

Pandemic Influenza Preparedness and Vulnerable Populations in Tribal Communities

American Indian and Alaska Native (AIAN) governments are sovereign entities with inherent authority to establish and administer public health programs within their communities and will be critical partners in national efforts to prepare for pandemic influenza. Within AIAN communities, some subpopulations will be particularly vulnerable during an influenza pandemic because of their underlying health conditions, whereas others will be at increased risk because of limited access to prevention or treatment interventions.

We outline potential issues to consider in identifying and providing appropriate services for selected vulnerable populations within tribal communities. We also highlight pandemic influenza preparedness resources available to tribal leaders and their partners in state and local health departments, academia, community-based organizations, and the private sector. (*Am J Public Health*. 2009; 99:S271–S278. doi:10.2105/AJPH.2008.157453)

Amy V. Groom, MPH, Cheyenne Jim, MS, Mic LaRoque, MD, Cheryl Mason, MPH, Joe McLaughlin, MD, MPH, Lisa Neel, MPH, Terry Powell, Thomas Weiser, MD, MPH, and Ralph T. Bryan, MD

IN THE UNITED STATES, FEDERALLY recognized American Indian and Alaska Native (AIAN) governments are sovereign entities with inherent authority to establish and administer public health programs within their respective communities.¹ Comprising approximately 1.5% of the total US population, the AIAN population exceeds 4 million people and includes more than 560 federally recognized Indian tribes and Alaska Native villages. Although many AIAN persons live in rural locations such as reservations, more than 60% now reside in urban settings.^{2,3} Criteria for tribal membership vary from tribe to tribe, with tribal enrollment ranging from under 200 to over 300 000 members. The size of a given tribal community (or a tribal government's jurisdictional area) can vary from a few to tens of thousands of acres. Tribes with the largest populations and land bases are primarily located in the western United States, but tribal communities are located in 34 states across the nation. Tribal lands exist both within and across state borders, and many rest on or near international boundaries with Canada and Mexico.^{3,4} Tribal lands, reservations, Alaska Native lands, and urban Indian communities are often referred to collectively as 'Indian country' and we use the term herein in that sense, in contrast to its more restricted use in federal law.

Many AIAN people receive health care from the Indian Health Service (IHS), tribal or Alaska Native health programs, and Urban

Indian health centers, but an increasing number also have access to health services through private health insurance plans.⁵ Delivery of public health services to AIAN communities and the ability to adequately prepare for and respond to public health events is affected by a number of factors that include the uncertain availability of federal funding, variability in tribal public health infrastructure (e.g., workforce, information systems, public health laws), and a mix of legal and jurisdictional factors that blur the lines of responsibility around public health actions.¹

AIAN governments and communities will be important partners in national preparedness and response efforts to address pandemic influenza. Although prevailing socioeconomic conditions may place entire AIAN communities at increased risk during an influenza pandemic, our focus is on the need to identify specific vulnerable populations within tribal communities and to provide appropriate services for them. Vulnerable populations in tribal communities may include, but are not limited to, persons with chronic diseases or disabilities, elderly community members, urban AIAN people, and residents of remote and isolated areas. The information and resources contained in this paper will be useful for tribal leaders and their partners in state and local health departments, academia, community-based organizations, and the private sector.

We produced this paper as a working group that represents a spectrum of backgrounds and expertise from AIAN tribes and tribal organizations, state health departments, and federal agencies. We received valuable input from tribal leaders across the country during a meeting with the Centers for Disease Control and Prevention's (CDC) Tribal Consultation Advisory Committee in July 2008. The information we present was gathered from peer-reviewed and non-peer-reviewed literature on both seasonal and pandemic influenza, web sites, and conference abstracts and proceedings.

TRENDS OF INFLUENZA IN INDIAN COUNTRY

Although data on the effects of the 1918 pandemic on AIAN populations are limited, government reports from 1919 and 1920 found that the epidemic among American Indians was "extremely severe," with mortality rates 4 times higher than that reported for larger cities in the United States during the epidemic.⁶ Numerous reports, both anecdotal and scientific, have noted the high attack rates and high burden of morbidity and mortality associated with influenza outbreaks in AIAN and other indigenous communities.^{6–17} The frequent and intense exposure to a novel viral pathogen in isolated communities, often with crowded housing conditions and limited access to medical care, likely contributed to high attack

rates and increased mortality in some communities.^{8,13,15–17}

Even today, AIAN people experience a greater burden of pneumonia and influenza mortality compared with the US population (Table 1). Hospitalization rates for pneumonia and for lower respiratory infections also are higher for the AIAN population compared with the general US population.^{24–26} Secondary bacterial infections resulting in pneumonia are a common cause of death in persons with influenza infection.²⁷ This cause of death may be of particular concern for some AIAN communities that experience increased rates of invasive pneumococcal disease^{28–30} or high rates of infection with methicillin-resistant *Staphylococcus aureus* (MRSA).^{31,32} In the event of an influenza pandemic, the presence of these pathogens may further contribute to influenza-associated morbidity and mortality.

Vulnerable Populations

Within AIAN communities, certain subpopulations will be particularly vulnerable to the effects of pandemic influenza. Some may be physically more vulnerable because of underlying health conditions, whereas others may be vulnerable because access issues

prevent them from receiving information and prevention and treatment interventions. Given the heterogeneity of the AIAN population and tribal communities, an exhaustive account of all potentially vulnerable populations is beyond the scope of this review. In the sections that follow, we discuss previously defined vulnerable populations and highlight some of the unique characteristics of these populations in AIAN communities that tribal, county, state and federal public health officials, as well as other stakeholders, should consider when planning and preparing for pandemic influenza.

