

- This page is left blank intentionally -

FOREWORD

The Sri Lanka Medical Association which has contributed immensely in terms of advocacy to the health hierarchy and to the profession, largely to shape up national health issues over a span of more than a century, is pleased to make yet another contribution, ***“The proposed Exit Strategy for the Lockdown of the COVID-19 third wave in Sri Lanka”***, that we believe would be useful for all who are involved with the decision making processes for the currently implemented Island wide lockdown.

As a responsible association with a vision for a healthier nation, while we appreciate the need to lift the lockdown, on principle we believe that the lifting the lockdown will have to be done in a carefully phased manner on a district-basis, grounded on reliable real-time data at district level, rather than being based on a composite picture in the country as a whole.

This document, prepared in collaboration with the College of Community Physicians of Sri Lanka, provides technical guidance to lift the lockdown, in a phased-out and orderly manner, to curb the epidemic of COVID 19 in Sri Lanka.

Sri Lanka Medical Association along with the Intercollegiate Committee, do most sincerely and deeply appreciate the contribution made by the College of Community Physicians of Sri Lanka for the development of this document. The special role played by Dr Ruwan Ferdinando, Consultant Community Physician, to formulate and release this document early is acknowledged herewith.

Dr Padma Gunaratne
President, Sri Lanka Medical Association
Chairperson, SLMA Intercollegiate Committee

List of Contributors

Dr. Ruwan Ferdinando	Dr. Nihal Abeysinghe	Prof Carukshi Arambepola
Prof. Shamini Prathapan	Dr. Kapila Jayaratne	Dr. Athula Liyanapathirana
Dr. Anuji Gamage	Prof. Suneth Agampodi	Dr. Indika Pathiraja
Dr. Suranga Fernando	Dr. Prabath Ranasinghe	Dr. Nimal Shantha Gamagedara
Dr. R. Kesavan	Dr. Thushani Dabrera	Dr. Geethika Amarasinghe
Dr. Indeewari Gunaratna	Dr. Chinta Jayasinghe	Dr. Tharanga Navodani
Dr. Saveen Semage	Dr. Hemali Jayakody	Dr. Janaka Weragoda
Dr. Niranjala Mudalige	Dr. Gamini Jayakody	Dr. Anoja Dheerasinge
Dr. Subramaniam Sivaganesh	Dr. Yasara Samarakoon	Dr. S.S.W. Fernando
Dr. Thathsara Weerathunge	Dr. Bhumini Karunarathna	Dr. D.A. Nathaniel
Dr. H.R.C.S. Anuttara	Dr. N.B. Walpita	Dr. Shanika Aththaragama
Dr. Nathasha Obeyesekera	Dr. H.M.C.D. Herath	Dr. P.T.S. Prasanga
Dr. M.A.G. Kalhari	Dr. I.D.J.C. Ranatunga	Dr. P.S. De Silva
Dr. W.D.J. K. Amarasena	Dr. K.A.D.N.S. Jayarathna	Dr. W.A.T.K. Wickramarachchi
Dr. P.H.P. Gajanayake	Dr. W.R.S. de Alwis	Dr. V.P. Eranga
Dr. N. Parameswaran	Dr. W.U. Naidu	Dr. G. Rajeev

Reviewers

Prof. Samath Dharmarathne

Prof. Sudarshani Wasalathanthri

Dr. B. J. C. Perera

Dr. Chathuri Suraweera

Contents

Chapter	Page
1. Executive Summary	1
2. Background	3
3. Principles and assumptions	5
4. Risk alert level classification issued by the Ministry of Health and the situational levels defined in this document	7
5. Criteria to introduce, adapt or lift PHSM	9
6. Some considerations in identifying the criteria and in calculating their cut offs for Each hazard level	12
7. Determining the hazard level	14
8. Monitoring of the outbreak	15
9. Public Health and Social Measures	15
10. Relationship of the intended physical distancing measures to the Hazard Levels	15
11. Implementation of physical distancing measures according to the Hazard Levels	13
12. Conclusion	25
13. References	26

Tables	Page
1. Indicators to define major criteria	10
2. Data availability at each administrative level	14
3. Guidance for implementation of physical distancing for each level of hazard	17

Figures	Page
1. Weekly incidence of COVID-19 per 100,000 population* during the last 7 days (05.05.2021 - 12.05.2021)	3
2. Weekly cumulative incidence per 100,000 population from 14.04.2021 to 13.05.2021	4

- This page is left blank intentionally -

Executive Summary:

The COVID-19 third wave has been far more devastating than the earlier two waves in terms of morbidity, mortality and case fatality. It pushed the health system capacities to its limits and also resulted in a considerable number of community deaths. Hence, exit from third wave has to be designed carefully. We propose an exit strategy to ensure that the country returns to 'some form of normalcy' safely while promoting economic recovery. The current level of the risk alert system adopted by the Ministry of Health is not quite suitable to calibrate the levels of public health and social measures to be adopted at this stage of the epidemic. Therefore, a new method of looking at the dynamics of the outbreak has been proposed, based on a scientific assessment of regional transmission status, system capacities and disease control. This phased out approach to end lockdown identifies six hazard levels to allow flexibility and leverage for decision making, especially at the district level. District level health managers need to be empowered to assess and take well-considered and firm decisions regarding implementing public health and social measures. A premature unscientific reopening, especially a blanket reopening of the whole country, without a firm scientific basis and a mechanism to mitigate the outbreak, could endanger the lives of the general public.

