



# **COVID19 Pandemic & Pediatric Vaccine Improvement Health Information Technology Perspective Part 2**



Presented By

**CAPT (ret) Scott Hamstra, MD**

Pediatrics

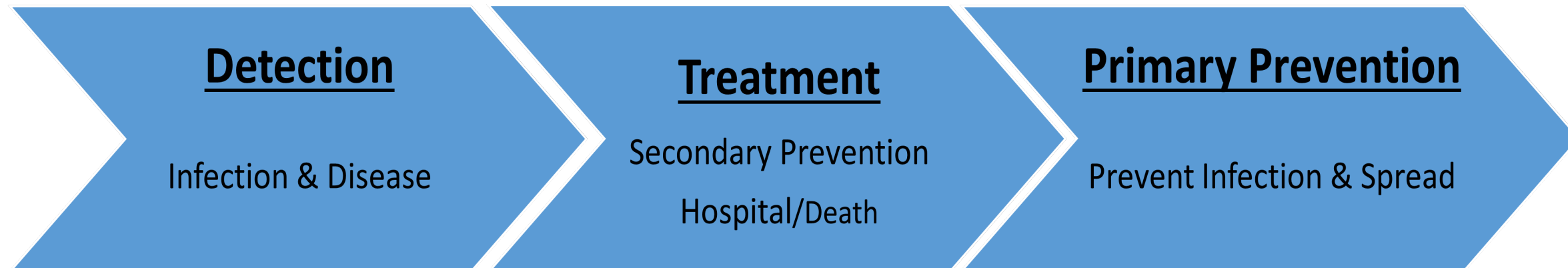
Pediatrics Infectious Disease

Medical Informatics



## Key Points and Objectives

- SARS-CoV2 & COVID-19 Clinical / Public Health Experience
  - Observations from the Past Year
  - Epidemic/Pandemic Disease
    - Progression
    - Treatments
  - Infection
    - Prevention





# Early Observations

## 2020 Calendar

January

Business as usual, breaking news

**January 9** WHO  
Mysterious Coronavirus-Related  
Pneumonia in Wuhan, China

**January 20** CDC  
SFO, LAX, JFK Airports Begin  
Screening

**January 21** CDC  
Confirms 1st US COVID Case  
In Wuhan < 200 sick, 4 dead

**January 23** Wuhan Quarantine  
300 more sick, 13 dead in 2 days

**January 31** WHO Issues Global  
Health Emergency  
> 9,800 sick, 200 dead

February

Business as usual, yet . . .

**February 2** US, NZ, Australia, Italy  
& Germany restrict Air Travel

**February 3** US Declares Public  
Health Emergency

**February 10** China  
COVID-19 deaths 908 exceed 774  
SARS (17 years ago)

**February 25** CDC  
COVID-19 moving toward  
Pandemic Status

March

Impacting USA Daily Lives

**March 11** WHO  
Declares COVID-19 a Pandemic

**March 13** Trump  
Declares National Emergency

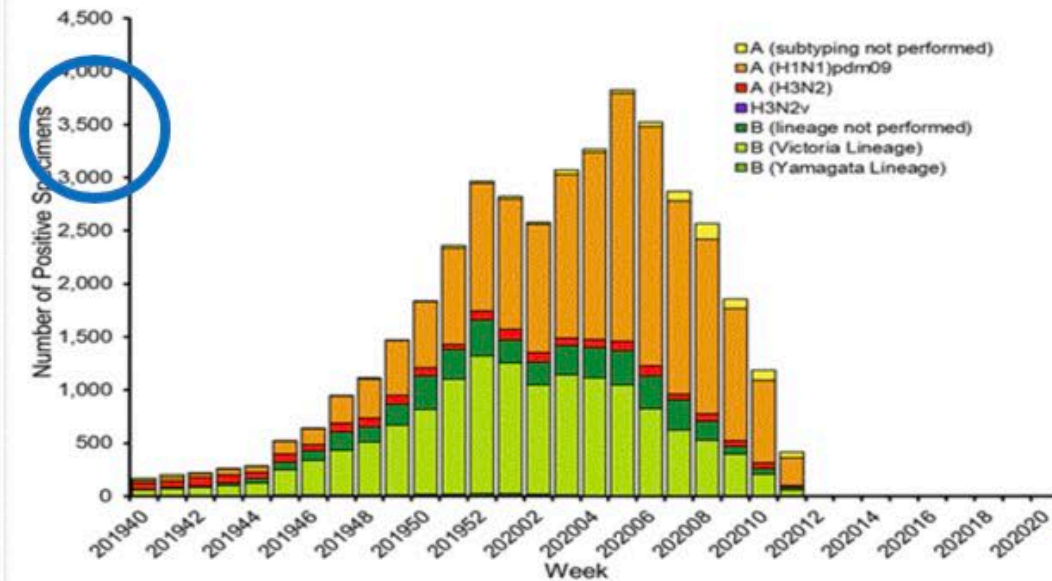
**March 17** West Virginia  
=> ALL 50 US states

