



Antimicrobial susceptibility profile of invasive pneumococcal isolates in India

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The Baseline Assessment of *Streptococcus pneumoniae* of India Serotypes (BASIS) Study Group

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Background

- Streptococcus pneumoniae* is a major cause of invasive diseases in children, causing significant morbidity and mortality in India.^{1,2}
- Treatment of invasive disease is complicated by emerging antimicrobial resistance combined with late or inaccurate diagnosis.^{3,4}
- Streptococcus pneumoniae* is a highly recombinant species, their expansion being determined by antibiotic and vaccine pressure.⁵
- This mandates continuous antimicrobial surveillance, especially in countries like India where the pneumococcal conjugate vaccine (PCV) was recently introduced in 2017.
- In this analysis, we aim to determine antimicrobial susceptibility patterns of invasive isolates of *S. pneumoniae* from children <5 years of age across India in the pre-PCV era

Methods

- The BASIS Study consisted of active (prospective enrolment of children) and passive (retrospective pneumococcal isolate collection) surveillance in 15 sites in India.
- 297 invasive pneumococcal isolates were collected from children <5 years of age presenting with pneumonia, meningitis or sepsis (blood=237, CSF=24, pleural/ascitic fluid=36).
- Pneumococcal isolates were reconfirmed and serotyped by the Quellung method at the WHO reference laboratory at Christian Medical College (CMC), Vellore.
- Antimicrobial susceptibility testing by the E-test method was done according to standard CDC and CLSI protocols by the reference laboratory.
- Multidrug resistance (MDR) was defined as acquired non-susceptibility to at least one agent in three or more antimicrobial categories.

Results

- The majority of (both active and passive) isolates were from pneumonia 39% followed by bacteremia/sepsis (26%), meningitis (15%), others (14%) and empyema/pleural effusion (6%).
- Resistance to cotrimoxazole and erythromycin was common (Figure 1).
- Multidrug resistance (MDR) was seen among 14% of all the isolates.
- 88% and 80% of PCV-13 type (n=231) and non-vaccine type (n=66) isolates, respectively, were resistant to at least one drug.
- Serotypes 14 (33%), 19F and 6B (17%), and 19A (13%) were most common among isolates resistant to penicillin (Figure 2).
- 80% of the drug resistant pneumococci isolates were of PCV-13 serotypes
- Among the isolates from cases of physicians diagnosis of meningitis, 24% (11/46) were MDR and all were PCV-13 serotypes: 14 (n=5), 6B (n=2), 19F (n=2), 19A (n=1).

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Figure 1: Antimicrobial susceptibility profile of invasive pneumococcal isolates in India

