# Estimating the duration of the inspection and storage of Covid-19

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## Abstract

"How long should these restrictions last?"

To measure this question, two measures of disease spread are proposed. These; daily growth rate and time to double cumulative cases. These metrics enable the targeting of three simple, intuitive, and actionable comparisons: Inspection, Control, and Enclosure (<10%, 1%, and 0.1% growth, respectively).

Besides, action or response is defined as major testing and quarantine, home orders, or deadlocks. Analysis of the top 36 countries and 50 states of the USA affected by the epidemic disease by the end of March gives the following results. Aggressive interventions only caused any damping or deceleration.

It takes an average of three weeks for countries to act. However, even aggressive intervention does not give immediate results. It takes an average of three to three weeks from countries' aggressive intervention, four weeks to control, and more than four weeks to spread the disease. During the action, there are important differences between Asian and European countries, large and small. Using these findings, possible inspection and control dates are estimated for certain countries and the US States.

Without a vaccine, treatment, or major test and quarantine, deadlocks and illegal orders will take months. However, the US faces a unique challenge, because only half of the states have adopted aggressive interventions and did it at different times. Even if these situations gain control or limitation, they may be vulnerable to transmission from other late countries.

**Keywords:** Coronavirus, COVID-19, lockdown, metrics, inspection, and storage

Jel Codes: G10, G15, F37, F65

## Introduction

States' orders to stay against COVID-19 do not shed light on people's minds, with crashes and increasingly enforcing quarantines. Based on previous extensive research on the spread of innovations, we propose two measures and three benchmarks to help answer these critical questions.

Two measures of the spread of the simple and generalizable disease are daily growth rate and time to double cumulative cases. The daily growth rate is the percentage increase in cumulative cases.

The doubling time is the number of days for cumulative cases to double at the current growth rate (divided by approximately 70 growths). Besides their simplicity and intuitive appeal, these metrics are not dependent on calendar time, country or type of disease.

This feature allows comparisons to be made across time and country. For example, when New York reported 1,008 new cases on March 17, based on a total of 1,374 cases, on March 17, the growth rate was 73% and the doubling time was 1.25 days. At this rate, the number of victims would increase to about 22,000 in five days. Using these two metrics, we define three measurable benchmarks for analysts and public health managers to target:

Moderation: when growth rate stays below 10% and doubling time stays above 7 days.

Control: when growth rate stays below 1% and doubling time stays above 70 days.

Containment: when growth rate stays below 0.1% and doubling time stays above 700 days.

Note, just like the metrics, these benchmarks are also independent of country, calendar time, or type of disease. This new model with its two metrics and three benchmarks allows us to compare across regions

(countries ( Sood *, et.al.,2012*) states, or cities) stricken by COVID-19, infer important patterns,[4] and draw actionable lessons. To do so, we record the start of the disease in each region (first incidence) and the start of aggressive intervention (action). We define the latter as, 1) Stay-at-home or lock down orders (e.g., China, California, Italy) or 2) Massive smart-testing and quarantine (e.g. Singapore, S. Korea, Japan). We then compute the time it takes for a region to adopt aggressive intervention and the time from then to moderation, control, and containment. We compute these statistics for 36 countries of the world and 50 states of the USA, for which we could assemble data, as of March 29th.

Using this model on the data collected, we compute the mean times for these events by region, either large Asian countries, large European countries, small countries, or states of the USA. Table 1 presents the results.

**Table 1: Mean Time to Act, Moderate, and Control by Region^**

| Country | Time to Act | Time to Moderate | Time to Control | Time to Containment |
|---|---|---|---|---|
| **Large Asian (n = 4)** | 22 | 18 | 31* | 45* |
| **Small Asian (n = 7)** | 16 | 15 | Pending | Pending |
| **Large European (n = 2)** | 31 | 17 | Pending | Pending |
| **Small European (n = 2)** | 21 | 5 | Pending | Pending |
| **US States Jan-Feb 27 1st case** | 50 | Pending | Pending | Pending |
| **US States Feb 17-Mar 1st Case** | 10 | Pending | Pending | Pending |

* Only China has achieved control or containment at this stage

^ These predictions are based on as of March 29th, 2020

Here are the important points to note about Time to Act. First, countries took, on average, about three weeks to act. This is a huge time interval, especially given the high cost of delay in terms of people falling sick, being hospitalized, and dying. Second, a large difference exists in time to act between Asian (19 days) and European (26 days) countries. The relatively shorter times to act for Asian countries could be due to their previous experience with similar viral epidemics (e.g., SARS). Third, across Asia and Europe, small countries act faster (18 days) than large ones (26 days), perhaps because small countries can achieve consensus among disparate coalitions faster than big countries. Fourth, the longest time to act is for US States that had the first case before Feb 27th (50 days). The probable reason is that the US had not been hit by a pandemic for decades. So, people were in disbelief that the pandemic would spread too rapidly in the US, with its premier medical system, physical separation from Europe and Asia, and long tradition of hygiene and fighting disease. Fifth, now that US states have seen the terrible consequences of delayed action in California and especially New York, they are acting one third as fast as the states that had the first case before Feb 27th and nearly as fast as small Asian countries.

