

**HEALTH AND HEALTH CARE OF
ELDERS FROM
NATIVE HAWAIIAN AND
OTHER PACIFIC ISLANDER BACKGROUNDS**

Gilbert Wergowske, M.D.,

Senior Focus, Mills-Peninsula Extended Care Facility, and
Peninsula Medical Center Skilled Nursing Facility, Burlingame, California

Patricia Lanoie Blanchette, M.D., MPH

Department of Geriatric Medicine and Pacific Islands Geriatric Education Center

John A. Burns School of Medicine

University of Hawaii, Honolulu, Hawaii

DESCRIPTION

This module includes information about Native Hawaiian and other Pacific Islanders living both in the 50 U.S. states and in the various Pacific Islands. As such, its content differs from that of other sections. The reasons for including information about the islands themselves include the ongoing relationships and responsibilities for health care services between many of them and the U.S. government. There is a paucity of information about these islands currently available elsewhere. This section is intended to be useful for health care workers preparing themselves to provide direct care to elders both on the U.S. mainland and in the Pacific Islands. Readers are urged to consult new and growing sources of information at the John A. Burns School of Medicine at the University of Hawaii. These include the Native Hawaiian Center of Excellence <http://www.hawaii.edu/nhcoe>, and the medical school's new Department of Native Hawaiian Health. <http://hawaiiimed.hawaii.edu>.

LEARNING OBJECTIVES

After completing this module, learners should be able to:

- 1) Explain the difference between health care decision-making based on the principle of autonomy vs. that of group orientation.
- 2) List four considerations Western providers should take into account in clinical assessment of Pacific Island elders.
- 3) Discuss appropriate approaches in dealing with rehabilitation after a stroke or other serious medical illness.

CONTENT¹

I. Introduction and Overview

A. Demographics

The majority of Native Hawaiian and other Pacific Islanders in the U.S. live in Hawaii and the Western states, notably California, Washington and Oregon. In the 2000 Census there were 398,835 residents of the U.S. who identified themselves as being only Native Hawaiian or other Pacific Islander. In addition, another 475,579 said they were from those backgrounds in combination with one or more other “racial” groups. Of the almost 400,000 who were only Native Hawaiian or other Pacific Islander, 140,652 (35%) were Native Hawaiian, 58,240 (15%) were Guamanian or Chamorro, and 91,029 (23%) were Samoan.

In the 1990 census there were 33,408 (9.2%) of the total Pacific Islander population, including Hawaii, that were aged 55 and over and 14,735 (4%) 65 and over. Almost all (99%) of the small population of Tongan elders were born outside the U.S., but only 38% of the 2000+ Samoan elders were. For more information on the characteristics of the older population from Pacific Islander background, see the chart in the Introduction Section to the Asian Pacific Islander modules.

B. Background

The Pacific Islands, also sometimes called "Oceania" consist of three distinct island groups in the Pacific Ocean, Micronesia, Melanesia, and Polynesia. These groupings are useful in that they cluster people by common heritage, and to some extent by cultural practices and values. The islands are widely dispersed over vast regions. For example, the entire continental U.S. can be superimposed over a small section of Micronesia. Providing health care in regions so widely dispersed can be a daunting challenge.

The islands are of both volcanic and coral origins. The oldest islands geologically consist of relatively flat spits of land, often shaped in the form of crescents, that derive their origin from coral reefs built up over eons around a central volcano that has long since sunk into the ocean. Newer islands geologically, such as the Hawaiian Islands, have large central extinct, dormant, or active volcanoes, with people living on the slopes or lava outcroppings.

¹ Citations for specific information are not included in the text. References for the content are taken from those resources listed in the reference list.

Centuries before the birth of Christ, the Pacific islands were populated progressively from West to East by several migrations of fishermen from Malaysia and South East Asia. There appear to have been four main components: Melanesian aborigines, a pre-Polynesian migration to coastal Melanesia, the Polynesians, and an independent non-Polynesian colonization of Micronesia. People were organized in tribes or clans, and generally shared the Asian attitude of the importance of the group over the importance of the individual.

Hawaii's population has the longest life expectancy of any state in the U.S. However, people with Native Hawaiian heritage make up only about 20% of the total and have one of the shortest life expectancies in Hawaii, about equal to the average U.S. life expectancy. Prior to Western contact with Captain Cook in 1776, it is estimated that there were 300,000-400,000 Native Hawaiians. Some have estimated the total to be greater. However, in Hawaii as in other isolated areas, contact with Western diseases for which the native population had no immunity, such as measles, chicken pox, and venereal diseases, nearly extinguished the native population. Other diseases, thought to have come from Asia, such as leprosy or Hansen's Disease, took another huge toll. Consequently, there are very few full-blooded Hawaiians remaining, and most of the people who are culturally Hawaiian today are of mixed ethnicity.

With the exception of Hawaii, the Pacific Islands have a young population. Strikingly, Palau, which has the oldest population in the non-Hawaiian Pacific Islands, only has a life expectancy at birth of 65 years for men and 69 years for women. Its median age is only 28.3 years. Many island groups have a median age of less than 20 years. The official retirement age in Palau is 60 years, but 45 is considered old, and there is pressure towards earlier retirement to open up jobs for the young.

Many young Pacific Islanders come to the United States in search of education and economic opportunity. In some cultures, particularly Samoa, there is pressure to return home after education to select a mate. For example, according to the Federated States of Micronesia Census Report of 1994, most of the 15,000 Micronesians then living in the United States and its territories stated that they were only there temporarily and were planning to eventually return home. For those who stay in the U.S., once they are financially established, like other immigrants, they sponsor other family members to enter the U.S.

