

REVIEW OF SURVEILLANCE SYSTEM TO TRACK COVID-19 IN INDIA

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AIM

To evaluate whether an indicator-based surveillance strategy is effective in accurate tracking of COVID-19 cases in India

RESEARCH QUESTION

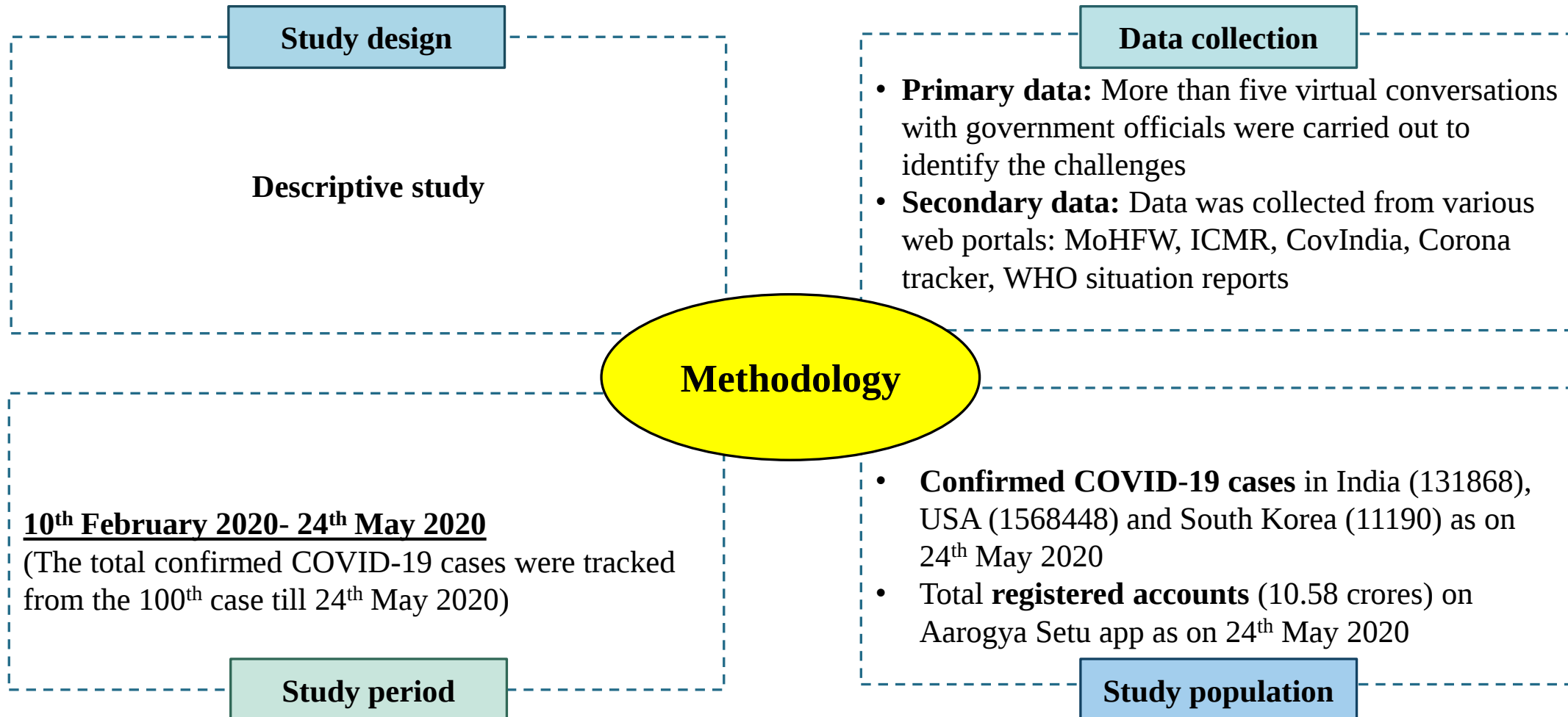
Is an indicator-based surveillance system effective for accurate monitoring of COVID-19 outbreak in India?

OBJECTIVES

- To identify and assess the current indicator-based surveillance system being used to track COVID-19 cases in India
- To identify the challenges in indicator-based surveillance of COVID-19

INTRODUCTION

- COVID-19 is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It was **first identified in December 2019 in Wuhan, China**, and has since spread globally, resulting in an ongoing pandemic across 188 countries with more than **5.2 million cases as on 24th May 2020**.
- The first case in India was reported on 30th January 2020 and since then the disease has progressed to more than 1.3 lakh cases with a low stable rate of infection. Around half of all cases in India are spread around **six cities-** Mumbai, Delhi, Kolkata, Ahmedabad, Chennai and Pune with Mumbai alone **accounting for 24% of the total confirmed COVID-19 cases**.
- **Numerous surveillance systems** have been developed by various government and private organizations like **ICMR, NDMA, CovIndia, Corona tracker etc**.
- The official portal being used for tracking COVID-19 cases in India is **an indicator-based surveillance system** which has helped in the development of an aggressive lockdown strategy and contact tracing system which has contributed in lowering and maintaining a low, stable rate of infection till now.



RESULTS

Description of the system

Disease under surveillance

Coronavirus disease 2019 (COVID-19)

Surveillance Objectives

- To monitor trends in COVID-19 disease over time in order to assess the present situation in India and compare disease trends across different states in order to respond with appropriate evidence-based action
- To identify population groups at risk and in need for targeted prevention measures
- To develop an effective contact tracing model to control the spread of disease
- To contribute to assessment of burden of COVID-19 on the population using data such as disease incidence, mortality rates, recovery rates etc.

