

COVID-19 by the Numbers – The Long and Short of It

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Caveats and Introduction

- The views expressed in this presentation are mine They may or may not reflect those of my employer or the SEAC.
- While the focus of the presentation is on mortality, much will also be relevant to those more interested in morbidity
- While this presentation may cover some topics of personal interest and use, it will also provide you with information you can use on the job
- One of my observations on COVID-19 is that we do not ask enough questions So please ask questions, whether of me or others



Question 1

What does the 19 in COVID-19 represent?



Question 2

When did U.S. COVID-19 cases reach 1 million?



Agenda



1. The Data

Quality of the data COVID-19 Cases and Deaths US Deaths vs. Life Insurance Claims Excess deaths and the drivers Wastewater surveillance



All of the data is wrong – State variations in definitions

COVID-19 Cases and Deaths

Cases are too high False positive tests

"Probable cases" (i.e., someone has the symptoms, but no testing was done or test was negative) are sometimes included



So why should we use it?

It is the best data we have

Deaths are too high

If positive test, counted as COVID death, even if really died from something else

Financial benefit for hospitals to call it a COVID death

Cases are too low False negative tests

Not everyone is tested, e.g., early on if a family member was positive, others may not be tested

Mild cases may be missed

At home tests are often not reported

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Deaths are too low If not tested, not counted as a COVID death

Initially, only hospital deaths counted and nursing home deaths were not counted

U.S. COVID-19 Daily Cases

January 22, 2020 – June 5, 2022 (Total Cases 6/5/22 = 84,762,022)



U.S. COVID-19 Daily Deaths

January 22, 2020 – June 5, 2022 (Total Deaths 6/5/22 = 1,008,585)



COVID-19 Daily Deaths, 1/22/2020 to 6/5/2022 Source: Johns Hopkins global daily COVID-19 deaths

COVID-19 U.S. Deaths vs. Industry Claims

Sources: US Deaths (John's Hopkins), Industry Claims (Milliman COVID-19 Claims Survey)



Percentage of COVID-19 Claims by Age

Source: Milliman COVID-19 Claims Survey

Percentage of Total Claims by Age



Excess COVID-19 Deaths

Sources: Deaths (Human Mortality Database), COVID-19 Deaths (Johns Hopkins)

YEAR	DEATHS	COVID DEATHS	YEARS	EXCESS DEATHS	EXCESS DEATHS EXCL. COVID
2017	2,759,665	-	2018 / 2017	101%	-
2018	2,787,265	-	2019 / 2018	100%	-
2019	2,799,673	-	2020 / 2019	121%	108%
2020	3,382,319	349,938	2021 / 2019	121%	104%
2021	3,397,528	824,309	2021 / 2020	100%	85%

Excess COVID-19 Deaths vs. Claims and Deaths by Age

Sources: Deaths (Human Mortality Database), COVID-19 deaths (Johns Hopkins, Claims data (Milliman COVID-19 Excess Claims Analysis)

YEAR	EXCESS DEATHS	EXCESS DEATHS EXCL. COVID	AGES	EXCESS DEATHS 2020 / 2019	EXCESS DEATHS 2021 / 2019
2020 / 2019	121%	108%	0 - 14	97%	98%
2021 / 2019	121%	104%	15 - 64	122%	133%
YEAR	EXCESS CLAIMS	EXCESS CLAIMS EXCL. COVID	65 - 74	124%	130%
2020 / 2019	117%	106%	75 - 84	122%	121%
2021 / 2019	122%	107%	85+	118%	108%

Drivers of Excess COVID-19 Deaths by Age (Ages 1-44)

Source: Centers for Disease Control (CDC), Rapid Release Data as of 3rd Quarter 2021

AGES	2020 EXCESS DEATHS	2020 EXCESS DEATHS EXCL. COVID	DRIVERS OF 2020 EXCESS DEATHS OVER 2019 (INCREASE OF AT LEAST 10%)
1 - 4	97%	97%	Cancer, Firearm, Homicide, Drug OD
5 - 14	102%	101%	Firearm, Homicide, Drug OD
15 - 24	121%	119%	Lower Resp., Diabetes, Accident, Firearm, Homicide, Drug OD
25 - 34	124%	120%	Heart, Lower Resp., Diabetes, Pneumonia/Flu, Liver, Accident, Firearm, Homicide, Drug OD, Other
35 - 44	128%	121%	Heart, Lower Resp., Diabetes, Pneumonia/Flu, Kidney, Septicemia, Liver, Hypertension, Accident, Firearm, Homicide, Drug OD, Other