Chronic Disease

There has been a dramatic increase in the prevalence of chronic diseases such as diabetes and cardiovascular disease among AIAN people over the past 2 decades.²⁰ AIAN people are more likely to have risk factors associated with chronic diseases and to live with chronic disability compared with other racial/ethnic groups (Table 1). This high prevalence of chronic medical conditions and disabilities presents challenges related to the potential impact of pandemic influenza in AIAN communities. These challenges include: (1) the

need to maintain adequate medical services to provide appropriate management of complex chronic conditions, (2) maintenance of pharmaceutical supply lines for medications to treat these conditions, and (3) the chronically low level of funding received by IHS.³³

Diabetes mellitus is a pervasive problem among AIAN communities everywhere and is the primary cause for the significant increase in end-stage renal disease (ESRD) observed in AIAN populations.^{34,35} ESRD is an issue of particular concern for many tribal leaders. Patients with ESRD, especially those with diabetes mellitus, face higher mortality, higher hospitalization rates, and an array of substantially disabling comorbidities such as vision loss, paralysis, amputation, and dementia.³⁴ Disruption of regularly scheduled dialysis during emergency situations has a significant impact on mortality, causing persistently increased rates for months after regular service is returned.³⁶

Meeting the needs of people with ESRD during an influenza pandemic will require continuity of operations of dialysis centers, access to specialty nephrologist care, an adequate supply of multiple medications, and access to

specialized diets. The National Forum on ESRD provides disaster-planning resources, including education and training for providers and resources for patients. Some of the 18 ESRD networks³⁷ across the nation have specific plans in place to maintain services during an influenza pandemic; however, most of these plans rely on state plans that do not specifically address the many challenges that dialysis centers will face to maintain staffing and medical supplies and to address the urgent needs for hospitalization that patients with ESRD often require.

More than 36 dialysis centers are now located on reservations or tribally owned lands, yet some patients must travel more than 1 hour each way to receive treatment.³⁸ Reductions in staffing, the possibility of isolation or quarantine procedures, and disruption of supplies all could have a significant impact on whether these vital services will remain available in AIAN communities. Short-term interim steps, such as the emergency 3-day diet, could serve as a bridge between treatments but are not a substitute for hemodialysis on an ongoing or prolonged basis.³⁹ Shifting more patients from hemodialysis to home-based peritoneal dialysis has been

TABLE 1—Examples of Mortality, Disability, and Risk Factors Among AIAN Versus Other Racial/Ethnic Groups

Condition	Year	Ratio ^a	Comparison Group	Reference
Pneumonia and influenza mortality (all ages)	2002–2004	1.5	All US races	IHS ⁸
Pneumonia and influenza mortality (infants)	2000–2001	4.0	US Whites	US DHHS and IHS ⁹
Diabetes mortality (all ages)	2002–2004	2.9	All US races	IHS ⁸
Prevalence of ≥3 chronic disease risk factors (adults)	2001–2002	1.2–6.9	US Blacks, Hispanics, and Asians	CDC ²⁰
Prevalence of disability in older adults	2003–2005	1.1–2.5	US Whites, Blacks, Asians, and Hispanics	Okoro et al. ²¹
Prevalence of disability in older adults	2000	1.3–1.6	US Whites	Goins et al. ²²
Prevalence of end-stage renal disease (all ages)	2006	1.7	US Whites	US Renal Data System ²³

Note. AIAN = American Indians and Alaska Natives; IHS = Indian Health Service; DHHS = Department of Health and Human Services; CDC = Centers for Disease Control and Prevention.
^aAIAN versus Comparison Group

suggested as a strategy for those living in disaster-prone areas.⁴⁰ Because this technique is mobile, does not require a fully staffed and functional dialysis center and uses supplies that can be stockpiled, this could be an option for certain patients in the event of an influenza pandemic. Careful planning and coordination among tribal and IHS health care facilities, ESRD networks, corporate providers of dialysis services, regional dialysis centers, and tribal transportation services will help to maintain this vital lifeline for ESRD patients in the event of an influenza pandemic.

Elderly Populations

The elderly population (aged 65 years and older) comprises 5.6% of the overall AIAN population, compared with 12.4% of the general US population.⁴¹ Whereas older people in all racial/ethnic groups may be at increased risk during an influenza pandemic, many older AIAN people face additional challenges that make them particularly vulnerable. In addition to an increased burden of disease and disability, older AIAN adults are less likely to have health insurance or access to public assistance compared with other racial and age groups, and may face additional pressures related to caregiving responsibilities.^{20–22,42–44}

The AIAN population also experiences increased disability at an earlier age compared with other racial/ethnic groups.²¹ Despite increased chronic disease and disability, access to health care and public assistance remains a challenge for some elderly AIAN adults. Although Medicare is an important source of health care for many elderly AIAN people, the requirement for at least 40 quarters of social-security covered

employment means some AIAN elders may not qualify. In addition, transportation to obtain health care services is often a problem, especially in rural areas where distances may be great, road conditions poor, and public transportation limited.^{42,43} These and other access issues, including language barriers, may explain why some elderly American Indians and Alaska Natives do not use public assistance and services that are available to them.^{42–44} These complex problems will intensify the challenge of protecting this population during an influenza pandemic.

