



COVID-19  
Past  
Present  
Future



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Professor of Infectious Diseases, U. of A.  
Vice President and Medical Director, AHS  
April 27, 2021

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# Objectives



- The Past – history of Pandemics
- The Present – vaccines/variants
- The Future – have we learned?

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# The Past

## A Bit of History

Should we be surprised?

3

THE NEW YORKER

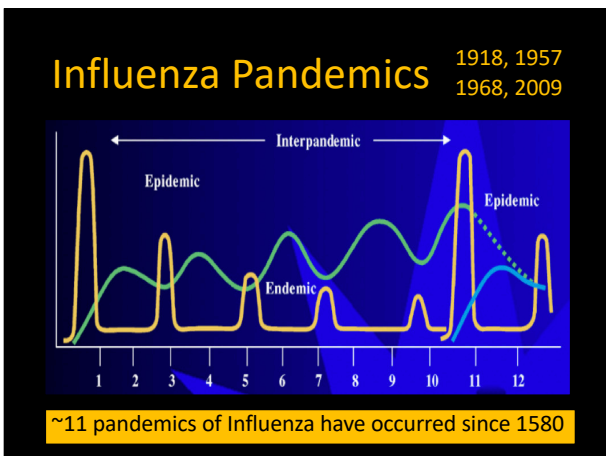


*“There’s never been anything like this in history. Nobody knew there would be a pandemic or epidemic of this proportion.”*

President Donald Trump  
Press Conference, March 19, 2020


<https://www.newyorker.com/magazine/2020/04/20/how-anthony-fauci-became-americas-doctor>

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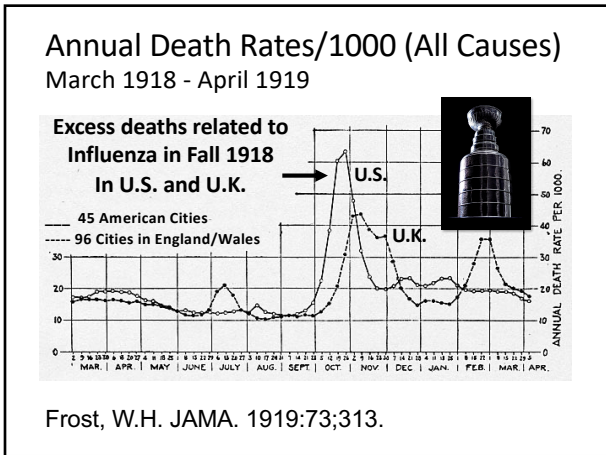
## “Spanish Flu” (H1N1) 1918 -19



20 - 40  
(100?)  
million  
deaths

©2001 Trish Perl, JHH Healthcare Epidemiology and Infection Control.

6



7

### “Asian Flu” (H2N2) 1957 - 58

**More than 2 million people died worldwide**

©2001 Trish Perl, JHH Healthcare Epidemiology and Infection Control.

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### Hospital Staff Hit By Flu

OCT 30 1957

Edmonton Journal October 30, 1957

About one quarter of the approximately 200 nurses at the Royal Alexandra Hospital have been absent from work during the influenza outbreak, the hospital board was told Tuesday night. Each nurse averaged less than four days' absence.

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### “Hong Kong Flu” (H3N2) 1968 -69

**More than 1 million people died worldwide**

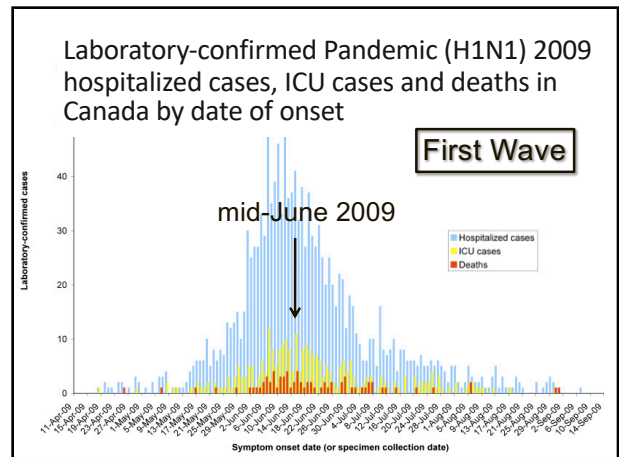
©2001 Trish Perl, JHH Healthcare Epidemiology and Infection Control.

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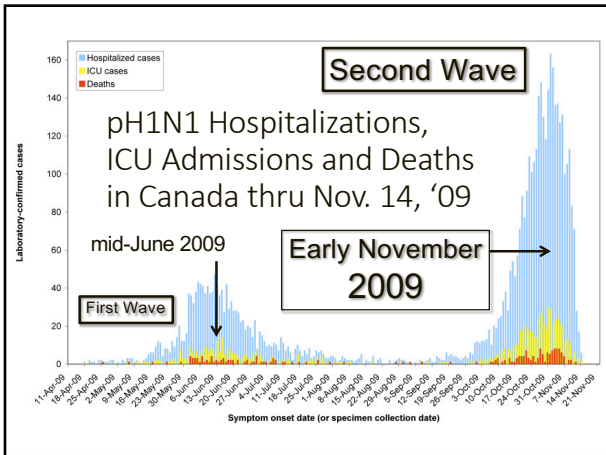
### “Hong Kong Flu” 1968 -69

**Wearing of Masks at Work**

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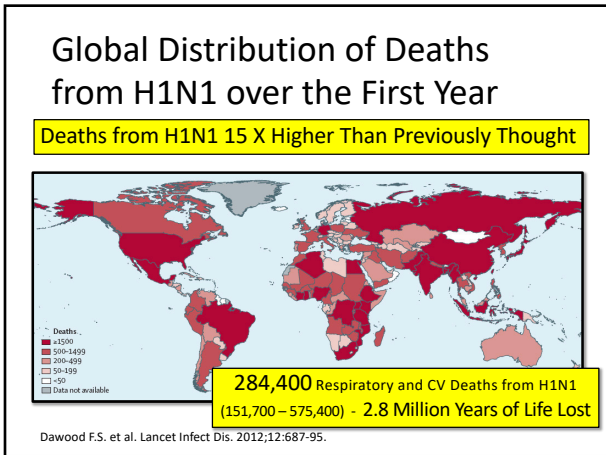


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## Influenza H1N1 2009 Paradox

Mild in Most  
Severe in Some

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The only thing certain about influenza viruses is that nothing is certain.

