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Children and the coronavirus disease 2019 pandemic:

a Caribbean perspective

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ABSTRACT This study aims to assess coronavirus disease 2019 (COVID-19) surveillance methods, health resources, vaccination coverage and income stratification and quantify burdens of disease and death in children and adolescents in the Caribbean. The investigation was a descriptive, cross-sectional study that included 15

Caribbean countries/territories and utilized surveys and secondary data sources.

Pediatric specialists were available across

the region, but few had designated pediatric hospitals or high-dependency units.

Compared to high-income countries/territories, upper and lower

middle-income countries/territories had higher disease burdens, fewer doctors and nurses per 1 000 pop-

ulation, lower bed capacities, and lower vaccination coverage. Child and adolescent cases ranged from

0.60% to 16.9%, compared with a global case rate of 20.2% in 2021. By August 2021 there were 33 deaths

among children from Haiti, Jamaica, Trinidad and Tobago, and Barbados. The respective case fatality rates for 0–9-year-olds and 10–19-year-olds were 2.80 and 0.70 in Haiti, 0.10 and 0.20 in Jamaica, and 0.00 and 0.14 in Trinidad, compared with 0.17 and 0.1 globally. Limited resources have been offset by availability of pediatricians across the region, and minimally direct effects on children.

- COVID-19 in children in the Caribbean² Rev Panam Salud Publica 46, 2022 | [www.paho.org/journal](https://doi.org/10.26633/RPSP.2022.135) | <https://doi.org/10.26633/RPSP.2022.135> During the early phase of the pandemic global data pertaining to children were limited. Multisystem inflammatory syndrome in children (MIS-C) was recognized as a feature of COVID–19, which was disproportionately affecting Hispanic and Black populations in high-income countries (HICs) (7). As epidemiologic patterns emerged internationally, scientists were unsure whether the ethnic and socioeconomic diversity of the Caribbean would render children more vulnerable to severe forms of COVID-19. Efforts to understand the risk posed to Caribbean children by COVID-19 were critical, given limited resources for both research and treatment. While data are available for adult patients with COVID-19, disaggregated data pertaining to pediatric patients infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in the Caribbean are limited. The aims of the current study were to assess the surveillance methods used to identify cases of COVID-19, document available health resources, vaccination coverage and income stratification among islands, and quantify the morbidity and mortality burden in children and adolescents in the Caribbean to inform policy guidelines. **METHODS** This descriptive, cross-sectional study contacted pediatricians working in 15 Caribbean countries/territories in two phases during the COVID-19 pandemic. Pediatricians

in Haiti, Cuba, and Guadeloupe who were not in the database were identified via pediatric networks. The survey asked questions on 5 broad themes: surveillance methods, surveillance sites, processes for isolation of the sick and for quarantine of the infected and available pediatric specialists. Surveillance methods included immediate case notification, contact tracing systems, sentinel surveillance, and cluster investigation.

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Nonresponse, the survey was kept short, and emailed reminders were sent. To minimize bias in countries where pediatricians were not accessed, country websites or online press releases were searched to retrieve any information pertaining to Caribbean children. To quantitatively assess the burden of COVID-19 infection across the region, available data from online dashboards or press releases were scanned until August 2021. The proportions of childhood and adoles-

cent cases and case fatality rates (CFRs) were then calculated and compared with international estimates of age-stratified mortality and case fatality in high-income countries (HICs), upper-middle income countries (UMICs) and lower middle-income-countries (LMICs). This study drew only on secondary information, mostly in the public domain, and therefore ethical approvals were not required. RESULTS

Responses to the survey were received from at least one pediatrician from 15 Caribbean countries/territories: Anguilla, Antigua, the British Virgin Islands, the Bahamas, Barbados, the Cayman Islands, Cuba, Grenada, Guadeloupe, Haiti, Jamaica, Saint Lucia, Saint Kitts and Nevis, Trinidad and Tobago, and Turks and Caicos Islands. The most common surveillance methods early in the pandemic