Population under surveillance

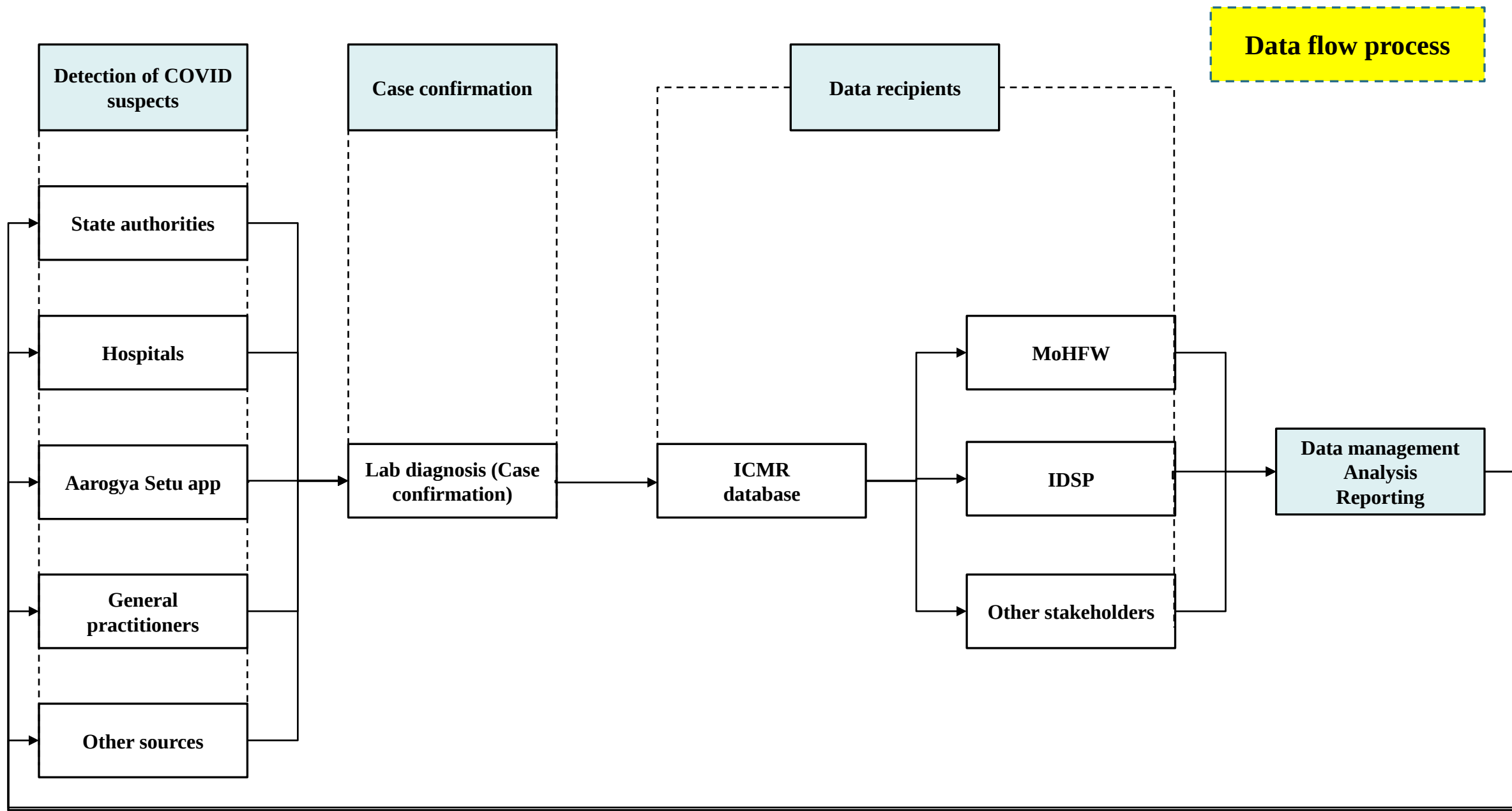
Entire Population

Geographic Coverage

Entire Population

Type of surveillance

Passive surveillance



Description of the system

Specifications of information reported

ICMR database:

- Contact details of patient
- Results of diagnostic tests

Aarogya Setu:

- Age
- Gender
- Name
- Health status
- Travel history
- Location details (tracked via GPS)
- Willingness to help in times of need
- Exempted category of professionals
- Self-assessment details- Presence of symptoms; Comorbidities; Travel history; Possibility of contact with confirmed COVID-19 cases

Reporting format

Electronic system

Data entry

Web based data entry

Evaluation of surveillance attributes

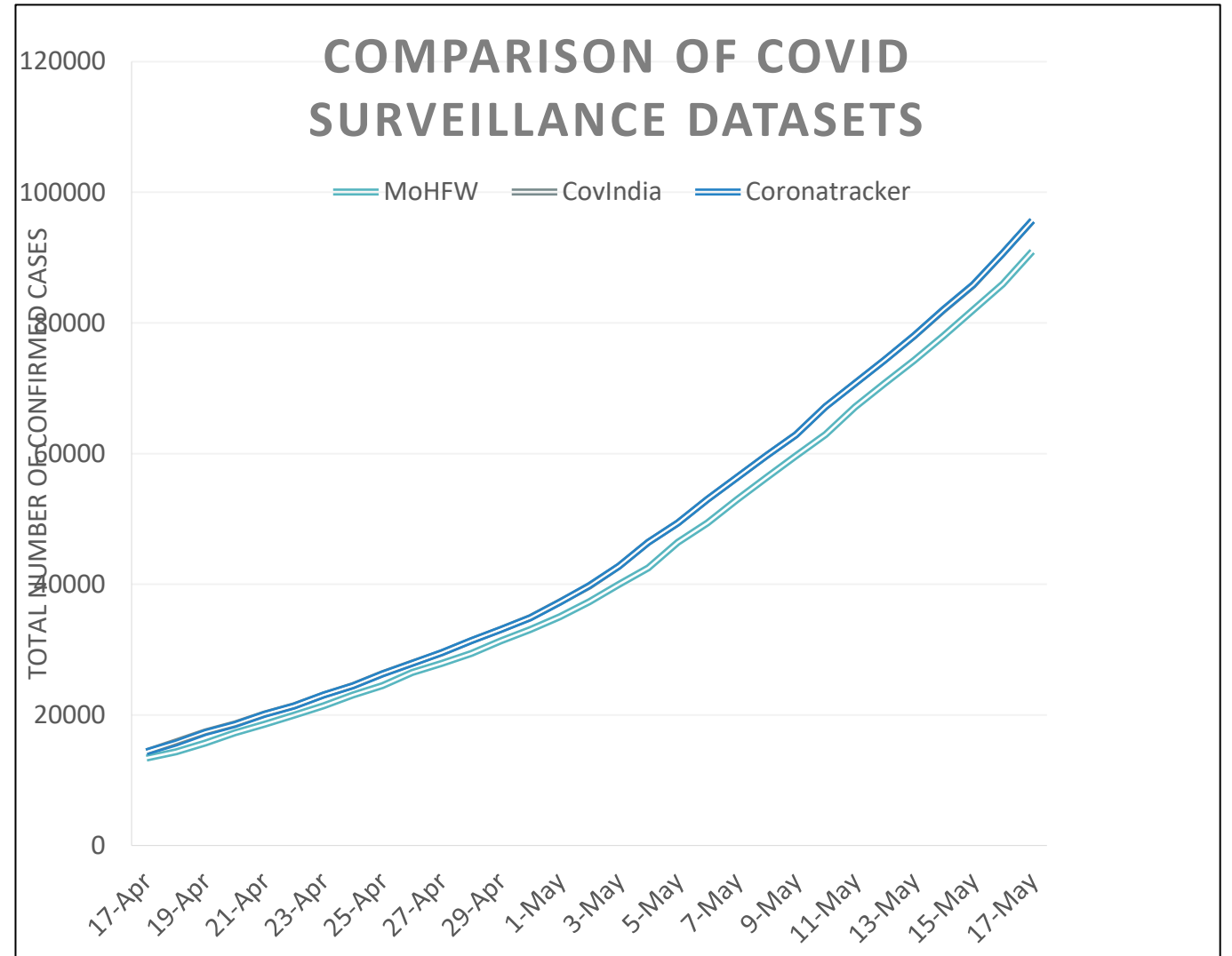
Internal Completeness

- ICMR database- **Low**
- Aarogya Setu app- **7.8%** (Total number of app users on May 10, 2020 were 10.58 crores while the total population of India is 135.26 crores)

