Government of Karnataka

Department of Health and Family Welfare Services

PRESS RELEASE

Estimating the burden of covid-19 in Karnataka: Results of the First round of survey

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A survey to estimate the prevalence of COVID-19 in Karnataka state was done from September 3-16, 2020. This included the proportion of people who had COVID-19 infection recently and those currently having active SARS-CoV-2 infection. The sampled population surveyed were all adults aged 18 years and above. All 30 districts of the state, including eight zones of BBMP, were included in the survey. The survey was conducted in hospitals and selected population settings. Three groups of the population were covered that included -- (i) low-risk group, i.e., pregnant women attending the antenatalclinic, persons attending the outpatient department in the hospitals/attendees of children or patients; (ii) moderate-risk group, i.e., persons movingin the community likebus conductors, vendors at the vegetable markets, health care workers, individuals in containment zones and congregate settingssuch as markets, malls, retail stores, Bus stops, railway stations, pourakarmikas/ waste collectors; and (iii)high-risk group .i.e. elderly and persons with comorbidconditions.A brief description of methods is provided in page.no.5

The study used Rapid Antigen Test (RAT) and RT-PCR for the diagnosis of acute infection. At the same time, serum testing for IgG antibodies was conducted to know the protection offered by the immune response. The standard ICMR protocols were used, and ICMR approved laboratory network in the state was utilized.

- Of the 16,585 persons surveyed covering the three risk categories, the analysis was done on results for 15,624 individuals whose RAT plus RT-PCR and COVID Kavach ELISA antibody test results were matched in the line list.
- The overall weighted adjusted seroprevalence of IgG was 16.4%. It suggests that in the surveyed population, 16.4% of the people were infected in the past and found to have IgG antibodies against SARS CoV-2.The overall weighted adjusted seroprevalence of IgG in Delhi was29.1%, Mumbai was 16% non-slum settings, 57% in slum settings, 36.1-65.4% across five prabhags in Pune, 7.8% in Indore, 22.7% in Puducherry, and 32.3% in Chennai. The national seroprevalence survey conducted by the Indian Council of Medical research found a seroprevalence of 0.7% in the first round (May) and 7.1% in the second round (August-September). Both rounds were conducted in 70 districts of the country. All these surveys capture only the evidence of infection in the past (IgG). The surveys done in other states were limited to capture information only within the confined limits of the metropolitan area.

- Compared to other studies in India,the survey undertaken in Karnataka has captured total prevalence, which includes information on both current and past infections. The participants were included from locations centred around 290 hospitals spread throughout the state of Karnataka at the district, taluk and rural areas. The survey employed all three tests: Rapid Antigen Tests,RTPCR, and antibody (IgG).
- 12.7% of the apparently healthy population in the surveyed area was found to have a current(active) infection.
- The overall adjusted prevalence of COVID-19 was 27.3% (combined IgG and activeinfection). As per the ICMR 2nd round of serosurvey, the weighted and adjusted prevalence among individuals aged ≥ ten years was 6.6%, with urban slums having 15.6% and non-slum urban areas having 8.2%.
- At the state level, it was estimated that there were 40 undetected infected individuals for every RT-PCR confirmed case, i.e., case-to-undetected-infections ratio (CIR) of 1:40. The cases-to-infections ratio ranged from 10 to 111 across units. In the national seroprevalence survey conducted by ICMR, the CIR was 81..6 to 130.1 in the first round (May), which improved by the second round to 26–32 infections per case.
  - Districts with high cases infections ratio (i.e., more than 40) need to improve detection of cases actively through syndromic approach, improve testing, and ensure other public health actions (avoiding 3Cs and following 3Ws) are implemented efficiently. These districts were Vijayapura, Belagavi, Chitradurga, Tumakuru, Raichur, Ramanagar, Haveri, Chamarajanagar, Bidar, Davanagere, Yadgir, Kalaburagi, Kolar, Kodagu, Mandya, Chikmagalur, Ballari, Bengaluru Rural, Hassan.
  - Districts with a low case to infection ratio (BBMP Bommanahalli, BBMP East, BBMP West, BBMP South, Mysuru)suggest that the strategy employed for testing is reasonable and can be replicated in other districts.
- Out of 7.07 crore estimated populationin Karnataka, the study estimates that 1.93 crore (27.3%) of the people are either currently infected or already had the infection in the past, as of 16 September 2020.
- The infection fatality rate due to COVID-19 was 0.05%.The infection fatality rate due to COVID-19 in the state of Karnataka is 0.05%. The districts with a high infection fatality rate suggest that clinical care needs to be improved in these places. The present IFR is likely an underestimate. The overall IFR based on the first round of sentinel serosurvey findings is 0.07%. The IFR reported across other cities are Mumbai (0.05-0.10%), Pune at 0.08%, Delhi is at 0.09, and Chennai is at 0.13%.

