

Data Analytics in Health Care

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FDP on Data Analytics in Healthcare

SSN College of Engineering

17 January, 2022

A long history

- Major outbreak of cholera in London in 1854



A COURT FOR KING CHOLERA.

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- Prevailing wisdom was that cholera was due to “bad air”—**miasma theory**



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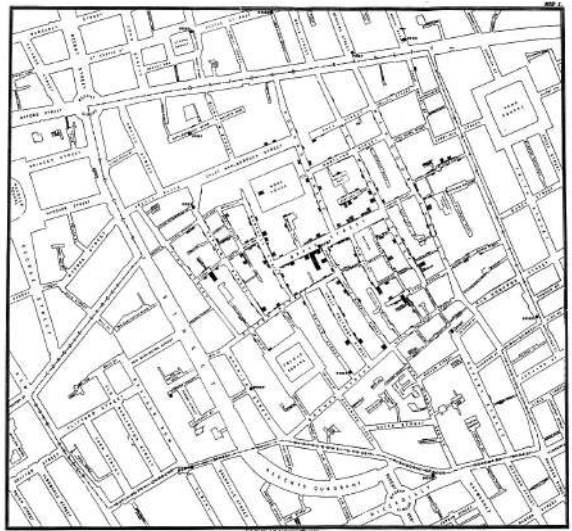
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- Snow plotted the locations where cholera was reported
- Cluster of points pointed to contaminated water pump on Broad Street



The many facets of Data Analytics and Health Care

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 - Epidemiology, interventions

