

The second wave of the COVID-19 epidemic in Cuba: the sixth- and seventh-month flare-ups

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Introduction

COVID-19 is a respiratory disease caused by the SARS-CoV-2 virus. It was first diagnosed in December 2019 in the Chinese city of Wuhan, Hubei province, and was found to generate pneumonia different from that produced by other viruses. [1] The disease was very aggressive and contagious and spread rapidly to other Asian countries and the rest of the world, causing a pandemic. On January 30th, 2020, the WHO declared it a global emergency. [2]

The first three cases of COVID-19 in Cuba were reported on March 11th of the same year.[3] That same day, the WHO declared 125,048 confirmed cases worldwide (6,729 on that day) and 4,613 deaths (321 of them new). Of these, 80,981 cases and 3,173 deaths were from China.

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Received: February 22, 2021.

Accepted: April 15, 2021.

Conflict of interest: none.

The remaining 44,067 confirmed cases (6,703 on that day) and 1,440 deaths (310 of them new) were distributed among the 118 countries reporting cases of the disease.[4]

In the Cuban epidemic, cases increased during March, and on April 24th, the curve reached its acme with 849 active cases. From May onwards, the number of positive cases decreased and, although 244 cases were reported on June 7th, the curve continued to decrease until mid-July, [5] which indicates an effective control of the disease in the country.

When the first cases were diagnosed, the Province and Municipality Defense Councils were activated. These councils are made up of decision-makers and executives from the administrations of each territory, who coordinate the protocols established by the Civil Defense during epidemics and other disasters and direct the programs with an intersectoral approach. A strategy to control the epidemic was developed and a system of daily updates on the epidemiological situation of the country (number of diagnoses, serious, critical and recovered cases, as well as deaths, etc.), was established, and disseminated through press, radio, television, and alternative media. This informational system has been maintained up to the present moment.

The Cuban epidemic control strategy was developed on the basis of international criteria and contains an epidemiological alert that encompasses three phases: pre-epidemic, limited autochthonous transmission and epidemic. Local transmission is part of the pre-epidemic phase and occurs when a person becomes infected through contact with diseased patients. These cases are referred to as primary cases, as the chain of transmission can be identified. [6] An "outbreak" is considered to exist when up to 9 confirmed cases are diagnosed in the same locality and a

local transmission event (LTE) is considered to exist when 10 or more are confirmed. LTEs are generally confined to one community or institution but may cause community transmission if they happen to affect a much larger area.[7]

In January 2020, before the first cases appeared, a program with actions to contain the epidemic was designed; it was organized into phases to be applied in the provinces according to the magnitude of the epidemic in each of them, and its measures range from maximum mobility restrictions to the restoration of "normality". The so-called autochthonous transmission phase is the worst-case scenario, and this denomination is applied to sites with SARS-COV-2 transmission rates above a provincially determined value. When incidence rates decrease, the epidemic is considered to be under control and provinces are placed in the so-called "recovery" stage, which provides for a de-escalation of the mobility restriction measures and is classified into three stages or phases (Table 1).

In the first stage, urban transportation is resumed, although with limits to the number of people in each vehicle, and other basic services in the territory are gradually recovered until the "new normal" is reached. The transition from one phase to another depends on five health indicators that evaluate the state of the epidemic in each territory: incidence rate, reproductive index, active cases, number of positive cases with known source of

infection in the last 15 days and local transmission events.[8] This strategy evaluates the territories individually, so within a same province, there may be municipalities in different phases of its evolution.

The plan to confront and control the coronavirus and its associated protocol was put into action in Cuba on March 11th, when the first three imported cases were detected. This program controls the daily evolution of the epidemic and is presided by the highest government authorities. On June 11th, the "Post COVID-19 Recovery Stage" was declared active in some provinces because the health indicators used to evaluate the epidemic decreased and, on June 17th, general and phase-by-phase measures were issued, to be complied with by the respective socioeconomic sectors of each territory. [8] The provinces which were in Phase III of control, and which had rates below 5 x 100,000 inhabitants, or which did not report new cases for several weeks, transitioned to the "new normal" phase on June 18th, except for Havana and Matanzas.

