Culturally Competent Prevention and Control of Asthma for American Indians and Alaska Natives

Report
April 30, 2003

Delight E. Satter, M.P.H., Andrea Zubiate, Steve Wallace, Ph.D.

With funding from the University of California, Los Angeles, Institute of American Cultures and the American Indian Studies Center

A publication of the UCLA Center for Health Policy Research

The views and opinions expressed in this report do not necessarily represent those of The Regents of the University of California, The UCLA Institute of American Cultures and the American Indian Studies Center, its advisory board, or any State, Tribe, or County executive agency represented thereon. This research was supported by funds from the Institute of American Cultures and the American Indian Studies, Los Angeles.

Suggested citation: DE Satter, A Zubiate, S Wallace. "Culturally Competent Prevention and Control of Asthma for American Indians and Alaska Natives." Unpublished report. Los Angeles, CA: UCLA Center for Health Policy Research.

UCLA Center for Health Policy Research
10911 Weyburn Avenue, Suite 300
Los Angeles, CA 90024

PHONE: (310) 794-0909
FAX: (310) 794-2686
Email: chpr@ucla.edu

http://www.healthpolicy.ucla.edu

Introduction

American Indians and Alaska Natives (AIAN) experience disparities in health compared to the US All Races[1, 2, 3]. Asthma is a serious and growing health problem. An estimated 14.9 million persons in the United States have asthma.[4] The number of people with asthma increased by 102 percent between 1979–80 and 1993–94.[5] The overall death rate from asthma increased 57 percent between 1980 and 1993, and for children it increased 67 percent.

Asthma and Chronic Obstructive Pulmonary Disease (COPD) are among the 10 leading chronic conditions causing restricted activity. After chronic sinusitis, asthma is the most common cause of chronic illness in children.[6] Methods are available to treat these respiratory diseases and promote respiratory health. Effective management of asthma comprises four major components: controlling exposure to factors that trigger asthma episodes, adequately managing asthma with medicine, monitoring the disease by using objective measures of lung function, and educating asthma patients to become partners in their own care.[7] Such prevention efforts are essential to interrupt the progression from disease to functional limitation and disability and to improve the quality of life for persons with asthma.

Methods

A literature search and annotated bibliography was conducted to identify culturally competent asthma prevention literature for AIAN. Dates used for the search were from 1985 to present. The search included reviewing the following resources: Medline, PschInfo, and the Centers for Disease Control and Prevention MMWR (CDC-MMWR) search engines, asthma and health related Department of Health and Human Services (DHHS) websites. An electronic request for literature was also submitted to the Native Research Network (NRN), and lastly, requests for asthma prevention materials were sent to states with Indian Health Service (IHS)

facilities and IHS headquarters and regional offices. The databases were searched using the terms American Indian, Alaska Native, Native American and asthma.

Websites were searched for publications regarding prevention materials and included the National Institute of Health (NIH), the National Health, Lung & Blood Institute (NHLBI), the National Institute of Allergy & Infectious Disease (NIAID), the Allergy and Asthma Network (AAN), Healthfinder, the American Lung Association (ALA), the American Association of Pediatrics (AAP), and the Native American Health Research database. Each available publication was reviewed and categorized as highly relevant (the article described an intervention that includes information on cultural competence), moderately relevant (the article appeared moderately relevant), and not relevant (no relevant information).

Results

The search yielded 11 highly relevant articles, 18 moderately relevant articles and 10 that were not relevant articles. Additional articles were identified through references in the above-mentioned publications and categorized accordingly. The highly relevant articles were included in this publication. The Internet search did not produce any highly relevant information. However, two fact sheets relating to lung disease and smoking among AIAN were found on the ALA's website. An inquiry submitted to the Native Research Network list-serve produced journal articles about asthma co-factors and tobacco programs. The inquiry to IHS headquarters yielded a small response including journal articles and a project proposal. The materials received were not relevant to this review. Because the articles included were identified through a selected search strategy, some relevant studies may have been excluded. Due to funding constraints, the literature search was limited; additional publications could have been obtained given further resources.

The Literature Review

A review of the literature suggests that a comprehensive primary, secondary and tertiary prevention strategy should be used to specifically target AIAN with asthma. The following section includes annotated bibliographies for articles that rated highly relevant in this literature review. Each annotated bibliography reports the following subcategories: a) objectives; c) methods; d) timeline; e) findings; and f) a summary.

Article Summaries

Wood-Burning Stoves and Lower Respiratory Tract Infection in American Indian Children
Morris, et al.
AJDC Vol.144
January 1990

Objectives: To determine if wood-burning stoves contribute to higher prevalence of lower respiratory tract infections among populations with high usage

Methods: Interviews with Navajo adult caretakers, usually a parent or grandparent about family history and environmental exposure (e.g. dirt floors, running water, humidification, and presence of cigarette smoke in the home). The participants included 58 age/sex-matched cases.