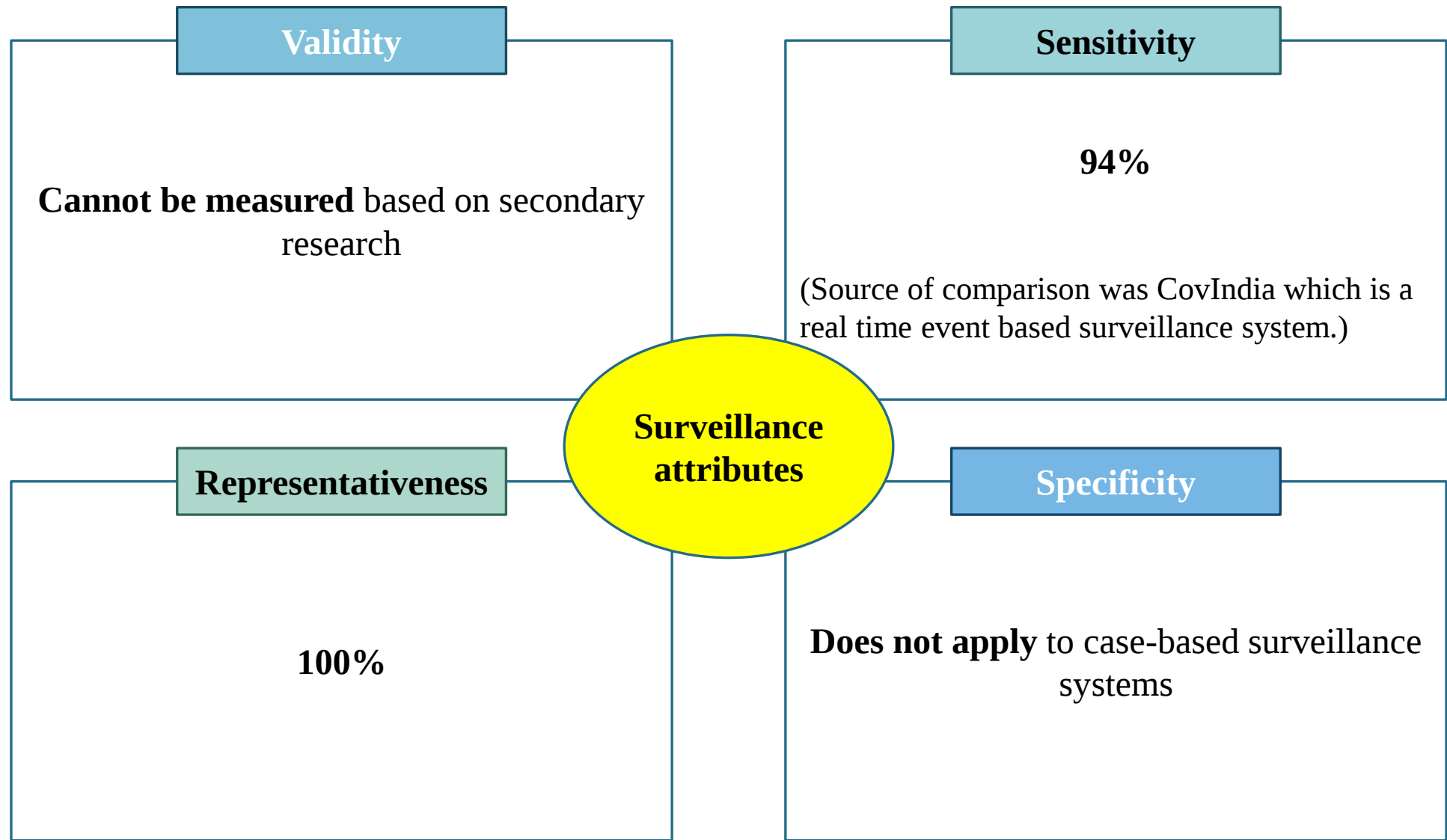
External Completeness

OBSERVATIONS

- The data being reported by MoHFW is significantly different from the data being reported by the other two datasets. This might be indicative of **underreporting of data in the ICMR database.**
- The total cases reported by MoHFW, CovIndia and Corona tracker in the given time period were 1348148, 1430252 and 1430087 respectively.
- Hence the external completeness of the system is low as it is not indicating the true number of COVID-19 cases in India.



