Circuit Breakers and Local Control Measures– Updates

Paper for TAG on 7th Sept 2020

By the TAC Modelling Subgroup

TAC.modelling@gov.wales

Background

On 18th August 2020, the National COVID-19 Control Plan was published by the MHSSS. The plan recommends that a series of new circuit breakers are adopted. These include cases per 100,000, test positivity and other C-19 intelligence. Additionally WHO recommend that a 50 cases per 100,000 threshold are used. JBC use the following indicators to assess and respond to outbreaks at a local level in England:

1. Individuals tested per day per 100,000 (7 day moving average)
2. Percentage of individuals testing positive (weekly)
3. Incidence per 100,000 (weekly)

In setting indicators and circuit breakers in Wales, we seek to ensure consistency both nationally and internationally.

National Circuit Breaker Changes

Since the programme of testing has increased and 'Test, Trace, and Protect' (TTP) is in place, it would be beneficial to include new circuit breakers relating to this area. In this document we provide suggestions for a new circuit breaker relating to indicators for testing. Additionally we provide proposed changes to two of the current circuit breakers with reasoning.

The current circuit breakers relating to hospital bed occupancy refer to "covid-related" patients. This means patients who have COVID-19 confirmed by a test but also includes those patients suspected of having COVID-19. Testing is now faster and more reliable. It may no longer be necessary to include suspected COVID-19 patients in this indicator. COVID-19 confirmed patients may be a more suitable measure for the bed occupancy circuit breakers. The source for the data still remains as NWIS. Armakuni are able to implement changes to the circuit breaker dashboard with relative ease.

The percentage of COVID-related patients who had COVID-19 confirmed has decreased as time has progressed. This can be seen from the chart below:

Percentage of confirmed COVID-19 patients out of covid-related patients
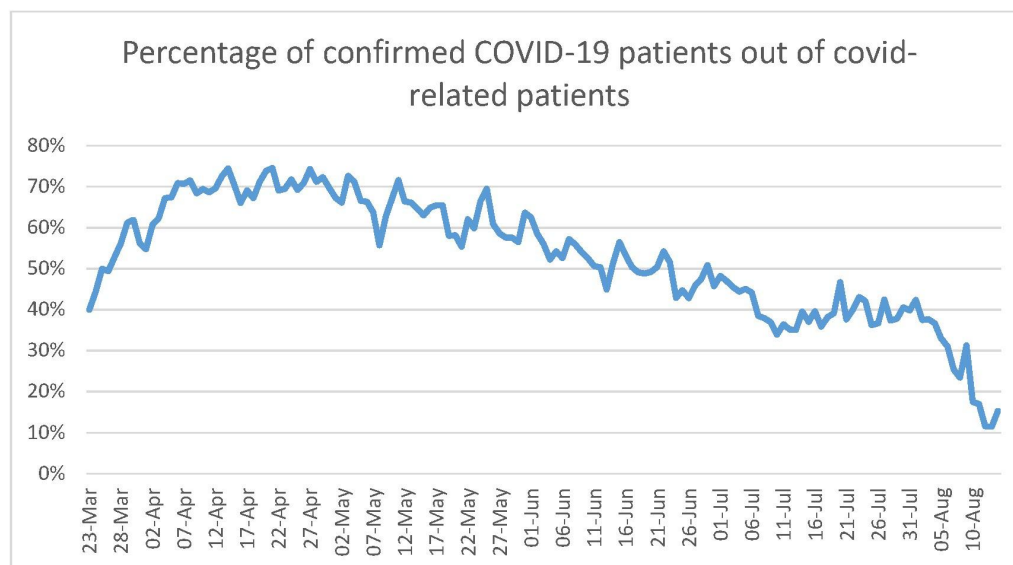
This makes the covid-related bed occupancy a less accurate indicator of the true story of how COVID-19 is spreading and we now have modelled data for the Winter to estimate at what point on the epidemic curve circuit breakers will be triggered. We therefore propose the following changes:

Proposed Changes

1. **Current circuit breaker:** Total covid-related beds is more than 1,200 (based on a rolling weekly average).
Proposed change: Total COVID-19 confirmed beds is more than 500 (based on a rolling weekly average). This is based on the projected rolling weekly average for the Swansea RWC scenario as of 15th December 2020, when cases are up an upward trajectory (actual value is 505 for previous rolling 7-day occupancy).