Although the epidemic seemed to be under control, cases increased at the end of July, with higher figures during August and the first half of September, based on which the country's health authorities declared a resurgence of the epidemic, based on the definition of the term "resurgence", which implies the reappearance of new cases in a place where a previous outbreak of the disease had already been controlled or eliminated.[9]

Table 1. Indicators for classification of territories according to COVID-19 transmission phases. Cuba 2020

Phases	All provinces, except for Havana		Havana	
	Rate of PCR tests carried out in the last 15 days	Rate x 100 thousand inhabitants in the last 15 days	Rate of PCR tests carried out in the last 15 days	Rate x 100 thousand inhabitants in the last 15 days
Autochthonous transmission	Indicators superior to those of Phase I			
I	0.70%	20	1.5%	25
II	0.60%	15	1.2%	20
III	0.50%	10	1.0%	15
New normal	0.35%	5	0.8%	10

Source: Republic of Cuba. Post COVID-19 recovery stage. Measures to be implemented in its three phases. Editora Política (Tabloid). Havana, June 17, 2020.

Table 2: Positive COVID-19 cases. Fatalities, case fatality, critical and severe cases, and PCR tests performed between March and September 2020.

Month	Positive cases		Incidence rate	Deceased		Lethality	PCR tests carried out	Critical cases		Severe cases	
	No.	Accumulated		N°.	Accumulated			No.	%	No.	%
March	212	212	1.9	6	6	2.8
April	1325	1537	11.8	58	64	4.2	46 643	233	17.5	170	12.8
May	546	2083	4.9	19	83	4.0	57 383	59	10.8	145	26.5
June	265	2348	2.4	3	86	3.7	66 116	12	4.5	55	20.7
July	285	2633	2.4	1	87	3.3	94 586	8	2.8	32	11.2
August	1433	4065	12.8	8	95	2.3	135 532	88	6.14	253	17.6
September	1605	5670	14.3	24	122	2.15	217 999	73	4.5	317	19.7

- Rate for every 100,000 inhabitants.

Source: Ministry of Public Health. Web site: <https://salud.msp.gov.cu/parte-de-cierre-del-dia-17-de-septiembre-a-las-12-de-la-noche/>

Note: The daily reports for March do not include the number of samples taken, nor the number of serious or critical cases, due to the unavailability of data.

The present article aims to describe the epidemiological conditions in Cuba during the months of August and September in relation to the increase of COVID-19 cases in the country. Its relevance lies in allowing us to appreciate the particularities of the resurgence of COVID-19 in Cuba, its behavior in the provinces with the highest incidence rates, possible causes, and the measures taken by the country's authorities to control the epidemic.

Information on the number of cases, the evolution of the epidemic and the actions taken to control it was obtained from the Cuban Ministry of Public Health's (Minsap) daily reports, from the official website of the National Center for Information on Medical Sciences (Infomed), from Cubadebate (an alternative media source), and from the online versions of the Cuban press.

Development

COVID-19 in Cuba between March and July 2020

Once the first cases appeared in March, there was a rapid rise in notifications and, in April, the highest figure of the March-July period was

reported. From May onwards, cases decreased, and June had the lowest rate of the period, but in the last days of July the number of positive cases increased slightly, although the incidence rate remained the same as in June (Table 2). While the highest number of deaths of the entire epidemic was recorded in April, in May they decreased to less than half, during June and July they continued to decrease significantly, and the case fatality rate decreased 1.3 times. (Table 2) Between March and July there was a notable increase in the number of samples for PCR testing in at-risk populations and suspects (Table 2) although, from May onwards, there was also a reduction in the number of cases due to a decrease in transmission. The numbers of critical and severe cases were highest in April, which coincided with the high number of cases and high rates of positive tests among older adults [10]. At the time, there was still little experience in the management of elderly patients and those with comorbidities, who tend to have the worst outcomes. So, while in April the number of deaths increased, from May to July the number of severe and critical patients decreased, as did the number of deaths. (Table 2).