**March 19** California  
Issues Stay-at-Home Order

**March 26** Senate  
Passes CARES Act \$2 Trillion

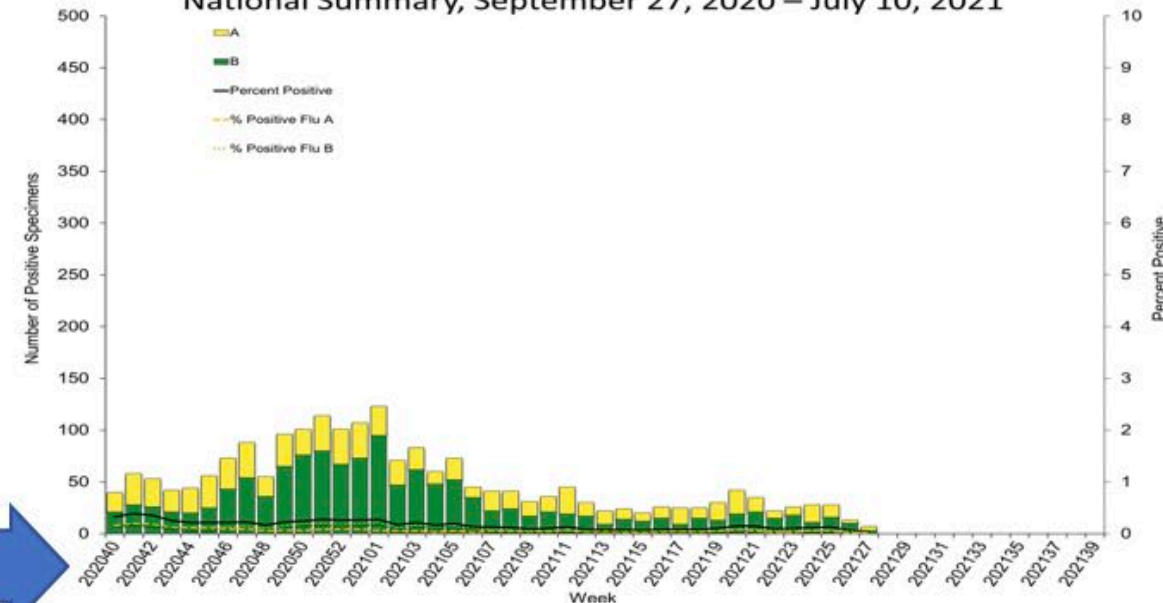
# Early Observations—National Summary

Influenza Positive Tests Reported to CDC by U.S. Public Health Laboratories, National Summary, 2019-2020 Season