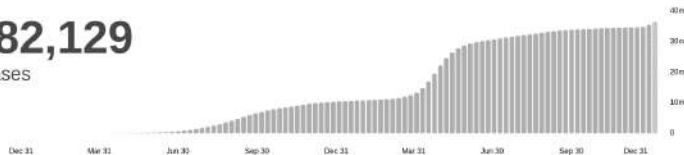
Data visualization and interpretation

- Covid case data

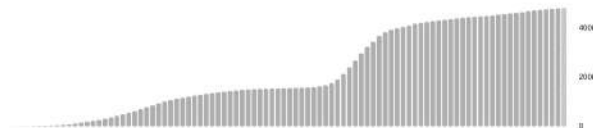
Data visualization and interpretation

- Covid case data
- Progress in time

3,65,82,129
confirmed cases



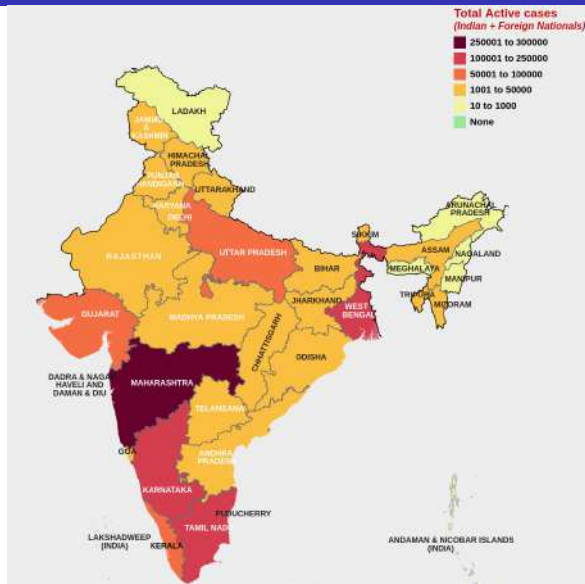
4,85,350
deaths



Source: World Health Organization

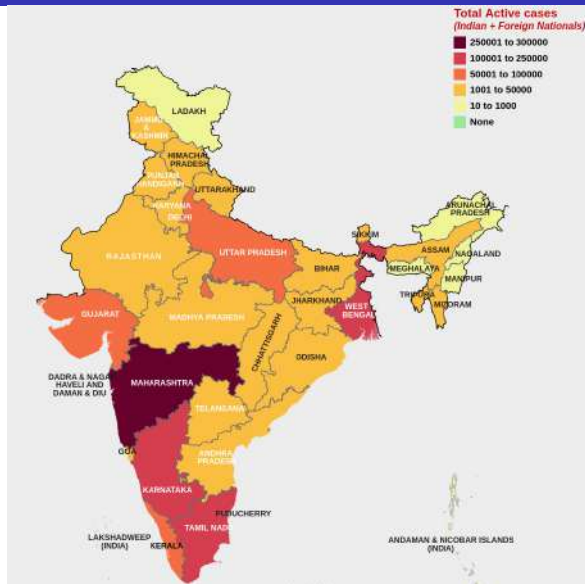
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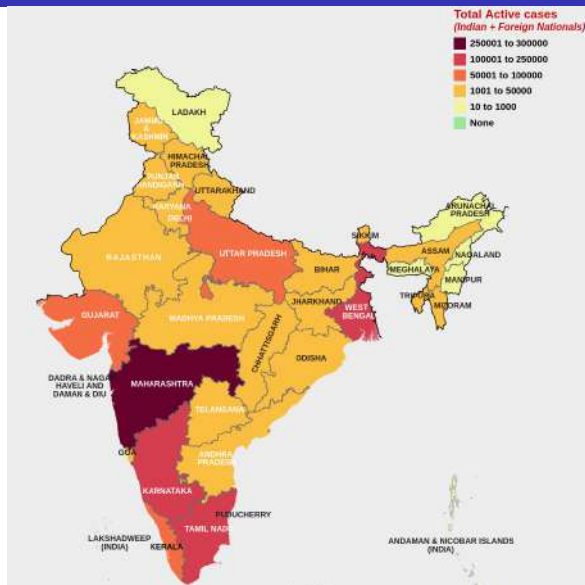
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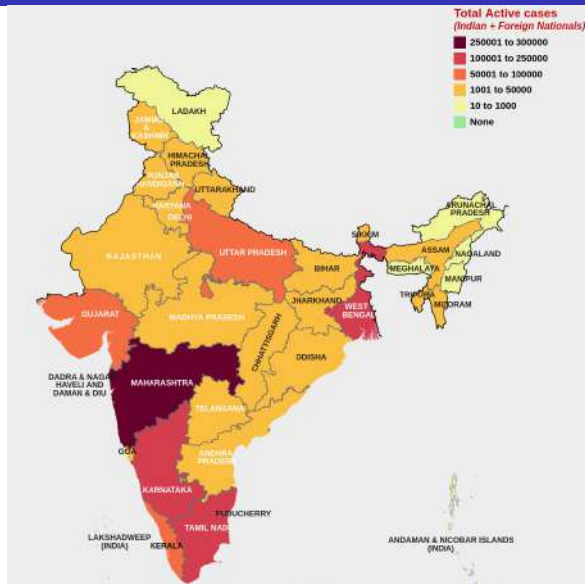
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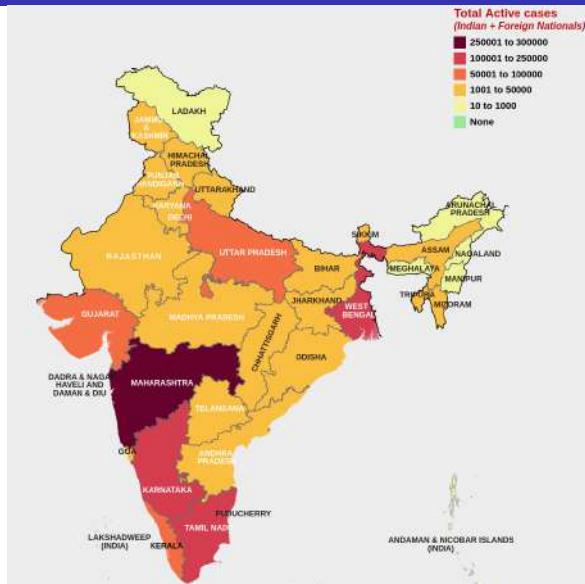
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- Designing testing protocols



