

Description of Confirmed Cases and Deaths from COVID-19 in Mexico, Until May 6, 2020: An Ecological Study

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A review is made of the confirmed cases of COVID-19 and deaths in Mexico as of May 6, 2020, from the public database of the General Directorate of Epidemiology and the National System of Epidemiological Surveillance of the Ministry of Health in Mexico. A descriptive ecological study of confirmed cases and deaths by COVID-19 is designed. 27,634 confirmed cases and 2,704 registered deaths were reviewed. Of the confirmed cases they predominated in men (58.48%) and their distribution by states of Mexico, being more frequent in Mexico City, State of Mexico, Baja California and Tabasco. Deaths are shown by day on which they occurred. It is concluded that the measures of social isolation and quarantine should be reinforced to decrease the number of confirmed cases and deaths related to COVID-19.

Keywords: SARS-CoV2; COVID-19; Mexican population.

As of December 8, 2019, several cases of pneumonia of unknown cause have been reported in Wuhan, Hubei Province, China¹⁻³ most of the patients worked in or lived around the Huanan seafood market, where animals for sale also live⁴. On December 31, 2019, a case of pneumonia of unknown cause was reported at the World Health Organization (WHO) office in Whuan, China⁵.

On January 10, 2020, the first death reported in China occurs from this new infection and on January 13, 2020, the first case was reported outside of China, in Thailand⁶. The outbreak is declared a Public Health emergency of international interest on January 30, 2020⁵.

Idiopathic pneumonia is reported to be caused by a new coronavirus on February 7 and the WHO named it 2019-nCoV⁷. The new disease caused by coronavirus was named COVID-19 on February 11, 2020⁵.

After a month, the virus was isolated, its genome was sequenced and its morphology was described; on January 12, 2020, the virus genome was shared with WHO by the Chinese Center for Disease Control and Prevention⁸. Zhou *et al.*⁹ reported that the causer of COVID-19 shares 79.5% of the SARS-CoV sequence; also, it uses the same cell entry receptor, angiotensin-converting enzyme-2, as SARS-CoV.

Zhu *et al.*¹⁰, reported the cytopathic effects and morphology and it is a member of a family of coronaviruses that infect humans; grew more in human airway epithelial cells than tissue culture cells, suggesting the potential for increased infectivity.

In Mexico, the follow-up of cases begins at the end of January, by February 20, 2020 the first confirmed case was reported and by March 23, 405 cases had been confirmed in the country¹¹ and by 28 of the same month 848 cases had been confirmed¹². All cases at the beginning traveled to United States of America, Spain or Italy, no one traveled to China¹¹.

The objective is to describe the confirmed cases of COVID-10 as well as the mortality due to COVID-19 in the Mexican population.

MATERIAL AND METHODS

A descriptive ecological study was designed with public data on confirmed, suspected and deceased cases by COVID-19 from the General Directorate of Epidemiology and the National System of Epidemiological Surveillance of the Ministry of Health of Mexico¹³.

Data on age, gender, state of residence, date of onset of symptoms, date of death were collected if it occurred. The date of positive test is missing in database.

For the statistical analysis, frequencies and percentages of categorical variables and mean and standard deviation were used for quantitative variables.

The STATA® 13.0 program (Stata Corp., College Station, TX, USA) was used.

RESULTS

Public records of confirmed cases of SARS-CoV-2 infection giving COVID-19 were 27,634 records.

Age range from 0 to 113 years with a mean of 46.72 ± 15.62 years. Table 1 shows the distribution by gender and by state reported by confirmed cases.

By May 6, 2020, 27,634 confirmed cases had been reported, higher than 848 cases reported on March 28, 2020, corresponding on average to an increase of 83.56% cases per day in that period.

Despite noticing a decrease in confirmed cases in the first days of May 2020, it is considered an artifact due to the delay in delivering the results of the Real Time-PCR test

Figure 2 shows the curve of accumulated cases as of May 6, 2020.