20 Weeks

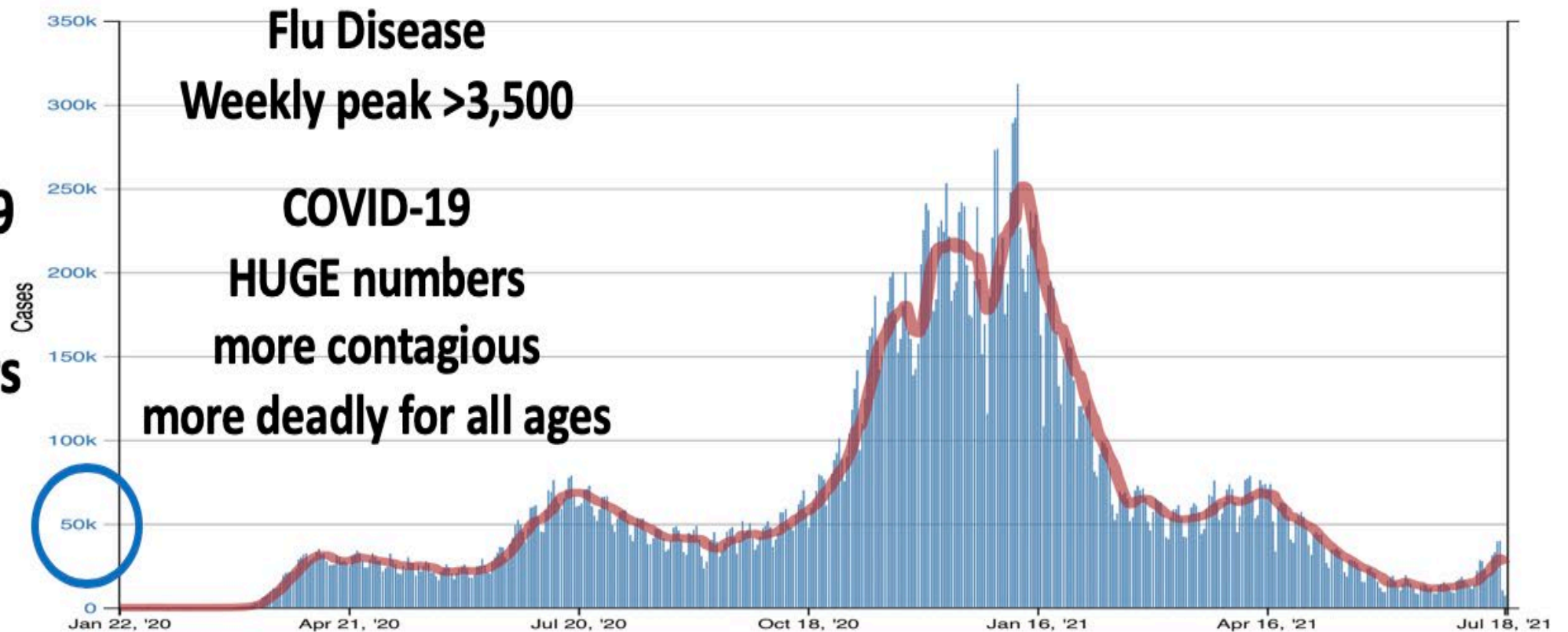
Influenza Positive Tests Reported to CDC by U.S. Clinical Laboratories, National Summary, September 27, 2020 – July 10, 2021



# Early Observations—Daily Report Trends

- Flu & COVID-19**
- Timing
  - Numbers
  - Deaths

Daily Trends in Number of COVID-19 Cases in the United States Reported to CDC







# Early Observations—Positive Cases

2020 Calendar



IHS Area	Tested	Positive	% Positive	Negative	Pending
Alaska	1,767	12	1.0%	1,146	609
<b>Albuquerque</b>	<b>1,996</b>	<b>215</b>	<b>18.9%</b>	<b>924</b>	<b>857</b>
<b>Bemidji</b>	<b>150</b>	<b>17</b>	<b>12.4%</b>	<b>120</b>	<b>13</b>
Billings	1,902	21	1.2%	1,748	133
California	779	45	7.1%	587	147
Great Plains	353	24	7.4%	300	29
Nashville	1,214	60	6.0%	947	207
<b>Navajo</b>	<b>5,225</b>	<b>1,045</b>	<b>22.8%</b>	<b>3,547</b>	<b>633</b>
Oklahoma City	2,758	101	4.4%	2,203	454
<b>Phoenix</b>	<b>909</b>	<b>153</b>	<b>19.8%</b>	<b>620</b>	<b>136</b>
<b>Portland</b>	<b>786</b>	<b>77</b>	<b>10.3%</b>	<b>674</b>	<b>35</b>
Tucson	552	11	2.4%	449	92
<b>TOTAL</b>	<b>18,391</b>	<b>1,781</b>	<b>11.8%</b>	<b>13,265</b>	<b>3,345</b>



Positive

13,165

8.3%



## Early on COVID-19 Pandemic—Few Sick Kids Idea “Spared Children” “Children are Safe”

- Wuhan: Initially no children, suggested no disease
- By March 90,870 confirmed cases
- 3112 deaths > 900 confirmed pediatric cases
  - 0 deaths in children < 10 years of age
  - 1 teen death 10–19 years of age
  - 1 infant severe disease
  - Most children infected from a household adult





## Early Data—Few Sick Kids

• China	1%	< 10 yo.
• Korea	6.3%	< 19 yo.
• Italy	1.2%	
• Spain	0.8%	< 18 yo.
• USA	1.7%	



Children ==> Not Infected? Not Sick?  
Rationale includes . . .