II. Patterns of Health Risks

A. Introduction

Most people who take an interest in Pacific Island health believe that they will be dealing with exotic tropical illnesses. While these do exist, the major health problems are those of obesity, Type II diabetes mellitus, hypertension, and their resulting cardiovascular and cerebrovascular diseases. In those islands where health care is relatively unavailable, people succumb to treatable medical illnesses and traumatic injuries. The challenges of providing modern health care for to a population dispersed over such a large area are daunting. The health risks below are worth considering both in caring for people in the Pacific Islands and in new immigrants to the U.S. from these areas.

B. Obesity

The reports of Captain Cook's first contact with Native Hawaiians described strong, healthy-looking, muscular natives. On subsequent voyages, the population had declined and the natives looked sicker. Obesity was rare. Today, obesity is a common problem, to the extent that it is considered the norm for both men and women.

C. Diabetes Mellitus

Type II diabetes mellitus is a common problem throughout the Pacific Islands. For example, the age-adjusted prevalence of Type II diabetes mellitus in Native Hawaiians is four times higher than of the US NHANES II population. The prevalence in women is three times that in men. In Nauruans, from 1% to 2% become frankly diabetic each year. Among Pacific Islanders, only non-Austronesian-speaking Melanesians are not particularly at high risk for diabetes mellitus. The rate of serious lower extremity infections is greater than in the U.S. as is the extent to which these poorly treated wounds result in amputation and in premature death.

D. Hypertension

From a sampling in California, Pacific Islanders were less likely than other ethnic groups to be aware of having hypertension, less likely to be in treatment, and less likely have their hypertension controlled.

E. Dyslipidemia

Abnormally high concentrations of lipids portending higher risk of cardiovascular and cerebrovascular diseases are common among Pacific Islanders. Early work has shown that dietary changes can successfully lower these risks.

F. Cardiovascular and Cerebrovascular Disease

As could be expected from the prevalence of obesity, Type II diabetes mellitus, hypertension, and dyslipidemia among Pacific Islanders, the prevalence of cardiovascular and cerebrovascular disease is very great. For example, in Samoa there is a virtual explosion of cardiovascular and cerebrovascular disease, especially stroke. Samoans in California are heavier than their counterparts in Samoa or Hawaii, but their elderly seem to be escaping the increased risk of stroke and heart disease so far. One theory for this relates to the deference and respect given them as elders, an effect that may disappear with acculturation and subsequent generations. On the other hand, heart disease and stroke are virtually non-existent in Kitava, Papua New Guinea, where tubers, fruit, fish and coconut are the main dietary staples. Valvular heart disease is common among immigrants from the Pacific Islanders, largely due to rheumatic fever as described below.

G. Infectious Diseases

Most of the world's deaths from tuberculosis occur in Asia and the Pacific Islands. Multiple-drug-resistant strains of mycobacterium are common. *Mycobacterium marinum* is common and may be the cause of chronic lower extremity lesions. *Leptospirosis* outbreaks occur throughout the region. *Angiostrongylus* and *Strongyloides* infections are seen. Infection with *H. pylori* is common, but with different strains than European New Zealanders, and less associated with peptic ulcer disease.

Rheumatic fever and rheumatic heart disease continue to be significant problems in the Pacific Islands. Most victims of rheumatic heart disease have not received prophylaxis. Influenza and other common viruses are also present in the Pacific Islands. Arthropod-borne viral disease, particularly dengue fever, is also common, but dengue hemorrhagic fever is rare. In the year 2001, there was an outbreak of dengue fever in Maui, a very unusual situation that the Hawaii Department of Health has attributed to contact with recent visitors from Tahiti.

Hansen's Disease, or leprosy, was thought to have been largely eradicated with the use of effective antimicrobials. However, there was a recent discovery of 15 new cases of Hansen's disease in Honiara, Solomon Islands. Because of the severe destruction and disfigurement of untreated Hansen's Disease, and the great success of medications, it is wise to be observant for anesthetic non-pigmented lesions in people from Pacific Islands. Culturally, Asian-Pacific Islander women tend to engage in non-explicit, inferential assessments of sexual partners' risk for HIV infection. This may place them at higher risk for exposure.

H. Hyperuricemia/Gout

This condition is common throughout the Pacific resulting from a hereditary reduced fractional excretion. While elevated levels of uric acid are often asymptomatic, it can predispose individuals to gout as a complication of medications that further elevate uric acid. Tophaceous gout, now largely relegated to medical textbooks in the U.S., is still seen in Pacific Islands where medical care is sparse.

I. Arthritis and Osteoporosis

Arthritis and osteoporosis are present at about the same rates as in other ethnic groups.

J. Neurological Diseases

The types of neurological diseases among Pacific Islanders appear to be the same as in other ethnic groups with the exception of the Guam Parkinsonian Dementia (GPD) syndrome, also called "lytico-bodig", and kuru. GPD is a disease of native Guamanian adults whose derivation is Chamorro, and it has a bimodal presentation. The syndrome has been known to affect Chamorro immigrants in the U.S. Symptoms greatly resemble amyotrophic lateral sclerosis (ALS) when GPD presents in middle age. When GDP comes on in later years, the symptoms are of Sinemet-unresponsive Parkinson's Disease and severe dementia. The cause(s) of Guam Parkinsonian Dementia remain uncertain despite many years of careful and intensive investigation. However, new cases are practically nonexistent, and one or more environmental factors that have changed seem likely to have been the cause. Kuru is a prion-related spongiform encephalopathy associated with the ritual of cannibalism in Papua New Guinea and is unlikely to be seen in the U.S. Although these diseases are rare, they are of significant interest to researchers studying both Alzheimer's Disease and Parkinson's Disease.

