The Indian Burden of Illness and Future Health Interventions

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Synopsis

This article describes the burden of illness of Indians eligible for services from the Indian Health Service (IHS) and discusses strategies for reducing morbidity and mortality related to those conditions. To improve health to an extent that parallels the IHS's past achievements, the illnesses that now are prevelant among Indians require changes in personal and community behavior rather than intensified medical services. Analysis of these conditions leads to the conclusion that much of the existing burden of illness can be reduced or eliminated.

IHS is responding to this challenge by continuing to ensure Indians' access to comprehensive health care services, by increasing educational efforts aimed at prevention, and by enlisting the support of other government and private organizations in activities that have as their purpose (a) treating diseases if intervention will lessen morbidity and mortality (such as diabetes and hypertension) and (b) encouraging of dietary changes, cessation of smoking, exercise, reduction in alcohol consumption, and other healthy behavior.

DISEASES AND CAUSES OF DEATH among Indians in reservation States today are different from those prevalent two generations ago. Infectious diseases such as tuberculosis and gastroenteritis have been superseded by injuries, violence, cardiovascular disease, alcoholism, diabetes, and mental illness as the major Indian health problems. As a consequence, the Indian Health Service (IHS) currently faces diseases that are less susceptible to correction by the measures adopted in the past 30 years such as provision of safe water, sanitary waste disposal, and primary medical care. In this article, we describe the health conditions that constitute the current burden of illness borne by the IHS service population, identify factors common to many of those conditions, and propose various strategies to diminish the adverse consequences of these conditions.

Indian Mortality and IHS Services

Following the lead of the Carter Center of Emory University (*1*), IHS officials recently initiated analysis of the following health problems to determine the relative contribution of each to the burden of illness borne by Indians:

Unintentional injuries	Chronic renal failure
Violence	Maternal health
Cardiovascular diseases	Pediatric conditions
Musculoskeletal diseases	Cancer
Substance abuse	Dental disease
Digestive diseases	Respiratory diseases
Infectious diseases	Diabetes mellitus

All 14 health conditions are prevalent, costly in terms of both suffering and dollars, and susceptible to known interventions.

Analysis of these conditions has employed cause-specific mortality data for calendar years 1981–83 for Indians in counties where IHS has responsibility and cause-specific patient care data for fiscal years 1982–84 for the IHS Areas. Because deaths are infrequent, the IHS normally uses a 3-year period to analyze Indian deaths. The number of hospital days is the total from 1982 through 1984 provided by the IHS directly, through its tribal projects, and under contract with local hospitals and practitioners. The number of outpatient visits is the total of ambulatory services rendered by IHS

Table 1. Mortality and clinical services related to selected Indian health conditions, 1981–83

Condition	Productive life lost[1]		Deaths		Hospital days[4]	Clinical impressions[5]
	Number of years	Percent of total	Number[2]	Rate[3]		
IHS total (all causes)	94,321	100.0	5,207	695.1	529,376	3,251,170
Unintentional injuries	31,050	32.9	957	116.5	76,277	198,221
Infant mortality[6]	17,593	18.7	270	12.6	. . .	. . .
Violence[7]	12,704	13.5	363	43.1	12,015	14,664
Cardiovascular diseases	6,620	7.0	1,362	192.3	32,780	143,723
Alcoholism	6,156	6.5	342	52.7	22,596	13,694
Cancer	4,036	4.3	615	92.9	17,051	6,213
Respiratory diseases	3,428	3.6	329	42.2	41,838	412,641
Digestive diseases	2,163	2.3	170	24.2	54,346	81,315
Infectious diseases	1,667	1.8	101	13.6	16,132	119,808
Diabetes mellitus	882	0.9	165	25.5	16,398	121,071
Chronic renal failure	624	0.7	81	11.7	3,961	3,195
Pregnancy and childbirth	75	0.1	2	0.0	73,634	239,404
Musculoskeletal diseases	. . .	. . .	. . .	. . .	20,373	133,533
All other	7,322	7.8	450	60.4	141,975	1,763,688

[1] Average years of productive life lost, 1981–83.
[2] Average annual deaths, 1981–83.
[3] Age-adjusted deaths per 100,000 population, 1981–83.
[4] Average annual direct and contract hospital days, 1982–84.
[5] Total primary care provider outpatient clinical impressions, 1983.
[6] Years of productive life lost through infant mortality excludes 73 infant deaths reflected in the other listed causes. The infant mortality rate, which includes those deaths, is based on the number of infant deaths per 1,000 live births.
[7] Self-inflicted and by others.
NOTE: 0.0 rounds to zero.
SOURCE: National Center for Health Statistics and the Indian Health Service Division of Program Statistics.