- This page is left blank intentionally -

Background:

Sri Lanka has gone through two epidemic surges of COVID-19 and is currently at a crucial stage of the third wave. According to the Epidemiology Unit, there have been 3396 cases and 13 deaths in the first wave with a case fatality rate of 0.38 as well as 92,341 cases and 591 deaths in the second wave with a case fatality rate of 0.64 and 132,519 cases, 1711 deaths as at 16.06.2021 with a case fatality rate of 1.29 in the current third wave. More than 50% of all deaths of the epidemic have been reported during the last one and half months and notably some community deaths at home have also been reported during that time. Since mid-May, the country is in a state of lockdown, while permitting continuation of essential services. The number of daily cases still remains high although a dip was evident since June 03. In the event of an exit from the lockdown, the country needs a scientific approach towards ensuring implementation of public health and social measures (PHSMs) including regional movement restrictions. Exit strategies should consider ongoing community transmission, testing capacity and protection of the healthcare systems⁽¹⁾. The transmission status and the health system response capacity which are the key determinants of the situational level, which in turn define the risk and the required level of implementation of the PHSM⁽²⁾ have considerable regional variations in Sri Lanka (Figures 1 and 2). These regional variations could be observed at present too. It is noted that during the first and second waves of the COVID-19 outbreak, as there was no mechanism in place to assess the transmission status or the health system capacity regionally, the Government had to lockdown some districts even without having a single case in those districts. These may have contributed to the lowest economic growth recorded in Sri Lanka after its independence during the lockdown period in 2020. It has also been shown that too stringent adoption of PHSM could lead to deleterious effects on economy, mental health and wellbeing, food security, socio-economic disparities and the continuity of other health services. However, it is imperative that measures should be taken to maintain the caseload to a minimum for the optimal functioning of Sri Lanka's resource constrained health system.

This draft paper proposes an exit strategy for the current lockdown status, based on key scientific principles in order to prevent the resurgence of the outbreak and to ensure economic recovery. There is a potential that this framework can be adopted in managing the outbreak even in the future until the population is adequately vaccinated to mitigate the epidemic.

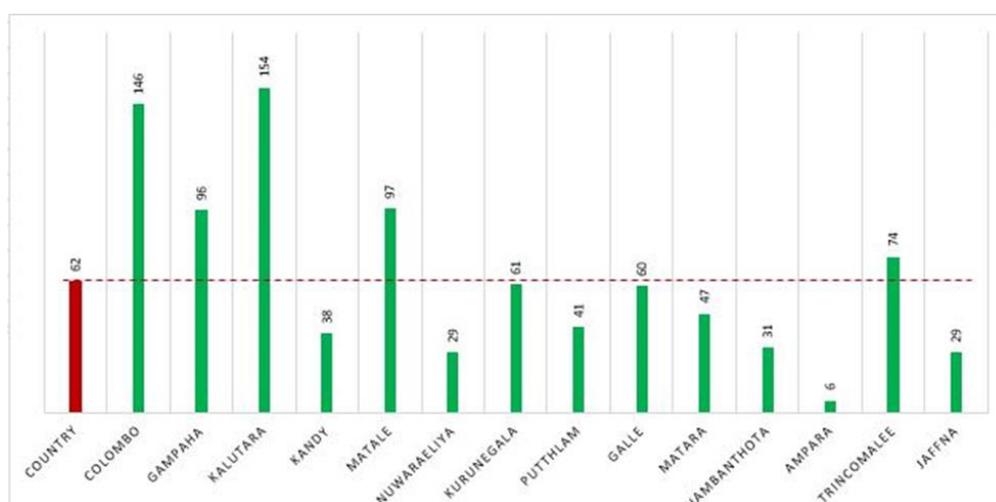


Figure 1 - Weekly incidence of COVID-19 per 100,000 population* during the last 7 days (05.05.2021 - 12.05.2021)

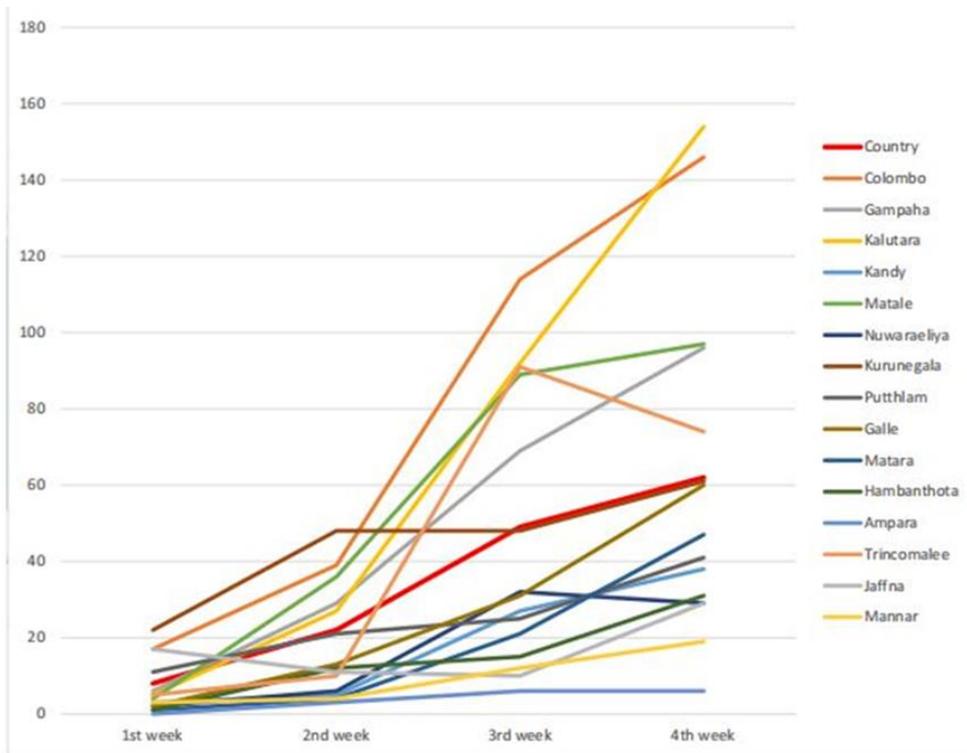


Figure 2 - Weekly cumulative incidence per 100,000 population from 14.04.2021 to 13.05.2021

Principles and assumptions:

