

# Global patterns of COVID-19 suggest some risk factors – An Ecological study

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# Background

- In the beginning there was little known about COVID-19, then age became the most common risk factor for covid related mortality.
- Using available data from public domain for different countries, we planned to study the global pattern of COVID-19 risk factors, to understand more about the disease.

# Aims & Objective

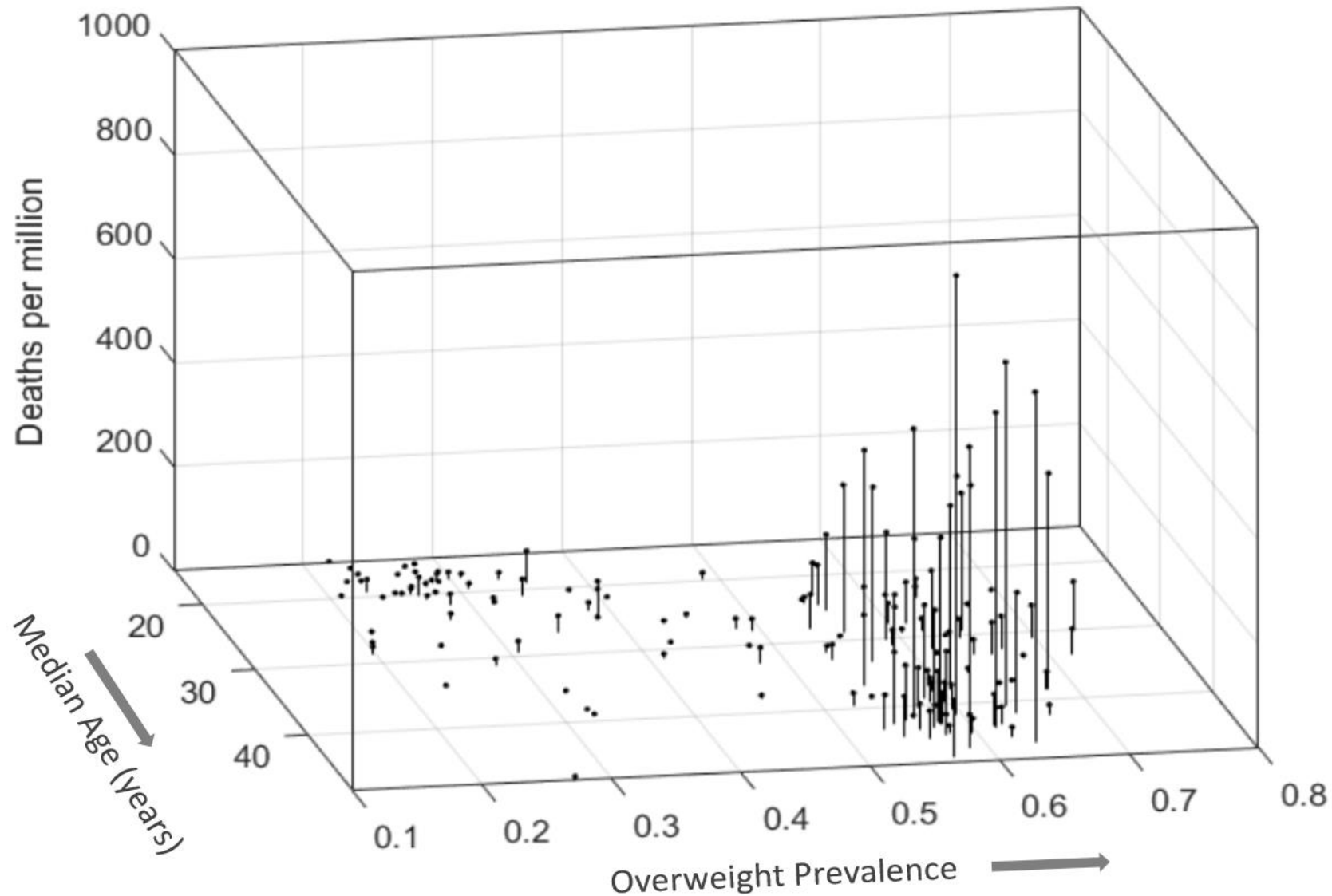
- Aim:
  - Identifying major risk factors in covid 19 mortality at global level.
- Objective:
  - Comparison of total mortality with respect to median age and prevalence of overweight in different countries
  - Comparison of total mortality across countries with respect to vaccine coverage

# Methodology

- Secondary data analysis was done for around 200 countries based on information (variables described below) collected from public domains.
- Variables –Deaths per million from covid 19  
Total population of the country  
Median age  
Overweight prevalence  
Vaccine coverage

# RESULTS

Combined association of age and overweight with mortality per million (Aug, 2020)  
with the help of IISER



COUNTRY	POPULATION (IN CRORES)	DEATHS/1 M POPULATION (MAY 3, 2020)	DEATHS/1 M POPULATION (AUG 23, 2022)	MEDIAN AGE (IN YEARS)	OVERWEIGHT (%)	% FULLY VACCINATED (AUG 23 2022)
USA	32.8	204	3207	38.5	67.9	67
UK	6.7	414	2724	40.6	63.7	75
Belarus	0.94	10	754	40.9	59.4	67
Brazil	21.26	35	3164	33.5	57.3	80
Germany	8.3	81	1738	47.8	56.8	76
Sweden	1.02	265	1920	41.1	56.4	73
Pakistan	20	2	133	22	28.4	57
Japan	12.58	38	297	48.6	27.2	82
Sri Lanka	2.17	0.3	771	33.7	23.3	67
Bangladesh	16	1	174	27.9	20	71
India	130	1	374	28.7	19.7	67
Egypt	10	4	231	24.1	63.5	36
South Africa	6	2	1676	28	53.8	32
Nigeria	20	0.4	14	18.6	28.9	13
Kenya	5	0.4	101	20	25.5	11
Ethiopia	11	0.03	63	19.8	20.9	31

**Study published in Annals of the Academy of Medicine, Singapore, Dec 2020**

# Obesity in COVID-19: A Systematic Review and Meta-analysis

Jamie S Y Ho<sup>1</sup>, Daniel I Fernando, Mark Y Chan, Ching Hui Sia

Affiliations + expand

PMID: 33463658 DOI: [10.47102/annals-acadmedsg.2020299](https://doi.org/10.47102/annals-acadmedsg.2020299)

Free article

## Abstract

**Objective:** Obesity has been shown to be associated with adverse outcomes, and infected patients should be monitored closely for adverse outcomes. influenza, but previous studies on coronavirus disease 2019 (COVID-19) had mixed results. The aim of this systematic review is to investigate the relationship between COVID-19 and obesity.

**Methods:** We performed a systematic review and meta-analysis. A literature search of MEDLINE, EMBASE, Scopus, Web of Science, CENTRAL, OpenGrey and preprint servers medRxiv and bioRxiv was performed, with no restriction on language or date of publication. Primary outcomes of this study were intensive care unit (ICU) admission or critical disease, severe disease and mortality. Secondary outcome was a positive COVID-19 test. Meta-analysis was performed using OpenMeta-Analyst software, and heterogeneity was tested using Cochran's Q test and I<sup>2</sup> statistic. The study protocol was registered on PROSPERO (CRD42020184953).

**Results:** A total of 1,493 articles were identified and 61 studies on 270,241 patients were included. The pooled prevalence of obesity was 27.6% (95% confidence interval [CI] 22.0-33.2) in hospitalised patients. Obesity was not significantly associated with increased ICU admission or critical illness (odds ratio [OR] 1.25, 95% CI 0.99-1.58,  $P=0.062$ ,  $I^2=31.0$ ) but was significantly associated with more severe disease (OR 3.13, 95% CI 1.41-6.92,  $P=0.005$ ,  $I^2=82.6$ ), mortality (OR 1.36, 95% CI 1.09-1.69,  $P=0.006$ ,  $I^2=88.5$ ) and a positive COVID-19 test (OR 1.50, 95% CI 1.25-1.81,  $P<0.001$ ).

**Conclusion:** Obesity increased the risk of severe disease, mortality and infection with COVID-19. Higher body mass index was associated with ICU admission and critical disease. Patients who are obese may be more susceptible to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

Ho JSY, Fernando DI, Chan MY, Sia CH. Obesity in COVID-19: A Systematic Review and Meta-analysis. Ann Acad Med Singap. 2020;49(12):996-1008. doi:10.47102/annals-acadmedsg.2020299

# COVID-19 Severity in Obesity: Leptin and Inflammatory Cytokine Interplay in the Link Between High Morbidity and Mortality

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## OPEN ACCESS

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### Specialty section:

This article was submitted to  
Nutritional Immunology,  
a section of the journal  
Frontiers in Immunology

Received: 04 January 2021

Accepted: 31 May 2021

Published: 18 June 2021

Obesity is one of the foremost risk factors in coronavirus infection resulting in severe illness and mortality as the pandemic progresses. Obesity is a well-known predisposed chronic inflammatory condition. The dynamics of obesity and its impacts on immunity may change the disease severity of pneumonia, especially in acute respiratory distress syndrome, a primary cause of death from SARS-CoV-2 infection. The adipocytes of adipose tissue secrete leptin in proportion to individuals' body fat mass. An increase in circulating plasma leptin is a typical characteristic of obesity and correlates with a leptin-resistant state. Leptin is considered a pleiotropic molecule regulating appetite and immunity. In immunity, leptin functions as a cytokine and coordinates the host's innate and adaptive responses by promoting the Th1 type of immune response. Leptin induced the proliferation and functions of antigen-presenting cells, monocytes, and T helper cells, subsequently influencing the pro-inflammatory cytokine secretion by these cells, such as TNF- $\alpha$ , IL-2, or IL-6. Leptin scarcity or resistance is linked with dysregulation of cytokine secretion leading to autoimmune disorders, inflammatory responses, and increased susceptibility towards infectious diseases. Therefore, leptin activity by leptin long-lasting super active antagonist's dysregulation in patients with obesity might contribute to high mortality rates in these patients during SARS-CoV-2 infection. This review systematically discusses the interplay mechanism between leptin and inflammatory cytokines and their contribution to the fatal outcomes in COVID-19 patients with obesity.