Given these results, the epidemic seemed to be under control. In those areas where no cases had been reported for several months, some epidemic control measures were relaxed and the "Post-COVID-19 Recovery Stage" was initiated.

COVID-19 between August and September 2020

After the curve of positive cases dropped during May and June, five and six times more cases were diagnosed in August and September, respectively, than in June (Table 2), with higher figures than those reported in April, when the peak of the first wave of the epidemic occurred. Cumulative cases doubled the amount recorded in July; the number of deaths increased during August and September but remained fewer than in April and were lower in proportion to the number of cases. (Table 2)

The COVID-19 situation during August and September not only differed from the first stage due to the higher number of cases, but its clinical and epidemiological behavior and the way in which transmission occurred had particular characteristics; more young people were infected and there were fewer critical and severe cases than between March and July (Table 2), which was related, among other causes, to the fact that in the first months of the epidemic, the highest average incidence rates were in the older adult groups, while during the resurgence they were lower for this age group (In the first stage, the rates were 28.83 x 100,000 inhabitants in the 75-84 age group and 28.36 x 100,000 inhabitants in the over 85 age group, while in the second stage, the rates were 10.72 x 100,000 inhabitants in the 75-84 age group and 6.30 x 100,000 inhabitants in the over 85 age group). [10] This is consistent with worldwide reports on the clinical characteristics of the disease, which show that older adults are at greater risk of progressing to severe forms of the disease and of dying. [11,12] During August and September, the average incidence rates for younger people were higher than in the first stage,[10] and in these groups, in addition to not having the risk factor of age, the comorbidities that accompany aging are less frequent.

Although the number of deaths in September was 1.4 times higher than in July, the case fatality rate decreased, among other reasons, due to a notable increase in the number of accumulated cases that are placed in the

denominator of the case fatality indicator. The increase in the number of deaths was not sufficient to increase this indicator, as deaths did not increase in the same proportion as the number of confirmed cases. In general, the number of deaths increased when the number of critically ill patients was higher, and in August and September the percentages of critically ill patients were lower than in March and April (Table 2). Although several factors are involved in the evolution of the disease and death due to COVID-19, the decrease in the percentage of seriously or critically ill patients and deaths can be attributed in part to the experience acquired by professionals in the management of patients, to the introduction of products of the Cuban biotechnology industry in the protocols for the treatment of cases and, above all, to the decrease in the average age of positive cases and higher frequencies in the 15-44 age group, [10] when people have fewer comorbidities that predispose them to a poor evolution of the disease and, ultimately, death from COVID-19. [12]

Due to the magnitude of the outbreak, new molecular biology laboratories were created to perform PCR tests in the capital and in nine provinces throughout the country. In March, there were only four in Havana, but by the time this article was drafted, there were 22, distributed throughout various provinces (Pinar del Río, Artemisa, Matanzas, Villa Clara, Cienfuegos, Ciego de Avila, Camagüey, Holguín, and Santiago de Cuba) with the capacity to study more than 18,000 samples per day. In August and September, almost five times more PCR tests were performed in active screening than when the epidemic began. (Table 2)

During the outbreak, the largest number of cases was concentrated in a few provinces: Artemisa, Havana, Matanzas, and Ciego de Avila (Table 3) and, during September, Sancti Spíritus. In Havana, the outbreak had local events that involved the adjacent province of Artemisa through work and family contacts. The epidemiological study showed that there was an intense transit between localities of this province and the capital, and contacts between patients and suspected cases detected in an LTE in localities of that province. [13] Most of the infections were related to LTE in workplaces and a greater proportion in communities.

During these two months, 53% of the cases were men, a proportion like that of previous months (in June 54.3% and July 50.8%). More than half were asymptomatic (63.6% in August, 66.7% in September), as in the preceding months (77.7% in June and 64.9% in July). The proportions of asymptomatic individuals in the world may vary between 6 and 96% depending on the populations studied and the countries reporting them,[14] but the average is 46% and they are an important factor in pre-symptomatic transmission [15].