World Health Organization

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# SARS

Severe Acute Respiratory Syndrome

SARS Coronavirus

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24 yr. Old Nursing Aide with 1 week of fever, dry cough and muscle pain

Day 1                      Day 5                      Day 7

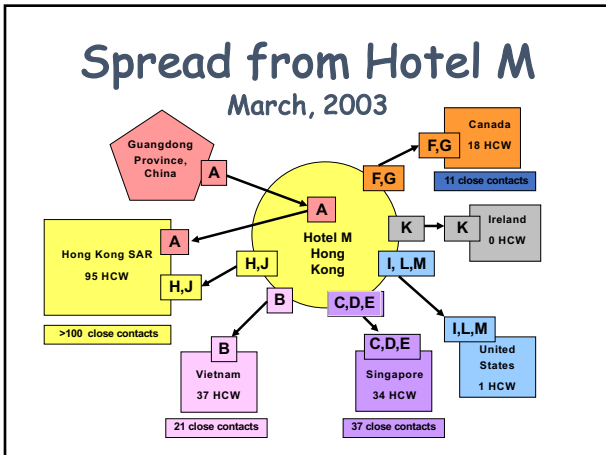
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### The Culprit.... ...A New Coronavirus

❖ Coronaviruses ...  
1/3 of all Colds

❖ Large virus with characteristic crown-like appearance

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# Outbreak

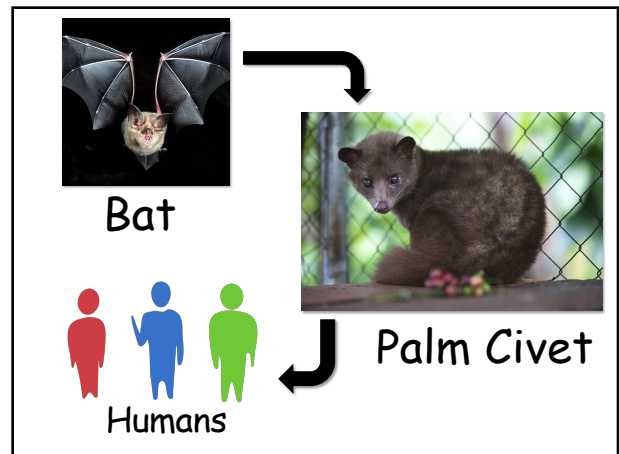
## Worldwide Spread of SARS

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### WHO SARS Case Count 26/9/03

| Country       | Cases       | Deaths     | Case Fatality (%) |
|---------------|-------------|------------|-------------------|
| China         | 5327        | 349        | 7                 |
| Hong Kong     | 1755        | 299        | 17                |
| Taiwan        | 346         | 37         | 11                |
| <b>Canada</b> | <b>251</b>  | <b>43</b>  | <b>17</b>         |
| Singapore     | 238         | 33         | 14                |
| Vietnam       | 63          | 5          | 8                 |
| U.S.          | 29          | 0          | 0                 |
| <b>TOTAL</b>  | <b>8437</b> | <b>813</b> | <b>9.6 %</b>      |

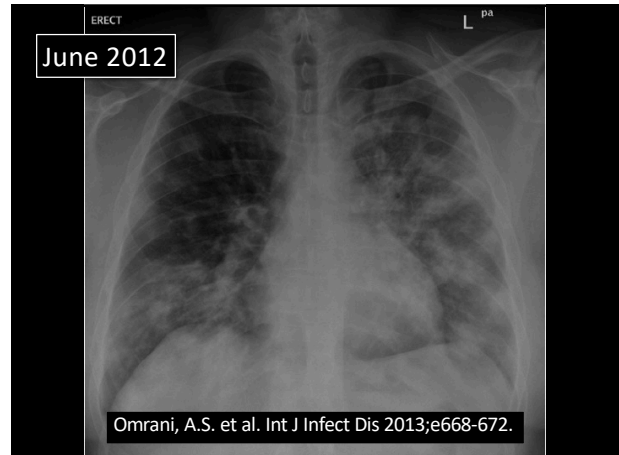
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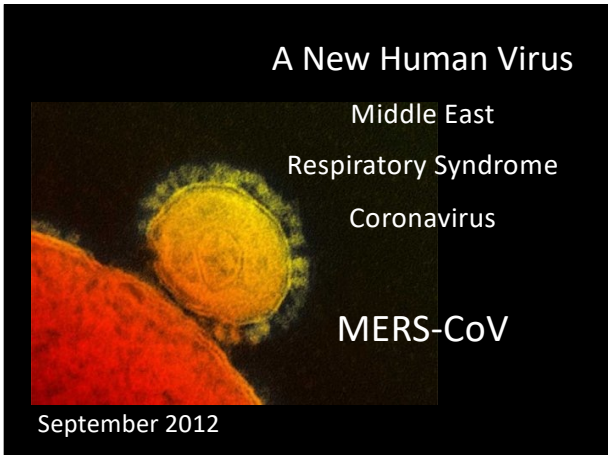
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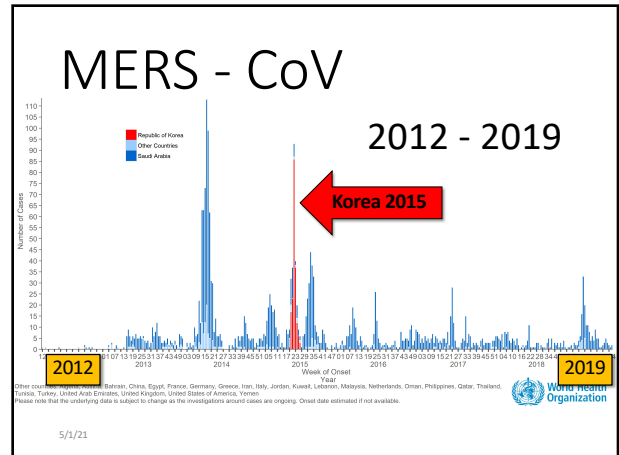
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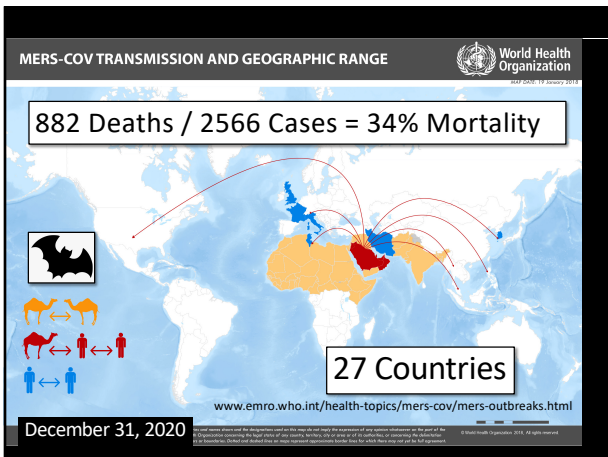
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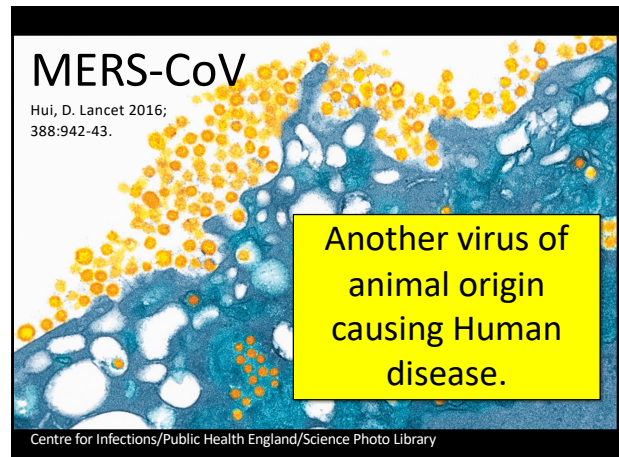
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On December 31, 2019, the World Health Organization was informed of an outbreak of **“pneumonia of unknown cause”** detected in **Wuhan City**, Hubei Province, China – the seventh-largest city in China with 11 million residents.

