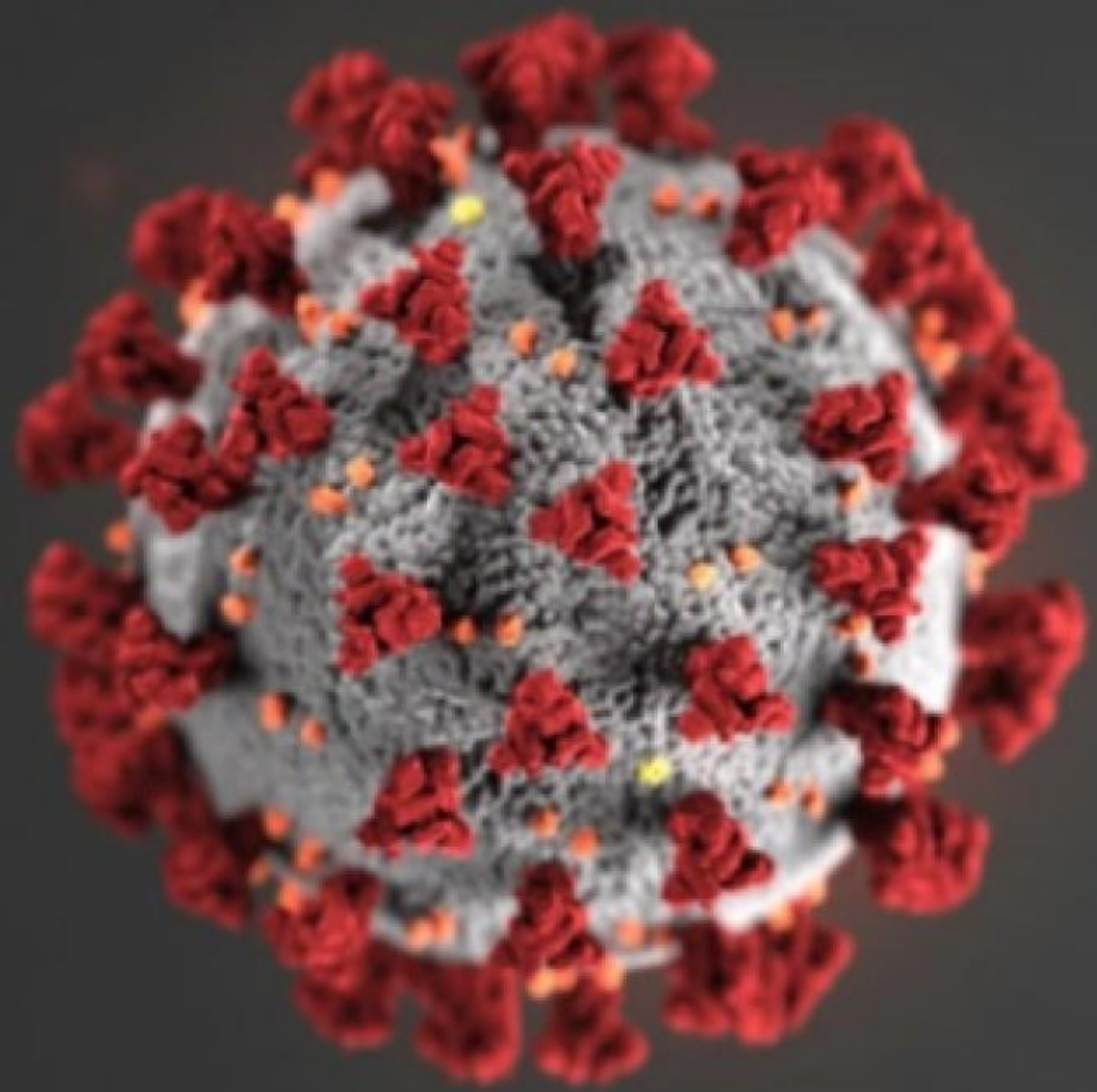
Epi Update and Pandemic Overview

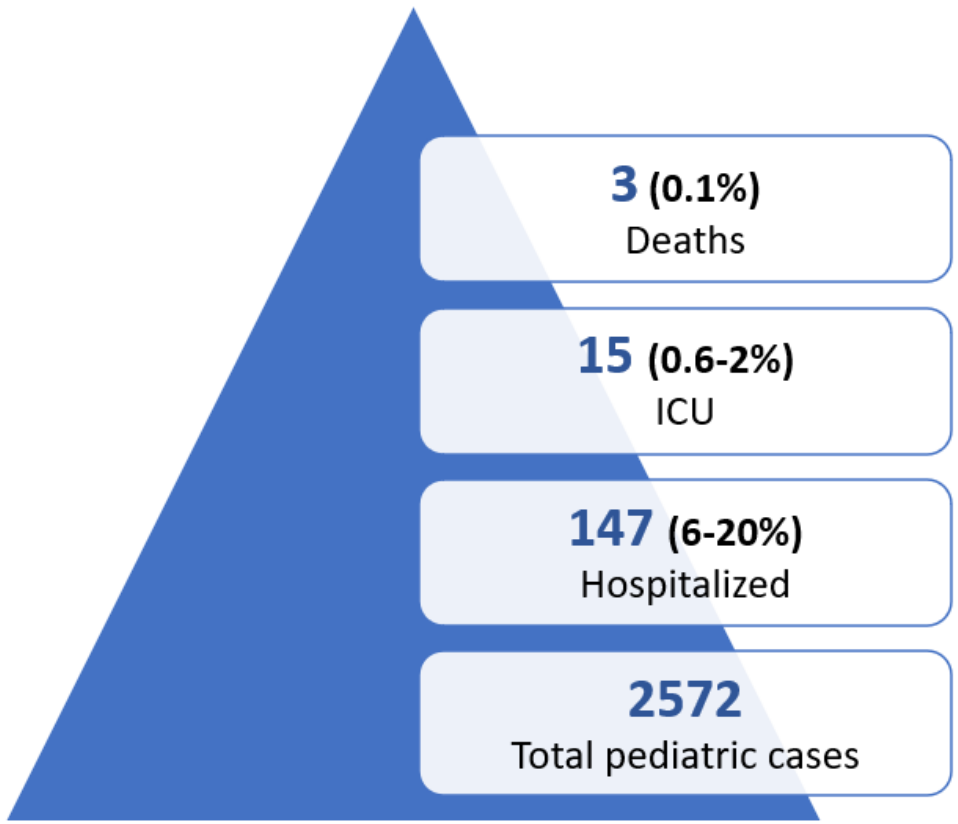
April 16, 2020



Morbidity and Mortality Weekly Report

Coronavirus Disease 2019 in Children — United States, February 12–April 2, 2020

CDC COVID-19 Response Team



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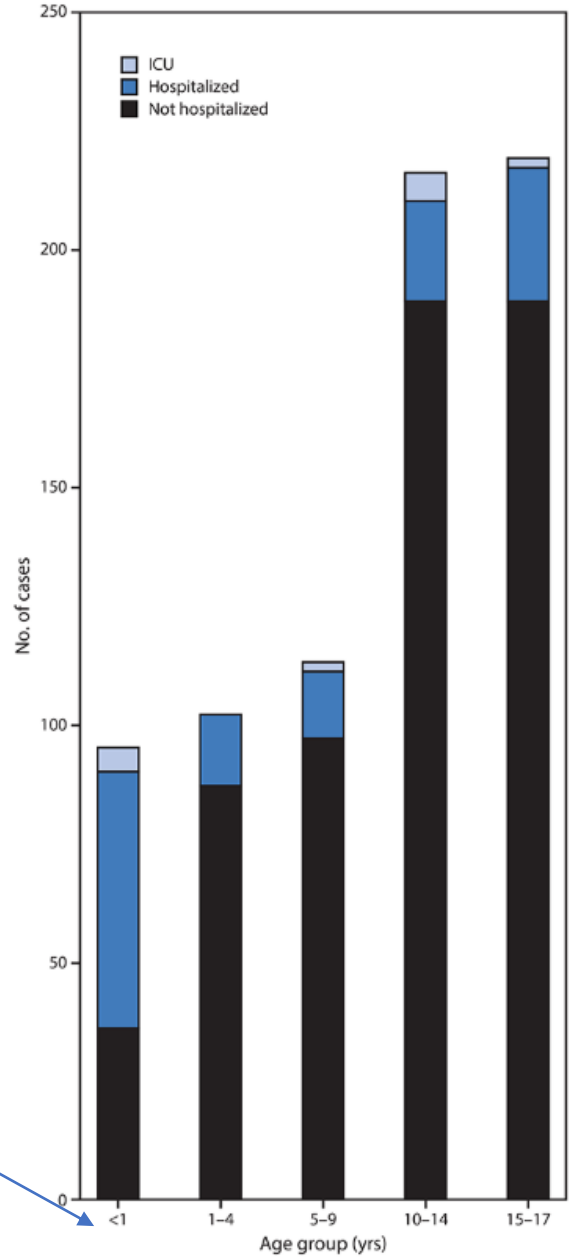

Hospitalizations
59/147 (**40%**)

ICU admissions
5/15 (**33%**)

