HHS Public Access

Author manuscript

J Pediatr. Author manuscript; available in PMC 2024 August 13.

Published in final edited form as:

J Pediatr. 2016 August ; 175: 10–12. doi:10.1016/j.jpeds.2016.05.001.

Hospitalizations with Lower Respiratory Tract Infections among American Indian and Alaska Native Children Under Age 5 Years: The Use of Non-Federal Hospital Discharge Data to Analyze Rates

Rosalyn Singleton, MD, MPH,
Robert C. Holman, MS

Arctic Investigations Program, National Center for Emerging and Zoonotic Diseases, Centers for Disease Control and Prevention, Alaska Native Tribal Health Consortium, Anchorage, Alaska

American Indian and Alaska Native (AI/AN) children aged <5 years who live on or near reservation communities and receive their health care through the Indian Health Service (IHS)/tribal healthcare system (IHS, tribal and contract healthcare facilities) are known to be have an extremely high rate of hospitalization associated with lower respiratory tract infections (LRTIs).[1–4] Less is known about the rate of LRTI-associated hospitalization for AI/AN children who do not use the IHS/tribal healthcare system and receive hospital care in only nonfederal hospitals. The occurrence of LRTIs among these AI/AN children is critical to evaluate, because the majority of the AI/AN population (60%) live outside of reservation communities[4] and indigenous children in other industrialized countries experience disproportionately higher morbidity and mortality due to LRTIs.[5]

Three previous publications have compared the LRTI hospitalization rate for AI/AN children aged <5 years receiving care within the IHS/tribal healthcare system with that for the corresponding general US childhood population.[1–3] Although the LRTI hospitalization rate declined during the study periods for both AI/AN children and the general US children population aged <5 years, the rate remained greater for AI/AN children. In the most recent study of these populations, Foote et al[1] reported that the 2009–2011 average annual LRTI-associated hospitalization rate was 1.5-fold higher for AI/AN children (20 per 1000) than that for the US child population aged <5 years (13.7 per 1000).[1] Significant rate disparities were found to exist among AI/AN children, with higher rates among infants and among children in the Alaska and the Southwest IHS regions.

In this volume of *The Journal*, Weinert et al[6] evaluate the rate of LRTI hospitalization for children aged <5 years by race, including the population of AI/AN children who receive care outside of the IHS/tribal facilities. The authors used the Kids' Inpatient Database (KID) to analyze nonfederal hospital discharge data; national data, such as the KID and the

Reprint requests: Rosalyn Singleton, MD, MPH, Arctic Investigations Program, National Center for Emerging and Zoonotic Diseases, Centers for Disease Control and Prevention, and Alaska Native Tribal Health Consortium, 4055 Tudor Centre Dr, Anchorage, AK 99508. risingleton@anthc.org.

The authors declare no conflicts of interest.

Nationwide Inpatient Sample of the Healthcare Cost and Utilization Project (HCUP) were used in the previous studies to calculate the LRTI hospitalization rates in US children for comparison with those for AI/AN children calculated using the IHS/tribal inpatient data.[1–3] Similar to Foote et al,[1] the authors report the LRTI rate for AI/AN children as well as for a corresponding US child population; however, Foote et al's comparison population was the general US child population, whereas that of Weinert et al was the US white child population.

Weinert et al found wide fluctuations in AI/AN LRTI hospitalization rates by time period, and, unlike Foote et al, did not detect a statistically significant decline in the AI/AN hospitalization rate over time. Foote et al reported that the average annual LRTI hospitalization rates per 1000 AI/AN children using the IHS/tribal healthcare system was 121.5 for children aged <1 year and 15.3 for children aged 1–4 years during 1998–1999, and 75 for children aged <1 year and 11 for children aged 1–4 years in 2009–2011.[1] The 2009–2011 Southwest AI/AN infant LRTI rate reported by Foote et al is much closer to the 2012 infant rate for Western region AI/AN reported by Weinert et al than those for the earlier time period of 1998–1999, compared with the 1997 and 2000 rates, respectively, suggesting underreporting of AI/AN LRTI hospitalizations in nonfederal facilities for 1997 and 2000. This underreporting is most likely due to the small number of states participating, along with the nonparticipation in the HCUP of some states with a high AI/AN population, such as Alaska, in the early years of the KID.[7] The authors acknowledge 2 potential reasons for the rate difference in early years: the relative undercounting of AI/AN discharges in 1997 owing to undercounting, and the addition of states with higher concentrations of AI/AN children to the KID over time in later years.

