

Health situation in children and adolescents infected with COVID-19 in selected geographical area. Study carried out between March and May 2020.

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INTRODUCTION

Infection with the new coronavirus (2019-nCoV), re-named SARS-CoV-2 and identified in 2019 in Wuhan, China, is the cause of the coronavirus disease 2019 (COVID-19). According to data from the World Health Organization (WHO)¹, the disease has spread across the world and taken on pandemic proportions. Since December 2019, when the new coronavirus SARS CoV-2 and the infection it causes (COVID-19) were identified, data on its pathogenesis, incidence and possible treatments have been known practically “in real time”, through the publication of numerous scientific texts.

In the paediatric field, a small proportion of cases with respect to the general population has been recorded. Most paediatric patients have mild, flu-like symptoms, such as short-term fever. In the case of Cuba, the situation is in line with international data published to date².

The first published works on paediatric cases from China corroborated the impression that children are not as severely affected as some adult patients³⁻⁵. In this sense, it has been documented that children, even those who present mild cases of the disease, can be an important source of transmission of the virus with an infection rate among contacts of 7.4 % in children under 10, similar to the average adult population, with a 7.9 %⁶. It has also been found that children can excrete the virus, mainly in faeces for a prolonged period of time, even a month, and that they can have high viral loads in respiratory secretions⁷.

The spectrum of manifestations described in 171 children (from 1 day old to 15 years old) infected with SARS-CoV-2 and treated at Wuhan Children’s Hospital have shown that the most common signs and symptoms include: coughing (48.5 % of cases), pharyngeal erythema (46.2 %) and fever (41.5 %). Other less common signs and symptoms, found in less than 10 % of children, were diarrhoea, fatigue, kidney rhinorrhoea and nasal congestion. Tachypnea on admission was found in 28.7 % of children and hypoxemia (saturated oxygen) with saturation of <92 % during the period of hospitalization, in only 2.3 % of the children. The most frequent radiological finding was the bilateral ground-glass opacity, observed in 1/3 of the cases³.

Twelve image abnormalities were found in the chest computed tomography (CT) of asymptomatic children, similar to those observed in adults with pneumonia caused by COVID-19. The assessment of imaging characteristics with clinical and laboratory findings can facilitate the early diagnosis of the pneumonia caused by COVID -19⁸.

With the spread of the pandemic in Europe and America, observations indicate that the situation among children is similar. There is still concern for immunosuppressed infants and children, or those who have other underlying conditions, such as chronic lung disease (like asthma) or cardiovascular disease⁹.

The situation of children and adolescents in Cuba during the pandemic appears to be similar according

to the number of reported cases. However, the implementation of studies describing the situation of this population in greater depth than the statistics disclosed daily do, is a necessity for future projections of a disease that, because of its newness, still leaves many scientific unknowns; both epidemiological and clinical.

In view of the risk posed by the COVID-19 for children and adolescents in Cuba, a group of professionals

committed to people's health have come together to carry out a multidisciplinary research that allows for the characterisation of health care. The National School of Public Health, the Cuban Society of Paediatrics and the Children's Health Nursing Network were involved in the study. The proposed objective is to describe the impact of COVID-19 in children and adolescents, and its main characteristics in selected territories of the country.

METHODOLOGY

A quantitative descriptive cross-sectional study was carried out in selected municipalities of the country, from March to May 2020.

◆ **UNIVERSE**

The universe was made up of 230 children and adolescents from all provinces of the country and the municipality Isla de la Juventud, who had been diagnosed as confirmed cases between weeks 13 and 23 of the period corresponding to the confirmation of cases in the country.

◆ **SAMPLE**

The sample was non-probabilistic of the type “Sample of extreme cases”. This type of sample is useful in researches about unusual problems, such as the case of the COVID-19 pandemic. It allowed to evaluate characteristics, groups or situations distant from the “normality” or “prototypes”.

