DISEASE PREVALENCE IN THE ALASKAN ARCTIC AND SUBARCTIC

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Abstract

During the last decade, there has been a significant improvement in the health of the Alaska Native population. In some areas of Alaska infant mortality rates have declined to a level equal to that of the overall United States population. Preventable infectious diseases have essentially disappeared. While environmentally related infectious diseases currently remain at a higher than acceptable level and sequalae of previously untreated infections such as otitis media continue to affect the Native population, modern health care programs designed to reduce these maladies are in affect. Finally, if progress is to be made in the reduction of Native deaths and injuries from accidents and if the ever increasing incidence of social and mental health problems is to be reduced, it is clear that the medical profession through the roles of advocacy and cooperation must influence those agencies responsible for environment and economic improvement.

This report presents the patterns of major morbidity and mortality in the Alaskan Arctic and Sub-Arctic over the past ten years. This period is best characterized by the word change. Discussion will relate to the Alaska Native, the aboriginal Indian, Eskimo, and Aleut population. Because it has been established that Alaska's immigrant population, unless they adopt Native ways, does not incur the same risk of disease as the Native, the non-Native residents are not included in the paper (Colyar 1963).

Infant Mortality

Within the past decade, spectacular successes have been achieved in the attempt to raise the health of the Alaska Native to at least that of the general United States population. In certain areas however a marked disparity still exists. Infant mortality best illustrates this changing health status. (Figure 1). In 1960, 75 infant deaths per 1000 live births were reported. By 1969, this rate declined to 31 per 1000. While the trend downward is significant, the rate of infant mortality is still noticeably above the U.S. all races figure of 20.

The primary contribution to the decline in infant mortality is the marked reduction in deaths during the post-natal period. This downward trend correlates most clearly with the reduction of environmentally related infectious

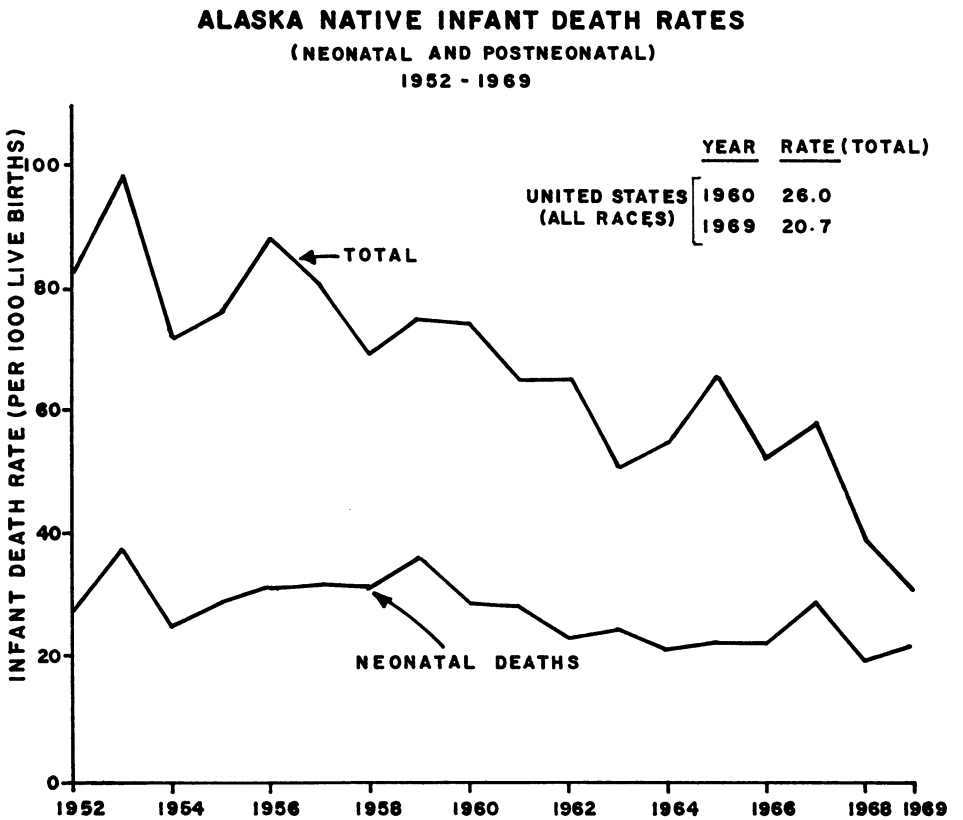

Fig. 1. Alaska Native Infant Death Rates (Neonatal and Postneonatal)

diseases, most notably in respiratory infections and diarrhea. (Figure 2). Such changes have been accomplished through health education and considerable expenditure on therapeutic health services. It is doubtful that further significant improvement will occur without major environmental modifications.