**Keywords:** COVID-19, leptin, obesity, inflammation, cytokine, mortality



# COVID-19 mortality and vaccine coverage

A study done by researchers of Harvard University and published in the European Journal of Epidemiology is also sobering. This paper reports that there was no impact of mass vaccination on Covid-19 incidence across 68 countries and 2947 US counties.

European Journal of Epidemiology  
<https://doi.org/10.1007/s10654-021-00808-7>

CORRESPONDENCE



## Increases in COVID-19 are unrelated to levels of vaccination across 68 countries and 2947 counties in the United States

S. V. Subramanian<sup>1,2</sup> · Akhil Kumar<sup>3</sup>

Received: 17 August 2021 / Accepted: 9 September 2021  
© Springer Nature B.V. 2021, corrected publication 2021

Vaccines currently are the primary mitigation strategy to combat COVID-19 around the world. For instance, the narrative related to the ongoing surge of new cases in the United States (US) is argued to be driven by areas with low vaccination rates [1]. A similar narrative also has been observed in countries, such as Germany and the United Kingdom [2]. At the same time, Israel that was hailed for its swift and high rates of vaccination has also seen a substantial resurgence in COVID-19 cases [3]. We investigate the relationship between the percentage of population fully vaccinated and new COVID-19 cases across 68 countries and across 2947

percentage data yielding 2947 counties for the analysis. We computed the number and percentages of counties that experienced an increase in COVID-19 cases by levels of the percentage of people fully vaccinated in each county. The percentage increase in COVID-19 cases was calculated based on the difference in cases from the last 7 days and the 7 days preceding them. For example, Los Angeles county in California had 18,171 cases in the last 7 days (August 26 to September 1) and 31,616 cases in the previous 7 days (August 19–25), so this county did not experience an increase of cases in our dataset. We provide a dashboard of

## Findings

At the country-level, there appears to be no discernable relationship between percentage of population fully vaccinated and new COVID-19 cases in the last 7 days (Fig. 1). In fact, the trend line suggests a marginally positive association such that countries with higher percentage of population fully vaccinated have higher COVID-19 cases per 1 million people. Notably, Israel with over 60% of their population fully vaccinated had the highest COVID-19 cases per 1 million people in the last 7 days. The lack of a meaningful asso-

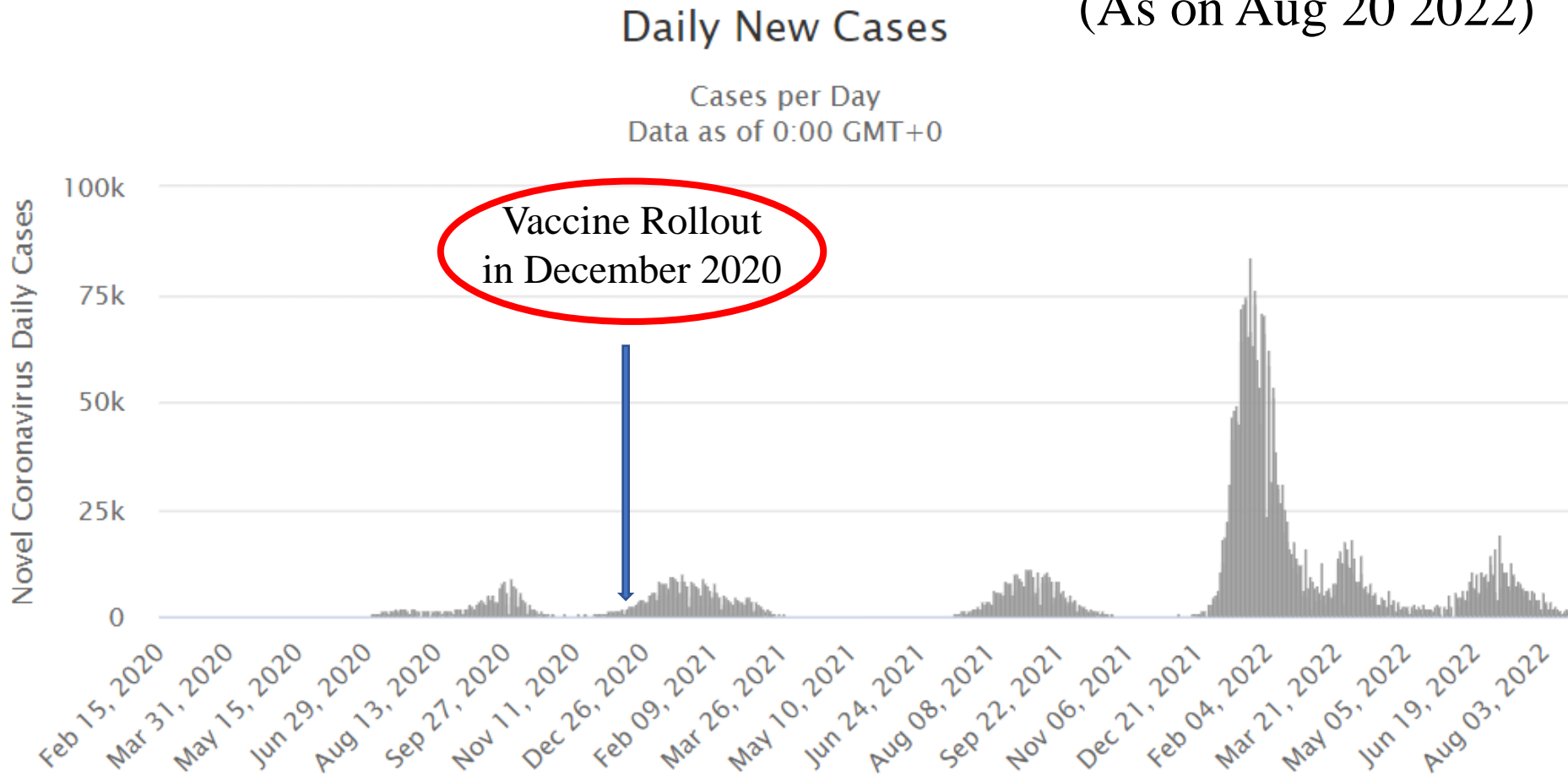
Subramanian, S.V., Kumar, A. Increases in COVID-19 are unrelated to levels of vaccination across 68 countries and 2947 counties in the United States. *Eur J Epidemiol* (2021). <https://doi.org/10.1007/s10654-021-00808-7>

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Germany	81	1416	1738	47.8	56.8	76
UK	414	2308	2724	40.6	63.7	75
Sweden	265	1538	1920	41.1	56.4	73
USA	204	2767	3207	38.5	67.9	67
Belarus	10	648	754	40.9	59.4	67
Japan	38	152	297	48.6	27.2	82
Bangladesh	1	170	174	27.9	20	71
Sri Lanka	0.3	721	771	33.7	23.3	67
India	1	358	374	28.7	19.7	67
Pakistan	2	129	133	22	28.4	57
Egypt	4	216	231	24.1	63.5	36
South Africa	2	1583	1676	28	53.8	32
Ethiopia	0.03	63	63	19.8	20.9	31
Nigeria	0.4	15	14	18.6	28.9	13
Kenya	0.4	101	101	20	25.5	11