When high numbers of asymptomatic individuals are detected in active screening of vulnerable populations, in individual focus controls or in those that are part of a LTE, it is considered that the procedure is correct because it identified positives that could have gone unnoticed. Screening is important, since identification of persons suspected of having the disease or who are contacts of a confirmed case, allows for their isolation, thus eliminating possible transmitters of the virus and controlling the infection in the community.[16].

Epidemiological situation in the provinces with the highest number of cases during August and September

Havana. In August, Havana and Artemisa had the highest incidence rates (Table 3) and, together, the two provinces accounted for 81.6% of the cases diagnosed in the country that month. There was viral transmission in almost all municipalities, which implied a serious epidemiological situation. In September, the rate decreased to less than half in Artemisa, while increasing 2.6 times in Matanzas, and surpassing that of Havana in Ciego de Avila (Table 3), the latter two of which accounted for 80% of the cases in the country.

In three municipalities of the capital (Arroyo Naranjo, Centro Havana and 10 de Octubre), the number of positive cases per day, accumulated cases, and LTEs increased. In August, there was a high rate of viral transmission with an average of 31.8 cases per day. During that month, 16 LTEs were opened, and 192 outbreaks were detected. The provincial authorities established actions to reduce transmission. Twenty-five doctors from other territories joined the epidemiological control work in their

municipalities. Active screening at the primary health care level was reorganized to identify people suspected of having the disease in vulnerable populations and in those who were not at risk. Epidemiological work focused on outbreak controls, LTEs, and stratified vulnerable areas in the affected communities. The areas considered vulnerable are those with high population density, high prevalence of people over 60 years of age with chronic diseases that increase the risk of COVID-19 following an unfavorable course, and high incidence and transmission rates of COVID-19.[17]

Sampling for PCR testing focused on vulnerable locations within outbreaks, LTEs, and their surroundings, and sites were identified for the carrying out of epidemiological studies focused on locating first-order contacts (contact of a SAR-positive CoV-2 case) and second-order contacts (contacts of first-order contacts), isolating suspects, and repeating PCR testing even if the initial test was negative, to ensure that no cases remained undetected.[18]

By the end of September, the average number of cases per day in the capital decreased (from 318 in August to 279 in September) and the intensity of viral transmission decreased by 12.3%. Outbreaks decreased from 192 to 104 and LTEs from 17 to six. Of those remaining, two were declared closed on the 30th of September, and the number of severe and critical cases decreased.

Ciego de Avila: This province had the highest incidence rate in the country during the second half of September (Table 3), with confirmed cases in almost all its municipalities, and 16 deaths. Four municipalities were the most affected, including the provincial capital [19].

There were six LTEs, two of which involved the two main hospitals in the municipalities of Ciego de Avila, the provincial capital, and Morón, the most populated in the province, and 145 active foci of the disease were detected. Due to the magnitude of transmission, 1,500 capacities were set up in several centers to isolate contacts and suspects. [20] Transmission rose from 0.46 confirmed cases per day in August to 15 in September. The emergence of LTEs in two clinical-surgical hospitals in the province reduced the number of physicians on the services, and 90 professionals from other provinces were incorporated into secondary care.[21]

A working group of the Ministry of Public Health, chaired by its minister, was created to work synergistically with the provincial authorities to control the epidemic. The work in hospitals and municipalities was reinforced with 200 professionals from different provinces of the country, including physicians, nurses, technicians and other health professionals, managers, and experts. The members of this working group gave lectures and seminars to local professionals on the Cuban protocol for treating the sick, evaluated the epidemiological situation in each area, designed a plan for recovery from the affectations, worked on medical care in the red zone of hospitals and on epidemiological control at the primary level of care. [21,22]

The members of the working group reviewed the results of the investigations, the “epidemiological spiders”, the number of contacts, the number of suspects identified, and the tests performed in outbreak and LTE controls, to correct errors and prevent new infections [23]; they also developed a theoretical-practical program designed to train health personnel in the municipalities on epidemiological control procedures during outbreaks and LTEs, as well as to carry out quality epidemiological surveys, and identify contacts and vulnerable persons. Health personnel, with the support of members of the communities, screened 54.3% of the province's population, and reinforced epidemiological work to control transmission and hasten the closure of outbreaks. [24]

