

## Early View

### Correspondence

# COVID-19 and complicated bacterial pneumonia in children

Mohamad Kaddour, Marcelle Simeonovic, Joshua Osowicki, Sarah McNab, Catherine Satzke, Colin Robertson, Cattram Nguyen, Sebastian King, Shivanthan Shanthikumar

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## **COVID-19 AND COMPLICATED BACTERIAL PNEUMONIA IN CHILDREN**

### **AUTHORS:**

Dr Mohamad Kaddour, MBBS<sup>1</sup>

Dr Marcelle Simeonovic, MBBS<sup>2</sup>

Dr Joshua Osowicki, FRACP<sup>3,4,5</sup>

Dr Sarah McNab, PhD<sup>2,5,6</sup>

A. Prof Catherine Satzke, PhD<sup>5,7,8</sup>

Prof. Colin Robertson, MD<sup>1,5,9</sup>

Dr Cattram Nguyen, PhD<sup>5,10</sup>

A. Prof Sebastian King, PhD<sup>5,11,12</sup>

Dr Shivanthan Shanthikumar, FRACP<sup>1,5,9</sup>

### **Affiliations:**

1. Department of Respiratory and Sleep Medicine, Royal Children's Hospital, Parkville, Victoria, Australia. 2. General Medicine, Royal Children's Hospital, Parkville, Victoria, Australia. 3. Infectious Diseases Unit, Department of General Medicine, The Royal Children's Hospital, Parkville, Victoria, Australia. 4. Tropical Diseases, Murdoch Children's Research Institute, Parkville, Victoria, Australia. 5. Department of Paediatrics, University of Melbourne, Parkville, Victoria, Australia. 6. Clinical Paediatrics, Murdoch Children's Research Institute, Parkville, Victoria, Australia. 7. Translational Microbiology, Murdoch Children's Research Institute, Parkville, Victoria, Australia. 8. Department of Microbiology and Immunology, The University of Melbourne at the Peter Doherty Institute for Infection and Immunity, Parkville, Victoria, Australia. 9. Respiratory, Murdoch Children's Research Institute, Parkville, Victoria, Australia. 10. Infection and Immunity Theme, Murdoch Children's Research Institute, Parkville, Victoria,

Australia. 11. Department of Paediatric Surgery, Royal Children's Hospital, Melbourne, VIC, Australia. 12. Surgical Research, Murdoch Children's Research Institute, Parkville, Victoria, Australia

#### **CORRESPONDING AUTHOR**

Dr Shivanthan Shanthikumar,

Respiratory and Sleep Medicine, Royal Children's Hospital,

50 Flemington Road, Parkville, VIC, 3052

[shivanthan.shanthikumar@rch.org.au](mailto:shivanthan.shanthikumar@rch.org.au)

+61 9345 5818

#### **COVID-19 AND COMPLICATED BACTERIAL PNEUMONIA IN CHILDREN**

To the Editor,

We read with great interest the recent publication by Steinfert *et al* [1] outlining the profound reduction in influenza infections in Australia as a result of social distancing during the COVID-19 pandemic. Similar dramatic effects of social distancing on paediatric hospital activity have been reported, with reduced hospital admissions, presentations for respiratory conditions, and detection of other viruses.[2-6] However, the impact of the pandemic on bacterial respiratory infections has not been well characterised. The Australian state of Victoria (population 6.7 million) has experienced a prolonged period of social restrictions ('lockdown') since March 2020. This period spanned the Southern Hemisphere Autumn to Spring, the usual peak period for bacterial respiratory infections.

Here, we assessed admissions to The Royal Children's Hospital Melbourne (RCH) for thoracic empyema ('empyema'), a complication of bacterial pneumonia that requires inpatient management. For added context, admissions for bronchiolitis, a common and well-defined viral respiratory infection, and

appendicitis, a common hospital-managed condition unlikely to be impacted by the lockdown, were assessed. RCH is the largest tertiary paediatric hospital in Victoria, with more than 89,000 emergency department presentations and 52,000 inpatient admissions annually.

Admissions from March to August 2020 were compared with the same months in the preceding three years. Patients with empyema aged 0-18 years were identified by ICD-10 discharge diagnosis. Every case was validated by manual file review using the electronic medical record, and incorrectly coded cases were excluded (26/113, 23.0%). Discharge coding for bronchiolitis (0-12 months) and appendicitis (0-18 years) was validated for a subgroup of patients and found to be greater than 95% accurate. For each condition, Poisson regression was used to compare the number of admissions across the study years. The only covariate in the models was year of admission, which was treated as a categorical variable, with 2020 as the reference category. Analyses were performed using Stata version 16.1.[7] The RCH Human Research Ethics Committee approved the study (HREC/65077/RCHM-2020).

During lockdown, we observed a significant reduction in the cases of empyema (figure 1). A comparable reduction was seen for bronchiolitis but not for appendicitis, suggesting that our findings were unlikely to be due to changes in hospital presentation. These findings match the large reductions in influenza, respiratory syncytial virus, bronchiolitis, and viral pneumonia cases reported by others during pandemic-related lockdown.[1, 6, 8] Elsewhere, a decline in streptococcal pharyngitis, acute otitis media and infectious mononucleosis has been noted.[4] Together, these data suggest a significant reduction in viral and bacterial respiratory tract infections. The Northern Hemisphere is now approaching its usual peak season for respiratory infection. Further studies may determine the extent to which the reduction in empyema that we observed may be attributed to decreased bacterial transmission or a decisive role for viral infection in the pathogenesis of complicated bacterial pneumonia.

### **Figure Caption**

Figure 1A. Bar chart of bronchiolitis, empyema and appendicitis admissions occurring between March and August, 2017-2020. 1B. Results from Poisson regression models comparing the number of bronchiolitis, empyema and appendicitis admissions between March and August, 2017-2020.

### **Take-Home Message**

Social distancing measures instituted due to #SARSCoV2 have dramatically reduced paediatric thoracic empyema cases in Australia

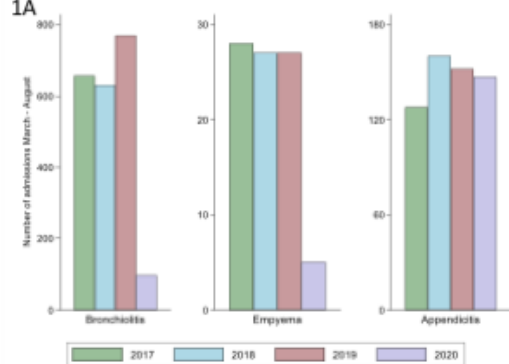
**Declaration of Interests**

The authors have no relevant interests to declare. CN and CS have received grants from Pzifer unrelated to this work.

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1A



1B

Condition	Year	Number	Incidence rate ratios	95% confidence interval	p-value
Bronchiolitis	2017	656	6.76	(5.46, 8.37)	<0.001
	2018	630	6.49	(5.24, 8.04)	
	2019	768	7.92	(6.41, 9.78)	
	2020	97	Reference	-	
Empyema	2017	28	5.60	(2.16, 14.50)	0.004
	2018	27	5.40	(2.08, 14.02)	
	2019	27	5.40	(2.08, 14.02)	
	2020	5	Reference	-	
Appendicitis	2017	128	0.87	(0.69, 1.10)	0.288
	2018	160	1.09	(0.87, 1.36)	
	2019	152	1.03	(0.82, 1.30)	
	2020	147	Reference	-	