01. The exit strategy has to ensure a compromise between the public health benefits, when compared against social and economic impacts, for the greater benefit of the majority of the population.
02. The exit has to be postponed until such time that the health system recovers from its over-burdening, together with the provision of adequate surveillance and control of the disease to prevent a re-emergence and the epidemiological criteria indicate mitigation of the disease.
03. In the event of an exit from the present lockdown, the level of the implementation of PHSM has to be geographically defined depending on the risk of local levels of disease transmission and disease control. When there is a lack of epidemiological data to assess the risk levels of different regions, the decision of defining the required level of PHSM has to be based on the assessment of the situational level (Hazard Level) for the given geographical area which could be considered as a proxy measure of the risk level at a given locality⁽²⁾.
04. A situational level (Hazard Level) should be identified by a joint assessment of the level of transmission and the health system response capacity with due consideration given to additional criteria at the lowest administrative level possible which should guide the decisions on implementing or adjusting PHSM⁽³⁾ in the given context. When the system capacity is less, even a lesser transmission status could result in a higher situational level than what is usually expected.
05. In a resource constrained country such as Sri Lanka, the health system response capacity which depends mainly on the available medical care facilities will be the defining factor in guiding the implementation of PHSM. For the efficient functioning of the public health system and the curative services, it is imperative that the caseload is kept to a minimum.
06. Measures should be adapted to the local context and regularly reviewed⁽³⁾.
07. The decision to introduce, adapt or lift PHSM should be balanced against the likelihood of the effects these measures may have on the general welfare of society and individuals⁽²⁾.
08. When a geographic locality (e.g., a district) is declared to be in a given situational level, a geographical subunit (e.g., Divisional Secretary area) cannot be classified to a lower situational level. However, it may be classified to a higher situational level. For example, when the country is in situational level (Hazard Level) 2, the provinces or any regional locality cannot be declared to be at Hazard Level 1 but it is possible these to be at a higher hazard level than 2.
09. Indicators and suggested thresholds are provided to gauge both the intensity of transmission and the capacity of the health system to respond. Taken together, these provide a basis for guiding the adjustment of PHSMs. Measures are indicative and need to be tailored to local contexts⁽²⁾ based on supportive indicators.
10. When feasible, measures should be adopted (or lifted) in a controlled, stepwise manner to allow better understanding of the effects of each measure on transmission dynamics⁽²⁾.
11. Public health surveillance data and case and cluster investigations may provide important information on conditions associated with transmission. Such information may help targeting application or intensification of certain PHSMs without imposing the measures universally on all settings⁽²⁾.

12. Selection of the indicators to implement PHSMs should depend on the available relevant data in a given local setting.
13. The indicators and the thresholds need to be constantly monitored and updated depending on the stage of the outbreak.
14. It is critical to safeguard vulnerable and disadvantaged populations by implementing specific measures to support them when PHSMs are implemented (2).
15. It will be pertinent and desirable consult and engage the communities when PHSMs are introduced and adjusted.

Risk alert level classification issued by the Ministry of Health and the situational levels (Hazard Levels) defined in this document:

The Ministry of Health has introduced an alert level system formulated to guide the country's COVID-19 response and it delineates the activities permitted at specific stages of the epidemic⁽⁴⁾. The Ministry has regularly updated the alert level and the permitted functions. As at present, the country is at Alert Level 3. However, the permitted functions stated in the original alert level system has been modified a few times and the present alert level has been called a "revised Alert Level" by the Ministry. The introduction of a risk-based assessment for determining the country situational level by the Ministry is commendable. However, it is clear that this system of classification is not suitable for determining the permitted functions and population movement restrictions at the exit status of the lockdown of the third wave of COVID-19 due to the following reasons:

- a) The Alert Level system is not based on an objective assessment of the disease transmission status nor the health system response capacity which are the key parameters in determining the situational levels as advocated by the WHO⁽²⁾.
- b) This is not amenable for use at regional settings due to lack of objectivity.
- c) The four levels are not adequate to delineate the diverse situational levels which the country may anticipate in the event of exiting the lockdown.
- d) To accommodate maximum leverage for the economic recovery at the exit, the repertoire of the situational levels has to be improved.
- e) The alert system does not take into consideration regional realities such as population characteristics, behaviour of communities in terms of compliance to PHSMs etc.

Therefore, it is timely that the situational levels are refined, an objective assessment of the key criteria are clearly laid down with additional criteria, in order to define a situational level. The situational levels, which have been identified as Hazard Levels in this document are as follows:

Hazard Level 1: This corresponds to the Alert Level 1 and 2 of the Health Ministry alert level guidelines. Alert Level 1 indicates a situational level when the cases reported are only those coming from outside the country (detected in quarantine) without any clusters. At this level, the DREAM concept of distancing, respiratory etiquette, aseptic practices, and proper use of a mask must be practiced at all times as indicated by the Ministry Alert Level 1. The Alert Level 2 of the Health Ministry guidelines corresponds to one cluster of cases and the quarantine curfew is implemented in one police division where functions are restricted, while restrictions are stepped up in the rest of the country.

Hazard Level 2 (HL-2), Hazard Level 3 (HL-3), Hazard Level 4 (HL-4), Hazard Level 5 (HL-5), Hazard Level 6 (HL 6): These correspond to the Alert Levels 3 and 4 in the Health Ministry circular. The Alert Level 3 has been defined as "several clusters in different districts" and Alert Level 4 as "cases are appearing with no connection to any cluster – community transmission". Definitions adopted to denote cluster and community transmission are misleading in Sri Lanka as of today. In the WHO publication, "Considerations for implementing and adjusting public health and social measures in the context of COVID-19"⁽²⁾, it has clearly stated how to objectively assess the

community transmission stage and the subclassifications of community transmission (CT): CT1; CT2; CT3; CT4. However, the Hazard Level classification prescribed in the present document has not hastened to use the term “community transmission” in assessing situational levels, due to different interpretations of CT by different professionals, but advocates an objective assessment of the next scenarios in the transmission status:

Low incidence of locally acquired widely dispersed cases (HL-3);

Moderate incidence of locally acquired widely dispersed cases (HL-4);

High incidence of locally acquired widely dispersed cases (HL-5);

Very high incidence of locally acquired widely dispersed cases (HL-6).

The present framework has attempted to define the Hazard Levels 3 to 6 objectively for the regional managers to assess the situational level scientifically and to implement PHSM in a transparent and reliable manner.

Criteria to introduce, adapt or lift PHSM:

Major criteria:

1. Disease transmission status
2. Health system response capacity
3. Disease control (as determined by both, given above)
4. Trends in transmission

Additional criteria:

Population density, population mobility and directions of mobility, behavioural characteristics of the population / the level of voluntary compliance for PHSMs, socio-demographic and geographical characteristics, geographical distribution of cases, societal needs, vaccine coverage, availability of a robust surveillance mechanism and systems for community screening, public health capacity for contact tracing and quarantine.

The indicators are given in the Table 1 below.

