How Government Policies affect the number of COVID 19 infections worldwide? – Case Study

Different government approaches and their consequences

Abstract:

The COVID 19 is a pandemic influencing the human health and economy at a global level. The major limitation to overcome is the lack of vaccines or effective medicines to control or to treat the disease.

One of the most influential ways to handle the infections on a large scale are individual actions and policies implemented by National Governments

The focus of this article is to portray contrasting approaches from different countries on how to handle the COVID-19 pandemic and the implications of multifactorial policies on the general population.
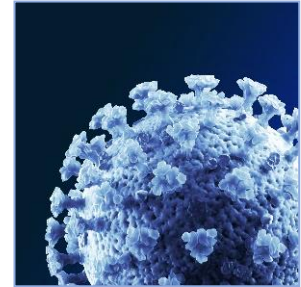
1.INTRODUCTION

The Coronavirus Disease 19 or COVID-19 is the name of a newly discovered respiratory illness that can spread from person to person causing flu-like symptoms such as fever, fatigue, shortness of breath, and in severe cases, death.

The origin of the virus was found to be from the city of Wuhan, Hubei province, China, in December 2019 [8], and due to its highly infectious nature, it was formally established as a pandemic in March 2020.

COVID-19 affected more than 100 countries in a couple of months from February [1] and as of July of 2020, more than 150 countries and 18 million people have been reported infected.

COVID-19 has been proven to be a global scale threat and the object of this article is to convey factors and government strategies that have been developed on how to trace, mitigate and warn the population against this threat.

Watch for COVID-19 symptoms [14]

- Fever or chills
- Cough
- Diarrhea
- Shortness of breath
- Fatigue
- Muscle aches
- Headache
- Sore throat
- New loss of taste or smell
- Nasal Congestion
- Nausea or vomiting

2.THE ROLE OF THE GOVERNMENT IN COVID-19

Due to the scale of the situation, few organizations on a global scale that can handle the logistics of the outbreak so the role of national governments has started to prove to be a major variable in the handling and the development of efficient ways of handling the course of this pandemic.

Independently of each country's circumstances, the success or failure of any national government must be measured by the well-being of its citizens, which translates well-placed policies.[3].

2.1.Why the Government Role is so important?

The major limitation to overcome the pandemic as of now is the lack of tested and approved vaccines or medicines to treat the disease.

Hence, as a society, we have to rely exclusively on enforcing strict preventive measures that minimize the risk of possible disease transmission. [5]

Among the means of controlling the transmission of disease, protecting groups of people by limiting their interactions may be highly effective. For example, "social distancing" has been shown to have a role in reducing the spread of pandemic flu. [5][6]

## 3. FACTORS AFFECTING THE GOVERNMENT DECISION MAKING

Considering that population health is the agreed priority for all countries, there are very important

CONSIDERING that most healthcare workers are unable to work remotely, strategies including the early deployment of viral testing for asymptomatic and/or frontline healthcare staff is imperative. [9]

