

लोकाः समस्ताः सुखिनो भवन्तु
In all of creation may joy happen and tranquility prevail
Ancient Indian prayer in Sanskrit

Strategy to address the COVID 19 epidemic

Metaphysical philosophical ruminations of an Infectious diseases clinician and Global Health worker

Prologue:

As an Infectious diseases clinician, global health worker and a lifelong educator dedicated to “One Health” and social justice, I see the continuum of the health of my patient; the family and community in natural harmony with animals and the environment. The goal of “One Health” can be facilitated by adopting the paradigm of “Salutogenesis” literally the formation of health. Applied to individuals as well as populations, salutogenesis is arrived at through a participatory action strategy to ensure (1) Comprehension: A clear understanding of the health condition. (2) Capacity: An ability to cope with the health condition and (3) Capability: An ability to pursue a purposeful life, with autonomy and dignity.

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1 Introduction:

The strategy to address an epidemic like COVID 19 fundamentally rests on the goal of eradication of infection from the population, failing which reducing the prevalence and incidence to below acceptable threshold levels. In view of the fact that SARS- CoV-2 is highly contagious, with no proven effective therapy and lack of adequate preventive measures such as vaccines, non-pharmacologic interventions with historical precedents largely patterned after the 1918 pandemic of influenza are being implemented.

2 Non-Pharmacologic interventions (NPI):

SARS- CoV- 2 is spread through airborne droplets that can spread the infection from an infected individual to a susceptible individual by inhalation of contaminated air or by transfer through touching a contaminated surface. Prevention of acquisition of infection requires an appropriate form of air filter (masks) used by the infected person; by the uninfected as well as meticulous personal hygiene especially hand cleansing. A sanitary environment by appropriate disinfection of contaminated surfaces is equally important. Ensuring clean air; clean hands (personal hygiene) and a clean environment to reduce risk of infection and spread is both an individual and a collective societal responsibility.

It is quite clear from the history of epidemics of infectious diseases that human behavior and the social determinants of health have a strong influence over the natural history of epidemics. The most successful campaigns to address contagious diseases have exploited the synergy between appropriate technology (e.g.: Vaccine) and insightful human factors engineering as a comprehensive multi-pronged strategy. Given the intensity and magnitude of the COVID pandemic it is desirable for the populace at large to accept and implement all of the components of NPI: Social distancing; personal and environmental hygiene with at least greater than 75% adherence to ensure success.

Humans are naturally social beings; fiercely independent and resent external control. The demands of NPI run counter to nature and are probably unrealistic for any reasonable length of time. The present conditions of the COVID pandemic are such that “State” agencies consider it necessary to resort to extraordinary measures such as a “Lockdown”, indeed it is almost impossible for state authorities to contemplate refuting the logic of this strategy given the historical precedent of the 1918 global pandemic of Influenza.

3 Implementation of NPI:

What started out as a limited time “broadly accepted” intervention has evolved into a more coercive “grudgingly accepted” intervention with a debate about the endpoint as well as the risk benefit analysis. The intensity and magnitude of the “lockdown” is unprecedented in its social impact and the staggering economic cost, borne disproportionately by the most vulnerable. The socio-economic cost escalation threatens to overwhelm and negate societal acceptance of the sacrifice needed to save lives. By any analysis, the principal benefit of the lockdown is in flattening the epidemic curve and mitigating the risk of overwhelming health care resources due to an acute unmanageable crisis than actually “eliminating” the contagion. The timing of the lockdown was unable to pre-empt introduction of the contagion into our communities. The debate about whether or not we are in the epidemic stage of community spread is largely academic at this point. The key question is what would make NPI a viable strategy?

A. The coercive strategy:

Any coercive strategy for implementation of public policy is prone to systemic distortion as well as pervasive evasion.