The sample was distributed into five age subgroups: less than 1 year old, from 1 to 4 years old, from 5 to 9 years old, from 10 to 14 years old and from 15 to 18 years old, which were obtained from 9 provinces across the country. Among them, researchers selected 13 municipalities that, because of the number of confirmed individuals, sources of transmission and forms of presentation of the disease, accounted for 96 cases. That represented 42.2 % of the total amount of children and adolescents notified during the period under review.

The selected provinces and municipalities are described in Table 1 below.

Table 1. Selected provinces and municipalities.

PROVINCES	MUNICIPALITIES
Pinar del Río	Consolación del Sur
La Habana	Arroyo Naranjo
	Centro Habana
	Habana del Este
	La Lisa
	San Miguel
Mayabeque	San José
Matanzas	Matanzas
Villa Clara	Camajuaní
Sancti Spiritus	Taguasco
Ciego de Ávila	Venezuela
Camagüey	Camagüey
Santiago de Cuba	Santiago de Cuba

◆ **STUDY VARIABLES**

The included variables of the study were: incidence; biological sex; age in years, source of infection; clinical status at diagnosis; place of residence, statistical week and geographical location.

The statistical calendar was organized in statistical weeks. Each one includes seven days, from Sunday to Saturday, throughout the year. This calendar has been established for annual case reporting by the World Health Organization (WHO). It allows to compare data between territories and countries, particularly in the case of communicable diseases. Based on this calendar, each country establishes its own that covers the 52 weeks of the year.

The national database, compiled by the temporary group for the monitoring and control of the epidemic at the Ministry of Public Health, was used as the primary source of information.

The statistical package used for processing was SPSS, version 21.0.

The results are presented in tables and graphs through frequencies, percentages, rates and averages. The data obtained were subjected to qualitative analysis of the content, by means of successive approaches through exchanges via e-mail and WhatsApp by researchers.

RESULTS

The study of the COVID-19 epidemic in Cuba, in the period between statistical weeks 13 to 23 (until May 31st May, 2020) showed low incidence of the disease in the population group under 18 years old. Up to that date, 230 cases had been notified in the country, which represent a rate of 0.98 x 10 000 inhabitants for that age group.

Observations reveal that throughout the period studied, the behaviour of the epidemic had a downward tendency in reported cases. The peak of notifications, in weeks 15 to 17, corresponded the 23.7 % and 17.5 % of the total diagnosed (Table 2).

These results coincide with those described in other COVID-19 studies² on the incidence in this age group, as well as the clinical situation at the time of diagnosis. About 63.5 % of these confirmed cases were asymptomatic at the time of diagnosis (See Figure 1).

The upward trend in asymptomatic cases shows that as the epidemic progressed over time and the number of cases decreased, those with no symptoms and signs prevailed.

This situation may have led to a decrease in risk perception by families. Hence the importance of keeping the population aware of the need for surveillance

Table 2. Confirmed and asymptomatic cases of COVID-19 in children and adolescents, by statistical week. CUBA, 31 May 31, 2020.

STATISTICAL WEEK	CONFIRMED CASES OF COVID-19		ASYMPTOMATIC	
	YES	NO	YES	NO
13	5	5,2	0	0,0
14	6	6,2	0	0,0
15	22	22,1	15	68,2
16	9	9,3	4	44,4
17	17	17,5	13	76,5
18	8	8,2	8	100,0
19	9	9,3	5	55,6
20	5	5,2	5	100,0
21	6	6,2	4	66,7
22	4	4,1	3	75,0
23	5	5,2	5	100,0
TOTAL	96	100,0	62	64,5

in these age groups, since asymptomatic children and adolescents can live together with and transmit the disease to others who are chronically ill and therefore more vulnerable to complications.