Although less significant, the downward trend in deaths occurring during the neonatal period completes the description of reduced infant mortality. While this vital event has never been markedly higher than the general U.S. statistic, the decline appears to be the result of increased Native births occurring in hospitals. Current records indicate that in 1970, 95 % of all Native births took place in medical facilities.

Because of Alaska's geographic size and diversity of environmental conditions, it is often important to look carefully at health patterns by region. It is notable that in 1969 the rate of infant mortality in the region above the Arctic Circle was the same as in the entire United States. We can offer only speculation as to the causes for this similarity.

Preventable Diseases

Certain infectious diseases, considered preventable, have been controlled without making alterations in the environment. This has been made possible by maintaining high immunization levels for diphtheria, pertussis, tetanus, polio and rubeola within the Alaska Native population. As an example, in 1969, rubella vaccine was given to 82 % of all Native children under 12 years of age.

Table 1 presents the reported incidence of select notifiable diseases from Alaska's Arctic region. Although separate reporting by ethnic group is not available, Fairbanks is the only major non-Native community in the area.

Otitis Media

Otitis media, a notifiable disease in Alaska, should be discussed more extensively. The reasons for emphasis are two. First, otitis media is extremely prevalent in the Native population; the acute condition being the most common cause of reported childhood morbidity. Multiple occurrences of acute otitis media gives rise to the fact that chronic sequela accounts for one-third of all pediatric admissions to the Alaska Native Medical Center in Anchorage. The second reason is that sound epidemiological information has allowed development of an effective program to prevent the acute stages of the disease from

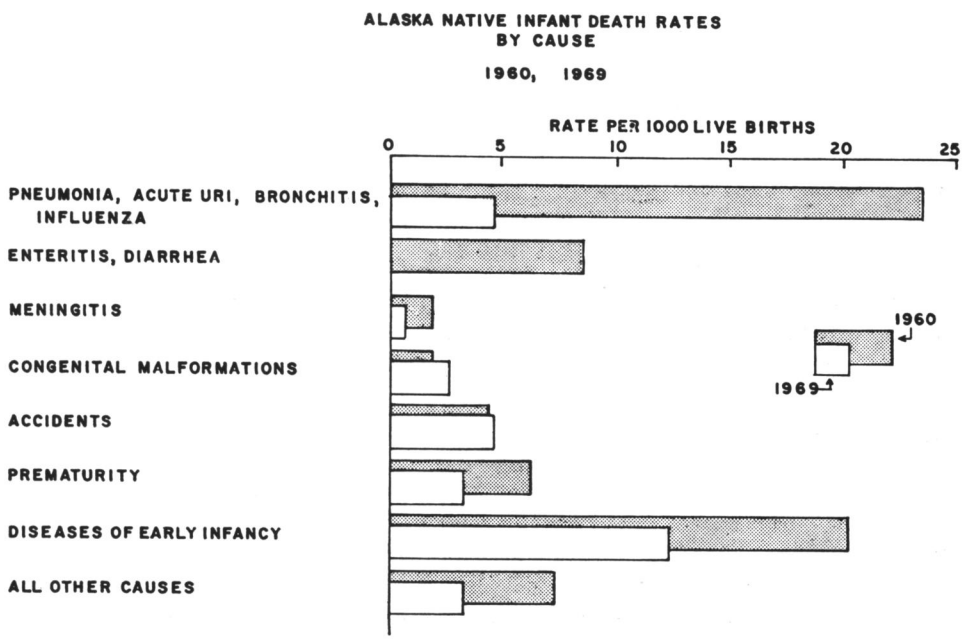

Fig. 2. Alaska Native Infant Death Rates by Cause

progressing to chronic and development of a rehabilitative program for the already existing chronic disease.

