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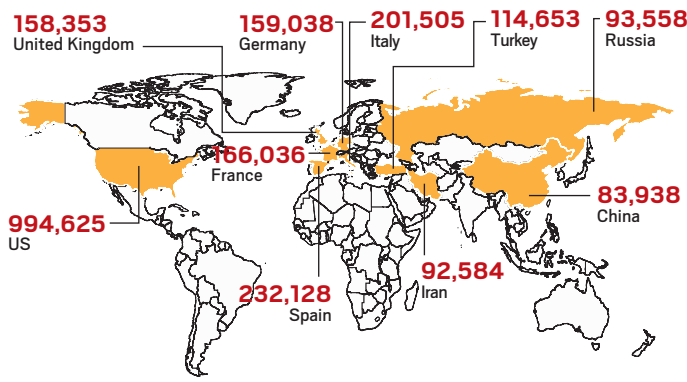
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SIMPLY PUT

Doubling times, earlier & now

COVID-19 cases in India are taking a longer time to double during the lockdown than they were earlier. A look at nationwide trends, and how widely the doubling rates have varied from one state to another

CORONAVIRUS OUTBREAK YOUR QUESTIONS ANSWERED DAILY



TOTAL CONFIRMED: 3,074,948 DEATH COUNT: 2,13,273

Source: Johns Hopkins University, updated at 11:00 pm on April 28

What extra care should I take if I visited a high-risk area?



Shopping during relaxation of lockdown in Shimla. Pradeep Kumar

MUCH AS the outbreak is keeping many people indoors, there are some professionals such as doctors and police who need to go to their workplace. Besides, everyone needs to visit the grocer for essentials at one point. If they feel this brought them close to a person possibly infected with COVID-19, what extra precautions should they take?

First, it is not necessary that a COVID-19 patient will always infect everyone who came close to them. Second, to know if they did, the newly infected has to develop symptoms, which not everyone does. But if one does begin to feel unwell, the Health Ministry advises self-isolation by staying at home. Do that even with mild symptoms such as headache, low-grade fever and slight runny nose, until you recover.

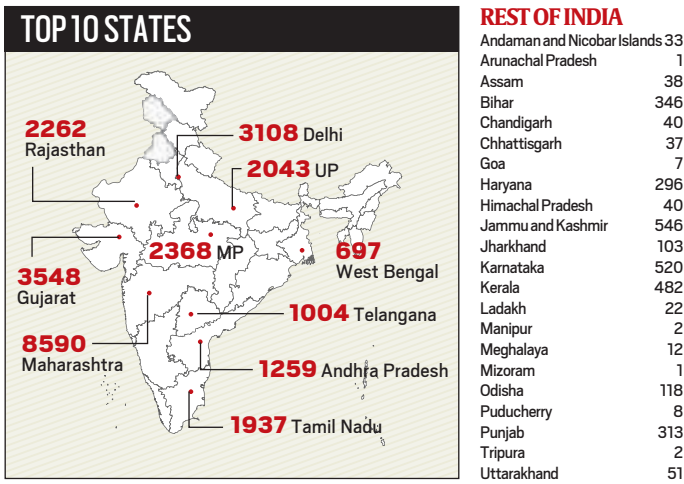
If you develop fever, cough and difficulty in breathing, seek medical advice promptly; this may be due to

a respiratory infection or other serious condition. Call the healthcare provider in advance and tell them of any recent travel or contact with travellers, so that the provider can quickly direct you to the right health facility, the Ministry advises.

Without symptoms, the usual guidelines apply. If you went out to buy or collect supplies, then wear a mask. Regularly and thoroughly clean your hands with an alcohol-based handrub, or wash them with soap and water. Both of these are known to kill viruses that may be on your hands; they destroy the fatty envelope that characterises viruses.

While outdoors, maintain at least 1 metre distance from others — especially if someone is coughing or sneezing. It is widely accepted that the novel coronavirus spreads itself through droplets, which are released in abundance when someone coughs or sneezes.