Some American Indians and Alaska Natives are grandparents who act as primary caregivers for their grandchildren, which presents another challenge for the elderly AIAN population. According to the US Census Bureau's *Census 2000 Report*, African American and AIAN populations have the highest prevalence of grandparent caregivers (6.0% and 5.8%, respectively) when compared with non-Hispanic White respondents (1.3%).⁴⁵ In AIAN communities, this subset of the elderly population may be particularly vulnerable in a pandemic situation. AIAN grandparent caregivers are more likely than their noncaregiving AIAN peers to be disabled, be unemployed, live in poverty, reside in overcrowded quarters, and be unable to communicate well in English. They are also less likely to receive public assistance services for which they are eligible.⁴⁵ A pandemic influenza situation may place increased pressure on AIAN grandparents already struggling to provide for their grandchildren.

The combination of increased vulnerability from underlying health issues, barriers to accessing health care, and infrequent use of

public assistance and other services suggests that typical methods of outreach and distribution of services may not be effective for reaching the elderly in AIAN communities. Alternative strategies may be needed to ensure that this population benefits from pandemic influenza interventions.

Urban American Indian/ Alaska Native Populations

Since the federal relocation programs of the 1950s, AIAN people have continued to move to urban areas seeking economic and educational opportunities and better access to health and social services. Data from the US Census Bureau's *Census 2000 Report* indicate that urban American Indian and Alaska Natives represent 61% of the total US American Indian population.² Despite the promise of prosperity in metropolitan areas, many urban AIAN persons face health and socioeconomic challenges. Only limited services are available through the 34 designated urban Indian health organizations, and most urban AIAN people lack access to adequate health care services.^{2,46} The urban AIAN population has poorer health compared with the US general population.⁴⁷ For instance, rates of infant mortality and mortality from unintentional injuries, chronic liver disease, diabetes, and alcohol are higher among urban American Indians and Alaska Natives compared with the urban US general population.⁴⁷ In addition to these health challenges, urban American Indians and Alaska Natives are twice as likely as the urban US population to be poor or unemployed and to lack a college degree.⁴⁷

Some urban AIAN persons travel back and forth between urban areas and rural tribal lands to visit or care for family, maintain

cultural practices, access IHS or tribal health services, or receive care from traditional healers.⁴⁶ In the event of an influenza pandemic, many urban AIAN persons may return to tribal lands to be close to family and have better access to tribal or IHS health care services, potentially overwhelming existing service capacities. This possibility should be considered in preparedness planning. In addition, the urban AIAN population's tendency to migrate, along with their intermittent access to care, may be a barrier to carrying out pandemic influenza community mitigation strategies.

Remote and Isolated Areas

Although the majority of the AIAN population resides in urban areas, 39% reside in rural areas. Of these, 40% reside in particularly remote and isolated areas referred to as Rural Minority Counties (RMCs).⁴⁸ RMCs are extremely rural, with only 1.4 persons per square mile compared with the national average of 79.6 persons per square mile. The poverty rate among AIAN people residing in RMCs is 38.5% compared with 14.3% for other rural residents.⁴⁸ American Indian and Alaska Native RMCs are found in primarily 3 regions of the United States: the northern plains (Montana, North and South Dakota), the southwest (Arizona, New Mexico, and Utah), and throughout much of Alaska. Household crowding rates for AIAN people residing in RMCs are 5 times higher than national crowding rates (28.9% vs 6%).⁴⁸ Because 20.7% of AIAN homes in RMCs lack household plumbing, limited access to potable water and safe wastewater disposal is a particular problem that places community members at increased risk for infectious diseases.^{48–51} Although rural

isolation may act as a buffer to the spread of influenza in some locations, the introduction of a novel viral pathogen into isolated communities, often with crowded housing conditions and limited access to medical care, could be devastating.^{8,13,15–17} In addition to housing issues, language barriers may be more common for AIAN people living in rural areas. On the rural Navajo reservation, for example, 24.5% of the population reported speaking English “less than well.”⁴¹

In Alaska, geographic isolation is particularly pronounced, with approximately 42% of Alaska Natives living in areas that are not accessible via road or the Alaska Marine Highway.⁵² Although many communities maintain at least a partial subsistence lifestyle, items such as fuel and medical supplies are primarily delivered by aircraft or by barges through water routes. In the event of a pandemic, maintaining these delivery systems will be particularly important. During the 1918 influenza pandemic, some residents of remote communities died of starvation or exposure to cold because of an inability to maintain a subsistence lifestyle during this time of extensive illness and death.^{17,53} While conditions today may be somewhat different, it is important for emergency preparedness planners to address issues related to maintaining subsistence lifestyles.

The socioeconomic factors, housing conditions, lifestyle, and access issues faced by AIAN people living in remote rural areas will likely present special challenges in the event of an influenza pandemic. During preparedness planning, public health officials should carefully consider that even tribal communities that are not particularly remote could

have tribal members that live in isolated settings.