Actively draining ears are a common occurence in Alaska's Native youngsters. As early as 1956, the prevalence of actively draining ears in Native children was reported to be 17 % (Hayman and Kester 1957, The McGrath Project). Detailed information obtained in a prospective study (Reed et al. 1967) of a cohort of newborn infants demonstrated that 38 % of the population incurred at least one episode of draining ears before their first birthday. The median age of occurrence was six months. During the investigation, these children were medically followed for at least two and some for as long as four years. The results of the study indicated that the highest risk of developing a draining ear occurred in the child's first year of life. Of all the children involved in the study who developed the disease, 65 % did so before their first birthday. Eighty-nine percent were so afflicted by the time they were two years of age.

With the decline in tuberculosis as well as in diseases leading to a high infant mortality, it was possible to shift resources toward an attack on otitis media. The approach was essentially directed toward the Native population at highest risk, those children under two years of age. Because this age group has also been shown to be at highest risk for developing chronic lung disease (Fleshman 1968) as well as other infectious processes, the approach was broadened to improve the general health of these infants.

Nutrition, more specifically the prevention of iron deficiency was emphasized. Parents were taught to be more aware of purulent otorrhea, that it was a pathological condition and deserved prompt treatment. Medical health aides in each village were provided extra training in recognizing and understanding acute otitis media as well as carrying out early antibiotic treatment either after consultation with physicians by radio or on standing orders. Finally, several village health aides were successfully taugh to treat the chronically draining ears by suction and cleansing.

The results of these efforts were first evaluated in the village of Barrow in 1967 (Unpublished data). The examination of school children in this community identified a ten percent prevalence of chronic otitis media throughout all grades. In contrast only three percent of the village youngsters two years of age displayed a chronic ear infection. Previously mentioned epidemiologic information supports the contention that most of the cases should have occurred by this younger age. Preliminary surveys in other Alaskan villages indicates that this lower level of disease has been partially achieved elsewhere.

We are concerned that further reduction in the incidence of chronic otitis media through a medical approach will probably be difficult. Because the occurrence of chronic otitis media appears directly related to the incidence of acute respiratory disease, we believe that environmental conditions such as housing and sanitation which significantly influence the dissemination of acute respi-

ratory disease must be improved before additional reduction in the disease will be noted.

At the present time there are approximately 25,000 Native school children. If our surveys are correct, 10 % or 2500 of these children are expected to have chronic otitis media. Also one-fourth or 625 of these children will be affected bilaterally. Surgical rehabilitation has been provided to a significant number of these and is reported elsewhere at this conference (Beal et al. 1971). In addition to the acute morbidity, chronic nuisance and occasional deaths due to cloleste-atoma we are concerned about the effect of otitis media on the development of language. Intermittent hearing loss occurring during the early years of language acquisition, seems to have an adverse effect on subsequent verbal ability and communication skills. Even though the child's ears subsequently healed, this early hearing loss appears to have permanent residual effect in a significant number of cases (Holm and Kunze 1969). Results of the cohort study of Eskimo children previously described shows that hearing loss was present in 31 % of the cohort population at four years of age. In 9 % of this population, a significant hearing loss was present in both ears.

The school age children who have had their hearing restored are being followed with much interest to determine the extent of academic improvement, if any, that occurs.

Respiratory Disease

Ten years ago respiratory infections were the most frequent cause of morbidity and mortality in Alaska Eskimo infants. While respiratory infection is a somewhat broad category, the incidence of pneumonia describes a significant portion. In 1965, 456 Native children were hospitalized for this disease. Since that time the number of pediatric hospitalizations for pneumonia has been reduced over one-third to 303 in 1970.

For this same period of time, pneumonia deaths have declined even more spectacularly. In 1960, 35 Alaska Native children died of pneumonia. In 1969, 8 pediatric deaths were reported for this same disease, a reduction of over 75 %.

As was reported in the first Circumpolar Health Conference, an exceptionally high prevalence of non-tuberculous bronchiectasis was evident in the Native pediatric population (Fleshman et al. 1968). A decline in new cases of bronchiectasis parallels the decrease in pneumonia.

Acute respiratory diseases of viral etiology continues to prevail with exceptional frequency in Alaska's smaller communities. Because of the environmental factors of inadequate underventilated housing, these diseases spread rapidly through the village population. During the last five years such disease patterns have been epidemiologically monitored in the community of Bethel,

Alaska. The entire spectrum of viral respiratory agents have been identified and Native children under five years of age have been documented to incur an average of eight viral respiratory infections per year (Fleshman).

