COVID-19 Mexican Analysis

Executive Summary

The Mexican government is trying to implement a lockdown semaphore to determine which activities will stop and how the people can move around the city. Most of the time, the local government create media advertisements to inform the people about the number of infected people in the country. Nevertheless, It is necessary to create a dashboard to display the infected people grouped by states and determine if it is necessary to set a lockdown. This is a very complicated task, because it is necessary to collect and process the information daily.

Introduction

COVID-19 is an infectious disease caused by the coronavirus, *SARS-CoV-2*, which. Is a respiratory pathogen. WHO (*World Health Organization*) first learned of this new virus from cases in Wuhan, People's Republic of China on December 31st, 2019.

COVID-19 IN MEXICO

The virus was confirmed to have reached Mexico in February 2020. However, the National Council of Science and Technology (CONACYT) reported two cases of COVID-19 in mid-January 2020 in the states of Nayarit and Tabasco, one case per state. As of October, there had been near 800,000 confirmed cases of COVID-19 in Mexico and circa 88,000 reported deaths, although the Secretariat of Health, through the "*Programa Centinela*" (Spanish for "Sentinel Program") estimated in mid July 2020 that there were more than 2,875,734 cases in Mexico, because they were considering the total number of cases confirmed as a statistical sample. COVID-19 pandemic in Mexico

The most common symptoms of COVID-19 are:

- Fever
- Dry cough
- Fatigue

Other possible symptoms that are less common and may affect some patients include:

- Loss of taste or smell
- Nasal congestion
- Conjunctivitis (also known as red eyes)
- Sore throat
- Headache
- Muscle or joint pain
- Different types of skin rash
- Nausea or vomiting
- Diarrhea
- Chills or dizziness

Symptoms are usually mild. Some people become infected but only have very mild symptoms or none at all.

Symptoms of severe COVID-19 disease include:
- Shortness of breath,
- Loss of appetite,
- Confusion,
- Persistent pain or pressure in the chest,
- High temperature (above 38 °C).

Other less common symptoms are:
- Irritability
- Confusion
- Reduced consciousness (sometimes associated with seizures)
- Anxiety
- Depression
- Sleep disorders
- More severe and rare neurological complications such as strokes, brain inflammation, delirium and nerve damage.

People of all ages who experience fever and/or cough associated with difficulty breathing or shortness of breath, chest pain or pressure, or loss of speech or movement should seek medical care immediately. If possible, call your health care provider, hotline or health facility first, so you can be directed to the right clinic. WHO Novel Coronavirus 2019 FAQs

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Business Case

The Undersecretary of Prevention and Health Promotion, Hugo Lopez-Gatell, design a lockdown protocol based on the number of infected people in the region classified by state. This protocol is used to determine which activities will stop and how the people can move in the state. Furthermore, Claudia Sheinbaum, the Head of Mexico-City Government is very interested into implement this protocol by sub-regions in the city.

The result of the pandemic-lockdown semaphore will be displayed in many media such as TV, website, smart-phone and tablets application, website among others. The information will be presented to the General Health Council and the presidential cabinet, who will decide to show to the Mexican people though the mentioned media.

In order to perform this project the Mexican government publish everyday the information in special website to be consumed. Nevertheless, the information is not easy to read and understand. Moreover, everyday, it grows in 20 thousand registers. Today, the database contains almost 5 millions register with all the information enter from hospitals, clinics, and medical laboratories.

The database can download from COVID-19 Datos Abiertos and the dictionaries from Data dictionary. The database is presented in a raw format (CSV file), this one collects the information from Mexico. Thus, it includes all the positive and negative cases. On the other hand, there are other reported cases that are not related to the COVID-19, but are classified as false-positive or negative positive.

The pandemic-lockdown semaphore takes into consideration only the real-infected cases in the state and need to avoid the negative cases. Due to the volume information that continuously increases, it is needed to automate and get an easy way to display the information to the Mexican people.

