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## Lockdown Maths\*

### Part 2: Relaxation of Lockdown—Perilous

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*Partha P. Majumder*

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My friend, Ranjan, calls me in the morning. He says that he read the article by Sunanda K. Datta-Ray that was published in *The Telegraph* on 21st March. Is it true that “We will die like flies if the pandemic comes here,” as Mr. Datta-Ray has written?

“Of course, Ranjan, there will be a large number of deaths. The lockdown is precisely to prevent this. No one is enjoying the lockdown. Yet lockdown should continue to be enforced. I am really scared that the lockdown is being relaxed. The West Bengal government has even allowed buses to run on some routes. This is scary.”

“But why?” Ranjan asks.

“The SARS-CoV-2 virus, or the nCoV virus, is circulating in our community. Everyday persons with the new infection are being identified. This means that there are many in the community who are not aware of their infection. With lockdown, they are only interacting with a small number of people in their homes. And possibly also infecting them. But all infected people are huddled together in their homes. Relaxing social distancing now will mean that infected individuals, who may not be sick, will start to socialize with many people in the community who are truly uninfected. And, pass on the infection to them. nCoV is highly infectious. Much more infectious than its cousins, SARS and MERS viruses. Suddenly we will encounter a tsunami of infected individuals.”



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“But if most infected individuals don’t fall sick, then what’s the problem? When everyone is infected then there will be no one to infect; correct? You had told me that when an infected person recovers from the infection, he gains immunity and will not get infected again. So I don’t see a problem.”

“Ranjan, don’t forget that our population density is very high. For example, in Mumbai 21,000 people live in every square kilometer. In Kolkata this number is about 7,500. In the State of Bihar, averaging over all the villages and cities, about 1,200 people live in every square kilometer. So, if nCoV spreads widely even in just four wards of Kolkata municipal corporation, many thousand people will have to be provided medical attention, of whom about 1,000 will die. Many of them will die a painful death gasping for breath, since they cannot be provided with ventilators. We don’t have so many ventilators in our hospitals. In spite of the Chief Minister trying her best to prepare the State for this perilous situation, you know that our health care system cannot handle so many sick people. It’s best for us not to relax the lockdown. When we can test and find out what fraction of individuals in the community has gained immunity, then we can provide some relaxation. But now is too early. We have not got ourselves tested. The government does not have the means to test even a decent fraction of our citizens who have not yet fallen sick.”

“But this is the first time I am seeing such a lockdown. Why so? There are many outbreaks of viral infection that I know, but we have never been locked at home.”

“Well, Ranjan, nCoV is highly infectious. We don’t have a vaccine to prevent nCoV infection. Physical distancing by closing down schools, offices, businesses and staying at home is pretty much all that we can do to slow down the spread of the virus.”

“But this lockdown is spelling a disaster for the economy,” Ranjan said.

“Oh, I have heard that argument before. When thousands and lakhs of people become infected and sick, the drain on our economy will certainly be even greater. We will have to spend colossal

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## GENERAL ARTICLE

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sums of money to care for the sick and dying. Still we will not be able to save lives from death. And then we will have to lockdown anyway to prevent more suffering and more death.”

“So when do you think the government can relax or lift this lockdown?”

“Ideally, when no infected individual can find another individual to infect. Then, infected individuals will recover or die without infecting anyone. We must remember that we gain immunity if we are infected once, even without falling sick. The ideal is nearly impossible to attain. We are usually satisfied if about 75% of the population gain immunity, provided that an infected individual can be assumed to infect about 4 people on an average. When this fraction is attained, a large number of newly infected individuals is unlikely to arise in a short period of time. How long may this take? We can't be too sure. Immunological testing of members of the community will reveal what fraction has gained immunity. Or, we can wait to see how new cases arise over time. If the time between detection of two successive new infected individuals is relatively long, then relaxation of lockdown can be allowed. We haven't reached that stage in India yet. Every day, many reports of new infections are pouring in from most geographical regions. We would do well to bear the hardship of lockdown. Science should drive decision-making of relaxation of lockdown. Opening up markets and allowing buses to ply at this stage will only ensure that Mr. Datta-Ray's prediction that “we will die like flies” comes true!”

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