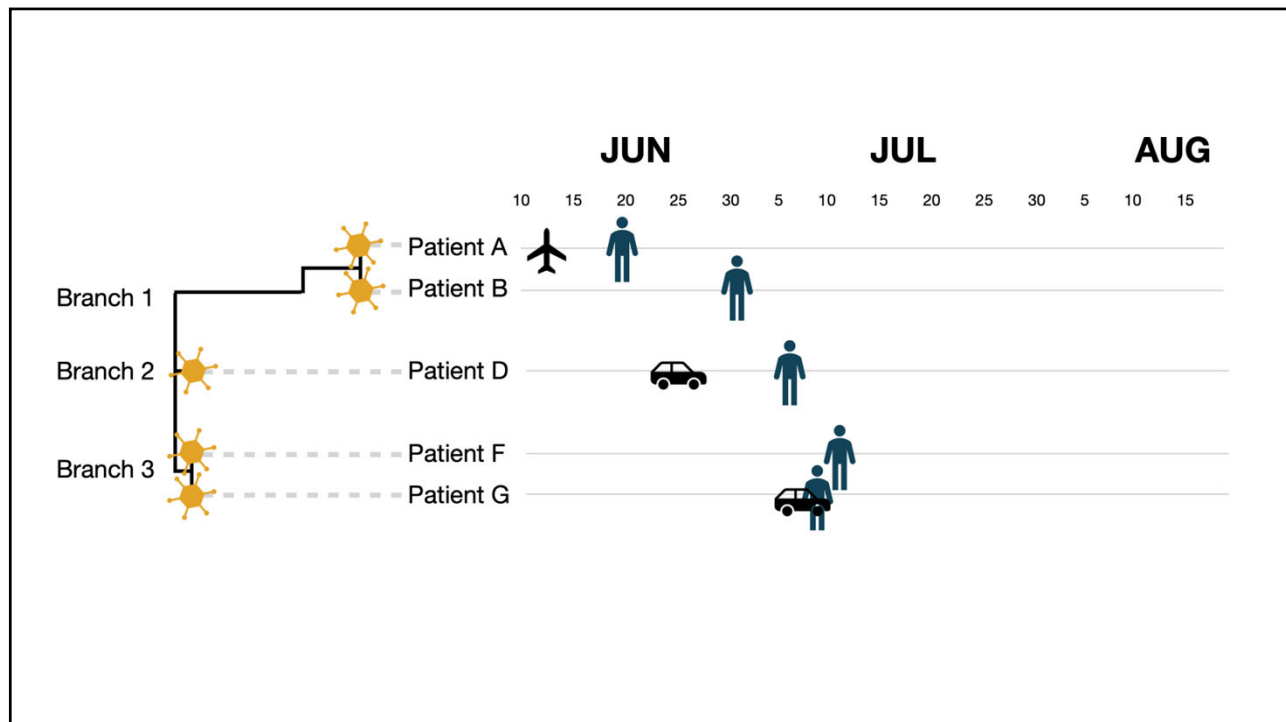




59



60



61

First key overlying principle

Vaccine MUST reach high risk individuals in the community as soon as possible.

21

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62

62

My recommendations for a limited supply of vaccine to the 3 eligible groups

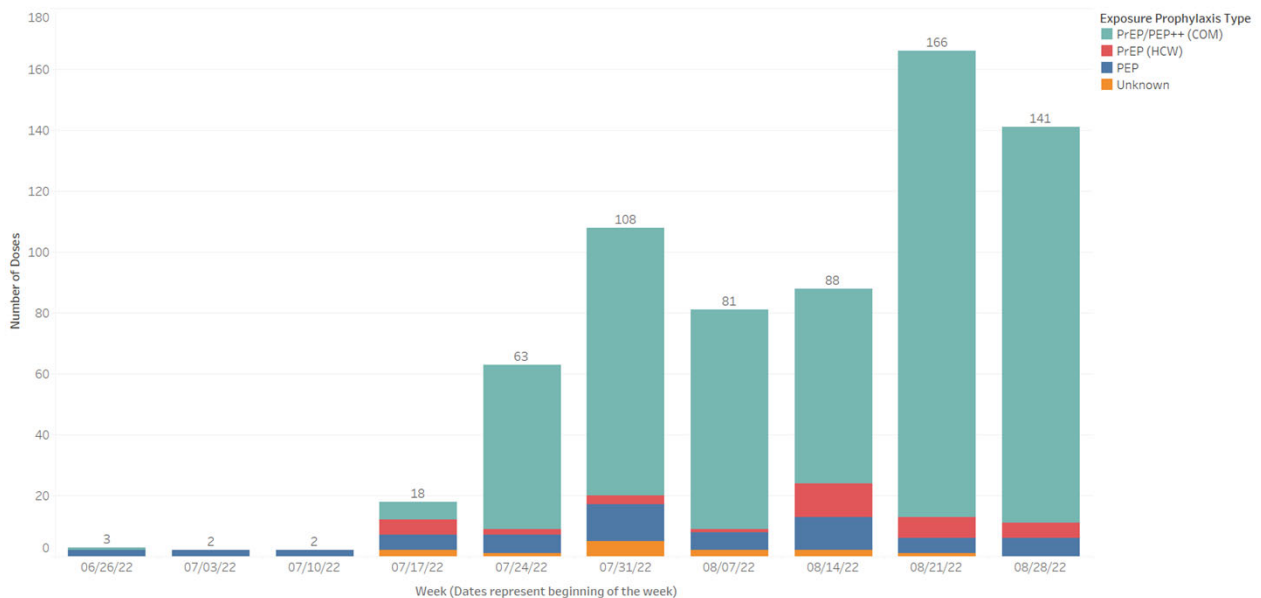
1. Hold a small fraction of doses for PEP, roughly $\frac{1}{4}$ is reasonable (for people who WERE exposed)
2. **Majority of doses must go to PEP++ (high risk community members)**
3. OK to use a small fraction for PrEP if you've received local interest from providers, would limit this to $\frac{1}{4}$ of courses as much as possible