physicians, physician assistants, and certain other IHS clinical personnel in 1983. Because IHS's California Area Office operates no hospitals and reports no contract hospital workload, the inpatient data that follow cover 11 of the 12 IHS Areas. IHS hospital discharge and day rates are adjusted for patients' age to permit comparisons with the U.S. population and among IHS Areas. Data on patient care funded privately or by third party resources are unavailable, thereby understating Indians' true rates for outpatient and inpatient care.

Indians who are eligible for and who periodically use IHS services constitute the IHS user population. The IHS user population is the denominator employed to calculate rates of inpatient and outpatient services provided by the IHS because the Service has patient care data only on the services it funds. The user population is a more appropriate denominator than the entire population eligible for IHS services. The entire population is estimated from the census of American Indians, Eskimos, or Aleuts who reside in the geographic areas where IHS has responsibility.

Table 1 displays Indian mortality and the number of services provided by IHS for the conditions analyzed. Together, these conditions account for approximately 92 percent of the years of potential life lost (YPLL) before age 65, 91 percent of all deaths, 46 percent of all IHS outpatient visits, and 73 percent of total IHS hospital days. These data reflect the relationship between the morbidity and mortality among the IHS service population and socioeconomic and environmental conditions. They illustrate the important combined effects of living conditions, environment, and personal behavior on the current burden of illness of the IHS service population. Changes in these conditions, therefore, have great potential for preventing many early deaths and reducing much of the burden of illness among Indians.

The YPLL rates presented in table 2 for all causes reflect the excessive numbers of deaths of young Indians in all IHS Areas. Unintentional injuries, diseases of infancy, violence, cardiovascular disease, cancer, and sequelae of alcoholism account for 80 percent of the productive life lost by the IHS service population.

Unintentional injuries and violence. In combination, unintentional injuries, homicides, and suicides account for 25 percent of the deaths among the service population of the Indian Health Service, roughly 1,300 annually. The age-specific death rate for Indians is approximately double the U.S. rate (all races) for the 15- to 45-year age group, and the rate of years of productive life that the IHS service population loses each year from nondisease causes is greater than that for any other cause of death.

Infectious diseases. IHS has had major success in reducing the incidence of infectious diseases among

Table 2. Rates of years of potential life lost before age 65 for selected causes of death, United States, all races 1982, and American Indians and Alaska Natives in Indian Health Service Areas, 1981–83[1]

Geographic area	All causes[1]	Unintentional injury	Infant mortality[2]	Violence	Cardiovascular	Alcoholism	Cancer	Respiratory disease	Digestive disease	Infectious disease	Diabetes	Renal failure
United States	60.6	11.9	11.6	6.6	10.0	1.5	9.3	2.0	2.2	0.8	0.6	0.3
IHS Areas[3]	113.9	37.5	21.2	15.3	8.0	7.4	4.9	4.1	2.6	2.0	1.1	0.8
Aberdeen.....	183.0	55.0	47.5	27.0	12.4	10.3	7.0	6.9	2.5	2.2	1.6	0.8
Alaska	166.2	64.5	31.5	23.4	8.8	4.2	8.0	8.9	1.7	2.6	0.2	0.1
Albuquerque.....	98.5	31.8	15.3	18.4	3.6	9.1	4.0	2.5	2.9	1.0	0.8	0.4
Bemidji.....	115.7	41.4	23.8	15.0	13.6	2.9	6.7	3.2	0.8	2.2	1.1	0.8
Billings.....	176.5	64.5	25.2	25.0	12.2	17.3	5.1	6.6	4.7	2.5	1.3	2.0
Nashville	113.0	29.5	26.5	12.6	11.7	2.9	7.4	3.8	2.4	2.7	2.1	0.3
Navajo	120.7	48.1	18.5	10.7	6.5	5.7	4.1	4.7	3.9	2.9	0.9	1.0
Oklahoma	72.2	20.5	16.2	6.2	6.6	4.8	4.3	1.9	2.0	1.1	1.0	0.6
Phoenix	134.4	36.3	16.0	25.9	10.3	16.7	4.9	6.2	3.3	3.2	1.9	0.7
Portland.....	109.4	33.2	23.6	16.1	7.5	9.6	3.5	2.6	2.0	1.6	1.3	1.0
Tucson.....	113.9	29.0	22.7	30.7	7.0	14.5	5.5	6.0	8.7	4.4	0.4	2.0

[1] Rates of years of productive life lost per 1,000 persons between birth and 65 years old at the time of death.
[2] Excludes infant deaths reflected in other listed causes.
[3] Data for California are not shown separately because Indian race on death certificates there is underreported. California data are included in the overall Indian rate.
SOURCES: National Center for Health Statistics and the Indian Health Service Division of Program Statistics.