In summary, the state is passing through different stages of the COVID-19 pandemic in the different districts. The surge in cases is yet to occur in the districts with the lowest estimated prevalence of COVID-19 (Dharwad, Gadag, Chikkaballapur, Bagalkot, and BBMP Mahadevapura).The study recommends establishing the district-level facility-based sentinel sero-surveillance to monitor the trend of infection in the long term systematically. This can inform local decision-making at the district level to mount the necessary public health response towards the COVID-19 epidemic in Karnataka state.

Lastly, a follow-up survey is planned to measure the extent and speed of transmission and evaluate the impact of containment strategies over time in the state.

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Note:

For details, please districtwise comparison on page 4. For any other clarifications, please contact the Department of Health and Family Welfare Services.

The survey was a collaborative effort of the Department of Health and Family Welfare, Indian Institute of Public Health -Bangalore, Indian Institute of Science, Indian Statistical Institute (BC), UNICEF, MS Ramaiah Medical College, Bangalore Medical College, and others.The protocol was designed by Prof Giridhara R. Babu and his team at the IIPH, Bangalore, along with the following members of the Technical Advisory Committee – Dr. Prakash, Dr. Lalitha Hande, Dr. Lalitha K., and Dr. Pradeep B. S. The Technical Advisory Committee chaired by Prof Dr. M. K. Sudarshan reviewed and provided feedback on the design and implementation of the survey. Dr. M. R. Padma, Dr. Mohammed Shariff,under the supervision of Dr. Parimala Maroor, Project Director IDSP, coordinated the implementation at the state level. The technical review group chaired by the Director, DHFWS, approved the conducting of the study. Mr. Pankaj Kumar Pandey reviewed and approved the protocol for implementation. Prof Siva Athreya of the Indian Statistical Institute provided support for data processing and statistical analysis. Prof Rajesh Sundaresan of the Indian Institute of Science provided support with modelling and confidence interval estimation.Professors Giridhara R. Babu, Siva Athreya, and Rajesh Sundaresan planned and executed the analysis, arrived at the findings, and wrote the report. The findings were shared with the TAC, and debriefing was done to the honourable Minister for Health and Family Welfare, the Additional Chief Secretary (HFWS), and the Commissioner, DHFWS.

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Appendix-1: Seroprevalence* of IgG antibodies against SARS-CoV2 and Acute infection in districts of Karnataka state (N=15624)