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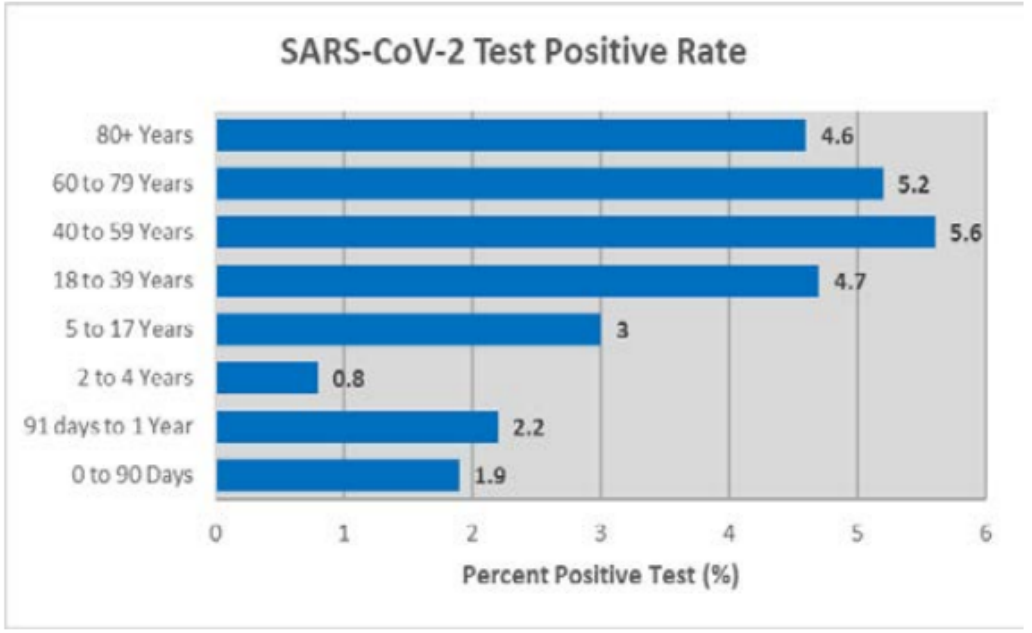
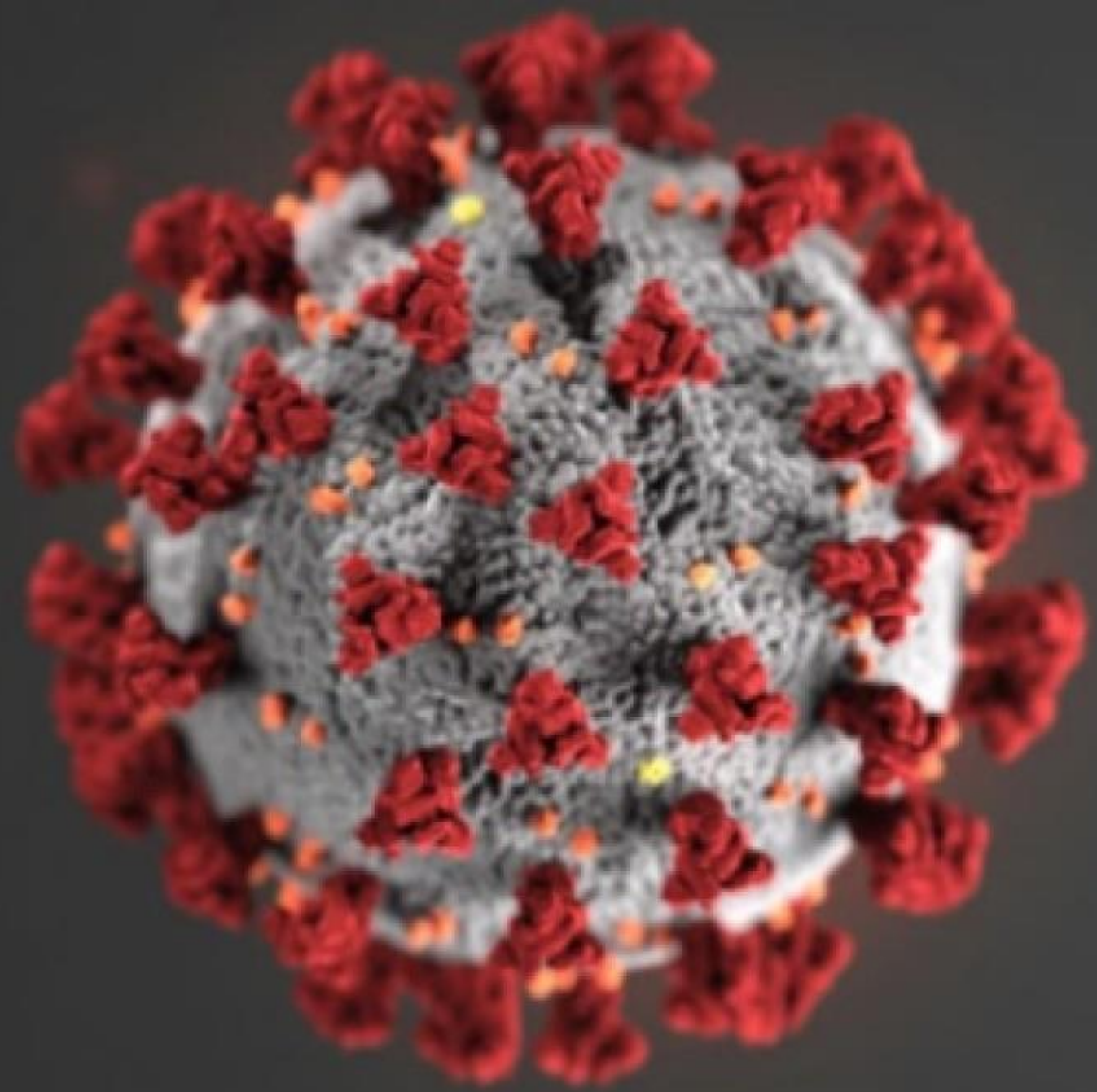
	Age <18 years	Age <1 year
Percentage of U.S. population	**22%**	**1.2%**
Percentage of ALL COVID-19 cases	**1.7%**	**0.3%**

GermWatch



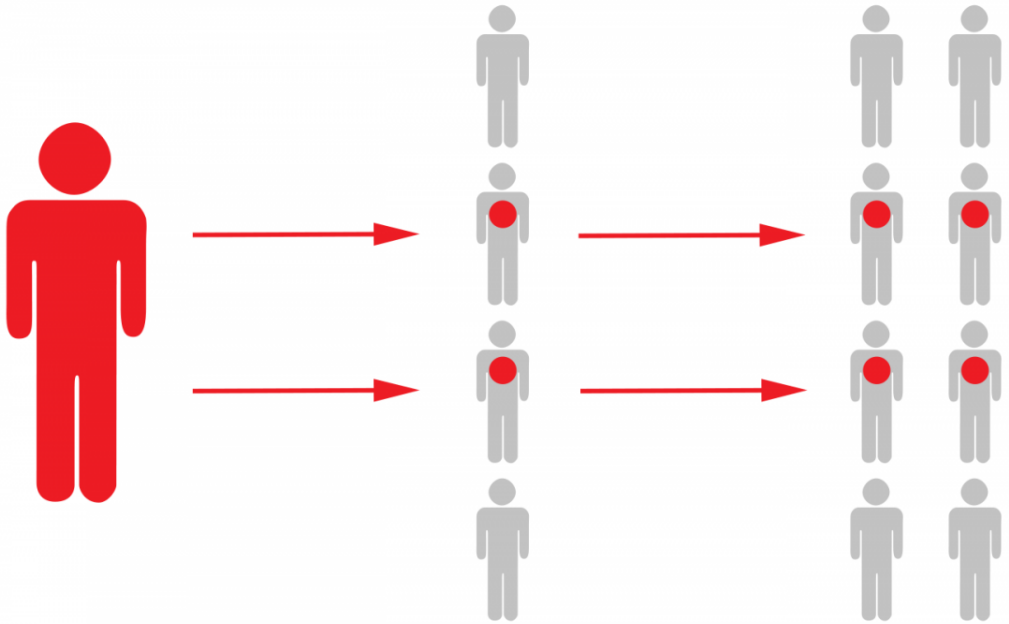
Pandemics 101



Herd Immunity

- Indirect protection from infectious disease that occurs when a large percentage of a population has become immune to that disease, either through **infection** or **vaccination**