The main idea is to create a simple dashboard that determine the number of infected people in the country and based on this number stop non-essential activities. Furthermore, this action should be applied to the 32 states in the country.

Summary

WHO:

- **Stakeholders** - Hugo Lopez-Gatell (Undersecretary of Prevention and Health Promotion), Claudia Sheinbaum (Head of Mexico-City Government)
- **Audience** - Mexican people, presidential cabinet, WHO representatives in Mexico.
- **Subject-Matter Experts** - General Health Council

WHAT:

- **Data Sources** - Mexican COVID-19 databases (COVID-19 Datos Abiertos) and the catalogues (Data dictionary).
- **Data Quality** - The database contains almost 5 millions registers with 40 columns. Also, it is required to download the catalogue and the dictionary to understand the database. It is necessary to eliminate blank fields, convert date columns to date stamp, check the date of death column, because this column has incorrect date stamp format and need to eliminate. Also the database contains all the possible covid cases (positive, false-positive, false-negative and negative).
- **Data Timeliness** - The database is updated everyday.

WHY:

- **Business Case/Other Goals** - Create and design a COVID-19 Dashboard to illustrate the real-cases since the outbreak starts. This dashboard will use and share with the Mexican people to inform the status and also determine the pandemic lockdown semaphore. This one is going to use to stop non-essential activities in the country.
- **Intended Outcome** - A pandemic lockdown analysis based on the number of infected people in the state.

HOW:

- **Format(s)** - Simple and large graphs with data easy to consume for the reader.
- **Presentation Vehicle** - The information will be display in TV, website, smart phones, tablets and slide decks. (Tableau Dashboard)

CHALLENGES:

- Download the last open access database in *.csv format, that is daily updated.
- Design a cleansing process to eliminate typos, clean blank fields, correct the date stamp in date columns and join the main table with the column catalogue.
- Eliminate the false-positive cases as well as non-infected cases.
- Design a dashboard to display the number of infected cases by state and the lockdown semaphore to minimize the contagion rates.

Persona

Persona 1: Hugo Lopez-Gatell

"The Mexican people are needed to be informed and known the number of infected people in their community. I want to create a dashboard to display all the information as well as a pandemic lockdown semaphore to eliminate the COVID-19 propagation."

Hugo needs to analyze all the information stored in an open access database to automatically compute the number of infected people in the country and design a lockdown semaphore.

Role: Undersecretary of Prevention and Health Promotion

Organization: Salvador Zubirán National Institute of Health Sciences and Nutrition

Goals:

- Creates rules of healthy and safety coexistence
- Modeling the current outbreak to set the lockdown
- Schedule the COVID-19 vaccination campaign for the Mexican people
- Determine which activities are necessary and continue open during the outbreak

Challenges and Needs:

- He is an epidemiologist expert in infectious diseases
- Determine the number of infected people in the country and set the rules for the vaccination campaign
- Create an online dashboard to show the lockdown semaphore as well as the essential activities by region
- Design a model to clean the current data collected from all the healthy sectors in the country

Persona 1: Hugo Lopez-Gatell

Persona 2: Claudia Sheinbaum

"It is necessary to minimize the infection rate and guarantee public healthy in the main city. The national vaccination campaign will help the people but it is require to continue the healthy measures."

Claudia Sheinbaum is very interested in create a different way to alert the community about the contagion rate in the community. Also, she is willing to support the secretary of health to inform society in a timely manner.

