

# Issue Brief



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# Responsible Decision-making in the Face of Corona – A Need for a Metric

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## Abstract

The asymmetry of the human mind in treating the information that is currently available and the information we do not have is remarkable. During the Covid-19 pandemic, many people have been conscious to take precautions to prevent contracting the virus oneself or their family members. However, the consequences of a person infecting another is not consciously considered by everyone while going on about their 'new normal' life making daily transactions which involve the labour of multitude of people. Nobody pauses to wonder whether anyone in the supply chain of the product or service consumed by an individual has contracted the virus or died due to the virus in the process of its production. This is because that information is unavailable to us in a tangible form for our minds to perceive and hence it chooses to ignore it. Although the number of cases increase with every wave, people have started accepting it or rather have become desensitised to the number of lives lost to Covid-19, mainly because these deaths are unseen. This article explores whether such a pondering – number of people infected and consequently lives compromised - would be a consideration in the decision-making in the production and consumption of products and services. If so, is there a need to develop a metric to inform us of this number? Would it be feasible to have such a metric? This article attempts to quantify these unseen deaths, so as to sensitise people to the consequences of a person getting infected.

## About the Author

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## Introduction

Now, two years after the onset of the Covid-19 pandemic, most people reading this would have lost one or more relatives, friends, colleagues, or an acquaintance due to the infection. I am no exception. But the trigger for this article is the death of a couple, Razia and Nasir (names changed), in the summer of 2021. Their small fruits and vegetable outlet, by a synergic arrangement, was situated within the spacious premises of another outlet - a cold storage that dispenses meat, poultry, and fish for the upwardly mobile residents living in a posh locality of Bangalore.

The outlet the couple ran was a typical Mom and Pop store, with one of their two daughters - the elder pursuing a medical degree and the younger in senior school – occasionally lending a helping hand. Their shelves were populated with seasonal fruits and vegetables dotted with a few exotic ones. When done with the frozen meat purchases, customers would invariably pick up some of their garden-fresh ware.

While helping myself to apple custard after a hearty Sunday lunch - a day after hearing about the couple's demise - a thought crossed my mind that Razia, Nasir, and their ilk have played a part for me to relish the dessert. I wondered about the many unknown and unsung Razias and Nasirs, who may have been affected by the virus; in the process of tending to the Malus Pumila, picking its fruits, packaging, warehousing, transporting in bulk from Shimla to Bangalore, distributing to vendors, and having these delivered at our door to be cut, dressed and served. Shopping in the grocery store is but one of the many transactions that take place in the processes leading to the production and delivery of an apple. One will never know the precise number of people infected by the virus as a consequence, and deplorably, one does not care either about those affected and may even have died, in the process of delighting a customer with an apple that keeps the doctor away. In short, each product or service we benefit from carries with it the risks of people contracting the virus, purely in the process of its production, some to a greater degree and some to a lesser degree.

While this is so, one continues to sink one's teeth into an apple, without considering whether one did right in choosing apple custard over banana custard, both being equally enjoyable; without pausing to consider whether more lives were compromised in bringing home an apple from Shimla, compared to bringing home a banana grown next door. Intuitively, given the higher human interactions and contact that bringing home an apple entails, the spread of the virus would have been higher than what would have been for a banana. This article explores whether such a pondering – number of people infected and consequently lives compromised - would be a consideration in decision-making in the production and consumption of products and services. If so, is there a need to develop a metric to inform us of this number? Would it be feasible to have such a metric?

## Well-seen and Unseen Consequences of an Infection Transmission

The death of a known person - such as Razia or Nasir – is a well-seen consequence of transmission of infection. Hearing of these deaths evokes strong emotions and plays a role in containing the spread of the disease; people tend to take precautions to keep themselves from being a victim of being infected and advise their loved ones to be careful as well.

However, there are unseen consequences of every transmission of infection that takes place. A person infected passes the infection to others. To examine this, one would need to apply mathematics, logic, and reason rather than emotion.

