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Coronavirus (COVID-19) protective measures: indicators and data

Introduction

The Levels system within our Strategic Framework has been designed to be applied either nationally or at a lower level of geography should the need for local protective measures arise. To inform decision making around the appropriate degree of restriction to apply, a set of indicators based on local data has been developed and is set out in this paper.

We describe how we plan to use routinely collected COVID-19 data on epidemiological conditions and health system capacity to inform when and how we change protective measures, in accordance with the Strategic Framework and the Levels Approach. This document outlines a set of core and secondary local indicators that have been selected for their relevance to the Scottish epidemiological context.

These local indicators will be used alongside wider data and intelligence. Local intelligence on the source and nature of outbreaks will form a core input to the decisions. Other factors, such as geography, population density and the level of public adherence will also be considered. Tighter restrictions may need to be quickly applied in areas where there is a resurgence of the virus. This may apply if new variants of concern arise that result in breakthrough cases among those who are vaccinated, or where other factors necessitate changing non-pharmaceutical interventions. Applying higher levels of restrictions is just one of the tools we can deploy to suppress the virus and may not always be the most appropriate response; other public health interventions, particularly at the local level, have a key role to play.

Decisions on whether and when to apply geographical variations in restrictions involve numerous evolving and sometimes competing factors. There is no textbook solution for these complex problems and the decisions will need to take account of data, trends, as well as careful consideration of Four Harms impacts, local population and geographical characteristics and experience gained from managing previous outbreaks. Judgement will be key to this decision making.

During the process of easing restrictions as Scotland moved out of the early 2021 lockdown, a national 'lockstep' move on 26 April to Level 3 was considered as most appropriate and proportionate, particularly taking account of domestic travel considerations. Up to that date, as set out in our updated Strategic Framework in February 2021, decisions on whether to proceed with nationwide easings[1] were informed by six conditions set out by the World Health Organisation (WHO).

Following this phase, while it is intended that a 'national' level of restrictions will still be set (with reference to the six WHO conditions), there will also be scope to vary the level of restrictions on a local basis, where that is considered necessary or appropriate. For example, this might be done to cater for areas which have experienced significant outbreaks, or (where appropriate) to support earlier moves to

[1] An exception was made for certain islands which were subjected to a lower level of restrictions.

lower levels where local conditions support that, for example as announced for certain islands on 11 May 2021.

Aim

The aim of this document is to set out the indicators that will be used to inform – but not determine – the geographical application of Levels of restrictions. It is designed to contribute to a consistent, transparent and proportionate decision-making approach to managing the pandemic in Scotland.

National Easings: WHO Six Conditions Review

To inform our progress through the national easings, we committed to undertaking regular reviews of the state of the epidemic and our response to it, to ensure that it remains safe to proceed. We adopted the six criteria recommended by the WHO[2] in assessing conditions for safe easing. This approach draws on quantitative metrics, including measures of NHS capacity, alongside assessments of the capability, readiness and delivery progress of key COVID-19 policies such as vaccine rollout and expansion of community testing.

These criteria are set out in Table 1 below:

Table 1: WHO criteria for easing restrictions

World Health Organisation criteria for easing restrictions
1. Evidence shows that COVID-19 transmission is controlled.
2. Sufficient public health and health system capacities are in place to identify, isolate, test and treat all cases, and to trace and quarantine contacts.
3. Outbreak risks are minimized in high vulnerability settings, such as long-term care facilities (i.e. nursing homes, rehabilitative and mental health centres) and congregate settings.
4. Preventive measures are established in workplaces, with physical distancing, handwashing facilities and respiratory etiquette in place, and potentially thermal monitoring.
5. Manage the risk of exporting and importing cases from communities with high-risks of transmission.
6. Communities have a voice, are informed, engaged and participatory in the transition.