- **Herd Immunity Threshold**: The proportion of the population needed to become immune to achieve herd immunity



COVID-19 $R_o \approx 2$

Herd Immunity Threshold = $\mathbf{(R_o-1)/R_o}$

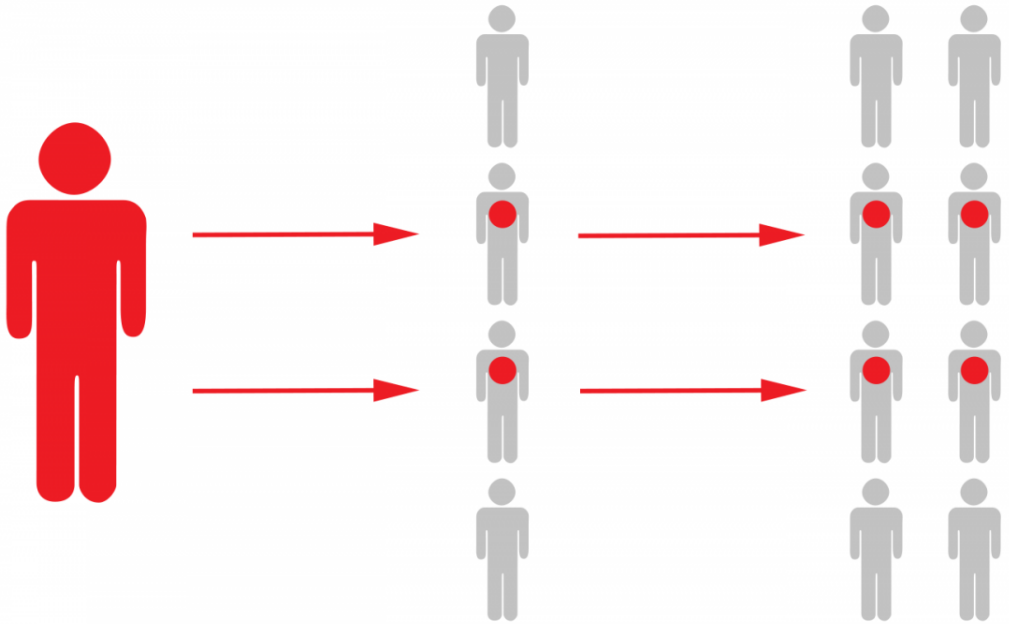
Measles ($R_o \approx 12$) Threshold = (12-1)/12 = **92%**

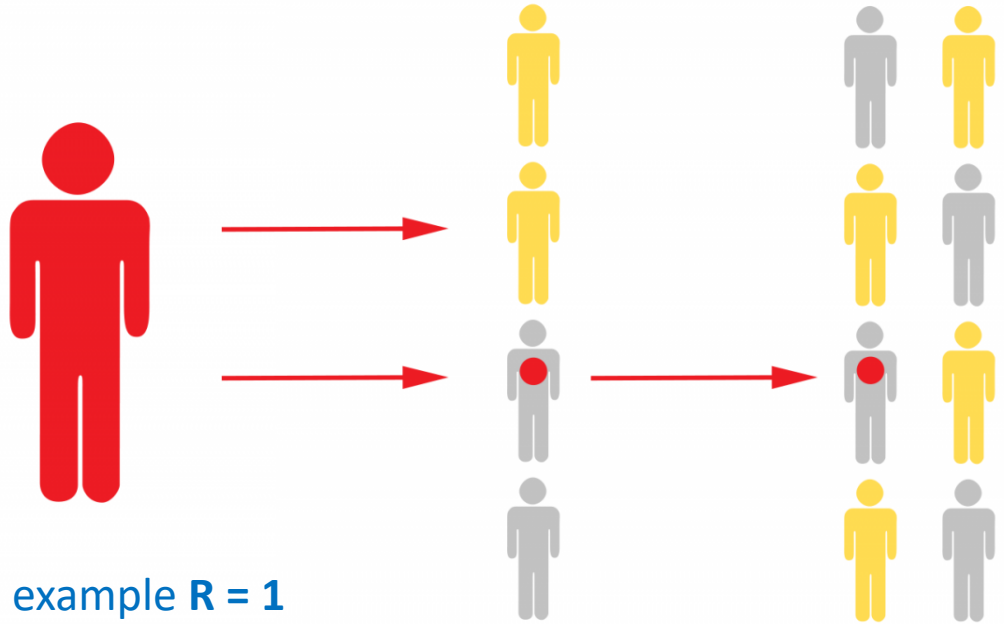
COVID-19 ($R_o \approx 2$) Threshold = (2-1)/2 = **50%**

When will the COVID-19 pandemic dissipate?

Once **≈50-60%** of the population has immunity to the virus

Basic Reproduction Number ($\mathbf{R_o}$) = Expected number of cases directly generated by one case in a population where all individuals are susceptible to infection. *COVID-19 R_o is between 2-2.5.