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**The New York Times** Jan. 6, 2020  
**China Grapples With Mystery Pneumonia-Like Illness**  
 Beijing is racing to identify a new illness that has sickened **59** people as it tries to calm a nervous public.  
 By S-L Wee and V. Wang

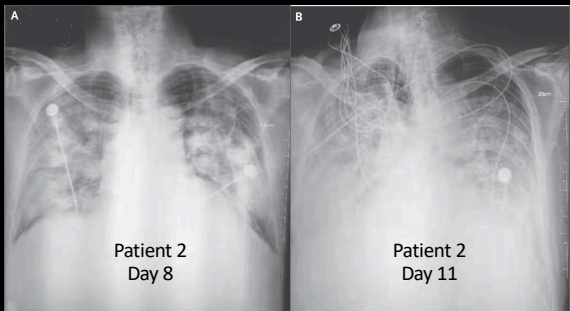


BEIJING — For days, Li Bin had what felt like a cold, with a high fever of between 102 and 105, and he could not understand why he wasn't getting better.

<https://www.nytimes.com/2020/01/06/world/asia/china-SARS-pneumonia-like.html>

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Pneumonia linked to the Seafood Market in Wuhan – Dec 2019

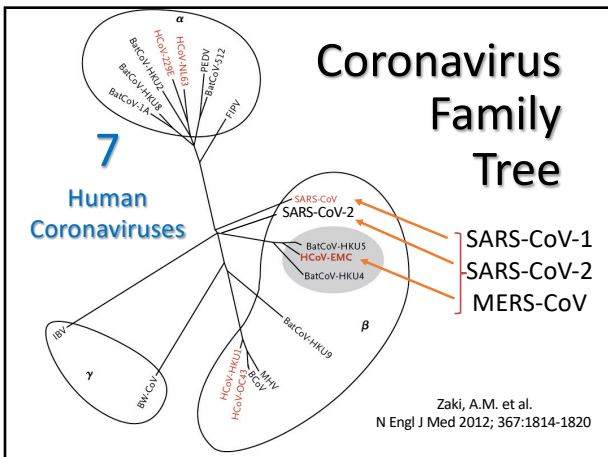


5/1/21 Zhu, N. et al. N Engl J Med 2020;382:727-33

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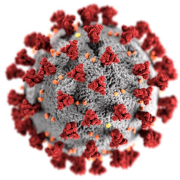


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**WHO**  
 World Health Organization

The disease caused by Novel Coronavirus, SARS-CoV-2

Virus



is now officially called

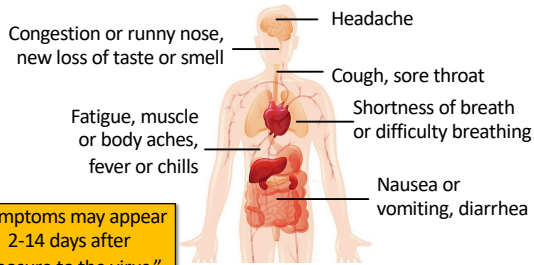
**COVID-19**

**CO – Corona**  
**VI – Virus**  
**D – Disease**

SARS-CoV-2

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### Primary Symptoms of COVID-19



"Symptoms may appear 2-14 days after exposure to the virus."

Li J Med Virol. 2020;92:577  
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC7109109/>  
 Slide credit: [clinicaltrials.com](https://www.clinicaltrials.com)

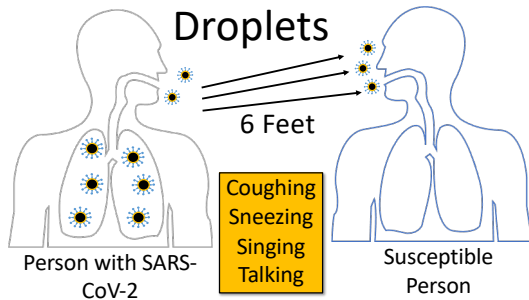
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### Early Experience in China

- 80% mild
- 15% more severe (possible hospitalization)
- 5% ICU/Death

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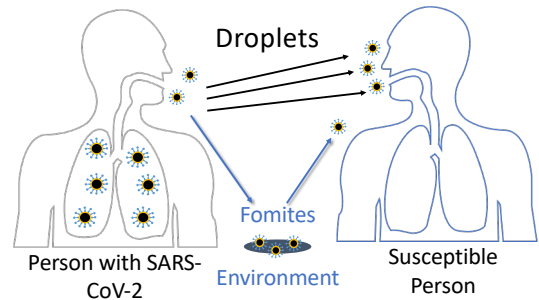
### Spread of SARS-CoV-2



Galbadage. Front Public Health. 2020;8:163  
 Slide credit: [clinicaltrials.com](https://www.clinicaltrials.com)