Table 1: indicators to define major criteria

Domain	Indicator	Description/ Rationale	Major limitations	Situational levels						Sources of information
				1	2	3	4	5	6	
Disease transmission status	Number of incident cases per 100,000 population / day	Numerator includes all test confirmed cases of PCR and Rapid Antigen Test. This includes the total number of cases reported in the district (which indicate risk for indigenous transmission) verified by the district health managers.	Difficulty in obtaining real-time data due to unavoidable delays in PCR; influenced by surveillance system performance, testing policy, testing capacity and lab capacity.	<1	1-3	4-6	7-8	9-10	>10	Consultant Community Physician / Regional Epidemiologist (RE), MOH, Epidemiology unit. Available at the Grama Niladhari (GN) level too.
	Percentage of COVID-19 among people presenting with Influenza-Like symptoms	ILI and SARI surveillance available at sentinel sites. Testing among symptomatic is a useful targeted screening strategy.	No proper surveillance system available currently at all divisional level curative health care institutions (ILI surveillance only available at DGHs and some BHs), therefore may not be representative of the general population. May also miss mild/asymptomatic cases.	<5	5- 10	11-14	15- 17	18-20	>20	Curative health care institutions, Available at the Consultant Community Physician / RE too.
Trends in Transmission*	Trend curve (for daily monitoring)	In a resource constrained setting, COVID-19 could lead to inundation of healthcare services rapidly. This indicator will be more pertinent with the newly emerging more virulent strains, hence, needs to be taken into account as a major criterion.	The rising trend needs to be calibrated against the existing caseload for decision making.	The cut-offs need to be decided by the regional health managers in relation to the caseload and other parameters.						Consultant Community Physician / Regional Epidemiologist (RE), MOH, Epidemiology unit.

Disease Control	% Case positivity rate (of random PCR)	Random asymptomatic community sampling is the best indicator of disease transmission status. PCR is considered as the gold standard test for COVID-19.	Limited capacity for PCR testing limits the number of PCRs done for random sampling	<2%	2-4 %	5-6 %	7-8 %	9-10 %	>10 %	Consultant Community Physician / RE
	Number of COVID 19 attributable deaths per 10,000,000 population /day (Institutional and home deaths)	Indicative of COVID-19-related mortality. Useful to assess disease severity but not a useful predictor in the disease transmission because deaths are indicative of past infection. Also minimally influenced by the testing capacity.	Substantial delay in confirmation of deaths as COVID 19 positive. At low levels and in small geographical regions, can be sensitive to minor fluctuations.	<1	1-3	4-6	7-8	9-10	>10	Consultant Community Physician / RE, Epidemiology unit
Health system capacity	(Capacity and) Bed occupancy	Denominator includes beds in the treatment centres and the beds in the ICCs which have resident HCWs. Total bed capacity was taken as 20,000 considering the limited availability of HCW and resources.	Though 'beds' can be added to the system over the time, capacity to offer optimum care is limited, when the beds do not accompany with the required health manpower. In the event patients are transferred from one district to the other, the data need to be interpreted carefully.	<25%	25-45%	45-60%	60-75%	75-90%	>90%	Consultant Community Physician / RE, Head of healthcare institutions
	(Capacity and) Occupancy of beds with oxygen and monitoring facilities	Denominator includes the number of beds dedicated for COVID-19 patients which has the facilities for monitoring and to give oxygen.	Rather than assessing availability of beds, the availability of service provision with the required facilities and health manpower is important.	<25%	25-45%	45-60%	60-75%	75-90%	>90%	Head of health care institutions
	(Capacity and) ICU bed occupancy	Denominator includes dedicated ICU beds for COVID-19 patients.		<15%	15-35%	35-55%	55-75%	75-95%	>95%	Head of the Healthcare institutions

Some considerations in identifying the criteria and in calculating their cut offs for each hazard level:

- a. The total available bed capacity for COVID patients is considered as 20,000. (The total number of bed capacity is a dynamic statistic since there are daily additions of beds into the pool. Average duration of hospital stay is taken as 10 days. Therefore, the maximum number of patients the system can accommodate per day is 2000 for the whole population (population was taken as approx. 20 M). Therefore, the maximum number of cases we can allow per day is 10 per 100,000 population. This was taken as the cut off for the level 6 and rest of the cut-offs were set up backwards.

Due to the irregularity in PCR reporting daily incidence may vary. Therefore, during the latter stages when the status has to be assessed more frequently, we may have to consider taking the average incidence over a few days than taking the daily incidence.

NB - Number of available beds will depend on the patient admission policies. If a policy level decision is taken to give home-based care for the asymptomatic, we can allow this rate to go a little higher than this. We will also have to consider the percentage of symptomatic patients, as well as the percentage of patients needing oxygen in order to accurately define the incidence levels according to the bed capacity and the facilities available. Bed capacity and facilities change from district to district. Therefore, we suggest that the regional health team involving Consultant Community Physicians, Regional Epidemiologists and other health managers should be given authority to adjust the cut off levels according to the transmission and the available facilities in their respective areas.

- b. Maximum number of PCR tests performed in the country is ~25,000. Taking the total bed capacity into consideration as in (a) above, maximum number of patients can be allowed per day is 2000. So, the highest positivity rate we can allow is 8% per day. However, due to limited PCR testing capacity and the high case load, currently the PCR testing is often done on a district quota basis and only among the first contacts. So, this will not be a useful indicator in the current situation.
- c. As per the WHO interim framework, >90% bed occupancy was considered as limited capacity level of red zone alert level. Therefore, it was taken as the cut-off for hazard level 6. <75% bed occupancy was considered as adequate capacity. So, the rest of the cut-offs were set accordingly⁽²⁾.
- d. Since the proportion of cases needing critical care is small, 95% of ICU bed occupancy was taken as the level 6 cut-off. However, due to the unpredictable and varying length of ICU stay, defining precise cut-off levels for this indicator is difficult.
- e. Trends in Transmission: In addition to calculating the level of risk, it is also important to understand the direction of the trends of key indicators (stable, decreasing or increasing) on a daily basis. This can assist in determining whether measures implemented are improving the epidemiological situation in the area, and for placing anticipatory changes to public health measures based on a likely change in the transmission classification. For this purpose, the following two indicators may be suggested: Trend curve of the daily incidence; Trend curve of the number of daily deaths attributable to COVID-19. It is generally accepted

that the PHSM have to be made more stringent during the rising period of the epi curve and for a period of at least two weeks even after reaching the “post-peak period”⁽¹⁾.