*Basic Reproduction Number (R0)* is defined as the mean number of individuals an infected person directly infects, and *Generation Time* is defined as the meantime that an infected person takes to infect another. If R0 is 2, then an infected person passes it to 2 others in the aggregate. If Generation Time is one week, a week later, these two newly infected people pass on the infection to 4 others, and this chain of transmissions continues. Evidently, hundreds of people get infected over time, and a few of them will die – all traceable to one person having got infected. As a consequence, the people who die are at another end of the chain and are completely unknown strangers to the person who triggered the chain of infections. These deaths happen long after the person who triggered the chain of infections has recovered. These deaths are the unseen consequences, so invisible and far removed that neither are tears shed, nor any pang of remorse or guilt felt, by the one who triggered the chain of infections by being infected.

In an article carried out by The Peninsula Foundation (TPF) publication, Vedamanickam (April 08, 2020) attempts to bring to the fore these unseen deaths in quantitative terms, thus sensitizing people to the consequences of a person getting infected. In that article, he computes by enumeration the expected number of people who would have been infected over two months due to one person being infected and the expected number of those infected who would die. He has considered the values  $R0 = 2$  and Generation Time of 7 days for the computation.

For the parametric values considered, he has shown that one person getting infected would result in 500 people being infected in a matter of two months. Further, by considering a mortality rate of 2%, he portrays that 10 - of the 500 infected during the two months – would eventually die. This is the unknown consequence of single infection transmission. In short, the unseen consequence of one person getting infected results in the death of 10 persons over a few months.

The TPF article thus argues that the main reason why one should take all precautions to protect oneself from being infected ought not to be fear of one's death (the probability that an infected person will die is just 2%), but it ought to be the number of other people who would die (it is almost certain that an infected person causes the death of about ten persons).

To gain an insight into the reasoning, the reader is referred to peruse the article available online and downloadable in pdf format through the TPF website link given in the References section of this article.

### **Validation of the Predicted Unseen Consequences**

At the time of publication of the TPF article, adequate data were not available to justify the parameters assumed. The parameter values were arrived at by a judgement of the news-making information. Could it be that the parametric values considered ( $R_0 = 2$ , Generation Time = 7 days, and Mortality Rate = 2%) were unrealistic to portend such a gloomy picture? However, other studies were published a few months later, based on the data collected during the period (March to June 2020). These studies establish that the parametric values chosen were fairly accurate (and in some cases were more appalling) and are reported below.

Marimuthu et al. (June 30, 2020) report that the value of  $R$  for India during the week from March 2–8, 2020, was 3.2 and around 2.0 for three weeks thereafter (from March 9–29, 2020) before reducing further. ( $R$ , which is a little different than  $R_0$ , is the *Effective Reproduction Number* - the Reproduction Number after the onset of an epidemic. Value of  $R$  tends to be lower than  $R_0$  due to part of the population gaining immunity due to some having been infected and recovered and some having been vaccinated). Perumal (July 17, 2020) reports the value as 1.83. Biswas et al. (2020) consider the set of data reported during the period March 25 to April 24, 2020, and estimate the average basic reproduction number  $R_0$  as 2.41. These findings confirm that the true value of  $R_0$  is close to (if not higher than) the value of 2, considered in the analysis predicting ten deaths per infection as the unseen consequence.

*Serial interval* is defined as the time interval between the onset of symptoms in the infector and the infectee (the one infected by the infector). It is a proxy for generation time which is not observable. Rai et al. (2021) pooled the data from 11 studies and determined the serial interval as 5.4 days, a value less than the 7 days considered in the analysis. It must be remembered that a smaller value of generation time leads to the severity of the consequences. Similarly, Perumal (July 17, 2020), tracking the data published by the Ministry of Health and Family Welfare (Government of India) between March 19 to June 01, 2020, has computed the case fatality rate to be 2.92% - the case fatality rates reported by the states aggregated for the overall country rate. The considered value of 2% for the parameter was not off the mark as well (the reported fatality rate in the following months was lower, and under-reporting was a cause for much debate in the months that followed).

The publications mentioned above validate that an estimated death of ten people for every one person who gets infected is a very conservative estimate that has been borne out by facts. The parameters validated for the prediction that one infection transmitted results in the death of ten people was for the period March to June 2020. The fatality rate was more severe during the second wave in 2021, which increased the predicted consequences (number of deaths per transmission of the infection). However, the current Omicron variant causing the third wave in December-January 2021 indicates a far less severe fatality rate. Despite a higher Reproduction number  $R_0$ , the predicted number of deaths per transmission with the Omicron variant is much lower.