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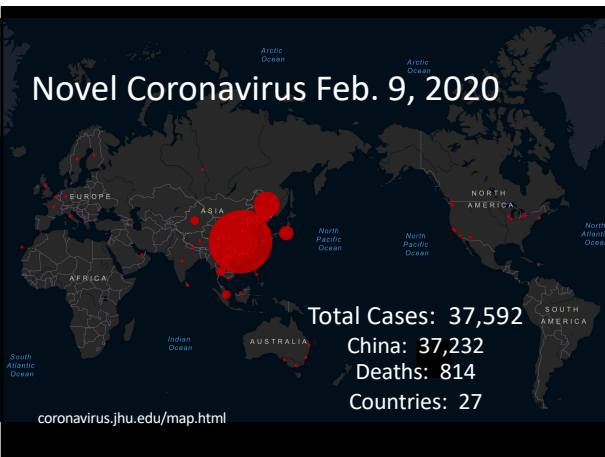
### Spread of SARS-CoV-2



Galbadage. Front Public Health. 2020;8:163  
 Slide credit: [clinicaltrials.com](https://www.clinicaltrials.com)

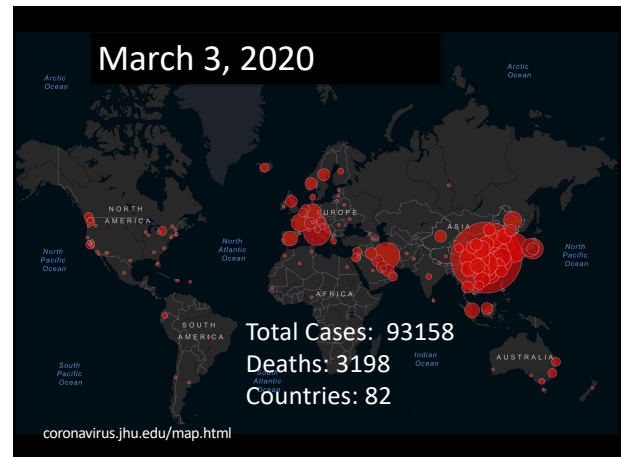
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### Novel Coronavirus Feb. 9, 2020

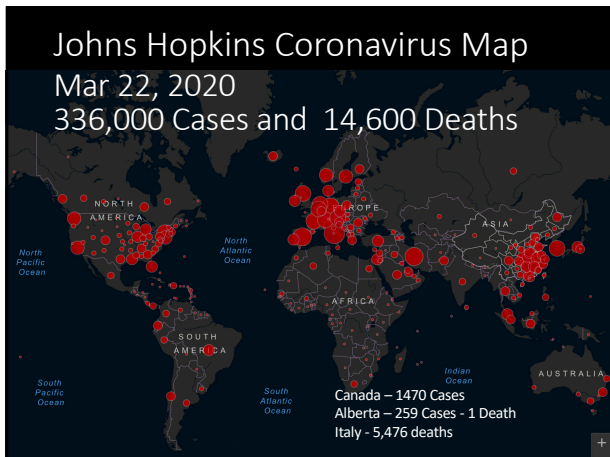


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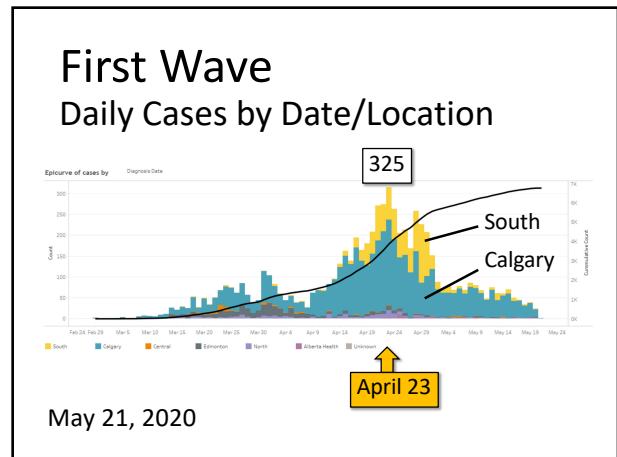
### March 3, 2020



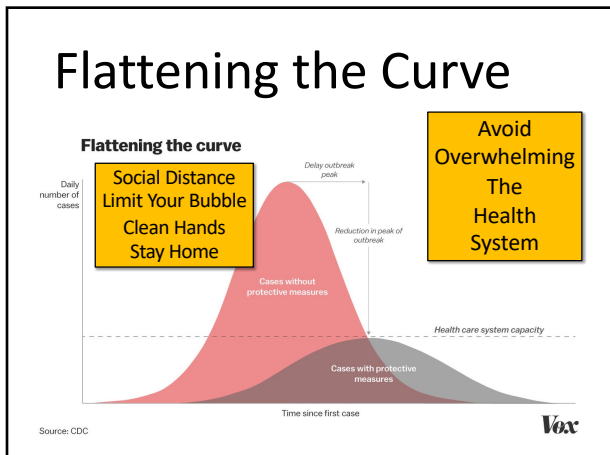
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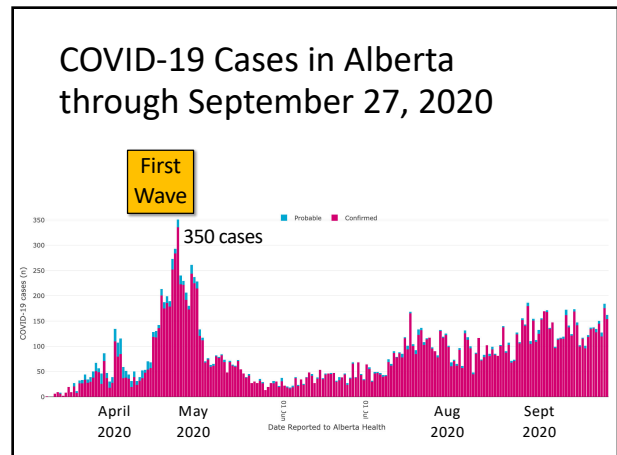
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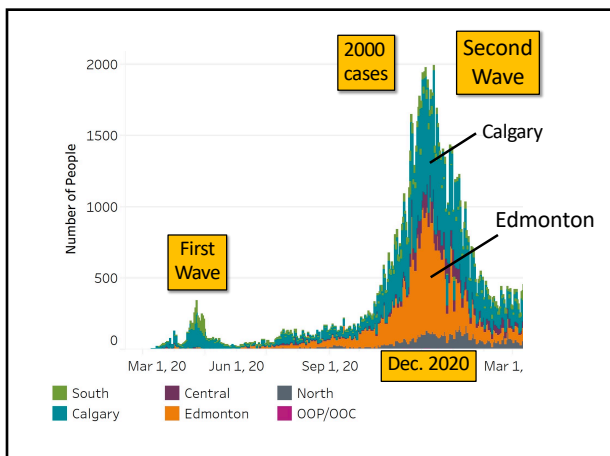
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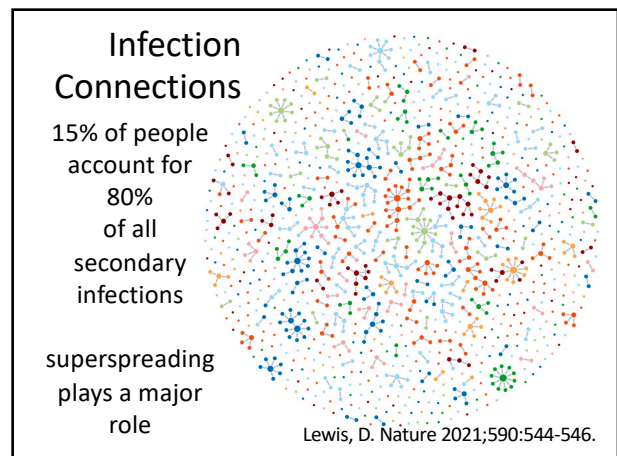
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Where did COVID-19  
come from?