Reason for change: We have used the model results to understand at what point action is needed once average covid-related hospital activity across the whole of Wales increases in response to an R number increasing to 1.5. At the point at which confirmed and suspected COVID-19 patients in hospital beds reached 1,200 in April 2020, there were 900 confirmed COVID-19 patients in hospital beds. (8th April 2020: There were 1,236 total covid-related beds of which 884 were COVID-19 confirmed)

2. **Current circuit breaker:** Covid-related ICU beds is more than 120. (based on a rolling weekly average)

   Proposed change: COVID-19 confirmed ICU beds is more than 70 (based on a rolling weekly average). This is based on the projected rolling weekly average for the Swansea RWC scenario as of 15th December 2020, when cases are up an upward trajectory (actual value is 70 for previous rolling 7-day occupancy).

   Reason for change: We have used the model results to understand at what point action is needed once covid-related hospital activity starts to increase as result of the R number increasing to 1.5. At the point at which confirmed and suspected COVID-19 patients in hospital beds reached 120 in April 2020, there were 100 confirmed COVID-19 patients in hospital beds. (4th April 2020: There were 122 covid-related ICU beds of which 102 were COVID-19 confirmed).

Figure 1. Trend in rolling 7-day average total hospital bed occupancy and ICU occupancy up to July 2020, and modelled reasonable worst case scenario (Swansea C3 scenario) from August 2020-March 2021. Red line shows timing of circuit breaker thresholds.


3
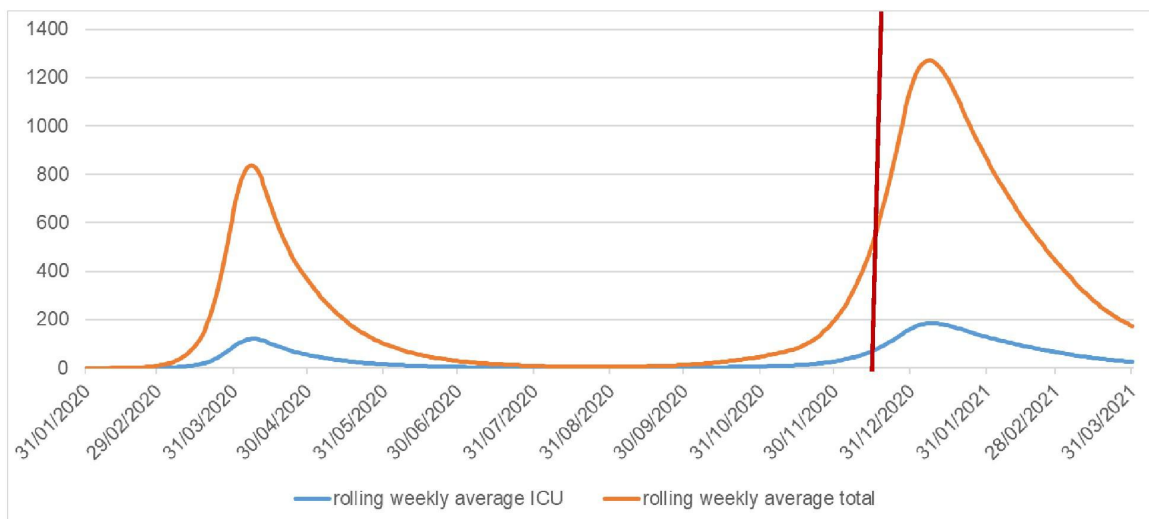
Proposed Additional Circuit Breakers:

It would be useful to include an indicator in the theme of TTP. These two circuit breakers could be used. Alternatively, they could be used as early warning indicators instead.

1. **Test positivity %:**

    Suggested circuit breaker: More than 7.5% of people in Wales tested for COVID-19 receive a positivity test result.