Indians since 1955. Immunization has nearly eradicated the vaccine-preventable diseases, but the mortality rate for infectious diseases is still more than two times higher for Indians than for the U.S. population in general. Inadequate water and sanitation facilities in Indian households contribute to high rates of infectious enteric, respiratory, and skin diseases and to high post neonatal infant mortality. Despite a dramatic 96 percent decrease since 1955, tuberculosis still occurs two to seven times more frequently among Indians than in the U.S. population. Meningitis, hepatitis, and sexually transmitted diseases also cause significant morbidity. Adequate housing, sanitation, water supplies, and new vaccines, not medical services, are the key to reducing these diseases among Indians.

Maternal and child health. Maternity care accounts for the majority of hospital admissions and outpatient visits at IHS and its contract care facilities among Indian women. Later pregnancies and more frequent pregnancies, both risk factors, occur more often among Indian women, although overall maternal mortality rates are similar for U.S. and Indian women. The prevalence of diabetes in certain tribes creates the need to ensure excellent preconception control of the disease.

The overall infant mortality rate is no longer higher for the IHS than for the U.S. population; the birth trauma and asphyxia rates, however, are 2.5 times the U.S. rates, and fetal alcohol syndrome occurs up to six times more frequently. The disproportionate number of Indian deaths after the first 27 days of life reflects adverse environmental factors rather than the events of pregnancy and birth. Deaths from gastroenteritis (three times the U.S. rate) reflect poor sanitation and living conditions and perhaps delays in obtaining medical care. Sudden infant death syndrome is almost twice as common among American Indians and Alaska Natives as in the U.S. population.

Chronic diseases. Indian life expectancy at birth (71.1 years for reservation States, 1979–81) is approaching that for the United States as a whole (73.7 years, 1980). As the Indian lifespan increases, the disease pattern of the IHS service population more closely resembles that of other Americans. For example, even if the age-specific incidence of cancer in the IHS service population remained the same, the increasing proportion of elderly would increase the number of patients with cancer. Age-specific rates of cardiovascular disease in the service population tend to resemble those in the general population, and diseases of the heart are now the leading cause of death for Indians. Although cancer is the third leading cause of death, age-adjusted cancer death rates among Indians are only 70 percent of the U.S. rate. Possible explanations include lower prevalence of smoking and other cancer risk factors, greater responsiveness to treatment of the types of cancer which afflict Indians, prompt seeking of services, and the availability of appropriate services.

Approximately 15 percent of the IHS user population aged 45 or more years is diabetic, and half of the adults ages 45–64 in some southwestern tribes are diabetic. Age-adjusted diabetes death rates are more than two times higher for Indians than for the general population. That fact alone, however, does not convey the relationship of diabetes to other health problems—coronary heart disease, blindness, peripheral vascular disease, and kidney failure. In fiscal year 1983, diabetes was second only to upper respiratory infection as the leading reason for IHS outpatient visits, and 76 percent of all IHS hospitalizations for lower extremity amputations involved diabetes.

Musculoskeletal diseases, including arthritis, low back pain, and diseases of the spine and connective tissue, are frequent causes of severe illness and disability. The risk factors of obesity, diabetes, and alcoholism put Indians at high risk for low back pain, and the prevalence of stress, another risk factor, may be increasing with acculturation and sociocultural development.

Oral diseases. Inadequate access to preventive services and basic dental care is partly to blame for the high rates of tooth decay and gum disease among American Indians and Alaska Natives. Indian children have more decayed, missing, and filled teeth than other U.S. children, and nursing caries in preschool children are common.