Daily new confirmed COVID-19 cases
The number of confirmed cases is lower than the number of actual cases; the main reason for that is limited testing.
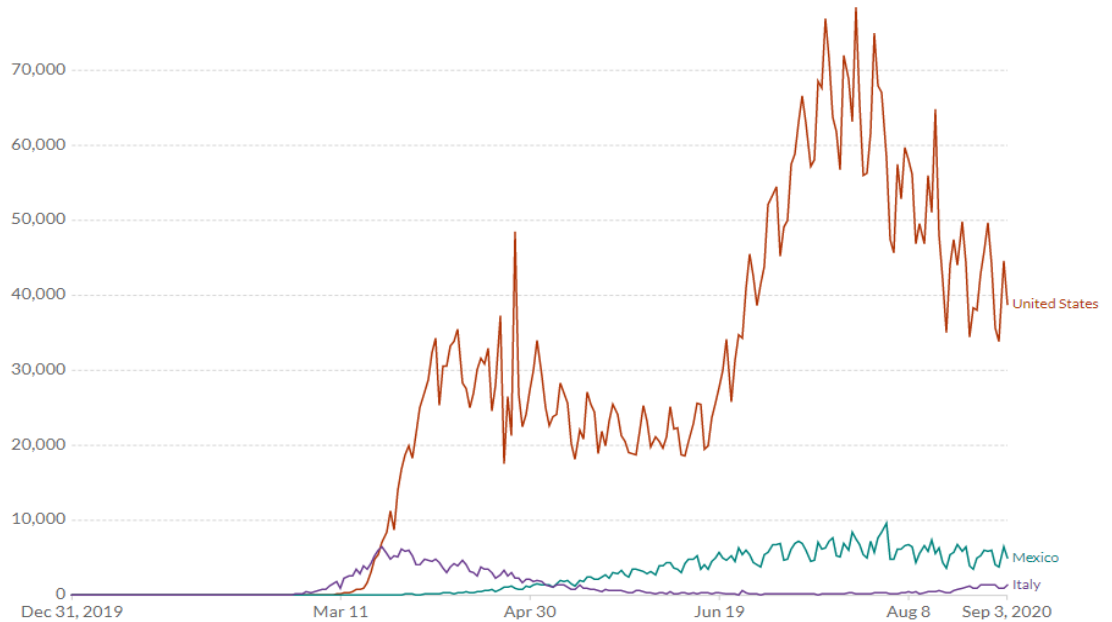
decision making factors that can impact the approach of each country to tackle coronavirus, like geography, population density, political orientation, and trust in healthcare services. Nevertheless, there are two particular factors impacting directly in all countries: Healthcare systems and Economic Landscape.

This model is an excellent statistical reference to illustrate that even when the outbreak is established in certain countries, the geographical and internal political variables affect the spread of the virus.

3.1. Healthcare Systems.

The COVID-19 pandemic has caused an unprecedented challenge for healthcare systems worldwide. In particular, the risk to healthcare workers is one of the greatest vulnerabilities of healthcare systems worldwide. Adding to the situation high healthcare costs, shortages of protective equipment, including face masks, and low numbers of ICU beds and ventilators have ultimately exposed weaknesses in the delivery of patient care.

3.2. Economic Landscape

Several countries are in lockdown mode, for an indefinite time. People are working from home, or simply, not working at all. There are implemented travel bans, sports events cancellations, and general prohibitions on mass gatherings. In some cases people are trying to avoid public transport and public spaces, such as restaurants and shopping centers.

Defining Factors on COVID-19 infections [8]

- Social Distancing and Community Consciousness
- Host Defense Potential
- Underlying Conditions
- Age
- Air Temperature
- Personal Hygiene Practices
- Virulence
- Population Density

This, without a doubt, will cause an economic downfall that may push some countries into further infections if the local population may feel the need to expose themselves to the possibility of infection to find an economic relief.[11].

Figure 1: Cumulative Cases – Example of the consequences of different government approach to COVID-19 Infections – The chart shows the timeline of a continuum outbreak, as in the case of USA, vs the bending of the outbreak curve as in the case of Italy.

4. DIFFERENT GOVERNMENTAL APPROACH

The following sections will describe some study cases related to the COVID-19 outbreak management by individual countries in very different circumstances (population, date of the outbreak, geographical location)

4.1. Italy Approach – A case in late awakening

In a matter of weeks, Italy went from the discovery of the first official COVID-19 case to a government decree that essentially prohibited all movements of people within the whole territory and the closure of all non-essential business activities. [24]

In Italy, since the high number of initial deaths, a rapidly growing number of infections, an enormous strain to the healthcare system, and the lack of a cohesive governmental policy which created a sense of emergency, the government was forced to consider and integrate scientific and technical inputs in the emergency policies.[23]

After COVID-19 new cases peaked in **March 2020,** the measures taken by the Italian government were implemented following the next points:

- Stricter control of population movement (Forced closure of non-essential businesses)
- Remote working and Tax reliefs
- Economic Stimulus

- Increase in testing (Most important increase in April 2020 – most notably April 25th with 95,273 tests conducted)[20] [21]

With these measures implemented, Italy became from once a critical case of COVID-19 infections to one of the most notable in the European Union in demonstrating a decline in COVID-19 cases.