[2] WHO/Europe | Coronavirus disease (COVID-19) outbreak - WHO/Europe publishes considerations for gradual easing of COVID-19 measures

Local Levels and Their Application

Prevalence of COVID-19 has varied across Scotland. For example, in recent weeks some areas of Scotland have seen sustained periods of low or zero levels of the virus, whereas other areas have seen a rise in cases leading to community transmission. Being able to adjust local levels as local circumstances require is crucial as we move through the levels as a nation. This approach maintains the clarity of a national approach, while allowing us to respond flexibly and target measures at the appropriate regional or local level.

Moving forward, the intention is for most of Scotland to move to Level 1 on 7 June and Level 0 on 28 June, if the data remain supportive and the restrictions in the Levels remain necessary and proportionate. Consistent with the approach to national easings set out above, a general nationwide move down through the Levels should satisfy the WHO's six conditions. For example, the general move down should be consistent with transmission in Scotland remaining controlled and NHS capacity sufficient to deal with expected levels of prevalence. However, the Levels approach also allows for differential treatment of areas where local conditions make that appropriate. Rather than pause progress for the nation as a whole, it may be appropriate to retain particular areas at their current level or potentially increase their level. In the event of a local COVID-19 outbreak showing signs of becoming more widely dispersed in the wider community, we will consider tighter restrictions in that area and potentially neighbouring ones if deemed necessary and proportionate, until the situation is brought under control. This would apply, for example, if an outbreak in a specific setting such as a factory spread more widely into community transmission. It is important that measures remain in place for as short a period as possible to suppress the virus, to minimise the overall harms caused.

We will continue to consider the most appropriate geography for restrictions, which might range from a town or individual island, through the basic building block of a local authority to a wider region, such as a health board area. However, we recognise the practical difficulties of applying travel restrictions between small areas. It is also possible that, following an outbreak, areas may move quickly down through the Levels once the outbreak has been suppressed – changes in Levels may not always be successive. For example, moving from Level 2 to Level 4 would be possible, as would moving directly back to Level 2 again, once an outbreak was addressed.

We recognise that smaller areas with smaller populations may show large proportionate changes in cases which are small in absolute value. For example, a week-long outbreak of 50 reported positive cases in a local authority with a population of 100,000 would present as 50/100,000 on the first core indicator (assuming no other cases in the area that week). In contrast, a similar 50-case, week-long, outbreak in a local authority with a population of 500,000 would present as 10/100,000. This might suggest quite different responses in terms of restrictions. This is why such numbers should not be considered in isolation but should be supported by local intelligence on the nature of the outbreak (e.g. whether the cases are in community transmission or centred on one particular setting). Where outbreaks are contained within single settings and where evidence of wider community transmission is not present, a different approach may be appropriate.

Close liaison with local health protection teams can aid in establishing circumstances and the most appropriate response.

The identification of any new variants of concern in an area may also need a higher level of restrictions to contain the virus. Should vaccine-resistant variants emerge in the future, then this could require tackling in different ways to the current Levels approach.

Relevant indicators

When the Strategic Framework was initially published in October 2020 introducing the five Protection Levels, a decision framework was presented which set out how data and intelligence is used to inform decisions applying the levels to local geographies. This included a basket of indicators drawing on local data[3].

Data related to the epidemic in Scotland were used to create five core indicators. These were used to produce an indicator report, in conjunction with other relevant facts and circumstances, to inform discussions on the level-setting process up until December 2020. Drawing upon clinical advice, health planning and the views of the National Incident Management Team data group, it was proposed that the indicator definitions be revised. The core indicators and their definitions are described in Table 2 and also in more detail in the annex.

Table 2: Core Indicators

Core Indicators	Informing	Description	Data source
Weekly new positive cases per 100,000 people	Community transmission	Cumulative seven day count of the number of people with a first positive PCR test result divided by the area population size and multiplied by 100,000.	ECOSS
Weekly percentage of tests that are positive	Community transmission	Seven day average of the number of positive PCR tests divided by all PCR tests carried out over the past week.	ECOSS
Projected cases per 100,000 people	Community transmission	Predicted number of PCR cases in 2 weeks' time from modelling at local authority level.	SPI-M modellers
Current and projected Covid hospital demand	Healthcare capacity	Two or three-week ahead forecast of COVID hospital demand, relative to capacity, by health board.	Scottish Government
Current and projected Covid forecast ICU demand	Healthcare capacity	Two or three week -ahead forecast of COVID ICU demand, relative to capacity, at a national level.	Scottish Government