Substance abuse. Indians have the highest frequency of drinking-associated problems of any ethnic group (*2*). Two-thirds of the alcoholics under treatment in Alaska, for example, are Eskimos and Aleuts; they constitute one-seventh of the State's population but experience three-fifths of all reported alcohol-related deaths. Indian alcohol-related deaths occur at more than four times the age-adjusted rate for U.S. population, and alcohol misuse results in a rate of years of productive life lost nearly five times that of the U.S. population. The increase over the past 15 years in the age-specific incidence of fetal alcohol syndrome is important because many mothers who produce one affected child also produce others (*3*). Although Indians are infrequent abusers of intravenous drugs, abuse of inhalants and other drugs, such as marijuana and stimulants, is common among Indian adolescents.

Respiratory diseases. Influenza, pneumonia, and chronic obstructive pulmonary disease are the most common respiratory diseases among American Indians. Mortality rates for influenza and pneumonia have decreased 82 percent since 1955, but rates for all respiratory diseases suffered by Indians are still 31 percent higher than the U.S. rates, and the rate of years of potential life lost is three times as high. Respiratory disease is closely linked to smoking prevalence. Occupational exposure to hazardous materials (asbestos, uranium) has not been a problem except in small groups, but the hazards may increase due to building and mining on Indian lands.

Digestive system diseases. The three major digestive diseases among Indians—gallbladder disease, appendicitis, and ulcers—together account for only a small part of the IHS workload and mortality in the IHS population. Overall, rates of Indian mortality and morbidity attributable to these diseases compare favorably with the U.S. rates; the rates for gallstones and cholecystitis among Indians, however, are up to six times higher than U.S. rates. Since ulcer disease is linked to both smoking and stress, acculturation may tend to increase the rate among Indians, which is currently slightly below the U.S. rate.

Proposed Interventions

Most of these conditions are largely unnecessary and unnecessarily costly, and deaths related to them may be regarded as "premature." Because they typically lead to health service encounters, these conditions are responsible for a large portion of IHS costs. Each condition has been analyzed in light of what can be done to reduce it by employing existing technology and participation by tribal, State, and local governments and the private sector. The interventions recommended in response to these health problems are summarized in the box. Some consist of objectives for the nation tailored to the IHS population (*4*). For conditions such as low birth weight and cancer, the challenge for the IHS is to maintain the currently favorable rates for Indians. Indians compare so poorly for such conditions as gastroenteritis, however, that the 1990 objectives for the nation are unrealistic for the IHS. At best, such national objectives become long-range goals for the Indian population; at existing levels of environmental health services, for example, the disproportionately high rates of enteric diseases and avoidable infant deaths will persist.

The infant mortality rates presented in table 3

Summary of objectives proposed for the Indian Health Service

Health status

Lower specific morbidity and mortality rates for the IHS service population

Awareness

Ensure that the IHS service population has a general knowledge of

- Stress reduction
- Parenting
- Nutrition
- Sanitation
- Symptoms requiring treatment
- Sources of information and care
- Specific health conditions; for example, diabetes
- Availability of mutual support and self-help for selected conditions, such as alcoholism

Ensure that IHS personnel have

- Appropriate training and experience
- Knowledge of Indian culture
- Continuing education
- Skills for taking patient histories that detect particular conditions
- Structured treatment protocols
- Self-awareness as role models

Advocate Indian health issues

Risk factors

Collaborate with tribal, other government, and private organizations to encourage healthful behavior including smoking cessation, diet, exercise, avoidance of substance abuse, injury avoidance, positive parenting attitudes, and so forth

Services

Screen for such conditions as hypertension and diabetes

Immunize the Indian population against vaccine-preventable diseases

Ensure universal accessibility to preventive primary care services for Indians, including well-child care, developmental screening, and prenatal care

Tailor specific programs to Indian culture

Coordinate regional service delivery with other community health resources

Surveillance

Establish and continue systems to monitor particular health conditions, including consistent reporting of notifiable diseases

Conduct periodic health status and health care delivery surveys

Improve current data gathering

Track specific health problems—for example, diabetes, hypertension, and pregnancy—and events indicating potential health or service delivery problems

Establish standards for all IHS programs and conduct periodic reviews

Table 3. Estimated preventable Indian infant mortality

Age at death	1 IHS 1982–84	2 U.S. 1983	3 Parity difference	4 U.S.[1] achievable	1–4 Preventable difference
Infant mortality[2]	11.7	11.2	0.5	4.0	7.7
Neonatal mortality[3]	5.2	8.3	−2.1	2.8	2.4
Postneonatal mortality[4]	6.5	3.9	2.6	1.2	5.3

[1] "Carter Center Interim Report: Closing the Gap." Estimate of the lowest achievable mortality rates. The achievable rate is the rate that could be realized nationwide under the best possible circumstances, including reduced maternal risk factors, optimal services, and so forth.