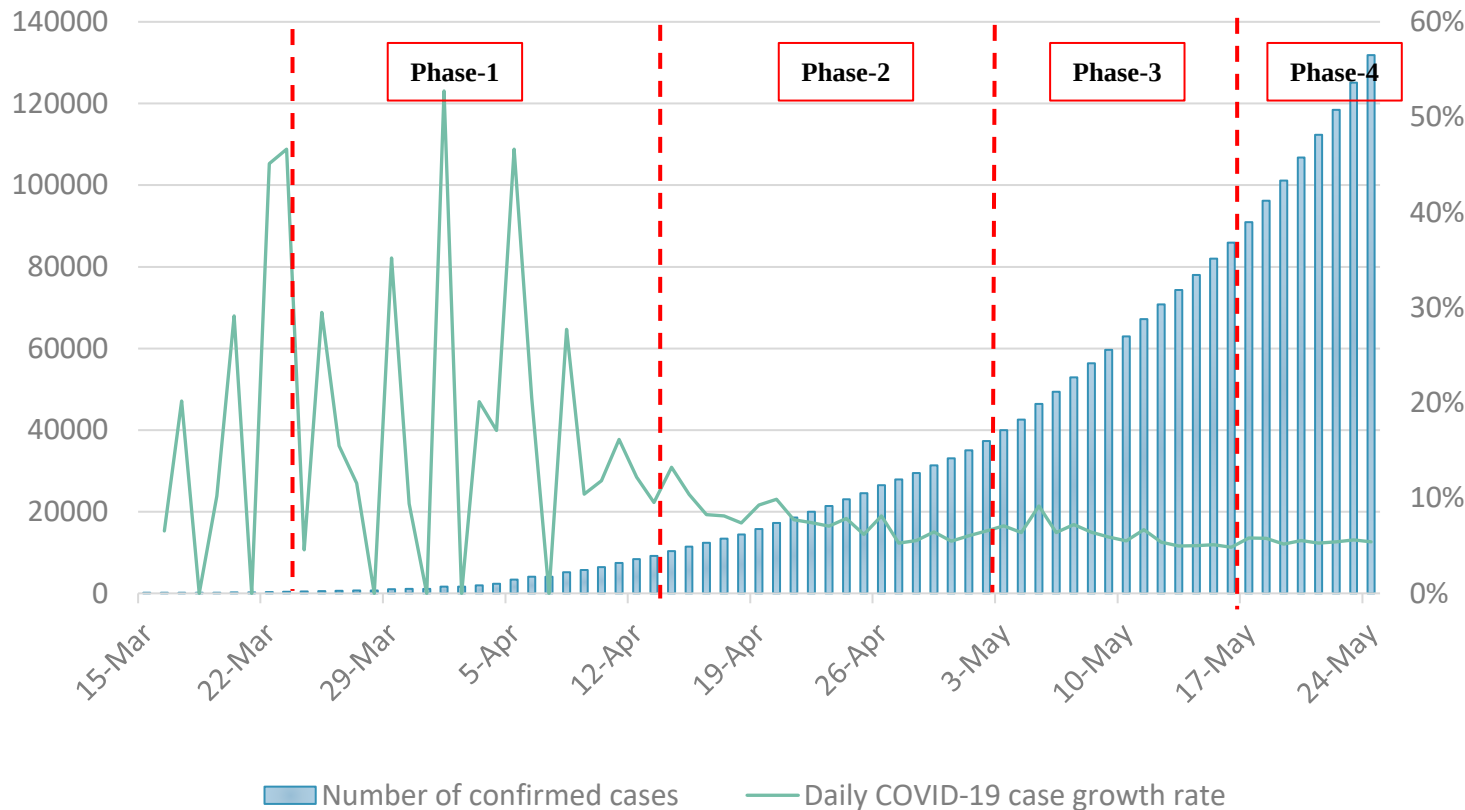
The above graph represents extent of external completeness of surveillance database.



Evaluation of surveillance attributes

Timeliness

COVID-19 SCENARIO IN INDIA



- Measured against the lockdown measures undertaken to control the COVID-19 spread in India
- Comparison with USA and Korea models to establish the effectiveness of lockdown and other control measures in controlling the growth of rate of infection.

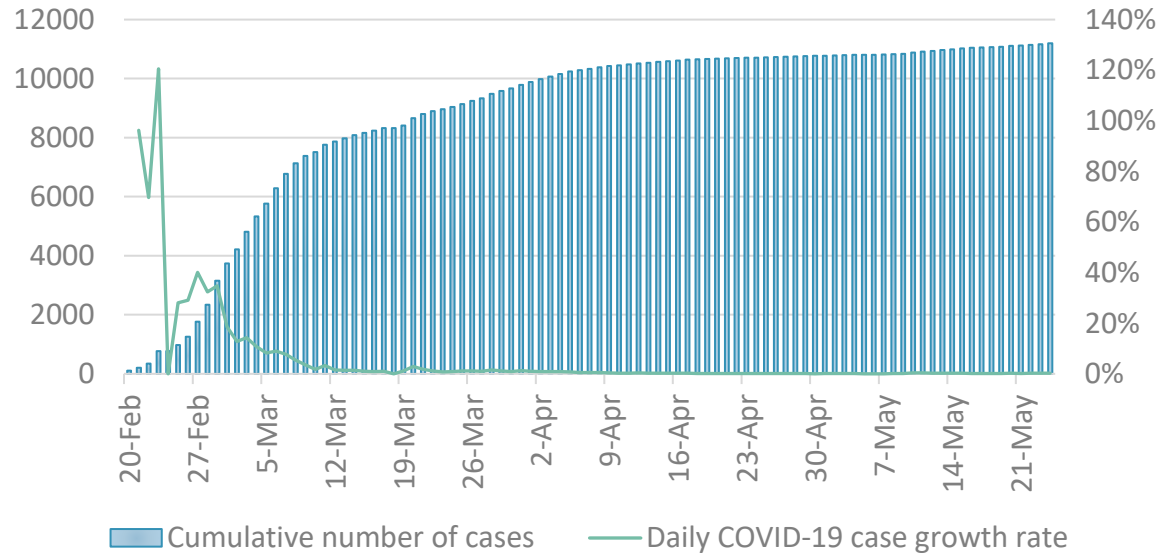
India

- First case: **30th January 2020**
- Number of days it took to attain 100 cases: **45**
- Total cases: **131868**
- Observation: Decrease in daily case growth could be indicative of a successful strategy.