As a result of epidemiological research and active surveillance established in Cuba to address the epidemic, it was found that the 62 asymptomatic cases (64.5 %) were identified as contacts of confirmed cases from their families or neighbours who had contracted the disease in the country or overseas. This clinical behaviour contributed to a decrease in the perception of risk about infection in children. These ones, in turn, can become carriers and infect the elders, because of the affective bonds between grandchildren and grandparents and the physical proximity

which is a usual practice, culturally rooted in the country. This makes the situation critical, as it is precisely the oldest population the one that is most at risk of complications and death.

Age is one variable of analysis in this type of study. The distribution of the sample by age groups is shown in figures 2a and 2b.

It is evident from figure 2a that the frequency of cases increases as age increases. From 4.2 % of cases in children under one year of age, the number increases by groups up to 37.5 % in those aged 15 to 18 years. This may be conditioned by the fact that the closer children get to adolescence, greater independence to carry out activities is achieved thus becoming more autonomous with respect to the family.

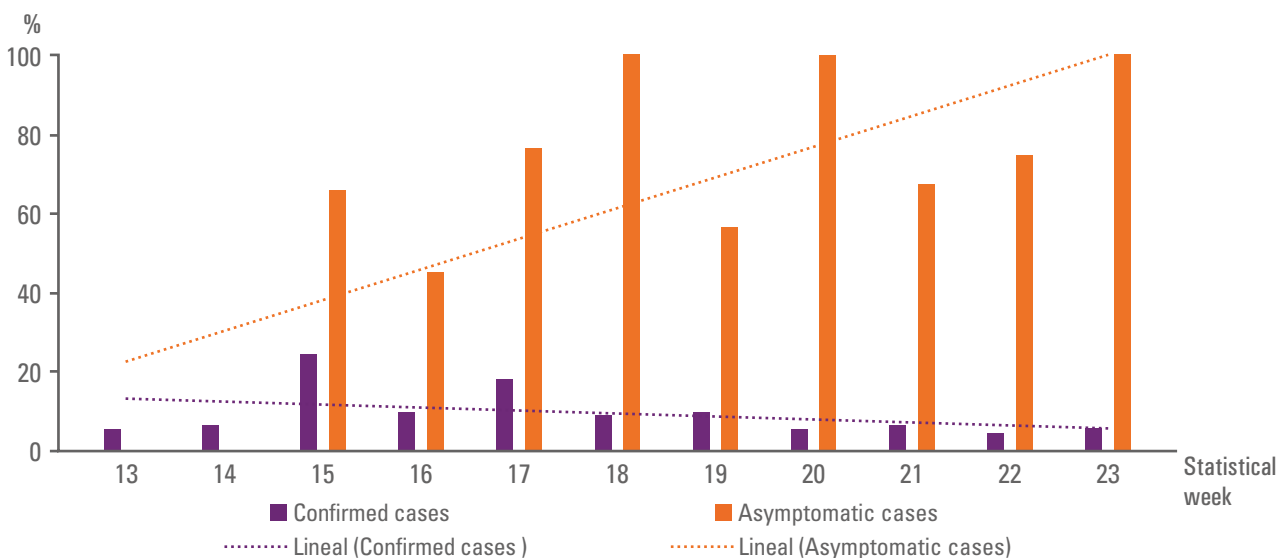


Figure 1. COVID-19 cases in children and adolescents, according to the confirmed and asymptomatic trend, by statistical week. Cuba, 31 May 31, 2020.