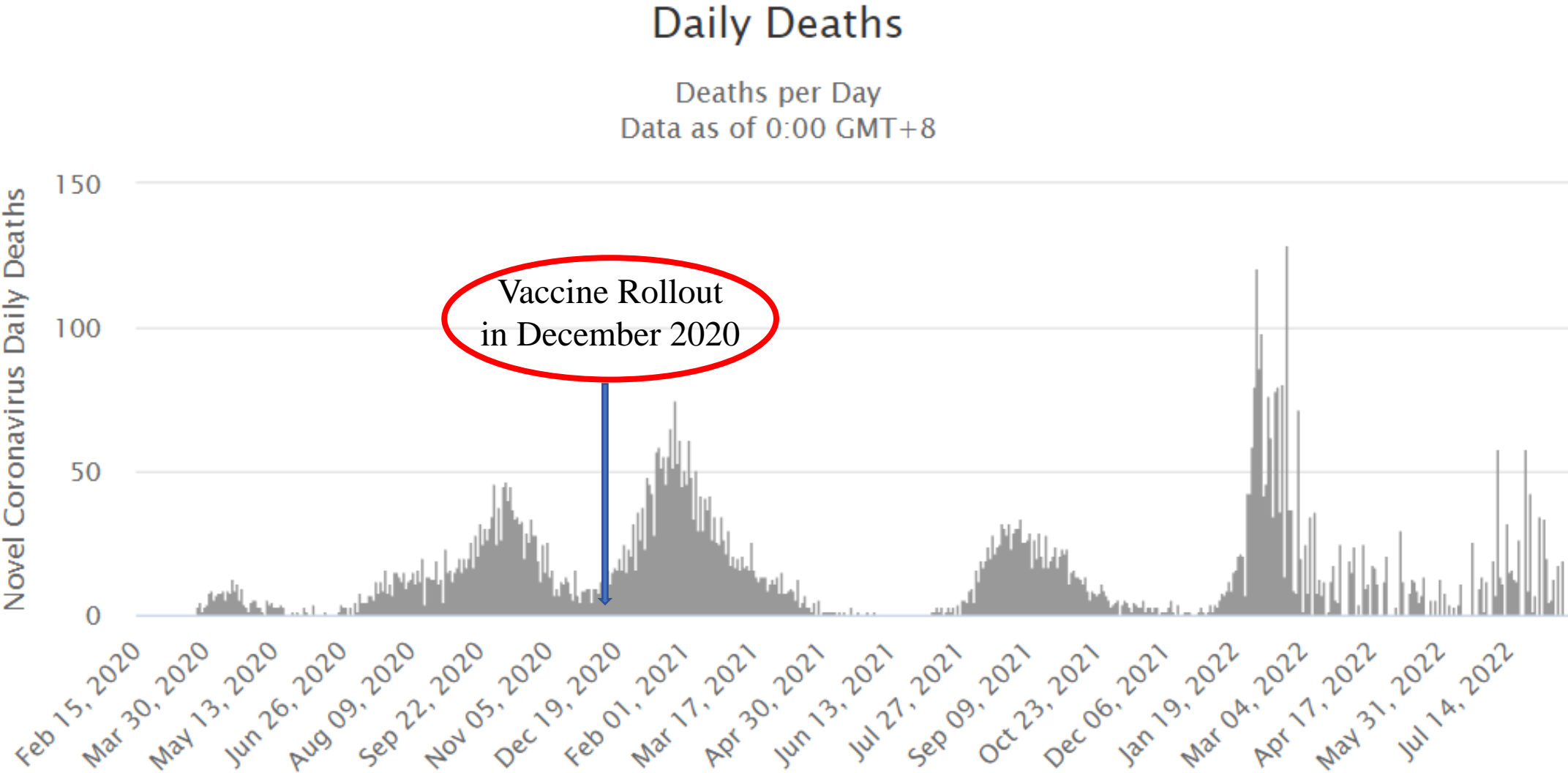
# The vaccine paradox

## Daily New Cases in Israel

Complete vaccine coverage – 66.20%  
Partially vaccinated – 6.08%  
(As on Aug 20 2022)



# Daily New Deaths in Israel

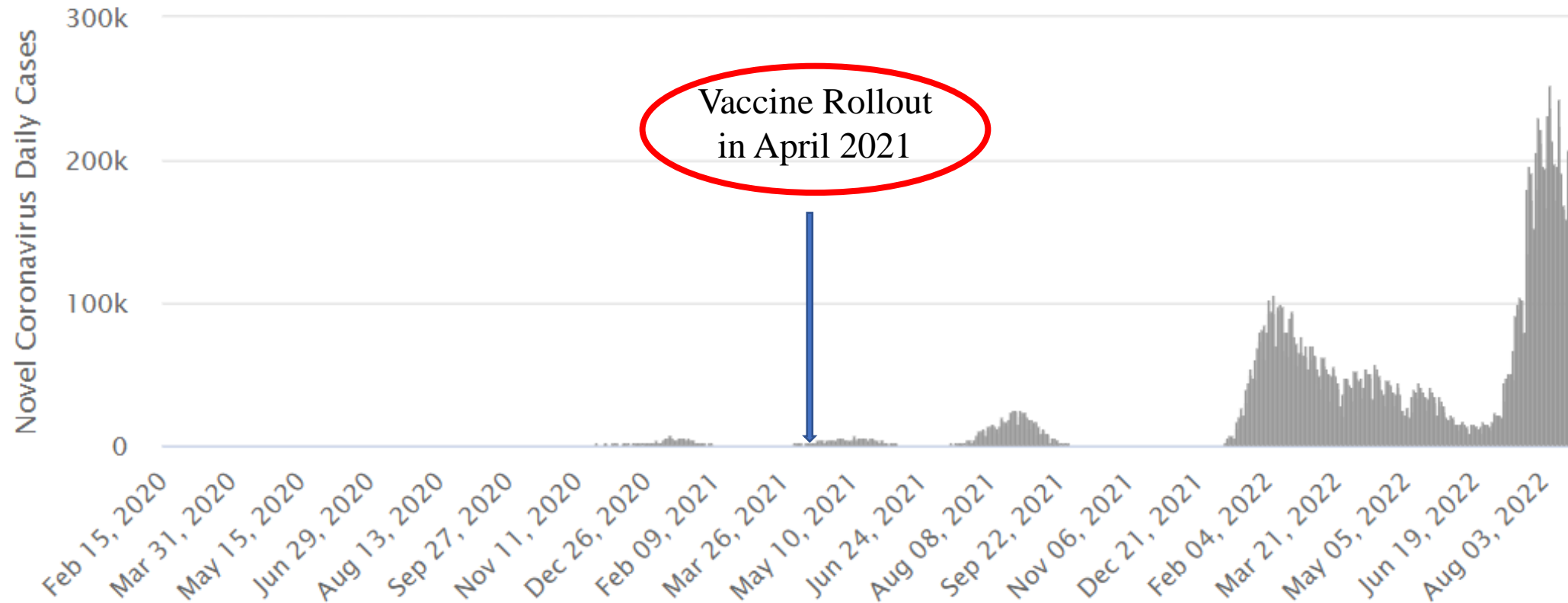


# Daily New Cases in Japan

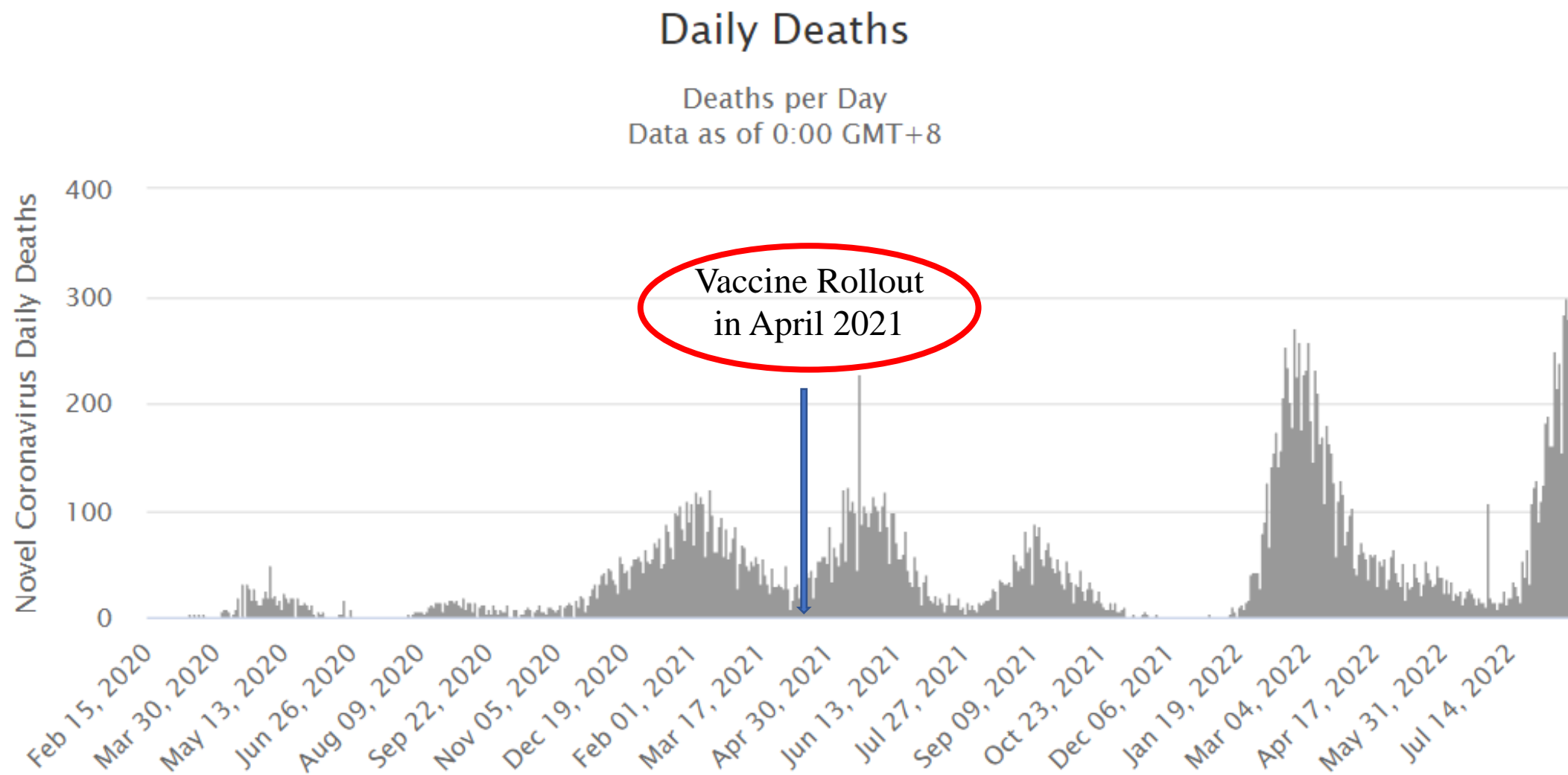
Complete vaccine coverage – 82.33%  
Partially vaccinated – 1.15%  
(As on Aug 18 2022)