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World Health Organization

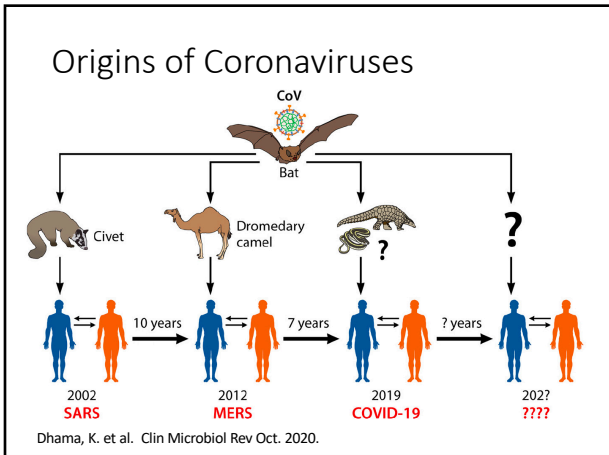
WHO Review of  
Source of  
SARS-Cov-2

**WHO**  
**BATS STILL LIKELY SOURCE OF VIRUS, EXPERTS SAY**

**WUHAN** The World Health Organization-led team probing the origins of COVID-19 said bats remain a likely source and that transmission via frozen food is a possibility, but it ruled out a lab leak.

Edmonton Journal February 10, 2021

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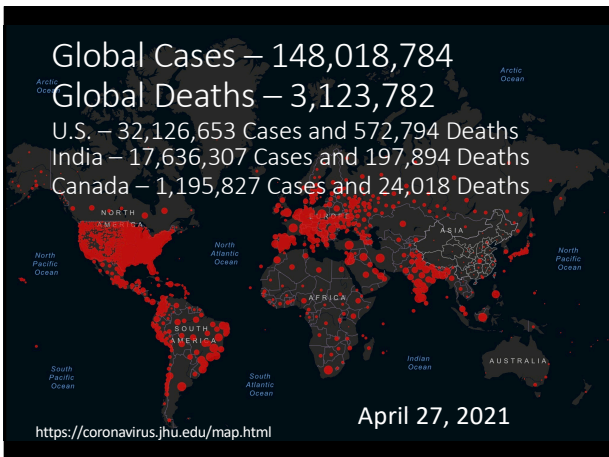


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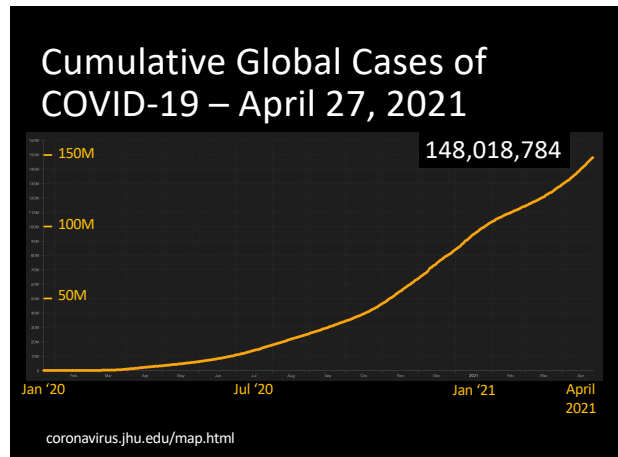
The Present