- a. Evasion: There is an incentive for people to escape adverse impacts of policy. With reference to COVID individuals try to avoid testing and labelling due to adverse consequences such as stigmatization; quarantine at home or institutionalization. This disincentive has an inherent compounding influence due to lack of effective therapy and the very real risk of suboptimal health care under the present circumstances.
- b. Systemic Distortion: The implementers of the policies prescribed by the state have shown a predilection towards a blunt sledgehammer approach rather than an appreciative and sensitive minimalist (surgical precision) intervention approach. This has resulted in complaints of “Excesses” as well as allegations of corruption in allowing exemptions from the lockdown etc. There are allegations of both undertesting as well as selective targeting of groups for testing. Whether these distortions are a consequence of actual policy, overtly stated or unspoken, or merely overzealous implementation by officialdom at multiple levels based on interpretations of perceived preferences of the elite is difficult to establish. To add to all of these is the inherent inadequacy of an overburdened and chronically under resourced public health infrastructure trying to cope with an unprecedented challenge.

B. The non-coercive strategy:

The nihilist will dismiss it as Utopian, nevertheless faith in the inherent wisdom of enlightened self-interest of the majority in open societies has historically triumphed over authoritarian regimes. It is only an open society that has the capacity to overcome the weight of accumulated systemic contradictions in societal hierarchy and control structures through necessary continuous reform. (The end of History and the Last Man by Francis Fukuyama, Freepress 1992) The key attributes of a policy that makes NPI more palatable are the following:

- 1) Tangible rather than abstract benefits:
 - i. Assurance that any inconvenience caused to the most vulnerable is addressed in real time.
 - ii. Prompt access to reliable testing and follow up.
 - iii. Assurance of access to credible treatment with minimal inconvenience and cost.
- 2) NPI that is modulated and nuanced with relevance to local conditions.
- 3) A clearly articulated and implemented strategy of public health measures that integrate early detection with testing and treatment see next section.

4 Integrated Public Health Approach

“Not by Bread alone” Humans have an indomitable spirit that allows them to overcome any challenge and willingly engage in battle. The need of the hour is to tap into this enormous resource of hope that COVID can be and must be conquered. Success of this strategy requires integration of Prevention; Detection (surveillance, testing and contact tracing) and Treatment into a continuum of responsive and compassionate care. The foundation of this strategy is “Credible Treatment” in the absence of which any resource put into prevention activities are an exercise in futility and quite predictably testing efforts encounter fierce resistance.

A. Treatment:

The absolute prerequisite for any treatment is compassion and equity in access. It took us (health care professionals in particular) many decades to understand and appreciate the superior therapeutic efficacy of “Palliative” care compared to “aggressive” medical care of many cancers. In the context of COVID it is imperative to guard against the perception of assured benefit from regimens based on “recommendations” of health agencies as being “proven” in efficacy. As an advocate of salutogenesis and participatory action strategy in health, I feel it is our responsibility to communicate to our partners in health the best possible understanding of current scientific evidence to facilitate an informed choice. Where evidence of proven therapy is lacking it is necessary to offer alternatives, the most desirable being ethically and scientifically sound clinical trials. The added advantage of such clinical trials is reinforcing the treating clinician with other capable professionals who can assist and supervise the provision of high quality health care and also generate evidence for greater public benefit. High quality treatment requires adequate infrastructure (Hospitals that have adequate space, running water and clean toilets; PPE; Medications; Medical Instrumentation: Diagnostic Laboratories and test reagents) as well as trained personnel who are provided with all necessary implements in real time. The information age has facilitated rapid dissemination of knowledge of best practices however translating such knowledge into actual practice requires a substantially greater investment in resources urgently! That we have fallen short of providing our frontline personnel adequate PPE with unacceptable outcomes is

tragic. Needless to say, such a state is not reassuring to anybody contemplating treatment at such facilities.