- f. Testing capacity and the testing strategy: The availability of a clearly defined testing strategy to suit the phase of the epidemic, the testing capacity and the number of tests done in a given day are of paramount importance to assess the existing transmission levels in the community. There has to be a mechanism to assess the level of community transmission using Random PCR based on a clearly laid down testing strategy. However, in resource constrained settings such as ours, and in many parts of the world, in a massive epidemic, the testing is largely focused on symptomatic cases⁽⁵⁾. Each district needs to define the requirement of the community screening they have to do, needs to communicate that to the national level and has to be equipped with the logistics to undertake this at their respective district levels in order to plan exit.
- g. Vaccination coverage: this will definitely be the cornerstone of lifting the lockdown status in the long run, however, to exit the third wave this will only serve as an additional indicator. Vaccination coverage of different work settings (e.g., economic centres, garment factories, tea factories etc.) and of essential services would also determine the feasibility of functioning of those in the event of the exit from lockdown.
- h. Public health capacity for contact tracing and quarantine: Contact tracing, quarantining and testing have been the cornerstone of the mitigation of first and second waves of the epidemic in Sri Lanka. However, in the third wave of the epidemic, the public health capacity was overwhelmed and testing of the contacts were not mainly geared for identifying them early for disease containment. The timing of exit from third wave should be undertaken giving some consideration to ensure the recovery of the capacity of our efficient public health system too.

Determining the Hazard Levels:

There could be many ways of interpreting the overall hazard level for a given locality based on above observations. Weighting the different indicators would be one, however, for the simplicity and ease of use by the regional managers, the following method is suggested:

Use the highest hazard level suggested by any indicator given above. The logic behind is to keep the case load to a minimum not to overwhelm the health services.

The following would be the general outline of the implementation of the PHSMs:

A region would be in an isolation (locked down) state if any of the indicators are Hazard 6. Hazard Level 1 could be maintained, if all indicators are of Hazard Level 1 (all are in green) and there will be no personal movement restrictions. From Hazard Levels 2 – 5, there will be selective personnel movement restrictions in the respective region.

However, it has to be noted that the decisions with regard to implementing, changing or lifting PHSM does not have to solely depend on the prescribed indicators nor has it got to be a rigid one based on one or two indicators. What is proposed here is the feasibility of the districts to monitor the outbreak at their regional levels scientifically and the necessity to take decisions based on the overall picture at each locality. Also, it should be noted that these decisions need to be supported by the availability and findings of the robust surveillance systems and availability and the results of the community random testing facilities.

Table 2: Data availability at each administrative level

	Local Level (GN area)	Divisional (MOH) Level	District Level (RE)	Provincial Level (Provincial Consultant Physician / PDHS)	National Level (Epidemiology Unit)
Number of incident cases per 100,000 population / day	X	X	X	X	X
Percentage of COVID-19 among people presenting with Influenza-Like symptoms		XX	X	X	X
% Case positivity rate (of random PCR)		X	X	X	X
Number of COVID 19 attributable deaths per 10,000,000 population /week	X	X	X	X	X
% of Bed occupancy		XX	X	X	X
% Occupancy of beds with Oxygen and monitoring facility		XX	X	X	X
% ICU bed occupancy		XX	X	X	X

X available / usually available

XX from the curative sector institutions of the region

Monitoring of the outbreak:

There has to be a coordinated mechanism for decision making at the district level which reported to and communicated with the national level. The districts could use the above indicators and other necessary parameters to continuously monitor the outbreak. The monitoring and appraisal of the outbreak has to be done daily at the district level with the arrival of new data. The decisions to adjust the PHSMs has to take the regionals practicalities and into consideration and we believe that the Hazard Levels 1 and 2 may need review at least every 14 days, Hazard Level 3 and 4, every 7 days and Hazard Level 5 and 6 every 3 days. When downgrading the hazard level and to lift the restrictions, it may be necessary to monitor the situation for a period of at least 14 days.

Public Health and Social Measures:

PHSMs include personal protective measures (such as hand hygiene, respiratory etiquette, mask wearing); environmental measures (such as cleaning, disinfection, ventilation), surveillance and response measures (including contact tracing, isolation and quarantine); *physical distancing measures* (e.g., limiting the size of gatherings, maintaining distance in public or workplaces, domestic movement restrictions); and international travel-related measures⁽⁶⁾. The decision to introduce, adapt or lift PHSM should be based primarily on a situational assessment of the intensity of transmission and the capacity of the health system to respond, but must also be considered in light of the effects these measures may have on the general welfare of society and individuals⁽²⁾. The following discussion is mainly to guide categorisation of *physical distancing measures* to suit the above discussed Hazard Levels, as applicable to Sri Lanka, while ensuring overall social welfare and continuation of essential services. It needs to be emphasized that at all Hazard Levels, individuals should apply personal protective measures as given in the Health Ministry guidelines (**DReAM** = D- Practice physical Distancing; Re- Practice **R**espiratory etiquette; A- Practice **A**septic procedure; M- Wear Face **M**ask), together with environmental measures (e.g., cleaning, disinfection, ventilation).

Physical distancing measures could be discussed broadly under the following 3 categories:

- Personal restrictions
- Gatherings and events
- Service-related restrictions

Relationship of the intended physical distancing measures to the Hazard Levels:

Hazard Level 6 will be a state of isolation. At the national level, it will be a national lockdown. This is intended to avoid overwhelming of health services which could result in a substantial increase of morbidity and mortality. At the personal level, it will be staying at home and people will be only allowed to leave home for emergencies such as medical emergencies. Gatherings and events will not be allowed. Only those who engage in essential services will be allowed to work. On the other hand, if an area in Hazard Level 1 has a few clusters, the cases and contacts will be isolated and quarantined. If the caseload is low in the given area in Hazard Level 1, there is no need to restrict movement of the general public. From Hazard Level 2 to 5, the physical distancing measures will be intensified as personal movement restrictions, control of gatherings and events and as regulations of service delivery.