Unit	Samples	%- IgG against SARS-CoV2[@]	%-Active Infection[@]	%-Prevalence of COVID-19[@]
Karnataka	**15624**	**16.4 (15.1--17.7)**	**12.7 (11.5--13.9)**	**27.3 (25.7--28.9)**
Ballari	406	22.1 (14.3--29.9)	34.5 (25.4--43.6)	43.1 (33.5--52.6)
Davanagere	412	16.4 (9.4--23.4)	29.2 (20.3--38.1)	40.6 (31--50.3)
Udupi	439	16.2 (9.5--23)	22.8 (15.1--30.5)	36.4 (27.5--45.4)
Vijayapura	381	23.9 (15.7--32.2)	13.9 (6.6--21.1)	35.4 (25.7--45.1)
Raichur	404	22.8 (14.9--30.7)	12.1 (5.5--18.7)	34.1 (24.7--43.4)
Chikmagalur	436	12 (5.9--18.1)	21 (13.2--28.8)	31.8 (22.8--40.8)
Yadgir	422	15.4 (8.6--22.1)	18.6 (11.2--26)	31.6 (22.7--40.5)
Hassan	410	13.2 (6.7--19.7)	21.2 (12.9--29.5)	30.7 (21.3--40)
Belgaum	430	23.7 (16--31.5)	6.4 (1.4--11.5)	30.1 (21.4--38.9)
Kalaburagi	425	17.1 (10.1--24.1)	14.5 (7.8--21.1)	29.8 (21.1--38.4)
Bengaluru Urban Conglomerate	3617	22 (19.1--24.9)	9.2 (7.1--11.3)	29.8 (26.5--33)
Tumakuru	429	6.8 (1.7--11.8)	25.2 (16.2--34.2)	29.4 (19.9--38.9)
Ramanagar	408	13.9 (7.2--20.6)	16.2 (8.7--23.6)	29.3 (20.2--38.5)
Bengaluru Rural	432	15.2 (8.6--21.9)	16.5 (9--23.9)	28.7 (19.8--37.6)
Haveri	417	14.8 (8.1--21.5)	14.6 (7.8--21.4)	28.6 (19.9--37.4)
Mysuru	402	18.8 (11.4--26.2)	8.4 (2.7--14.1)	27.2 (18.4--36)
Dakshina Kannada	430	14.5 (8--21.1)	13.5 (7--20.1)	27 (18.5--35.5)
Chitradurga	411	10.2 (4.2--16.1)	16 (8.5--23.4)	25.9 (17--34.8)
Mandya	414	18.5 (11.2--25.9)	6.7 (1.3--12.2)	25.3 (16.6--33.9)
Koppal	427	19.6 (12.3--26.9)	2.7 (0--6.2)	22.3 (14.3--30.2)
Shivamogga	426	7.7 (2.4--13)	13.7 (6.8--20.6)	21.4 (13.1--29.7)
Chamarajanagar	383	15.8 (8.6--22.9)	6.6 (1.1--12.1)	21.1 (12.7--29.5)
Kodagu	412	12 (5.8--18.3)	8.7 (2.8--14.6)	20.5 (12.4--28.7)
Bidar	407	18 (10.7--25.2)	0.7 (0--3.3)	18.7 (11--26.3)
Uttara Kannada	419	8.1 (2.6--13.5)	8.7 (3--14.4)	16.3 (8.8--23.8)
Kolar	431	10.1 (4.3--15.9)	6.8 (1.6--11.9)	16.1 (8.8--23.5)
Chikkaballapur	412	6.4 (1.3--11.5)	5.9 (0--11.8)	12.1 (4.5--19.7)
Bagalkot	401	4.1 (0--8.6)	9.7 (3.6--15.8)	12 (5--19.1)
Gadag	341	6.3 (0.8--11.8)	2.7 (0--8.5)	9 (1.1--17)
Dharwad	440	7.1 (2--12.1)	2 (0--5.6)	8.7 (2.7--14.7)

@Adjusted for sensitivities and specificities of RAT, RTPCR, and antibody testing kits and procedures.

Estimating the burden of covid-19 in Karnataka: Results of the First round of survey

This *was the first round of the proposed Serial Cross-sectional surveys* across the districts of Karnataka, wherein each district is considered as a unit. The participants included *all adults aged 18 years and above*. In Bengaluru, each zone (8) of BBMP was considered a unit (East, West, South, Bommanahalli, Dasarahalli, Mahadevapura, RR Nagara, and Yelahanka). Hence, there were a total of 38 units. We *excluded* those already diagnosed with SARS-CoV2 infection, unwilling to provide a sample for the test, or did not agree to provide informed consent.Health facilities were selected from each unit based on thefeasibility and ease of recruitment in terms of process and adequate participants. The study was *conducted in the hospitals and select populations settings,* as described below.