Equal in importance to viral respiratory diseases are infections due to streptococci. Although reporting of the acute disease is far too inaccurate at the present time for incidence figures to be meaningful, non-suppurative complications bear out the extreme seriousness of streptococcal influence. Villages in western Alaska report an annual rate of 67 new identifiable cases of rheumatic fever per 100,000 population (Goorman). The rate is excessive when compared to the general United States figure which annually varies from three to twelve cases per 100,000. Additionally, nearly entire villages have involved in epidemics of glomerulonephritis. In 1971 while sampling for a pilot program for streptococcal control 36 % of the throat cultures from randomly selected school children were positive for B streptococcus.

The history of the medical assault on tuberculosis is an excellent example of disease control in which removal of the infecting organism was accomplished without any change in living conditions. However because this subject is to be covered in detail in another paper at this symposium, no further mention of it will be made here (Johnson 1971).

Enteric Infections

Enteric infections such as hepatitis, shigella, and occasionally salmonella continue to occur with varying frequency. However, as with other previously described diseases, current health reporting does not allow an accurate measurement of their incidence. Because resources presently expended on sanitary construction are small when compared to need, most of the over 200 Native villages currently lack basic modern sanitation facilities. However, in spite of insufficient construction the mortality and serious morbidity resulting from enteric disease is small.

Unfortunately, unsanitary environmental conditions are optimum for the introduction of virulent pathogens which do cause serious disease. Such an event occurred in 1965 when enteropathogenic Escherichia coli strain 0111:B4 appeared in western Alaska. Before its spontaneous disappearance, approximately 20 % of Native infants living in that area had acquired the infection with a case fatality rate of 28 % (Brenneman and Fortuine 1966).

Venereal Disease

The U.S., including Alaska, is experiencing an extremely rapid rise in the rates of venereal diseases. The Native population is included in this increase.

Cancer and Arteriosclerosis

Historically diseases such as arteriosclerosis and cancer were considered a rare occurrence in Alaska's Eskimo population. This theory, essentially undocumented, was undoubtedly influenced by the relatively low number of elderly Eskimo inhabitants. In the past, the diagnoses of these diseases were often overshadowed by infectious diseases.

Within recent years however malignant tumors of all organ systems have been observed within these Alaskan residents. In 1967, the overall rate for malignant neoplasms was reported to be 66 cases per 100,000 Native population, contrasted to the general United States rate of 157. Because these rates are not age specific no real conclusions can be drawn at this time. Although coronary artery disease and strokes occur within the Alaska Natives at a lower overall rate than in the total United States population, the current pace of these conditions is increasing. Rates of malignancies on the other hand have been essentially stable for the past eight years.

Nutrition

Culturely and economically, the Alaska Native population is no longer able to live entirely by subsistance from the land and sea. Within recent years, these people have turned to a money economy, often in the form of welfare. Food patterns are changing from the gathering of edibles to patterns of purchasing. Unfortunately, these changes have taken place without a sound knowledge of nutrition. Although classic nutritional deficiencies are not identified and total caloric intake is considered adequate, iron deficiency in children is a serious problem.

While economic patterns are in a constant state of modification, certain traditional methods of food preparation continue to exist. As a result such food born diseases as gastroenteritis and botulism type E are occasionally reported. As a result, it can generally be said that a program of continuing health education on the subject of nutrition is a primary requirement for the foreseeable future.

Accidents

Accidents continue to be the leading cause of death in Alaska Natives and far exceeds the comparable rate for the general United States population. (Figure 3). Alaska's adverse environment supplemented by inadequate and unsafe housing contribute to a large number of deaths due to fire. Drowing, very often caused by a total disregard for common water safety rules and coupled with the use of alcohol contributes to approximately 16 % of all Native deaths. As the snowmobile rapidly replaces the dogteam as a common means of transportation,