(90%) were case notification, contact tracing, and cluster investigation, with 50% using sentinel surveillance for ILI-SARI. The most common surveillance sites (80%) were primary care sites (non-sentinel ILI-SARI), hospitals (non-sentinel ILI-SARI), and sentinel ILI-SARI sites. Fifty percent targeted individuals in the community and 30 % monitored residential facilities (targeting the elderly), and other vulnerable groups. All Caribbean countries/territories required quarantine at home or designated government facilities, and isolation in designated hospital wards. In Barbados, which had a population aged 0-19 years of approximately 67 000 (Table 1), home isolation was not being used at the time of the study but was subsequently included in protocols. In Jamaica, which had a population aged 0-19 years of approximately 931 000 (Table 1), symptomatic children requiring hospital admission were managed in a designated ward and transferred to the main children's hospital or another intensive care unit if required. In the Bahamas, which had a population aged 0-19 years of approximately 117 000 (Table 1), the main referral and treatment center for children was in the capital city Nassau. Most islands did not have a designated pediatric hospital with a high-dependency unit (HDU), but pediatricians were well represented. Available data derived from eleven Caribbean countries/territories pertaining to child and adolescent populations, health resources, and most recent vaccination coverage are shown in Table 1. There were six HICs, four UMICs, and only one LMIC. Four territories (Anguilla, British Virgin Islands, Cayman Islands and Turks and Caicos Islands) are British overseas territories and Guadeloupe is a French overseas territory and are not classified by the World Bank. There were five islands with approximately 100 000 children or less in the 0–19 years age group, and four countries with approximately one million

children or more, with Cuba, Dominican Republic and Haiti, having the highest numbers.

Cumulative COVID-19 cases, deaths, and case fatality rates by age group among children and adolescents

Cases, N (%) Cumulative deaths Case fatality rate

0–9 10–19 0–19 0–9 10–19 0–9 10–19 0–19

Anguilla^a

July 2020 0 0 0 0 0 0 0 0

July 2021 4 (3.5) 12 (10.4) 16 (14.1) 0 0 0 0 0

Bahamas^b

August 2021 237 (1.3) 1048 (5.8) 1285 (7.1) 0 0 0 0 0

Barbados^c

June 2020 1 (1) 1 (1) 2 (2.1) 0 0 0 0 0

August 2021 849 (16.9) 0 1 0 - 0.12

British Virgin Islands^d

May 2020 0 0 0 0 0 0 0 0

May 2021 9 (3.6) 15 (6) 24 (9.7) 0 0 0 0 0

Cayman Islands^{e,f}

April 2021 9 (1.7) 37 (6.9) 46 (8.6) 0 0 0 0 0

Cuba^{g,h}

May 2020 – – 223 (10.5) 0 0 0 0 0

July 2021 – – 413140 (11.9) - - - - -

Grenadaⁱ

July 2020 0 (0) 0 (0) 0 (0) 0 0 0 0 0

July 2021 1 (0.6) 0 (0) 1 (0.60) 0 0 0 0 0

Haiti^{j,k}

June 2020 107 (2.4) 130 (2.9) 237 (5.3) 3 1 2.8 0.8 1.7

July 2021 460 (2.3) 852 (4.2) 1312 (6.5) 13 6 2.8 0.7 1.4

Jamaica^{l,m}

May 2020 42 (7.2) 64 (10.9) 106 (18.1) 1 0 2.3 0 0.9

August 2021 3125 (5.2) 4576 (7.7) 7701 (12.9) 3 7 0.1 0.2 0.13

St. Kitts and Nevis^e

June 2020 0 (0) 0 (0) 0 (0) 0 0 0 0 0

August 2021 3 (0.9) 1 (0.3) 4 (1.2) 0 0 0 0 0

Trinidad and Tobago

May 2020 3 (2.6) 0 (0) 3 (2.6) 0 0 0 0 0

August 2021 1305 (3.3) 2192 (5.5) 3497 (8.8) 0 3 0 0.14 0.09

Turks and Caicose

June 2021 0 (0) 0 (0) 0 (0) 0 0 0 0 0

August 2021 109 (4.1) 143 (5.4) 252 (9.5) 0 0 0 0 0

World (67 countries**)o

Dec 2021 6,489,510 (7.2) 11,693,811 (13.0) 18,183,21 (20.2) 3073 4035

00.17p0.1p0.06p

This table was prepared by the authors. The Dominican Republic had the highest number of MIS-C

cases in the region (9) and a large population of children and

adolescents (Table 1). The number of cases identified in Haiti

was disproportionately low compared with the child and ado-

lescent population (Table 1), but this may be related to the

testing strategy used in that country. A clinical case definition based on

symptoms and radiology was used to identify patients in need

of care (11). A meta-analysis revealed that CFRs were significantly

higher in LMICs and UMICs than in HICs (0.24 vs. 0.013) (12)

which is consistent with a higher CFR in Haiti compared with TABLE 2.