    Reason: The figures have ranged between 1% and 2.6% between 8 June and 26 July 2020. COVID-19 was thought to be controlled and stable throughout this period. An increase much above this may be indicative of an increase in transmission that may need to trigger a circuit breaker. During the peak in early April, the test positivity rates were much higher around 43.4% but this was when tests were scarce and mainly given to those with severe symptoms. We would expect to be testing a greater pool of people now which will lead to the percentage of positive people naturally being higher. Therefore anything over 7.5% could be a point where action or further assessment is required.
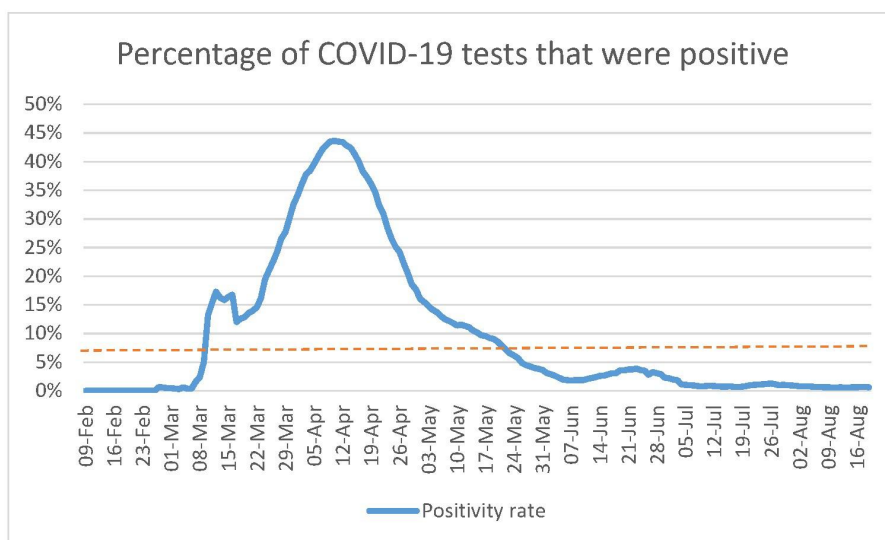
2. **7 day rolling average positive testing rate per 100k:**

    Suggested circuit breaker: A 7 day rolling average positivity testing rate of more than 20 per 100,000 people in Wales.

    Reason: The WHO suggest using 50 per 100,000 but this figure seems too high. A trigger point of 20 per 100,000 seems reasonable as we are

4

currently at less than X confirmed cases per 100,000. The previous peak was just over 10 per 100,000 but testing has greatly expanded since the initial peak. 20 per 100,000 is used as a rough estimate of when other travellers returning from other countries should quarantine.

How do national circuit breakers interact with local control measures?

There have been discussions about thresholds of cases that should be set to indicate a need for local control measures.

There has been several examples of local control measures being introduced in English local authorities based on different metrics. The main one being the number of confirmed cases over the last 7 days per 100,000 population. It makes sense for a local threshold to be set higher (where a higher value indicates more spread of the virus) than a national threshold because the amount of random variation will be higher at a local level and there needs to be either continuous transmission across the country or very high transmission in some parts of the country.

The WHO use above 50 cases per 100,000 (7 day rolling) as a threshold for more action, and PHE/JBC also use this threshold for 'red' alert areas, as well as 100 cases per 100,000 over 14 days rolling (so essential the same rate but checking whether it has been breached over a longer time horizon). The PHE/JBC reports are also 'red' where testing positivity is over 7.5%. If the proportion of tests fell, or if the signature of covid symptoms became more precise in predicting true covid cases, then this might change testing positivity, so this would need to be kept under review.

We recommend having confirmed case rate over 50 per 100,000 over 7 days as indicating a significant need for action (red); and over 25 per 100,000 as indicating a need for specific review and support (amber).

We recommend having test positivity over 7.5% of over as indicating a potential significant need for action (red); and 4% - 7.5% as indicating a need for specific review and support (amber).

Any analysis of local incidence and testing positivity needs to factor in:

1. Direction of travel and speed of increase (for instance factor in doubling times)
2. Age structure of cases – cases in younger people are less likely to result in poor outcomes like hospital, ICU and deaths; but need to be aware that cases in young people might indicate more cases that are not being tested if young people are more likely to be pausisymptomatic or asymptomatic, and also there is a clear risk of cases spilling over into older people over time, as has happened in Florida and is starting to happen in France and Spain.