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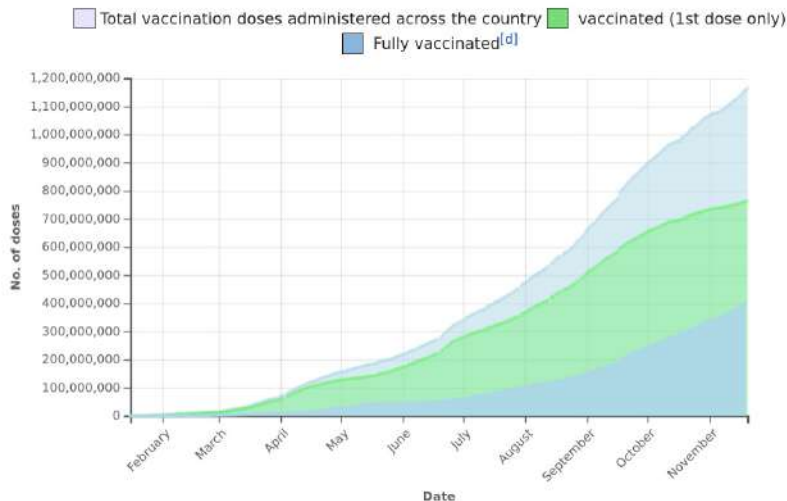
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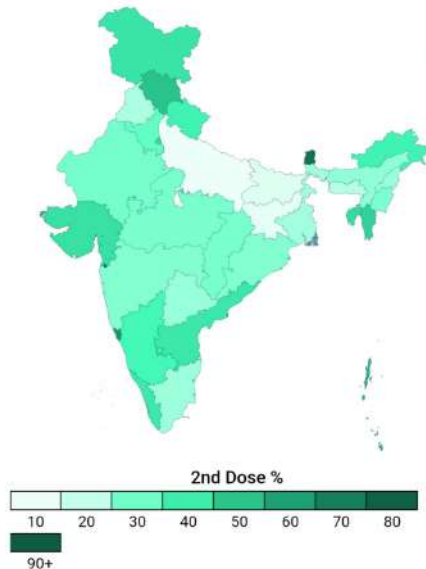
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- Progress in time

Graph of cumulative doses administered across the country



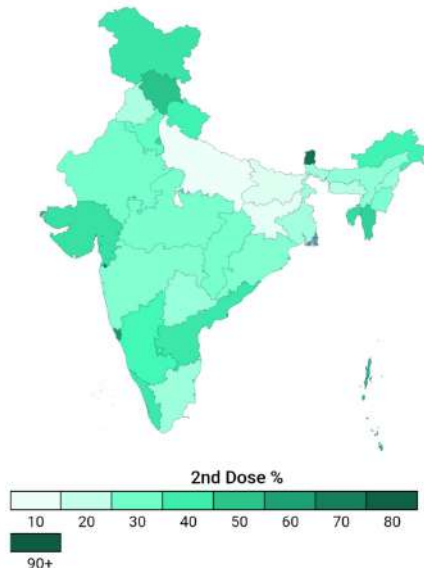
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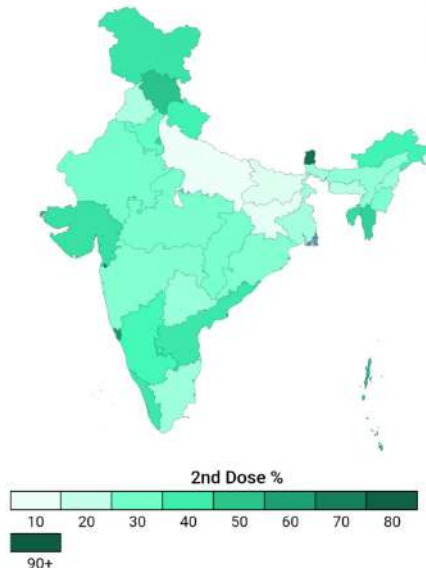
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 - Urban vs rural
 - Gender
 - Socio-economic status



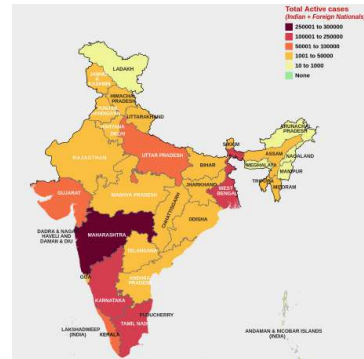
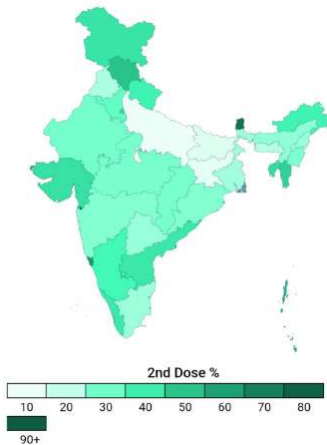
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- Data-driven policy
 - Targetted camps
 - Awareness campaigns