Weinert et al found that LRTI hospitalization rates for AI/AN children remained higher than those for white children, especially for infants living in the West census region. In 2012, the LRTI hospitalization rate per 1000 AI/AN infants in the West census region (72.8; 95% CI, 45.8–99.8) was similar to the 90.1 per 1000 rate for AI/AN infants in the Southwest IHS region using the IHS/tribal healthcare system reported by Foote et al[1]; however, the overall 2012 LRTI hospitalization rate per 1000 AI/AN infants (55.5; 95% CI, 41.9–69.0), was lower than the overall 2009–2011 LRTI hospitalization rate for the AI/AN infant population within the IHS/tribal system of 75.1.[1]

Unfortunately, Weinert et al were able to examine only the rate for 4 US census regions, which does not take into account important geographic differences, such as socioeconomic status and the high LRTI hospitalization rate of AI/AN children reported in the Southwest and the Alaska IHS regions compared with Washington, Oregon, and California (West region).[1–3] Alaska, which experienced the highest AI/AN infant LRTI hospitalization rate within the IHS system,[1–3] did not participate in the HCUP until 2010.[7]

Weinert et al determined that, although AI/ANs were more likely to have markers of low socioeconomic status, AI/AN race remained a significant predictor of hospitalization for LRTI in the West census region. We agree with the authors' assessment that the socioeconomic status data available through the KID are inadequate to fully describe the living conditions and socioeconomic status of AI/AN children, especially in the West region.

Indigenous children in several affluent countries experience disparities in LRTIs; poverty and geographic remoteness, rather than indigeneity itself, appear to be key drivers.[5] Certain factors not described through the KID (eg, lack of plumbing, extreme household crowding, wood smoke exposure) likely contribute to the inequity in hospitalization among AI/AN children.[8–11]

Weinert et al describe LRTI hospitalizations in AI/AN children using nonfederal facilities, which complements published findings in children using the IHS/tribal healthcare system. In both populations, the disparity in LRTI hospitalizations was seen only in the West census region, correlating with the Alaska, Northern Plains West, and Southwest IHS regions. We also believe that the underreporting of hospitalizations for AI/AN children in the early years of the KID contributed to the lack of a decline in the LRTI hospitalization rate for AI/AN children as reported for AI/AN children using the IHS/tribal healthcare system.[7] Nonetheless, the present study and these previous studies concur that racial disparities in LRTI hospitalizations exist among AI/AN infants, especially those living in the Western census area, and that modifiable risk factors, including living conditions and healthcare access, contribute to this disparity. The findings reported by Weinert et al, considered together with previous studies, indicate the need for ongoing research and strategies aimed at reducing LRTIs among AI/AN children.[5]

Acknowledgments

The findings and conclusions in this article are those of the author(s) and do not necessarily represent the official position of the Centers for Disease Control and Prevention or Indian Health Service.

Glossary

AI/AN	American Indian and Alaska Native
HCUP	Healthcare Cost and Utilization Project
IHS	Indian Health Service
KID	Kids’ Inpatient Database
LRTI	Lower respiratory tract infection

References

1. Foote EM, Singleton RJ, Holman RC, Seeman SM, Steiner CA, Bartholomew M, et al. Lower respiratory tract infection hospitalizations among American Indian/Alaska Native children and the general United States child population. Int J Circumpolar Health 2015;74:29256. [PubMed: 26547082]
2. Singleton RJ, Holman RC, Folkema AM, Wenger JD, Steiner CA, Redd JT. Trends in lower respiratory tract infection hospitalizations among American Indian/Alaska Native children and the general US child population. J Pediatr 2012;161:296–302.e2. [PubMed: 22437150]
3. Peck AJ, Holman RC, Curns AT, Lingappa JR, Cheek JE, Singleton RJ, et al. Lower respiratory tract infections among American Indian and Alaska Native children and the general population of US children. Pediatr Infect Dis J 2005;24:342–51. [PubMed: 15818295]
4. Indian Health Service. Trends in Indian health, 2014 edition. Rockville (MD): Indian Health Service; 2014.

5. Chang AB, Chang CC, O'Grady K, Torzillo PJ. Lower respiratory tract infections. Pediatr Clin North Am 2009;56:1303–21. [PubMed: 19962023]

6. Weinert BA, Edmonson MB. Hospitalizations at nonfederal facilities for lower respiratory tract infection in American Indian and Alaska Native Children younger than 5 years of age, 1997–2012. J Pediatr 2016;175:33–9. [PubMed: 27039229]

7. Houchens R, Whalen D, Elixhauser A. Comparative analysis of the HCUP Kids' Inpatient Database (KID), 1997. HCUP Methods Series Report 2001–1. https://www.hcup-us.ahrq.gov/reports/methods/KIDComp1997Final.pdf. Accessed May 10, 2016.

8. Bulkow LR, Singleton RJ, DeByle C, Miernyk K, Redding G, Hummel KB, et al. Risk factors for hospitalization with lower respiratory tract infections in children in rural Alaska. Pediatrics 2012;129:e1220–7. [PubMed: 22508919]

9. Bulkow LR, Singleton RJ, Karron RA, Harrison LH. Risk factors for severe respiratory syncytial virus infection among Alaska native children. Pediatrics 2002;109:210–6. [PubMed: 11826197]

10. Robin LF, Less PS, Winget M, Steinhoff M, Moulton LH, Santosham M, et al. Wood-burning stoves and lower respiratory illnesses in Navajo children. Pediatr Infect Dis J 1996;15:859–65. [PubMed: 8895916]

11. Hennessy TW, Ritter T, Holman RC, Yorita KL, Bruden DL, Bulkow L, et al. The relationship of in-home water service and the risk of respiratory tract, skin, and gastrointestinal infections among rural Alaska Natives. Am J Public Health 2008;98:2072–8. [PubMed: 18382002]