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## Hospital-level impact of viral lower respiratory tract infections in child population



In Catalonia, information is scarce about the in-hospital burden of diseases involving viral lower respiratory tract infections (bronchiolitis, bronchitis, asthma exacerbation and pneumonia) in paediatric population. A new study has analyzed the epidemiology, the symptoms, the severity and the economical features of these infections between 2012 and 2020 at the Children's Hospital in Vall d'Hebron Barcelona Hospital Campus.

Lower respiratory tract infections (LRTI), -bronchiolitis, bronchitis, asthma exacerbations, and pneumonia- are the main cause of hospital admission in children and one of the main causes of infant mortality worldwide. In Catalonia, information is scarce about the in-hospital burden of these diseases. This information could be useful to evaluate the effect of preventive treatments that are expected to be implemented in Catalonia at the end of 2023, such as influenza vaccination in children or drugs to prevent bronchiolitis due to respiratory syncytial virus (RSV).

In this study, we analyse the hospital burden of viral LRTI caused by classic respiratory viruses such as RSV or influenza viruses, excluding SARS-CoV-2 associated with COVID-19. We include all patients under 16 years of age admitted, due to viral LRTI, at the Children's Hospital in Vall d'Hebron Barcelona Hospital Campus between November 2012 and December 2020.

Overall, 4056 hospitalization episodes were included that corresponded to 3325 patients. The 66% of the patients were under 2 years of age, 57% of them were male, and approximately 90% of them were previously healthy. Of the total number of episodes, more than 90% happened during the so-called “cold months” (between October and May) and 9% required admission to the paediatric intensive care unit (PICU). Mortality was exceptional: 4 cases; all in patients with chronic diseases, one related to influenza A and three related to RSV.

The most prevalent viruses were RSV, rhinovirus and metapneumovirus; in terms of diseases, the most frequent were bronchitis/asthmatic exacerbation followed by bronchiolitis and lastly pneumonia. Rhinovirus was the virus that most increased the risk for bronchitis/asthma exacerbation, RSV for bronchiolitis, and influenza viruses for pneumonia.

The two viruses with longer hospital stays were influenza and RSV. RSV was also the virus with the highest percentages of admission to the PICU and higher needs for respiratory support. Overall, the four factors that most increased the risk of PICU admission were age under 12 months, male sex, suffering from a chronic disease and bronchiolitis as a disease.

During the fall-winter months, RSV was the first virus to circulate with a peak in hospitalizations in December, followed by influenza in January-February and metapneumovirus in March-April. These patterns changed during 2020 in which, probably due to the application of measures to prevent the transmission of COVID-19 and the co-circulation of SARS-CoV-2, no patients were hospitalized because of these viruses during the winter months.

During the “cold months”, 14% of the beds/day in the hospitalization ward and 7% of the beds/day in the PICU were occupied with viral LRTI. The total hospitalization cost during the 8 years was €16,603,415, with a cost per patient of €4,000.

Our results reinforce the need to monitor the cases of hospital admission due to these respiratory viruses, as was done for COVID-19, to adapt the available health resources according to the needs. In addition, it is important to promote research in this field to develop drugs to prevent infection or reduce its severity.

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