BACKGROUND

• Infants are at greatest risk for severe pertussis, with ~30% of infant cases requiring hospitalization¹.

• Recent surveillance indicates a resurgence of overall pertussis incidence in the United States (US), but limited data exist on whether severe infantile cases also are resurging and the extent to which severe pertussis incidence in infants varies by sex and race.

OBJECTIVE

• We assessed recent US trends in overall and sex- and race-stratified incidence of pertussis-related hospitalizations.

METHODS

Study Design

• Retrospective database analysis

Data Source

• Discharge data from the 2000-2011 Healthcare Cost and Utilization Project (HCUP) Nationwide Inpatient Sample (NIS)

• The NIS is the largest all-payer inpatient core database in the US

• The NIS includes many variables for each inpatient stay, including demographics, diagnosis codes, length of stay, total charges, admission, and discharge status

• Sampling weights allow for generating nationally representative estimates

• Inclusion Criteria

• Inpatient discharges containing a diagnosis code (primary or nonprimary) for pertussis (International Classification of Diseases, 9th Revision, Clinical Modification codes 033.0, 033.1, 033.2, 033.3).

• Age <1 year

Study Measures and Analytical Methods

• The annual number of pertussis-related hospitalizations per 10,000 infants aged <1 year was estimated using NIS sampling weights and year-specific population denominators from US census data

• Incidence was analyzed descriptively and stratified by sex and race.

• Demographic characteristics of infants hospitalized for pertussis during 2000-2011 were also reported

• Analyses were described and carried out using SAS® (Version 9.3) statistical software

RESULTS

Demographics (Tables 1a, 1b)

• Infants hospitalized for pertussis were generally evenly distributed by sex each year of the study period.

• The racial composition of infant pertussis-related hospitalizations was relatively stable during this period, with whites representing the highest proportion of cases in each year except for 2006 and 2010, when Hispanics represented 20% and 30% of cases, respectively.

Incidence (Figures 1, 2)

• Overall incidence of pertussis-related hospitalization was ~4/10,000 infants between 2000 and 2003 before increasing sharply in 2004 (6.0/10,000) and 2005 (13.1/10,000) (Figures 1 and 2).

• Thereafter, overall incidence of pertussis-related hospitalization fell substantially in 2006, 2007 and 2008 (2.1, 4.1, and 4.7/10,000, respectively) before increasing again in 2010 and 2011 (5.9 and 7.8/10,000, respectively).

• Incidence was lowest for white and Asian infants, reaching a 2005 peak of only 5.6 and 5.3/10,000, respectively.

• Incidence was highest in Hispanic infants, starting at 14.7/10,000 in 2005 before another sharp increase in 2009 and 2010 (5.9 and 7.8/10,000, respectively).

• Thereafter, overall incidence of infant pertussis-related hospitalizations was relatively stable during this period, with whites representing the highest proportion of cases in each year except for 2006 and 2010, when Hispanics represented 20% and 30% of cases, respectively.

LIMITATIONS

• Patient discharges were identified based upon diagnosis codes that, if recorded inaccurately, may cause misclassification of pertussis

• Because unique patient identifiers were not provided, we were unable to follow patients who moved from facility to facility; results may be biased somewhat if the experiences of patients who transfer from facility to facility differed from those who remained in the analytic sample

CONCLUSIONS

• Infant pertussis hospitalization peaked in 2005 before a sharp decline thereafter, possibly due to increased herd immunity conferred by the 2005 launch of universal adolescent tetanus, diphtheria toxoids, and acellular pertussis (Tdap) vaccination

• Incidence surged again through 2010 before another decline in 2011, demonstrating for severe cases the documented cyclical pattern of peaks and nadirs for overall pertussis incidence

• This analysis also highlights the need for increased focus on minorities, particularly Hispanics, in pertussis vaccination programs

REFERENCES


AFFILIATIONS AND DISCLOSURES

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