# Effect of pneumococcal conjugate vaccination on radiological findings of chest in infants hospitalized with community acquired pneumonia in northern India: a case-control study Shally Awasthi<sup>\*1</sup>, C. M. Pandey <sup>2</sup>, Neelam Verma <sup>3</sup> Chandra Bhushan Kumar <sup>3</sup>, Chittaranjan Roy<sup>4</sup>, Kripa Nath Mishra<sup>5</sup>, P.K. Jain<sup>6</sup>, Rajesh Yadav<sup>7</sup>, Ram Chandra Shukla<sup>8</sup>, Namita Mohindra<sup>9</sup>, Abhishek Chauhan<sup>10</sup>, Monica Agarwal<sup>11</sup>, Neera Kohli<sup>12</sup>.

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### ABSTRACT

**Background:** Burden of community acquired pneumonia (CAP) in infants is high in India. Streptococcus pneumoniae is stated to be an common etiological agent for it. Hence Pneumococcal Conjugate Vaccination (PCV) has been introduced in India since 2017(phased-wise).

**Objective:** To study effect of PCV on radiological findings of chest in infants hospitalized with WHO-defined CAP. Methods: Prospective hospital-based pneumonia surveillance is ongoing since 2015 in Lucknow & Etawah districts, Uttar Pradesh and Patna & Darbhanga districts, Bihar, India. Recruitments were done from a network of hospitals formed for project. Infants(2-11months)hospitalized with WHO-defined CAP from index districts with <14 days of symptoms were recruited. Clinical data was abstracted. Chest X-rays(CXRs) were digitalized, interpreted by panel of three independent blinded radiologists.

Results: From May2017-April 2019, 473 (110,23.25% females) infants with PCV vaccination (cases) and 2146 (626, 29.17% females) without PCV vaccination (controls) with interpretable CXRs were analyzed. Primary end point pneumonia (PEP) alone or with other infiltrate (OI) were found in 55(11.6%) cases and 395 (18.41%) controls (p=<0.0001);OI in 190(40.17%) cases and 929(43.29%) controls (p=0.21) and normal CXR in 228 (48.20%) cases and 822(38.20%) controls (p=<0.0001). There were 4 deaths among cases and 29 deaths among controls. **Conclusion:** Among hospitalized patients of CAP radiological findings differ by PCV vaccination status in infants.

## AIMS

To study the effect of PCV on the chest radiological findings in infants (2-11months) hospitalized with WHO-defined CAP.

### METHOD

- Design: Multi-site prospective study<sup>[1]</sup>
- Infants hospitalized with WHOdefined CAP were recruited from a network of public and hospitals that private provided secondary / tertiary level care.
- Clinical data was abstracted.
- Chest X-rays were digitalized, interpreted by panel of three independent blinded radiologists

### **Inclusion Criteria :**

- Infants hospitalized with WHO-defined CAP from study districts
- Parents consent for participation



### **Exclusion Criteria:**

Infants with:

- Respiratory symptoms for >14 days
- Pleural tap/ intercostal drainage done prior to hospitalization
- Admitted within 14 days of discharge from a hospital facility



<b>Clinical variables</b>	PCV status	p value		
	Yes (N=473)	No (N=2146 )		
	$(n, Mean \pm SD)$	(n, Mean ± SD)		
Age (months)	5.11±2.52	5.12±2.75	0.92	
<b>Respiratory Rate</b>	473, 60.28 $\pm 10.33$	2146, 56.24 $\pm 10.75$	< 0.0001	
Heart Rate	473, 129.38 ±16.24	2146, 138.70±19.27	< 0.0001	
Height (cm.)	350, 62.70±5.80	1158,62.61±7.73	0.84	
Weight (kg.)	462,5.97±1.58	2066, 5.86±1.70	0.19	
Duration of illness (fever in days)	388,3.11±2.12	1931 4.13±2.49	< 0.0001	
TLC (cubic mm)	443,12885±8.53	1725,13746±8970	0.06	
Hb gm (%)	444,10.07±1.38	1726, 9.90±1.53	0.03	
CRP (mg/L)	103,104.76±278.66	340,58.95±189.68	0.05	
Weight for age Z score ≤ -3SD	72(15.22)	435(20.27)	0.011	
Deaths	4(0.8%)	29(1.35)	0.41	



Table 2: Radiological CXRs Findings of Infants with /   without PCV				
Radiological findings of CXRs	PCV Status of Infant		<b>Odds Ratio</b>	
	Yes N=473 (C %)	No N=2146 (C %)	(95%CI)	
Normal <sup>Ref.</sup>	228 (48.20)	822 (38.30)		
PEP only or with other infiltrates*	55 (11.63)	395 (18.41)	0.50 (0.37-0.69)	
Other infiltrates only**	190 (40.17)	929 (43.29)	0.73 (0.63-0.91)	
* p value < 0.0001	,** p value = 0	.005		

- reduction in PEP only or with other infiltrates.
- is significantly reduced.
- childhood pneumonia in India.

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### CONCLUSION

• In PCV vaccinated (vs. non PCV vaccinated) hospitalized cases of CAP, there was a 50%

• Among PCV vaccinated cases, with increase in number doses of PCV, the odds of having PEP

Hence introduction of PCV in national immunization program is likely to reduce the burden of

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### REFERENCES

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