Figure 3 shows the deaths reported by COVID-19 per day. On March 28, 200, a specific mortality rate of 1.9% was reported, with 16 deaths

Table 1. Confirmed cases by gender and residence state (n=27,634)

Variable	n	%
Gender		
Female	11,475	41.52
Male	16,159	58.48
States		
Aguascalientes	292	1.06
Baja California	2,097	7.59
Baja California Sur	358	1.30
Campeche	147	0.53
Coahuila de Zaragoza	491	1.78
Colima	31	0.11
Chiapas	263	0.95
Chihuahua	600	2.17
Cd Mexico	7,521	27.22
Durango	91	0.33
Guanajuato	343	1.24
Guerrero	413	1.49
Hidalgo	396	1.43
Jalisco	492	1.78
MexicanState	4,661	16.87
Michoacán de Ocampo	423	1.53
Morelos	612	2.21
Nayarit	151	0.55
Nuevo León	511	1.85
Oaxaca	202	0.73
Puebla	910	3.29
Querétaro	179	0.65
Quintana Roo	980	3.55
San Luis Potosí	187	0.68
Sinaloa	1,248	4.52
Sonora	342	1.24
Tabasco	1,319	4.77
Tamaulipas	415	1.50
Tlaxcala	280	1.01
Veracruz Ignacio de la Llave	872	3.16
Yucatán	688	2.49
Zacatecas	119	0.43
Total	27,634	100.0

Source: Secretary of Health [13]

among 848 confirmed cases. For May 6, 2020, the specific mortality rate was 9.8% with 2704 deaths among 27,634 confirmed cases.

DISCUSSION

Of the 27,634 confirmed cases in Mexico as of May 6, 2020, men predominated slightly with 58.38% and the states with the highest frequency were: Mexico City (27.22%), State of Mexico (16.87%), Baja California (7.59%), Tabasco (4.77%) and Sinaloa (4.52%) (Table 1).

In the public data of the General Directorate of Epidemiology, of the National Epidemiological Surveillance System of the Ministry of Health of Mexico, on March 23, 2020¹⁴, the first confirmed case started with symptoms on February 20, 2020; in the database of May 6, 2020¹³, several cases with symptom onset were reported on January 8, 14, 15 and 17, 2020. One reason is the delay in the result of the RT-PCR tests. Each state health system must report each case to the federal health system.

In mid-March, some state governments such as Guanajuato, Jalisco, among others, began

to restrict the meetings of more than 10 people, cancel massive events, and by March 23, social isolation measures had been implemented and school activities were suspended at all levels, with the aim of reducing community transmission of SARS-CoV-2.

Sanche *et al.*¹⁵, they estimated a serial interval of 6 to 9 days and calculated R_0 of 5.7, so they recommended active surveillance, contact surveillance, quarantine and strong social distancing to stop the transmission of the virus. If one case can infect almost six more people, the spread of the infection will continue to appear in the community. Quarantine and social isolation aim to decrease this R_0 .

Analyzing the confirmed cases from March 23 to May 6, 2020 in Mexico, it is found that there was an increase in cases from 405 to 27,634, in 43 days, with an average of 158.67% per day of increase in cases per day, much higher than Italy and to Spain with an average and increase in confirmed cases of 25 and 20%, respectively¹⁶.

Bulut *et al.*¹⁷, report that accord to early models total 10-12 weeks is required to control



Source: México Desconocido. La República Mexicana vista desde un satélite. Google maps © <https://www.mexicodesconocido.com.mx/mapa-de-mexico.html>