[2] Deaths in the first year of life per 1,000 live births.

[3] Deaths during the first 27 days of life per 1,000 live births.

[4] Deaths of infants aged 28 days to under 1 year of life per 1,000 live births.

SOURCES: National Center for Health Statistics and IHS Division of Program Statistics.

illustrate the concepts of parity and preventable gaps in Indian health status. The first and second columns present Indian infant mortality rates for Areas served by IHS for 1982–84 and the corresponding U.S. rates for 1983. The difference, which appears in the third column, is the amount that the Indian rate would have to be reduced in order for it to equal the U.S. rate. If Indian death rates for each age and sex group were the same as for the U.S. population, there would be 1,200 fewer Indian deaths annually—23 percent of all deaths within the service population. The last column of table 3 indicates that Indian rates are almost triple those which could be realized if all available scientific and technological capabilities could be brought to bear, which would result in preventing more than 8 deaths per 1,000 live Indian births. That much of this burden can be prevented by applying existing knowledge suggests that the IHS should aim for the reduction and eventual elimination of all preventable disease, not simply for parity with the nation.

Future IHS efforts will be focused on (*a*) ensuring adequate levels of demonstrably effective prevention and clinical services and (*b*) attacking specific health problems with targeted programs of health promotion and disease prevention.

Alcohol abuse. Alcohol is the leading and perhaps the most costly risk factor among Indians. Alcohol misuse underlies many major causes of Indian deaths in reservation States and contributes to an array of physical conditions treated by the IHS. Four of the top 10 causes of death among Indians are alcohol-related—injuries (18 percent of all deaths), chronic liver disease and cirrhosis (5 percent), suicide (3 percent), and homicide (3

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percent). An estimated 75 percent of all traumatic deaths and suicides among Indians involve alcohol, making it a major contributor to premature death. Strategies should be developed to target alcohol abuse among Indians; elements of such strategies should include public education aimed at heavy drinking, especially during pregnancy, and attempts to enhance community support for those at risk for alcohol problems. The IHS role will be largely limited to that of facilitator for the community. More and more Indian communities are beginning to recognize that only their members can adequately deal with the problem.

Obesity. The recent upsurge of obesity in some Indian populations makes them disproportionately susceptible to diabetes, hypertension, and cardiovascular disease; all conditions that are aggravated by sedentary living and high-fat diets. Manual labor, hunting, and travel on foot have given way to mechanization, and highly refined processed foods have supplanted a high-fiber diet. Most obesity among Indians can be controlled by diet and exercise. The IHS, therefore, should initiate aggressive interventions to prevent the projected increased incidence of diabetes by almost a third among the IHS user population within the next decade. At present, community fitness programs appear to offer the greatest opportunity for attacking this problem.

The Zuni Diabetes Project, for example, is trying to prevent diabetes on the Zuni Indian reservation through weight reduction and minor changes in eating habits. Seventeen aerobic exercise classes are offered each week at central locations within the pueblo. Since July 1983, 140 Zunis have been involved in the project; most had been obese and sedentary for their entire adult lives. Not only are these formerly nonathletic adults now embracing fitness, but 36 participants have lost an average of 12 pounds each. The 12 diabetics who required medication to control blood sugar levels at the beginning of the program have all lost weight and been taken off medication (*5*).

Tobacco use. The burden of illness that the use of tobacco creates for Indians varies by locale; Indians in the Southwest, for example, smoke little relative to those in northern States, including Alaska. Smokeless tobacco also is an ascendent problem among Indian youth. In Areas where smoking and using smokeless tobacco are uncommon, IHS should encourage Indians not to start, and in Areas where tobacco use is widespread, Indians should be encouraged to stop.

In 1983, the Keams Canyon Public Health Service Indian Hospital became totally free of tobacco smoke, and with the approval of the tribes, nearly all IHS facilities are now smoke-free.

Maternal and child health. The age of the mother, birth interval, and number of children affect fetal development and birth outcomes. Improved family planning services, prenatal care that includes preconception control of diabetes, and education about nutrition and health risks can improve maternal and infant mortality rates. Postneonatal mortality and infectious disease statistics likewise reflect the continued need for environmental health services.