Tribal Strategies and Models

In preparing for an influenza pandemic, tribal leaders face unique challenges around jurisdictional issues, tribal sovereignty, and tribal self-determination. All entities engaged in pandemic influenza preparedness planning for tribal communities are currently operating in the context of a federal funding stream that does not allow for direct funding to tribal governments. Therefore, tribes must depend on close cooperation with state and county health departments to receive resources to support pandemic influenza preparedness planning. Effective cooperation across all jurisdictions—tribal, county, state, and federal—will help to ensure that tribal communities and their vulnerable populations fully benefit from available federal resources. Such resources include access to the Strategic National Stockpile, assistance with purchasing antiviral medications, and support in administering pandemic influenza vaccine. In addition, improving tribal public health legal infrastructure and using legal tools such as mutual aid agreements will help address jurisdictional issues and carry out community mitigation strategies within tribal communities.¹

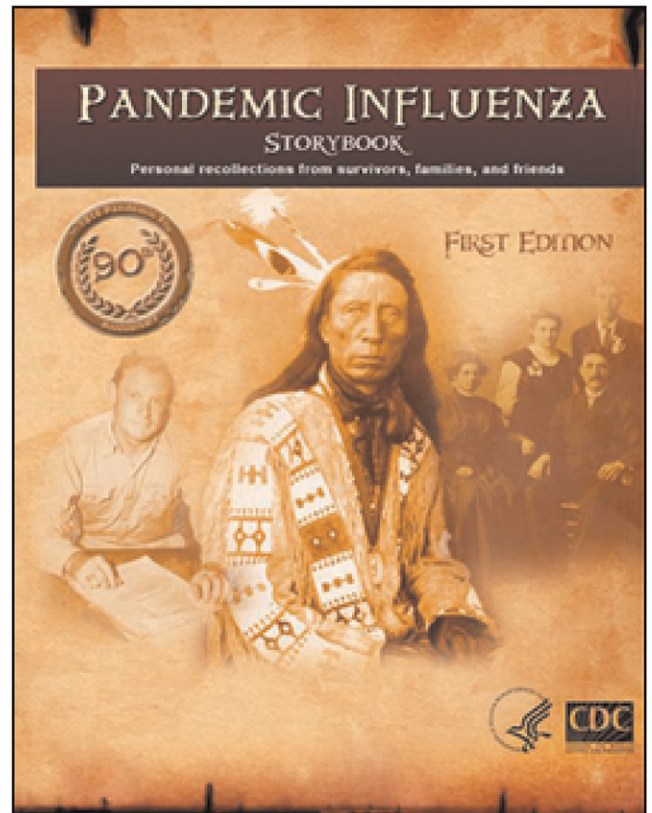
There is a well-documented history of AIAN people confronting and responding to infectious disease outbreaks and other hazards,^{54,55} and although this history need not frame all discussion of pandemic response in tribal communities, these experiences can help inform the planning and implementation of national emergency response activities in tribal communities.⁵⁶ Compelling stories of courage, loss, and survival from

descendants of victims of the 1918 influenza pandemic continue to emerge, and many of these stories are being compiled in CDC’s online *Pandemic Influenza Storybook*. In one of these stories, an American Indian family demonstrated how traditional native knowledge exemplified “modern” principles of disease containment that led to their survival (Figure 1).⁵⁷

Resources for health care are already stretched thin in many tribal communities, so it is important that emergency preparedness planners consider other public health activities when planning for pandemic influenza. Leveraging and strengthening existing tribal public health infrastructure will be important and, ideally, preparing

for an influenza pandemic will improve outreach and health care delivery in general. To that end, numerous tribally focused tools, models, and strategies have been developed to improve clinical service delivery or strengthen public health capacity in Indian country. Some innovative examples of these efforts follow.

In 1 tribe, geospatial technology was used to identify the homes where elderly or disabled people live. During a recent heat wave, outreach workers were able to quickly identify every elderly or disabled tribal member. Workers mobilized in less than 1 hour to visit homes, deliver water, and distribute information about staying cool. Before this system was in place, it took the police 5 days to



Source. US Department of Health and Human Services.⁵⁷

Figure 1—Pandemic Influenza Storybook.

complete the same tasks [L Harvey, Chairperson, Northwest Tribal Emergency Management Council, oral communication, September 2008].

Tribes' participation in state emergency preparedness exercises has occurred in several states. The Navajo Nation, for example, developed and successfully tested a mass prophylaxis distribution plan for their communities using community gathering sites known as chapter houses.⁵⁸

The community-based participatory research model emphasizes the importance of involving tribal communities in researching, developing, and implementing strategies to address a variety of health issues.⁵⁹⁻⁶² A range of tribally specific health interventions have

been developed based on this model,⁶³⁻⁷⁰ which could be useful for emergency preparedness planning and response activities.

Models for community-based health care delivery, such as the Community Health Representative program⁷¹ and the Alaska Community Health Aide Program,⁷² exist in many AIAN communities. These programs train community members to help deliver health care and public health services to their own communities and are an important resource for emergency preparedness and response activities.

The IHS Portland Area office worked with IHS, tribal, and urban Indian health facilities to implement a short-term initiative that successfully increased influenza

vaccination coverage among AIAN adults older than age 65 years. The initiative engaged nontraditional partners in promoting vaccinations and used innovative techniques to increase the use of electronic health data systems.⁷³

In addition to these examples, Table 2 includes a list of resources for emergency preparedness planning in tribal communities.

CONCLUSIONS AND ADVICE

Most tribal communities have particular population groups with unique characteristics that place them at increased risk for adverse health outcomes if an influenza pandemic occurs. Tribal leaders

and public health officials will need to take the lead in identifying vulnerable population groups within their communities and in developing pandemic influenza response plans that address the needs of these groups. Developing sound public health legal preparedness and formal partnerships with local, state, and federal public health agencies will also help address these needs. Public health officials should engage tribes in pandemic influenza planning efforts to ensure that pandemic influenza response activities are effective and that the needs of all communities are met.