In this example **R = 1**

Infected
Susceptible
Immune

Effective Reproductive Number (**R**) = Expected number of cases generated by one case in a population made up of susceptible and non-susceptible individuals

If half of people are immune, half of infections will never happen, so the spreading speed is effectively cut in half. The outbreak simmers along and eventually dissipates.

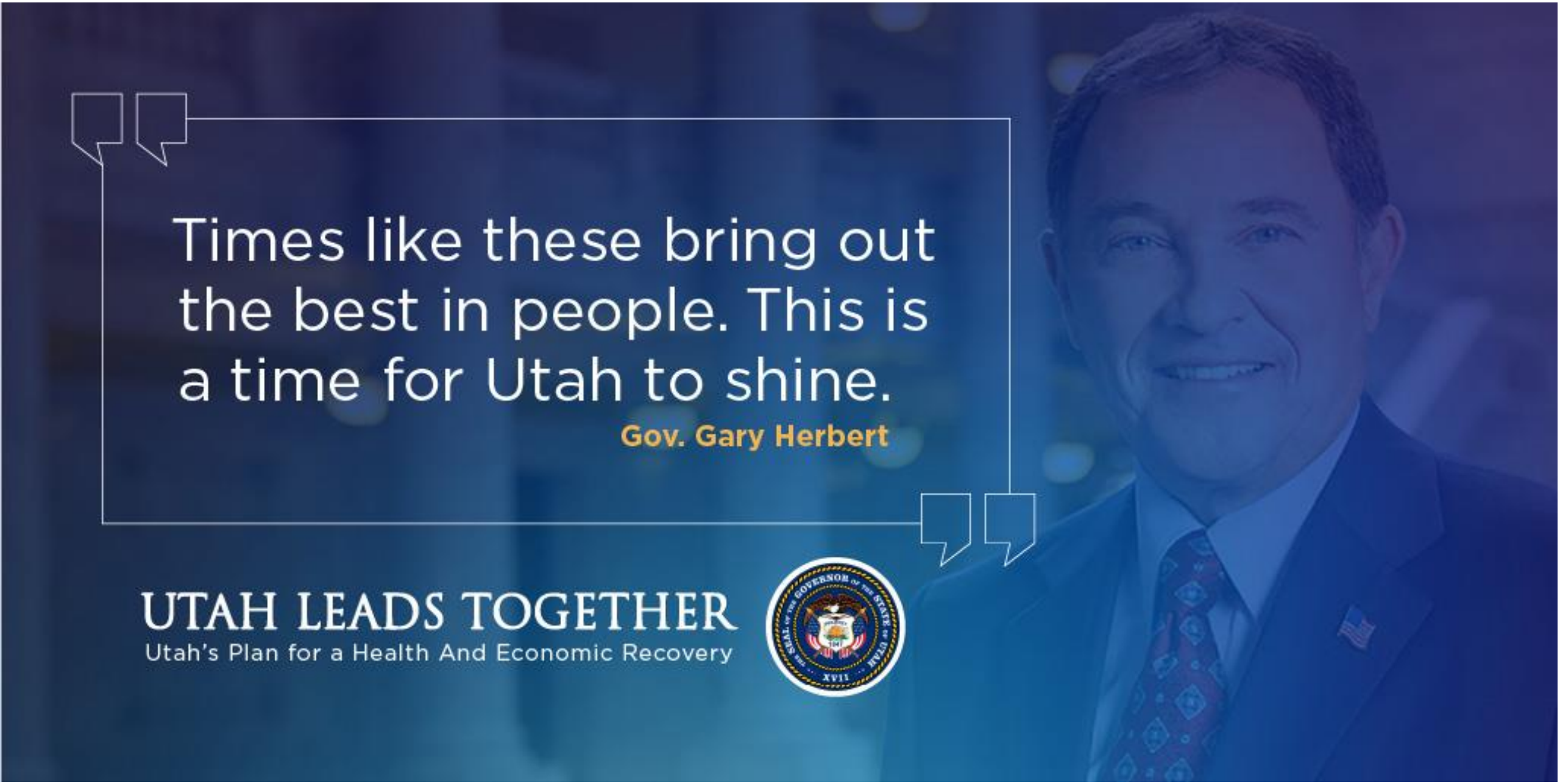
Methods of Outbreak Control

Mitigation

- Uses **Nonpharmaceutical Interventions** (**NPIs**), not to interrupt transmission completely (R>1), but to reduce the health impact
- Controlled burn
- NPIs
  - Social distancing
  - School and university closures
  - Advising populations to remain home
  - Cancellation of large gatherings

Suppression

- Goal is to substantially reduce **R to <1** thereby reducing case numbers to low levels or eliminate human-to-human transmission
  - SARS, Ebola
- Reducing the fire to coals and putting the fire out completely
- Main challenge is that **NPIs** need to be maintained – at least intermittently - for as long as the virus is circulating or until a vaccine becomes available


Times like these bring out the best in people. This is a time for Utah to shine.
Gov. Gary Herbert
UTAH LEADS TOGETHER
Utah's Plan for a Health And Economic Recovery

THE PLAN

Urgent Phase → Stabilization Phase → Recovery Phase

Coordinated public health response coupled with historic economic stimulus

Goal: 8-12 weeks
beginning March 16, 2020

Public health measures and economic interventions begin to take hold

Goal: 10-14 weeks

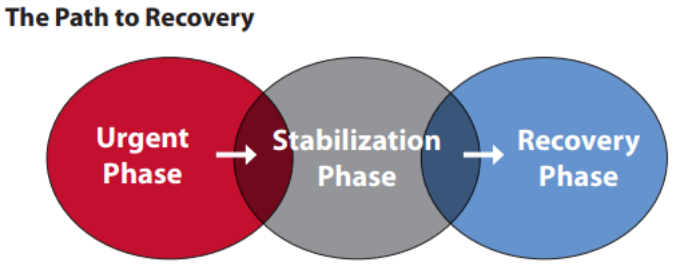
Return to stability and positive growth ADAPT, INNOVATE, and OVERCOME