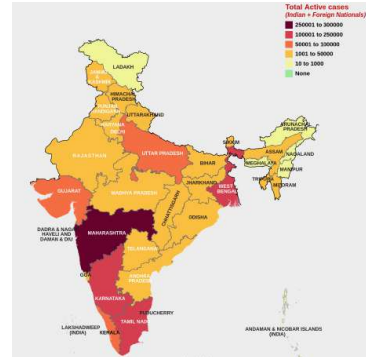
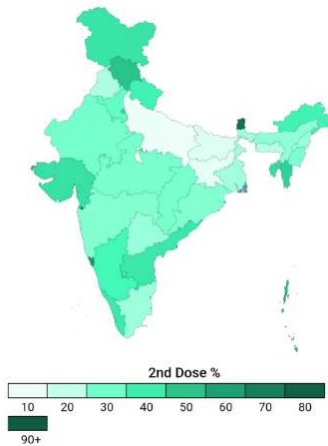
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■ Vaccine data vs Covid case data



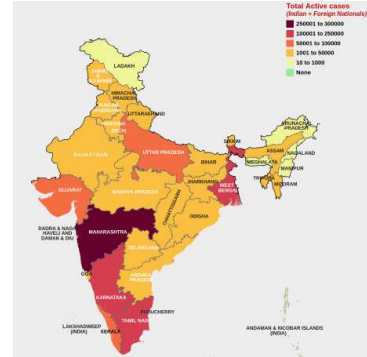
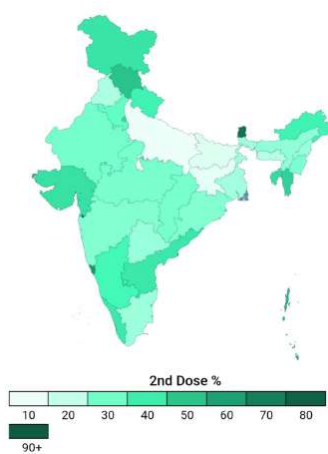
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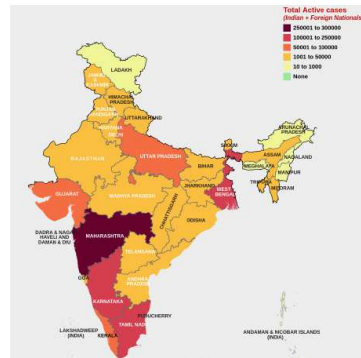
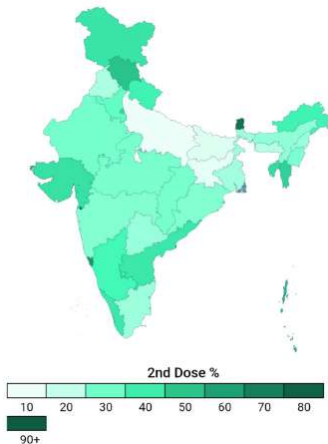
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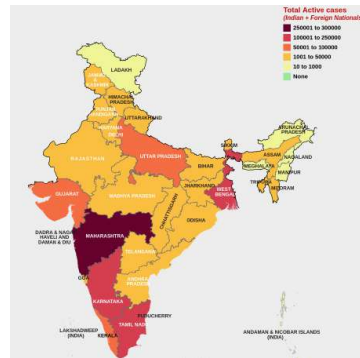
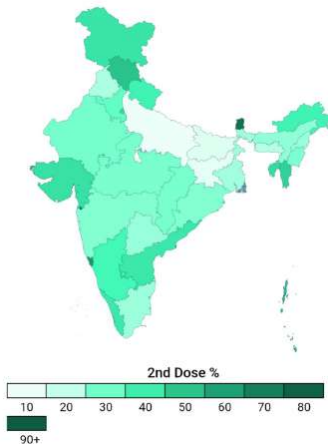
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Data visualization and interpretation