Figure 1: Schema for different tests in the Survey, Round 1, Karnataka state

- Low-risk group:Pregnant women presenting for ANC clinic and persons attending the outpatient department in the hospitals/attendees.
- Moderate risk:*P*ersons with high contact in the community, bus conductors, vendors at the vegetable markets, healthcare workers, individuals in containment zones, and congregate settings (Markets, Malls, Retail stores, Bus stops, Railway stations, Pourakarmikas/ waste collectors).
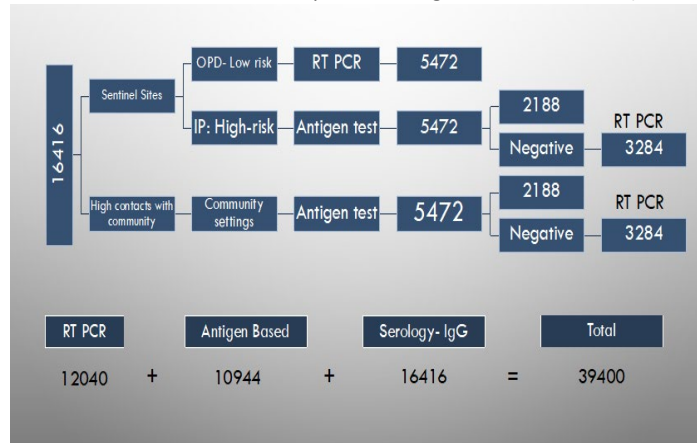- High risk:Elderly and persons with comorbidconditions.

The data collection of all participants was done through a specific app designed for the study, linked to the samples using the ICMR Specimen Referral Forms for COVID-19. The schema for employing different types of tests for the survey is provided in figure 1.
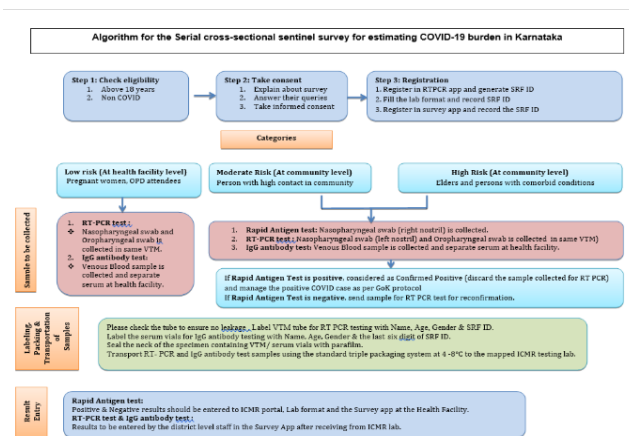

Figure 2: Algorithm for the Serial cross-sectional sentinel survey for estimating COVID-19 burden in Karnataka

We used Rapid Antigen Detection Test and RT-PCR for the diagnosis of acute infection. At the same time, *serum testing for IgG* antibodies was conducted for understanding protection offered by the immune response. The nasopharyngeal/ Oropharyngeal swab (NPS/OPS) collection was conducted according to existing protocols and RT-PCR testing done through the current ICMR approved testing network. *The current sample collection, transport, and analysis protocols developed by ICMR were used.* RT PCR was used in the entire low-risk group and in the persons who are tested negative in the antigen-based tests. The Rapid Antigen Detection Test was done by using Antigen Standard Q COVID-19 Ag detection kit, a rapid chromatographic immunoassay for the qualitative detection of specific antigens to SARS-CoV-2. For antibody testing, 4 ml of venous blood was collected in all the subjects who agreed to participate. The sample was centrifuged, and the serum was transported to the laboratory. SARS-CoV-2-specific IgG antibodies were detected using an ELISA-based test as per the specified optical density (O.D.) cut-off value. [6]

*With a 95% confidence level, the margin of error at 0.05, the design effect at 3, considering 10% prevalence, the minimum sample size obtained is 432 per cluster.*We considered each district or a zone in BBMP as a unit and collected the data from 38 units(30 districts + 8 zones of BBMP), leading to a total sample size of 16416. The study was conducted during 03-16 September 2020.