Virus  
Variants  
Vaccine

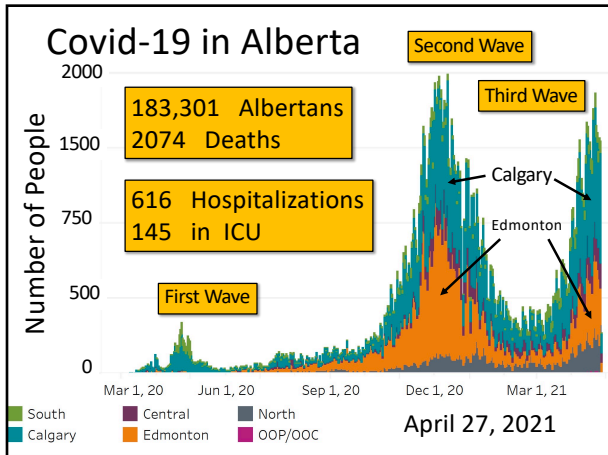
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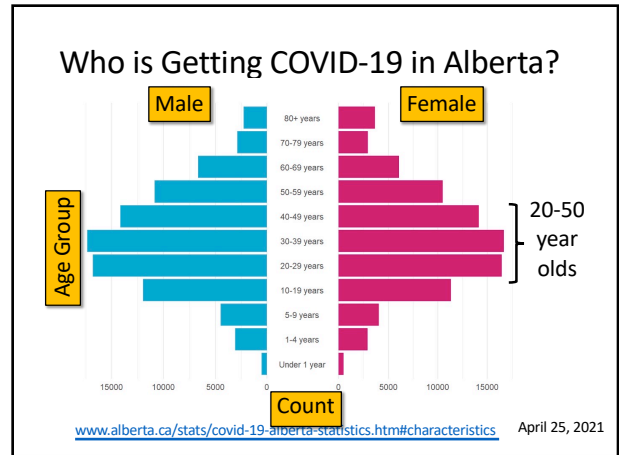
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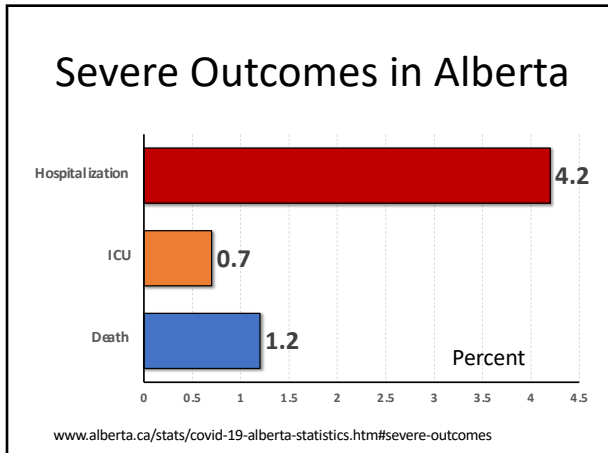
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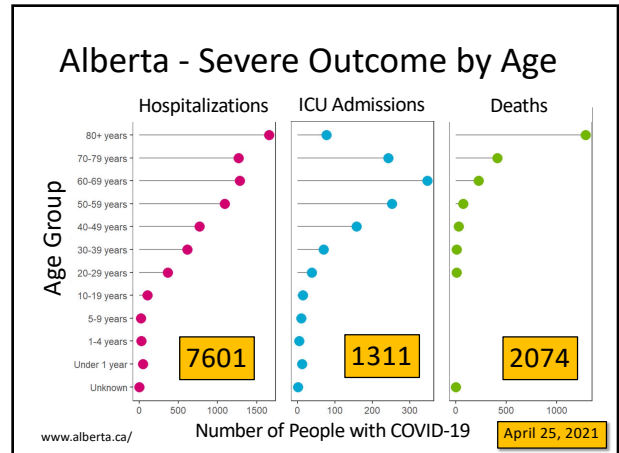
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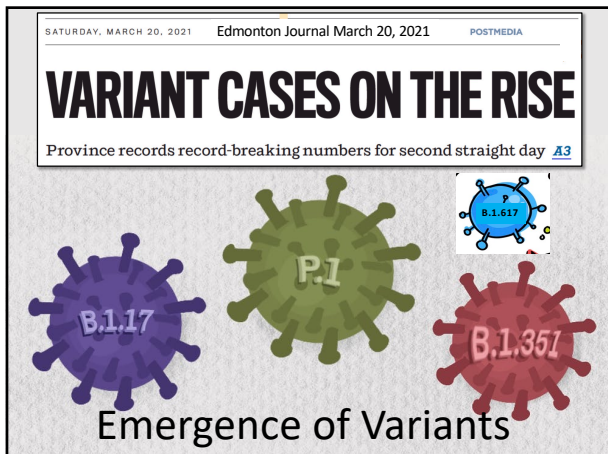
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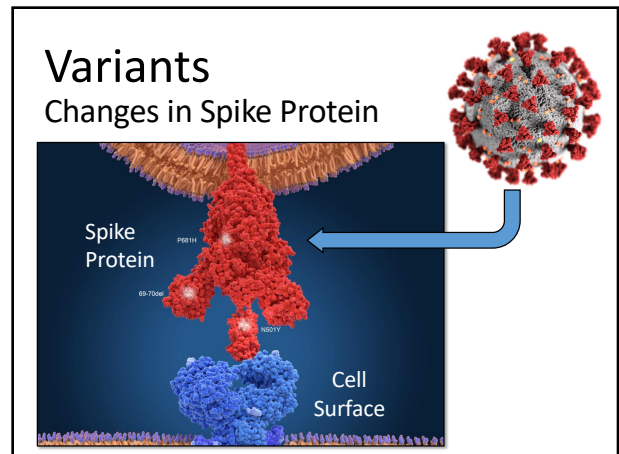
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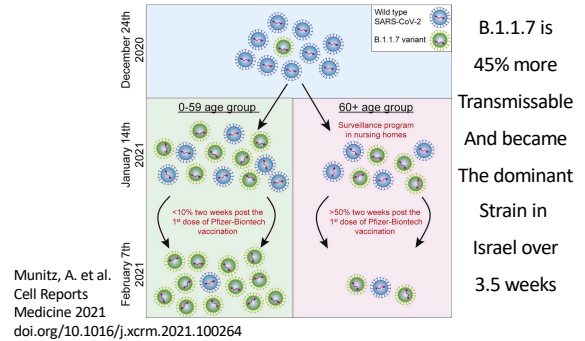
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## Variants – Why Do We Care?

1. More infectious??
2. More serious??
3. Evade our immune systems or vaccines??
4. (Evade our tests??)

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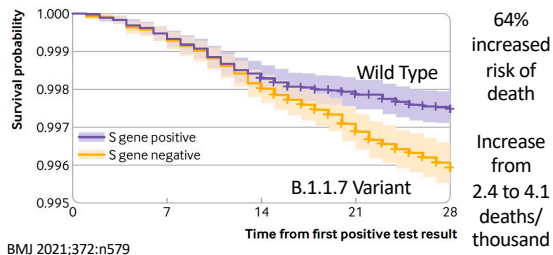
## Emergence of B.1.1.7 and Prevention by Vaccination in Israel



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## Risk of mortality in patients infected with SARS-CoV-2 variant of concern 202012/1: matched cohort study

Robert Challen,<sup>1,2,3</sup> Ellen Brooks-Pollock,<sup>3,4,5</sup> Jonathan M Read,<sup>3,6</sup> Louise Dyson,<sup>3,7</sup> Krasimira Tsaneva-Atanasova,<sup>1,8</sup> Leon Danon<sup>3,5,8,9</sup>



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The Absolutely True, Incredibly Amazing Story of the Covid-19 Vaccine