**Other key elements:**

Here are the important points to note about time to moderate. First, large Asian countries take slightly less than three weeks to moderate. Small Asian countries take about fifteen days to moderate. The small difference may be due to more stringent implementation or compliance of orders in small Asian countries. Second, it's too early to see a pattern between time to act and time to moderate, though we suspect that such a pattern will emerge. Thus, across this sample, size of region, prior exposure to epidemics, prior challenges of neighboring states, and misunderstanding, may play a role in time to act and time to moderate

the spread of the disease. The figure below shows dates of intervention, moderation, control, and containment in China, which is the only country that has gone through all four events.

**Fig. 1: Total Cases & Daily Growth in China**
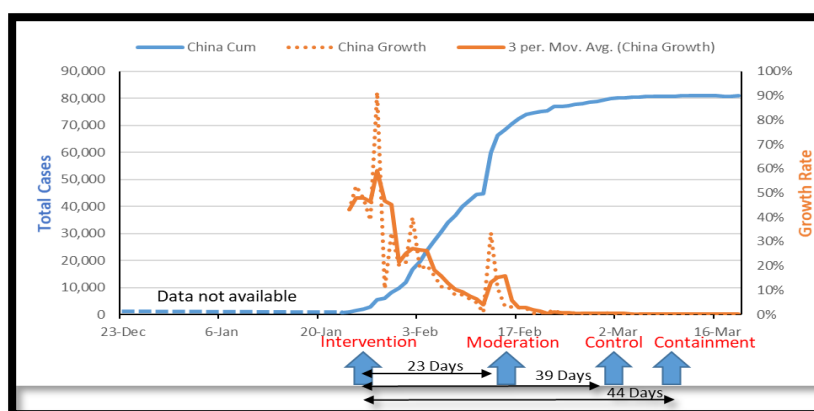


*Source:* *It was prepared by researchers.*

These results give the important results in Table 2.

The spread of the disease did not slow down due to its penetration into the entire population. However, even aggressive intervention does not show immediate results. For large countries, moderation takes only three weeks. Moreover, moving for longer does not shorten the moderation time. From the experience of some East Asian countries, early removal and stay at home may not be fruitful. Using this model, we can evaluate the value of US states' stay orders. As an alternative to complete locking, Singapore, South Korea, Japan and Hong Kong used smart identity, large tests and selective quarantine. With these strategies, these countries can gain even more control.Using our model on the data we collected, Table 2 (below) gives the tentative predicted time to moderation and control for select regions of the world.

**Table 2: Times to Predicted Moderation and Control for a Select Countries and US States**

| Region | Date - First Incidence | Action Day | Days to Act | Days to Moderate | Date of Moderation | Predicted Date of Control* |
|---|---|---|---|---|---|---|
| China | 23-Dec | 23-Jan | 31 | 16 | 8-Feb | 23-Feb |
| Japan | 23-Jan | 3-Feb | 11 | 14 | 17-Feb | (>29-Mar) |
| South Korea | 23-Jan | 12-Feb | 20 | 21 | 4-Mar | (>29-Mar) |
| Italy | 31-Jan | 6-Mar | 35 | 17 | 23-Mar | (>14-Apr) |
| Washington | 21-Jan | 12-Mar | 51 | Pending | (>01-Apr) | (>12-Apr) |
| Illinois | 24-Jan | 21-Mar | 57 | Pending | (>04-Apr) | (>21-Apr) |
| California | 26-Jan | 19-Mar | 53 | Pending | (>02-Apr) | (>19-Apr) |
| Germany | 27-Jan | 22-Mar | 55 | Pending | (>05-Apr) | (>22-Apr) |
| Massachusetts | 1-Feb | 24-Mar | 52 | Pending | (>07-Apr) | (>24-Apr) |

| Spain | 1-Feb | 14-Mar | 42 | Pending | (>01-Apr) | (>14-Apr) |
| New York | 1-Mar | 22-Mar | 21 | Pending | (>05-Apr) | (>22-Apr) |

Especially in the USA, there are significant political and economic pressures to remove the deadlocks after two weeks. As can be seen in Table 1, two weeks will not be enough. Are there alternatives to home stay and lockout orders? Yes, if it's well done. Intelligent identification, large tests and quarantine can reduce blunt need or coverage and economically disrupt accommodation-athome or locking measures.

Some important assumptions confirm these preliminary findings. First, the data reported by various countries and regions in the countries are transparent. The detection rate is similar across countries, but we know that the test rates are very different (Tellis[., et.al,2003]). It has not yet been explicitly controlled for other active drivers such as humidity and temperature (Sood[., et. al., 2012]), geographical latitudes (Sood[., et. al., 2018]), population density, implementation of control, cultural greetings, personal hygiene (Chandrasekaran., et., al,2008) etc. When available, such data will enable more sophisticated models, which may give more precise estimates than me.