## Daily New Cases

Cases per Day  
Data as of 0:00 GMT+0



# Daily New Deaths in Japan

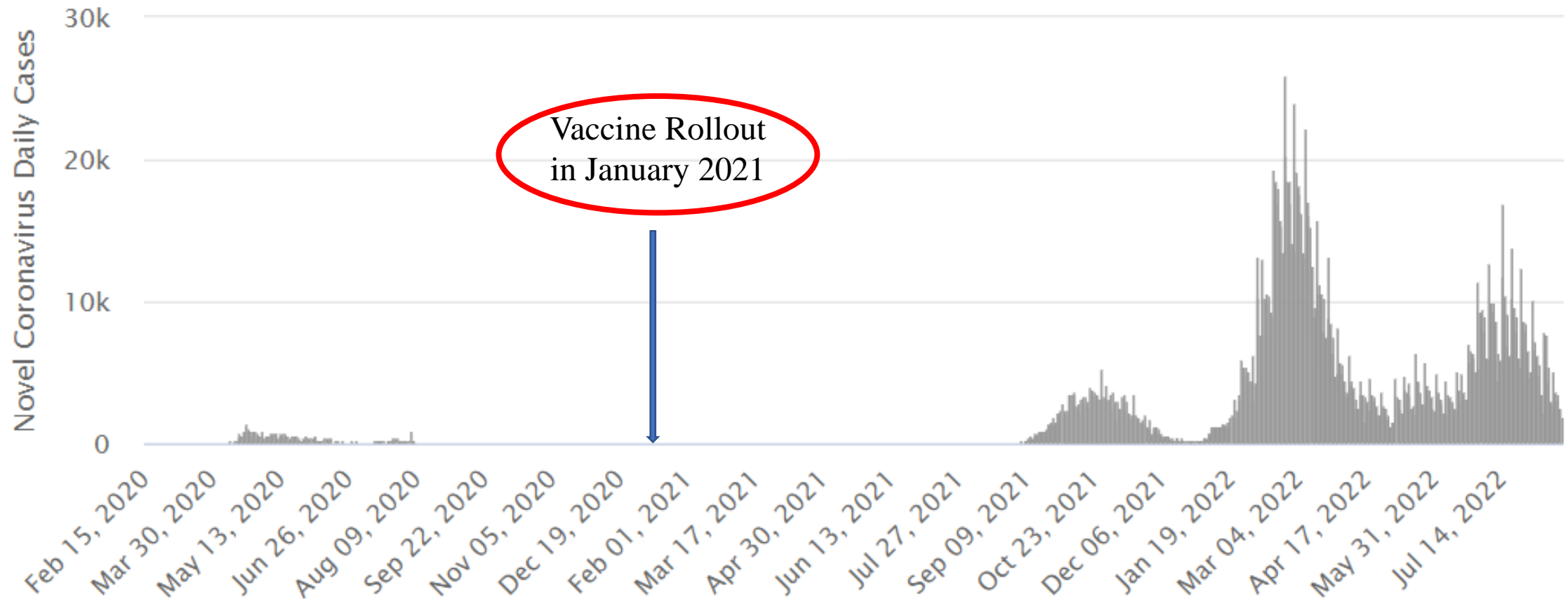


# Daily New Cases in Singapore

Complete vaccine coverage – 92%  
Partially vaccinated – 0.4%  
(As on Aug 20 2022)