Evaluation of surveillance attributes

Timeliness

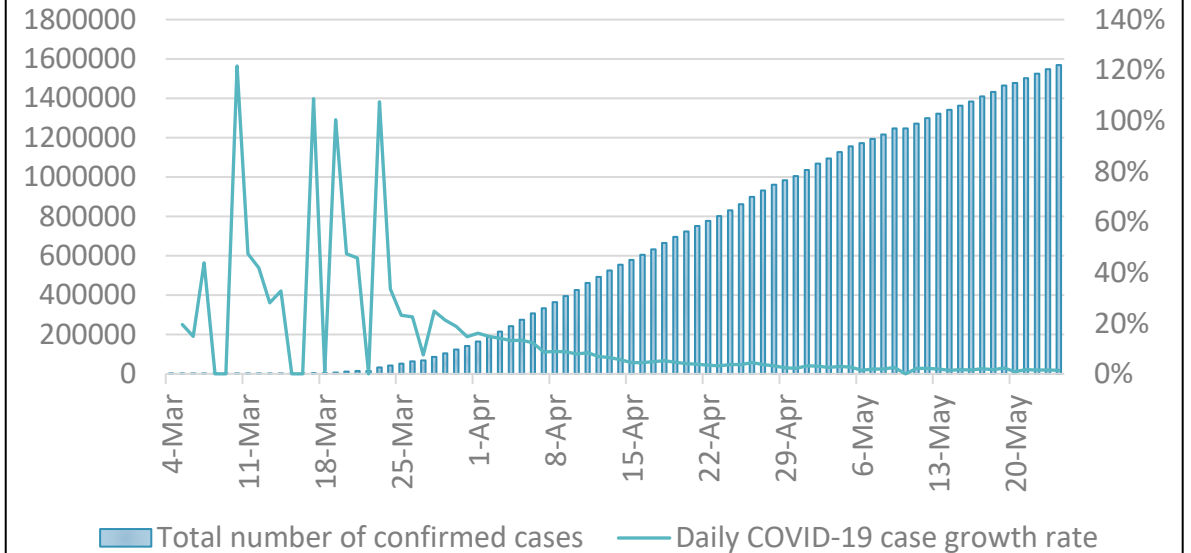
COVID-19 scenario in South Korea



South Korea

- First case: **21st January 2020**
- Number of days it took to attain 100 cases: **30**
- Total cases: **11190**
- Observation: Timely uptake of effective surveillance strategy and other measures helped flatten the curve.

COVID scenario in USA



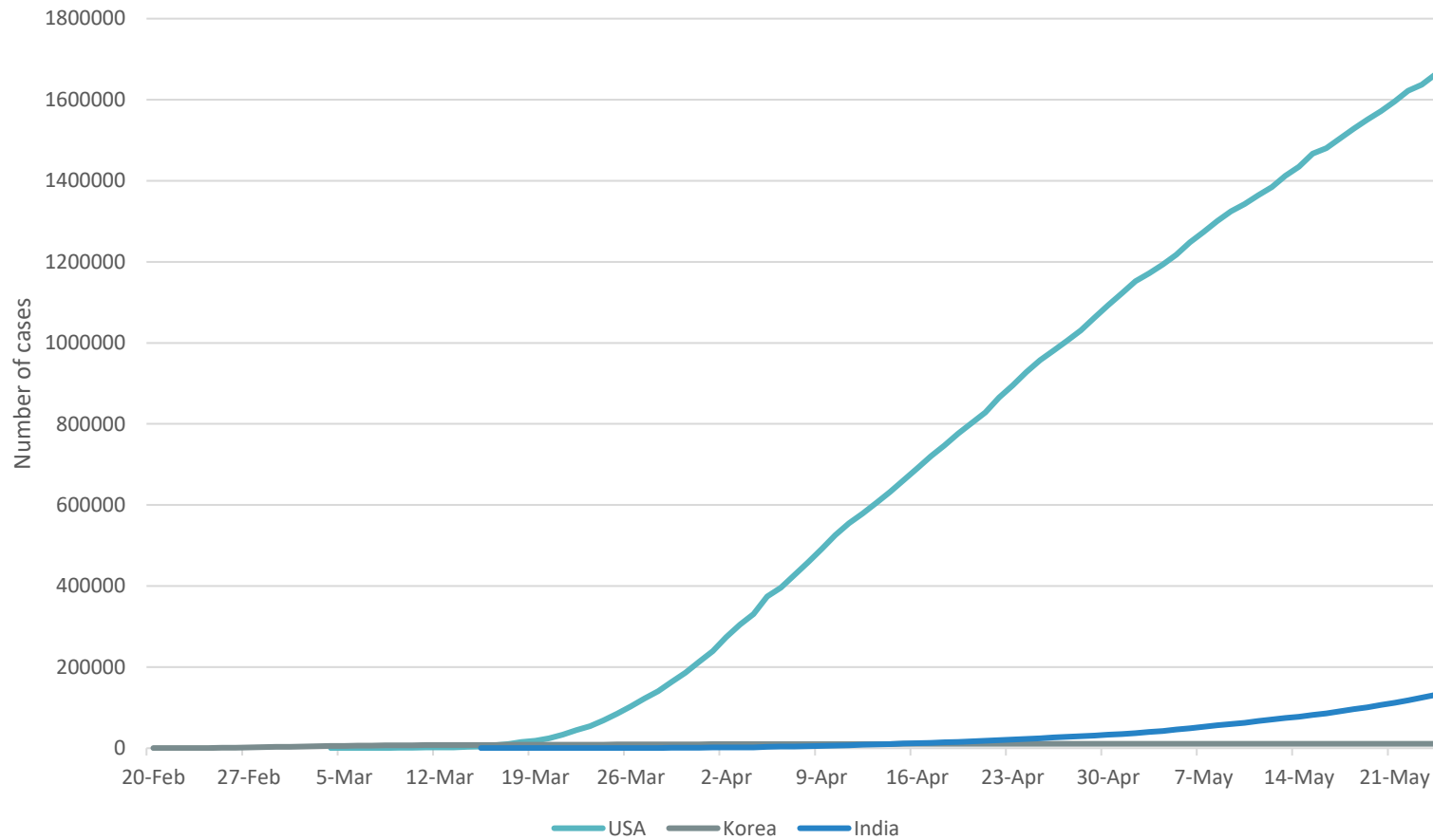
USA

- First case: **23rd January 2020**
- Number of days it took to attain 100 cases: **40**
- Total cases: **1568448**
- Observation: Delayed uptake of containment measures resulted in widespread infection.

Evaluation of surveillance attributes

Timeliness

Comparison of cumulative number of cases of COVID-19



Country	Number of days since 1 st case	Number of cases
South Korea	94	11190
USA	83	1568448
India	71	131868

India has a population size 4.12 times that of USA yet 9.84 times less cases when compared to USA on the 71st day post the 100th case.