Timeline: Eight weeks, January 4 to February 27, 1988

Findings: Found that home wood-burning stove use, recent respiratory illness exposure, family history of asthma, dirt floors, and lack of running water in the home increased the risk of lower respiratory tract infections (LRTI)

Summary:
The study investigated risk factors for acute LRTI in American Indian children and found that those living in homes equipped with wood-burning stoves did have a higher risk of bronchiolitis and pneumonia. The study found that family history of asthma did not contribute independently to risk, which suggests that family health history may potentate or modify the occurrence of LRTIs when environmental factors are also present.

The Major Respiratory Diseases of American Indians
Rhoades
Am Rev Respir Dis Vol 141; 595-600
1990

Objectives: Overview of the occurrence of respiratory diseases among American Indians

Methods: Examination of the contribution made by respiratory disease to mortality rates and an appraisal of the hospitalization rates and discharges

Timeline: Review of IHS referral data from 1980 through 1986

Findings: In relation to asthma, the study found that asthma is becoming an important subject for further studies. This is especially important because of the relationship of respiratory allergy and hay fever to asthma. Notably, respiratory allergies and hayfever were the 10th most common reason for ambulatory visits in 1987.

Summary:
The study provided an overview of the major respiratory disease of AIAN specifically looking at mortality rates, cancer, chronic obstructive pulmonary disease, tuberculosis, pneumonia, smoking and asthma. The study found that asthma should be the topic of further study.

Asthma symptoms, bronchial hyper responsiveness and atopy in a Maori and European adolescent populations
Shaw, et al.
The New Zealand Medical Journal, Vol. 104, No.911
May 1991

Objectives: To determine the prevalence of asthma symptoms, bronchial hyper responsiveness (BHR) and atopy (allergies)

Methods: Written survey of 543 New Zealand rural adolescents of largely Maori descent

Timeline: August and September 1989

Findings: The study found a greater prevalence of asthma symptoms among Maori adolescents, but found a similar prevalence of BHR and allergies in both populations.

Summary: The higher prevalence of asthma or "wheeze" was associated with a high prevalence of smoking among Maori. The study also suggested that adolescents would be a particularly useful population for national or international comparisons of the prevalence of asthma rather than younger age set because asthma symptoms can dissipate.

The use of videotaped questionnaire for studying asthma prevalence: A pilot study among New Zealand Adolescents
Shaw, et al.
The Medical Journal of Australia, Vol. 157
September 1992

Objectives: To examine the feasibility of measuring asthma prevalence by means of an audio-visual presentation of asthma symptoms and signs and to compare them with standard written questionnaire for predicting bronchial hyperresponsiveness (BHR).

Methods: Cross-sectional study using video and written questionnaires among 456 students from Wairoa Colleges. The age range was from 12 to 19 years of age.

Findings: Use of video is effective in the community setting and gives predictions of BHR similar to those of a standard interviewer administered questionnaire.

Summary:
Surveys of asthma rely heavily on self-administered questionnaire data. For comparisons on asthma prevalence among different cultures or languages the use of such questionnaires might not provide relevant/reliable comparisons. For example, a study conducted among New Zealand adolescents found that Maori students had a higher prevalence of asthma compared to their non-Maori counterparts. According to the study this may be explained by the cultural differences in the interpretation of the questionnaire by both groups

The Questionnaire
The video questionnaire consisted of three short asthma scenarios depicting asthma symptoms in children while at rest, during exercise, and nocturnal wheezing. During the video a one page questionnaire was completed. The video instructed the participants on how to complete the survey with spoken directions and allowed for pauses for completion of each question. All responses were yes or no and related to symptoms experienced within the previous 12 months. The video and questionnaire was administered to groups of 70 at a time.

Conclusions
It was not the objective of the study to define the diagnosis of asthma based on the video questionnaire, but to provide a valid and reproducible means of comparing prevalence among different populations. The study found the video questionnaire allowed for rapid collections of data, free of observer biases and that the method allowed for comparative studies of different cultures.

Asthma in Jemez Pueblo Schoolchildren
Clark, et al.
Am J Respiratory Critical Care Medicine, Vol 151 1625-1627
1995

Objectives: To address community and physician concerns about the frequency of asthma

Methods: Prevalence survey administered through the school system to parents of 324 Jemez Pueblo children ages 3-13. The Jemez Tribal Leaders gave approval for the study. Local research assistants, fluent in Towa were trained to assist families in completing the English-language questionnaire.

Timeline: October through November 1992

Findings: The study showed that asthma was not uncommon among Jemez Pueblo children and, in fact, was more common than in recent nationwide surveys. The study also indicated a need for further research on asthma and it's risk factors among AIAN.