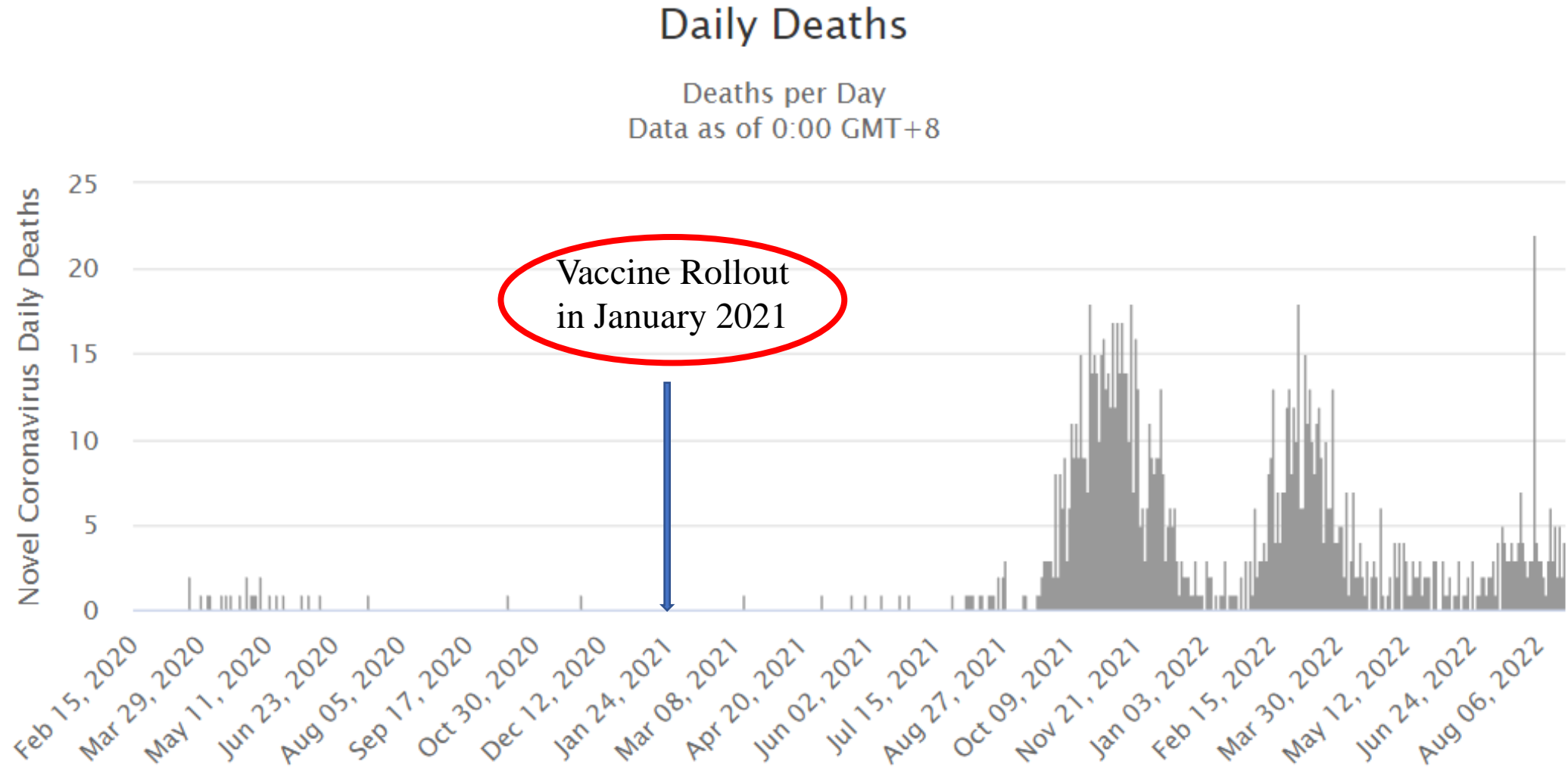
## Daily New Cases

Cases per Day  
Data as of 0:00 GMT+0



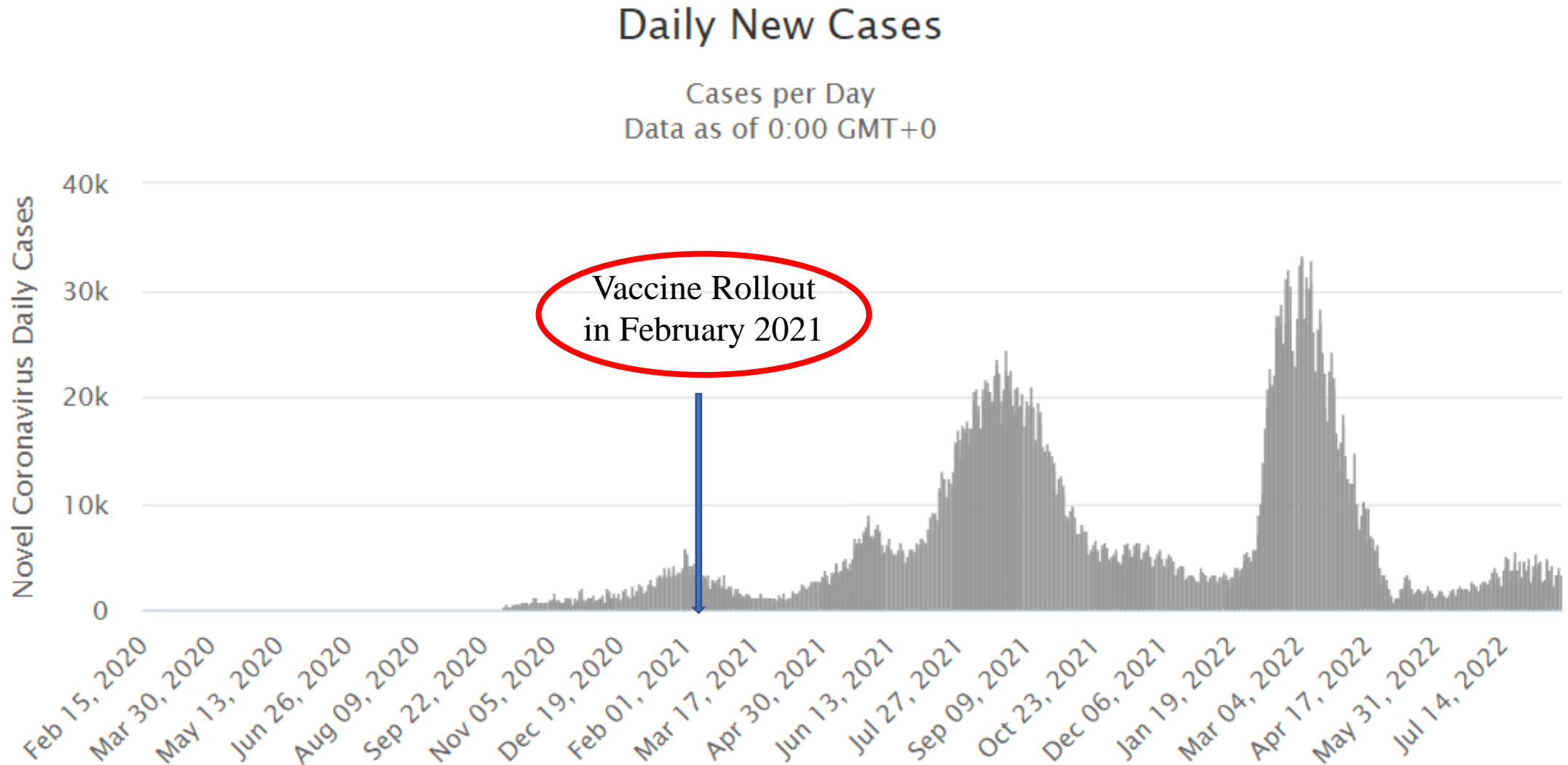


# Daily New Deaths in Singapore

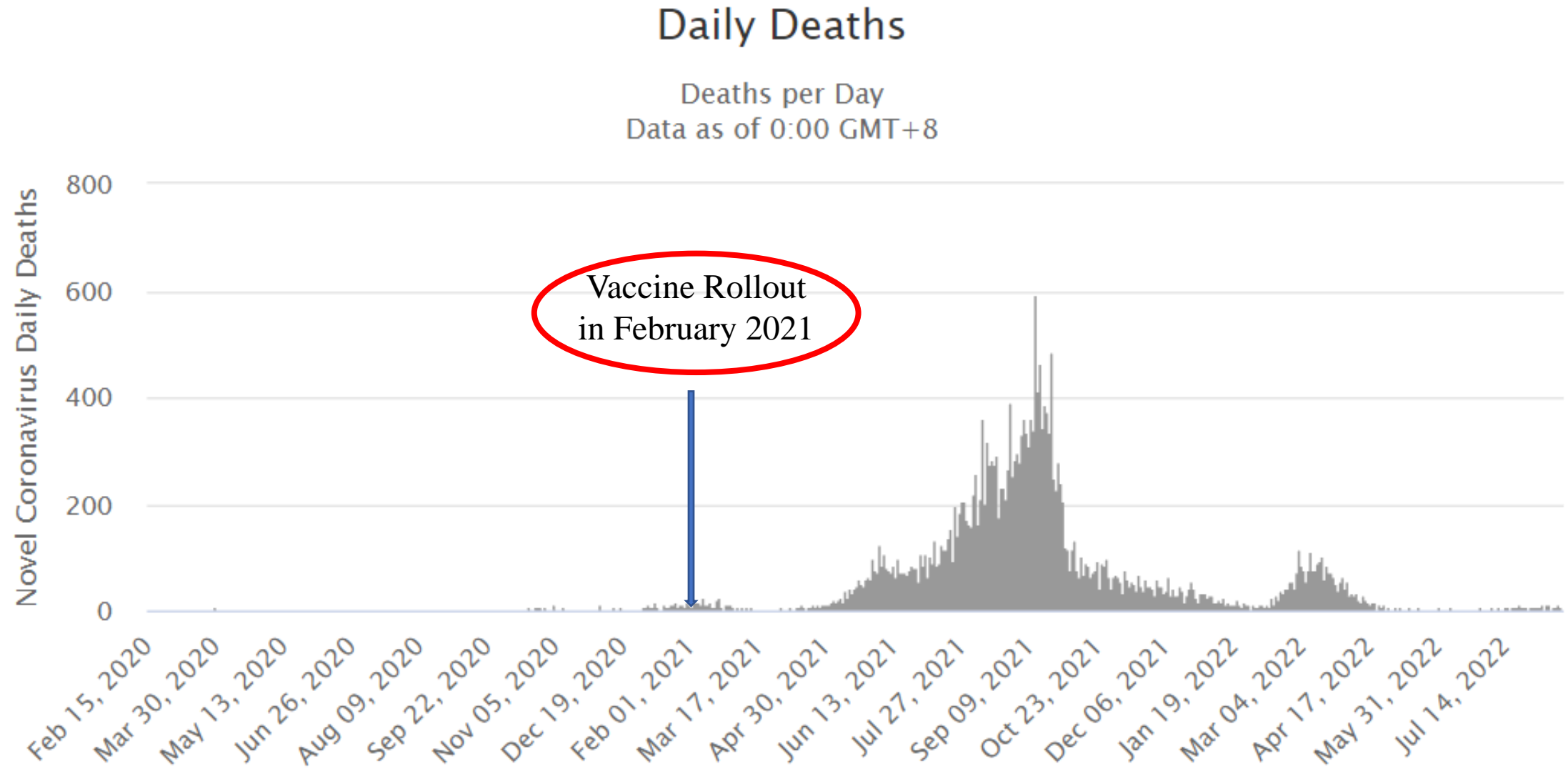


# Daily New Cases in Malaysia

Complete vaccine coverage – 81.86 %  
Partially vaccinated – 1.79%  
(As on Aug 20 2022)



# Daily New Deaths in Malaysia

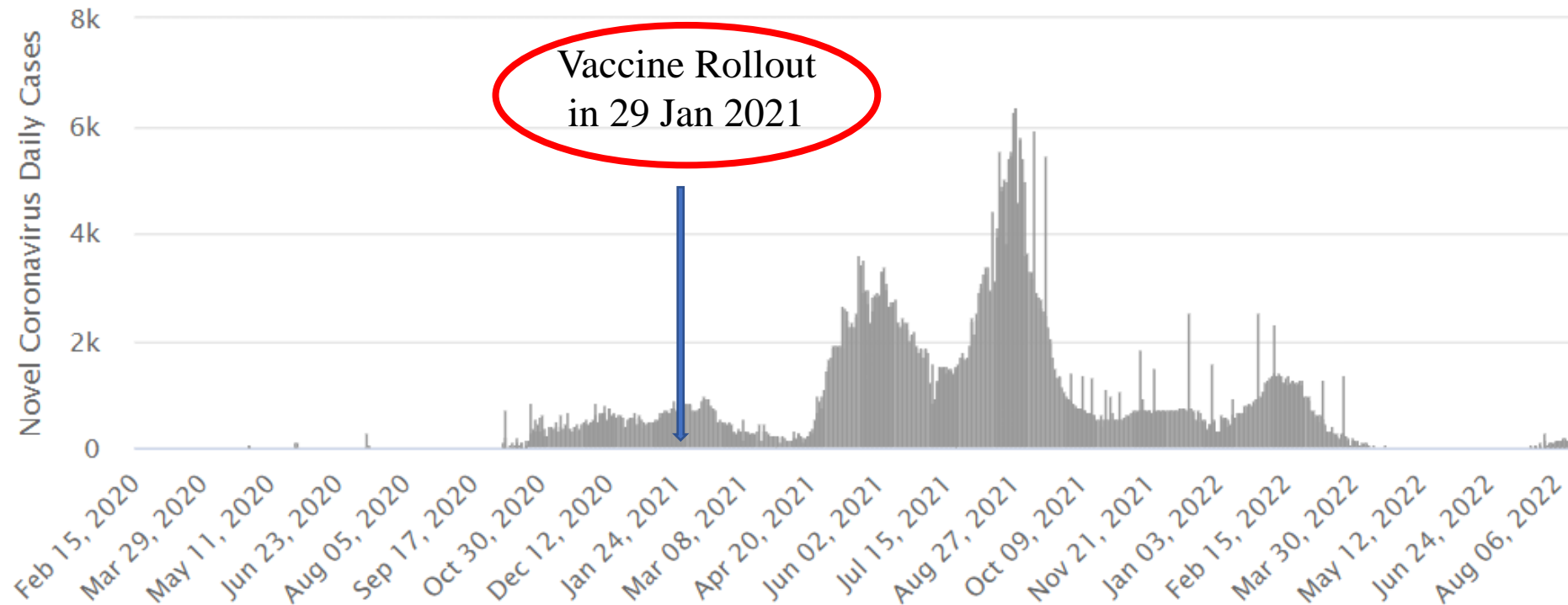


## Daily New Cases in Sri Lanka

Complete vaccine coverage – 66.88%  
Partially vaccinated – 11.69%  
(As on Aug 15 2022)