**World Health Organization's Approach to Outbreak**

**Chronology of the epidemic and the World Health Organization's approach**

China first reported cases of pneumonia (pneumonia) of unknown etiology on 31 December 2019 to the World Health Organization (WHO). Between 31 December and 3 January, the number of these cases rose to 44. On January 7, 2020, China identified a new type of coronavirus as the cause of the disease. On January 13, the first case was detected in Thailand. Then came reports from Japan on January 15 and from South Korea on January 20.

WHO declared worldwide emergency on January 31, 2020, a month after China made its first notice. President Tedros Adhanom explained that the reason for the emergency declaration was not in China, but in other countries. The number of confirmed cases on January 31, when the emergency was announced was 9,720 in China, 106 outside China; the number of suspect cases is 15,238 in China; The total number of countries affected by the epidemic was 20.

The disease is also in Southeast Asia, the United States (6 cases in the USA), Europe (6 cases in France, 2 cases in Italy) and the Eastern Mediterranean regions, apart from the West Pacific region, including China, Japan, South Korea, Singapore was determined.

WHO's characterization of the disease as a pandemic occurred on March 11, 2020, 1.5 months after the disease spread to other continents. At that time, the total number of cases was 118.319, the total number of deaths was 4.292; The number of cases outside China was 37,364, the number of deaths was 1,130, and the number of countries affected by the outbreak had reached 113.

WHO chief Adhanom, who described the stage reached on January 31 as a pandemic, reported that they were following the outbreak closely, the situation was under control, the number of cases in China and South Korea started to decrease, and they called the countries for urgent and aggressive actions every day.

Adhanom stated that using the word pandemic at a press conference at the end of February would not meet the facts and lead to unnecessary fear and said: "What we see are epidemics that affect different countries in different parts of the world."

Even if the impact of the collapse has passed the pandemic, it will continue to affect the world for years.

**10 Countries With The Highest Number of Population and Case Number by Continents**

In this part of the study, 10 countries with the largest population on the continents and 10 countries with the highest number of cases will be examined. In this way, it will be possible to evaluate countries and

regions where cases are concentrated in each continent and the share of countries with high number of cases in the continent population and their share in the number of cases.

The population of the 10 countries with the largest population in the European continent ranges from 145.934.462 (Russia) to 17.134.872 (the Netherlands).

These 10 countries have about 79% of the continent's population. The countries with the largest share in the population are Russia with 19.5%, Germany with 11.2% and the United Kingdom with 9.1%. Among the top 10 countries, Poland with 5,8%, Romania with 5,1% and Netherlands with 2,3% have relatively low share in the continent. The shares of the remaining 4 countries within the continental population range from 8.7% to 5.8%. In addition, in 10 countries with the highest population on the continent, the urbanization rate ranges from 55% (Romania) to 92% (the Netherlands) and is usually above 70%.

Source: http://www.worldometers.info

In 10 countries with the highest number of cases on the European continent, this value varies between 200,210 (Spain) and 20,863 (Portugal). While 10 countries with the highest number of people infected with Covid-19 virus in Europe constituted 69.2% of the continent population, 88% of the number of cases in the continent in these countries. The countries with the highest share of cases in the top 10 countries

Spain with 18%, Italy with 16% and France with 14%, while the countries with the lowest share are Netherlands with 3%, Switzerland with 2.5% and Portugal with 2%.

On the other hand, Ukraine, which is among the top 10 countries in the total population in Europe, is not among the top 10 countries in terms of number of cases.

However, Belgium, Switzerland and Portugal, which are not among the top 10 countries in terms of total population, are among the top 10 countries in terms of number of cases. This data shows that Covid-19, which has spread widely in Western European countries, has not spread much in their countries in Eastern Europe.

Source: http://www.worldometers.info

**RESULTS**

Due to economic globalization and rapid communication or means of transportation, there is no rapid displacement of capital, industrial goods, agricultural products, raw materials and energy resources, information and people in the world today.

At the same time, there is a rapid displacement and spread of microbes and diseases that are transported unwittingly.

On the other hand, in an article titled "Medieval Diseases Flare as Unsanitary Living Conditions Proliferate" published on scientificamerican.com on March 15, 2019, states in the US, such as California, New Mexico, Washington, Kentucky and Ohio, and San

It has been emphasized that there are many homeless people in cities such as Diego, California, Los Angeles, Sonoma and Washington and their environments are very dirty4 causing diseases such as typhus, hepatitis A, syphilis and diarrhea (seicentificamerican.com).

It comes to mind that the rapid spread of Covid19 in America and Europe can be caused by a large number of homeless people living in unhygienic environments. That is, the social structure of the west is produced and

The homeless community may have confronted this wealthy society with serious health problems.

Today, researchers from many fields of science, especially those in history, geography, economics and political science, Covid-19 will be an important turning point in human history and that various services, economic, health, education, trade, industry, tourism, especially They say that in the field of activity and human mobility, different approaches from the past may emerge and be adopted in the future.

We hope that this study, which examines the geography where the Covid-19 virus continues to spread, by countries and examines some variables other than the number of cases in countries where the virus in question is widely seen in the world, will contribute to future studies.

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## Conflicts of Interest

There is no conflict.