Role: Head of the Mexico-City Government

Organization: Mexico-City Government

Goals:

- Enforce the law and maintain order within Mexico City
- Enforce government health regulations
- Follow up on health programs during the outbreak
- Manage city resources to ensure basic and necessary services

Challenges and Needs:

- She is a Mexican scientist, politician and an active member of the National Research System
- She wants to implement the lockdown semaphore to minimize the current outbreak propagation
- She is interested into enforce the healthy measures created by the current undersecretary of prevention and health promotion

Persona 2: Claudia Sheinbaum

Dataset Description

N°	Variable Name	Variable Description
1	FECHA_ACTUALIZACION	The database is daily update, this variable allows to identify the date of the last update.
2	ID_REGISTRO	Case identifier number
3	ORIGEN	Sentinel surveillance is carried out through the system of respiratory diseases monitoring health units (USMER). The USMER includes medical units of the first, second or third level of care, and third level units also participate as USMERs, which due to their characteristics contribute to broadening the epidemiological information panorama, including those with a specialty in pulmonology, infectology or pediatrics. . (Categories in Annex Catalog).
4	SECTOR	Identifies the type of institution of the National Health System that provided the care.
5	ENTIDAD_UM	Identify the entity where the medical unit that provided the care is located.
6	SEXO	Identify the sex of the patient.
7	ENTIDAD_NAC	Identify the patient's birth entity.
8	ENTIDAD_RES	Identify the entity of residence of the patient.

9	MUNICIPIO_RES	Identify the municipality of residence of the patient.
10	TIPO_PACIENTE	Identify the type of care the patient received in the unit. It is called an outpatient if you returned home or it is called an inpatient if you were admitted to the hospital.
11	FECHA_INGRESO	Identify the date of admission of the patient to the care unit.
12	FECHA_SINTOMAS	Identifies the date on which the patient's symptoms began.
13	FECHA_DEF	Identify the date the patient died.
14	INTUBADO	Identify if the patient required intubation.
15	NEUMONIA	Identify if the patient was diagnosed with pneumonia.
16	EDAD	Identifica la edad del paciente.
17	NACIONALIDAD	Identify if the patient is Mexican or foreign.

18	EMBARAZO	Identify if the patient is pregnant.
19	HABLA_LENGUA_INDIG	Identify if the patient speaks an indigenous language.
20	INDIGENA	Identify if the patient self-identifies as an indigenous person.
21	DIABETES	Identify if the patient has a diagnosis of diabetes.
22	EPOC	Identify if the patient has a COPD diagnosis.
23	ASMA	Identify if the patient has a diagnosis of asthma.
24	INMUSUPR	Identify if the patient is immunosuppressed.
25	HIPERTENSION	Identify if the patient has a diagnosis of hypertension.
26	OTRAS_COM	Identify if the patient has a diagnosis of other diseases.

27	CARDIOVASCULAR	Identify if the patient has a diagnosis of cardiovascular disease.
28	OBESIDAD	Identify if the patient has a diagnosis of obesity.
29	RENAL_CRONICA	Identify if the patient has a diagnosis of chronic kidney failure.
30	TABAQUISMO	Identify if the patient has a smoking habit.
31	OTRO_CASO	Identify if the patient had contact with any other case diagnosed with SARS CoV-2
32	TOMA_MUESTRA_LAB	Identify if the patient had a laboratory sample taken.
33	RESULTADO_LAB	Identifies the result of the analysis of the sample reported by the laboratory of the National Network of Epidemiological Surveillance Laboratories (INDRE, LESP and LAVE) and private laboratories endorsed by InDRE whose results are registered in SISVER. (Catalog of diagnostic results attached).
34	TOMA_MUESTRA_ANTIGENO	Identify if the patient had an antigen sample for SARS-CoV-2
35	RESULTADO_ANTIGENO	Identifies the result of the analysis of the antigen sample taken from the patient

36	CLASIFICACION_FINAL	Identify if the patient is a case of COVID-19 according to the catalog "FINAL_CLASSIFICATION".
37	MIGRANTE	Identify if the patient is a migrant person.
38	PAIS_NACIONALIDAD	Identify the nationality of the patient.
39	PAIS_ORIGEN	Identify the country from which the patient departed for Mexico.
40	UCI	Identify if the patient required admission to an Intensive Care Unit.