K. Cancer:

Most Pacific Islanders do not appear to be at greater risk for cancer with the exception of American Samoan men. They have an increased risk for lung, prostate, thyroid and liver cancer, and leukemia compared to other Pacific Islander populations. However, Samoan men have a lower risk of colon and rectal cancer. American Samoan women have an increased risk of breast cancer, uterine and cervical cancer, and thyroid cancer at an early age compared with other Pacific Islanders.

Melanesians from New Caledonia have an extraordinarily high incidence of papillary thyroid carcinoma, not associated with known radiation exposure. Familial Burkitt's lymphoma, previously thought isolated to Africa, has been seen in four families in Papua, New Guinea.

L. Alcohol and Drug Abuse

Alcohol use and abuse is widely prevalent among Pacific Islanders, both in the U.S. and in the native islands. Mainly older people, especially men, have had significant exposure to alcohol for much of their lives. Some islands have been used as part of the drug trade, and exposure to both alcohol and drugs is prevalent among younger people.

III. Fund of Knowledge Regarding Health

A. Heterogeneity

There is an extremely wide variation among Pacific Islander individuals and groups with regard to ethnicity, culture, religion, work experience, education, and degree of Westernization. As with many people, Pacific Islanders must be assessed individually for their health beliefs and knowledge. Grouping them masks their individuality, and doing so risks establishing an effective relationship. Someone with little experience in the Pacific Islands may presuppose that Pacific Islanders living in the U.S. are more Westernized or better educated than individuals living in the Pacific Islands. However, for any individual, the opposite may be true. For example, an elderly immigrant to the U.S. may be very traditional, while a person who is an educated world traveler may choose to keep his or her primary residence in a remote Pacific Island. Two centuries of Western contact have provided opportunities for education and modernization.

It is important for clinicians to be as specific as possible about the background of the older patient since there is a long history of rivalry between some of the Pacific Island populations.

B. Culturally Related Health Beliefs

Because of the cultural variability in the vast region, it is important for the provider to recognize the non-Western health beliefs and practices that may influence the older patients from specific Pacific regions. Identifying cultural guides or informants from the specific community, such as religious leaders or clan leaders, and asking them to educate the health care providers can help avoid potential misunderstanding. An example of the conflicting expectations of care based on the traditions of the *kahuna lapa'au* (priest who heals with medicines) in the Native Hawaiian culture is found in Case 4 in the Instructional Strategies section.

C. Effect of Historical Experiences on Health Care

Almost all of the Pacific Islands have been subjugated by the U.S. and/or European countries, many times in association with military conquests. The colonial regimes have frequently mistreated the native populations, confiscated land, and brought severe disruption to their way of life and economic system (e.g., overthrow of the Hawaiian monarchy by Americans). There may be a resulting level of distrust of Western providers that affects the clinical interaction.

IV. Culturally Appropriate Geriatric Care: Assessment

A. Approach to the Patient

Pacific Islander societies traditionally revere their elders. To be accepted, the health care provider must show respect. A simple greeting in the native language goes a long way to opening the relationship. An interpreter is essential if the patient and provider do not share a common language. An appropriate interpreter will often be a child of the patient. Issues of privacy and autonomy will be less important to the patient than the cohesiveness of the group. In matters of health, elders will often defer to the judgment of their adult children. Because of the great diversity in this group, it is important to ask the patient or the caregiver what is culturally appropriate. Do not use first names unless invited. Be sure to ask the patient and family member how they wish to be addressed. It is usually appropriate to express a lack of knowledge about the culture and concern that the interaction be meaningful. It is acceptable to invite the patient and family to speak up if they begin to feel uncomfortable during the interview or examination.

B. Important Cultural Issues

As previously stated, individuals may vary widely. However, there are a few relatively common cultural beliefs among Pacific Islanders. It is well to remember that an individual may be modern in dress, but traditional in health beliefs. The reverse is also true.

1. Individual Autonomy vs. Group, and Rank. Most Pacific Island societies place more emphasis on the group, and the hierarchy within the group, than on the rights of the individual. It would not be unusual to see more concern about a minor illness in an elder village chief than a more serious illness in someone younger and of lower rank. While this goes against the grain for egalitarians, this behavior is likely to derive from the history of people of chiefly rank having a much greater responsibility for the survival of the entire group. Body tattooing in many Pacific Island cultures has great significance. Although it may be simply decorative, in many older people tattooing at various stages of their lives denotes a significant achievement in rank.

2. Indirect Communication Style : Keep in mind however, that group-oriented people may be very indirect in their pattern of communication. Internal negative feelings such as unfairness, disappointment, and anger may not be culturally appropriate for external expression. This is especially important to remember in working with family caregivers.

3. Possible Suspiciousness. Many Pacific Islanders have been subjugated and dominated by Westerners, both European and American, and have been mistreated over decades or centuries. Some of the patients harbor resentment and suspicion of Western ways. Resentment and suspicion must be overcome for a successful therapeutic relationship. Genuine concern for the patient and absolute honesty are the best approaches to suspicion and resentment.