**1. ACE2 receptors**

immature and fewer

**2. Innate immune response (Key Factor)**

more robust in children

**3. Comorbidity**

fewer with underlying or chronic conditions

# SARS-CoV-2: Angiotensin-converting Enzyme 2

## **ACE2 is present everywhere:**

attached to the cell membrane of  
mainly

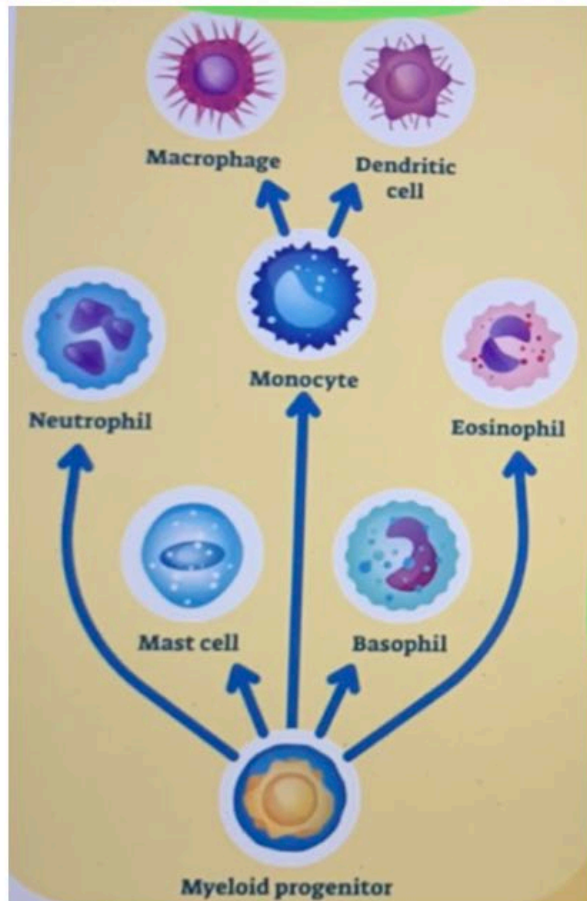
- enterocytes of the small intestine
- **arterial and venous endothelial cells**
- **arterial smooth muscle cells**
- **lung type II alveolar cells**
- cortical neurons and glia