In short, it is validated that every transmission of infection resulting in the death of 10 people is well established.

### **What You See Is All There Is (WYSIATI)**

One scenario related to a person getting infected is that there is a 2% risk of the infected person dying. This is the well-seen consequence of the infection. Another scenario is the death of ten people, as portrayed in the TPF paper (Vedamanickam, April 08, 2020), which is the unseen consequence. It is evident that the unseen consequence of one transmission of an infection is very gruesome compared to the well-seen consequence. If the unseen deaths when one person gets infected had evoked a commensurate emotion, individuals would have taken adequate measures to contain the virus. Yet, the unseen deaths do not evoke a strong emotion – Why?

Daniel Kahneman, a Nobel laureate in Economics, has the answers. Among the many far-reaching contributions of the psychologist attracting the Nobel Prize in Economics, he introduces a relatively humble concept - WYSIATI (What You See Is All There Is). This concept is about the remarkable asymmetry between the way our mind treats the currently available information and information that we do not have. Information that is not retrieved from memory might as well not exist (Kahneman, 2011). Razia and Nasir's death is retrieved from memory to evoke sympathy and fear. However, the unseen consequences of one transmission of infection, namely unknown faces dying a few months down the line, fail to make an impact.

Much of Behavioural Economics is about emotions that drive decisions not being in tune with the related facts. This results in poor decisions that are far from optimality. The mismatch is more pronounced when it concerns dealing with risks. Our emotions tend to give an irrationally high weightage to present scenarios that are concerned with known people (well-seen consequences with a risk of 2% fatality of one transmission of the infection) while completely ignoring future scenarios concerned with unknown people (unseen consequences – almost certain death of ten people a few months after that one transmission).

## **Need for Metrics in the Face of the Pandemic**

In the introduction of this article, it was indicated that more lives are compromised in the production, transportation, and delivery of apples to Bangalore, compared with bananas. It also alluded that in the choice of a dessert, one should prefer bananas to apples; all this from consideration for the people who may have been infected in the process of producing and delivering a product or a service. It was further explained that since these are unseen consequences, the human mind tends to ignore them. Is there a way to sensitise one to such unseen consequences?

A look at other decisions which have unseen consequences gives a clue. A lesson can be drawn from how the world deals with greenhouse gas effects. To address the concerns of global warming caused by greenhouse gas emissions, a metric Carbon Footprint was formulated, adopted by IPCC (Intergovernmental Panel on Climate Change), and ISO standards were established for Carbon reporting and Carbon audits. As a result, fossil fuel-driven energy gradually gives way to renewable energy.

On a smaller scale, consider obesity arising as an unseen consequence of individuals' poor choice of food intake. To sensitise one to this consequence, when one shops for groceries, there are metrics, and these are displayed; Carbohydrates, Energy in Kilocalories, and Fat content in the food are indicated in the package. The numbers displayed nudge the shopper to make informed decisions regarding their health and fitness.

There are also situations where there are no metrics. In such situations, declarations are made. For instance, labels announce 'Organically Farmed' products, and based on that label; people prefer to pay 40% more to buy vegetables that have been organically farmed. There are no metrics to count the extent of child labour engaged in producing a good. But people wish to know whether the shawl has been produced engaging child-labour before they decide to buy a pashmina. Here one looks for the label that declares, 'No child labour was engaged in the production of this product.' Producers declare that in the production of a film, 'No animals were harmed' under the oversight of the American Humane Association. And yet, in the face of Covid-19, human beings die in the process of producing a product or service, and this unseen consequence remains unseen.

The Seattle Times (Gates, March 19, 2020) has reported that a total of 14 employees in the Puget Sound region of the Boeing Company, most of them in their Everett factory, were infected as of that date. Similarly, twelve employees of Hindustan Aeronautics Ltd., another aircraft manufacturing company, had tested positive for Covid-19, and one had died due to the virus (Business Today; July 09, 2020). It would thus be impossible for these manufacturers to state truthfully, 'No individual had been infected or had died in the production process of this aircraft.'