Drivers of Excess COVID-19 Deaths by Age (Ages 45+)

Source: Centers for Disease Control (CDC), Rapid Release Data as of 3rd Quarter 2021

AGES	2020 EXCESS DEATHS	2020 EXCESS DEATHS EXCL. COVID	DRIVERS OF 2020 EXCESS DEATHS OVER 2019 (INCREASE OF AT LEAST 10%)
45 - 54	121%	110%	Heart, Stroke, Diabetes, Septicemia, Liver, Hypertension, Accident, Homicide, Drug OD, Other
55 - 64	118%	106%	Heart, Stroke, Diabetes, Septicemia, Liver, Hypertension, Accident, Homicide, Drug OD, Other
65 - 74	117%	104%	Alzheimer's, Diabetes, Liver, Hypertension, Parkinson's, Accident, Homicide, Drug OD
75 - 84	116%	102%	Alzheimer's, Pneumonia/Flu, Liver, Hypertension, Parkinson's, Drug OD
85+	115%	103%	Diabetes, Hypertension, Parkinson's, Homicide

Summary of Drivers of Excess COVID-19 Deaths by Age

Sources: Centers for Disease Control (CDC), Rapid Release Data as of 3rd Quarter 2021

DRIVER	AGES	DRIVER	AGES	DRIVER	AGES / SEX
CANCER	1 - 4	LIVER	25 - 84	DRUG OD	1 - 84
DIABETES	15+, EXCEPT 75-84	LOWER RESPIRATORY	15 - 44	FIREARM	1 - 44
HEART	25 - 64	PNEUMONIA / FLU	25-44, 75-84	HOMICIDE	1-74, 85+
HYPERTENSION	35+	STROKE	45 - 64	- FIREARM	FEMALE
KIDNEY	35 - 44	ACCIDENT	15 - 74	- ALZHEIMERS + PNEUMONIA/FLU	MALE

Biggest improvements in 2020, across most ages, came from pneumonia/flu and lower respiratory.

CDC Wastewater Surveillance Data and Analytics

Minimum set of data needed to interpret SARS-Cov-2 data

Water treatment plant

Information on the area the plant serves, number of people served, and treatment process

Sampling

Sample collection time, date, location, type (grab or composite), and flow rate during sample

Testing

Information about sample concentration, extraction, quantification methods, recovery efficiency, and molecular inhibition measurements

Purpose of project

To build and coordinate the nation's capacity to track the presence of SARS-CoV-2 in wastewater samples Looking at results over time can help to quickly identify new outbreaks and control spread

CDC Wastewater Surveillance Data and Analytics (cont'd)

Florida – Study of last 15 days, as of June 12, 2022

Percent change of SARS-CoV-2 in the last 15 days by site, Florida

1	5-day % change category	Num. sites	% sites	Category change in last 7 days
	- 100%	0	0	N/A*
	– 99% to – 10%	4	50	100%
	– 9% to 0%	0	0	N/A*
	1% to 9%	1	13	- 50%
	10% to 99%	0	0	- 100%
	100% to 999%	3	38	200%
	1000% or more	0	0	N/A*

Total sites with current data: 8

Total number of wastewater sampling sites: 16

O New site ● 0% to 19% ● 20% to 39% ● 40% to 59% ● 60% to 79% ● 80% to 100% ● No recent data

2. Some Learnings and Findings

Social distancing Vaccinations



Question 3

What is the correct "social distance" to provide protection from COVID-19?



Social distancing – What matters?

Need to consider all of these to reduce the risk of transmission:

Number of people in the group

Is activity indoors or outdoors?

If indoors, the level of ventilation – Good or poor

The length of contact / exposure – Short or long

Type of activity – Silence, speaking, shouting / singing

If sneezing or coughing, being anywhere near is a problem

Refer to table in link below for more details

Source: https://www.bmj.com/content/370/bmj.m3223

Question 4

Which of the following are learnings regarding the COVID-19 vaccines?