**As a transmembrane protein  
ACE2 serves as the main  
entry point into cells**

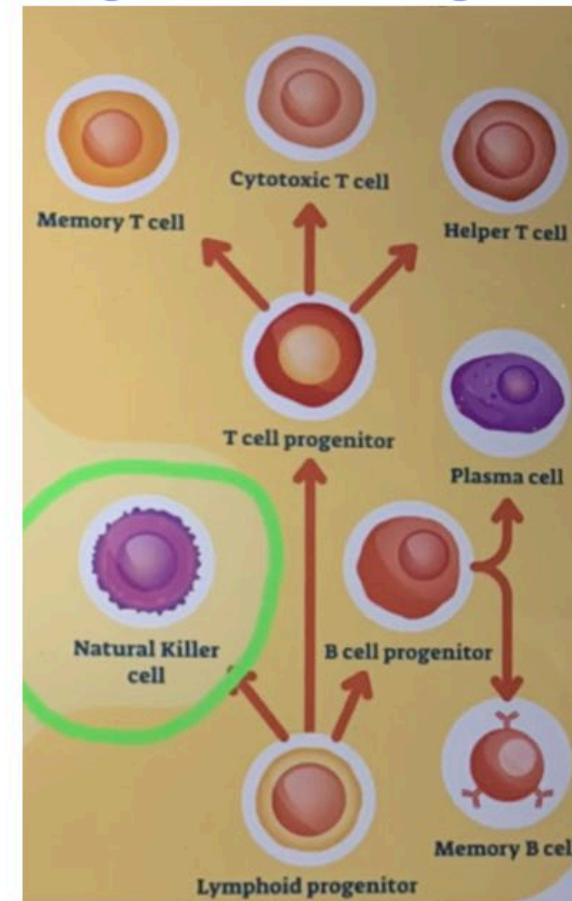


# Human Immune System—2 Parts

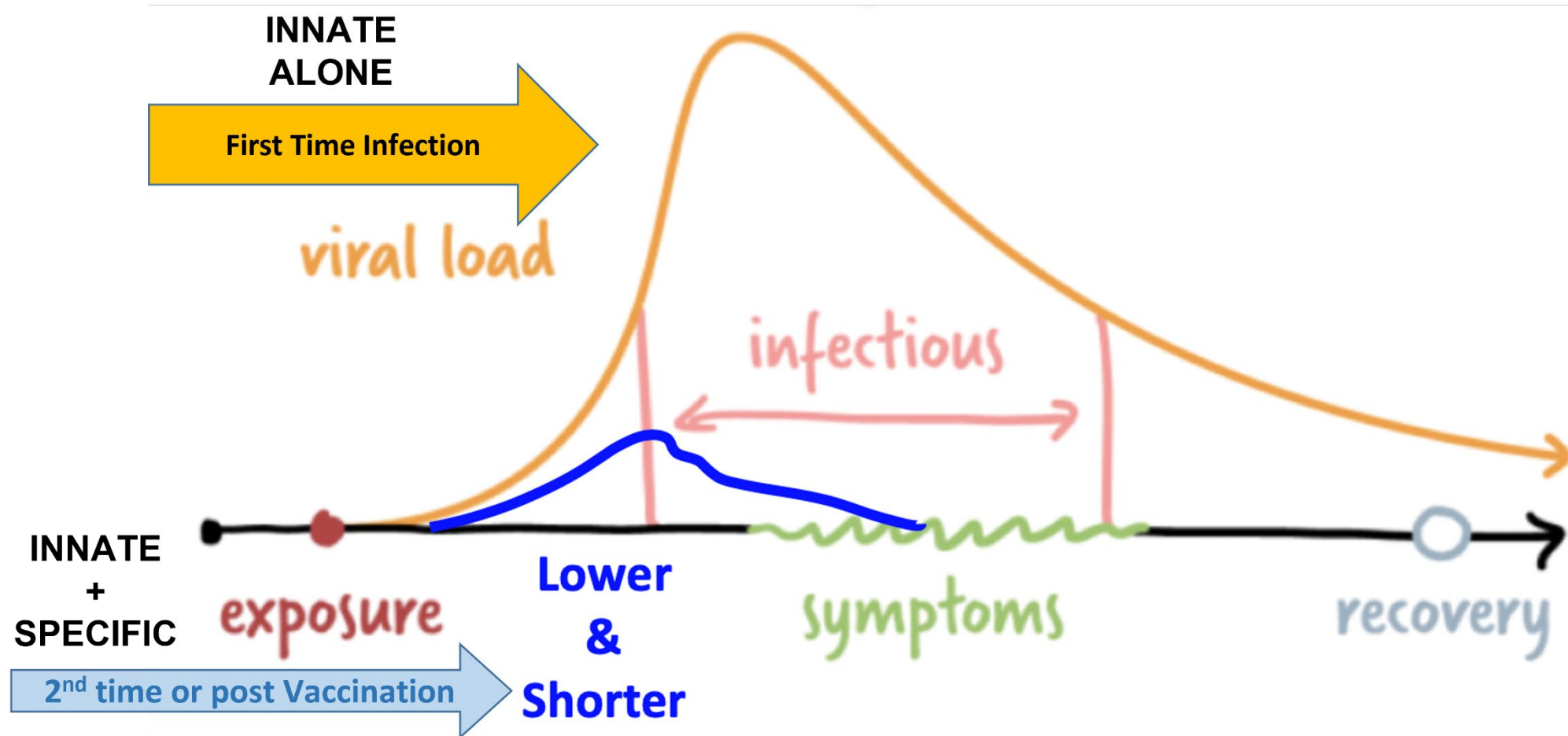
## Innate - General



## Adaptive - Specific



## Timeline: After Infection . . . or Vaccination







# Immune System—Innate

## **WEAKER with**

1. Age
2. Overweight/Obese
3. Chronic Conditions
4. Stress
5. Poor Sleep
6. Poor Nutrition
  - a) Vitamin D deficient
  - b) High Fructose Corn Syrup

## **STRONGER with**

1. Sleep 7-9 hours
2. Fitness
3. Good Nutrition  
(30/day & color)
  - a) Vitamin D
  - b) Zinc
  - c) Quercetin
  - d) N-Acetyl-Cysteine
  - e) Vitamin C