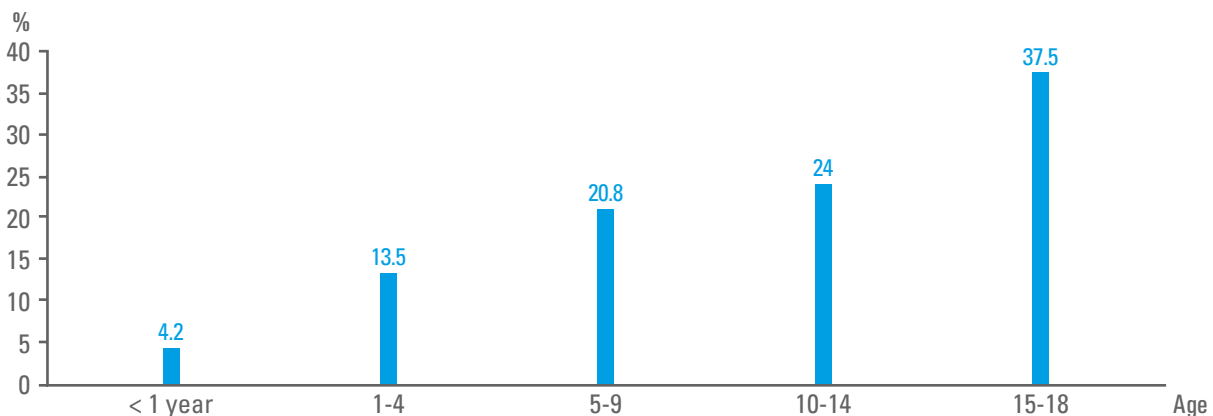


Figure 2a). COVID-19 cases in children and adolescents by age group. Cuba, 31 May, 2020.

RESULTS

The analysis within the municipalities is shown in Table 2. Camagüey, Centro Habana and Habana del Este were the territories that reported the highest number of cases in the 10-14 age group, with 17.4 %, and 13.0 % respectively. Meanwhile, cases in the 15-18 age group were more predominant in

Taguasco (27.8 %), Camajuaní (13.9 %) and Centro Habana and Habana del Este (both with 11.1 %). Figure 2b.

This element could contribute to low risk perception among families, and therefore to non-compliance with the protection measures advised by

Table 2. Confirmed and asymptomatic cases of COVID-19 in children and adolescents, by statistical week. CUBA, 31 May 2020.

PROVINCE	MUNICIPALITY	UNDER 1 YEARS OLD		1-4		5-9		10-14		15-18		TOTAL	
		Nº	%	Nº	%	Nº	%	Nº	%	Nº	%	Nº	%
PINAR DEL RÍO	Consolación del Sur					1	25,0	2	50,0	1	25,0	4	4,2
LA HABANA	Arroyo Naranjo			3	23,1	2	10,0	1	4,3	3	8,3	9	9,4
	Centro Habana			2	15,4	1	5,0	2	8,7	4	11,1	9	9,4
	Habana del Este			2	15,4			3	13,0	4	11,1	9	9,4
	La Lisa			1	7,7	2	10,0	2	8,7	3	8,3	8	8,3
	San Miguel					5	25,0	3	13,0	1	2,8	9	9,4
MAYABEQUE	San José			2	15,4			2	8,7	2	5,6	6	6,3
MATANZAS	Matanzas	1	25,0	2	15,4	1	5,0	1	4,3	1	2,8	6	6,3
VILLA CLARA	Camajuaní							2	8,7	5	13,9	7	7,3
SANCTI SPIRITUS	Taguasco					1	5,0			10	27,8	11	11,5
CIEGO DE ÁVILA	Venezuela	1	25,0	1	7,7	3	15,0	1	4,3			6	6,3
CAMAGÜEY	Camagüey					2	10,0	4	17,4	1	2,8	7	7,3
SANTIAGO DE CUBA	Santiago de Cuba	2	50,0			2	10,0			1	2,8	5	5,2
TOTAL		4	4,2	13	13,5	20	20,8	23	24,0	36	37,5	96	100,0