INDIA COUNT: 29,974 (937 DEATHS)



Union Health Ministry update as of 11 pm, April 28. Some states may have reported higher numbers. Only states/UTs with at least one case listed above. 7027 PATIENTS DISCHARGED IN 30 STATES AND UNION TERRITORIES

Have a question on the COVID-19 outbreak and what you should/should not do? Write to explained@indianexpress.com

ABHISHEK DE & NUSHAIBA IQBAL
NEW DELHI, APRIL 28

THE GOVERNMENT has maintained that due to the lockdown imposed on March 24, the doubling time of coronavirus cases has increased. In the week before the lockdown, the doubling time across India was 3.4 days. By the week ending April 27, it had improved to 10.77 days, an analysis of daily data shows.

Why this matters

Doubling time is a concept borrowed from the world of finance, where it is routinely used to compute the time taken for an investment to double. In a pandemic such as this, a single-day doubling time would mean that, if there were 100 cases to start with on Day 0, there would be 200 cases on Day 1, 400 on Day 2, 800 on Day 3 and so on. However, if the doubling rate was three days, 100 cases on Day 0 would increase to 200 cases on Day 3. Doubling rate is not known in advance. It has to be calculated, based on the emergence of new cases, and as such, it changes every day.

Sometimes, a large surge or dip in the number of cases can give an erroneous impression of the spread of the disease. Therefore, doubling rate is often calculated using the five-day, seven-day or ten-day moving average of cases to capture trends over longer periods. The government had highlighted seven-day moving averages. Here, we have calculated the doubling rate for five-day moving averages.

The trends

Using five-day averages, and data till April 27, we show that the doubling rate at the national level increased from 3.21 days on March 23, just ahead of the lockdown, to 7.82 days in the five-day period ending April 17 (when the first phase of lockdown ended), to 10.77 days in the period ending April 27.

The national figures mask the wide variations in the states. Among the 12 states with the highest number of cases on April 27, the disease was growing at the fastest rate in West Bengal, doubling at just 7.13 days, followed by Maharashtra and Gujarat, at 7.9 and 8.3 days respectively. The slowest doubling was in Telangana, at 58 days (see chart).

West Bengal saw an increase of nearly 93% between April 20 and April 27, which corresponds to a cumulative daily growth rate (CDGR) of more than 10%. Cases in Maharashtra and Gujarat grew by 85% and 93%, respectively, in the same period.

In Kerala, which had registered the first three cases of COVID-19 in India in end-January, the doubling time has improved from about 3 days before the lockdown to 37.17 days now. The state has earned global praise for its containment strategy. While Telangana's doubling rate is even slower, Kerala's is significant given that it has a lower number of cases.

Doubling times have increased in all the top 12 states, underlining the effect of the lockdown so far. Except in West Bengal, the CDGR for the last five days of all other states in the top 12 have dropped below 10%. This has happened for the first time for Maharashtra, whose count grew by an average 8.74% per day as compared to over 17% in the first week of April.