Summary:
Community Background
The Jemez Pueblo encompasses 87,000 acres in rural New Mexico. The majority of the reservations population lives in extended family groups in adobe dwellings within the Pueblo. For the Jemez population wood stoves and fireplaces were important sources of heat. The community also maintained their traditional religious activities.

The study was conducted because of community concern over growing rates of childhood asthma. The study showed that asthma should no longer be considered rare among AIAN because recent mortality rates are comparable to the general population

Researchers could not offer explanations for the increased prevalence of asthma in Jemez children without further investigation. In this study, they did not find evidence of indoor pollutants. However, wood-burning stoves have been associated with lower respiratory problems, which have been linked to asthma. Parental smoking was relatively uncommon with the Jemez community. The study did not measure indoor allergens in Pueblo homes.

The study hypothesized that the strong association of reported bronchiolitis and high rates of lower respiratory infections could explain the increased asthma prevalence among Jemez school children.

Increased Asthma Hospitalization among registered Indian children in Saskatchewan 1970-1989
Senthilselvan, et al.
Journal of Clinical Epidemiology, Vol. 48, No. 10, 1277-1283
1995

Objectives: To study asthma morbidity in children and adults of "Registered Indians" in Saskatchewan

Methods: Review of asthma hospitalization rates for "Registered" Indian, non-Registered Indians, and other Saskatchewan populations. Registered Indians in this study were tribal members of the Cree, Chippewa, Saulteaux, Assiniboine and Dakota nations that are recognized by the Canadian government. The Canadian government has a special relationship with these tribes. The study divided the population into two distinct groups, Registered Indians and non-Registered.

Timeline: 1970-1989

Findings: When compared with other Saskatchewan populations Registered Indians ages 0-4 and 35-64 had significantly higher rates of hospitalization for asthma. Asthma morbidity is increasing among Indian children and young adults in Saskatchewan.

Summary:
Special Issues
The government of Saskatchewan provides virtually 100% health coverage to it's residents.

Hospitalizations Rates
Asthma hospitalization rates increased in all age groups for Registered Indians. The most significant increase was among Registered Indian children under 4 years of ages. This is consistent with other non-Indian populations of the same age. The study hypothesized that recent increases might be attributed to a rise in properly diagnosed cases of asthma. They also theorized that increased hospitalizations for asthma might be partially explained by increased allergies due to urbanization and living conditions.

Conclusion
Indian children in Saskatchewan live in poor socio-economic conditions including, overcrowded homes. The study theorized that there might be a link between living conditions and asthma. In addition the study found that exposure to passive smoke may trigger asthma and contribute to morbidity for Saskatchewan children. According to the study boys had higher hospitalization rates for asthma than girls for children ages 0-4, but reversed for children 15 and older.

An increased trend in asthma hospitalizations indicated the need for further investigation of the increased risk for asthma among Registered Indians.

Wood-burning stoves and lower respiratory illnesses in Navajo children
Robin, et al.
Pediatric Infections Disease Journal, Vol., 15, 859-865
October 1996

Objectives: To study further the association between acute lower respiratory illnesses (ALRI) and domestic smoke in Navajo children.

Methods: Home interviews of parents of subjects, using case/controls ascertained from inpatient logs of the Indian Health Service facility in Fort Defiance, AZ.

Timeline: October 1992-March 1993

Findings: Exposure to wood-burning stoves was associated with higher indoor air concentrations of respirable particles and an increased risk of Acute Lower Respiratory Infections (ALRI) in Navajo children.

Summary:
Community Background
The Navajo Reservation is home to more than 200,000 Navajo people, many live in remote rural settings. The Reservation experiences extreme seasonal temperatures ranging from –20 to 100 degrees Fahrenheit. Most families live in small one to two bedroom wood frame houses that have gas or electricity, but biofuels such as, wood and coal are still used for heating and cooking. On the Navajo Reservation health care is available at no cost.

Interviews
Trained researchers interviewed parents of the cases and controls at home. Information regarding the following was obtained: 1) availability of electricity and running water, 2) type of home and number of rooms, 3) relationship of primary caretaker to the child, 4) distance to clinic/hospital, 5) transportation, 6) tobacco and ceremonial herb usage, 7) number of children in the home, and 8) type of cooking and heating fuels used.

According to the study one determinant of increased risk and severity of ALRI is timely use of health services and proximity to the nearest hospital or clinic.

Conclusion
The findings of the study confirm earlier observations regarding exposure to wood-burning stoves and ALRI in Navajo children and suggest that the effects of exposure rather than distance to a health care facility increase the risk for ALRI. Navajo homes in the study used, in decreasing order of frequency, pine, cedar, juniper, and oak as biofuels.

Observations from the study highlight the importance of considering indoor air pollution a possible risk factor for severe ALRI.

An unexpected secondary finding is that children hospitalized with ALRI were more likely to have someone other than their mother as the primary caretaker. This is important because it may be critical to resource allocation as well as be responsible for shifts in the focus of health education.