It is important to note that the first two indicators are backward-looking – they reflect what happened in the past due to the lagged impact of past decisions and other factors. However, when we look ahead, we are interested in what we think future changes to restrictions and other factors would do to the virus in an area: what has happened in the past is only a limited guide to what will happen in the future,

[3] Coronavirus (COVID-19): allocation of levels to local authorities - 29 October 2020 - gov.scot (www.gov.scot)

particularly as new variants arise which may be more transmissible. In other words, low case numbers now do not automatically mean that restrictions should be eased. Instead, it is important to consider whether case numbers would remain suppressed, under the restrictions we are putting in place, if the virus was imported into an area. This question is particularly important for areas of low incidence as travel increases and settings re-open and activities resume. In this context forecasts play a key role – taking account of future changes in restrictions and of other relevant factors, particularly vaccination rates which would render outbreaks less harmful.

Along with the five core indicators, secondary indicators and broader considerations on health will be considered (see Table 3). The economic and social impacts of any Level decisions will also draw on the insights of local partners and stakeholders and data such as that found on the Four Harms Dashboard[4] . This quantitative and qualitative information will allow for transparent, reliable and consistent decision-making when setting Levels. These indicators depend on a combination of routine data, as well as forecasts based on these data. They might also include subjective judgements on hard-to-measure indicators such as the level of adherence with the regulations. This is not an exhaustive or static list of all potential indicators, we will continue to draw upon the latest developments in science and technology to monitor the epidemic.

Table 3: Secondary Indicators

Secondary Indicator	**Description**	**Data source**
Viral concentrations in units of SARS-CoV-2 million gene copies per person per day	Quantification of viral load in wastewater will give an indication of case levels in the local community.	SEPA wastewater
Prevalence and incidence of COVID-19 cases	The COVID-19 Infection Survey (CIS) is the largest regular survey of coronavirus (COVID-19) infections and antibodies, providing vital information to help the UK's response to the pandemic.	ONS
Exceedance	Exceedance is defined by Health Protection Scotland as a greater than expected rate of infection compared with the usual background.	Scottish Government ECOSS
Vaccine roll out	The proportion of the population vaccinated in an area and by age and at risk.	VAXAPP and ECOSS
Community LFT testing	LFT testing to identify asymptomatic cases in an area.	NHS portal
Mortality	Number of COVID-19 attributed deaths per 100 000 population per week averaged over a seven day period.	ECOSS and NRS
Hospitalisations	Cumulative new COVID19 hospitalizations per 100 000 population averaged over a 7 day period.	RAPID
Proportion of unlinked cases amongst new cases	Defined as the proportion of cases not previously listed as contacts. It is a measure of the spread in the community beyond known clusters. It is heavily influenced by case investigation and contact tracing capacity.	CMS and ECOSS
Testing access	Number of persons tested per 1000 population per week, averaged over a 7 day period.	ECOSS/NHS portal
Track and protect system functioning	Proportion of cases for which an investigation has been conducted within 24 hours of identification.	CMS
Proportion of cases arising from contact lists	Proportion of cases arising from contact lists.	CMS

[4] COVID-19 in Scotland (data.gov.scot)

The aim of these indicators is to capture a reliable and robust view of current and projected local conditions in relation to health system capacity and transmission. These will sit alongside other intelligence in informing decision making concerning the placing or lifting of restrictions. This is consistent with the approach of the WHO. Such an approach supports transparent and consistent assessment to inform decision making that is able to respond swiftly whilst taking cognisance of wider uncertainties and science.

The decision-making for Levels allocation draws in part on numerical thresholds for a set of indicators. The WHO thresholds that were published in the Strategic Framework Update in February 2021 remain helpful and are set out in Table 4 below. It is important to remember that indicators and thresholds serve as one of a number of considerations, rather than being used in a rigid way. The overall context in an area, including the delivery of the outbreak management response and the success of the vaccination programme, as well as further scientific evidence around vaccine efficacy, will always be crucial. Situations may arise, such as the growing presence of vaccine-resistant mutations and new variants of concern both within Scotland and other countries, where the role of judgement in decision making remains central, supported by evidence, analysis, and local intelligence.