5

3. Testing practice – has there been a big increase in testing in an area which will find more cases, and have asymptomatic people been tested? What is the likely onset date of positive cases?
4. Cluster size and whether clusters are under control; likely settings of virus transmission – so a big cluster that is under control may be less worrying than continuous, dispersed community transmission. Related cases may be confirmed with viral genome sequencing.
5. Whether cases have been imported from other areas or other countries.
6. Different levels of decision making at different geographies, e.g. SCGs may want to have a consistent approach across the area that they cover
7. Absolute numbers of cases, particularly for smaller local authorities e.g. Ceredigion, Isle of Anglesey, Blaenau Gwent and Merthyr Tydfil.
8. Comparison of cases and test positivity with other data, including 111 calls, GP sentinel surveillance data, Zoe symptom tracker app data, and local wastewater monitoring.

Appendix. COVID-19 Alert Level Methodology

Introduction
This document outlines a set of criteria for moving between the alert levels[1] in Wales, with data sources included in the Annex. The initial criteria for the UK were developed in consultation with national public health experts, reviewed by SAGE, agreed by the CMO and DHSC Ministers, and are subject to quarterly review by the JBC Technical Board, chaired by UK CMOs.

We have adapted the JBC indicators to the Welsh population by taken 5% of each of the figures. For example, if there over 2,000 confirmed cases of COVID-19 in the UK required to move from level 2 to level 3, we have adjusted this figure to 100 for Wales.

This is to assist with making decisions regarding local lockdowns in Wales. The actions (including NPIs and advice to the public on behaviour change) that may be taken by local and national government at each alert level are not considered here. It is an assumption that the scope of these can be increased or reduced within a given alert level.

- **Level 1**: Covid-19 is not known to be present in Wales
- **Level 2**: Covid-19 is present in Wales, but the number of cases and transmission is low
- **Level 3**: A Covid-19 epidemic is in general circulation.
- **Level 4:** A Covid-19 epidemic is in general circulation; transmission is high or rising exponentially
- **Level 5:** As level 4 *and* there is a material risk of healthcare services being overwhelmed

Approach
The approach is focussed on the criteria to move between levels, rather than criteria that define an individual level. This is because the relative importance of different attributes of the COVID-19 Alert Scale will have different weight when the Alert Level is escalated than when it is de-escalated. For example, it will be necessary to review and escalate the alert level as rapidly as possible, to signal an escalating public health crisis which may emerge over hours or days. This reflects disease transmission dynamics, particularly the importance of the doubling time of cases and the reproductive number at any point in time. Conversely, as the threat of disease slowly drops and public restrictions are eased, it will be important to ensure changes to alert level are undertaken in a stable fashion and that a long term downward trend in new infections has been established. This stability will be important for establishing public confidence in the alert scale.

Timeliness of review of Alert Levels
Minimum times between changes of level are important. The impact of any major change in NPIs on the transmission of the virus is unlikely to become apparent for at

---

[1] The alert levels were defined in the UK Government's COVID-19 recovery strategy Our Plan to Rebuild in May 2020.

least two weeks. The proposed interval for reduction may therefore vary for downward changes between levels and with changes, in general, taking place over a longer period than for upward changes, in keeping with the public health precautionary principle. This will also avoid rapid oscillation between levels when specific metrics are at, or close to, a chosen threshold.

COVID-19 Alert Level Indicators[2]

Is R>1?

Are there more than 500 confirmed new infections in Wales per day?

Are there > 50 confirmed new infections in Wales per day?

Is the consensus R value for Wales reliably ≥1?

Is the doubling time of confirmed new infections less than 7 days?

Has the number of COVID-19 outbreaks notified in specific settings in Wales increased ≥ 20% over the previous 7 days?

Is the doubling time of confirmed new infections less than 7 days?

Are Covid-19 related total deaths increasing at ≥50% over the same 7 day period?

Are Covid-19 related hospital admissions increasing at ≥50% over the same 7 day period?

Have NHS national leadership stated that forecasted demand will outmatch forecasted capacity within the next 14 days, across any region in wales?