Asthma Prevalence among American Indian Children and Alaska Native Children Stout, et al
Public Health Reports, Vol. 114 i3, 257
May 1999

Objectives: To address asthma prevalence in the American Indian and Alaska Native (AIAN) population.

Methods: Data analysis using the National Medical Expenditure Survey (NMES) and the Survey of American Indians and Alaska Natives (SAIAN)

Findings: The study indicated that AIAN children had a prevalence of parent-reported asthma or wheezing according to NMES and SAIAN.

Summary
Limitations of The Study
The researchers acknowledged several limitations in their study. The AIAN sample was too small and did not allow for comparison with all U.S. children or for the researchers to draw associations with other factors including, income and location. AIAN are frequently not included in prevalence estimates because they account for a small portion of the total population. Secondly, the information reviewed reported asthma prevalence from 1987 and childhood

asthma has increased in prevalence in the last 10 years. Third, the data from SAIAN was restricted to Indian Health Service eligibles and does not accurately represent AIAN living in urban areas or off the reservation. They hypothesized that the exclusion of urban AIAN in the data limits the generalizability of prevalence estimates. Finally, the researchers were concerned that the estimates may not represent the regional differences in asthma prevalence because of the well-documented differences in lifestyles and environments of AIAN.

The study also cited the disparity in quality of health care received by poor and non-poor children and the higher asthma morbidity associated with this disparity. The researchers theorized that this might relate to IHS resource allocations.

Conclusion
Further study of asthma prevalence and morbidity among AIAN children is needed.

Asthma and Bronchiolitis Hospitalization Among American Indian Children
Liu, et al
Arch Pediatr Adolesc Med, Vol. 154 No. 10, 991-996
October 2000

Objectives: To compare asthma and bronchiolitis hospitalization rates in American Indian and Alaska Native (AIAN) children and all children in Washington State.

Methods: Retrospective data analysis using Washington State hospitalization data. AIAN were identified by linking state data with Indian Health Service enrollment data.

Timeline: 1987-1996

Findings: AIAN have significantly higher rates of hospitalizations for wheezing illnesses during the first year of life compared to other age groups and races. Disparity rates have increase significantly. Future public health measures should be directed at managing asthma and bronchiolitis in AIAN infants.

Differences in Asthma Prevalence between Samples of American Indian and Alaska Native Children
Stout, et al.
Public Health Reports, Vol. 116
January-February 2001

Objectives: To better understand the prevalence of asthma among American Indian and Alaska Native (AIAN) children and to explore the contributions of locale to symptoms and diagnoses.

Methods: Screening surveys of AIAN middle school students in grades 6-9. Researchers compared self-reported responses from 147 metropolitan Tacoma, Washington (metro WA) students and 365 non-metropolitan Alaska (metro AK) students. The study used the

International Study of Asthma and Allergy In Children (ISAAC) group's written and videotaped questionnaire.

Timeline: Fall of 1997

Findings: The prevalence of asthma between both groups was similar, but a significantly higher percentage of metro WA reported a physician's diagnosis of asthma.

Summary
Using the International Study of Asthma and Allergy in Children (ISAAC) survey instrument, researchers found no differences between the metro WA and non-metro AK sample in asthma prevalence in response to four of five video prompted questions. However, responses from children in metro WA did indicate a higher percentage of nocturnal wheezing and wheezing too severe to speak. Because of the similarities in the other six variables the researcher were not able to conclude if this might be specific to a subset of metro WA children. The concluded that there is no difference in asthma-like symptoms in the two populations, even though there are significant differences in the percent with an asthma diagnosis by a doctor.

Limitations of the Study
The limitations of measuring asthma prevalence make it difficult for the researchers to know whether their findings represent diagnostic behavior, differences in health beliefs, or biological differences.

Culturally Specific Issues
ISAAC was designed to minimize cultural differences; however the study hypothesized that cultural differences may still influence the reporting of symptoms. For example, according to Yup'ik health workers whom the researchers spoke with, the Western concept of asthma is not part of their traditional health belief system. Since the study still showed similar asthma symptom rates between both populations despite this difference the researchers hypothesized that the non-metro AK community may have used different labels to report symptoms to physicians.

The report stated that their two random AIAN samples should not be generalized. However, the samples did provide evidence that physician diagnosis may vary according to location even in similar clinical situations. The researchers theorized that socioeconomic status, ethnicity and urban vs. non-urban residence may be more strongly associated with receiving a physician diagnosis of asthma than the prevalence of asthma symptoms.

Conclusion
Future research should consider the influence of patients' health beliefs and patterns of health service use as well as diagnosis trends.

Navajo Perceptions of Asthma and Asthma Medications: Clinical Implications
Van Sickle, et al.
PEDIATRICS Vol. 108 No.1
July 2001

Objectives: To examine how medication usage and the use of health services are influenced by perceptions of disease and treatments among Navajo.