In general, it would be quite impossible for any producer of a product or a service to aver that no one has been infected in the process of production, whether it is the production of a mighty aircraft or a simple apple. This is similar to a food package's inability to declare, 'No harm to one's health would be caused by consumption of the contents in this package.' Where such statements cannot be made, metrics come into play, and the potential harm - either in the production of the product or in its consumption – are quantified and indicated as a number. Therefore, metrics are the answer to deal with decisions that have unseen and undesirable consequences.

### **Metric for Infection Transmission – A Pipedream or a Possibility**

The extent of people's proximity (the main cause of the spread of infection) essential in producing goods and services vary. Intuitively one is aware that the people proximity essential for the production of an aircraft is much higher than the people proximity essential in producing a computer software product. The idea of a metric is to reduce this intuitive knowledge to a parameter that can be expressed as a number.

Such a metric is currently not available. WYSIATI tells us that we ignore information (and also a metric) that is currently not available. Thus, it would not be surprising that developing a metric would be discarded as a pipedream rather than a possibility. Therefore, the structure of the proposed metric is briefly explained below.

The metric would be an *Expected Number*; the Expected Number of infections transmitted as a consequence of the production of a good, delivery of a service, or the conduct of an event (an election rally or a wedding reception would qualify as an event for such a computation). Transmission of infection is probabilistic – a stochastic system - and hence the metric is expressed as an Expected Number. This Expected Number (of infections transmitted) would be an attribute associated with a product, process, or event.

The computation of the Expected Number rests on the fact that infection spreads in one of two ways, namely: (1) People proximity - being in proximity with an infectious person and (2) Fomite transmission – touching material surfaces that had, a little while earlier, been handled by or had been in the vicinity of an infectious person. Thus, the Expected Number would be made of two dimensions, direct airborne transmission through people proximity and indirect transmission through fomites. Transmission through people's proximity further considers two probabilities: the probability of a person being infected and the probability that the infected person transmits the infection to another person.

These computations appear to be dauntingly complex, particularly for products with a long cycle time and various types of people proximity. The author of this paper has conceived and developed a suitable model that simplifies the methodology for data collection and resulting computation of the suggested metric. Describing this is beyond the scope of this paper.

## Conclusion

All decisions are not as innocuous as an inconsiderate consumer choosing between an apple and a banana; some decisions have colossal implications manifold in gravity. India's Election Commission (EC) did not stop political parties from violating Covid protocols during their campaigning in the summer of 2021. This led to the Madras High Court's sharp remark, 'You should be put on murder charges, probably,' (Janardhanan, April 27, 2021). A metric to estimate the consequences of campaigning would have given the EC the much-needed teeth to stop political parties from irresponsible campaigning. Further, when the EC had not exercised its powers and stopped the irresponsible campaigning, the High Court would have had grounds (and the teeth) to charge and try the EC for the murder charges that the High Court only guardedly voiced.

It is easy to see that where there is a metric that highlights the undesirable but unseen consequences of a decision in numbers, decision-making takes responsibility. The ethics involved in decisions surface.

Richard Thaler (another Nobel laureate in Economics, who is considered the father of Behavioural Economics) in his book co-authored with Cass Sunstein, suggests that nudging is essential in decision situations where one does not get prompt feedback and when there is trouble translating the aspects of the situation that one can easily understand (Thaler and Sunstein, 2009). Decision-making in the face of a deadly virus playing havoc is precisely such a situation where nudging is essential. A metric that translates the unseen (gruesome) consequence and presents it as a number that one can relate to will thus serve as a nudge to make better decisions.

We have not seen the last of the Coronavirus. Neither will Covid be the last of the pandemics. While this pandemic may have triggered the need for a metric, the metric need not be limited to the Coronavirus but would be appropriate for any transmissible disease. An appropriate metric to make informed decisions in the face of a transmissible disease, be it a killer disease or one that causes suffering, is an imminent need. This paper highlights that need.

*\*\*\*The views and opinions expressed in this publication are of the author and do not necessarily reflect the views or positions of The Peninsula Foundation (TPF), Chennai.*

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