### Daily New Cases

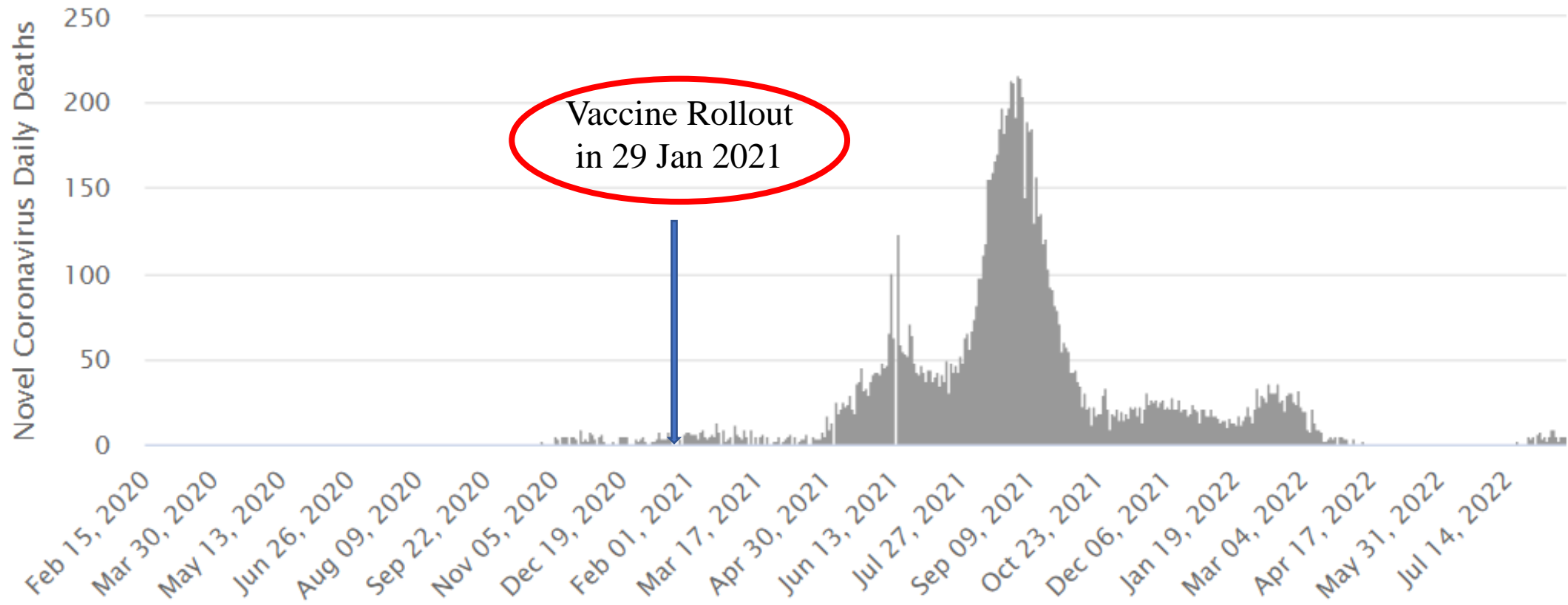
Cases per Day  
Data as of 0:00 GMT+0



# Daily New Deaths in Sri Lanka

## Daily Deaths

Deaths per Day  
Data as of 0:00 GMT+8

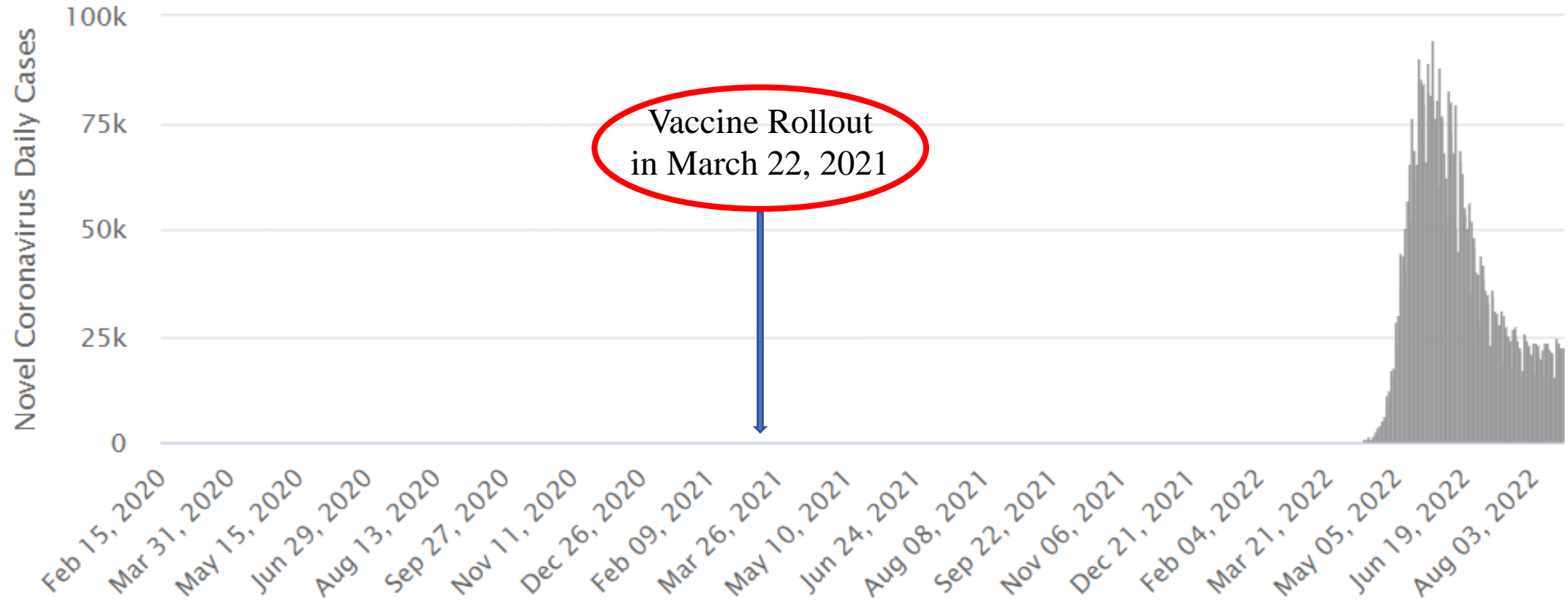


# Daily New Cases in Taiwan

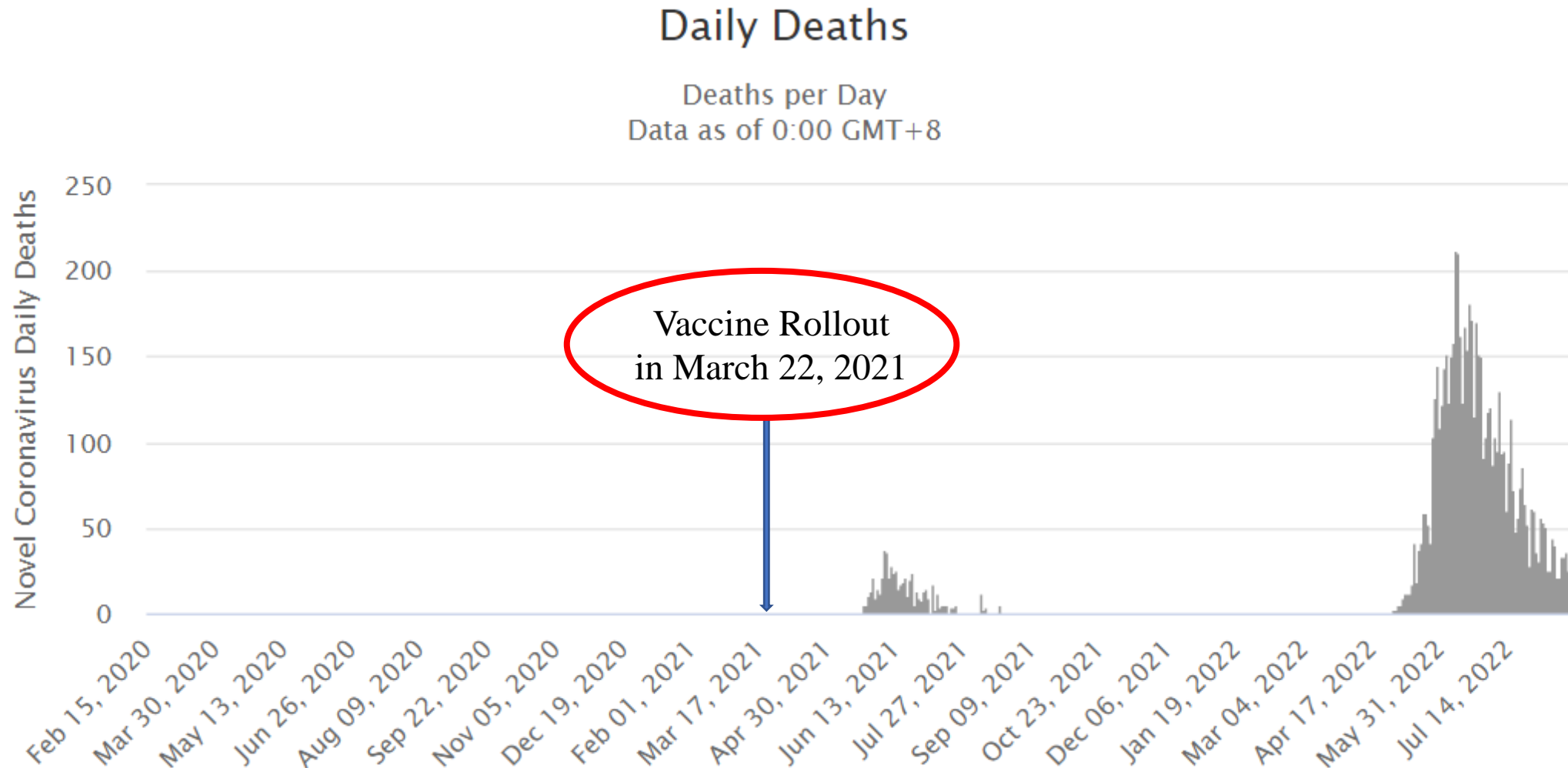
Complete vaccine coverage – 84%  
Partially vaccinated – 5.81%  
(As on Aug 18 2022)

## Daily New Cases

Cases per Day  
Data as of 0:00 GMT+0



# Daily New Deaths in Taiwan



**IS VACCINE STILL A PANACEA?**



# VEJON CONFERENCES



## Innovative COVID-19 Epidemiology Solutions

Saturday 9th October, 2021 @ 17:00 UK time



Dr Amitav Banerjee  
India



Jennifer Smith PhD  
Hawaii



Knut Wittoski PhD  
USA



Dr Caroline Wang  
Canada



Sean G. Kaufman MPH  
USA



Dr Shabeer Nellikode  
UAE



Dr Philip McMillan  
UK



Dr Shahzad Khan  
Pakistan



Dr Amitav Banerjee, India



Dr Philip McMillan UK



Knut Wittoski PhD, USA



Dr Shankara Chetty - South Africa

Covid-19 Global Patterns 14 Oct - Protected View - PowerPoint

### Trends in relation to Age, Overweight and Vaccination Coverage.

	M/Age	Overweight	Deaths/M	7 day average/M	1 <sup>st</sup> dose%	2 <sup>nd</sup> dose%
USA	38.5	68%	2218	4.9	66%	57%
Sweden	41.1	87%	1462	0.46	70%	66%
UK	40.6	63 %	2020	1.66	74%	68%
Israel	30.4	58.5%	853	1.58	68%	63%
Brazil	33.2	56.9%	2805	1.48	73%	47%
India	28.7	18%	323	0.16	51%	20%
Japan	48.6	27%	143	0.23	73%	66%
Sri Lanka	33.7	23%	623	1.48	68%	38%
B/desh	27.9	20%	166	0.08	23%	11%
Pakistan	22	28%	125	0.11	30%	16%
Ethiopia	19.8	21%	51	0.32	2.7%	0.8%
Kenya	20	26%	94	0.06	6%	2%
Egypt	24.1	63%	170	0.36	13%	6.6%
S. Africa	28	54%	1468	1.15	41%	17%
Nigeria	18.6	55%	13	0.02	2.5%	1.1%

COVID-19: Epidemiology of a comorbid Pandemic - International discussion, India, UK, South Africa and U





**amitav banerjee** • 6:14 PM

Have shared a couple of links to my earlier columns. I have noticed that Brazil, a fast developing economy, has high prevalence of overweight almost like USA and Europe. Obesity besides being a risk factor for mortality for Covid-19, also is surrogate marker for other conditions like diabetes, hypertension and heart diseases. This may explain the high impact of the pandemic presently faced by Brazil.



