

Unexpected lessons from the COVID-19 lockdowns in France: Low impact of school opening on common communicable pediatric airborne diseases.

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Dear Editor, for government fighting the COVID-19 pandemic, Health, Education, Economy all represent major priorities, and a fine tuning has to be found.[1-3] While vaccine development has opened the door to more optimism, to date SARS-CoV-2 infection rate is at its highest,[4] resulting to a national curfew imposed in France on October 10th 2020, followed on October 30th 2020 by a second lockdown (**Figure S1**). These national lockdowns most often raise a critical question: should the schools remain open or not? France is a good example to partially answer this question. Indeed, the country's first lockdown in Mars 2020 included all schools, while during the second lockdown (10/30/2020) it was decided to keep all schools, up to High-School, open, with reinforcement of social distancing and mandatory face masks since six years old.[5] A major question following this decision has been to wonder about the consequence on the SARS-CoV-2 circulation, which is difficult to evaluate.[6] To provide an indirect answer to this question, we decided to compare the first and the second lockdown and to study the impact of deciding to keep the school open on the circulation of different airborne viruses.[7, 8]

We conducted a study based on a multicenter prospective French surveillance database, which includes all the pediatric emergency department (PED) visits and related hospital admissions. Methods used in this study are available online (**Supplemental_method**). A total of 972,642 PED visits from January 1st, 2017 to November 30th, 2020 in 6 university hospitals were included.[7] Overall, 90,042 of these PED visits resulted in pediatric hospitalizations (**Figure 1A**).

As shown in **Figure 1B**, the annual seasonal bronchiolitis outbreak caused by the respiratory syncytial virus was not observed so far in France compared to 2017, 2018 and 2019. Looking more closely at these bronchiolitis data, we found that the second lockdown had also a major impact on the number of patients hospitalized for bronchiolitis (**Figure 1C**). This impact on the second lockdown was also major on the total number of pneumonia and acute otitis media (AOM) diagnosed (**Figure 1D-E**). In parallel, the social distancing and the national mandatory facial mask associated with the curfew seemed to have an effect on acute asthma exacerbation (AAE) and the common cold, effect that was

emphasized and extended after the start of the second lockdown (**Figure S2**). Finally, as previously described, the ongoing health measures, and probably in first the handwashing, were associated with a very low rate of acute gastro-enteritis even before the curfew (**Figure S3a**). As previously reported, none of these national decisions had any impact on the number of urinary tract infections (**Figure S3b**). [7, 8]

The low rates of bronchiolitis, AOM, common cold, AAE, pneumonia, and pediatric admission found in our study suggest low respiratory virus transmissions in children in France, despite the decision to keep the schools open during the second French lockdown. An unexpected result, probably useful when considering whether to keep the school open or not during national lockdowns decided in situation such as the current COVID-19 pandemic.

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NOTES

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Potential conflicts

CL reports grants from GSK, grants, personal fees and non-financial support from MSD, grants, personal fees and non-financial support from Pfizer, and grants from Sanofi, all for ACTIV, outside the submitted work. RC reports grants, personal fees and non-financial support from GSK, grants, personal fees and non-financial support from Merck, grants, personal fees and non-financial support from Pfizer, and grants, personal fees and non-financial support from Sanofi, outside the submitted work. All other authors declare no potential conflict of interest relevant to this article.

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Figure Legend

Figure 1A, B, C, D, E

Weekly pediatric emergency visits and hospitalization during the weeks 1 to 48 of the calendar year.

A) Weekly hospital admissions related to emergency visits from Weeks 1 to 48 of 2020 were compared with the average for the three previous years (2017, 2018, 2019). End of lockdown Step 1 begin on May 11th, 2020; Step 2 begin on June 2nd, 2020; Step 3 begin on June 22th, 2020. B) Visits related to bronchiolitis from Weeks 37 to 48 of 2017, 2018, 2019, and 2020. C-E) Weeks 42 to 48: 2020 compared with the average for 2017, 2018, and 2019 for hospital admission related to bronchiolitis (C), Pneumonia (D), and Acute Otitis Media (E)

