

Pertussis-Associated Hospitalizations in American Indian and Alaska Native Infants

TRUDY V. MURPHY, MD, SHAMSUZZOHA B. SYED, MD, MPH, DPH(CANTAB), ROBERT C. HOLMAN, MS, DANA L. HABERLING, MSPH, ROSALYN J. SINGLETON, MD, CLAUDIA A. STEINER, MD, MPH, EDNA L. PAISANO, MSW, AND JAMES E. CHEEK, MD

Objective To investigate the burden of pertussis in American Indian and Alaska Native (AI/AN) infants.

Study design AI/AN pertussis-associated hospitalizations between 1980 and 2004 were evaluated using Indian Health Service (IHS)/tribal inpatient data, which include all reported hospitalizations within the IHS/tribal health care system.

Results Between 1980 and 2004, 483 pertussis-associated hospitalizations in AI/AN infants were documented; 88% of cases involved infants age < 6 months. For this entire period, the average annual hospitalization rate was 132.7 per 100,000 AI/AN infants (95% confidence interval [CI] = 121.3 to 145.2), and 234.5 per 100,000 AI/AN infants age < 6 months (95% CI = 213.1 to 258.1). Between 2000 and 2004, the annual hospitalization rate was 100.5 per 100,000 AI/AN infants (95% CI = 81.6 to 123.7), which exceeds the estimated 2003 pertussis hospitalization rate of 67.7 per 100,000 in the general US infant population (95% CI = 61.9 to 73.5). The highest pertussis hospitalization rates in 2000 to 2004 were in AI/AN infants in the Alaska and Southwestern IHS regions of the United States.

Conclusions The burden of pertussis in AI/AN infants is high, particularly so in infants age < 6 months in the Alaska and the Southwestern IHS regions of the United States. Ensuring implementation of vaccination strategies to reduce the incidence of pertussis in AI/AN, infants, adolescents, and adults alike is warranted to reduce the burden of pertussis in AI/AN infants. (*J Pediatr* 2008;152:839-43)

The global burden of pertussis is substantial, and pertussis remains an important health concern in most high-income countries.¹ In the United States, the reported pertussis disease burden has gradually increased since 1976, despite childhood vaccination coverage rates > 90% in recent years.²⁻⁴ Severe pertussis, as indicated by related complications, hospitalizations, and deaths, occurs predominately during infancy, with the highest rates during the first 6 months of life.^{2,5} For the years 2000 to 2004, an annual average of 2435 infant cases of pertussis was reported nationally through the passive US National Notifiable Diseases Surveillance System, with approximately 2/3 of the reported cases hospitalized.³ In 2005, 2 tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis (Tdap) vaccines formulated for adolescents and adults were licensed in the United States.^{3,4} Tdap is recommended for adolescents and adults for personal protection against tetanus, diphtheria, and pertussis and also to reduce the risk of transmitting pertussis to infants.^{3,4}

The American Indian and Alaska Native (AI/AN) population has a higher burden of infectious diseases compared with the general US population,^{6,7} especially in infants and children.^{8,9} In the 1990s, pertussis-associated mortality was 4-times higher in AI/AN

From the Office of the Director, Division of Bacterial Diseases, National Center for Immunization and Respiratory Diseases, Centers for Disease Control and Prevention, Atlanta, GA (T.M.); Division of Epidemiology, Office of Public Health Support, Indian Health Service, Albuquerque, NM (S.S., J.C.); General Preventive Medicine Residency Program, Johns Hopkins University Bloomberg School of Public Health, Baltimore, MD (S.S.); Office of the Director, Division of Viral and Rickettsial Diseases, National Center for Zoonotic, Vector-Borne, and Enteric Diseases, Centers for Disease Control and Prevention, Atlanta, GA (R.H., D.H.); Alaska Native Tribal Health Consortium, Anchorage, AK (R.S.); Arctic Investigations Program, National Center for Preparedness, Detection and Control of Infectious Diseases, Centers for Disease Control and Prevention, Anchorage, AK (R.S.); Healthcare Cost and Utilization Project, Center for Delivery, Organizations and Markets, Agency for Healthcare Research and Quality, US Department of Health and Human Services, Rockville, MD (C.S.); and Division of Program Statistics, Office of Public Health Support, Indian Health Service, US Department of Health and Human Services, Rockville, MD (E.P.).

The findings and conclusions presented in this report are those of the authors and do not necessarily represent the views of the sponsoring agencies.

Submitted for publication Aug 9, 2007; last revision received Oct 24, 2007; accepted Nov 30, 2007.

Reprint requests: Trudy V. Murphy, MD, Division of Bacterial Diseases, National Center for Immunization and Respiratory Diseases/CDC, 1600 Clifton Rd NE, Mail Stop C-25, Atlanta, GA 30333. E-mail: tkm4@cdc.gov.

0022-3476/\$ - see front matter

Copyright © 2008 Mosby Inc. All rights reserved.

10.1016/j.jpeds.2007.11.046

AHRQ	Agency for Healthcare Research and Quality	IHS	Indian Health Service
AI/AN	American Indian and Alaska Native	KID	Kids' Inpatient Database
CI	Confidence interval	NPIRS	National Patient Information Reporting System
DTaP	Diphtheria and tetanus toxoids and acellular pertussis [vaccine]	Tdap	Tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis [vaccine]
HCUP	Healthcare Cost and Utilization Project		
ICD-9-CM	International Classification of Diseases, 9th Revision, Clinical Modification		

infants than in Caucasian infants.⁵ To date, no study has examined the burden of pertussis-associated illness in AI/AN infants. The present study describes the occurrence of pertussis-associated hospitalizations in AI/AN infants in the years 1980 to 2004.