Table 4: WHO thresholds

		Level 1	Level 2	Level 3	Level 4
Case incidence	New confirmed cases per 100,000 population per week averaged over a two-week period.	<20	20-<50	50-<150	150+
Test positivity	Test positivity proportion from sentinel sites averaged over a two-week period.	<2%	2%-<5%	5%-<20%	20%+

Conclusion

Scotland as a whole continues to make good progress in tackling the virus with cases having been driven down considerably from the peak seen at the early part of the year due to the B.1.1.7 variant. Crucially, hospitalisations and death rates have reduced significantly and the vaccination programme is progressing very well. However, the virus still has the potential to cause localised outbreaks and national resurgence, with the possibility of exponential growth in cases and potentially hospitalisations and deaths, requiring our route out of the pandemic to continue to be managed carefully. To ensure proportionality, it is necessary to consider where areas may, for reasons of prevalence, context and geography, be able to move to lower levels of restrictions.

The current approach – a national path of easing restrictions but with scope for local variation informed by these indicators and the wider context – gives us the best chance of moving effectively through the next phase of the pandemic consistent with our strategic intent to suppress the virus and minimise the broader harms of the crisis. As with other aspects of our COVID response, this approach will be kept under review to ensure it remains appropriate for the changing nature of the pandemic.

ANNEX A – CORE INDICATORS AND THEIR USE

Weekly new positive cases per 100,000 people

This indicator is defined as the number of people with a first positive test result, measured over a week, relative to population size. The new positive cases number is based on the date the test specimen was taken. There is a reporting delay in testing results, so data is drawn with a 3-day lag to allow for results to be available.

This indicator provides a valuable indication of the actual current spread of the epidemic. This figure is most helpful when used as complementary to the forecast case rate. The weekly total proposed aligns with the figures published on the PHS dashboard neighbourhoods site with a 3-day lag to allow for results to be available.

Percentage of tests that are positive over the past week

This indicator is defined as the 7-day average of the number of positive PCR tests divided by all tests carried out over the past week. Local intelligence would be required where there are low numbers of tests. There is a reporting delay in testing results, so data is drawn with a 3 day lag to allow for results to be available.

This indicator is important as it reflects both levels of testing and, by drawing on positive test results, can indicate the spread of the virus.

Projected weekly cases per 100,000 people

This indicator is defined as the projected number of cases per 100,000 people in two weeks' time, provided by modelling from the SPI-M consensus. The probability of an area exceeding 300, 150, 50 or 20 cases per 100,000 population is calculated. A 75% or higher probability of exceeding a number of cases is used to help define what level an area is assigned to.

This indicator is important because it can be used to identify hotspots across Scotland where infections are likely to be high in two weeks' time. This gives an early warning of where there may be increases, which gives time to act to slow the rate of increase.

Projected Covid Hospital Demand

This indicator is defined as the current and projected occupancy of Covid hospital beds in future weeks.

The Covid bed indicator will operate at NHS Board level. It reflects system capacity and pressures on individual boards, factoring in well-established mutual aid arrangements at regional and national level. Data currently used is based on recently-confirmed COVID-19 cases (within 28 days). Work is ongoing with Boards and Public Health Scotland to explore extending this to include patients with COVID-19 for more than 28 days. Pending finalisation, a definition of recently-confirmed Covid-19 cases will be used.

Projected Covid Intensive Care Unit (ICU) Demand

This indicator is defined as the current and projected occupancy of national Covid ICU beds in future weeks.

ICU will be assessed at a national level throughout the levels process, as the NHS Scotland service delivery model for ICU includes well-established mutual aid arrangements at regional and national level. Covid ICU bed numbers equate to total patients in ICU with recently confirmed COVID-19 and those with COVID-19 for more than 28 days.