

Alfredo Tagarro<sup>1,2</sup>, Irati Gastesi<sup>2</sup>, Sara Villanueva<sup>2</sup>, Andrea Ramirez<sup>3,19</sup>, María Lucía Mesa<sup>3,19</sup>, Pablo Vasquez<sup>4,19</sup>, Gabriela Friedrich<sup>3,19</sup>, Melisa Naranjo<sup>4,19</sup>, Sonia Restrepo<sup>5,19</sup>, Olga L Baquero<sup>6,19</sup>, Luz M Mejía<sup>7,19</sup>, Carlos Álvarez<sup>4,19</sup>, Inés Leoz<sup>8</sup>, Cristina Calvo<sup>9</sup>, Cristina Epalza<sup>10</sup>, Antoni Soriano-Aranda<sup>11</sup>, Ana Menasalvas<sup>12</sup>, Marisa Navarro<sup>13</sup>, Mercedes Herranz<sup>14</sup>, Victoria Fumadó<sup>15</sup>, Siobhan Crichton<sup>16</sup>, Marthe Le Prevost<sup>16</sup>, Carlo Giaquinto<sup>17,18</sup>, Teresa Reinoso<sup>1</sup>, Marta Conde<sup>1</sup>, Cinta Moraleda<sup>2</sup>, on behalf of EPICO-AEP, EPICO-Colombia and ORCHESTRA Working Groups

<sup>1</sup>Fundación para la Investigación del Hospital Universitario Infanta Sofía y del Henares, Madrid, Spain, <sup>2</sup>Universidad Europea de Madrid <sup>3</sup>Fundación de Investigación Biomédica Hospital 12 de Octubre, Madrid, Spain. Instituto de Investigación 12 de Octubre (imas12), Madrid, Spain, <sup>4</sup>Universidad de los Andes, Bogotá, Colombia, <sup>5</sup>Universidad Nacional de Colombia, Bogotá, Colombia, <sup>6</sup>Fundación Santa Fe, Bogotá, Colombia, <sup>7</sup>Clínica Infantil Colsubsidio, Cundinamarca, Bogotá, Colombia <sup>8</sup>Instituto Roosevelt, Bogotá, Colombia, <sup>9</sup>Hospital Niño Jesús, Madrid, Spain, <sup>10</sup>Hospital La Paz, Madrid, Spain, <sup>11</sup>Hospital Universitario 12 de Octubre, Madrid, <sup>12</sup>Spain, Hospital Universitario Vall d'Hebron, Barcelona, Spain, <sup>13</sup>Hospital Clínico Universitario Virgen de la Arrixaca, Murcia, Spain, <sup>14</sup>Hospital General Universitario Gregorio Marañón, CIBERINFEC ISCIII, Madrid, Spain., <sup>15</sup>Complejo Hospitalario de Navarra, Pamplona, Spain, <sup>16</sup>Hospital Sant Joan de Déu, Barcelona, Spain, <sup>17</sup>Medical Research Council, London, UK, <sup>18</sup>Fondazione PENTA Onlus, Padua, Italy, <sup>19</sup>Pediatric Infectious Diseases Unit, University Hospital of Padova, Padua, Italy <sup>19</sup>EPICO-Colombia

**BACKGROUND**

Little is understood about which comorbidities are associated with severe outcomes in children hospitalized with acute COVID-19. Some confusion lies especially for cancer or diabetes.

**METHODS**

Data from 2 multicenter prospective cohort studies of hospitalized children (aged 0-18 years) with confirmed SARS-CoV-2 in Spain and Colombia were combined for this analysis.

Data were obtained from 116 hospitals.

Outcome was classified as (in decreasing order of severity): death, mechanical ventilation (MV), pediatric intensive care unit (PICU) admission, high flow/CPAP, oxygen therapy with nasal prong (NP) and hospitalization without respiratory support.