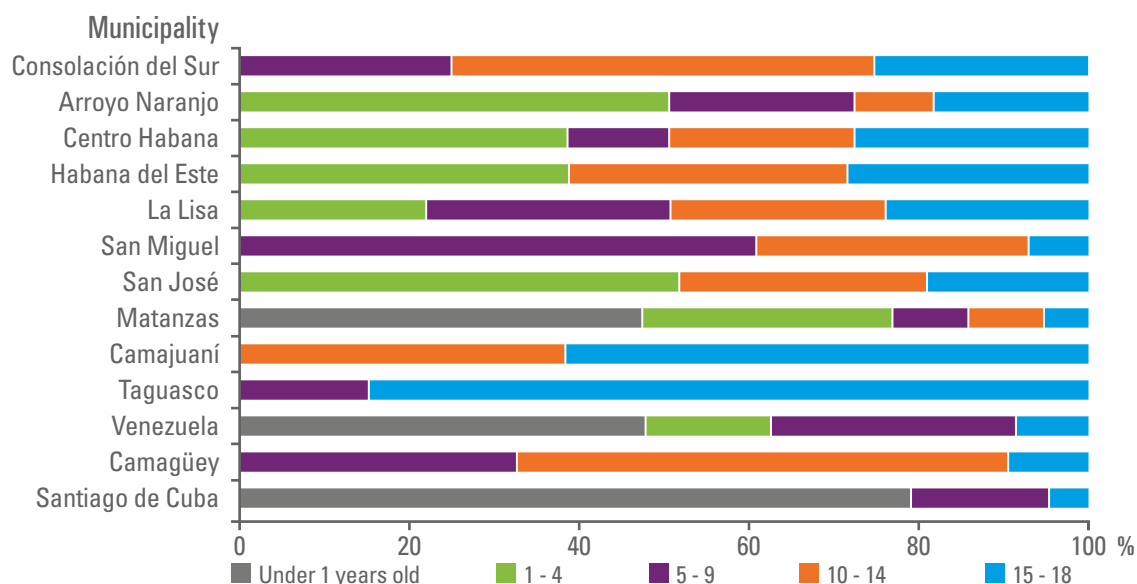


Figure 2b). COVID-19 cases in children and adolescents according to age in selected municipalities. Cuba, 31 May 2020

health authorities. The number of breastfeeding babies (4) is relevant in Figure 2a. In this stage, maximum protection is expected, which includes avoiding exposure to any source of infection, even if there is no epidemic situation. Special attention is given to protection measures follow-up in childcare consultations across the country¹⁰. They must be announced during the interventions that are carried out at the institutional level and during home visits by the Basic Health Care Team (BHCT), which includes a family doctor and a nurse, as well as guidance from other member of the Basic Working Group (BWG) and specific technical assistance by the paediatrician.

The analysis of the behaviour of the under-five population generated similar considerations. The BHCT should also give priority attention to this group. Both families and caregivers were expected to be prepared to implement the protection measures in place to prevent the emergence of cases in that age group. Figure 2b shows that this population group is distributed in 9 of the 13 municipalities studied, so their presence was not a chance event. This information will be a reference for future actions as part of childcare activity.

An encouraging aspect of these results is that no new-borns have been registered, as has been the case in other countries¹¹⁻¹². This situation seems to respond to the accurate surveillance and care actions by the National Maternal-Child Health Program, since according to Chinese researchers¹¹⁻¹³ there is no clear evidence of vertical transmission. There are few published cases of children of infected mothers in the third trimester, with virological analysis testing negative. The risk of horizontal transmission by contact with an infected person seems to be the same as in the general population.

In this sense, the country documents the early multidisciplinary care for patients and the integration of many sectors of national life outside healthcare, which have supported all the epidemic control activities. The creation of a multidisciplinary group to study the epidemiological situation made it possible to work on the evaluation and monitoring of the evolution of the pandemic, design community intervention strategies early on, prepare the health care system ahead of the

emergence of cases, use science and research into concrete actions and advise the highest state authorities about the design of the national disease containment plan¹⁴.

The percentage distribution of cases according to sex, (see Figure 3) shows figures similar to the ones reported in adults throughout the country¹⁵. In this regard, there are several theories yet to be confirmed, some of them are related to biological and sociocultural characteristics, like the greater exposure of men to social interaction. In the case of children and adolescents, further research should also be carried out.