Goal: 8-10 weeks

UTAH LEADS TOGETHER

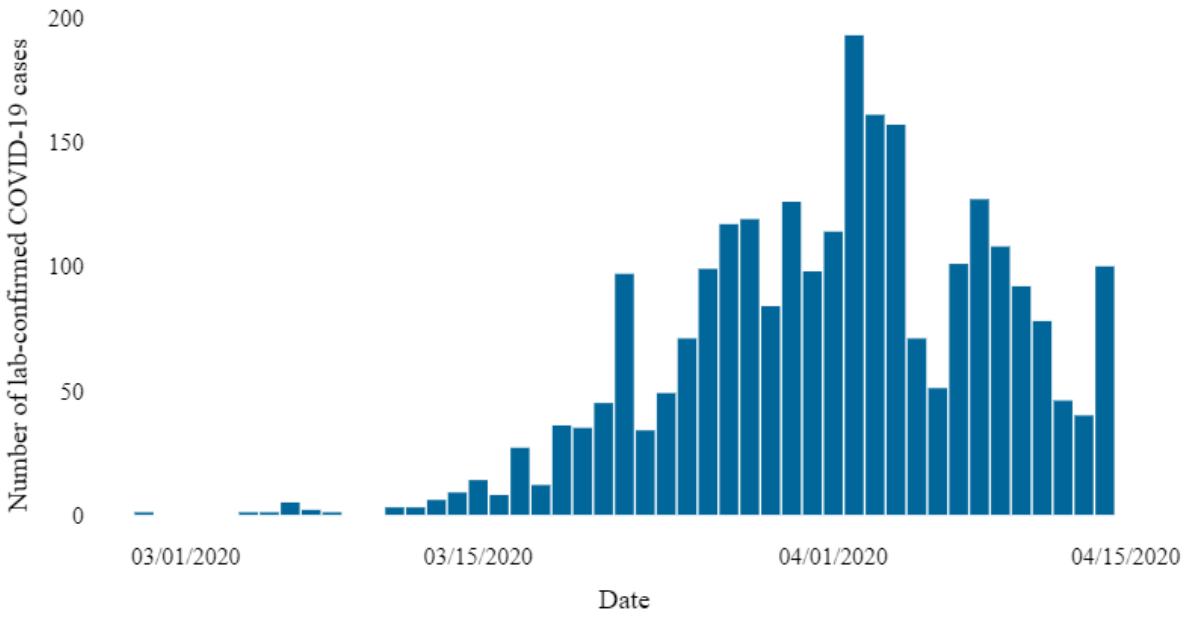
Utah's Plan for a Health And Economic Recovery