Treatment sites:

a) Institutional:

The advantages of specialized center institutionalization, whether special quarantine units or acute care in a dedicated hospital is the efficiency of concentration of resources in specialized approaches. The secondary advantage would be avoiding cross infections of non COVID patients in general hospitals due to nosocomial transmission. The possible concern of concentrating large numbers of COVID patients in geographically restricted areas is the risk of cross infections/superinfections of individuals. In some infections a previously infected person can be reinfected/superinfected by a heterologous strain of the pathogen acquired from another infected individual. The two distinct populations can then mix and reassort to allow the emergence of a population with attributes acquired from both of the parent populations. This has been seen multiple times in infections such as HIV or CMV and also occurs quite frequently in nature with multiple different strains of influenza viruses mixing and reassorting in birds and pigs. The significance of such reassortment in viral populations is the possible emergence of either enhanced virulence, enhanced replication or resistance to antiviral agents or any combination thereof. Many decades ago, Paul Ewald suggested that all populations of living organisms always evolve strategies for perpetuation of the species regardless of consequences to the host. (The evolution of virulence by Paul W. Ewald. *Scientific American*; April 1993; 86-93.) Stuart Kauffman's theories of life forms being autocatalytic and auto-poetic (A world beyond Physics. The emergence and evolution of life, by Stuart A. Kauffman. Oxford University press 2019) suggest a mathematical inevitability of population expansion through replication as the primary phenomenon. Any constraints imposed on replication are probably an evolution of strategies imposed on the population for preserving and perpetuating the population. This explains the difference between the population dynamics of *Mycobacterium tuberculosis* persisting in the latent infection state in small numbers in the host and then opportunistically spreading to other uninfected persons in the appropriate context vs the population dynamics of a gastrointestinal pathogen like Cholera with a greater tendency towards higher replication and much more rapid spread. Any pathogen population is therefore agnostic towards outcomes in the host, its primary imperative is perpetuation of the species. For many respiratory pathogens, the strategy best suited for perpetuation of the species is replication and transmission without immediately killing the host, that a minority of infected hosts develop fatal disease appears to be more a consequence of an exuberant (? Aberrant) host immune response as we see in *Mycobacterium tuberculosis* and COVID. Paul Ewald further suggests that "Virulence" of a pathogen as manifested in host outcomes may in part be influenced by behaviors in the human population. Inferentially if large numbers of infected individuals allow very efficient transmission of the pathogen by close proximity etc, one would anticipate the emerging populations of COVID to use reassortment as a means to preferentially increase the rate of replication and transmission without immediate elimination of the host being a constraint on transmission to a new host. The consequences of such a phenomenon make increased transmission efficiency and higher replication mathematically inevitable. For COVID 19 the concern is that enhanced replication with greater viral loads probably contributes to higher mortality in infected individuals. A further concern is that SARS- CoV-2 may actually represent a population with a very high replication rate and therefore this viral quasispecies (Viral Quasispecies by Manfred Eigen *Scientific American* Vol 269 # 1, July 1993 pp 42-49) may not be amenable to treatment with a single antiviral agent alone thus requiring combination antivirals for effective viral control and prevention of emergence of resistance.

b) Domiciliary:

The obvious disadvantage of domiciliary quarantine and care is that decentralized resource application is inherently less efficient and in the event of need for critical care impractical. The clear advantage would be greater convenience and comfort for individuals in their own homes/communities as opposed to institutionalization. Considering the fact that all household contacts have already been exposed to the index case there is probably not, any significantly greater concern for household transmission. In circumstances where critical care is not needed and especially if effective medication can be used domiciliary care obviates all of the concerns about cross infections from other institutionalized infected persons as discussed in the previous section.

B. Testing:

Clinical testing for SARS- CoV-2 currently relies on detection of the virus in clinical specimens utilizing nucleotide amplification by PCR. The acceptance of testing is tied to perceptions of reliability as well as possible benefit accruing from access to early curative treatment. Conversely the barriers to acceptance are the absence of proven therapies and the very real possibility of stigmatization and involuntary restriction of personal freedom. In a coercive testing environment, there is an incentive for either complete avoidance of testing or using unconventional avenues of testing where it is possible for individuals to conceal both the act of testing as well as the results. For improving acceptability of testing it needs to be voluntary and clearly tied to tangible benefits with mitigation of risks described. The extent and access to testing are also influenced by policy regarding who and how much to test, as well as policy implementation with a systemic incentive or lack thereof to promote testing. Policies surrounding testing influence precision in quantification of the size and character of the epidemic. A policy of very restrictive testing may underestimate the true number of infected individuals and also reduce the probability of early detection of a problematic index case or localized clusters with consequent loss of opportunity for effective epidemic control intervention in a timely manner. A completely uncontrolled access to a liberal regime of testing is wasteful of resources and sometimes creates avoidable distress due to inappropriate testing, particularly a positive test in asymptomatic individuals imposing undue restrictions of personal freedom quite apart from the rare albeit very real possibility of a false positive test. It is important to acknowledge that at the current level of understanding it is unclear if a positive test in an individual who has clinically recovered translates into an actual risk of transmission of infection to others.