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- How reliable are the data sources?
- Vaccinations
 - Administered in controlled centres
- Covid cases
 - Unreliable self-reporting
 - Uncertain attribution of deaths

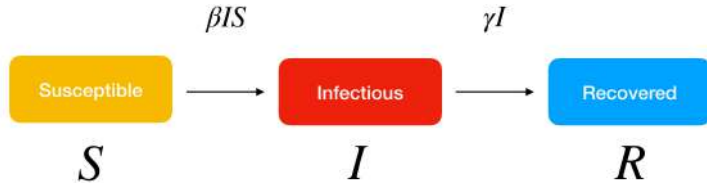


Predictive analytics

- Epidemiology

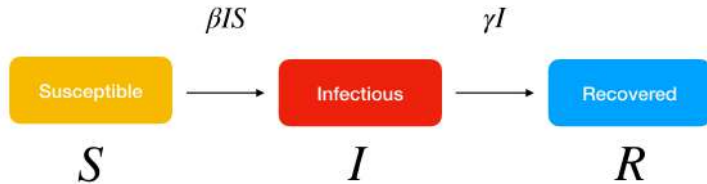
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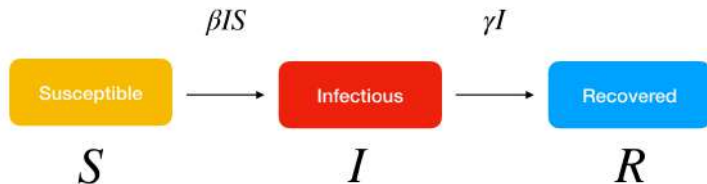
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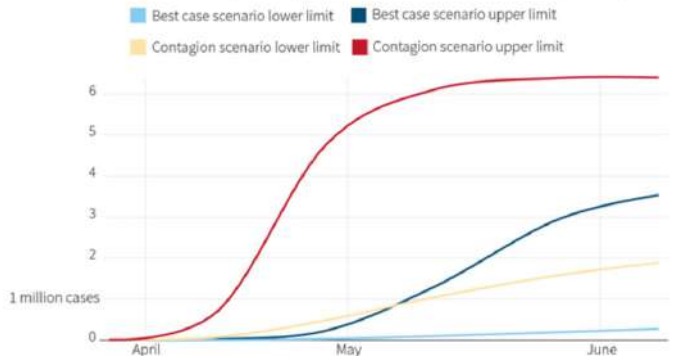


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- “Data driven” predictions
 - Speculative, unfalsifiable

Predicted cases of COVID-19 in India

By the end of April, India could see between around 30,000 and 230,000 confirmed COVID-19 cases, according to the team of biostatisticians and epidemiology experts, many of them from the University of Michigan.



Source: COV-IND-19 Study Group

Staff, 23/03/2020

REUTERS

Machine learning

- Medical imaging

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- How much data is available?
Necessary?



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- Shape of a protein determines how it acts
- Predict the shape from the chemical formula



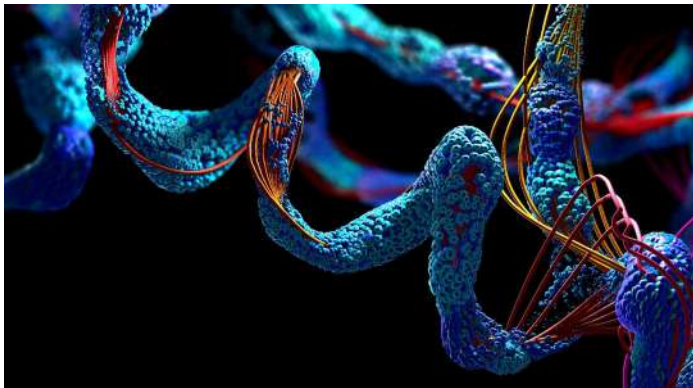
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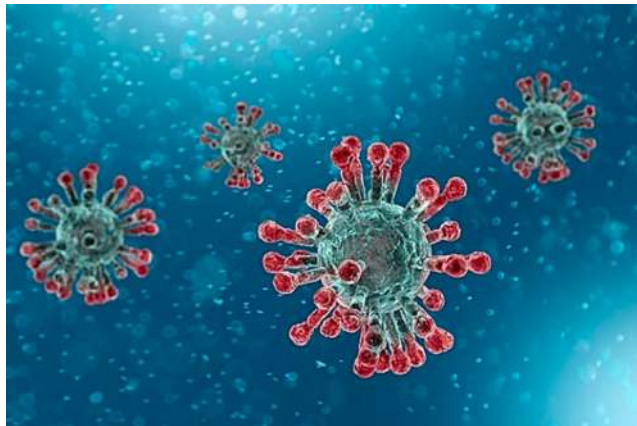
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- But why does a protein fold the way it does?