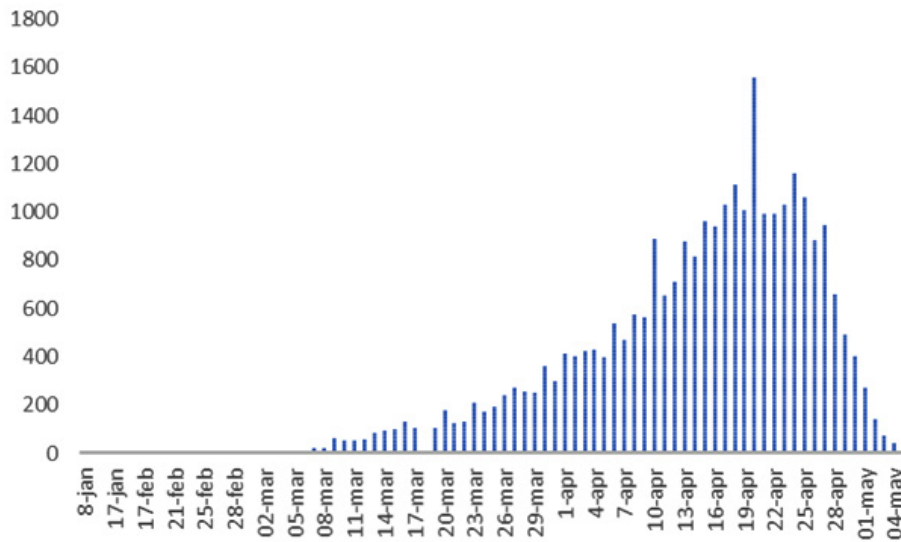
Fig. 1. Map of Mexico

an outbreak in the community, but in all countries affected by COVID-19 is needed more than 12 week to flattened the epi.curve of new cases.

Matrajt *et al.*¹⁸, reported that after social distancing interventions, 20% of new cases and most hospitalizations were averted, but to the end of intervention, the epidemic rebounded. Similar conclusion reported by Li *et al.*¹⁹, imposing social controls impact the number of new cases.

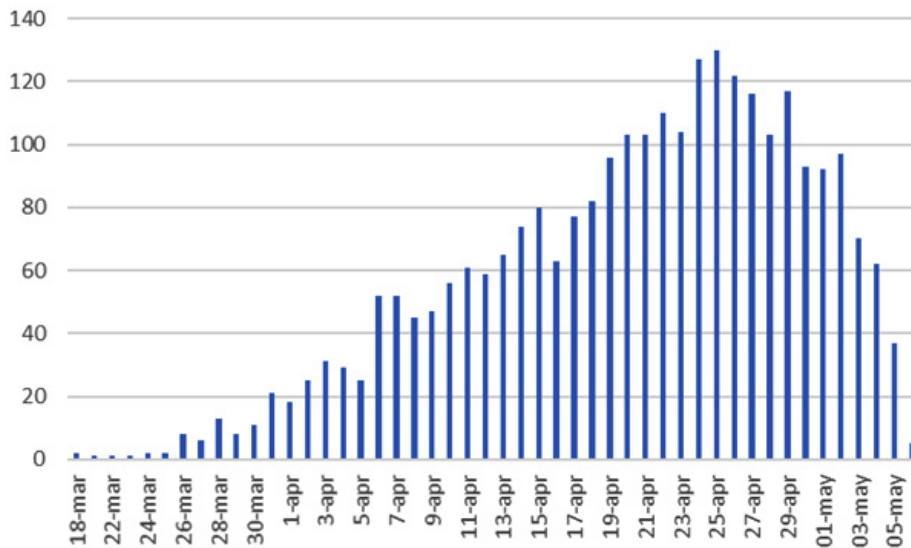
Regarding mortality, Mexico reported 5 deaths on March 24²⁰, and for May 6, 2020, the registered deaths were 2,704, with an average daily increase of 1.257% in specific mortality. The specific mortality rate for Mexico, as of May 6, 2020, was 9.8% higher than that reported by the PAHO on the same day of 7.11%²¹.

With the figures of confirmed cases and deaths in Mexico, they confirm that the social



Source: Secretary of Health [13]

Fig. 2. Distribution of confirmed cases by day (n=27,634)[13]



Source: Secretary of Health [13]

Fig. 3. Distribution of deaths by day (n=2,704)[13]

isolation and the quarantine established by the health authorities have not produced a decrease in new cases. The massive campaigns launched targeting the general population, to stay home, wear protection (face masks) and wash your hands have not produced the expected results.

CONCLUSION

Although quarantine and social isolation were implemented more than a month ago, the number of confirmed cases in Mexico continues to grow. Social isolation measures and a healthy distance between people must be reinforced.

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