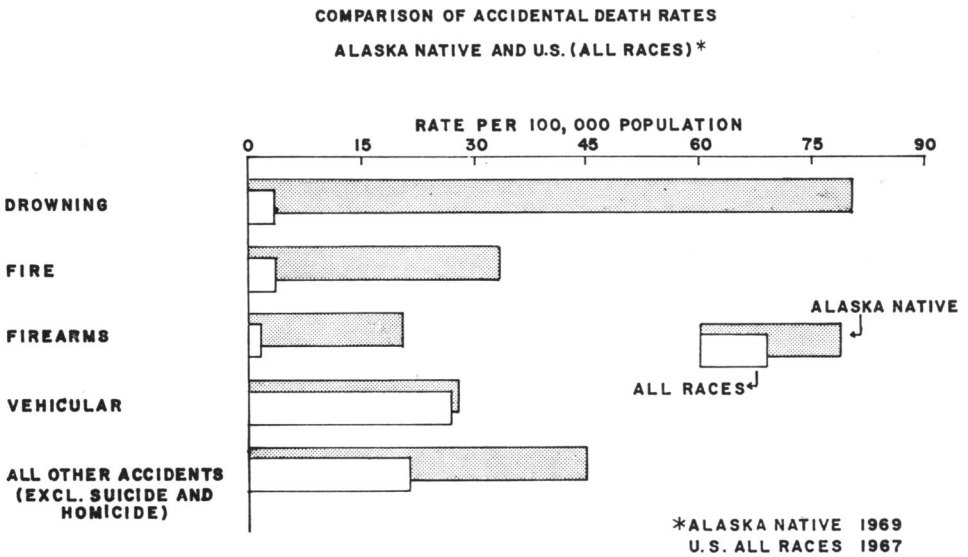

Fig. 3. Comparison of Accidental Death Rates

injuries to extremities and deaths due to cold exposure continue to increase. Unfortunately, in the past decade minimal progress has been made in reducing injuries and deaths due to accidents. In this area of need, the health profession must act more clearly as a strong advocate of effective programs for prevention and control.

Social and Mental Health

Health professionals are becoming increasingly aware of social and mental health problems within the Native population. Alcoholism is considered by some to be the most serious health problem among Alaska Natives. In 1960, deaths due to alcoholism were reported to be 5.9 per 100,000 Native population. By 1968, this mortality rate had increased to 23 per 100,000, 14 times greater than the rate for the general United States population. In addition, suicides and homicides, frequently alcohol related, have climbed from 14 per 100,000 Native population to 46 in the same time period, more than twice that of the general U.S. population.

While some alcoholic indulgence is accepted by most villages in Alaska, the drinking patterns of individuals vary. Those drinking to excess are in time not accepted by other village residents and leave. When ostracized, the problem drinker quite often migrates to neighboring communities or to larger cities where their alcoholic pattern continues. Alternately drinking often begins in an urban setting.

For the most part, Alaska visualizes this as a civil problem and alcoholic overindulgence is considered a public offense. This unfortunate circumstance is dramatically attested to by the fact that although the Alaska Native makes up only 4 % of the population of the city of Anchorage, 66 % of the arrests reported in 1968 for being drunk in public involved this Native population. Although federal, state and local agencies are cooperating to help the alcoholically inclined Native, it is recognized that equal effort must exist to reshape the community's attitude regarding this social problem.

While rapid cultural changes and increased mobility are primarily implicated in these social problems, many believe that personal losses, deprivation and family disruptions caused by the tuberculosis epidemic of the past have greatly contributed to the prevailing crisis in mental health and alcoholism. In addition, it is perhaps paradoxical that Alaska's modern programs of health care, education, and economic development requiring the continual separation of Native families may also be adding to these problems of society.

Other Diseases

Naturally, there are many diseases in Alaska of interest to the clinician and researcher that because of relatively low incidence are not mentioned here. For those interested in reviewing less significant health problems, work relating to the rare infectious diseases, helminth problems, and genetically controlled conditions references may be easily found in bibliographies of Arctic research.

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TABLE I. Selected notifiable diseases reported for Alaska's Northern Region 1962—1970
Year of occurrence

Disease	1962	1963	1964	1965	1966	1967	1968	1969	1970
Diphtheria	0	0	0	0	0	0	0	0	0
Pertussis	0	3	36	0	0	0	0	0	1
Rubeola	390	374	124	74	166	93	7	15	23
Rubella	45	103	166	46	42	197	81	5	26
Polio	0	0	0	0	0	0	0	0	0
Otitis media	1007	1165	1641	1610	1557	1883	1661	1673	1210