As for July 2020, Italy has started to reduce the strict measures taken towards the population and economy, although not completely relaxed as a second wave may occur. Different economic activities have re-opened and started to recover in Italy, but with a seemingly low number of daily cases. (Less than 400 cases daily in July).[21][23]

Figure 2: Daily confirmed COVID-19 deaths per million people (United States, Mexico & Italy)

The chart visually balances the effect of the COVID-19 related deceases vs the overall population of the country, as is difficult to compare 300+ million population in the USA in contrast with Italy 60 million. The implementation of government policies at national level is a major indicative of the success in governmental approach,

Daily confirmed COVID-19 deaths per million people

Limited testing and challenges in the attribution of the cause of death means that the number of confirmed deaths may not be an accurate count of the true number of deaths from COVID-19.
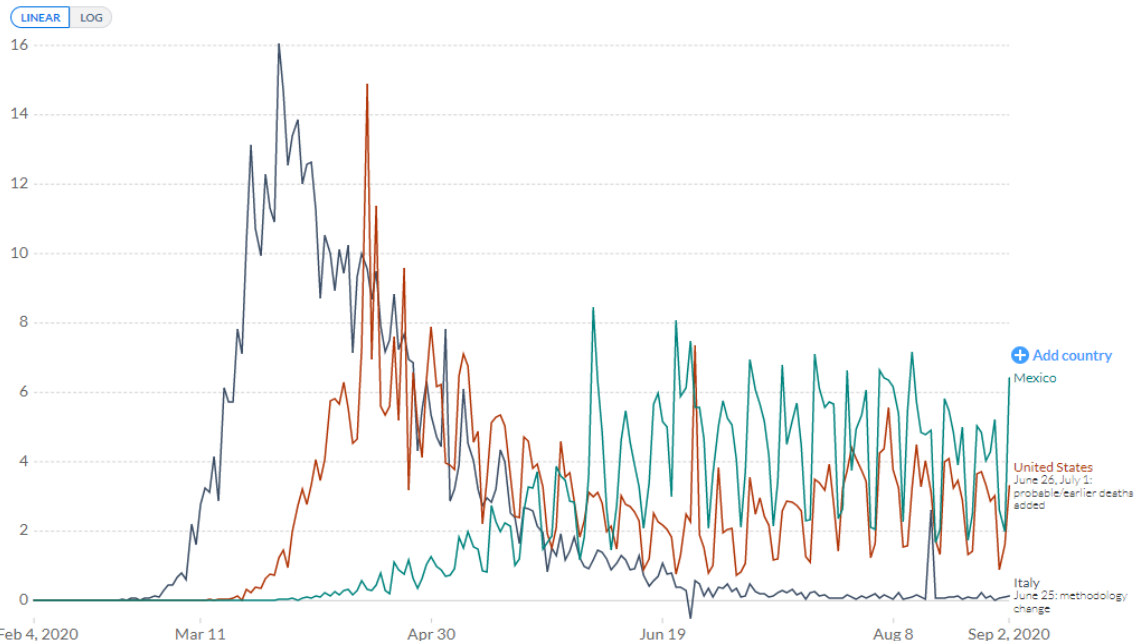
4.2. United States Approach – No Lockdown & Internal Turmoil

Covid-19 has exposed major weaknesses in the United States' federalist system of public health governance. The impact varies around the country, with states such as Washington, California, and New York hit particularly hard, meanwhile, cases are mounting nationwide with appalling velocity (July 25th, has the highest daily number of confirmed new cases with 78,427 cases).

Criticisms of the government's response continue, as several states have complained about a lack of coordinated national response and confused messaging from the White House, since there is no country single approach to COVID-19.

The U.S. approach contrasts strikingly with countries which have prevented widespread community transmission by rapidly implementing a centralized national strategy. With a loose federal leadership to guide a uniform response, the United States quickly fulfilled the World Health Organization's prediction that it would become the new epicenter of COVID-19.