METHODS

We analyzed hospital discharge data for AI/AN infants from the Indian Health Services (IHS) Direct and Contract Health Service Inpatient Dataset for calendar years 1980 through 2004.¹⁰ The data set, obtained from the IHS National Patient Information Reporting System (NPIRS), contains all patient discharge records from IHS- and tribal-operated hospitals and from hospitals that have contracted with the IHS or tribes to provide health care services to federally recognized AI/AN people in the United States.¹¹ A total of 49 IHS/tribal hospitals reported hospital discharge data through the NPIRS for fiscal year 2001.¹² Hospitalization information with no patient identifiers was exempt from Human Subjects Review.

Approximately 1.3 million of 1.6 million AI/AN persons who are eligible for IHS-funded medical care received IHS/tribal health care services in fiscal year 2001.¹² The AI/AN population receives health care in 7 IHS administrative regions: California, Portland (Washington, Oregon, and Idaho), East (Nashville), Northern Plains (Aberdeen, Bemidji, and Billings), Alaska, Southern Plains (Oklahoma), and Southwest (Albuquerque, Navajo, Phoenix, and Tucson).^{11,12} We analyzed data for the AI/AN infants who received direct or contract health care through IHS- or tribal-operated inpatient or ambulatory care facilities in all administrative regions, excluding California and Portland.^{11,13} The hospitalizations and population denominators for the California and Portland regions were excluded from analysis because neither region had any IHS- or tribal-operated hospitals.¹² Moreover, the California region did not report contract health services inpatient data by diagnosis, and the Portland region had limited contract health service funds for inpatient care.¹⁴ Newborn (birth) hospitalizations were excluded.

IHS hospital discharge records associated with pertussis hospitalizations were selected using the *International Classification of Diseases, 9th Revision, Clinical Modification* (ICD-9-CM) codes¹⁵ for whooping cough and pertussis (033): *Bordetella pertussis* (033.0); *B parapertussis* (033.1); whooping cough due to other specified organism, *B bronchiseptica* (033.8); and whooping cough, unspecified organism (033.9). Although these are uncommon, we included hospitalizations for *B parapertussis* and *B bronchiseptica*, because they have been associated with a pertussis-like illness, and hospitalizations for *B parapertussis*, because this agent can co-infect with *B pertussis*.¹⁶ Hospitalizations were accepted if the pertussis illness was coded as any of the first 6-listed discharge diagnoses. Among pertussis hospitalizations, we evaluated other specific ICD-9-CM codes¹⁵ co-listed during the hospitalization episodes: apnea (786.03), atelectasis (518.0), pneumonia (480 to

486), respiratory failure (518.81, 518.83, 518.84), bacteremia (790.7), convulsions (780.3), and encephalopathy (348.3).

The unit of analysis was an episode of hospitalization. Infant pertussis hospitalizations were examined by sex, age group (<6 and 6 to 11 months), and administrative region (except for the East region, which had few pertussis hospitalizations). Data from the entire period of 1980 to 2004, and also from the 5-year period of 2000 to 2004, were analyzed. Month of discharge and length of stay also were examined.

Annual hospitalization rates with 95% confidence intervals (CIs) were calculated and expressed as the number of hospitalizations per 100,000 AI/AN infants. The infant population denominator for the IHS hospitalization rates was estimated by year and region. For 2004, the population estimate used the fiscal year 2004 IHS estimate of the infant "user population," which included all registered AI/AN persons receiving IHS-funded health care at least once during the previous 3-year period.¹¹ For each year between 1980 and 2003, the 2004 denominator was adjusted for the proportional change in the estimated number of AI/AN persons eligible for IHS-funded health care in that year.^{9,11,13} The number of infants for the 5 regions included in this study was estimated as 10,053 in 1980 and 19,164 in 2004. The populations for the <6-month and 6- to 11-month age groups were each estimated to be 50% of the total infant population. Linear regression was used to test for trends in the annual rates.¹⁷ Median lengths of hospital stay were compared using Wilcoxon's rank-sum test.¹⁸

Pertussis hospitalizations for 2003 were obtained for the general US infant population using the Kids' Inpatient Database (KID),^{19,20} an all-payer inpatient care pediatric database that supports national estimates of hospital care for children in the United States. Produced by the Healthcare Cost and Utilization Project (HCUP) within the Agency for Healthcare Research and Quality (AHRQ) in collaboration with public and private statewide organizations, the KID includes a sample of pediatric discharges from all non-federal, short-term, non-rehabilitation hospitals in 36 participating states, which together compose the complete sampling frame. Systematic random sampling is used to select 10% of uncomplicated in-hospital births and 80% of complicated in-hospital births and other pediatric cases from each frame hospital. National estimates are produced using the discharge weights provided with the KID. The HCUP methodology was used to calculate standard errors and 95% CIs around the estimates and rates.²¹ AHRQ selected hospital discharge records using the KID with complete month of age reporting, and pertussis as 1 of up to 15 diagnoses, consistent with IHS/Tribal data selection. Hospitalization rates for the <6-month and 6- to 11-month age groups were produced using the 2003 natality data as the denominator (estimated as 50% of the births for each age group).²²

RESULTS

Between 1980 and 2004, 483 pertussis hospitalizations in AI/AN infants were reported to the IHS (Table I). More

Download English Version:

<https://daneshyari.com/en/article/4167239>

Download Persian Version:

<https://daneshyari.com/article/4167239>

[Daneshyari.com](https://daneshyari.com)