**Flavia Kintschner Cruger** • 6:55 PM

That's excellent! Thank you!

So true...I've noticed that the majority of people who complicated with covid is obese.

Honestly, I don't think the authorities here are conducting right this pandemic....I'm so afraid we won't see an end for that.

# Take home message.....

- Overweight appears to be a bigger risk factors than age (suggested by outliers Brazil, Japan)
- Despite different strategies and vaccination the mortality gap over 2 years among different continents remains same.
- Review of mass vaccination can be considered  
The rationale of mass vaccination was to lower the trends at population level, however the data does not support this optimism.  
Therefore one has to review the strategy and require further research.

# References

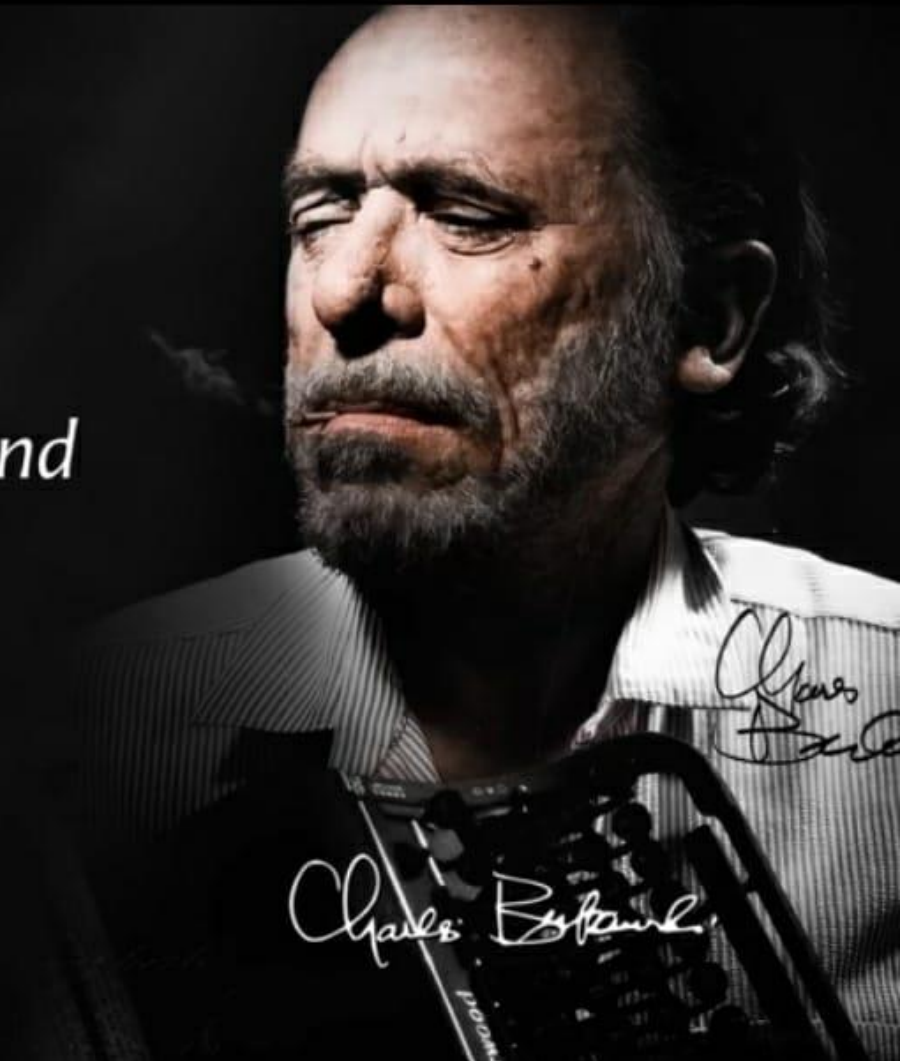
- COVID Live - Coronavirus Statistics - Worldometer (worldometers.info)
- Average age by country (worlddata.info)
- Prevalence of overweight among adults, BMI  $\geq 25$  (age-standardized estimate) (%) (who.int)
- Coronavirus (COVID-19) Vaccinations - Our World in Data
- Subramanian, S.V., Kumar, A. Increases in COVID-19 are unrelated to levels of vaccination across 68 countries and 2947 counties in the United States. *Eur J Epidemiol* (2021).  
<https://doi.org/10.1007/s10654-021-00808-7>

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*...and you'll be surprised to find that the  
...in the first place. But you'll find that the  
...and you'll find that the*

**“Genius might be  
the ability to say a profound  
thing in a simple  
way.”**

**CHARLES BUKOWSKI**  
A German-American poet, 1920 – 1994



**THANK YOU.....**





- Adverse impact of lockdown on substance abuse – A case study in community

Dr Nirankush  
Dr Sandeep  
Residents  
Dept Of Community Medicine



# Social Pathology

- In 1848, pathologist Rudolf Virchow, while investigating the typhus outbreak in Europe realized socioeconomic predicaments such as:
  - Poverty
  - Unemployment
  - Illiteracy
- Population health and political actions are as important as medical interventions.
- He famously summed up, “*Medicine is a social science and politics is nothing but medicine on a large scale.*”
- His reputation as a practitioner of “social medicine” equaled that as a pathologist.