[unicef.org/cuba/media/2231/file/COVID 19_I%20Cuban%20children&adol.pdf.pdf](https://www.unicef.org/cuba/media/2231/file/COVID_19_I%20Cuban%20children&adol.pdf.pdf);

[hhttps://www.cecmed.cu/noticias/aprueba-cecmed-ensayo-clinico-fase-i-ii-candidato-](https://www.cecmed.cu/noticias/aprueba-cecmed-ensayo-clinico-fase-i-ii-candidato-vacunal-soberana-poblacion-pediatrica)

[vacunal-soberana-poblacion-pediatrica](#); iGovernment of Grenada

Ministry of Health;

[jhttps://www.humanitarianresponse.info/en/operations/haiti/documents?page=42](https://www.humanitarianresponse.info/en/operations/haiti/documents?page=42);

kRepublic of Haiti, Ministry of Public Health and Population (MPSS);

l<https://jamcovid19.moh.gov.jm/>; mMinistry of Health and Wellness,

Jamaica; nGovernment of the Republic of Trinidad and Tobago, Ministry of Health;

o<https://data.unicef.org/covid-19-and-children/>; psystematic review of articles and

national reports as of December 7, 2020 for 138 LMIC,UMIC and HIC

(reference 11, S4 Table.

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communicationRev Panam Salud Publica 46, 2022 | www.paho.org/journal |
<https://doi.org/10.26633/RPSP.2022.135> 5other countries (Table 2). Deaths from
COVID-19 in children
are rare and have been highest in infants < 1 year old with

CFR of 0.58. (12) . CFR is an estimated value that depends on the testing strategy, which may not identify all cases. In this study, HIC and UMICs such as the Bahamas, Barbados, Trinidad and Tobago and Jamaica exhibited higher CFRs among ages 10-19 compared with ages 0-9. The pooled data used for comparison in Table 2 showed a higher CFR among the younger age group but there were limitations outlined in that analysis (12). The higher CFR among 0–9-year-olds in Haiti may be related to a low number of confirmed cases, although low socioeconomic status and a poor healthcare system may have had an effect. This study had some limitations. The analysis was limited to countries that supplied disaggregated data for COVID-19 infection among children. Case identification determines the case rate and is dependent on the test-and-trace capacity in each country which was not analyzed. Furthermore, children were mainly asymptomatic or had mild disease and may not have been prioritized for testing. Data from national ministries of health may have inherent weaknesses of timing, completeness, and accuracy. We were unable to describe specific clinical outcomes or disease severity among children, or the effects of vaccination coverage, which was low in countries with relatively higher burdens of disease such as Haiti and Jamaica (Table 1). The effects of bed capacity and hospital isolation requirements on non-COVID-19 admissions were not evaluated. The high burden of MIS-C cases in the Dominican Republic, the higher CFR in the 0–9-years age group compared to the 10–19-years age group in Haiti, and the multidimensional effects of COVID-19 across socioeconomic strata warrant further investigation. Despite these limitations, this is the first regional published work investigating the burden of the COVID-19 pandemic in children and adolescents in the context of health resources. As the pandemic evolves, the important findings of the current study can serve as a reference point for policymakers. Overall, surveillance strategies

were similar but wide variability in case rates suggests differences in testing capacities. Nevertheless, COVID-19 incidence and mortality in children were consistent with global estimates. A lack of designated pediatric hospitals and HDUs and health resources has been partly offset by the availability of pediatricians across the region, and minimal direct effects on children. Potential increased hospitalization with emerging variants in the face of limited doctors, nurses, bed capacity, specialized hospitals for children, and hospital isolation facilities across the Caribbean subregion would burden the health sector and result in unfavorable outcomes in patients with severe COVID-19 needing HDU support, and non-COVID-19 cases requiring hospitalization. Furthermore, the uncontrolled spread of SARS-CoV-2 in unvaccinated populations may prolong or exacerbate any indirect effects of the pandemic on children. Collaborative research of the COVID-19 pandemic's multidimensional effects must be ongoing to generate tailored policy decisions concerning children and adolescents. Prioritization of hospital admissions for children with specific comorbidities associated with COVID-19 diseases severity should further minimize poor outcomes. Ongoing training of first responders to identify and manage early signs of life-threatening complications such as shock in severe MIS-C can limit morbidity and mortality. Additionally, standardized guidelines along with acquisition of equipment such as a vital signs monitors, infusion pumps and high flow nasal oxygen could be considered for early management of severe complications in settings with limited or no HDUs. In countries challenged with achieving high vaccination coverage rates, strategic vaccination campaigns should be geared towards pregnant women, vulnerable children and adolescents, and other at-risk groups. Author contributions. TE-G conceived the original idea and