Evaluation of surveillance attributes

Timeliness

South Korea

Sharp decline in daily case growth rate post implementation of control measures

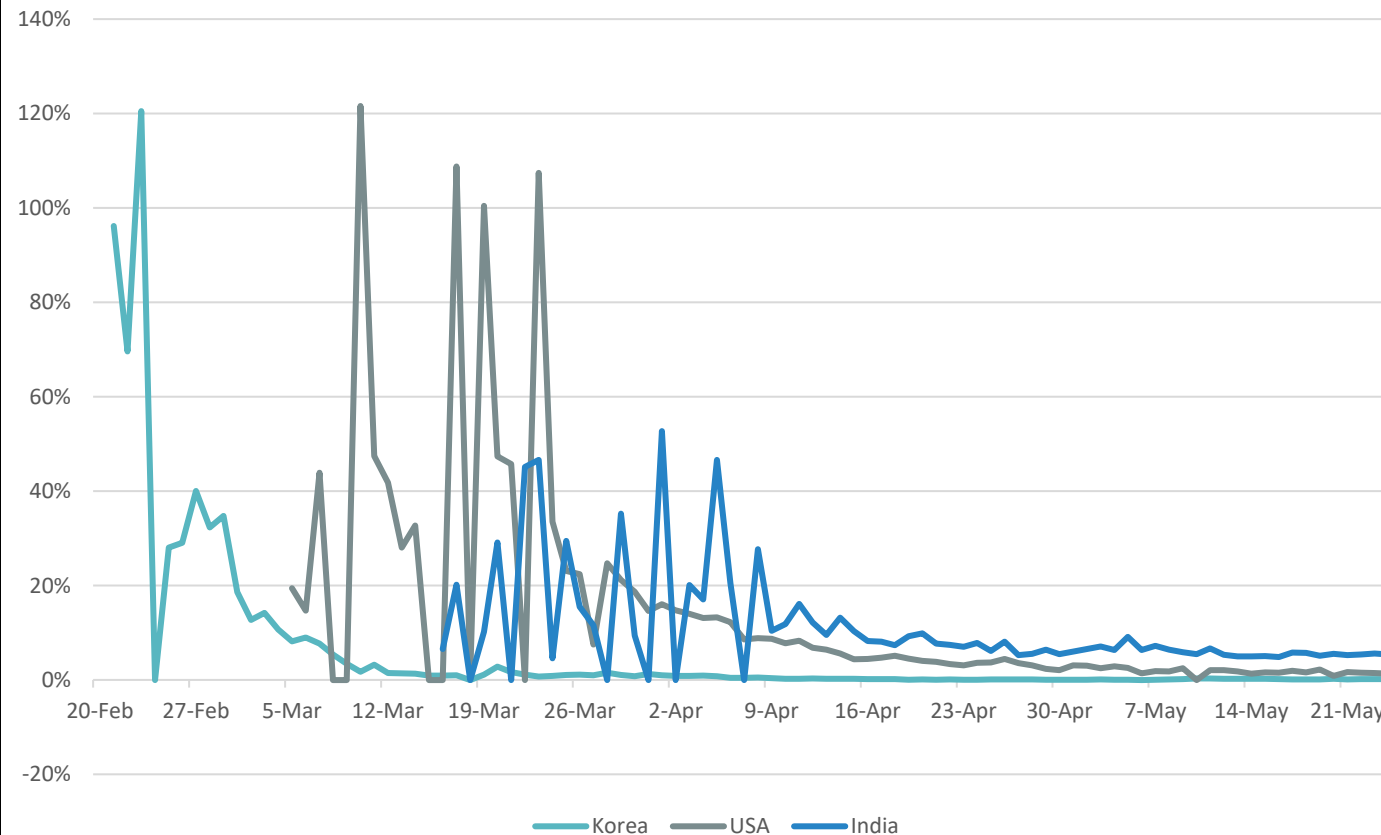
USA

Daily case growth rate >10% for a period of 30 days due to delayed response

India

Fall in daily case growth rate could be attributed to lockdown measures however the effectiveness would be more significantly measured based on the case rates post de-lockdown