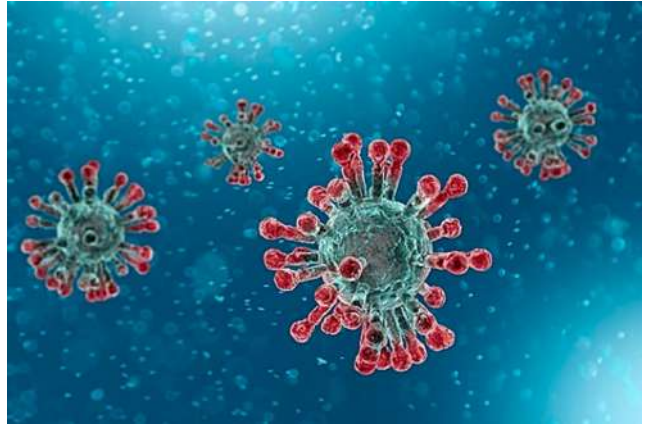


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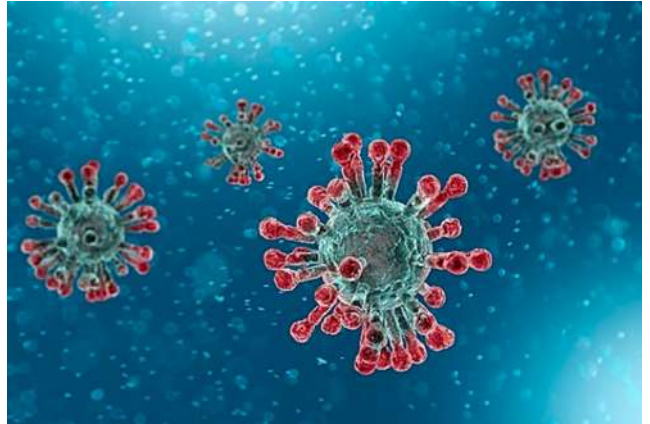
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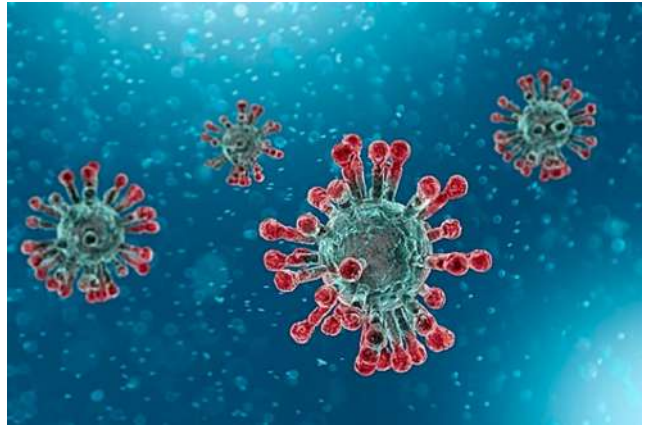
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- Side effects — why, who, how many?



Smart diagnostics and treatment

- Wearable devices to monitor health parameters



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- Targetted treatment
 - Insulin pumps



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- Interpreting the data
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 - How to determine cause and effect?
- Data privacy
 - “Triangulate” medical data to identify individuals
 - Balancing individual privacy and public good
 - Example — contact tracing



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- Security of devices
 - Wearable devices connect to the internet
 - How to prevent malicious interference



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- There is no shortage of irrational skeptics!