Vaccinations

Source: Our World in Data, https://ourworldindata.org/us-states-vaccinations

Total vaccine doses administered by state as of 6/9/2022

US: Total COVID-19 vaccine doses administered, Jun 9, 2022

Our World in Data

All doses, including boosters, are counted individually



Source: Centers for Disease Control and Prevention – Last updated 10 June 2022 (Eastern Time) OurWorldInData.org/us-states-vaccinations • CC BY



Vaccinations (cont'd)

Source: Our World in Data, https://ourworldindata.org/us-states-vaccinations

Total vaccine doses administered per 100 by state as of 6/9/2022

US: Total COVID-19 vaccine doses administered per 100 people, Jun 9, 2022

Our World in Data

All doses, including boosters, are counted individually



Source: Centers for Disease Control and Prevention – Last updated 10 June 2022 (Eastern Time) OurWorldInData.org/us-states-vaccinations • CC BY



COVID-19 Deaths by State

Source: CDC, U.S. COVID-19 Death rate per 100,000 by state, last 7 days as of June 10, 2022, https://covid.cdc.gov/covid-data-tracker/#cases_deathsper100klast7days



Comparison of Vaccination Rates and COVID-19 Deaths by State

Sources: Our World in Data (Vaccination Rates per 100) and CDC (COVID-19 Deaths per 100,000 last 7 days)

State Top 10	Vac. Rate per 100	COVID-19 Deaths Last 7 Days	State Bottom 10	Vac. Rate per 100	COVID-19 Deaths Last 7 Days
1 – VT	232.31	3 (0.4 – 0.6)	50 – WY	130.85	4 (0.7 – 0.9)
2 – MA	221.59	4 (0.7 – 0.9)	49 – ID	142.86	2 (0.2 – 0.3)
3 – CT	219.13	4 (0.7 – 0.9)	48 – GA	143.50	3 (0.4 – 0.6)
4 – ME	219.07	6 (1.7 – 3.0)	47 – IN	145.22	4 (0.7 – 0.9)
5 – RI	215.00	3 (0.4 – 0.6)	46 – ND	147.35	2 (0.2 – 0.3)
6 – HI	212.56	3 (0.4 – 0.6)	45 – KY	148.82	3 (0.4 – 0.6)
7 – NY	205.71	4 (0.7 – 0.9)	44 – MO	148.86	3 (0.4 – 0.6)
8 – MD	205.66	4 (0.7 – 0.9)	43 – TN	148.91	2 (0.2 – 0.3)
9 – NJ	198.34	4 (0.7 – 0.9)	42 – SC	149.39	4 (0.7 – 0.9)
10 – VA	197.99	2 (0.2-0.3)	41 – OK	152.08	3 (0.4 – 0.6)
		Avg. = 3.7			Avg. = 3.0

COVID-19 Case Rates by Vaccination Status and Age, UK

Source: COVID-19 cases by vaccination status between week 38 and week 41, 2021, COVID-19 vaccine surveillance report, Week 42, UK Health Security Agency

Age	Rates among persons <u>vaccinated</u> with 2 doses (per 100,000)	Rates among persons <u>not vaccinated</u> (per 100,000)
Under 18	314.1	3,013.6
18 – 29	462.1	615.4
30 - 39	956.7	751.1
40 - 49	1,731.3	772.9
50 - 59	1,075.3	528.6
60 - 69	704.1	347.1
70–79	537.9	267.6
<u>></u> 80	406.8	304.1

3. What can we expect in the future?

Regarding COVID



A better understanding of potential future events will help to set future mortality, morbidity, and other assumptions.

The Future of COVID-19 and Possibility of Another Pandemic

My opinions

COVID Issues	The Future	
Long COVID	Definition: Wide-ranging symptoms, including shortness of breath, fatigue, fever, headaches, "brain fog" and other neurological problems Expectation: Will persist longer than most are currently thinking	
Suicides	Will increase in future as people with Long COVID grow tired of the sufferir	ng
Delays in care	Will impact some conditions for longer than others	
Traffic fatalities	Will go back to normal	
Mental illness	Will continue longer than most expect	
Drug overdoses	Will continue shorter term, but should be able to be brought under control	
Another pandemic?	Monkey pox?	
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Thank you

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