wrote the manuscript. PML provided the email contacts of pediatricians in the Caribbean region. TE-G, PML, EL, CS-Q, IS-M, MF, JWT, BN, JB collected data. TE-G and IH interpreted the results.

La población infantil y la pandemia de COVID-19: una perspectiva del Caribe

RESUMEN El presente estudio tiene como objetivo evaluar los métodos de vigilancia, los recursos de salud, y la cobertura de vacunación y la estratificación de los ingresos, así como cuantificar las cargas de enfermedad y muerte de la enfermedad por coronavirus del 2019 (COVID-19) en niños, niñas y adolescentes en el Caribe. La investigación consistió en un estudio descriptivo y transversal que incluyó a 15 países o territorios del Caribe y empleó encuestas y fuentes de datos secundarios. Las medidas de cuarentena y aislamiento fueron sólidas, igual que las estrategias de vigilancia. Había especialistas pediátricos disponibles en toda la región, pero pocos designados en hospitales pediátricos o unidades de alta dependencia. En comparación con los países y territorios de ingresos altos, los de ingresos medianos altos y medianos bajos presentaron una mayor carga de morbilidad, menos personal médico y de enfermería por 1 000 habitantes, menor capacidad de camas y menor cobertura de vacunación. Los casos de niños, niñas y adolescentes oscilaron entre 0,60% y 16,9%, en comparación con una tasa general de casos de 20,2% en el 2021. En agosto del 2021, hubo 33 muertes de pacientes pediátricos de Haití, Jamaica, Trinidad y Tabago y Barbados. Las tasas de mortalidad de los grupos etarios de 0 a 9 años y de 10 a 19 años fueron respectivamente de 2,80 y 0,70 en Haití; 0,10 y 0,20 en Jamaica; y 0,00 y 0,14 en Trinidad; en comparación con 0,17 y 0,1 a nivel mundial. La incidencia general de COVID-19 y la mortalidad en la población infantil fueron coherentes con las estimaciones mundiales. Se compensaron

los recursos limitados

con la disponibilidad de pediatras en toda la región y efectos directos mínimos en los niños. Priorizar la admisión de grupos específicos de riesgo, la capacitación de los equipos de respuesta inicial y las campañas de

vacunación dirigidas a mujeres embarazadas y niños, niñas y adolescentes vulnerables podría beneficiar a

los países con recursos limitados y bajas tasas de cobertura de vacunación. • COVID-19 in children in the Caribbean6 Rev Panam Salud Publica 46, 2022 |

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• COVID-19 in children in the Caribbean Brief communication Rev Panam Salud Publica 46, 2022 | www.paho.org/journal | <https://doi.org/10.26633/RPSP.2022.135.7A>

crianças e a pandemia da doença do coronavírus de 2019: uma perspectiva do Caribe

RESUMO Este estudo visa a avaliar os métodos de vigilância, recursos de saúde, cobertura vacinal e estratificação

de renda relacionados à doença do coronavírus de 2019 (COVID-19) e quantificar a carga de morbimortali-

dade a ela atribuível em crianças e adolescentes no Caribe. Foi realizado um estudo descritivo e transversal

que incluiu 15 países e territórios caribenhos e utilizaram-se levantamentos e fontes de dados secundárias. As medidas de quarentena e isolamento foram robustas, e as estratégias de vigilância foram semelhantes. Em comparação com os países/territórios de alta renda, aqueles

de renda média-alta e média-baixa apresentaram uma maior carga de morbidade, menos médicos e enfer -

meiros por 1 000 habitantes, menor capacidade de leitos e menor cobertura vacinal.

De 0,60% a 16,9% dos

casos ocorreram em crianças e adolescentes, contra uma média mundial de 20,2% em

2021.