Comparison of daily COVID-19 case growth rate in three countries

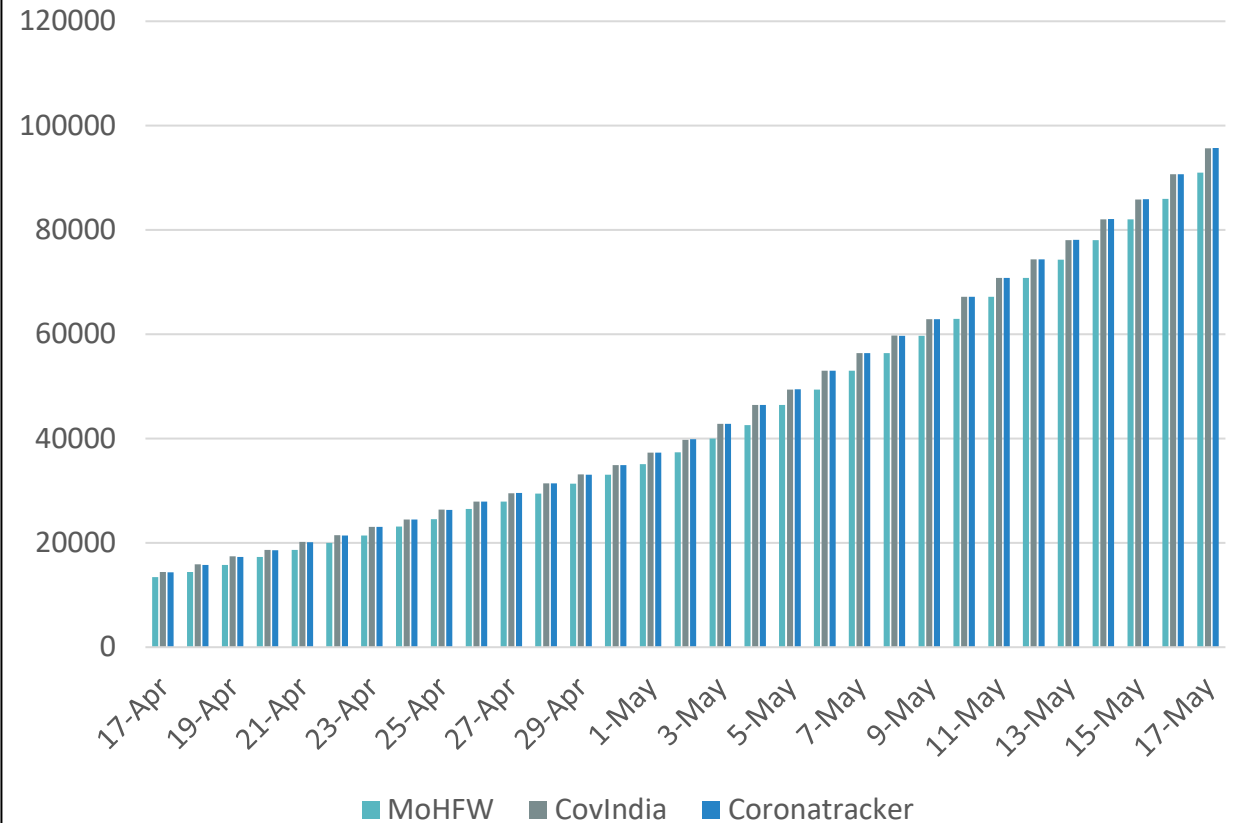


Challenges

Poor data quality

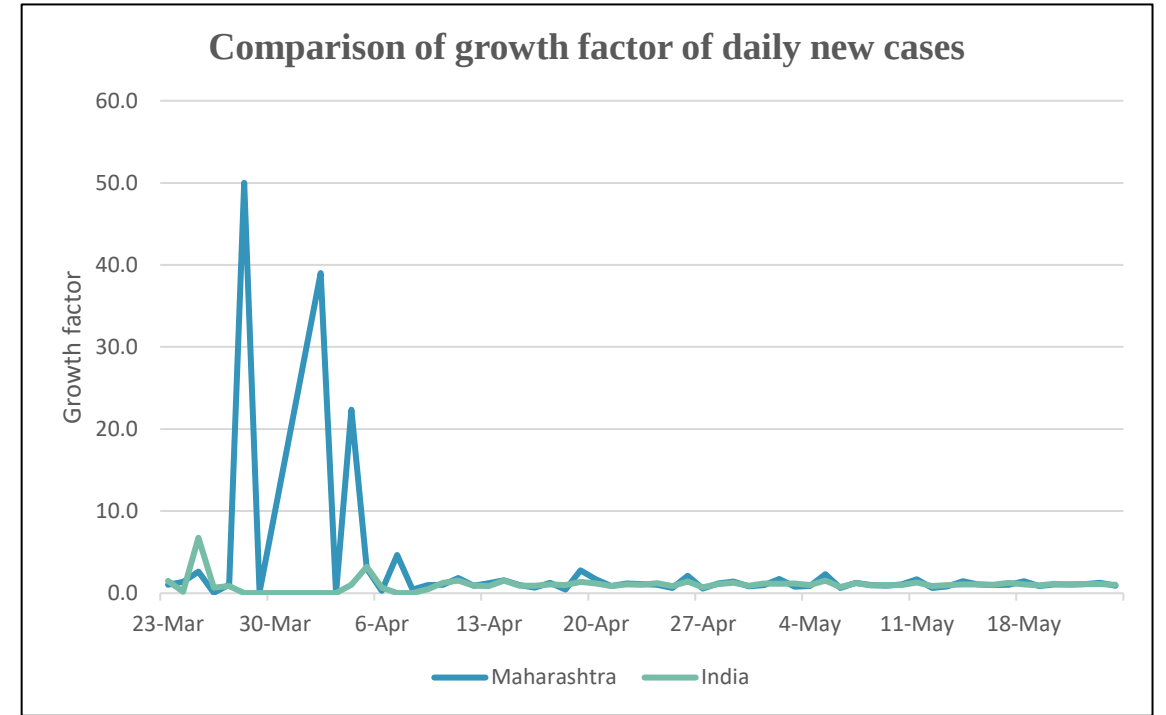
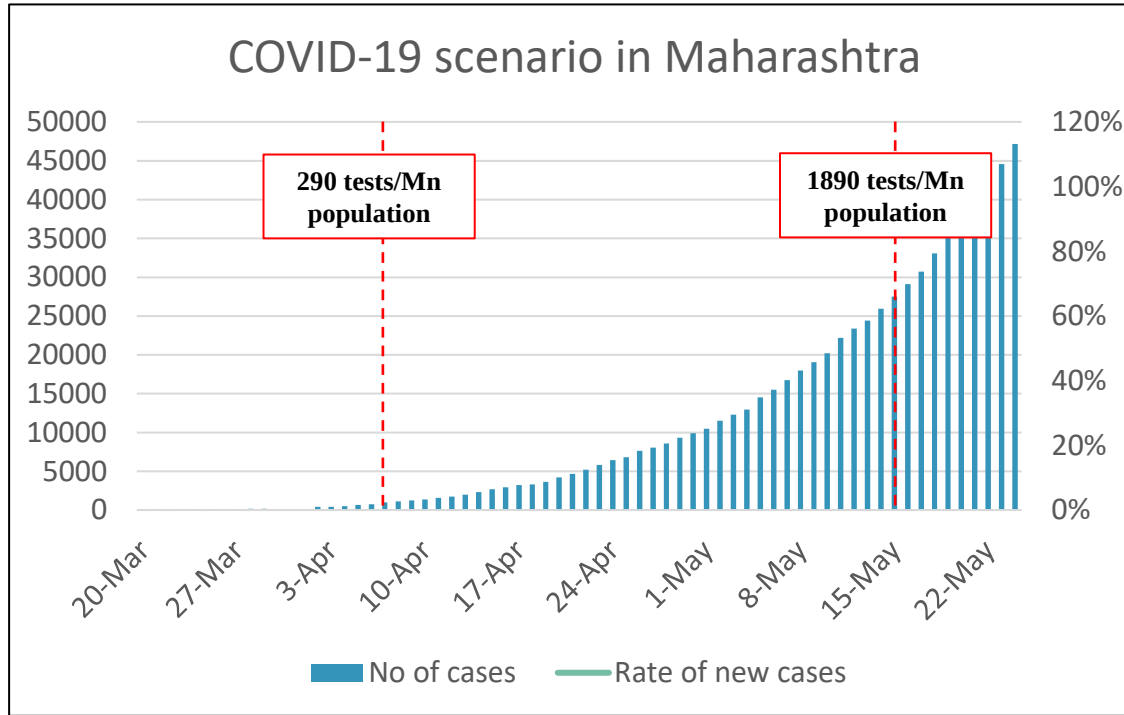
A comparison between the three datasets depicts how the ICMR data has very poor data quality in terms of delay in reporting of cases as the event-based surveillance systems are tracking a cumulative number of 5000 additional cases in comparison to the ICMR database.