To effectively address the needs of vulnerable populations in tribal communities, tribal leaders and health officials should identify the

TABLE 2—Resources for Emergency Preparedness Planning in Tribal Communities

Source	Resource Type	Description	Reference
Centers for Public Health Preparedness	Guidance Document	Principles for collaborating with AIAN tribes	2005-2006 ASPH/CDC Tribal Preparedness Resources Collaboration Group ⁷⁴
Centers for Public Health Preparedness	Web site	Links to tribal-specific resources (eg, training modules for tribal planners)	Centers for Public Health Preparedness ⁷⁵⁻⁷⁸
Northwest Center for Public Health Practice and Northwest Portland Area Indian Health Board	Conference	Emergency preparedness conference bringing together tribal, local, state, and federal emergency preparedness planners	Northwest Portland Area Indian Health Board ⁷⁹
Northwest Tribal Emergency Management Council	Web site	Links to tribal resources such as tribal pandemic influenza plans, grant opportunities, Community Emergency Response Team (CERT) training, Tribal Medical Reserve Corps, and legislative updates	Northwest Tribal Emergency Management Council ⁸⁰
CDC, Public Health Law Program	Guidance Documents	Guidelines for developing mutual aid agreements and similar legal tools to aid preparedness activities across all jurisdictions; inventory of tribal-specific mutual aid agreements	CDC ⁸¹
CDC, Office of Enterprise Communication	Training	Crisis and Emergency Risk Communication (CERC) training opportunities for tribal audiences; course materials available	CDC ⁸²
Association of State and Territorial Health Officials (ASTHO)	Guidance Document	Guidance for public health agencies to plan for identifying and engaging at-risk populations and testing, exercising, and improving preparedness plans for these groups	ASTHO ⁸³
CDC, Emergency Preparedness and Response Web site	Workbook	Workbook for defining, locating and reaching special, vulnerable, and at-risk populations in an emergency.	CDC ⁸⁴

Note. CDC = Centers for Disease Control and Prevention.

specific vulnerable populations in their communities and determine the pandemic influenza preparedness needs of those populations; state health officials should engage tribal health officials and community leaders in preparing to assist vulnerable populations in tribal communities; and tribal leaders and their federal, state, and county partners should refer to existing, tribally focused models and proven approaches from other public health interventions to inform pandemic influenza preparedness planning for vulnerable populations. Tribal and state leadership should also cooperate closely to clarify responsibilities that may cross jurisdictional lines, legal authorities should be defined for specific public health activities needed to assist vulnerable populations in tribal communities, and legal tools, such as mutual aid agreements, should be used to help accomplish these tasks. Finally, federal and state officials should clarify mechanisms for distributing pandemic influenza resources, such as Strategic National Stockpile supplies, that may be needed for vulnerable populations in tribal communities, and federal and state officials should ensure that tribal communities have adequate resources and training to support pandemic influenza planning and response efforts that are designed to meet the needs of vulnerable populations. ■

About the Authors

Amy V. Groom and Cheyenne Jim are with the Immunization Services Division, National Center for Immunization and Respiratory Diseases, Centers for Disease Control and Prevention, Atlanta, GA, and the Division of Epidemiology and Disease Prevention, Indian Health Service, Albuquerque, NM. Mic LaRoque is with the Gallup Indian Medical Center, Indian Health Service, Gallup, NM. Cheryl Mason is an independent project consultant in

Santa Fe, NM. Lisa Neel is a project consultant in Washington, DC. Joe McLaughlin is with the Alaska Section of Epidemiology, Anchorage. Terry Powell is with the Alaska Area Institutional Review Board, Anchorage. Thomas Weiser is with the Portland Area Office, Indian Health Service, Portland, OR. Ralph T. Bryan is with the Office of Minority Health and Health Disparities, Office of the Chief of Public Health Practice, Office of the Director, Centers for Disease Control and Prevention, Atlanta.

Correspondence should be sent to Amy V. Groom, IHS Division of Epidemiology and Disease Prevention, 5300 Homestead Road, NE, Albuquerque, NM 87110 (e-mail: Amy.Groom@ihs.gov). Reprints are available at <http://www.cdc.gov>; click on the "Reprints/E-prints" link.

This article was accepted March 18, 2009.

Contributions

A. V. Groom led the authors in writing and editing, compiled contributions from all authors, and conducted key components of the literature review. C. Jim contributed to the literature review and writing of the sections on chronic disease and the elderly. M. LaRoque led the literature review and the writing and editing of the section on rural isolation. J. McLaughlin contributed crucial information for the section on rural isolation and reviewed and helped edit the essay. L. Neel conducted the literature review and led the writing and editing of the tribal strategies and model section and participated in the literature review and drafting of the section on the urban population and the influenza in Indian country background. C. Mason conducted the primary literature review for and led the writing of the urban section and provided input and helped write the background about influenza in Indian country. T. Powell contributed to the section on rural isolation and served as a primary resource for Alaska Native health issues. T. Weiser conducted the literature review and led the writing of the chronic disease section, provided critical review of the entire essay and helped develop and review the tables. R. T. Bryan originated the project and led all components of it. All authors helped conceptualize ideas, conduct literature reviews, interpret findings, and review and re-write drafts of the essay.

Human Participant Protection

No approval was needed.

References

1. Bryan RT, McLaughlin-Schaefer R, DeBruyn L, Stier DD. Public health legal preparedness in Indian country: an

analytic review of tribal health codes. *Am J Public Health*. 2009; In press.