V. Culturally Appropriate Geriatric Care: Treatment

A. Compliance

Pacific Islander patients tend to visit the doctor less frequently than Western patients. Even in the face of chronic disease, if they feel well, they tend not to come for follow-up. The concept that you should have to take a medicine for the rest of your life may be foreign to them. Encouragement may be necessary in the form of education and follow-up phone calls to continue them on long-term medications and to get them to return for follow-up.

B. Lack of Experience with Recovery from Serious Illness

Because many Pacific Islanders have little experience seeing people fully recover from a heart attack or stroke, there is generally a much greater acceptance that a serious disease later in life is likely to be fatal. Therefore, efforts at rehabilitation may be difficult to implement. These societies traditionally revere their elders, a concept we know as filial piety. For example, when an elder is recovering from a stroke there is a tendency to lovingly attend to the elder's every need and make his/her last days comfortable rather than to pursue the return to ambulation and independent self-care.

C. Informed Consent

Some of the societies hold the physician in such reverence that it is unthinkable for them to ever ask a question to help understand the office visit. Providers may have to go to great lengths to get the truly informed consent that the American society demands.

D. Acceptance of Aging and Death

There is often a combined body, mind, and spirit existence among Pacific Islanders that engenders a coping strategy of adaptation to change and maintenance of continuity rather than trying to preserve youth. Death may be seen as a part of life. The elders put more importance on their value to society than on their own comfort and health.

E. Caregiver Stress

More Westernized children may experience significant cultural conflict in decision-making for their more traditional parents. It may be necessary to anticipate and to assist the caregivers through these stresses. When dementia is present, caregivers may have some difficulty accepting that the patient is not always in control of his or her actions and does not intend the disruption caused to the family and caregiver. Attitudes such as these may be a sign of previous or actual dysfunction or of some history of domestic violence.

F. Late Presentation of Illness.

Patients in these societies tend to present much later in the course of a disease than typical Western patients, whether it is from an acute infection, cancer, dementia, or from renal failure or failure-to-thrive.

G. Community Support

It is important to enlist the support of family and caregivers. Get to know the cultural community leaders, such as chiefs or ministers. If they do not accept your approach to treatment, your approach is much less likely to be successful. Be alert for, and accepting of, where possible, alternative or complementary medicine approaches. If one of these approaches must be rejected, explain in detail why you believe the alternative approach may be detrimental. Be prepared for a rejection of your position. Samoan people, for example, are often very involved in their churches.

INSTRUCTIONAL STRATEGIES

In addition to lecture and reading assignments, the following cases can be used for discussion or written assignments.

Cases

Case 1: *A young American physician, newly assigned to provide care at the Lyndon Baines Johnson Medical Center in American Samoa, is caring for a very sick child in the Emergency Room. He is astonished when the nurses whisk the child off of the examining table and, with great deference, assist an older man who is heavily tattooed onto the table. The older man does not appear to be very ill and has the complaint of a minor sore throat. The American physician protests to the nurses and orders them to return the child to the table and to have the older man wait. The nurses refuse to do so, and the Emergency Room comes to a standstill.*

What explains this behavior and what should the physician do?

Answer: The physician is faced with several cultural issues. The older man is of a high chiefly rank and it is expected that he will be treated with great deference and be seen first. The chief has very likely done extraordinary service to his people over his lifetime, has a major role to play with regard to resources, and his survival better insures the well-being of his people than does the survival of the child. Although children are highly valued, rank is more important. The concept of triage according to severity of illness is less important to the staff than the cultural imperative to treat the chief first. The staff does not know how to explain this to the new physician and their non-confrontational conversational styles increases their level of difficulty. The physician should show great deference to the chief, examine and treat him carefully but quickly, and then return to caring for the child as quickly as he can. He should remember that he is working with people who do not completely share his values.

Case 2: *A medical student is working in a clinic in Hawaii that frequently serves the indigent and new immigrants. An elderly Samoan woman who has recently immigrated to Hawaii is brought to the clinic because of a hypopigmented lesion on her face. It appears to be vitiligo. However, to be thorough with the examination, the medical student tests the sensation in the lesion by touching it with a pin. The patient speaks no English, but they work out a system of communication whereby the patient clearly indicates when she does and when she does not feel the pinprick. She clearly does not feel the pinprick in the central part of the lesion. The medical student makes a diagnosis of Hansen's Disease (leprosy), and presents the patient to her attending physician. The attending physician smirks at the medical student's "zebra" diagnosis and gives her a lecture about vitiligo, and common things being common. He then examines the patient himself, fully prepared to send the patient on her way. However, much to his surprise, he confirms the medical student's diagnosis!*

Case 3: *A medical resident does a one- month elective in the Marshall Islands. He sees an elderly diabetic patient with a minor wound on his left leg. He makes the diagnosis, explains the necessary treatment to the patient and family, and carefully explains the need for follow-up care. A year later, the resident returns for another elective and is astonished and saddened to see that his patient has had a below-the-knee (BKA) amputation of his left leg. He learns that the patient lives in crowded unsanitary conditions and that simple cleansing of the wound is very difficult. The patient's family did not return him to the clinic until an amputation was the only treatment possible because they did not want to put him through the difficulty of a clinic visit.*

Case 4: *A geriatrician is working at a VA clinic. He sees a new patient, an elderly Native Hawaiian whose blood sugar is 400, and blood pressure is 220/150 (greatly elevated). He has great difficulty walking because of arthritis in both knees. The blood sugar and blood pressure are so high that the geriatrician wishes the patient to start treatment immediately and to return to the clinic every day until he is certain that the conditions are well under control. The patient listens carefully, but explains that he will not take the medications nor will he return to the clinic. He rarely leaves his home. He has come today only at the insistence of his granddaughter; he intends for this to be his first and last visit.*

What should the geriatrician do?