The extent of the number of infections and deceases have escalated in the last months and has catapulted the United States to the most affected countries in both statistics. (4,813,984 of confirmed cases and 158,375 deaths as of August 2nd, 2020) [15]

In **Figure 3**, the diagram shows the huge difference between states in the same country, but at the same time, some of the key aspects in the geopolitical landscape of the USA in relation with the COVID-19 outbreak (highly populated and highly influential political states like Florida, California & New York are the most affected).

One of the main social concerns in the current approach of the US for example, is regarding uninsured individuals, as the United States does not have a universal healthcare system. These individuals in case of an infection, especially if working on an infection-likely job, not only are less prone to seek proper medical attention but also may lose the source of their income, increasing the chance to spread the virus.[10]

As of now, the United States is planning to enforce more social distancing measures, mandate the use of masks, reduce mass gatherings, and augment the number of testing. Nevertheless, these measures will only apply to certain states as each is responsible for local measures, so no centralized policy has been taken place and political divisiveness are still constant in this country.[19]

4.3. Mexican Approach – Passive measures & forced re-opening.

Mexican Government actions and measures regarding COVID-19 infections have been partial but aimed at a national level, mainly based on combining a recommended lockdown (Implemented since March 16th, 2020) and reducing the possibility of mass gatherings.

At the beginning of the outbreak, the Mexican Health Ministry expressed concerns about the possibility of the outbreak, so social distancing was implemented

Deaths by Jurisdiction

This map shows COVID-19 cases reported by U.S. states, the District of Columbia, New York City, and other U.S.-affiliated jurisdictions. Hover over the maps to see the number of deaths reported in each jurisdiction. To go to a jurisdiction's health department website, click on the jurisdiction on the map.
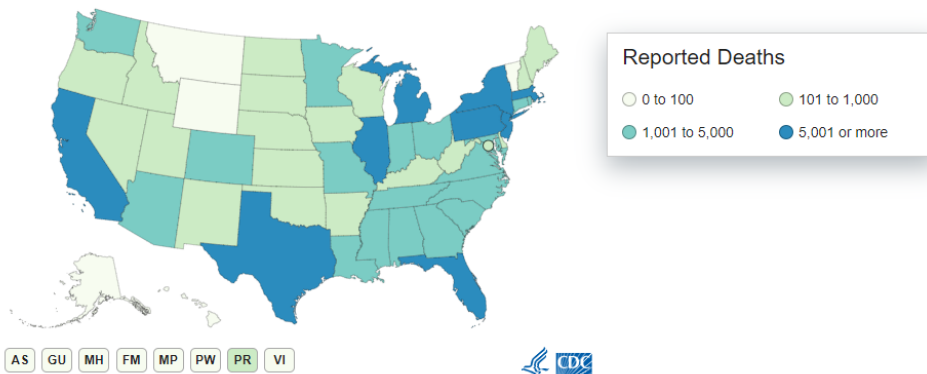

Reported Deaths
- 0 to 100
- 101 to 1,000
- 1,001 to 5,000
- 5,001 or more

AS GU MH FM MP PW PR VI

CDC

Figure 3: Reported deaths by individual states in the US territory.[18]

and non-essential businesses and schools were forced to close temporally. [17]

As the contingency extended from the initial time estimates, Mexico was forced to start opening as a measure to stop an economical downfall.

Figure 4 shows that to manage a partial opening, Mexico has established a "Traffic Light" Monitoring System. The criteria for each level of risk is related to the number of infected & deceased people in each of the 32 states of Mexico [16], depending on the "light" or status of the Traffic Light, the day-to-day activities (like economic, entertainment and education activities) in the population will be affected.

But as the opening is ongoing, the center of Mexico (Mexico City and Mexico State) as the most populated states in the republic report the highest numbers of COVID-19 infections & deaths (Combining 125,000+ Cases confirmed & 15, 300+ deaths [15]) with no current reports of a plateau in cases it is expected to increase in the number of fatalities and infections.

The future of Mexico's management of the COVID-19 outbreak is not clear, yet. Not only the cases are still increasing, but also general distrust in healthcare services and a lack of sufficient infrastructure is present in the population. These circumstances may prolong the pandemic in the country as both healthcare and infrastructures are forces that maintain the movement of its people. As of now,

Mexico is the 3rd country with more total deceased due to COVID-19[15].