Are there any confirmed infections that cannot be traced to importation to Wales?

Are any cases or clusters detected through sentinel surveillance NOT linked to a known transmission chain?

Are Covid-19 related HDU/ICU admissions increasing at ≥50% over the same 7 day period?

Have UK COVID-related hospital admissions been >100 per day for the last 10 consecutive days?

OR

-----------------------> ------------------------> -----------------------> -->

--->

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |

<--------------------- <------------------------ <------------------------ <--

Is there reliable evidence and consensus by the CMO of Wales that COVID-19 is no longer endemic in Wales?

Has the total count of defined outbreaks been in decline in Wales and LHBs for at least 4 weeks?

Has the estimate of R in the general population been consistently <1 for at least two serial intervals?

Have NHS hospitals stated that forecasted demand will not exceed forecasted capacity for at least the next 14 days, across Wales?

Are there < 50 estimated new infections per day?

Are there estimated to be <500 new infections per day?

Have Wales COVID-related hospital admissions been <100 per day for the last 14 consecutive days?

Has the estimated R been on a downward trajectory for the last 4 weeks?

Have the number of new daily COVID-19 infections, hospital admissions, ICU admissions and deaths been on a downward trend for the last 4 weeks?

Have the observed number of new daily COVID-19 confirmed infections, hospital admissions, ICU admissions and deaths been on a downward trend for the last 4 weeks?

Is there an adequate supply of PPE, Staffing and Medicine?

i. PPE - 14 day DHSC forecasted supply meets modelled demand
ii. Staffing - Percentage of absent staff below 15%
iii. Medicine - No Level 3 supply Distribution Alerts for critical care medicines

---

[2] Note that, moving from level 3 to level 2 should not be considered until at least 2 serial intervals have elapsed since the move from level 4.

Annex: Sources

Data is required to make a decision on whether to move up or down a level. The data needed comes from various sources all of which are listed in the tables below:

Moving up from Level	To level	Sources used in making the decision to move from one level to another	Circuit breaker or on dashboard (but not a circuit breaker)?
1	2	New infections notified to PHW and intelligence cell.	No
2	3	• Confirmed cases: PHW • Consensus R value: SPI-M/SAGE[3] • Doubling time: PHW • Cluster/outbreak detection: Notification of institution outbreaks to Health Protection Teams.	Dashboard Circuit breaker Circuit breaker No
3	4	• Confirmed cases: PHW • Consensus R value: SAGE • Doubling time: PHW • Deaths: PHW (tbc) • Hospital admissions: PHW • ICU admissions: PHW	Dashboard Circuit breaker Circuit breaker Dashboard Dashboard Dashboard
4	5	• Hospital admissions: PHW • Hospital capacity/demand: NWIS	Circuit breaker Circuit breaker

Moving down from Level	To level	Sources used in making the decision to move from one level to another	Circuit breaker or on dashboard (but not a circuit breaker)?
2	1	Identification that the disease is no longer endemic, drawing on a range of routine data and research.	No
3	2	• Confirmed cases: PHW • Consensus R value: SPI-M/SAGE[3] • Hospital admissions: PHW/NWIS • ICU admissions: PHW/NWIS • Deaths: PHW (tbc)	Dashboard Circuit breaker Dashboard Dashboard Dashboard No

---

[3] Modelling provided by TAG; PHW death data.

		• Cluster/outbreak detection: Notification of institution outbreaks to Health Protection Teams.	
4	3	• Confirmed cases: PHW • Consensus R value: SPI-M/SAGE4 • Hospital admissions: PHW (tbc) • ICU admissions: PHW (tbc) • Deaths: PHW (tbc) • Cluster/outbreak detection: Notification of institution outbreaks to Health Protection Teams.	Dashboard Circuit breaker Dashboard Dashboard Dashboard No
5	4	• Hospital capacity/demand: NWIS • Hospital admissions: PHW (tbc) • Staffing: NWIS • Medicine levels: TBC • PPE: NHS Wales Shared Services Partnership (NWSSP)	Circuit breaker Dashboard No No Dashboard

---

4 Modelling provided by TAG; PHW death data.