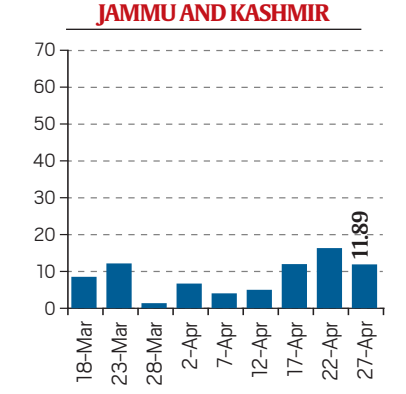
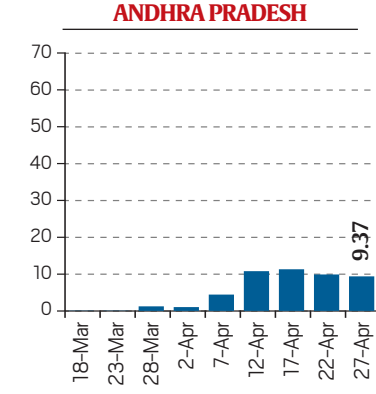
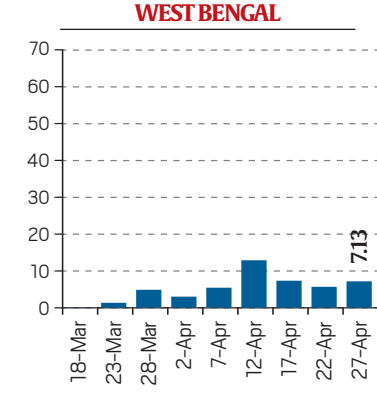
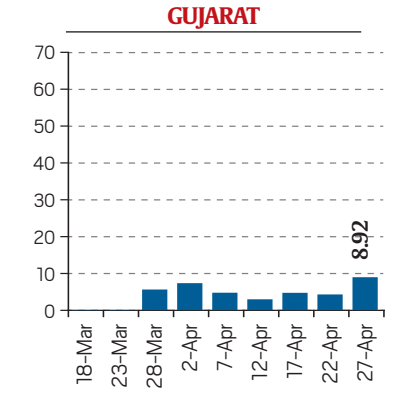
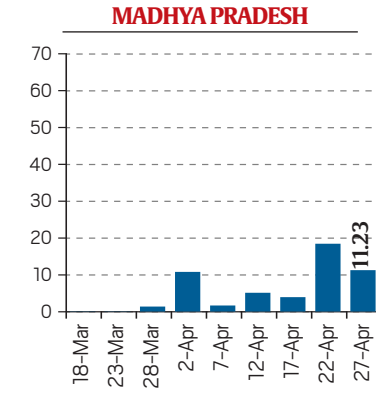
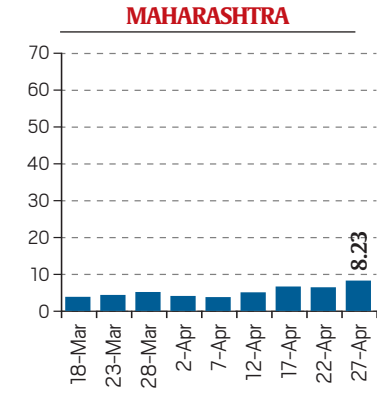
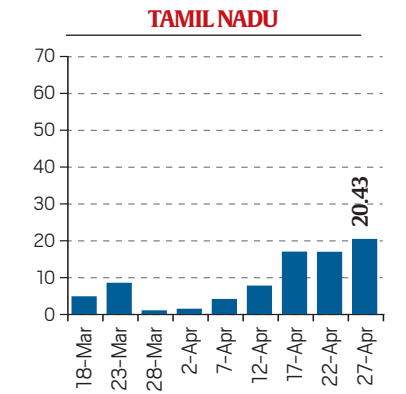