The categorisation of the different levels of these restrictions to different Hazard Levels is debatable. Also, may seem complicated to some. As the mobility of the population of a country might depend on multiple factors including health literacy, population movement patterns, cultural

norms and adaptability, the presentation of such restrictions to citizens would definitely need to be done in a simplified manner to reach an average civilian. However, in preparation of a guideline for implementation of such restrictions targeted at a healthcare worker, it seems prudent that such guidelines are presented with clarity, elaboratively covering all domains of personal movement, gatherings and service provision. Therefore, further simplification of such guidelines might result in confusion at implementation as the model will be activated at multiple geographical settings. However, it needs to be emphasised that the guidelines provided will function as the core of the model implementation while the district/provincial teams would have the ability of adjusting such regulations to suit the population they cater, depending on other factors associated with mobility such as population density, behaviour and mobility patterns of population, adaptability to change, disease trend etc. in each geographical setting. Also, it should be noted that there is an urgent need to have such a scientific detailed classification, due to the fact that the present Alert Level system adopted by the Ministry of Health cannot be expected to provide the required granularity at the peak of the outbreak, as discussed above. The proposed framework gives the broader outlook and it could be further developed based on scientific evidence.

Implementation of physical distancing measures according to the Hazard Levels:

Mobility restriction is a globally adopted evidenced-based strategy which could result in an immediate reduction of disease transmission, disease caseload and related case fatality. The health system capacities too recover fast in the event of wider mobility restrictions. There are many countries such as China, New Zealand, Australia and Vietnam which have controlled the outbreak successfully by adopting such measures. As a resource constrained country, Sri Lanka's chances to mitigate the outbreak depends heavily upon the implementation of the PHSMs until vaccination takes up the pivotal role in prevention.

The success of these measures will totally depend on their implementation. Hence, the role of the regulatory authorities in ensuring mobility restrictions becomes crucial. Also, implementation of these should be coupled to regular updating of the public about the necessity of these decisions and the need for voluntary compliance. Communication networks and social media could effectively be used to inform the relevant messages to the public regularly, in this regard.

It should also be noted that the validity of this strategy and the success of its implementation could also depend on the quality of district level data and the testing capacity for COVID-19. The public health managers at districts need to be aware about these when implementing the proposed strategy. The need to have real time, representative data and the authority and capacity for decision making at district level cannot be overemphasized.

The mobility restrictions imposed at level 3 of this proposed indicator-based hazard model has been set to suit the current restrictions of mobility imposed nationwide at Alert Level 3 as at present, according to the guideline on 'Revised Restrictions on Permitted Functions issued by the Ministry of Health⁽⁴⁾. It is further emphasized that no district, no divisional secretariat could be declared as being at either hazard level 1 or 2 during the current state as explained under the above stated principles. The restrictions imposed on the next levels of 4 and 5 are gradually made more stringent adhering to the indicator-based analysis while the final hazard level (HL-6) in the hazard model corresponds to the declaration of an 'isolation state' with maximum restriction of mobility in the demarcated geographical setting.

The following table (Table 3) gives details of physical distancing (personal restrictions, gatherings and events, service-based restrictions) at different Hazard Levels.

Table 3: Guidance for implementation of physical distancing for each level of hazard^(7,8)

Activities	HAZARD LEVELS				
	Level 3 (According to current Alert Level 3)	Level 4	Level 5	Level 6 (Isolation)	Relevant notes
Personal Restrictions					
Stay at Home	Encouraged to stay at home.	Should stay at home as much as possible. Should leave for only specific purposes.	Should stay at home as much as possible. Should leave for only specific purposes.	Should stay at home (except for emergencies, e.g. medical emergency).	
Number of people allowed outside the home (from a house)	Only one person is permitted to go out of the house on a given day (preferably based on the NIC number or according to specific instructions). Exceptions are for work purposes and health services.	Only one person is permitted to go out of the house once in three days (preferably based on the NIC number). Can go out only for work purposes and health services.	Only one person is permitted to go out of the house once a week (preferably based on the NIC number). Exceptions include those engaged in essential services.	Only one person is permitted to go out of the house once a week to fulfil urgent family needs. Exceptions include those engaged in essential services.	The person who is going out for the needs of the family should ideally be a healthy person (without chronic illnesses) and should aim to fulfil essential needs such as purchasing food items and medicines with a prior plan in place.
Walkways	Open only to walk by self in one's own locality and no crowding allowed.	Open only to walk by self in one's own locality and no crowding allowed.	Open only to walk by self in one's own locality and no crowding allowed.	Closed.	

<p>When meeting with others in neighbourhood and public outdoor places</p>	<p>Only spending time in house with family members OR meeting up with three people at a time in public outdoor places; Recommended not to invite or visit the family members / friends that one does not live with, over to his/her house.</p>	<p>Only spending time in house with family members OR meeting up with two people at a time in public outdoor places; Recommended NOT to invite or visit the family members / friends that one does not live with, over to his/her house.</p>	<p>Only spending time in house with your family OR meeting up with one person in public, outdoor places; NOT allowed to invite / visit family / friends that does not live with, over to one's house.</p>	<p>Only spending time in house with immediate family members; NOT allowed to meet other people outside the house. NOT allowed to invite / visit family / friends who does not live with, over to one's house.</p>	<p>*Up to two carers for children under 5 or someone with a disability; *DREAM measures should be followed when meeting people outside.</p>
<p>When travelling and transport</p>	<p>Travels should be minimized. A person can go to shops, essential works and venues which are open by public transport. Avoid travelling to areas under hazard level 4,5 or 6 unless for a medical reason or essential work. A person can cross areas under higher hazard levels without getting out from the vehicle. If entering level 4 area - follow rules as that of level 4. If a person is travelling to areas under hazard level 1 or 2, he/she should still follow the rules of level 3. Should not travel at night between 11 pm - 4 am.</p>	<p>Travels should be minimized but a person can go to shops when necessary. A person can use their personal vehicle or secure transport media for essential services. Avoid travelling to areas under level 5 & 6. If a person enters area under level 5 - follow the level 5 rules. If a person travels to areas under hazard level 1, 2 or 3 – he/she should still follow the rules of level 4. Should not travel at night from 11 pm - 4 am and have strict travel restrictions on weekends.</p>	<p>Allow only those who provide essential services to travel. One person can go to shops if necessary. Avoid travelling to areas under level 6. If a person travels to areas under hazard level 6 - follow rules of level 6 area. If a person travels to areas under lower hazard levels, he/she should still follow rules of level 5. Should not travel at night time from 11 pm - 4am and have strict restrictions on weekends.</p>	<p>One person can go to shops, if necessary, but should not travel outside of their geographical zone. Travelling outside the zone is allowed only for those who provide essential services (e.g., health, security forces) and during medical emergencies. The level 6 rules should be followed by such personnel.</p>	
<p>Mode of transport (Private taxi services)</p>	<p>Maximum number of passengers are limited to two for cars and trishaws; For other types of vehicles, it is limited to seated passengers only.</p>	<p>Maximum number of passengers are limited to two for cars and trishaws. For other types of vehicles, it is limited to 50% of the seating capacity.</p>	<p>Minimum number of passengers limited to one for cars and trishaws. For other types of vehicles, limited to 25% of the seating capacity.</p>	<p>Minimum number of passengers limited to one for cars and trishaws. For other types of vehicles, limited to 25% of seating capacity. (Alterations considered only during a medical emergency)</p>	