2. Urban Indian Health Commission. *Invisible Tribes: Urban Indians and Their Health in a Changing World*. Seattle, WA: Urban Indian Health Commission; 2007.
3. US Census Bureau. Characteristics of American Indians and Alaska Natives by Tribe and Language. US Census Bureau Web site. Available at: <http://www.census.gov/prod/cen2000/phc-5-pt1.pdf>. Accessed December 10, 2007.
4. US Census Bureau. American Indians and Alaska Natives in the United States. 2000. US Census Bureau Web site. Available at: http://www.census.gov/geo/www/maps/aian_wall_map/us_wall100.htm. Accessed December 10, 2007.
5. Zuckerman S, Haley J, Roubideaux Y, Lillie-Blanton M. Health service access, use, and insurance coverage among American Indians/Alaska Natives and Whites: what role does the Indian Health Service play? *Am J Public Health*. 2004;94:53–59.
6. Strath R. Influenza among American Indians. *Public Health Rep*. 1919;34:1008–1009.
7. Heagerty J. Influenza among American Indians. *Am J Public Health*. 1920;3:193–194.
8. Philip RN, Lackman DB. Observations on the present distribution of influenza A/Swine antibodies among Alaskan Natives relative to the occurrence of influenza in 1918-19. *Am J Hyg*. 1962;75:322–334.
9. Reagan A. The influenza and the Navajo. *Proc Indiana Acad Sci*. 1919;29:243–247.
10. Treon F. Epidemic influenza among the Sioux Indians. *The Cincinnati Lancet-Clinic*. 1890;24:160–161.
11. Philip RN, Weeks WT, Reinhard KR, et al. Observations on Asian influenza on two Alaskan islands. *Public Health Rep*. 1959;74:737–745.
12. Clark PS, Feltz ET, List-Young B, et al. An influenza B epidemic within a remote Alaska community. *JAMA*. 1970;214:507–512.
13. Maynard JE. Influenza B at Fort Yukon: report of an outbreak 1961. *Alaska Med*. 1962;4:1–6.
14. Nagler FP, Van Rooyen CE, Sturdy JH. An influenza virus epidemic at Victoria Island, NWT Canada. *Can J Public Health*. 1949;40(1):457–465.
15. Rooyen CE, McClelland L, Campbell EK. Influenza in Canada during 1949 including studies on Eskimos. *Can J Public Health*. 1949;40:447–456.
16. Rice GW. *Black November: The 1918 Influenza Epidemic in New Zealand*.

Christchurch, New Zealand: Canterbury University Press; 2005.

17. Ganley ML. The dispersal of the 1918 influenza virus on the Seward Peninsula, Alaska: an ethnohistoric reconstruction. *Int J Circumpolar Health*. 1998;Suppl 1:247–251.
18. Indian Health Service. Government Performance Results Act (GPRA) 2007 Executive Summary. February 2008. Available at: http://www.ihs.gov/cio/crs/crs_gpra_reporting.asp. Accessed September 8, 2008.
19. US Department of Health and Human Services, Indian Health Service. Trends in Indian Health 2000–2001. Indian Health Service Web site 2008. Available at: http://www.ihs.gov/NonMedicalPrograms/IHS_Stats/index.cfm?module=hqPub&option=t00. Accessed May 22, 2008.
20. Centers for Disease Control and Prevention. Health status of American Indians compared with other racial/ethnic minority populations—selected states, 2001–2002. *MMWR Morb Mortal Wkly Rep*. 2003;52(47):1148–1152.
21. Okoro CA, Denny CH, McGuire LC, Balluz LS, Goins RT, Mokdad AH. Disability among older American Indians and Alaska Natives: disparities in prevalence, health-risk behaviors, obesity, and chronic conditions. *Ethn Dis*. 2007;17:686–692.
22. Goins RT, Moss M, Buchwald D, et al. Disability among American Indians and Alaska Natives: an analysis of the 2000 census public use microdata sample. *Gerontologist*. 2007;47:690–696.
23. US Renal Data System. *USRDS 2008 Annual Data Report: Atlas of Chronic Kidney Disease and End-Stage Renal Disease in the United States*. Bethesda, MD: National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases; 2008. Available at: <http://www.usrds.org/atlas.htm>. Accessed September 18, 2008.
24. Holman RC, Yorita KL, Singleton RJ, et al. Increasing rate of hospitalizations among older American Indian and Alaska Native adults. *Journal of Health Disparities Research and Practice*. 2007;2(1):35–49 Available at <http://chdr.unlv.edu/journal.htm>. Accessed October 5, 2008.
25. Holman RC, Curns AT, Kaufman SF, et al. Trends in infectious disease hospitalizations among American Indians and Alaska Natives. *Am J Public Health*. 2001;91(3):425–431.
26. Peck AJ, Holman RC, Curns AT, et al. Lower respiratory tract infections among American Indian and Alaska Native children and the general population of U.S. children. *Pediatr Infect Dis J*. 2005;24(4):342–351.