Tara Haele

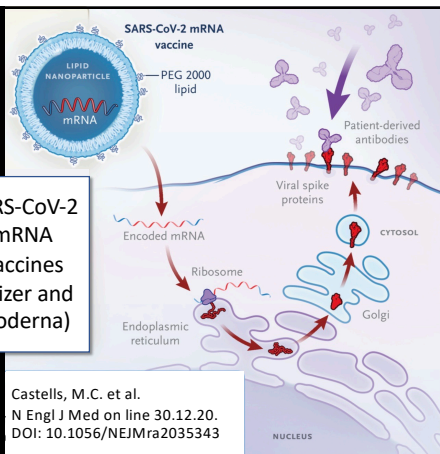


<https://elemental.medium.com/the-absolutely-true-incredibly-amazing-story-of-the-covid-19-vaccine-264c65891632>

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## SARS-CoV-2 mRNA Vaccines (Pfizer and Moderna)

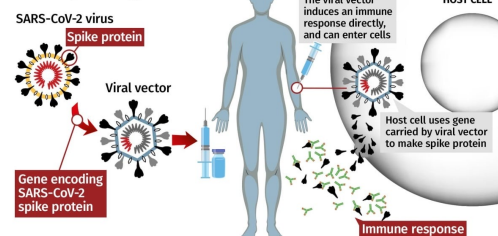
Castells, M.C. et al. N Engl J Med on line 30.12.20. DOI: 10.1056/NEJMra2035343



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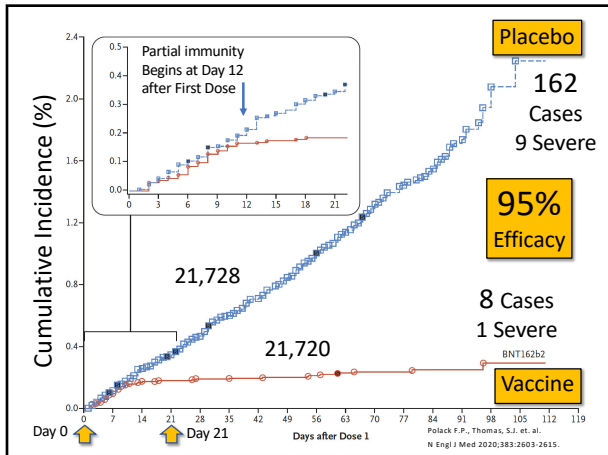
## Johnson and Johnson; Oxford-Astra-Zeneca/Covishield

### Non-replicating viral vector

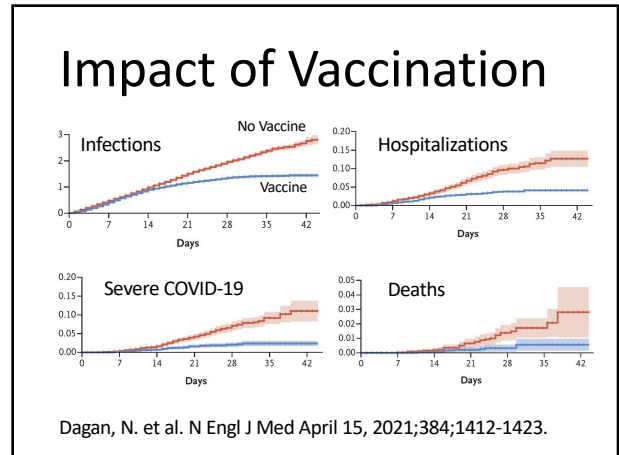


<https://www.cbc.ca/news/health/covid-vaccines-canada-profiles-1.5708240>

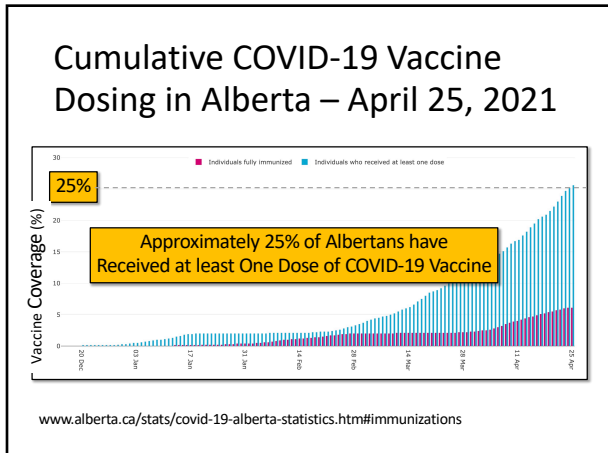
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**Rapid,  
But Not Rushed**

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**theguardian**

**Ten reasons we got Covid-19 vaccines so quickly without 'cutting corners'**

Adam Finn.  
December 26, 2020

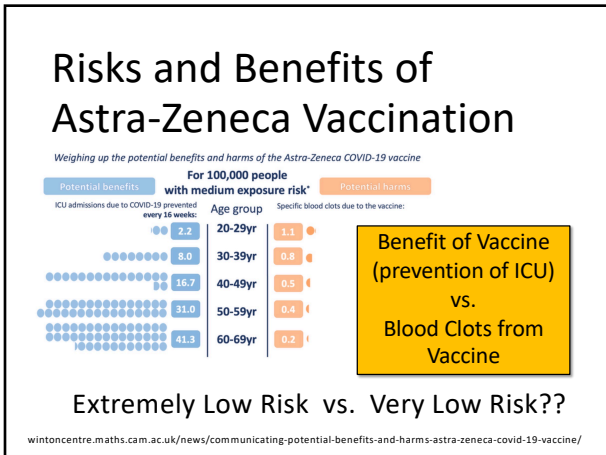
**Rapid But Not Rushed**

www.theguardian.com/commentisfree/2020/dec/26/ten-reasons-we-got-covid-19-vaccines-so-quickly-without-cutting-corners?CMP=share\_btn\_link

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- Ten reasons we got Covid-19 vaccines so quickly without 'cutting corners'**
1. Pandemic plans were already in place
  2. China identified a novel coronavirus early
  3. Substantial funding was granted immediately
  4. The clinical trials process was speeded up
  5. Vaccine trials started straightaway
  6. Research data was collected electronically
  7. Studies attracted a huge number of volunteers
  8. Trials have yielded rapid results
  9. Early vaccines worked well
  10. Regulation took place while the studies were continuing
- Adam Finn. The Guardian Dec. 26, 2020  
www.theguardian.com/commentisfree/2020/dec/26/ten-reasons-we-got-covid-19-vaccines-so-quickly-without-cutting-corners?CMP=share\_btn\_link