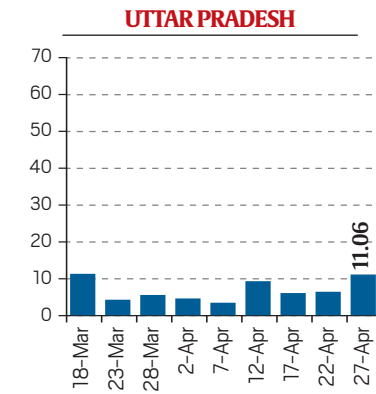
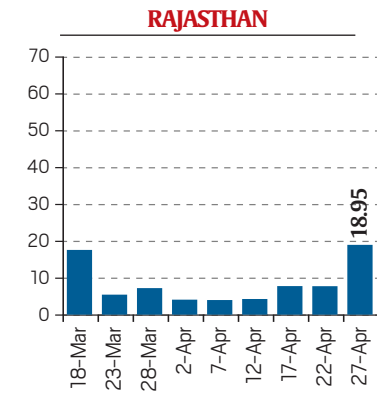
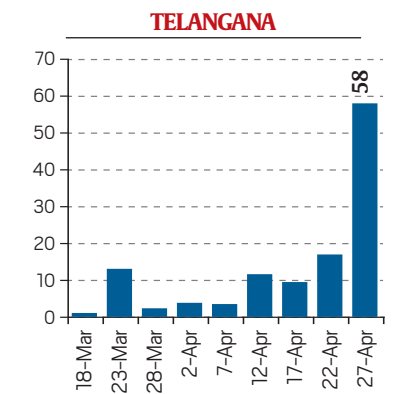
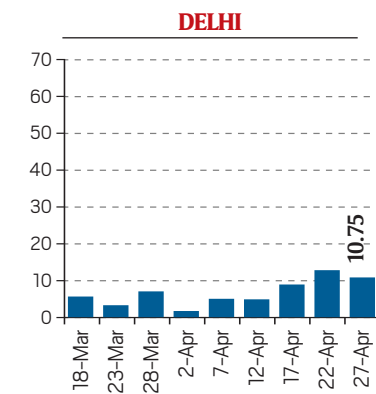
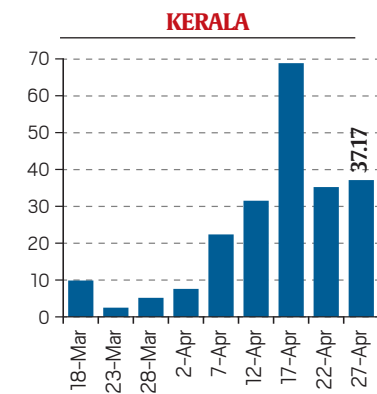
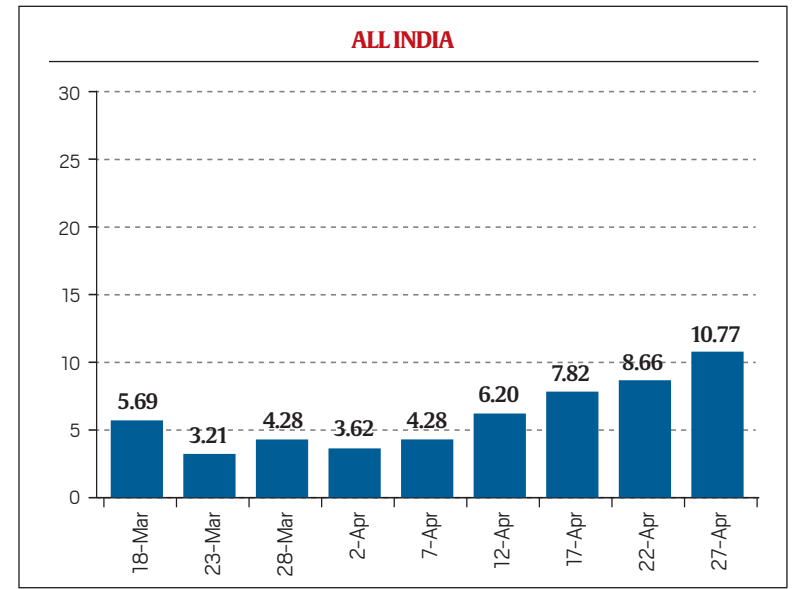
The caveats

