

Day 26 - Learning Curve on Exponential Curves

Living through an epidemic teaches us all about the study of epidemics. And this is the most socialist of all subjects. Everyone is equal in the statistics as to how a disease spreads. If one person passes the virus on to three others within a week, it is not just 3×7 people that the first person has passed the virus to. It is not $3 + 3 + 3 + 3 + 3 + 3 + 3 = 21$. Think about it. Each of the first three then spreads it to three others at the same time, making it nine. So, it is what in mathematics is called “three to the power of seven”. It is $3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 = 2,187$. This is what is called “exponential” growth.

So within one week, one person gives the virus, through others, to 2,187. The next day, the number infected would be $2,187 \times 3 = 6,561$. And in two weeks, the number infected would be 4,782,969 which is more than the whole population of Mauritius.

In fact, each person with the coronavirus, on average, gives it to between 2 and 3 people.

This is why it is important to trace-test-isolate very fast. And this is what has, so far, given an advantage to Mauritius. We have a tradition of trace-test-act from the eradication of malaria. In LALIT, we called on people to comply with the Government strategy, because we immediately saw that it was rational. The doctors in charge, like Dr. Gujadhur, had the strategy clear in their minds from the very start:

So, the action plan of the State here, which Government representatives have not been able to explain very well, has been the following two-pronged strategy (A and B):

A. 1. Put all people from abroad, who may carry the virus, in quarantine in hotels, direct from the airport. Then after 14 days (the time it takes to become positive is generally between 2 and 14 days), test all those in one quarantine unit. Let them all out if they all test negative. If one or more test positive, take them into a hospital or a hospital-like situation, and keep the others for another 14 day period. And so on.

2. Anyone who tests positive, who is already in the population (i.e. caught the virus from before the compulsory quarantine) is put in a hospital, or hospital-like institution, even if he or she is without symptoms, i.e. asymptomatic.

3. The person is then interviewed personally about any contacts he or she has had in the past week or so, for more than 15 minutes. This has to be a very frank exchange. These individuals, who are candidates for the virus, are then visited in person and tested. Any who test positive, are then put in the hospital or hospital-like institution, and, in turn, interviewed about contacts. The others are taken in to a hospital for isolation and testing. As any one on the Ward tests positive, they are whipped off to the part of the hospital for patients. This way you can block spread at, say, 12 people, and not find you need to interview 2,187 – which starts to get impossible.

In the USA (as in the UK, Italy, Spain, France), the Authorities have had to give up on trace-test-isolate, and just treat the sick people, and make blind appeals for self-isolation via the sick person. The asymptomatic people all go through the net and continue to spread the illness.

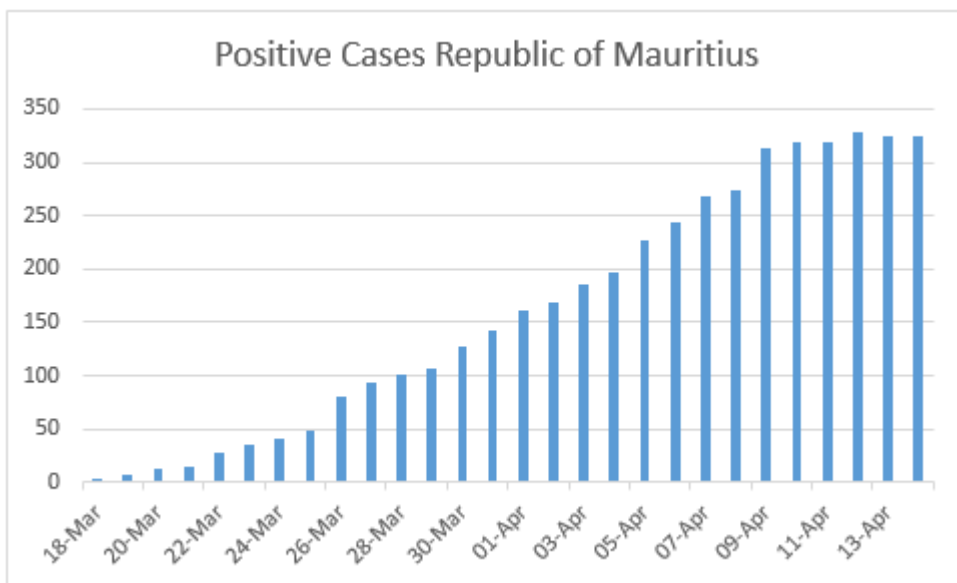
B. 1. The Mauritian Authorities also imposed first a lockdown for a week or so, then one week or total curfew with no retail outlets open, and from then we have continued with a lockdown until now. Only people in essential services are allowed out i.e. unless you have a “work permit”. When people go to the supermarket, only one-third are allowed out any one day, by first letter of alphabet by surname.

2. Call for social distancing of one or two metres, when you do have to go out.

3. Call for hand washing, hand-sanitizing, and the wearing of face masks.

This seems to have begun to work – but it will work, only if Part B is maintained.

Here is the Table:



Now, the curious thing about the exponential growth of the illness is that it can be closed down very fast, too. Just as exponentially.

And, of course, it can re-start again and grow just as fast, once again.

Hence, the difficulty of lifting the lockdown. In Italy, a friend says they have opened baby clothing and child-clothing stores. And then stationery and book stores. In Spain, they have opened big construction sites. In Korea, they have also lifted the lockdown. But there, they are finding another big problem. They have found some 100 people who have already got over the Covid 19 illness, i.e. have tested negative twice, have weeks later, tested positive. Their hypothesis is that the virus can re-activate, rather than that they are re-infected. But since the virus is new, it is difficult to know for sure yet.

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for LALIT, a personal view.