Public Transportation	Only allowed to transport seated passengers on the bus/ train.	Only allowed to transport seated passengers on the bus/ train.	Only allowed to transport 50% of the seating capacity of the bus/ train.	Only allowed to transport 25% of seating capacity of the bus/train. Considering population movement patterns, the regional team should decide on the inter-regional and intra-regional transportation.	At level 6, it should be ensured that the minimum public transportation services are available for essential and emergency use.
Going to work	Should work from home when possible. Exceptions include those working in essential services. Provide all essential services with minimum staff.	Should work from home when possible. Exceptions include those working in essential services. Provide all essential services with minimum staff.	Region needs to declare work from home as a policy; Exceptions include those working in essential services. Provide all essential services with minimum staff.	Region needs to declare work from home as a policy; except for those working in essential services with minimum staff.	Should abide by relevant departmental instructions (State sector/ Private sector).
Leisure activities (Carnivals, musical shows, beach)	Prohibited. Beach parties and gatherings - not allowed.	Prohibited	Prohibited	Prohibited	
Exercise and sports activities	Can engage in individual physical activity within the household area & close surroundings only. Team sports ARE NOT allowed. Gyms/ sports halls (indoor & outdoor) closed.	Can engage in individual physical activity within the household area & close surroundings only. Gyms / sports halls (indoor & outdoor) closed.	Can engage in individual physical activity within the household area & close surroundings only. Gyms/ sport halls are closed.	Can engage in physical activity within household areas only. Gyms/ sport halls are closed.	
If you are at a higher risk for COVID*	Other than for exercise, try to stay at home as much as possible. Avoid going to shops / pharmacies or ask your immediate family members to pick things up for you.	For exercise - try to avoid places which have lots of people. Otherwise, try to stay at home as much as possible. Avoid going to shops / pharmacies or ask your immediate family members to pick things up for you.	Stay at home as much as possible unless for medical emergencies.	Stay at home as much as possible unless for medical emergencies.	*Higher risk for COVID - underlying medical conditions e.g., Noncommunicable diseases - cancer, Chronic Kidney Diseases, Lung diseases, diabetes mellitus / age over 70 years / smokers / pregnant women

Gatherings and Events					
Religious activities	No collective activities or gatherings. Number of devotees at a given time should be restricted to a maximum of 15 people at any given time.	No collective activities or gatherings. Number of devotees at a given time should be restricted to a maximum of 10 people at any given time.	Engage within household only.	Engage within household only.	
Weddings / Parties / Events / Gatherings (indoors & outdoors) and public gatherings (in-house & outdoor)	Prohibited (Please refer relevant notes given).	Prohibited (Please refer relevant notes given).	Prohibited	Prohibited	At hazard levels 3 & 4 - marriage registrations will be allowed with immediate family members up to a maximum of 15 participants. At levels 5 & 6, registrations are prohibited.
Funerals (except for COVID -19)	Should be held within 24 hours after releasing the dead body. All possible precautions to minimize number who are attending to a maximum of 15 persons at a given time adhering to the instructions given.	Should be held within 24 hours after releasing the dead body. All possible precautions to minimize number who are attending to a maximum of 15 persons at a given time adhering to the instructions given.	Should be held within 24 hours after releasing the dead body. All possible precautions to minimize number who are attending to a maximum of 15 persons at a given time adhering to the instructions given.	Should be held within 24 hours after releasing the dead body. All possible precautions to minimize number who are attending to a maximum of 10 persons at a given time adhering to the instructions given.	

Service-related restrictions					
Public services (e.g., essential public services)	Adherence to national or departmental guidelines issued by the Ministry of health.				
Health Services	Adherence to national or departmental guidelines issued by the Ministry of health.				
Supermarkets	Will be kept open. A maximum of 25 % of the total number customers that could be accommodated in the space available can be allowed at a given time adhering to the instructions given (1.5m ² of available walking space can be considered as adequate for one person).	A maximum of 25% of the total number customers that could be accommodated in the space available can be allowed at a given time adhering to the instructions given. Advised to use delivery services as much as possible.	Can be kept open for online or delivery services only. Should avoid supermarket visits as much as possible.	Should remain closed. Can provide online and delivery services.	The capacity i.e. the number of people to be accommodated within supermarkets should be displayed at all entrances.
Grocery shops, Bakery, Pharmacies	A maximum of 50% of the total number customers that could be accommodated in the space available can be allowed at a given time adhering to the instructions given.	A maximum of 50% of the total number customers that could be accommodated in the space available can be allowed at a given time adhering to the instructions given.	A maximum of 25% of the total number customers that could be accommodated in the space available can be allowed at a given time adhering to the instructions given.	A maximum of 25% of the total number customers that could be accommodated in the space available can be allowed at a given time adhering to the instructions given.	
Open markets, Fairs, Economic centres	A maximum of 25% of the total number of customers that could be accommodated in the space available, can be allowed at a given time adhering to the instructions given.	A maximum of 25% of the total number of customers that could be accommodated in the space available can be allowed at a given time adhering to the instructions given.	Should remain closed.	Should remain closed.	