The current Indian Council of Medical Research guidelines allow for testing only people with symptoms, those with travel history, or contacts of infected people. However, 80% of patients are asymptomatic, giving rise to the possibility of many cases going undetected.

"One would expect that as more people are tested, more cases would come to light each day and the doubling interval will also decrease. Since that is not the case here, it suggests that there is a slowdown in the propagation of the disease. These data need to be read in conjunction with the hospitalisation numbers for serious acute pulmonary infection and the population surveillance data on influenza like illness, to give a three dimensional view," said Dr K Srinath Reddy, president of the Public Health Foundation of India.

FASTEST IN WEST BENGAL, SLOWEST IN TELANGANA

Doubling rates for COVID-19, simply defined as the number of days it takes of the count of cases to double, have been calculated here for five-day moving averages and plotted for the country and the 12 states with the highest number of cases as of April 27. The vertical bar against March 22, for example, signifies the doubling rate of cases in the five-day period leading to that date, which was two days before the lockdown was announced. As of April 27, West Bengal had the fastest doubling rate at 7.82 days. Cases in Telangana were doubling at the slowest rate — every 58 days — while Kerala's rate was 37 days.



Do sex hormones help women fight COVID better? To find out, trials on men

EXPRESS NEWS SERVICE
NEW DELHI, APRIL 28

FROM TRENDS so far, men have appeared likelier than women to die of COVID-19. While the reason remains an open question, reports from the US over the last two days have described trials that will seek to find out whether the answer lies in two sex hormones in women — estrogen and progesterone.

The trends & the theories

Various studies have captured a trend that appears to prevail in many countries and regions. In mid-February, a paper by Chinese researchers analysed data from Wuhan, Hubei, and China as a whole and calculated a fatality rate of 2.8% for men, as compared to

1.7% for women. Since then, Italy, Iran, South Korea, Germany, France and the UK have released data that showed a similar trend. Data from the UK's national statistics office, in fact, suggested that men were twice as likely as women to die of COVID-19. And daily data from Australia's Health Department show a visibly higher death rate among men in the age groups 70-79 and 80-89.

India does not release sex-aggregated data on COVID-19 cases and deaths.

As for the cause, there have been various since the trend became obvious, including the possibility that women's sex hormones help them fight the infection better than men. Among other theories related to biology, one draws from the fact that a woman's genetic makeup consists of two X chromosomes (a man has only one of those).

Because X chromosomes contain most of the genes related to the immune system, the inference is that women are better equipped to mount an immune response.

Other theories are based on lifestyle and perceptions — men are likelier to smoke and take risks, which could include not taking enough precautions against infection.

The hormones

Estrogen and progesterone are the two main sex hormones that characterise a woman. Estrogen helps her develop female physical features and also maintains her reproductive system. Progesterone is secreted by a temporary endocrine gland that the body produces during the second half of the menstrual cycle, and helps prepare the body for possible pregnancy after ovulation. The

male body too has estrogen and produces progesterone, both in smaller amounts.

Now, two teams in the US are testing the theory that these hormones help women fight COVID-19 better. One team, at Stony Brook University, New York, has already started treating male patients of COVID-19 with mild doses of estrogen. The other team, at Cedars-Sinai Medical Center in Los Angeles, will conduct trials with progesterone on men infected with the coronavirus.

More candidates are being recruited for the estrogen trials. "The purpose of this study is to find out if estrogen... given as a patch placed on skin of COVID-19 positive or presumptive positive patients for 7 days can reduce the severity of COVID-19 symptoms compared to regular care," the US National Library of Medicine says.

The New York Times quoted Dr Sara Ghandehari, principal investigator for the progesterone study of Cedars-Sinai, as saying that men are clearly doing worse than women in ICU, and that pregnant women (who have high levels of estrogen and progesterone) tend to have mild courses of the disease. "So something about being a woman is protective, and something about pregnancy is protective, and that makes us think about hormones," she told The NYT.

The counter-argument

Women produce the most estrogen and progesterone during reproductive age, and the levels of both fall drastically after menopause. So, if these hormones were responsible for the lower fatality rate among women, the trend should not have shown

itself among older women. However, even elderly women have shown a better survival rate than elderly men.

As such, some experts who study sex differences in immunity have warned that hormones may fail to be the magic bullet that some are hoping for, The NYT report said. Sabra Klein, who studies sex differences in viral infections and vaccination responses at the Johns Hopkins Bloomberg School of Public Health, told The NYT: "We see this bias across the life course. Older men are still disproportionately affected, and that suggests to me it's got to be something genetic, or something else, that's not just hormonal."

The disproportionate fatality rate among men shows itself very prominently among 70-89-year-olds in graphics released by the Australian government.