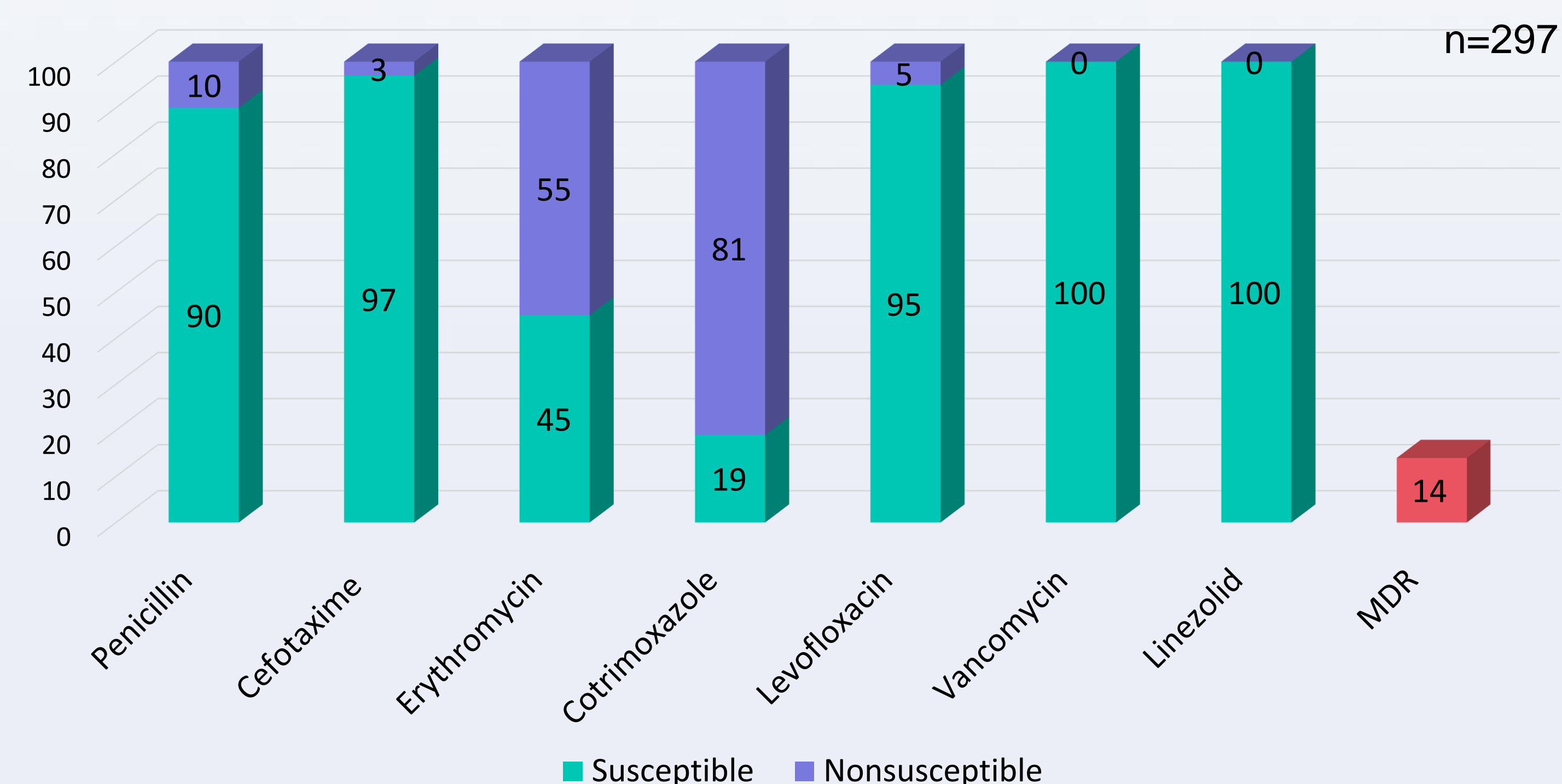
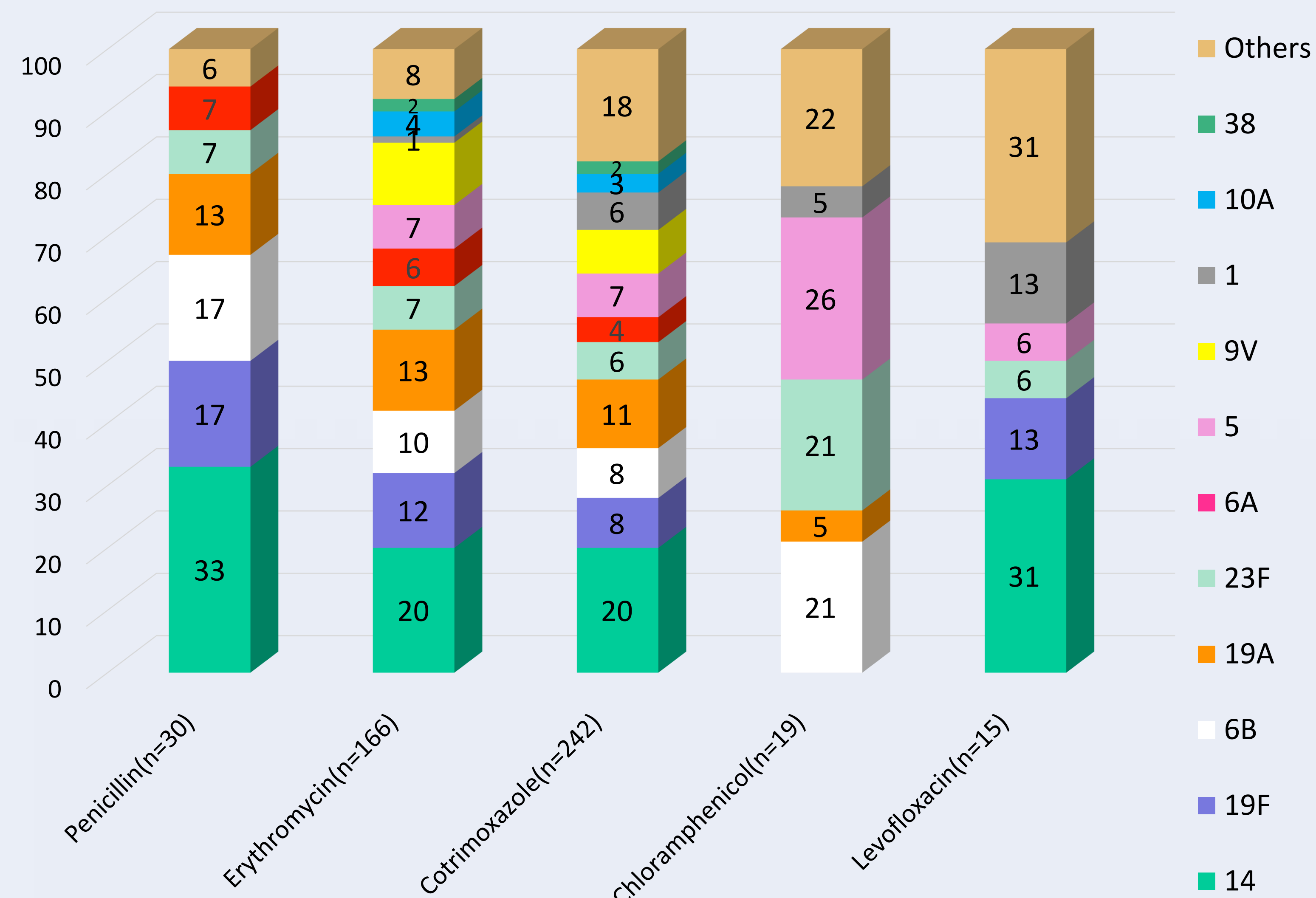


Figure 2: Distribution of serotypes among isolates resistant to each antibiotic



Conclusions

- The study results provide baseline data on the antimicrobial resistance profile of invasive *S. pneumoniae* isolates in India prior to the introduction of PCV.
- The study anticipates that PCV13 can protect against at least 80% of resistant invasive pneumococcal disease
- Sustained pneumococcal antimicrobial surveillance in the vaccine era will give evidence to support preventive strategies.

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