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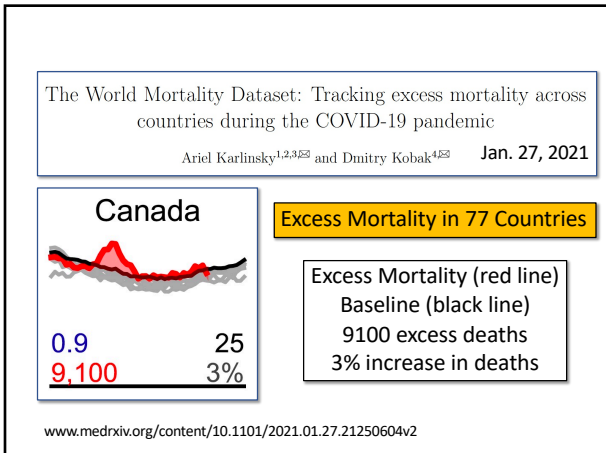
### VANCOUVER SUN

## COVID-19: Majority of Canadians plan to get vaccine, but hesitancy and misinformation common, says poll

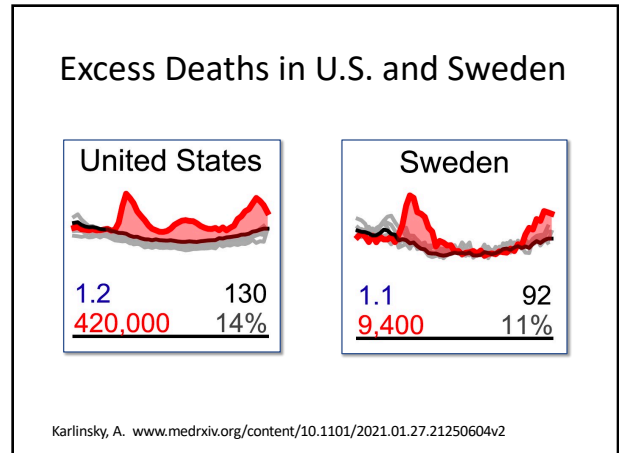
Cheryl Chan. April 19, 2021

*Nearly one in four Canadians expressed some degree of vaccine hesitancy, the nationwide Insights West poll finds, with concerns ranging from side effects of the vaccines to a belief they're not effective and that COVID-19 isn't a serious disease*

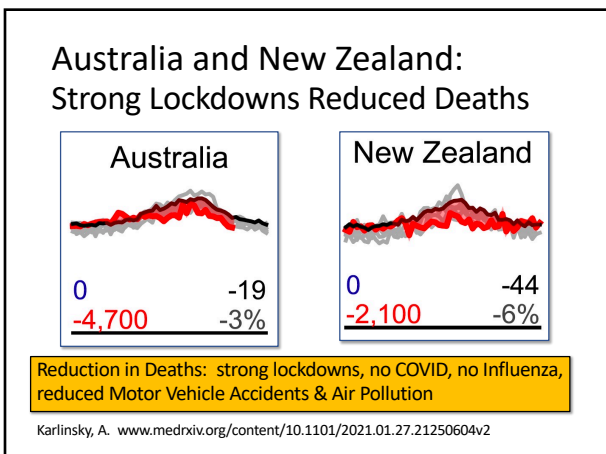
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# The Future

## LIFE'S 'NEW NORMAL' AFTER COVID-19

Edmonton Journal February 17, 2021

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## Four Predictable Waves of COVID

Dr. Sohail Gandhi April 15, 2020

**1<sup>st</sup> Wave**  
Immediate mortality and morbidity of COVID-19

**2<sup>nd</sup> Wave**  
Impact of resource restriction on urgent non-COVID conditions

**3<sup>rd</sup> Wave**  
Post-ICU recovery Readmissions

**4<sup>th</sup> Wave**  
Impact of interrupted care on chronic conditions

Immediate Impact

Delayed Urgent Conditions

Ignored Chronic Disease

Mental Health

? Long COVID

Illustrated by Viktor Stemp MD

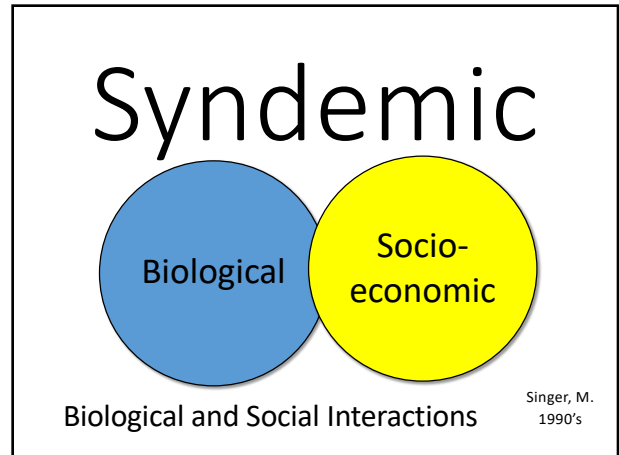
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# What will we learn from this that will make us better?

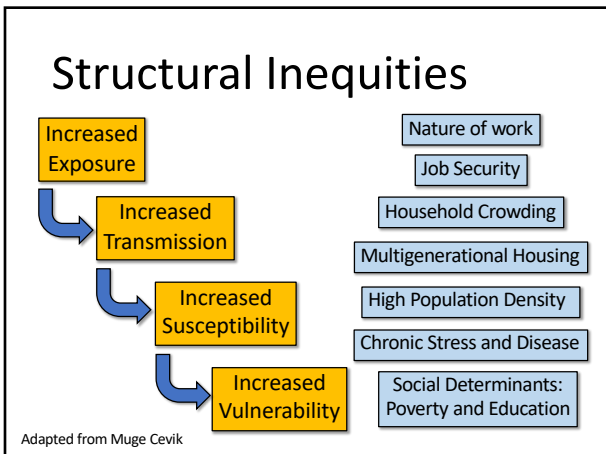
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- ## What will things be like?
- What is the future of Continuing Care?
  - What is the future of Public Health Restrictions vs. Individual Rights and Freedoms (we need a Supreme Court Case to address this)
  - What is the future of Downtown? Office Towers? Retail and Shopping Centres?
  - What is the future of the Handshake? Will it be replaced by the Fist Bump, Elbow Bump, etc?
  - Will we need Vaccine Passports to travel or attend concerts and sporting events?

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# Infodemic

**COVID Has Created a Perfect Storm for Fringe Science**

It's always been with us, but in a time of pandemic, its practitioners have an amplified capacity to unleash serious harm.

Richard Grimes, Scientific American April 26, 2021

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