Matanzas. During August, cases increased in this province (Table 3) with an average of 1.5 cases per day, and multiplied by 2.5 times in September, with an average of 3.5 cases per day. There were three LTEs and six outbreaks of the disease. The health teams were not reinforced with personnel from other provinces but, in the municipality of Cárdenas, they increased the screening of the healthy population and vulnerable populations to locate cases and suspects. In the tourism construction sites, where there was a LTE, 2,113 PCR tests were performed among the 2,200 workers of the company, and investigations were maintained to identify contacts in the construction camps and within communities.[25]

Artemisa. This province had the highest number of cases in August, with five LTEs and 66 outbreaks of the disease but, in September, the

number of cases decreased (Table 3) and the LTEs were declared closed. The number of cases increased, and PCR testing focused on outbreaks and LTEs.

By the end of September, there was a resurgence of cases in Sancti Spíritus province, with an incidence rate of 1,202 x 100,000 inhabitants. In the municipality of the same name resided 41% of the detected cases that infected inhabitants of nearby territories with whom they had family or work ties. In the province, there were two LTEs and six outbreaks, three of them in the head municipality. In one of the outbreaks, the positives were officials and workers of the Provincial Health Directorate and the Board of Directors of the provincial hospital, but the source of infection was not identified, so the epidemiological situation was different and more serious than that which occurred in Ciego de Avila, where health personnel became infected because they violated biosecurity protocols. Two thousand PCR tests were performed to identify other positives and contacts were isolated. On the last day of the month, an LTE with 30 cases was opened in the provincial capital,[26] but transmission was controlled and no actions like those in Havana or Ciego de Avila were taken.

Local transmission events.

In the first month of the epidemic, transmission took place through LTEs but, after the second month, community transmission became more frequent, particularly during the limited autochthonous transmission and new normality phases, when there was a low incidence rate of the disease, but, during the resurgence, LTEs became, once again, the main form of transmission in the country. Many started in workplaces and spread to the community, such as the one in a construction company in Mariel, where 120 positive cases were diagnosed and caused outbreaks in several municipalities of the province where the workers lived.

During the first five months of the epidemic, 57 LTEs were opened and, during the two months of the outbreak, 45 remained open, which shows that the average number of LTEs per month doubled that of the first stage. The LTEs were related to the increase in incidence rates in the provinces where the outbreak occurred. In

August, there were 23 LTEs: 15 of them new, and eight that started in July, remaining open during August. In September there were 22 LTEs: eight from August that continued to remain open, and 14 that opened in that month. Of the 45 LTEs during the flare-up, 17 originated in state institutions with high caseloads, and 28 in communities. During the two months that the outbreak lasted, 20 were closed and 25 were open, remaining so through October.

There is no defined time for an LTE to remain active and open, because it depends on the number of cases and the quality and speed with which the measures to control it are applied. These measures include detection and isolation of all contacts, screening of the area or workplace, closure of surrounding areas when necessary, and 10 days without the appearance of new cases. Thirty LTEs were active for up to one month, 13 lasted more than one month, and two for up to two months.

Causes of the resurgence and case behavior

Although it is difficult to identify the causes for the appearance of new cases of a communicable disease with alarming rates, after some statistics suggested that the epidemic was under control, the resurgence of COVID-19 in Cuba can be associated with sanitary indiscipline, considering the way and speed with which the virus is transmitted and its capacity to infect many people from a single positive case. In the provinces where cases increased, risky behavior and negligence in complying with prevention measures were observed. [27, 28, 29, 30]

Measures taken

Due to the epidemiological situation in the provinces with the highest rates, national authorities reinforced measures to control the disease in the five western provinces as of August 6. Artemisa province returned to Phase II, except for the municipality of Bauta, which went into Phase I. All services carrying passengers between the five western provinces (Havana, Artemisa, Pinar del Río, Mayabeque and Matanzas), as well as between these and the rest of the country, were suspended.[31]