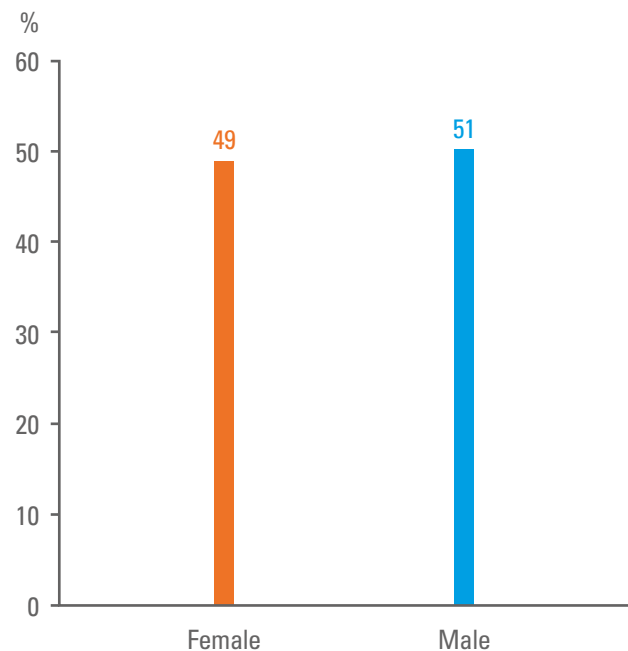


Figure 3. COVID-19 cases in children and adolescents by sex. Cuba, 31 May, 2020.

Table 3 details the distribution of the sample by sex, according to selected provinces and municipalities.

A closer look at the distribution of this variable reveals a concentration of male cases in the municipalities of La Lisa, Taguasco and Camajuaní. No male cases were diagnosed in Consolación del Sur. Confirmed cases of girls and female adolescents have a more homogeneous distribution among municipalities in Havana and Taguasco in Santi Spíritus, which are the municipalities that contribute with more female cases to the sample.

The source of infection required particular analysis. It was observed that children under one year on average had more than 15 contacts per child.

RESULTS

Table 3. COVID-19 cases in children and adolescents according to sex in selected municipalities. Cuba, 31 May, 2020.

PROVINCE	MUNICIPALITY	MALE		FEMALE		TOTAL	
		Nº	%	Nº	%	Nº	%
PINAR DEL RÍO	Consolación del Sur	0	0	4	8,5	4	4,2
LA HABANA	Arroyo Naranjo	3	6,4	6	12,2	9	9,4
	Centro Habana	3	6,4	6	12,2	9	9,4
	Habana del Este	4	8,5	5	10,2	9	9,4
	La Lisa	7	14,9	1	2,0	8	8,3
	San Miguel	4	8,5	5	10,2	9	9,4
MAYABEQUE	San José	2	4,3	4	8,2	6	6,3
MATANZAS	Matanzas	2	4,3	4	8,2	6	6,3
VILLA CLARA	Camajuaní	5	10,6	2	4,1	7	7,3
SANCTI SPIRITUS	Taguasco	6	12,8	5	10,2	11	11,5
CIEGO DE ÁVILA	Venezuela	4	8,5	2	4,1	6	6,3
CAMAGÜEY	Camagüey	4	8,5	3	6,1	7	7,3
SANTIAGO DE CUBA	Santiago de Cuba	3	6,4	2	4,1	5	5,2
TOTAL		47	49,0	49	51,0	96	100,0

The sources of infection are distributed among an Italian foreigner, two undetermined sources and a contact to a confirmed case outside the family, which is a proof of the low perception of risk. No cases were asymptomatic. On average, patients stayed five days in the hospital with favourable evolution.

The predominant source of infection in the sample (Table 3) was associated to contacts of confirmed cases of Cuban residents with positive PCR test for COVID-19, in 75 cases. Twelve cases, which were reported in weeks 13, 14 and 15 at the beginning of the pandemic and just before the closure of air borders,

Table 4. COVID-19 cases in children and adolescents according to source of infection and statistical week. Cuba, 31 May, 2020.