Risk factors for severity, adjusting for age and gender, were identified using multinomial logistic regression and a backwards selection process.

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**Asthma, chronic neurological, cardiac and lung disease were consistently associated with multiple severe outcomes**

Comorbidity	Death	MV	PICU	CPAP/High flow therapy	O2
Chronic cardiac disease	1.36 [0.29;6.49]	5.21 [1.76;15.41]	2.78 [1.27;6.08]	3.28 [0.87;12.32]	1.73 [0.92;3.26]
Chronic pulmonary disease	6.22 [2.28;16.94]	2.60 [0.73;9.22]	1.14 [0.41;3.17]	2.97 [0.83;10.59]	3.12 [1.74;5.58]
Asthma or recurrent wheezing	4.17 [1.34;12.97]	7.94 [3.59;17.56]	3.37 [1.91;5.96]	6.65 [2.69;16.46]	3.85 [2.57;5.77]
Chronic neurological disorder	7.34 [3.01;17.90]	3.07 [1.20;7.82]	1.52 [0.79;2.96]	4.36 [1.68;11.29]	1.10 [0.68;1.76]
Malignant Neoplasm	5.03 [2.09;12.12]	0.00 [-;-]	1.15 [0.59;2.21]	1.00 [0.22;4.41]	0.15 [0.06;0.37]
Chronic hematologic disease	2.67 [0.85;8.37]	1.44 [0.32;6.40]	0.68 [0.27;1.69]	0.75 [0.10;5.86]	0.35 [0.15;0.80]
Diabetes	2.99 [0.29;30.70]	0.00 [0.00;0.00]	5.67 [1.84;17.47]	0.00 [-;-]	1.19 [0.33;4.24]

Table 1. Multivariable association between comorbidities on the odds of each outcome (compared to hospitalization without respiratory support). Color gradient across endpoints means red: risk factors, green: protective. MV, mechanical ventilation; PICU: Pediatric intensive care unit; CPAP, Continuous positive airway pressure.

**CONCLUSIONS:** Asthma, chronic neurological, cardiac and lung disease were consistently associated with multiple severe outcomes of COVID-19. Cancer and diabetes association with selected endpoints rather than with most endpoints may be more related to the baseline disease than with the actual COVID-19.

**RESULTS**

- A total of 1,753 patients were included, 734 (41.8%) in Spain and 1,019 (58.1%) in Colombia. The most frequent comorbidities were asthma (9.0%), chronic neurological disorder (NRL) (7.4%), immunosuppressive medication (7.2%), malignant neoplasms (5.4%), and chronic lung disease (not asthma) (CLD) (4.5%).
- Asthma was associated with a significantly increased risk of death (OR: 4.17; 95%CI 1.34-12.97), MV (OR: 7.94; 95%CI 3.59-17.56), PICU admission (OR: 3.37; (95%CI 1.91-5.96), high flow/CPAP (OR: 6.65; (95%CI 2.69-16.46), and NP (OR: 3.85; (95%CI 2.57-5.77) compared to hospitalization without respiratory support.
- NRL was associated with increased risk of death (OR: 7.34; 95%CI 3.01-17.90), MV (OR: 3.07; 95%CI 1.20-7.82) and high flow/CPAP (OR: 4.36; 95%CI 1.68-11.29).
- CLD was associated with increased risk of death (OR: 6.22; 95%CI 2.28-16.94) and NP (OR: 3.1; 95%CI 1.74-5.58).
- Chronic cardiac disease was associated with increased risk of MV (OR: 5.21; 95%CI 1.76-15.41) and PICU (OR: 2.78; 95%CI 1.27-6.08).
- Risks of death (OR: 4.49; 95%CI 2.03-9.05), MV (OR: 2.97; 95%CI 1.52-5.81), PICU (OR: 4.27; 95%CI 2.89-6.33), and NP (OR: 4.67; 95%CI 3.64-5.99) were higher in the Colombia Cohort.