Urgent Phase

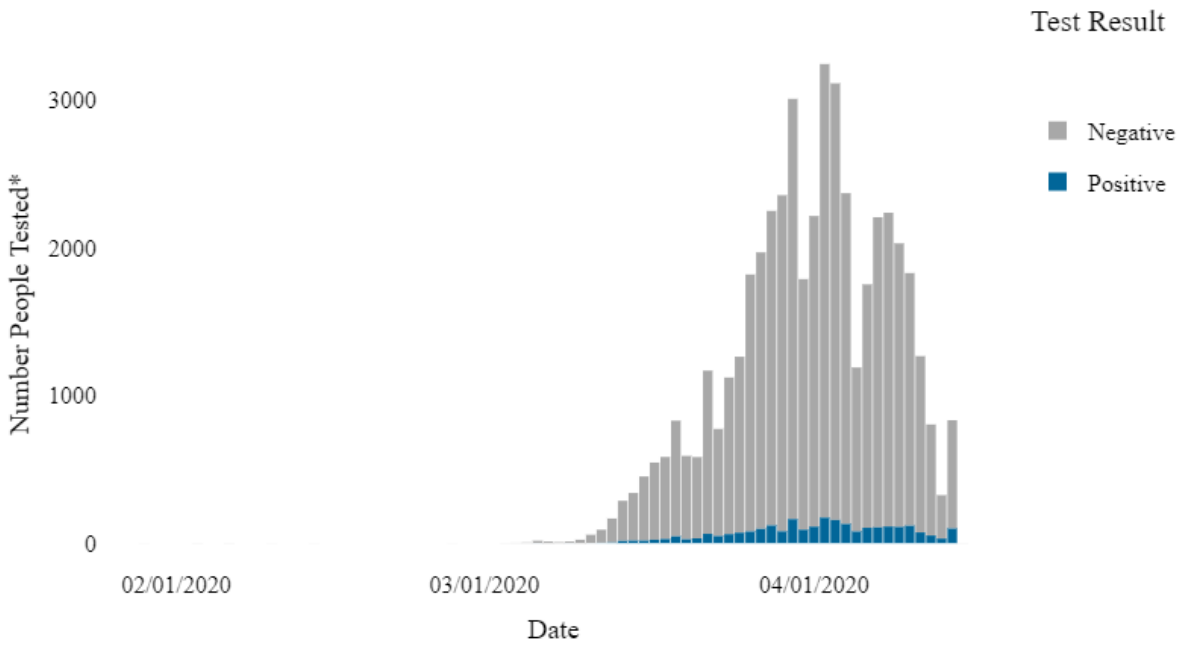


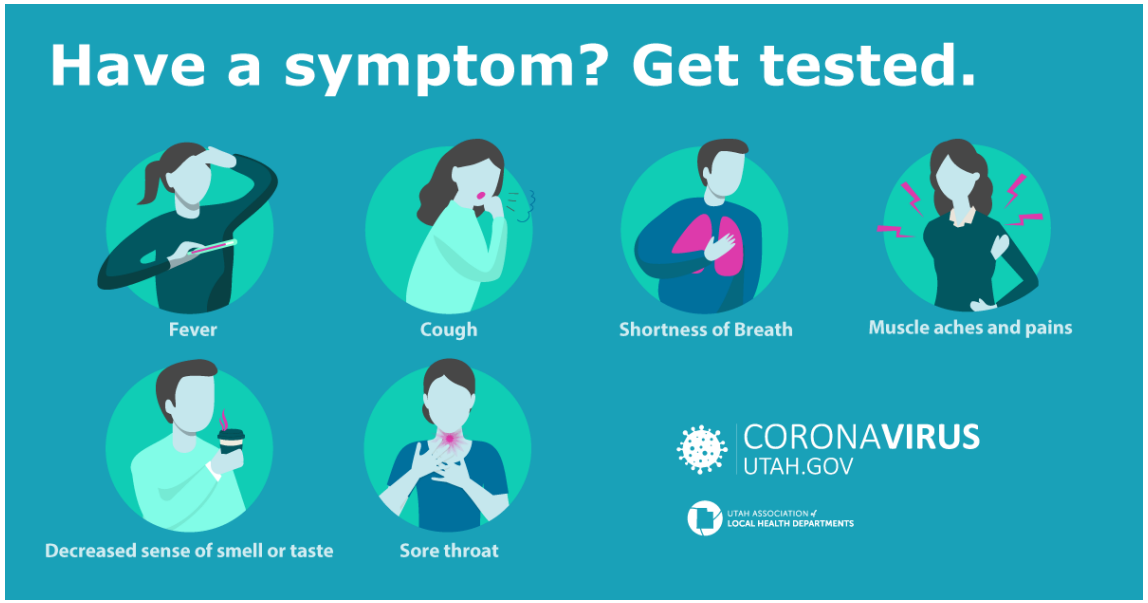
- **Goal**: To reach an R < 1 (**Suppression**)
- **Strategy**: Identify, mitigate, and reduce the virus' impact before Utah reaches a hospital-bed crisis
- Involves a coordinated public health response and large-scale testing