Answer: The geriatrician should ask the patient if it is okay to bring the granddaughter into the office.

The patient readily agrees. The granddaughter is willing to bring her grandfather back every day and to supervise the medication administration. However, the patient is friendly and smiling, but, in a circuitous way, he refuses. The granddaughter suggests that the patient is very traditional and expects that any physician that he should listen to should come to his house and "talk story".

What should the geriatrician do?

Answer: *The geriatrician arranged to make a home visit the next day. At the home visit, the patient asks the physician many personal questions about his family, and other people and things that he cares about, and he seems disinterested in the physician's credentials. To the physician, this feels like an invasion of privacy, but he goes along with it because he is so worried about the patient's condition. After a leisurely visit, the patient agrees to take the prescribed medications, and to be enrolled in the VA's Home Care Program. He still expects the physician to come by his house now and then to "talk story" some more.*

What should the geriatrician do?

Answer: To many elderly Hawaiians, treatment should be provided in the native healer style where the "*kahuna lapa'au*" (priest who heals with medicines) gets to know the person very well, not only the disease. It is not unusual for a *kahuna lapa'au* to stay with the patient for an entire day, or to have the patient come to his home for a day or more. Treatment is done in the context of knowing the whole person, and is often highly effective. The time necessary for this is highly impractical in Western medicine. The physician should not make commitments to the patient that he knows he cannot meet. Rather, an introduction of the home care team should be made and is likely to be effective as long as team members are also willing to share personal information about themselves and not appear to be too much in a rush to leave.

STUDENT EVALUATION

In addition to written assignments based on the cases above, the following objective questions can be used for student evaluation.

True/False:

1. To many Pacific Islanders, the needs of the group are more important than the needs of the individual. (true)
2. Most Pacific Islanders have had relatively little contact with Europeans or Americans. (false)
3. Pacific Islander elders should initially be addressed by their first names. (false)
4. The extent of a person's education can easily be gauged by the Westernization of the dress. (false)
5. Hansen's Disease (leprosy) has been completely eradicated. (false)
6. Alcohol and drug abuse are not commonly found among Pacific Islanders. (false)
7. Pacific Islanders can be expected to easily understand the need to give written informed consent for procedures. (false)

Multiple Choice:

8. Among some Pacific Islanders, resistance to rehabilitation efforts after stroke or heart attack may stem from: (a, b,c are true)
 - a) less experience seeing people recover from these conditions.
 - b) a desire to tenderly care for an elderly loved one.
 - c) distrust of Western medical approaches to care.
 - d) a typical lack of respect for the elderly.
9. Common medical problems of elderly Pacific Islanders include: (all are correct)
 - a) obesity
 - b) Type II diabetes mellitus
 - c) valvular heart disease
 - d) stroke

REFERENCES AND ADDITIONAL INFORMATION

- Andrews, G. R. (1998). Health and aging in the developing world. *Ciba Foundation Symposium, 134*, 17-37.
- Ballivet, S., Salmi, L. R., Durourdieu, D., & Bach, F. (1995). Incidence of thyroid cancer in New Caledonia, South Pacific, during 1985 - 1992. *American Journal of Epidemiology, 141*(8),741-746.
- Barker, J. C. (1988). Admission of geriatric patients to hospital on Niue Island 1977 - 1982. *New Zealand Medical Journal, 101*(855), 638-640.
- Baumgart, K. W, Britton, W. J., Mullins, R. J., Basten, A., & Barneston, R. S. (1993). Subclinical infection with *Mycobacterium leprae* -- a problem for leprosy control strategies. *Trans R Soc Trop Med Hyg, 87*(4), 412-415.
- Beizer, R. A. (1990). Prevalence of abnormal glucose tolerance in six Solomon Islands populations. *American Journal of Physical Anthropology, 81*(4), 471-482.
- Berg, B. W. (1994). Marshall Islands Survey. *Hawaii Medical Journal, 53*(6),160-161.
- Bogen, K. T., Conrado, C. L., & Robison, W. L. (1997). Uncertainty and variability in updated estimates of potential dose and risk at a U.S. nuclear test site--Bikini Atoll. *Health Phys, 73*(1), 115-126.
- Braun, K. L., & Browne, C. V. (1998). Perceptions of dementia, caregiving, and help seeking among Asian and Pacific Islander Americans. *Health and Social Work, 23*(4), 264-274.
- Braun, K. L., Yang, H., Onaka, A. T., & Horiuchi, B. Y. (1996, December). Life and death in Hawaii: Ethnic variations in life expectancy and mortality, 1980 and 1990. *Hawaii Medical Journal, 55*(12), 278-283, 302.
- Braun, K. L., Yang, H., Onaka, A. T., & Horiuchi, B. Y. (1997). Asian Pacific Islander mortality differences in Hawaii. *Social Biology, 44*(3-4), 213-226.
- Brewer, T. F., Heymann, S. J., & Harris, J. B. (1997). Tuberculosis control in Asia and the western Pacific: A role for computer modeling. *Annals of the Academy of Medicine Singapore, 26*(5), 642-646.