Methods: Ethnographic interviews of 22 families that included 29 asthmatic children.

Timeline: June 1997 through August 1998.

Interviews: During interviews parents were asked to describe the cause of asthma. For 50% of the families answers included heredity, environmental pollution and local geographical conditions. Also mentioned were physical changes in lungs caused by childhood diseases such as pneumonia, unhealthy diets and lifestyles. Four families suggested exposure to lightening as a traditional cause of asthma. All families felt that asthma might be a chronic condition, but continued to treat attacks episodically.

Medications: The study indicated that all but one child was using bronchodialators and that one third used inhaled steroids. Sixty-percent of the children in the study were responsible for managing their own symptoms with medication. Parents indicated that the children were in a better position to know when they needed to use their medications. The authors hypothesized that this might be consistent with the Navajo belief system that places value on individual autonomy. This highlights the importance of identifying the responsible party and targeting health education to the appropriate party (i.e. parent or child). Also indicated was that families used over-the-counter medicines such as cough syrup and allergy pills.

Respondents perceived that both preventive and rescue medications worked similarly by opening airways and clearing obstructions. Parents attributed the immediate effectiveness of the bronchodialator as the best control of asthma. Twelve families felt that asthma treatment should be determined individually. When a child responded to a treatment it was believed the medication "agreed" with the child.

More than two thirds of the parents had concerns/hesitations about the repeated use of medications. Respondents "feared" dependency on the medications and felt that the body should be allowed to heal itself or to "grow out" of the disease. Parents reported allowing children to go without medications during an episode to teach the body how to manage the symptoms and to "wean" them from their medicine over time. Also mentioned was the concern that that use of the medications would result in further illnesses. Navajo parents were reluctant to uses control medications in the absence of symptoms because they consider asthma to be a series of acute episodes rather than a chronic disease. Two parents worried about under-medicating their children.

Emergency Room Usage: Respondents indicated that the use of emergency departments were based on three reasons including, it was the only source of care during non-clinic hours, the "breathing treatment" was the most effective treatment, and the clinical setting eased anxiety. Only three households had nebulizers at home. Respondents perceived the use of at home medications as "prolonging the suffering" of their children and used the emergency room as a "first-line" course of treatment. This reliance prevented children from receiving rescue or

preventive medicines. Also contributing to increased reliance on emergency room visits were long distances to the Indian Health Service (IHS) facilities and transportation difficulties.

Conclusions: The study concluded that knowledge of beliefs and behavior patterns of specific cultures would be useful in the development of appropriate medical interventions and lead to significant reductions in the cost of care.

Conclusion

Culturally competent health care requires, "Attention to the social, cultural and biomedical characteristics that tend to distinguish Indian people from the other populations."[8] Providers must pay attention to language differences and patient understanding of disease causes and treatment in order to provide quality care. In addition, they must understand the nature of American Indian and Alaska Native utilization of care. Health-seeking behaviors vary in AIAN populations, which may contribute to delayed treatment.[9] Many AIAN do not access care until their illness is in an advanced state or requires emergency attention. Thus, in developing asthma prevention strategies, every level of possible intervention should be examined. Interventions should focus on improving local environmental factors such as air quality, pollution, and adequate housing, all of which provide the framework for developing healthy AIAN communities.

This document presents summaries of highly relevant articles identified by a literature search. However, the number of highly relevant articles was limited due to funding constraints. Overall, the highly relevant articles examined prevalence rates of asthma among AIAN children, with additional emphasis on environmental risk factors. Other topics included medication usage, cultural understanding of asthma, and diagnoses methods. The primary method of research involved ethnographic interviews and both written and video-based surveys. The articles also used historical data reviews of hospitalization rates and medical charts. In summary, the articles

reviewed illustrate a need for further research regarding asthma and AIAN populations, especially in the areas of risk factors and culturally appropriate treatments.

---

[1] "Regional Differences in Indian Health." 2001. U.S. Department of Health and Human Services, Public Health Service, Indian Health Service, Office of Public Health, Division of Community and Environmental Health, Program Statistics Team.

[2] "Trends in Indian Health." 2001. U.S. Department of Health and Human Services, Public Health Service, Indian Health Service, Office of Public Health, Division of Community and Environmental Health, Program Statistics Team.

[3] Healthy People 2010. http://www.health.gov/healthypeople/document/

[4] National Heart, Lung, and Blood Institute (NHLBI). Data Fact Sheet. Asthma Statistics. Bethesda, MD: National Institutes of Health (NIH), Public Health Service (PHS), 1999.

[5] National Center for Health Statistics (NCHS). Current estimates from the National Health Interview Survey, 1990. Vital and Health Statistics 10(194), 1997.