- Expected to last 8-12 weeks (starting March 16th)
  - Measures in place through **mid-May through early June**

Date when COVID-19 Cases Have First Been Reported to Public Health in Utah



Number of People Tested by Date

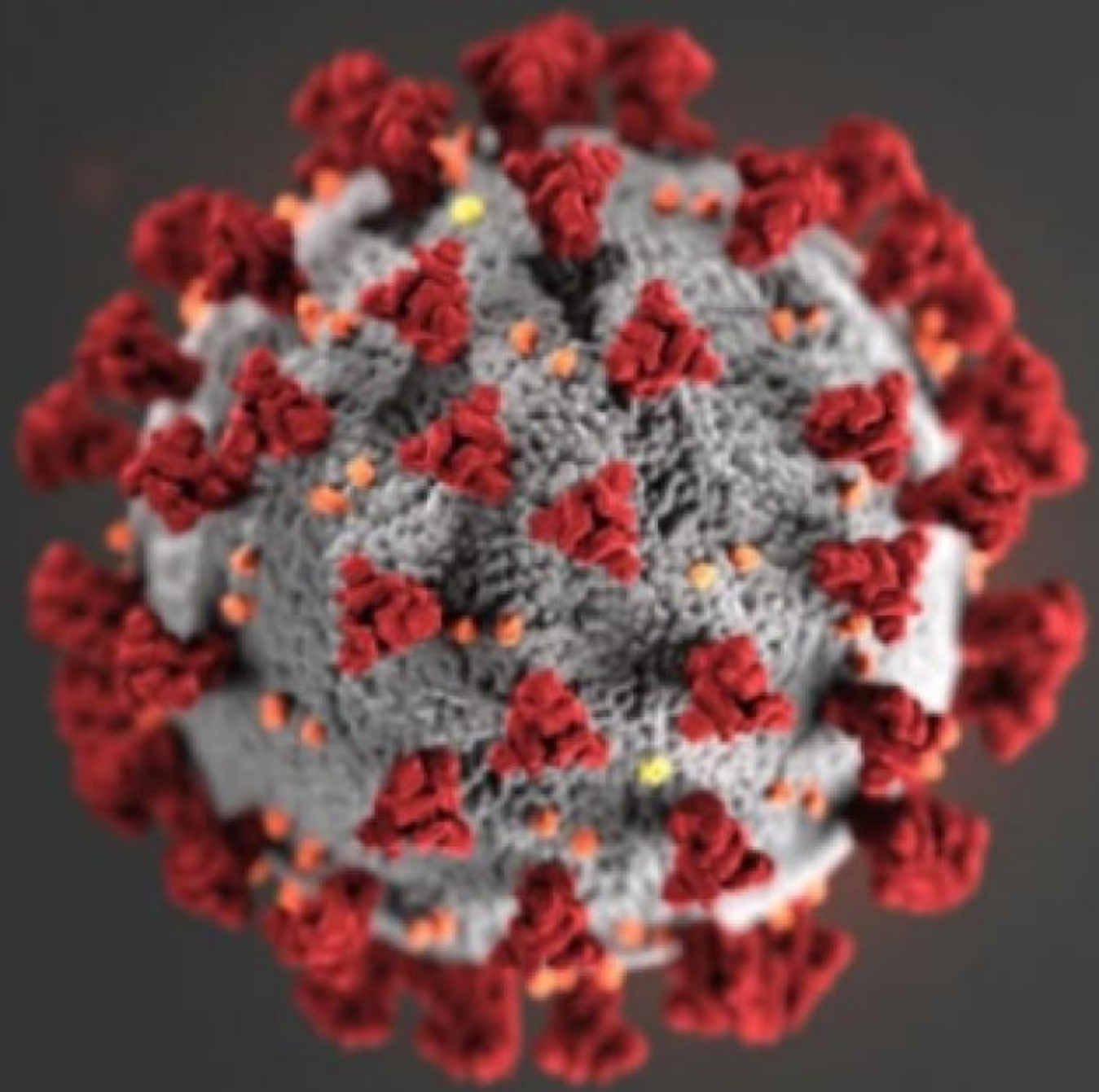




What questions are epidemiologists debating?