C. Contact Tracing:

In a highly transmissible infection like SARS- CoV-2 contact tracing and testing are invaluable tools of epidemic control. Contact tracing does however raise concerns about privacy of the index case as well as contacts. To be effective privacy concerns need to be addressed with sensitivity in particular when newer tools such as cellular phone contacts and or social media activity are included as strategies to enhance contact tracing. Done inappropriately contact tracing can lead to stereotyping of distorted perceptions of communal behavior. Contact tracing done well with appropriate safeguards, augmented with powerful data processing and analytic tools such as geospatial mapping integrated with other epidemiologic data allow triangulation of all sources of relevant information with powerful insights into epidemic characteristics and possible innovations in epidemic control. Protection of civil liberties and privacy cannot be overemphasized! If the hazard of active and systematic concealment of COVID is to be prevented.

D. Early Detection:

Early detection facilitates timely epidemic control interventions. The key tools for early detection are surveillance integrated with testing. Whether surveillance is laboratory based (passive surveillance) or population based is predicated on the type of problem being evaluated. In the context of a large pandemic like COVID 19 multiple methods such as syndromic surveillance integrated with testing and tracing would be most cost effective. A high level of health literacy in the population through effective educational campaigns is potentially helpful in early reporting of conditions that need immediate investigation (active surveillance). Currently sero-epidemiologic studies based on antibody testing for SARS- CoV-2 are just starting. Targeted surveillance and testing of high risk individuals based on epidemiologic factors such as travel to high prevalence areas or contact with infected individuals provides necessary information for intervention as well as measuring effectiveness of epidemic control measures. Random population testing is a tool used to determine community level prevalence and transmission.

Conclusion:

The ideal approach to COVID epidemic response is integrating a foundation of high quality clinical care with appropriate testing and epidemic control measures that provide broad acceptance of voluntary non pharmacologic interventions. In India the COVID epidemic response has been characterized largely by a state imposed coercive non pharmacologic intervention that has now entered into a state of diminishing returns. Considering the fact that 80% of all infected persons are asymptomatic and of those testing positive, less than 4% have a fatal outcome a more nuanced approach to addressing the epidemic is desirable. There is an almost unreal and naïve expectation that the lockdown extended for a long enough period of time will provide the principal solution. There is insufficient recognition or acknowledgement that the lockdown can at best flatten the epidemic curve, buying necessary time for building crucial credible health care systems by augmenting infrastructure and human resources. The scientific and technical response (largely non state entities) to the epidemic in areas of diagnostic technology, vaccine and therapeutic options have far outpaced the cumbersome state regulatory apparatus in place, using legacy processes to evaluate newer modalities. The pandemic has exposed the stark and tragic inadequacy of the health care infrastructure and human resource capacity to respond to this unprecedented public health emergency. The socio-economic consequences of the lockdown threaten to cause greater damage than the current state of the epidemic. The chronic systemic neglect of public health, environmental degradation and complete disregard for the role of animals in human health needs a transformational paradigm shift towards the goal of “One Health” COVID 19 is a warning wakeup call from nature, we ignore it at our own peril.

Epilogue:

There has been injustice, but GOD forgives! for justice to prevail, we must bear witness to truth so that people always remember.

Power is an Illusion; Authority is a Delusion; RESPONSIBILITY is REALITY

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