27. Gupta RK, George R, Nguyen-Van-Tam JS. Bacterial pneumonia and pandemic influenza planning. *Emerg Infect Dis.* 2008;14(8):1187–1192.
28. Lacapa R, Bliss S, Larzelere-Hinton F, et al. Changing epidemiology of invasive pneumococcal disease among White Mountain Apache persons in the era of pneumococcal conjugate vaccine. *Clin Infect Dis.* 2008;47:476–484.
29. Watt JP, O'Brien KL, Benin AL. Invasive pneumococcal disease among Navajo adults, 1989–1998. *Clin Infect Dis.* 2004;38(4):496–501.
30. Singleton RJ, Butler JC, Bulkow LR, et al. Invasive pneumococcal disease epidemiology and effectiveness of 23-valent pneumococcal polysaccharide vaccine in Alaska native adults. *Vaccine.* 2007;25(12):2288–2295.
31. Weber JT. Community-associated methicillin-resistant *Staphylococcus aureus*. *Clin Infect Dis.* 2005;41(Suppl4):S269–S272.
32. Stemper ME, Shukla SK, Reed KD. Emergence and spread of community-associated methicillin-resistant *Staphylococcus aureus* in rural Wisconsin, 1989–1999. *J Clin Microbiol.* 2004;42:5673–5680.
33. Basu S. Red lake wake draws cries for more IHS funds. *US Medicine.* May 2005. Available at: <http://www.usmedicine.com/article.cfm?articleID=1071&issueID=74>. Accessed December 2, 2008.
34. Narva A, Kuracina T. Chronic Kidney Disease Is a Public Health Issue. *Indian Health Service Primary Care Provider.* 2002;27:188. Available at: <http://www.ihs.gov/PublicInfo/Publications/HealthProvider/issues/PROV0902.pdf>. Accessed December 2, 2008.
35. Centers for Disease Control and Prevention. Racial differences in trends of end-stage renal disease, by primary diagnosis, United States 1994–2004. *MMWR Morb Mortal Wkly Report.* 2007;56(11):253–256.
36. US Renal Data System. *USRDS 2007 Annual Data Report: Atlas of End-Stage Renal Disease in the United States.* Bethesda, MD: National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, 2007. Available at: http://www.usrds.org/2007/view/06_hosp_morte.asp. Accessed December 9, 2008.
37. The National Forum of ESRD Networks. ERSN Web site. Available at: <http://www.ESRDnetworks.org>. Accessed August 26, 2008.
38. Indian Health Service. *The Epidemic of Type 2 Diabetes.* Appendix 1, p176. Indian Health Service Web site. Available at: http://www.ihs.gov/MedicalPrograms/Diabetes/resources/irc2004_apndx1.pdf. Accessed October 5, 2008.
39. US Department of Health and Human Services. *Centers for Medicare and Medicaid Services. Preparing for Emergencies: A Guide for People on Dialysis.* Baltimore, MD: US Dept of Health and Human Services; 2002.
40. Kleinpeter MA. End-stage renal disease use in hurricane-prone areas: should nephrologists increase the utilization of peritoneal dialysis? *Adv Chronic Kidney Dis.* 2007;14(1):100–104.
41. Ugonwole SW. *We the people: American Indians and Alaska Natives in the United States.* Washington, DC: United States Census Bureau; 2006.
42. Upper Midwest Rural Health Research Center. Health insurance coverage and access to health care for American Indian and Alaska Native elders. Upper Midwest Rural Health Research Center Web site. Available at: http://www.uppermidwesthrhc.org/pdf/policybrief_native_elders.pdf. Accessed February 23, 2009.
43. Chapleski EE, Dwyer JW. The effects of on/off reservation residence on in home service use among Great Lakes American Indians. *J Rural Health.* 1995;11(3):204–216.
44. Fuller-Thomson E. Functional limitations among older American Indians and Alaska Natives: findings from the census 2000 supplementary survey. *Am J Public Health.* 2005;95:1945–1948.
45. Fuller-Thomson E, Minkler M. American Indian/Alaska Native grandparents raising grandchildren: findings from the census 2000 supplementary survey. *Soc Work.* 2005;50:131–139.
46. Burhansstipanov L. Urban Native American health issues. *Cancer Supplement.* 1999;88(5):1207–1213.
47. Castor ML, Smyser MS, Tauli MM, et al. A nationwide population-based study in identifying health disparities between American Indians/Alaska Natives and the general populations living in select urban counties. *Am J Public Health.* 2006;96(8):1478–1484.
48. Housing Assistance Council. Native American rural minority counties. Housing Assistance Council Web site 2008. Available at: http://www.ruralhome.org/pubs/RacePlaceandHousing/RacePlace&Housing_NA_RMCs.pdf. Accessed July 8, 2008.
49. Hennessy TW, Ritter T, Holman RC, et al. The relationship between in-home water service and the risk of respiratory tract, skin, and gastrointestinal tract infections among rural Alaska Natives. *Am J Public Health.* 2008;98:2072–2078.
50. National American Indian Housing Council. *Too Few Rooms: Residential Crowding in Native American Communities and Alaska Native Village.* Washington, D.C.: National American Indian Housing Council; 2002.
51. Gessner BD. Lack of piped water and sewage services is associated with pediatric lower respiratory tract infection in Alaska. *J Pediatr.* 2008;152:666–670.
52. The Alaska Department of Labor and Workforce Development. Borough and census area, “bridged” age, race and sex for July 1, 2006. Available at: <http://www.labor.state.ak.us/research/pop/estimates/CABridge06x.xls>. Accessed July 23, 2008.
53. Barry JM. *The Great Influenza: The Epic Story of the Deadliest Plague in History.* New York, NY: Penguin Books; 2005:360–361.
54. Stiffarm LA, Lane P. The state of Native American genocide, colonization and resistance. In: Jaimes MA, ed. *The Demography of Native North America: A Question of American Indian Survival.* Boston, MA: South End Press; 1992:23–53.
55. Bianchine PJ, Russo TA. The role of epidemic infectious disease in the discovery of the Americas. *Allergy Proc.* 1992;13(5):225–232.
56. Peate WF, Mullins J. Disaster preparedness training for tribal leaders. *J Occup Med Toxicol.* 2008;3:2 Available at: <http://www.occup-med.com/content/3/1/2>. Accessed October 5, 2008.
57. US Department of Health and Human Services. *Pandemic Influenza Storybook.* Available at: <http://www.pandemicflu.gov/storybook>. Accessed September 8, 2009.
58. Houk K, Sweeney L. IHS rural mass prophylaxis planning. *IHS Prim Care Provid.* 2005;30(4):92–94.
59. Christopher S. Recommendations for conducting successful research with Native Americans. *J Cancer Educ.* 2005;20(1, suppl):47–51.
60. Fisher PA, Ball TJ. Tribal participatory research: mechanisms for a collaborative model. *Am J Community Psychol.* 2003;32(3-4):207–216.
61. Weaver HN. The challenges of research in Native American communities: incorporating principles of cultural competence. *J Soc Serv Res.* 1997;23:1–15.
62. Manson SM, Garrouette E, Goins RT, et al. Access, relevance and control in the research process: lessons from Indian Country. *J Aging Health.* 2004;16(5 Suppl):58S–77S.
63. Conti KM. Diabetes prevention in Indian Country: developing nutrition models to tell the story of food-system change. *J Transcult Nurs.* 2006;17:234–245.
64. Unger JB, Soto C, Thomas N. Translation of health programs for American Indians in the United States. *Eval Health Prof.* 2008;31(2):124–144.
65. Davis SM, Clay T, Smyth M, et al. Pathways curriculum and family interventions to promote health eating and physical activity in American Indian schoolchildren. *Prev Med.* 2003;37(6 Pt 2):S24–S34.
66. Teufel-Shone NI. Promising strategies for obesity prevention and treatment within American Indian Communities. *J Transcult Nurs.* 2006;17:224–229.
67. LaRowe TL, Wubben DP, Cronin KA, et al. Development of a culturally appropriate, home-based nutrition and physical activity curriculum for Wisconsin American Indian families. *Prev Chronic Dis.* 2007;4(4):A109.
68. Bachar JJ, Lefler LJ, Reed L, et al. Cherokee choices: a diabetes prevention program for American Indians. *Prev Chronic Dis.* 2006;3(3):A103.
69. Petereit DG, Molloy K, Reiner ML, et al. Establishing a patient navigator program to reduce cancer disparities in the American Indian communities of western South Dakota: initial observations and results. *Cancer Control.* 2008;15(3):254–259.
70. The University of New Mexico Cancer Center. Reaching out to overcome New Mexico's cancer health disparities. *El Oso Sanador.* Spring 2008.
71. Community Health Representative Program. Indian Health Service Web site. Available at: <http://www.ihs.gov/NonMedicalPrograms/chr>. Accessed July 3, 2008.
72. Alaska Community Health Aide Program. Available at: <http://www.akchap.org>. Accessed July 3, 2008.
73. Weiser T, Lee D. Short-term initiatives make a difference. *Northwest Portland Area Indian Health Board Health News and Notes.* April 2008, p8. Available at: http://www.npaihb.org/resources/npaihb_program_newsletters. Accessed October 5, 2008.
74. 2005–2006 ASPH/CDC Tribal Preparedness Resources Collaboration Group. Tribal preparedness resources: developing collaborations with tribal nations. Centers for Public Health Preparedness Network Web site. Available at: http://www.swcphp.ouhsc.edu/pdf/tribal_cg_06.pdf. Accessed August 26, 2008.
75. Centers for Public Health Preparedness. Tribal community health representative workshop. Centers for Public Health Preparedness Web site. Available at: http://preparedness.asph.org/RC_Details.cfm?ResourceID=2333. Accessed August 5, 2008.