- Browne, C., Fong, R., & Mokuau, N. (1994). The mental health of Asian and Pacific Island elders: Implications for research and mental health administration. *Journal of Mental Health Admin.*, 21(1), 52-59.
- Calne, D. B., Eisen, A., McGeer, E., & Spencer, P. (1996). Alzheimer's disease, Parkinson's disease, and motor neuron disease: A biotrophic interaction between ageing and environment? *Lancet*, 2(8515), 1067-1070.
- Campbell, S., Fraser, A., Holliss, B., Schmid, J., & O'Toole, P. W. (1997). Evidence for ethnic tropism of *Helicobacter pylori*. *Infect Immun*, 65(9), 3708-3712.
- Cartel, J. L., Boutin, J. P., Spiegel, A., Glaziou, P., Plichart, R., Cardines, R., & Grosset, J. H. (1992). Leprosy in French Polynesia: Epidemiological trends between 1946 and 1987. *Leprosy Review*, 63(3), 211-222.
- Chen, K.-M., & Uebayashi, Y. (1984). Amyotrophic lateral sclerosis and parkinsonism-dementia of Guam: An update. In K.-M. Chen & Y. Yase (Eds.), *Amyotrophic Lateral Sclerosis in Asia and Oceania* (pp. 199-238). Taiwan: National Taiwan University.
- Chin, D. (1999). HIV-related sexual risk assessment among Asian/Pacific Islander American women: An inductive model. *Social Science Medicine*, 49(2), 241-251.
- Chow, T. W., Ross, L., Fox, P., Cummings, J. L., & Lin, K. M. (2000). Utilization of Alzheimer's disease community resources by Asian-Americans in California. *International Journal of Geriatric Psychiatry*, 15(9), 838-847.
- Collins, V. R., Dowse, G. K., Cabealawa, S., Ram, P., & Zimmet, P. Z. (1996). High mortality from cardiovascular disease and analysis of risk factors in Indian and Melanesian Fijians. *International Journal of Epidemiology*, 25(1), 59-69.
- Conrad, R. A., Demoise, C. F., Scott, W. A., & Makar, M. (1971). Immunohematological studies of Marshall Islanders sixteen years after fallout radiation exposure. *Journal of Gerontology*, 26(1), 28-36.
- Coughlin, S. S., & Uhler, R. J. (2000). Breast and cervical cancer screening practices among Asian and Pacific Islander women in the United States, 1994-1997. *Cancer Epidemiol Biomarkers Prev*, 9(6), 597-603.
- Counts, D. A., & Counts, D. R. (1984). The cultural construction of aging and dying in a Melanesian community. *International Journal of Aging and Human Development*, 20(3), 229-240.

- Crews, D. E., & Pearson, J. D. (1998). Cornell Medical Index responses and mortality in a Polynesian population. *Social Science Medicine*, 27(12), 1433-1437.
- Cronkite, E. P., Bond, V. P., & Conrad, R. A. (1995). Medical effects of exposure of human beings to fallout radiation from a thermonuclear explosion. *Stem Cells* (Dayt), 13(Suppl. 1), 49-57.
- de Vathaire, F., & Le Vu, B. (1996). Cancer mortality in French Polynesia between 1984 and 1992. *British Journal of Cancer*, 74(10), 1680-1681.
- Dowse, G. K., Spark, R. A., Mavo, B., Hodge, A. M., Erasmus, R. T., Gwalimu, M., et al. (1994). Extraordinary prevalence of non-insulin-dependent diabetes mellitus and bimodal plasma glucose distribution in the Wanigela people of Papua New Guinea. *Medical Journal of Australia*, 160(12), 767-774.
- Dowse, G. K., Zimmet, P. Z., & Collins, V. R. (1996). Insulin levels and the natural history of glucose intolerance in Nauruans. *Diabetes*, 45(10), 1367-1372.
- Federated States of Micronesia National Census Report: *1994 Census of Population and Housing*.
- Friedlaender, J. S., & Rhoads, J. G. (1982). Patterns of adult weight and fat change in six Solomon Islands societies: A semi-longitudinal study. *Social Science Medicine*, 16(2), 205-215.
- Galanis, D. J., McGarvey, S. T., Quested, C., Sio, B., & Afele-Fa'amuli, S. A. (1999). Dietary intake of modernizing Samoans: Implications for risk of cardiovascular disease. *Journal of the American Dieticians Association*, 99(2), 184-190.
- Gao, X., & Serjeantson, S. W. (1991). Diversity in HLA-DR4-related DR, DQ haplotypes in Australia, Oceania, and China. *Human Immunology*, 32(4), 269-276.
- Goycoolea, M. V., Goycoolea, H. G., Farfan, C. R., Rodriguez, L. G., Martinez, G. C., & Vidal, R. (1986). Effect of life in industrialized societies on hearing in natives of Easter Island. *Laryngoscope*, 96(12), 1391-1396.
- Graham, P., & Davis, P. (1990). Life expectancy free of disability: A composite measure of population health status. *Community Health Studies*, 14(2), 138-145.
- Grandinetti, A., Chang, H. K., Mau, M. K., Curb, J. D., Kinney, E. K., Sagum, R., & Arakaki, R. F. (1998). Prevalence of glucose intolerance among Native Hawaiians in two rural