[6] Benson, V., and Marano, M.A. Current estimates from the National Health Interview Survey, 1995. Vital and Health Statistics 10(199): 1-428, 1998.

[7] National Asthma Education and Prevention Program. Expert Panel Report 2: Guidelines for the Diagnosis and Management of Asthma. NIH Pub. No. 97-4051. Bethesda, MD: NIH, 1997.

[8] Rhoades, Everett. "American Indians and the Private Health Sector: The Growing Use of Private Care by Indians has implications for patients, providers and Policy Makers." Western Journal of Medicine, 2002 Jan; 176(1), 7-9.

[9] Ibid, 7-9

Literature Evaluated

1. Respiratory diseases disproportionately affecting minorities. The NHLBI Working Group. - Chest 1995 Nov; 108(5): 1380-92. - 108, - 1380-92. - 0012-3692 - 1995 Nov.

2. Allergy and Asthma Network. Website: www.aanma.org

3. American Association of Pediatrics. Website: www.pediatric-asthma.com

4. American Lung Association. 2000. American Indians/Alaska Natives and Lung Disease Fact Sheet. Website: www.lungusa.org/diseases/nativelung_factsheet.html

5. American Lung Association. 2002. American Indians and Alaska Natives and Tobacco. Website: www.lungusa.org/tobacco/native_factsheet99.html

6. American Lung Association. 1997. Targeted Populations and Smoking. Website: www.lungusa.org/tobacco/smktarpofac.html

7. American Lung Association. 2000. Tobacco Control and Lung Disease: Minority Lung Disease Data. Website: www.lungusa.org/pub/minority/tobacco_00.html

8. American Lung Association. Website. www.lungusa.org

9. Bulkow LR, - Singleton RJ, - Karron RA, and - Harrison LH. - Risk factors for severe respiratory syncytial virus infection among Alaska native children. - Pediatrics 2002 Feb; 109(2): 210-6. - 109, - 210-6. - 1098-4275 - 2002 Feb.

10. Clark D, - Gollub R, - Green WF, - Harvey N, - Murphy SJ, and - Samet JM. - Asthma in Jemez Pueblo schoolchildren. - Am J Respir Crit Care Med 1995 May; 151(5): 1625-7. - 151, - 1625-7. - 1073-449x - 1995 May.

11. Comino EJ, - Bauman A, - Mitchell CA, - Ruffin RE, - Antic R, - Zimmerman PV, and - Gutch RC. - The Australian National Asthma Campaign: effects of public education activities based on mass media. - Am J Prev Med 1997 Jul-Aug; 13(4): 251-6. - 13, - 251-6. - 0749-3797 - 1997 Jul-Aug.

12. Coultas DB, - Gong H Jr, - Grad R, - Handler A, - McCurdy SA, - Player R, - Rhoades ER, - Samet JM, - Thomas A, and - Westley M. - Respiratory diseases in minorities of the United States. - Am J Respir Crit Care Med 1994 Mar; 149(3 Pt 2): S93-131. - 149, - S93-131. - 1073-449x - 1994 Mar.

13. Crane J, - Beasley R, - Stewart B, - Shaw R, - Pearce N, and - Burgess C. - The international asthma video questionnaire for measuring asthma prevalence in different populations. - Int Arch Allergy Immunol 1995 May-Jun; 107(1-3): 450-1. - 107, - 450-1. - 1018-2438 - 1995 May-Jun.

14. Evans D, - Mellins R, - Lobach K, - Ramos-Bonoan C, - Pinkett-Heller M, - Wiesemann S, - Klein I, - Donahue C, - Burke D, - Levison M, - Levin B, - Zimmerman B, and - Clark N. - Improving care for minority children with asthma: professional education in public health clinics. - Pediatrics 1997 Feb; 99(2): 157-64. - 99, - 157-64. - 1098-4275 - 1997 Feb.

15. Gottlieb DJ, - Beiser AS, and - O'Connor GT. - Poverty, race, and medication use are correlates of asthma hospitalization rates. A small area analysis in Boston. - Chest 1995 Jul; 108(1): 28-35. - 108, - 28-35. - 0012-3692 - 1995 Jul.

16. Gottlieb S. - Personalized medicine comes a step closer for asthma. - West J Med 2000 Dec; 173(6): 372-3. - 173, - 372-3. - 0093-0415 - 2000 Dec.

17. Gupchup GV, - Hubbard JH, - Teel MA, - Singhal PK, - Tonrey L, - Riley K, - Rupp MT, and - Coultas DB. - Developing a community-specific health-related quality of life (HRQOL) questionnaire for asthma: the Asthma-Specific Quality of Life Questionnaire for Native American Adults (AQLQ-NAA). - J Asthma 2001 Apr; 38(2): 169-78. - 38, - 169-78. - 0277-0903 - 2001 Apr.