Poor data quality of an indicator based surveillance system



Challenges

Poor data quality

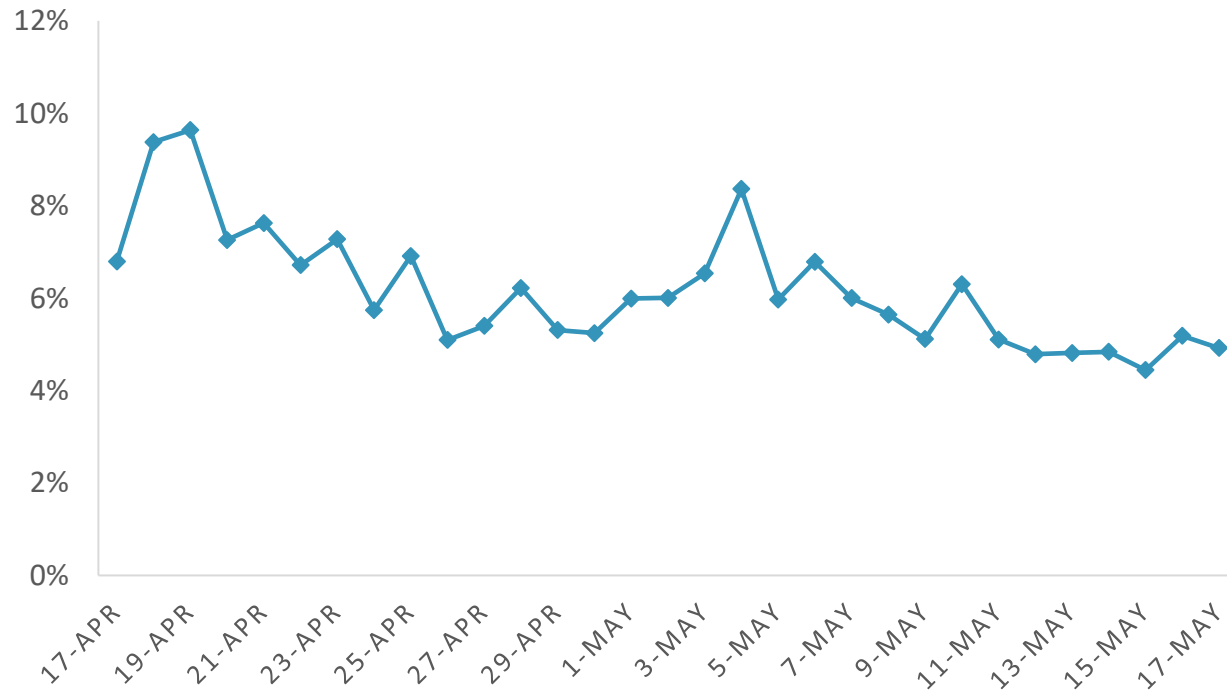


A tricky reporting pattern that emerges repeatedly in cases of poor data quality is an apparent increase in disease incidence that is actually caused by increased surveillance efforts and/or diagnostic capacity thus highlighting the asymptomatic cases.

70% cases identified in Maharashtra are asymptomatic. The significantly higher growth factor of daily cases of Maharashtra in comparison to national average is highlighted to depict the effect of importance of effective surveillance in control of pandemic.

Challenges

ESTIMATED PROPORTION OF MISSING CASES

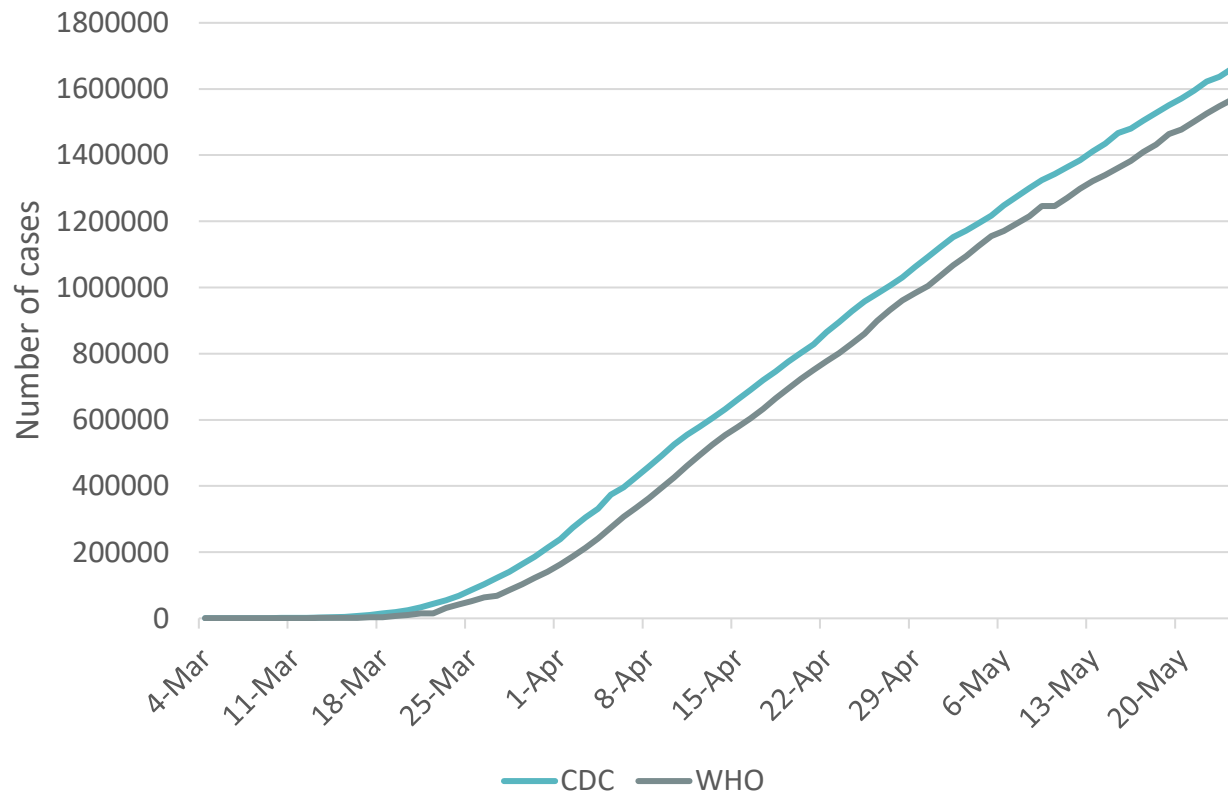


Lack of reporting from private sector

- ICMR is the controller of all testing being done in India and the restrictions imposed by it on private labs such as price capping has not received a positive response so far.
- This could be resulting in lack of reporting from the private sector as they still might be testing on their own terms
- The comparison has been done between CovIndia data and ICMR data.

Challenges

Comparison of number of cases in USA reported by different surveillance systems



Lack of uniformity in data being reported by different surveillance systems

The graph represents the difference the total number of cases of COVID-19 reported for USA by two official surveillance systems- WHO and CDC despite the fact that the source of WHO data is the CDC itself. Such discrepancies in data makes it difficult to estimate the true prevalence of disease in the country.

Conclusion

Surveillance attributes		Observations
Completeness	Internal	- Low for ICMR database 7.8%- Aarogya Setu
	External	Low
Validity	Internal	Cannot be estimated based on secondary research
	External	
Sensitivity		94%
Specificity		Not applicable
Representativeness		100%
Timeliness		Effective as on 24/05/20

Challenges

- Poor data quality
- Lack of private sector participation
- Lack in uniformity of data reported by different surveillance systems extracting data from the same source

- Indicator-based surveillance is not a very effective surveillance system for a country like India with scanty resources and a not so robust healthcare system.
- Participative disease surveillance model might be an effective alternative.

Thank you

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