- communities. Native Hawaiian Health Research (NHHR) Project. *Diabetes Care*, 21(4), 549-554.
- Hodge, A. M., Dowse, G. K., Collins, V. R., & Zimmet, P. Z. (1996). Mortality in Micronesian Nauruans and Melanesian and Indian Fijians is not associated with obesity. *American Journal of Epidemiology*, 143(5), 442-455.
- Hodge, A. M., Dowse, G. K., Toelupe, P., Collins, V. R., & Zimmet, P. Z. (1997). The association of modernization and changes in lipid levels in the Polynesian population of Western Samoa. *International Journal of Epidemiology*, 26(2), 297-306.
- Honolulu Advertiser. (1999, February 23). p. A2. (no author listed).
- Hornick, C. A., & Fellmeth, B. D. (1981). High density lipoprotein cholesterol, insulin and obesity in Samoans. *Atherosclerosis*, 39, 321-328.
- Houghton, P. (1978). Preshistoric New Zealanders. *New Zealand Medical Journal*, 87(608), 213-216.
- Howard, J. E., Vaswani, A., & Heotis, P. (1997). Thyroid disease among the Rongelap and Utirik population--an update. *Health Phys*, 3(1), 190-198.
- Hoyert, D. L., & Kung, H. C. (1997). Asian or Pacific Islander mortality, selected states, 1992. *Mon Vital Stat Rep*, 46(Suppl. 1),1-63.
- HRSA Office of Minority Health. *White House Initiative on Asian Americans and Pacific Islanders*. 301-443-2964.
- Janes, C. R., & Pawson, I. G. (1986). Migration and biocultural adaptation: Samoans in California. *Social Science Medicine*, 22(8), 821-834.
- Jensen, G. D., & Polloi, A. H. (1984). Health and life-style of longevous Palauans: Implications for developmental theory. *International Journal of Aging and Human Development*, 19(4), 271-285.
- Jensen, G. D., & Polloi, A. H. (1988). The very old of Palau: Health and mental state. *Age and Ageing*, 17(4), 220-226.
- Johnson, J. C., Thaul, S., Page, W. F., & Crawford, H. (1997). Mortality of veteran participants in the CROSSROADS nuclear test. *Health Phys*, 73(1),187-189.

- Kagawa-Singer, M., & Pourat, N. (2000). Asian American and Pacific Islander breast and cervical carcinoma screening rates and healthy people 2000 objectives. *Cancer* 89(3), 696-705.
- Katz, A. R., Sasaki, D. M., Mumm, A. H., Escamilla, J., Middleton, C. R., & Romero, S. E. (1997). Leptospirosis on Oahu: An outbreak among military personnel associated with recreational exposure. *Military Medicine*, 162(2), 101-104.
- Khan, M. A. (1996). Epidemiology of HLA-B27 and arthritis. *Clin Rheumatology*, 15(Suppl. 1), 10-12.
- King, H., Collins, V., King, L. F., Finch, C., & Alpers, M. P. (1994). Blood pressure, hypertension and other cardiovascular risk factors in six communities of Papua New Guinea, 1985-1986. *PNG Medical Journal*, 37(2), 100-109.
- King, H., Zimmet, P., Raper, L. R., & Balkau, B. (1984). The natural history of impaired glucose tolerance in the Micronesian population of Nauru: A six year follow up study. *Diabetologia*, 26(1), 39-43.
- King, H., Zimmet, P. Z., & Taylor, R. J. (1988). Glucose tolerance in Polynesia: Association with obesity and island of residence. *Diabetes Research Clin Pract*, 4(2), 143-151.
- Kliks, M. M., & Palumbo, N. E. (1992). Eosinophilic meningitis beyond the Pacific Basin: The global dispersal of a peridomestic zoonosis caused by *Angiostrongylus cantonensis*, the nematode lungworm of rats. *Social Science Medicine*, 34(2), 199-212.
- Kogan, M. D., Alexander, G. R., Mor, J. M., & Kieffer, E. C. (1998). Ethnic-specific predictors of prenatal care utilization in Hawaii. *Pediatric Perinatal Epidemiology*, 12(2), 152-162.
- Kuo, J., & Porter, K. (1998). Health status of Asian Americans: United States, 1992-94. *Advance Data*, 298, 1-16.
- Lee, M. W., & Brenan, J. (1998). *Mycobacterium marinum*: Chronic and extensive infections of the lower limbs in south Pacific islanders. *Australasian Journal of Dermatology*, 39(3), 173-176.
- Liao, Y., McGhee, D. L., & Cooper, R. S. (1999). Mortality among US adult Asians and Pacific Islanders: Findings from the National Health Interview Surveys and the National Longitudinal Mortality Study. *Ethn Dis*, 9(3), 423-433.