18. Halfon N and - Newacheck PW. - Childhood asthma and poverty: differential impacts and utilization of health services. - Pediatrics 1993 Jan; 91(1): 56-61. - 91, - 56-61. - 0031-4005 - 1993 Jan.

19. Harris SB, - Glazier R, - Eng K, and - McMurray L. - Disease patterns among Canadian aboriginal children. Study in a remote rural setting. - Can Fam Physician 1998 Sep; 44:1869-77. - 44, - 1869-77. - 0008-350x - 1998 Sep.

20. Healthfinder. Website: www.healthfinder.org

21. Hefflin BJ and - Etzel RA. - Out-of-hospital deaths due to asthma in North Carolina, 1980-1988. - Am J Prev Med 1995 Jan-Feb; 11(1): 66-70. - 11, - 66-70. - 0749-3797 - 1995 Jan-Feb.

22. Hisnanick JJ, - Coddington DA, and - Gergen PJ. - Trends in asthma-related admissions among American Indian and Alaskan native children from 1979 to 1989. Universal health care in the face of poverty. - Arch Pediatr Adolesc Med 1994 Apr; 148(4): 357-63. - 148, - 357-63. - 1072-4710 - 1994 Apr.

23. Karron RA, - Singleton RJ, - Bulkow L, - Parkinson A, - Kruse D, - DeSmet I, - Indorf C, - Petersen KM, - Leombruno D, - Hurlburt D, - Santosham M, and - Harrison LH. - Severe respiratory syncytial virus disease in Alaska native children. RSV Alaska Study Group. - J Infect Dis 1999 Jul; 180(1): 41-9. - 180, - 41-9. - 0022-1899 - 1999 Jul.

24. Kimball EH, - Goldberg HI, and - Oberle MW. - The prevalence of selected risk factors for chronic disease among American Indians in Washington State. - Public Health Rep 1996 May-Jun; 111(3): 264-71. - 111, - 264-71. - 0033-3549 - 1996 May-Jun.

25. Kozyrskyj AL. Mustard CA. Simons FE. Socioeconomic status, drug insurance benefits, and new prescriptions for inhaled corticosteroids in schoolchildren with asthma. Archives of Pediatrics & Adolescent Medicine. Nov; 155(11): 1219-24.

26. Lawrence R and - Martin D. - Moulds, moisture and microbial contamination of First Nations housing in British Columbia, Canada. - Int J Circumpolar Health 2001 Apr; 60(2): 150-6. - 60, - 150-6. - 1239-9736 - 2001 Apr.

27. Liu LL, - Stout JW, - Sullivan M, - Solet D, - Shay DK, and - Grossman DC. - Asthma and bronchiolitis hospitalizations among American Indian children. - Arch Pediatr Adolesc Med 2000 Oct; 154(10): 991-6. - 154, - 991-6. - 1072-4710 - 2000 Oct.

28. Lwebuga-Mukasa JS and - Dunn-Georgiou E. - The prevalence of asthma in children of elementary school age in western New York. - J Urban Health 2000 Dec; 77(4): 745-61. - 77, - 745-61. - 1099-3460 - 2000 Dec.

29. Morris K, - Morgenlander M, - Coulehan JL, - Gahagen S, - Arena VC, and - Morganlander M. - Wood-burning stoves and lower respiratory tract infection in American Indian children. - Am J Dis Child 1990 Jan; 144(1): 105-8. - 144, - 105-8. - 0002-922x - 1990 Jan.

30. National Heart, Lung and Blood Institute. Website: www.nhlbi.nih.gov

31. National Institute of Allergy & Infectious Diseases. Website: www.niaid.nih.gov/publications/asthma

32. National Institutes of Health. Website: www.nih.gov

33. Native American Health Research Databases. Website: http://hsc.unm.edu

34. Negoita S, - Swamp L, - Kelley B, and - Carpenter DO. - Chronic diseases surveillance of St. Regis Mohawk Health Service patients. - J Public Health Manag Pract 2001 Jan;7(1):84-91. - 7, - 84-91. - 1078-4659 - 2001 Jan.

35. Ray NF, - Thamer M, - Fadillioglu B, and - Gergen PJ. - Race, income, urbanicity, and asthma hospitalization in California: a small area analysis. - Chest 1998 May; 113(5): 1277-84. - 113, - 1277-84. - 0012-3692 - 1998 May.

36. Rhoades ER. - The major respiratory diseases of American Indians. - Am Rev Respir Dis 1990 Mar; 141(3): 595-600. - 141, - 595-600. - 0003-0805 - 1990 Mar.

37. Rhoades ER, - Brenneman G, - Lyle J, and - Handler A. - Mortality of American Indian and Alaska native infants. - Annu Rev Public Health 1992; 13:269-85. - 13, - 269-85. - 0163-7525 - 1992.