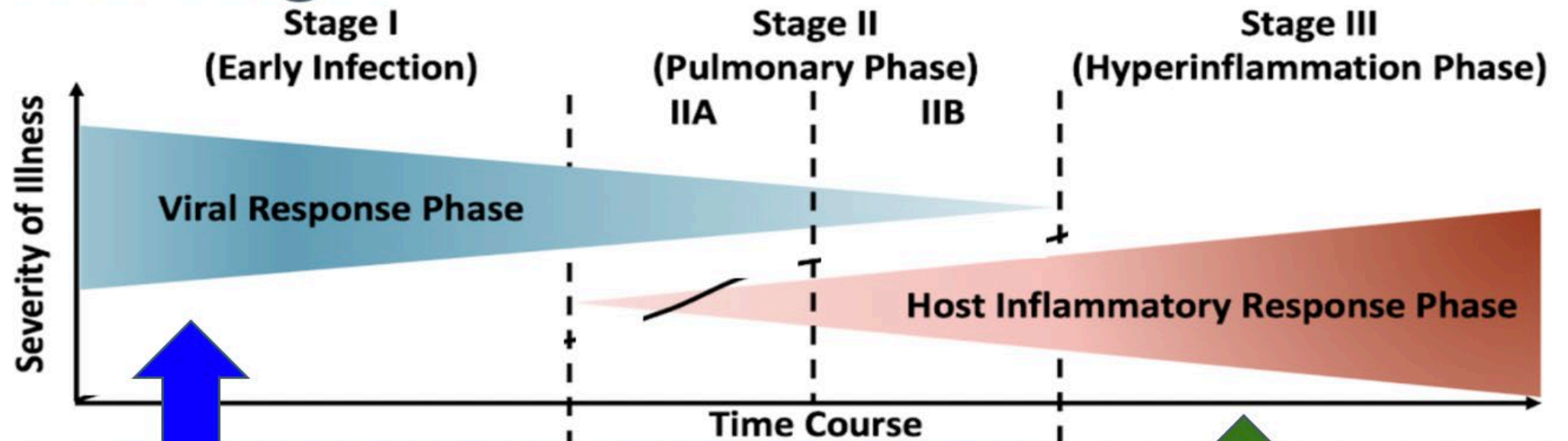


# Pediatric COVID-19 Disease

1. Asymptomatic Infection
  - Contagious ==> Transmit to adults / elders
2. Classic COVID-19 – fever, cough, URI, pneumonia
3. Multisystem Inflammatory Syndrome (MIS-C)
  - ACE2 Receptors present everywhere blood goes

# COVID-19 Treatments

## Different Stages





# Young & Poor Avoid Care for COVID-19 Symptoms

- Pandemic focus ==> “deferred care” in health care circles  
= FACT: Many avoid a doctor/hospital for anything that could wait  
\*Important\* Preventive Care – Vaccines & Screenings
- Gallup poll ==> darker side for the classic symptoms of COVID-19  
1 in 7 Americans report would not seek care for a fever or dry cough
- Most likely
  - younger than age 30
  - income less than \$40,000 a year



## Pandemic Delays—IMM Reports

- 3-6 mo. delay – Adults (50–65 yr.) & Teens (11–16 yr.) – easy catch up
- 19-35 mo. – Two-Year-Old Report
  - July 2020 (24–35 mo. All Past Due), in July 2021 (aged out of Report)
  - July 2020 (19–23 mo. also Past Due = > July 2021 31–35 mo. \*\*in Report/catch up
  - The largest “Impact” / Decrease will be seen in Sept and Dec NIRS Reports
- 3-18 mo. (youngest part of 3–27 mo.)
  - July 2021 = > 15-30 mo.
  - MOST CHALLENGING Group in 2020
  - More vaccines Due --- More vaccines missed
  - Higher number Past Due

