A missing science pillar in the COVID response

(Mains GS3:Science and Technology- developments and their applications and effects in everyday life.)

Context:

- The optimism that India might have beaten the COVID-19 pandemic has given way to pessimism from a sharp increase in new cases and deaths from the disease.
- Maharashtra seems to be particularly affected, but nearly all States are reporting increased COVID-19 cases.
- The epidemiology of COVID-19 is poorly understood, but some early understanding of the transmission of the virus can enable a more effective science-driven response.

Spread of variants of COVID-19:

- The surge is probably driven by variants from the original, as variants worldwide comprise much of the current wave.
- A resumption of global travel meant that spread of variants into India was almost inevitable.
- Evolutionary theory would expect SARS-CoV-2, the virus that causes COVID-19, to mutate to become more transmissible.
- After all, the only task of a virus is to reproduce. However, the expected concomitant decrease in lethality has not yet been documented.
- Anecdotal reports that the current surge is occurring more in younger adults and accompanied by unusual symptoms also support the idea that variants are responsible. Direct evidence is needed from genetic sequencing of the virus.
- it was, and remains, wishful thinking that India had achieved “herd immunity”.
- The patterns of infection in India clearly suggest multi-generational transmission, with younger adults the engine of transmission into the elderly.
- Various serosurveys have consistently found that half or more of tested urban populations have antibodies to the virus.
- However, this high level of infection is not the same as a markedly reduced level of transmission, which is what is required for herd immunity.

Herd immunity is not enough hard on COVID-19:

Notions of herd immunity do not fully capture the fact that for largely unknown reasons, viral transmission is cyclical.

- Delhi had two major peaks, in 2020, of death rates and case rates, one in June and another in November, and now is entering a third major wave.
- Within Mumbai, the current wave appears to be affecting more affluent areas and private hospitals, in contrast to last year where the highest infection levels were in the slums and poorer areas.
- Some mortality-based analyses suggest several sub-waves exist within major viral peaks, reflecting subtle changes in community transmission.
- The ebbs and flow of vaccine transmission are far more variable than we assume.

- Much of infection in India might well be mild, with less durable immune protection than induced by vaccination.
- 'Asymptomatic infection is more commonly reported in Indian serosurveys, exceeding 90% in some, in contrast to high-income countries, where about one-third of infections report as asymptomatic'.
- Recent findings from Wuhan, China show most seropositive infections were asymptomatic and among these, the important protective antibodies were low during follow-up periods.
- Milder infection might well also correlate with lower severity of clinical illness, helping to explain the Indian paradox of widespread transmission but with low mortality rate.

Decision must be data guided:

- India needs to increase the quantity, quality and public availability of actual data to guide decision-making.
- Theories or mathematical models are hugely uncertain, particularly early on in the epidemic.
- Better understanding of the unique patterns of Indian viral transmission has a few pillars, which can be achieved quickly.

Collection of demographic details:

Collection of anonymised demographic and risk details (age, sex, travel, contact with other COVID-19 patients, existing chronic conditions, current smoking) on all positive cases on a central website in each State remains a priority.

Sequence viral genome:

Greatly expanded sequencing of the viral genome is needed from many parts of India, which can be achieved by re-programming sequencing capacity in Indian academic and commercial laboratories.

Better reporting:

- Far better reporting of COVID-19 deaths is needed.
- Daily or weekly reporting of the total death counts by age and sex by each municipality would help track if there is a spike in presumed COVID-19 deaths.
- The Registrar General of India's verbal autopsy studies are invaluable, but must be reactivated to review deaths occurring in 2020, given that the last available results are from 2013.

Better surveys required:

- The Indian Council of Medical Research's national serosurvey had design limitations such that it probably underestimated the true national prevalence.
- A far larger and better set of serial surveys is required.

Mechanism of virus needs to be understood:

- Need is to understand better why some populations are not affected.
- For example, COVID-19 infection and death levels in Thailand and Vietnam are remarkably low, and cannot be assigned to their stronger testing and tracing programmes.
- Widespread existing immunity, perhaps from direct exposure to bat coronaviruses might be one explanation
- Rapidly assembled comparative studies across parts of India and Asia are a priority.

Contour growing inequality:

- The science pillar of a response is complementary to action.
- The central and State governments have already pushed for a rapid expansion of COVID-19 vaccination.
- India can learn from Chile, which has successfully provided at least one dose to over half of its population.
- Affluent and connected urban elites of India are vaccinating quickly, but the poorer and less educated Indians are being left behind.
- Vaccination campaigns need to reach the poor adults over age 45, without having to prove anything other than approximate age.
- Follow-up studies among the vaccinated can establish the durability of protection, and, ideally, reduction in transmission.
- Similarly, India must capture and report data on who is vaccinated, including by education or wealth levels. The poor cannot be left in the dark.

Adult vaccination plan

- COVID-19 could well turn into a seasonal challenge and thus, the central government should actively consider launching a national adult vaccination programme that matches India's commitment and success in expanding universal childhood vaccination.
- The Disease Control Priorities Project estimates an adult national programme would cost about ₹250 per Indian per year to cover routine annual flu vaccination, five-yearly pneumococcal vaccines, HPV vaccines for adolescent girls and tetanus for expectant mothers.
- Per year, vaccines for one billion adults might save about 200,000 lives from the targeted diseases.
- Annual flu vaccination reduces the risk of influenza pandemics and perhaps even COVID-19 infection.
- Indeed, we might already be in the era where major zoonotic diseases are not once-a-century events, but once a decade.
- Thus, adult and child vaccination programmes are essential to prepare for future pandemics.

Conclusion:

- An another full national lockdown should be considered carefully, as they incur a huge toll on the poor and stunt education of Indian children.
- It also remains unclear if the population would comply.
- The resurgence of COVID-19 presents a major challenge for governments, yet the best hope is to rapidly expand epidemiological evidence, share it with the public and build confidence that the vaccination programme will benefit all Indians.