38. Robin LF, - Less PS, - Winget M, - Steinhoff M, - Moulton LH, - Santosham M, and - Correa A. - Wood-burning stoves and lower respiratory illnesses in Navajo children. - Pediatr Infect Dis J 1996 Oct; 15(10): 859-65. - 15, - 859-65. - 0891-3668 - 1996 Oct.

39. Senthilselvan A and - Habbick BF. - Increased asthma hospitalizations among registered Indian children and adults in Saskatchewan, 1970-1989. - J Clin Epidemiol 1995 Oct; 48(10): 1277-83. - 48, - 1277-83. - 0895-4356 - 1995 Oct.

40. Shaw R, - Woodman K, - Crane J, - Moyes C, - Kennedy J, and - Pearce N. - Risk factors for asthma symptoms in Kawerau children. - N Z Med J 1994 Oct 12; 107(987): 387-91. - 107, - 387-91. - 0028-8446 - 1994 Oct 12.

41. Shaw RA, - Crane J, and - O'Donnell TV. - Asthma symptoms, bronchial hyper responsiveness and atopy in a Maori and European adolescent population. - N Z Med J 1991 May 8; 104(911): 175-9. - 104, - 175-9. - 0028-8446 - 1991 May 8.

42. Shaw RA, - Crane J, - O'Donnell TV, - Lewis ME, - Stewart B, and - Beasley R. - The use of a videotaped questionnaire for studying asthma prevalence. A pilot study among New Zealand adolescents. - Med J Aust 1992 Sep 7; 157(5): 311-4. - 157, - 311-4. - 0025-729x - 1992 Sep 7.

43. Shaw RA, - Crane J, - O'Donnell TV, - Porteous LE, and - Coleman ED. - Increasing asthma prevalence in a rural New Zealand adolescent population: 1975-89. - Arch Dis Child 1990 Dec; 65(12): 1319-23. - 65, - 1319-23. - 1468-2044 - 1990 Dec.

44. Shaw RA, - Crane J, - Pearce N, - Burgess CD, - Bremner P, - Woodman K, and - Beasley R. - Comparison of a video questionnaire with the IUATLD written questionnaire for measuring asthma prevalence. - Clin Exp Allergy 1992 May; 22(5): 561-8. - 22, - 561-8. - 0954-7894 - 1992 May.

45. Singleton R. - Association between maternal smoking and severe respiratory syncytial virus infections and sudden infant death syndrome. - Alaska Med 1996 Jan-Mar; 38(1): 34. - 38, - 34. - 0002-4538 - 1996 Jan-Mar.

46. Singleton R, - Morris A, - Redding G, - Poll J, - Holck P, - Martinez P, - Kruse D, - Bulkow LR, - Petersen KM, and - Lewis C. - Bronchiectasis in Alaska Native children: causes and clinical courses. - Pediatr Pulmonol 2000 Mar; 29(3): 182-7. - 29, - 182-7. - 8755-6863 - 2000 Mar.

47. Stout JW, - Sullivan M, - Liu LL, and - Grossman DC. - Asthma prevalence among American Indian

and Alaska Native children. - Public Health Rep 1999 May-Jun; 114(3): 257-61. - 114, - 257-61. - 0033-3549 - 1999 May-Jun.

48. Stout JW, - White LC, - Redding GJ, - Morray BH, - Martinez PE, and - Gergen PJ. - Differences in asthma prevalence between samples of American Indian and Alaska Native children. - Public Health Rep 2001 Jan-Feb; 116(1): 51-7. - 116, - 51-7. - 0033-3549 - 2001 Jan-Feb.

49. Todd NW and - Feldman CM. - Allergic airway disease and otitis media in children. - Int J Pediatr Otorhinolaryngol 1985 Oct; 10(1): 27-35. - 10, - 27-35. - 0165-5876 - 1985 Oct.

50. Van Sickle D and - Wright AL. - Navajo perceptions of asthma and asthma medications: clinical implications. - Pediatrics 2001 Jul; 108(1): E11. - 108, - E11. - 1098-4275 - 2001 Jul.

51. Weiss KB and - Wagener DK. - Changing patterns of asthma mortality. Identifying target populations at high risk. - JAMA 1990 Oct 3; 264(13): 1683-7. - 264, - 1683-7. - 0098-7484 - 1990 Oct 3.

52. Weitzman M, - Gortmaker S, and - Sobol A. - Racial, social, and environmental risks for childhood asthma. - Am J Dis Child 1990 Nov; 144(11): 1189-94. - 144, - 1189-94. - 0002-922x - 1990 Nov.

53. Wissow LS, - Gittelsohn AM, - Szklo M, - Starfield B, and - Mussman M. - Poverty, race, and hospitalization for childhood asthma. - Am J Public Health 1988 Jul; 78(7): 777-82. - 78, - 777-82. - 0090-0036 - 1988 Jul.