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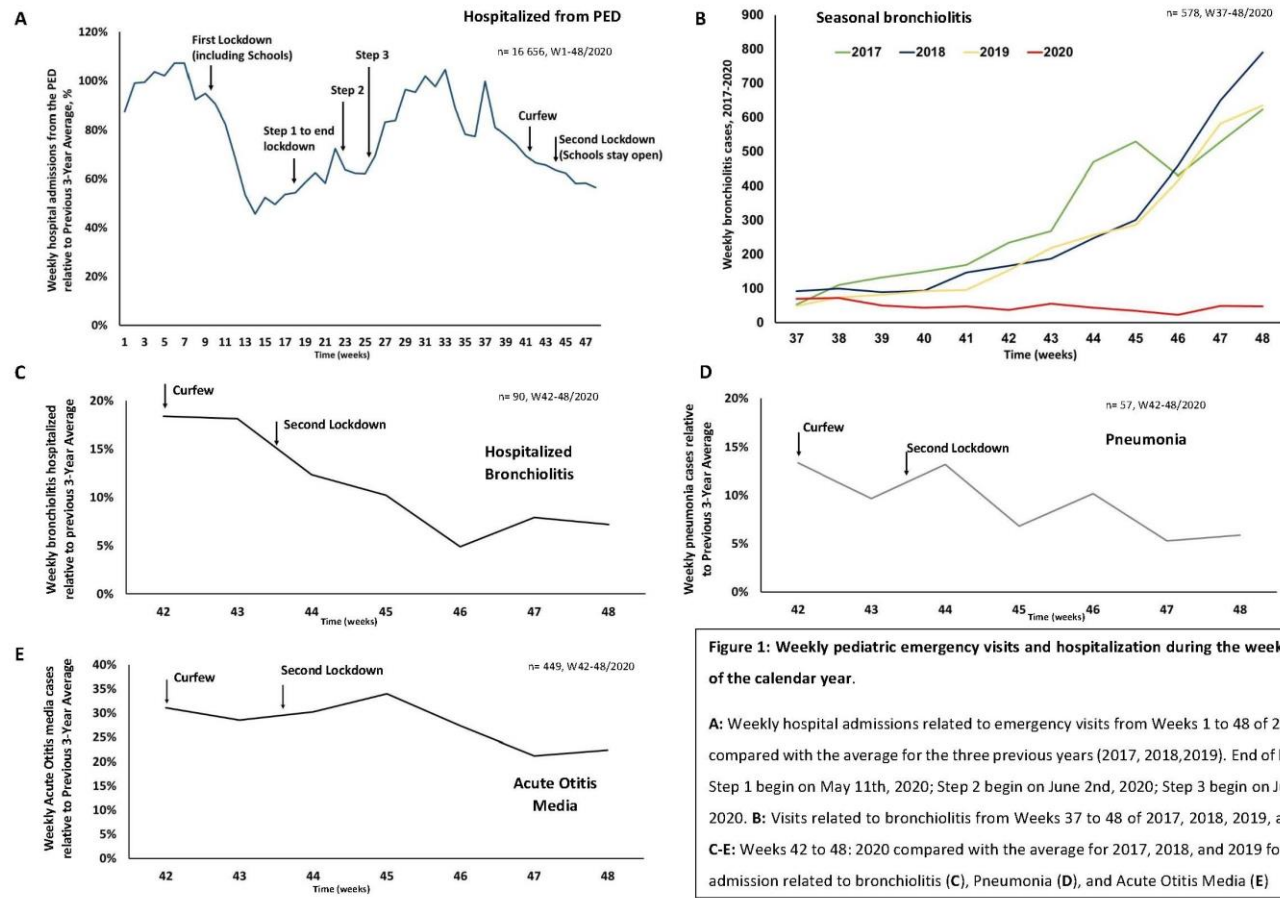


Figure 1: Weekly pediatric emergency visits and hospitalization during the weeks 1 to 48 of the calendar year.

A: Weekly hospital admissions related to emergency visits from Weeks 1 to 48 of 2020 were compared with the average for the three previous years (2017, 2018,2019). End of lockdown Step 1 begin on May 11th, 2020; Step 2 begin on June 2nd, 2020; Step 3 begin on June 22th, 2020. **B:** Visits related to bronchiolitis from Weeks 37 to 48 of 2017, 2018, 2019, and 2020. **C-E:** Weeks 42 to 48: 2020 compared with the average for 2017, 2018, and 2019 for hospital admission related to bronchiolitis (**C**), Pneumonia (**D**), and Acute Otitis Media (**E**)