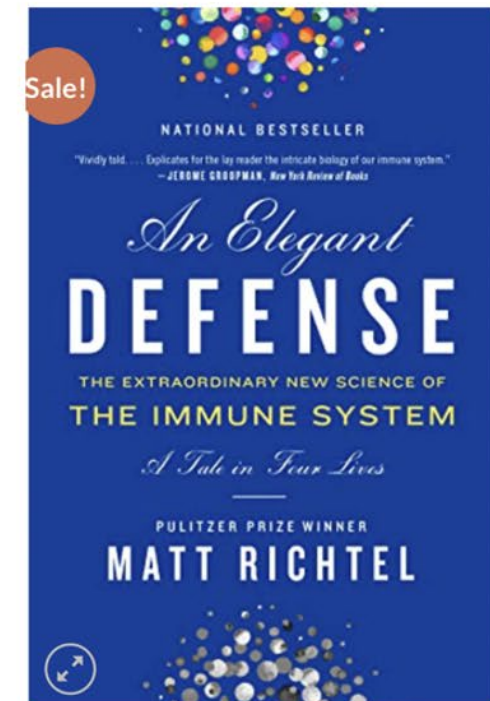
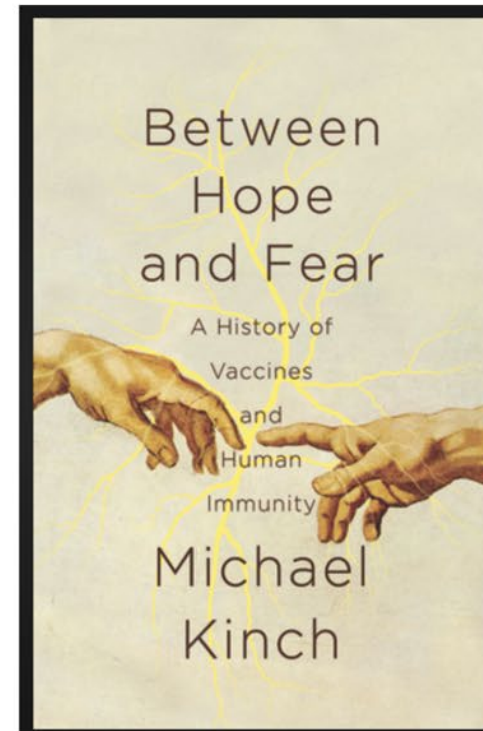
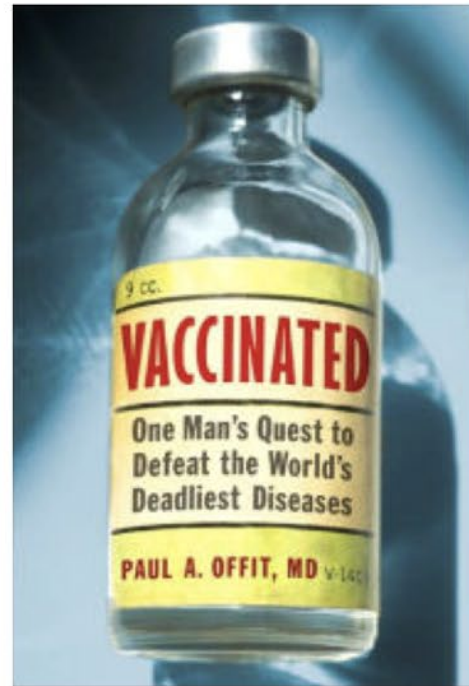
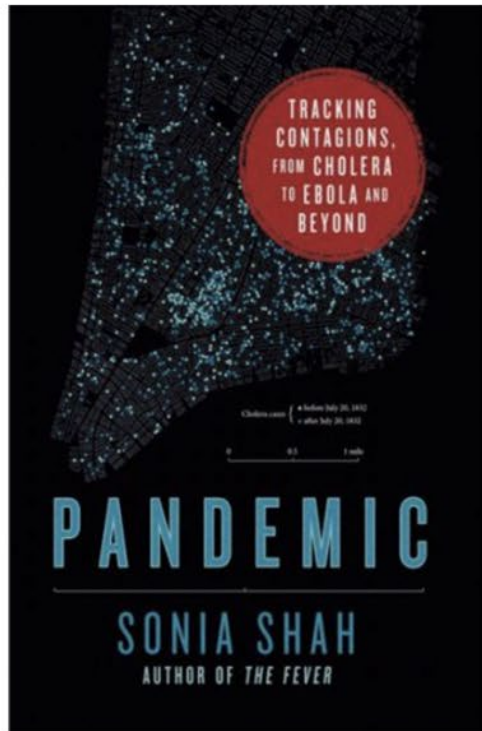
### WEEKLY

**#1 3–27 mo. Not Current**

**#2 LLS - PAST DUE**



## Recommended Books





# Questions & Discussion