- Lindberg, S., Berntrop, E., Nilsoon-Ehle, P., Terent, A., & Vessby, B. (1997). Age relations of cardiovascular risk factors in a traditional Melanesian society: The Kitava Study. *American Journal of Clinical Nutrition*, 66(4), 845-852.
- Lin-Fu, J. S. (1988). Population characteristics and health care needs of Asian Pacific Americans. *Public Health Reports*, 103(1), 18-27.
- Matsuoka, M. (1996). High prevalence of leprosy in the Federated States of Micronesia and special project for the elimination. *Nihon Hansenbyo Gakkai Zasshi*, 66(3), 100-205.
- McLaughlin, L. A., & Braun, K. L. (1998). Asian and Pacific Islander cultural values: Considerations for health care decision making. *Health and Social Work*, 23(2), 116-126.
- Meng, L., Maskarinec, G., & Lee, J. (1997). Ethnicity and conditional breast cancer survival in Hawaii. *Journal of Clinical Epidemiology*, 50(11), 1289-1296.
- Mesler, D. E., McCarthy, E. P., Byrne-Logan, S., Ash, A. S., & Moskowitz, M. A. (1999). Does the survival advantage of nonwhite dialysis patients persist after case mix adjustment? *American Journal of Medicine*, 106(3), 300-306.
- Newland, H. S., Woodward, A. J., Taumoepeau, L. A., Karunaratne, N. S., & Duguid, I. G. (1994). Epidemiology of blindness and visual impairment in the Kingdom of Tonga. *British Journal of Ophthalmology*, 78(5), 344-348.
- Ohtsuka, R. (1989). Hunting activity and aging among the Gidra Papuans: A behavioral analysis. *American Journal of Physical Anthropology*, 80(1), 31-39.
- Papoz, L., Barny, S., & Simon, D. (1996). Prevalence of diabetes mellitus in New Caledonia: Ethnic and urban-rural differences. *American Journal of Epidemiology*, 143(10), 1018-1024.
- Pawson, I. G., & Janes, G. (1982). Biocultural risks in longevity: Samoans in California. *Social Science Medicine*, 16(2), 183-190.
- Perolat, P., & Reeve, P. A. (1992). First evidence of leptospirosis in Vanuatu. *Trans R Soc Trop Med Hyg*, 86(5), 557-559.
- Perrocheau, A., & Perolat, P. (1997). Epidemiology of leptospirosis in New Caledonia (South Pacific): A one year survey. *European Journal of Epidemiology*, 13(2), 161-167.

- Pietrusewsky, M., Douglas, M. T., & Ikehara-Quebral, R. M. (1997). An assessment of health and disease in the prehistoric inhabitants of the Mariana Islands. *American Journal of Physical Anthropology*, 104(3), 315-342.
- Plato, C. C., Garruto, R. M., Yanagihara, R. T., Chen, K. M., Wood, J. L., Gajdusek, D. C., & Norris, A. H. (1982). Cortical bone loss and measurements of the second metacarpal bone. I. Comparisons between adult Guamanian Chamorros and American Caucasians. *American Journal of Physical Anthropology*, 59(4), 461-465.
- Population/Demography Programme*, South Pacific Commission. (1997). Noumea, New Caledonia
- Rapaport, M. (1989). Fenuafala health survey: The ecology of health and disease on a coral atoll village. *Asia Pacific Journal of Public Health*, 3(2), 129-138.
- Rhoades, E. C. (1984). Reevaluation of the aging and modernization theory: The Samoan evidence. *The Gerontologist*, 24(3), 243-250.
- Richens, J., & McGill, P. E. (1995). The spondyloarthropathies. *Baillieres Clin Rheumatol*, 9(1), 95-109.
- Rothschild, B. M., & Heathcote, G. M. (1995). Characterization of gout in a skeletal population sample: Presumptive diagnosis in a Micronesian population. *American Journal of Physical Anthropology*, 98(4), 519-525.
- Sawata, S., Hidaka, H., Yasuda, H., Tomomatsu, K., Sato, R., & Oka, H. (1988). Prevalence of cardiovascular diseases in the Kingdom of Tonga. *Japan Heart Journal*, 29(1), 11-18.
- Schwab, C., Steele, J. C., Akiyama, H., & McGreer, P. L. (1996). Distinct distribution of apolipoprotein E and beta-amyloid immunoreactivity in the hippocampus of Parkinson dementia complex of Guam. *Acta Neuropathology (Berl)*, 92(4), 378-385.
- SenGupta, S. K., Ades, C. J., & Cooke, R. A. (1996). Malignant lymphomas in Papua New Guinea: An immunohistological study of 125 cases. *Pathology*, 28(1), 36-38.
- Shimamoto, Y. (1984). Aging in Palau. *Journal of Gerontological Nursing*, 10(11), 13-16.
- Shimamoto, Y., & Ishida, D. (1988). The elderly Samoan. *Public Health Nursing*, 5(4), 219-221.
- Simmonds, H. A., McBride, M. B., Hatfield P. J., Graham, R., McCaskey, J., & Jackson, M. (1994). Polynesian women are at risk for hyperuricemia and gout because of a

genetic defect in renal urate handling. *British Journal of Rheumatology*, 33(10), 932-937.

Steller, C. A. (1994). Kaposi's sarcoma and volcanic soils. *Lancet*, 343, 231.

Stodder, A. L. (1997). Subadult stress, morbidity, and longevity in the Latte Period populations on Guam, Mariana Islands. *American Journal of Physical Anthropology*, 104(3), 363-380.

Su, Y. P., & Ferraro, K. F. (1997). Social relations and health assessments among older people: Do the effects of integration and social contributions vary cross-culturally? *Journal of Gerontology: B. Psychological Science-Social Science*, 52(1), S27-S36.

Takahashi, T., Trott, K. R., Fujimori, K., Simon, S. L., Ohtomo, H., Nakashima, N., et al. (1997). An investigation into the prevalence of thyroid disease on Kwajalein Atoll, Marshall Islands. *Health Phys*, 73(1), 199-213.

Torsch, V. L., & Ma, G. X. (2000). Cross-cultural comparison of health perceptions, concerns, and coping strategies among Asian and Pacific Islander American elders. *Qual Health Res*, 10(4), 471-489.

www.census.gov

Young, J. J., & Gu, N. (1995). *Demographic and socio-economic characteristics of elderly Asian and Pacific Island Americans*. Seattle: National Asian Pacific Center on Aging.