## How Lockdowns aggravated Social Pathology-





## School Dropouts and Juvenile Drug Addiction:



Bhaskaran Raman  
04 Sep 2021

## Social Distancing in Letter & Spirit

ESSENTIAL  
FASCISM a.k.a  
LOCKDOWN  
LOGIC

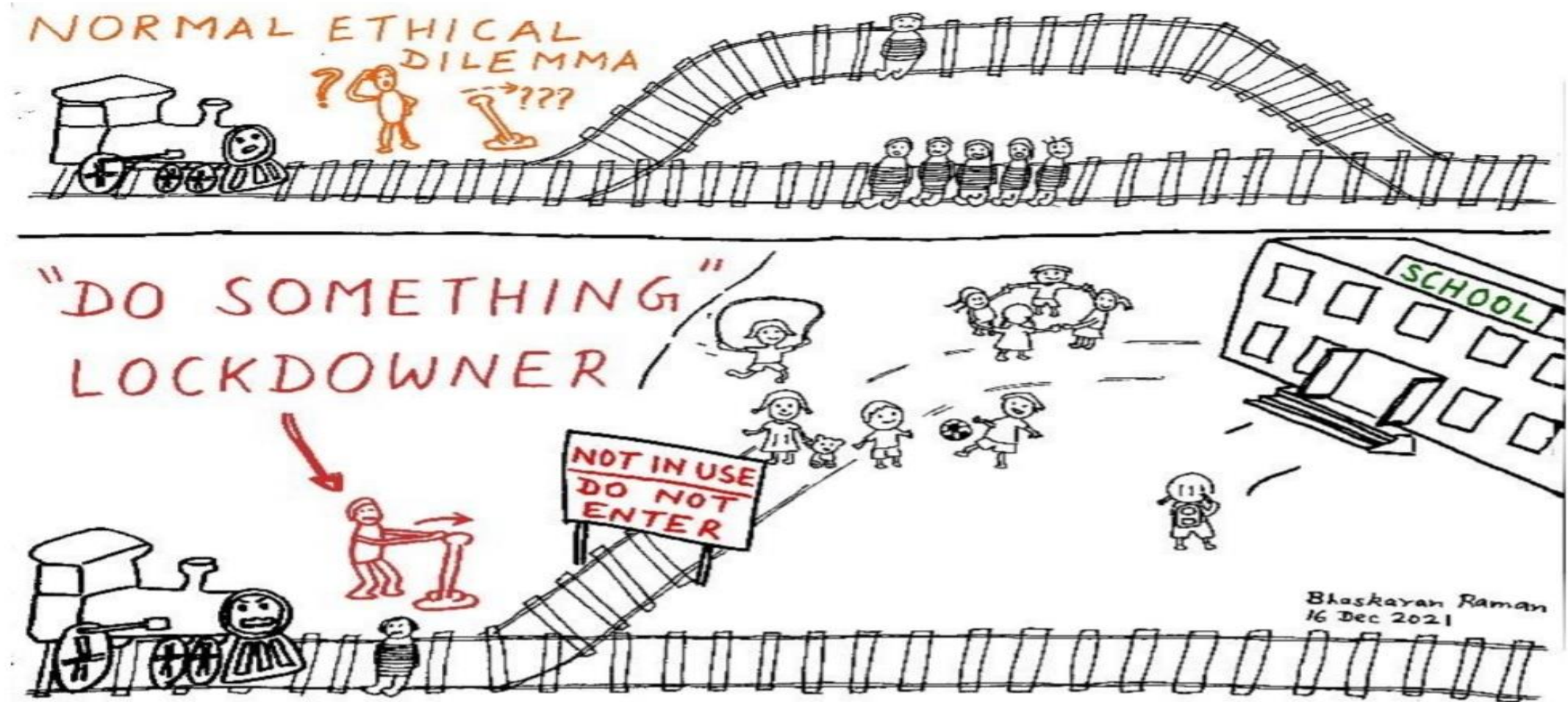


Bhaskaran Raman 16 June 2021

## **Virchow revisited – Not much has changed in 200 years**

- We identified a neighborhood of substance abusers aged 12 years to 40 years in our urban field practice area.
- School closure threw a 12 year old boy in close contact with an alcoholic father.
- The child got addicted to alcohol.
- A 36 year old alcoholic had an impressive criminal record having been in and out of jail 20-25 times. For income practices perjury.
- A few suffered from liver failure manifested by ascites.
- Some had bouts of pancreatitis.

# The Eternal Ethical Dilemma





## The Corona Dilemma



If you do not divert the train - one person, John, will get run over. He is elderly and suffering from many diseases. You know him personally and all his friends and family are watching you. They are all shouting at you to divert the train, claiming it is the moral and safe thing to do. You know that if you do not pull the lever, your life in the society you live in is over.

If you pull the lever - the diverted train will run over 50 random people from all over the world as the train drives through them, including people in your own country. Yet these people and their friends won't know where the train came from that hit them.



## The Corona Dilemma



If you do not divert the train -you are letting the virus rage unchecked (**COVID deaths**).

If you pull the lever - the diverted train will put whole countries into isolation, destroying many international industries and thus affecting the livelihood of billions, which through reduced government services and general prosperity will cost tens of millions of lives (**COVID reaction**).



## Take home messages

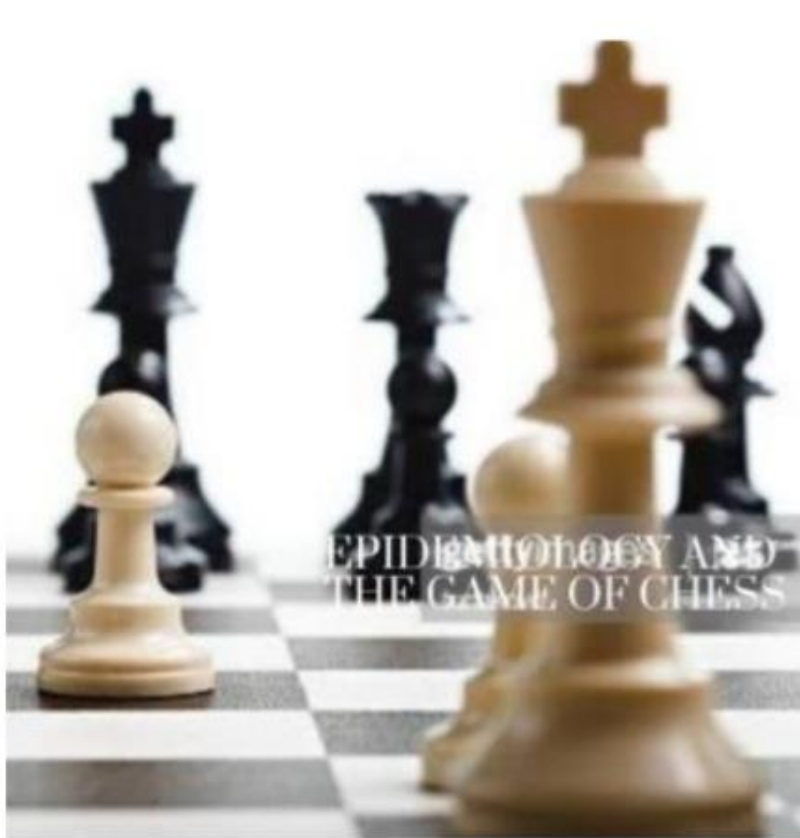
- Virchow concluded 200 years ago that even in a pandemic of typhus the social conditions affected health and well being more than the rickettsial agent.
- History is repeating itself. The response to the Covid-19 has precipitated social conditions like school drop out and loss of employment.
- In the long run this will have more adverse impact than the acute infections from the virus.
- **In future pandemics this lessons to be kept in mind. To save few we should not jeopardize the lives of many.**

# Conclusion

**The Covid-19 Chess Game: Are we seeing all the pieces and their combinations on the board?**

*While the clinician sees only one piece at a time, the epidemiologist sees all the pieces and their combinations which is essential to tackle public health problems.*

# Thank you





# Acknowledgement:

- We would like to extend our gratitude to Prof. Bhaskaran Raman(IIT Bombay) for granting us the permission to use his drawings.

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