76. Centers for Public Health Preparedness. Tribal public health emergency and bioterrorism preparedness and response training modules. Centers for Public Health Preparedness Web site. Available at: http://preparedness.asph.org/RC_Details.cfm?ResourceID=1647. Accessed August 5, 2008.

77. Centers for Public Health Preparedness. Tribal public health emergency and bioterrorism preparedness and response final report. Centers for Public Health Preparedness Web site. Available at: http://preparedness.asph.org/RC_Details.cfm?ResourceID=1642. Accessed August 5, 2008.

78. Centers for Public Health Preparedness. Tribal, IHS and public health emergency preparedness training. Centers for Public Health Preparedness Web site. Available at: http://preparedness.asph.org/RC_Details.cfm?ResourceID=921. Accessed August 26, 2008.

79. Northwest Portland Area Indian Health Board. Emergency response Web site. Available at: http://www.npaihb.org/resources/emergency_response. Accessed September 8, 2008.

80. Northwest Tribal Emergency Management Council. Available at: <http://www.NWTEMC.org>. Accessed August 26, 2008.

81. Centers for Disease Control and Prevention. Public health law program. Available at: <http://www2a.cdc.gov/php/mutualaid/index.asp>. Accessed August 26, 2008.

82. Centers for Disease Control and Prevention. Emergency preparedness and response crisis and emergency risk communication (CERC) Web site. Available at: <http://emergency.cdc.gov/cerc/index.asp>. Accessed September 8, 2008.

83. Association of State and Territorial Health Officers (ASTHO). At-risk populations and pandemic influenza: planning guidance for state, territorial, tribal, and local health departments. ASTHO Web site. Available at: http://www.astho.org/index.php?template=at_risk_population_project.html. Accessed August 26, 2008.

84. Centers for Disease Control and Prevention. Public health workbook to define, locate, and reach special, vulnerable, and at-risk populations in an emergency (draft). Emergency Preparedness and Response Web site. Available at: <http://www.bt.cdc.gov/workbook>. Accessed December 2, 2008.