5. NEXT STEPS – CONSIDERING SUCCESFUL OPTIONS

As the timeline progresses form the initial COVID-19 virus outbreak, there has been some successful policies implemented that have diminished the number of infections in a large scale.

These policies base their success in scientific – planning, non-pharmaceutical countermeasures and heavy support from the population.

Figure 5 - (Confirmed Cases of COVID-19 overtime by region (Europe vs Americas)) the graphs demonstrate that even with relatively the same number in confirmed cases, the implementation of national policies can bend the infection curve in the same amount of time and also reducing the peaks of daily infections.

Some of the most important policies (as presented by the European Centre for Disease Prevention and Control - ECDC) are as follows:

5.1. Community measures and physical distancing

This option is supported by universal use of the facemask, rigorous hygiene protocols. For this option to be successful, trust in scientific knowledge is the background for this option.

Traffic Light Monitoring System for Epidemiological Risk of COVID-19 (Federal Mexico)
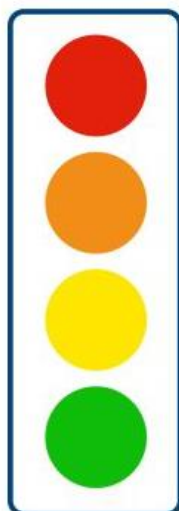
Red
Only essential economic activities will be allowed, and people will be limited to move outside their homes during the day.

Orange
In addition to essential economic activities, companies with nonessential economic activities may conduct operations with 30 percent of their personnel, always taking into account the greatest degree of care for people with the highest risk (High Risk Individuals) of presenting severe COVID-19–related symptoms. Public spaces will be reopened with reduced capacity.

Yellow
"All work activities are allowed." The guidance states that it is still necessary to take care of High Risk Individuals. Public spaces are reopened on a regular basis, and closed public spaces can be opened with reduced capacity. Activities should be carried out with preventive measures and maximum care for High Risk Individuals.

Green
"All activities, including school activities, are allowed."

Figure 4: Traffic Light Monitoring System – Mexican Government.

5.2. Infection prevention and control in the community

This option is based in diminishing the physical between individuals. These activities include: self-isolation, reducing the non-essential economic activities and reducing the entry to a country. Vulnerable groups like the elderly are encourage to reduce outside activities.

5.3. Measures for healthcare Services.

Hospital preparation is an absolute and immediate priority. In healthcare settings, surge capacity plans must be enacted to meet the expected high demand for care of patients with moderate or severe respiratory distress.

Measures to prevent transmission in healthcare facilities are an immediate priority in order to slow the demand for specialized healthcare.

Protect healthcare workers and minimize the export of cases to other healthcare facilities and the wider community is essential.

5.4. COVID -19 Testing

Timely and accurate laboratory testing of specimens from cases under investigation is an essential element of the response, supporting decisions on infection control strategies and patient management at healthcare facilities.

Sufficient capacity for various testing strategies during the different phases of the outbreak is paramount and will continue to be essential when Member States begin de-escalating control measures. EU countries should follow EU and WHO guidance on testing strategies.

## 6. UNDERSTANDING STATISTICAL INFORMATION

Statistical data can be overwhelming in a scenario where multiple variables and constant data is input daily in a global level.

Once starting to realize the amount of information available for the COVID-19 outbreak, it is challenging to start understanding all the available data.

To guide the comprehension, several recommendations can be provided as this case study was elaborated and are as follows:

- Only one statistical parameter (Daily new cases, total deaths, number of tests etc.) cannot be used as a full measurement of COVID-19 management in any case.
- A more integral approach regarding data collection (multiple sources, geographical location, and the economic, political and social structure of each country) is required to understand the full circumstances of a country of interest.
- Social factors, politic animosity and scientific literacy can be outstanding factors to determine the success of government policies.
- As the timeline of each country advances and the number of infections may not decrease, the possibility of a "New Normality" maybe very different between countries and be more gradual than expected.
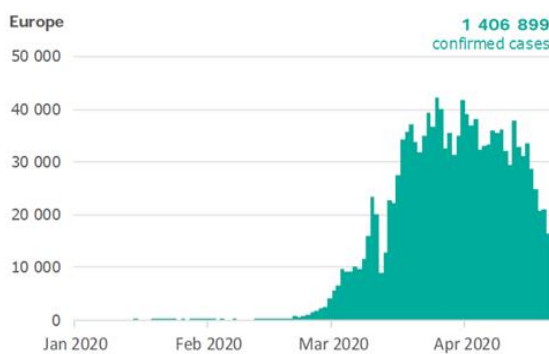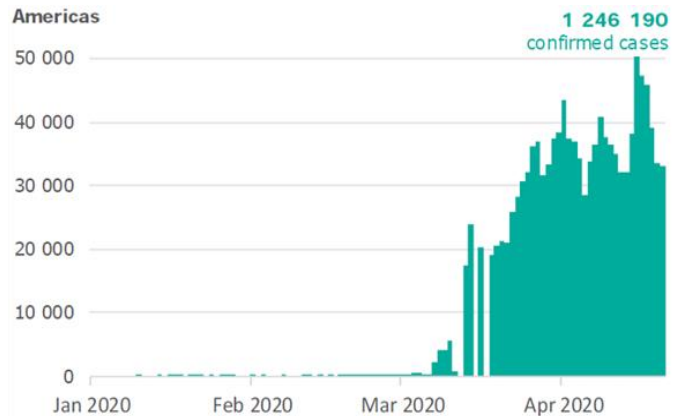

Figure 5: Confirmed Cases of COVID-19 overtime by region (Europe vs Americas)[15]

7.CONCLUSION

Due to the scale of the COVID-19 crisis a significant demand to shift in the international and national systems to plan, finance and implement a practical and cost–effective solution to reduce the risk and infections in the general population.

Planning these kind of strategies, each country must address the principal local variables like geographical location, climate, average age, economical landscape and population support in government policies.

Comparing the scenarios proposed in this article, we have found that there is no single approach to governmental policies as there are many factors that may impact the decision-making and the success rate of each policy.

Governmental policies also convey certain risk, as they can only be verified after weeks or months after their implementation (mandatory lockdown vs voluntary lockdown).

A couple of interesting factors that can be very important are the economical state and political orientation of the population, developing countries like Mexico can face a dire situation choosing economic instability or more aggressive social distancing measures with direct implications in the popularity of the government's approach.

Understanding how to approach data in this multi-factorial problem, can be a challenge even for purpose studies. To understand and provide a useful framework, multiple data must be reviewed and compare with successful government statistics.

We conclude, as time passes, that the government management of the pandemic will be more effective as more integral strategies are identified. The analysis and communication of these strategies can be then implemented by countries and adjusted to the local and intrinsic factors for the benefit of the population.

Glossary

1. **Coronavirus**

   - Coronaviruses (CoVs) are positive-sense, single-stranded RNAviruses of the family Coronaviridae (subfamily Coronavirinae) that infect a wide host range to produce diseases ranging from common cold to severe/fatal illnesses. The novel virus was initially named "2019-nCoV" which was changed to "SARS-CoV-2" by the Coronavirus Study Group (CSG) of International Committee on Taxonomy of Viruses (ICTV)

2. **COVID-19**

   - The disease caused by Severe Acute Respiratory Syndrome coronavirus 2 (SARS-COV-2))

3. **Non-Pharmaceutical Countermeasures (NPC) or Non – Pharmaceutical Intervention**

   - All actions to prevent and mitigate further viral infection growth by applying population control measures (lockdown, school closures, etc.) and health campaigns to reduce viral transmission scenarios.

4. **Epidemic vs. Pandemic**

   - An epidemic is defined as "an outbreak of disease that spreads quickly and affects many individuals at the same time." A pandemic is a type of epidemic (one with greater range and coverage), an outbreak of a disease that occurs over a wide geographic area and affects an exceptionally high proportion of the population. While a pandemic may be characterized as a type of epidemic, you would not say that an epidemic is a type of pandemic.

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