- Will this virus demonstrate seasonality – decreasing in the summer?
- What proportion of the population has already been infected?
- Will infection provide lasting immunity?
- When will a vaccine be available?
- Will there be a college football season?

Extra Slides



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CDC COVID-19 Response Team

TABLE. Signs and symptoms among 291 pediatric (age <18 years) and 10,944 adult (age 18–64 years) patients* with laboratory-confirmed COVID-19 — United States, February 12–April 2, 2020

	No. (%) with sign/symptom	
Sign/Symptom	**Pediatric**	**Adult**
Fever, cough, or shortness of breath†	213 (73)	10,167 (93)
Fever§	163 (56)	7,794 (71)
Cough	158 (54)	8,775 (80)
Shortness of breath	39 (13)	4,674 (43)
Myalgia	66 (23)	6,713 (61)
Runny nose¶	21 (7.2)	757 (6.9)
Sore throat	71 (24)	3,795 (35)
Headache	81 (28)	6,335 (58)
Nausea/Vomiting	31 (11)	1,746 (16)
Abdominal pain¶	17 (5.8)	1,329 (12)
Diarrhea	37 (13)	3,353 (31)

Total Utah Residents with COVID-19 Demographics Table

Age Group	Case Count	Percent of Cases	Rate / 100,000 Population
Less than 1 year	12	0%	23.9
1-14 years	60	2%	8.2
15-24 years	370	15%	72.6
25-44 years	1023	40%	113.7
45-64 years	805	32%	129.4
65-84 years	254	10%	81.2
85+ years	15	1%	39.7

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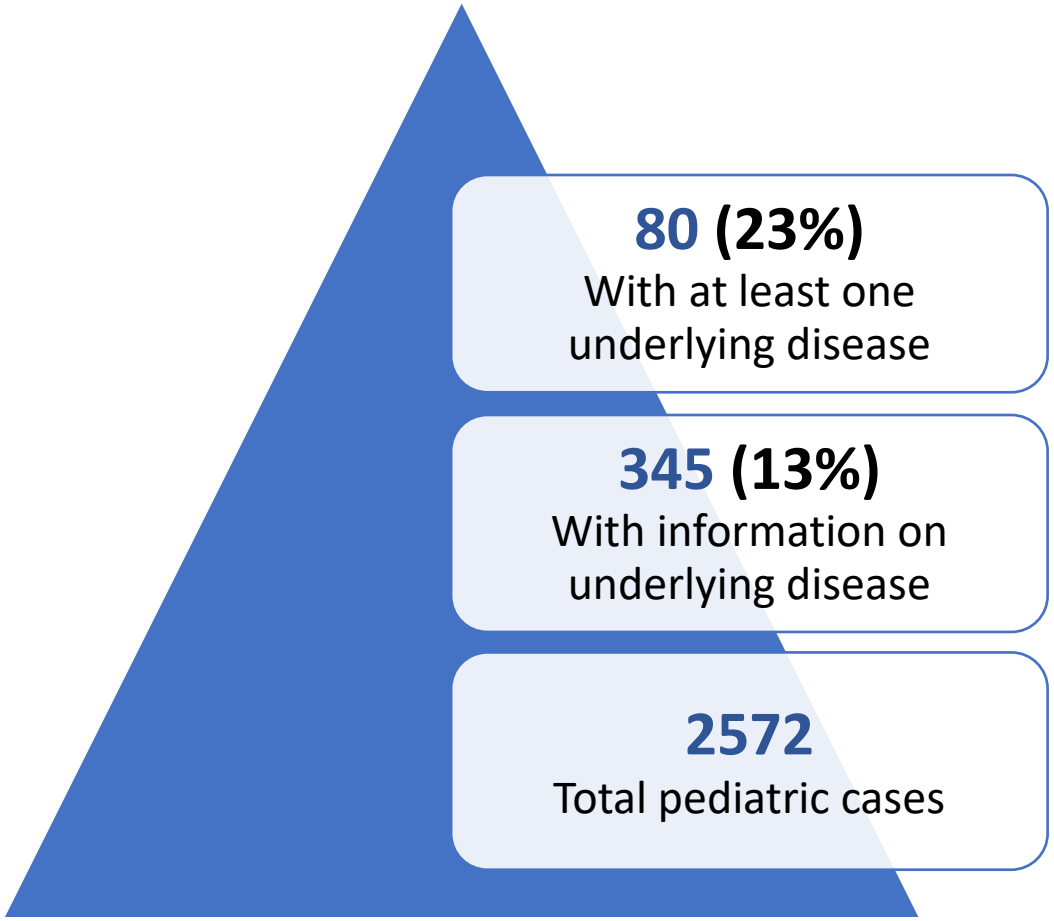

- Most common conditions
  - Chronic lung disease **(12%)**
  - Cardiovascular disease **(7%)**
  - Immunosuppresion **(3%)**