Havana returned to the limited autochthonous transmission phase as of August 7,

because its rates in the preceding 15 days had been above 25 x 100 000 inhabitants, [32] and new control provisions were approved. (Box 1)

Box 1. Measures taken by Havana provincial authorities, August 6th, 2020

- Restrict access to the province from nearby provinces, according to the provisions of the Ministry of Transportation.
- Limit to 9:00 pm the opening hours of bars, restaurants, and nightclubs.
- To sell drinks in bars but no dancing.
- Allowing background music at a moderate volume. Tables and stools in bars and restaurants should be placed at one and a half meters from each other.
- Require reservations to enter recreation centers and social circles.
- Provide special attention from the health system to professionals who offer direct services to people, considered vulnerable and high risk: barbers, hairdressers, manicurists, and seamstresses.
- Limit urban transportation and mobility of citizens to 11:00pm.
- Do not allow concerts, multitudinous events, shows, public, recreational events, sports and religious activities.
- Decrease mobility between Havana and Matanzas, Artemisa and Mayabeque. Between these provinces, control points will be established with representatives of the Health System, the Ministry of Transportation and the National Revolutionary Police.
- Limit to a minimum the interprovincial mobility of state-owned vehicles and require the approval of the provincial authorities.
- Ensure that hygienic-sanitary measures, capacity restrictions and the obligatory use of masks in means of transportation are complied with.
- Prohibit the activity of passenger boarding sites on highways and roads.
- To prohibit the circulation, on highways and roads, of means of transportation with more than eight seats without authorization.
- Maintain transportation services to hotels and camping bases, and those linked to Health.
- Maintain the current regulations for mobility between the special municipality

- Isla de la Juventud and the capital.
- Allow up to 40 standing passengers in articulated buses and 20 in rigid buses.
 - Intensify screening according to municipal risk stratification and reorganize health care services so that health professionals and activists carry out this task in the offices of the family doctor and nurse.
 - Increase the number of samples for real-time PCR testing in municipalities with high and very high risk of transmission and perform at least 2,240 tests per day.
 - Carry out prevention interventions with the drugs that the country has made available to address COVID-19 in at-risk populations, according to stratification.
 - Increase discipline, control, and ensure that professionals and support staff comply with established care protocols in isolation centers and hospitals.
 - Increase the rigor of state sanitary inspection, the intensity of social communication strategies and the evaluation of compliance with transmission prevention measures in each territory.
 - Prohibit access to workplaces for workers with respiratory symptoms, risk factors and those over 65 years of age.

Source: Provincial Defense Council, available at: <http://www.tribuna.cu/capitalinas/2020-08-06/reunion-consejo>

At the end of August, the provincial authorities of Havana, together with the temporary working group of the Government - an ad hoc group created during the epidemic, made up of the highest government authorities and headed by the President of the Republic - established new measures for the capital, which were implemented during the first 15 days of September. (Box 2) These measures were extended until the end of the month because the epidemiological situation did not improve.

Box 2. Measures adopted in Havana on September 1st, 2020

- Labor measures:**
- Centers that are not continuous production or priority services will remain closed or open only with essential workers.
 - Evaluate in each center the possibility of using teleworking and telecommuting.

- Provisions to reduce the mobility of people and vehicles:**
- Prohibit the mobility of people and vehicles from 7:00 p.m. to 5:00 a.m. of the following day.
 - Readjust the schedules for the transfer of workers from production and service centers.
 - Re-evaluate the permits to circulate with the category of FREE WAY: limit the circulation demand of authorized transports.
 - Restrict the movement of cars, motorcycles, and private means of transportation.
 - Reduce pedestrian traffic on the streets.
 - Eliminate interprovincial transportation for tourism, vacations, or other reasons. The entrances and exits of Havana are highly restricted.
 - Eliminate, for 15 days, the exits from Havana for work purposes for all organizations and institutions.
 - Limit the movement of private street vendors between municipalities.