Financial Institutions (Banks, Finance companies, Pawning centres etc.)	A maximum of 25% of the total number of customers that could be accommodated in the space available can be allowed at a given time adhering to the instructions given	A maximum of 25% of the total number of customers that could be accommodated in the space available can be allowed at a given time adhering to the instructions given.	A maximum of 10% of the total number of customers that could be accommodated in the space available can be allowed at a given time adhering to the instructions given.	Should remain closed.	Maximum number of customers allowed should be displayed outside by the institution prior to entering.
Schools, Day-care and Preschools, Higher education centres including universities, Tuition classes	Should remain closed.	Should remain closed.	Should remain closed.	Should remain closed.	
Personal services (e.g.: barbers and beauty salons)	A maximum of 50% of the total number customers that could be accommodated in the space available can be allowed at a given time adhering to the instructions given.	A maximum of 25% of the total number customers that could be accommodated in the space available can be allowed at a given time adhering to the instructions given.	Should remain closed	Should remain closed.	*Availability of different services will depend on the specific guidelines issued by the Ministry of Health. The services which require close contact in indoors pose a greater risk.
Restaurants	Restaurants function with a maximum of 25% of total seating capacity. Group dining is restricted to a maximum of eight.	Should remain closed. Can remain open for takeaways, drive-through with maximum two people and delivery services.	Should remain closed. Can obtain food via delivery services.	Should remain closed. Can obtain food via delivery services.	
Pubs / Bars / Casino / Night Clubs / Betting centres	Closed	Closed	Closed	Closed	
Public venues (e.g.: libraries, museums, cinemas, theatres playgrounds, markets)	Should remain closed.	Should remain closed.	Should remain closed.	Should remain closed.	

Business venues (e.g.: Furniture, electrical, hardware, tailors and dressmakers, laundry, communications and photocopy shops)	A maximum of 50% of the total number of customers that could be accommodated in the space available can be allowed at a given time adhering to the instructions given.	A maximum of 25% of the total number customers that could be accommodated in the space available can be allowed at a given time adhering to the instructions given.	Should remain closed.	Should remain closed.	Maximum capacity should be displayed on entrance to the facility.
Shopping Malls, Clothing/Textile shops	Maximum of 25% of total number of customers that can be accommodated in space available at a given time (while adhering to instructions given).	Functional for online services & deliveries.	Functional for online services & deliveries.	Closed.	
Boarding Houses	Can remain at full capacity adhering to the instructions given. However no new persons should be given accommodation.	Can remain at full capacity adhering to the instructions given. However no new persons should be given accommodation.	Can remain at full capacity adhering to the instructions given. However no new persons should be given accommodation.	Can remain 50% of capacity adhering to the instructions given. However no new persons should be given accommodation.	
Hospitality venues (Hotels, rest houses, guest houses)	A maximum of 25% of total capacity can be allowed at a given time adhering to instructions.	A maximum of 25% of total capacity can be allowed at a given time adhering to instructions.	Should remain closed.	Should remain closed.	
Wine stores	Strict adherence to DReAM.	Closed	Closed	Closed	
Street and mobile vendors	Allowed with strict adherence to guidelines and DReAM. Movement restricted to divisional secretariat setting.	Allowed with strict adherence to guidelines and DReAM. Movement restricted to divisional secretariat setting.	Allowed with strict adherence to guidelines and DReAM. Movement restricted to divisional secretariat setting.	Closed.	

Agriculture-based	Normal operations with strong adherence to DReAM.				
Construction sites	Allowed with strict adherence to DReAM	Allowed with strict adherence to DReAM	Allowed with strict adherence to DReAM	Closed	

Conclusion:

We have proposed the outline of a carefully crafted scientific exit strategy. The key elements in a scientific exit strategy need to include a scientific way of assessing the ongoing transmission, an assessment of the system capacity, a phased approach to end the lockdown, which is again based on some scientific classification and a viable decision-making process at the district level, while taking the regional realities into consideration. This will definitely facilitate the decision-making processes which are happening at the national level too. It is clear that a premature unscientific reopening, especially a blanket reopening of the whole country without a firm scientific basis and a mechanism to mitigate the outbreak could endanger the lives of the general public.

In addition, the abiding need for scrupulous attention to all details in the implementation of the different phases of the exit processes from the lockdown cannot be overemphasised. Laxity in implementation would negate all useful steps that are formulated in that endeavour.

References:

01. Griffin M, Sohrabi C, Alsafi Z, Nicola M, Kerwan A, Mathew G, Agha R. Preparing for COVID-19 exit strategies. *Ann Med Surg (Lond)*. 2020 Dec 13;61:88-92. doi: 10.1016/j.amsu.2020.12.012. PMID: 33391762; PMCID: PMC7773555.
02. World Health Organisation (2021), Considerations for implementing and adjusting public health and social measures in the context of COVID-19. <https://www.who.int/publications-detail-redirect/considerations-in-adjusting-public-health-and-social-measures-in-the-context-of-covid-19-interim-guidance>
03. World Health Organisation (2020), Coronavirus Update 44, https://www.who.int/docs/default-source/coronaviruse/risk-comms-updates/update44-public-healthand-social-measures.pdf?sfvrsn=1bcdd00f_5
04. Instructions on Alert levels in COVID-19 country response and permitted functions, Ministry of Health, Sri Lanka (issued: 03.11.2020). http://www.epid.gov.lk/web/images/pdf/Circulars/Corona_virus/revised_alert%20level_3_01%20may%202021.pdf
05. Li C, Romagnani P, Anders HJ. Novel Criteria for When and How to Exit a COVID-19 Pandemic Lockdown. *Front Big Data*. 2020 Jul 24;3:26. doi: 10.3389/fdata.2020.00026. PMID: 33693399; PMCID: PMC7931856.
06. World Health Organisation (2020), Considerations for implementing and adjusting public health and social measures in the context of COVID-19. https://apps.who.int/iris/bitstream/handle/10665/336374/WHO-2019-nCoV-Adjusting_PH_measures-2020.2-eng.pdf?sequence=1&isAllowed=y
07. Ministry of Health, New Zealand (2021). COVID-19: Gatherings. Accessed 12th May, 2021. <https://www.health.govt.nz/our-work/diseases-and-conditions/covid-19-novel-coronavirus/covid-19-information-specific-audiences/covid-19-gatherings>
08. Public Health England, (2021). Four-tier coronavirus alert levels: Tier 1, 2, 3 and 4 rules explained. Adapted from Public Health England. Accessed on 13th May 2020. <https://www.ageuk.org.uk/information-advice/coronavirus/coronavirus-guidance/local-lockdown-tiers>