Would rather use it all than hold onto a little

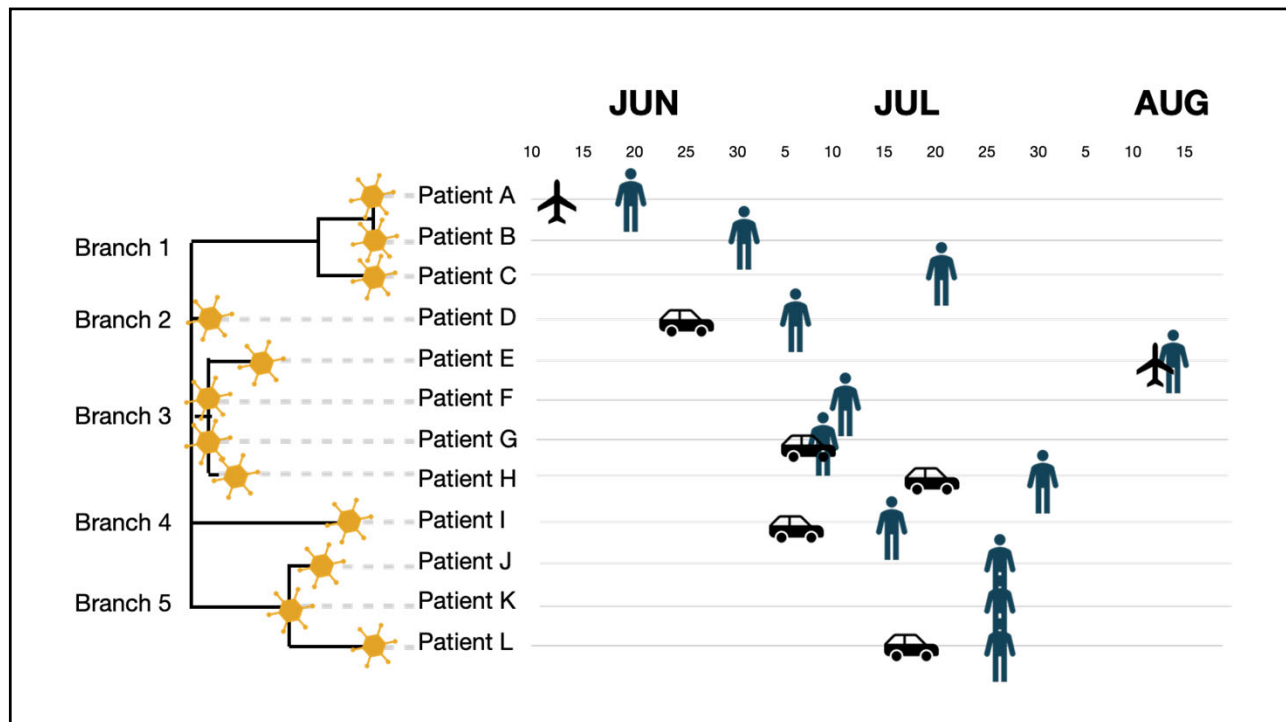
63

63

Number of Mpox Vaccine Doses Administered Weekly by Exposure Prophylaxis Type, Nebraska, June-August 2022



64



65

**NEBRASKA RANKS 9TH FOR
VACCINE COVERAGE AMONG
THOSE AT INCREASED RISK**

-CDC

66

66

Epidemiology is finding the right numerator and right denominator

$$\frac{X}{Y}$$

67

Epidemiology is finding the right numerator and right denominator

Applied epidemiology is implementing a change to affect the **numerator**...

$$\frac{X}{Y}$$

68

Epidemiology is finding the right numerator and right denominator

Applied epidemiology is implementing a change to affect the **numerator**...

...or implementing a change to affect the **denominator**.

$$\frac{X}{Y}$$

69

Reducing disease burden
Increasing vaccinations

Applied epidemiology is implementing a change to affect the numerator...

...or implementing a change to affect the denominator.

$$\frac{X}{Y}$$

Increasing access
Ensuring equitable service
Policy to improve quality of life

70



THANK YOU

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MATTHEW DONAHUE, MD
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