- For the network of stores:**
- Limit sales hours to Monday through Saturday from 9:00 a.m. to 4:00 p.m. and, on Sundays, from 9:00 a.m. to 1:00 p.m.
 - Sell only food products, toiletries, and alcoholic beverages for home consumption.
 - High demand products will be sold only to persons residing in the municipality where the stores are located.

- Apply severe and high fines to persons or entities that incur in acts such as:**
- Not using or incorrectly using the face mask.
 - Absence of podalic steps, chlorinated or alcoholic water solutions in state entities, services to the population, non-state, and non-governmental associations.
 - Remaining in living areas, parks, and public roads outside established hours.
 - Using cultural and sports areas.
 - Exercising, playing games, or staying on public roads.
 - Allowing minors or disabled adults to remain on public roads, parks, or other areas, for which the guardians will be held responsible.
 - Keeping premises, gastronomic or service facilities open outside the hours established for any form of management.
 - Holding parties of any kind.
 - Drinking alcoholic beverages in public places.

Source: Havana Provincial Defense Council, available at: <http://www.cubadebate.cu/noticias/2020/08/27/covid-19-nuevas-medidas-restrictivas-para-reforzar-el-aislamiento-fisico-en-la-habana/>

Although the capital remained in a phase of limited autochthonous transmission, the restrictive measures were modified on September 30 to revitalize the city's economy (Box 3).

Box 3: Measures adopted in Havana as of October 1, 2020

Measures to be eliminated:

- Prohibit the movement of people and vehicles between 7:00 p.m. and 5:00 a.m.
- Restrict the movement of state vehicles.
- Restrict the movement of private vehicles.
- Limit the movement of private peddlers between municipalities.
- Store purchases only in the municipality of residence.
- Limit sales to food products and toiletries in chain stores.
- Chain stores return to their normal opening hours.

Measures to be maintained:

- Prohibit interprovincial transportation to and from Havana.
- Allow people who were unable to travel to other provinces before the application of the restrictive measures to leave for other provinces.
- Prohibit entry and exit from the city (only in exceptional cases authorized by the provincial authorities through the General Directorate of Transportation).
- Decree 14/2020, which establishes high fines violation of established measures.

Mandatory measures:

- Use of masks.
- Physical distance in public places.
- In educational and work centers, mandatory use of disinfectant shoe mats, and hand washing and disinfection.
- Body temperature control in public places and workplaces.
- Prohibition of entry of persons with respiratory symptoms to work and educational centers, as well as guaranteeing their immediate referral to health institutions.

Other provisions:

- Restore commercial activities, public and private services, to 50 percent of capacity,

except for bars, discotheques, public and private parties that, due to their concentration of people, do not guarantee the necessary physical distancing.

- To authorize the enjoyment of the beach, always adopting distancing and protection measures.
- To authorize state and private swimming pools to 30 percent of capacity.
- Conditions will be created for the completion of the 2019-2020 school year and to restart the 2020-2021 school year as of November 2nd.
- Maintain the weighing at checkpoints.
- Reestablish the public passenger transportation service, with up to 80 percent utilization of standing capacity, as of October 3rd.

By the end of September, seven provinces and the special municipality Isla de La Juventud continued to report no new cases: Granma and Guantánamo for 150 days, Santiago de Cuba and Isla de la Juventud for 100 days, Villa Clara for 32 days, Las Tunas for 30 days, Pinar del Rio for 22 days, and Cienfuegos for 18 days. Although the epidemiological situation in these territories was stable and transmission was controlled, epidemiological surveillance continued, and PCR testing was performed [33].

Conclusions

During the months of August and September, there was an increase in COVID-19 cases within several Cuban provinces, which was considered a resurgence of the disease, with an increase in rates between 7 and more than 100 times (the latter, in two provinces). The western and central provinces had the highest number of outbreaks and LTEs. The cause was determined to be non-compliance with the protocols and measures established to control the disease. In Havana, regulations were put in place that limited the movement and concentration of people within the province and between provinces. While cases decreased towards the end of September, they remained high.

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