

Calculation and presentation of the Stringency Index 2.0

15 April 2020

Check for most recent version here: www.bsg.ox.ac.uk/covidtrackerCalculation

The stringency index is calculated using only the policy indicators S1 – S7. The value of the index on any given day is the average of seven sub-indices pertaining to the individual policy indicators, each taking a value between 0 and 100:

$$I = \frac{1}{7} \sum_{j=1}^7 I_j$$

Indicators S1 to S6 have an additional flag corresponding to whether the policy has been applied locally, in specific areas/circumstances, or generally, nationwide. We define G_j to be 0 if the policy is targeted and 1 if general. Note that a policy can only be general if it has a non-zero value, since a zero value corresponds to no measures being taken.

If indicator S_j has a numeric value of S_j ranging from 0 to N_j , then we define, for $j < 7$, the sub-indices to be

$$I_j = 100 \frac{S_j + G_j}{N_j + 1}$$

and S7 has no notion of general vs targeted, so

$$I_7 = 100 \frac{S_7}{N_7}$$

The sub-indices are thus linearly proportional to the ordinal value of that policy indicator, with a ‘bonus point’ of 1 for a generally-applied policy, scaled so that 100 is the maximum possible value and 0 corresponds to no measures being taken.

We make the conservative assumption that an absence of data corresponds to a sub-index of zero.

Here is an explicit example of the calculation:

Indicator	Value	General?	Max value	Sub Index
Variable:	S_j	G_j	N_j	I_j
S1	No data	No data	2	0.00
S2	1	1	2	66.67
S3	2	0	2	66.67
S4	1	0	2	33.33
S5	1	1	1	100.00
S6	1	1	2	66.67
S7	2	NA	3	66.67
Overall				57.14

If fewer than six policy indicators have data on a given day, the index calculation is rejected and no value is returned.

Display

Because data are updated on twice-weekly cycles, but not every country is updated in every cycle, recent dates may be prone to missing data. To increase consistency of recent data points which are perhaps mid contribution, index values pertaining to the past seven days are rejected if they have fewer policy indicators than another day in the past seven days, i.e. if there is another recent data point with all seven indicators coded.

For example, the date at the time of writing was 6th April. The table below gives an example of which index calculations would be rejected based on the number of policy indicators with data on each data.

The API outputs two values for the stringency index – the actual index `stringency_actual` which is the calculated value, null if the index has been rejected for that date for having insufficient data, and a ‘smoothed’ value `stringency`.

The smoothed value is only different in the past week, and is equal to the most recent valid index (if there is one, else null). The motivation for this is to provide a stabilized value for display purposes.

Date	# Valid Sj	# Needed	Rejected?	Calculated index	Displayed
24/03/2020	3	6	YES	None	None
25/03/2020	6	6	NO	60	60
26/03/2020	4	6	YES	None	None
27/03/2020	6	6	NO	65	65
28/03/2020	3	6	YES	None	None
29/03/2020	5	6	YES	None	None
30/03/2020	2	6	YES	None	None
31/03/2020	3	7	YES	None	65
01/04/2020	7	7	NO	70	70
02/04/2020	7	7	NO	70	70
03/04/2020	6	7	YES	None	70
04/04/2020	5	7	YES	None	70
05/04/2020	6	7	YES	None	70
06/04/2020 (Today)	5	7	YES	None	70