STATISTICAL WEEK	CONFIRMED CASES	OVERSEAS	UNKNOWN
13	2	3	
14	1	5	
15	17	4	2
16	6		3
17	15		2
18	7		
19	8		1
20	5		
21	6		
22	3		1
23	5		
TOTAL	75	12	9

were the result of contacts with foreigners or Cubans infected overseas. In a total of nine cases, the source of infection was undetermined. (Figure 4).

Three 18-year-old male workers were diagnosed as part of a transmission event in their workplaces. Adolescents and young people that age are expected to un-

dergo vocational training or take advantage of the technical and higher education opportunities offered by the National Education System. However, taking up work has become more frequent among this age group as the new economic model has generated other work, family and personal practices and demands.

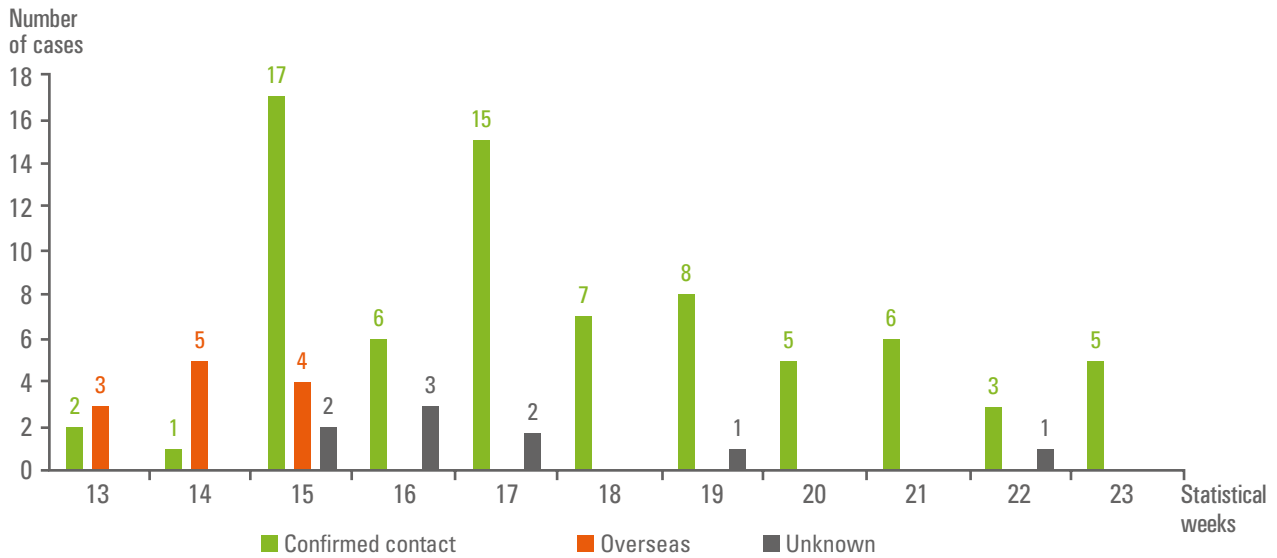


Figure 4. COVID-19 cases in children and adolescents according to source of infection and statistical week. Cuba, May 31st, 2020.

CONCLUSIONS

The results of the study are consistent with international reports about these age groups. Among the main characteristics of the population under study, there is a trend of asymptomatic cases, with a slight difference between the sexes and more incidence among boys and adolescents, the latter also being the most reported.

Notwithstanding the efforts and actions of the health system and the State to prevent cases, especially in these age groups, the results show the necessity for better management of risk perception in families and for tasks aimed at promoting and preserving health in these age groups.

RECOMMENDATIONS

Given the newness of this disease and the results of this preliminary study, other researches that look in more detail at the causes and propose actions for future situations, need to be developed.

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