Program planning. In recognition that sound epidemiologic studies are essential to the refinement of its present health care delivery system, IHS is developing the structure and procedures necessary to conduct regular epidemiologic analyses of the use of health services. The IHS will develop standards that permit refined analyses of community health problems and determine where to target IHS resources. The IHS will also develop epidemiology-based models with the ability to predict the impact of developments in the private and public health service sectors. Specific service, enrollment, cost, and revenue assumptions will enable IHS management to evaluate its policy alternatives routinely.

Additional headquarters and field positions are being filled by medical epidemiologists; analytic and administrative procedures to ensure routine epidemiologic analyses by IHS will be developed; and the results of these analyses will be integrated with IHS's ongoing statistical, planning, budget-

ing, and evaluation activities. An immediate benefit will be more appropriate allocation of resources based on need, rather than allocations made according to historic demand. Allocation based partly on epidemiology will improve the existing system.

Health professionals representing a variety of disciplines and IHS Areas have developed a strategy to improve Indian health status over the next several years. The proposed strategy consists of 14 goals derived from national objectives for 1990 that focus on the most common health problems of Indians. Most Areas are already addressing the national objectives relevant to IHS, and many have subsequently incorporated elements of the proposed strategy in their program plans. By concentrating on health status, the strategy provides clear direction for future programmatic efforts but avoids the additional reporting burden that would be created by process-oriented objectives; achievement of IHS goals can be monitored from data that are generated by existing data systems.

Extramural activities. The creative involvement of other organizations can provide substantial technical and financial assistance to the IHS and its service population. None of the three health block programs, for example—preventive health; maternal and child health; and alcohol, drug abuse, and mental health—has a specific set-aside either for tribes that previously had received categorical funds or for nonreservation Indian health programs. In the case of block grants, IHS will serve as an advocate of Indian interests with State and local governments to help ensure that, as citizens, Indians receive appropriate types and amounts of services.

IHS also proposes to expand its collaborative efforts within the Health Resources and Services Administration and with the Centers for Disease Control, the National Institutes of Health, Bureau of Indian Affairs, and other Federal agencies to provide funding, technical assistance, training, and consultation.

The joint IHS-Centers for Disease Control attack on hepatitis B in Alaska Native villages is an example of the potential of such collaboration. Beginning in 1981, all Native residents were screened; their communities were ranked by the incidence of the disease; and all susceptible residents, including newborns, were vaccinated. The incidence of hepatitis B dropped from 240 to 10 new cases per 100,000 population after 2 years, and it is expected that hepatitis B and its lethal complications will eventually disappear in Alaska Native villages.

IHS has enjoyed similar success in collaboration with other Federal, State, and local organizations to promote Indian safety, curb alcohol and substance abuse, and so forth. Likewise, leaders of individual IHS programs and Areas will actively explore alternative and innovative ways of participating with the private sector in consortia that share facilities and coordinate services and otherwise involve business and industry, civic and social groups, and broadcast and print media in IHS activities.

Applied research. Steady improvement of Indian health status requires the deliberate, coordinated application of existing technology and research to programs that promise substantial dividends. Ways to effect behavioral and environmental change are increasingly understood; many causes of chronic disease are known; some effects of health programs have been isolated from the results of other factors; and the impact of modifying several proven risk factors has been demonstrated adequately. What remains is to apply this knowledge to the unique social and cultural circumstances in which many Indians live. As regards alcohol and substance abuse, for example, IHS needs to improve the level of knowledge about alcohol and drugs and their prevention and to rehabilitate casualties more successfully (*6*). IHS's research agenda therefore includes participation in special information-gathering activities such as the National Medical Expenditure Survey conducted by the National Center for Health Services Research and Technology Assessment.

Information systems. Historically, lack of complete information made it difficult for IHS to manage its resources efficiently and to respond readily to requests for data about its operations. IHS has adopted a strategic plan for information systems that is designed to promote effective and efficient resource management and delivery of health care services. The plan has defined, as a basic requirement of information systems, the need to satisfy both the clinical and administrative needs of the organization. The plan also focuses on several broad initiatives that include improving the usefulness of financial management information systems, support of the efficient use of third party resources, and promotion of local control and responsibility for data. As a result, known deficiencies in data collection are being corrected, and

improved methods of data retrieval and presentation are being implemented.

The Resource and Patient Management System (RPMS), for example, represents a major departure for IHS toward decentralization of data system operations; when fully implemented, RPMS will place multiuse computers at IHS Areas, Service Units, hospitals, and health centers to support patient care, administration, hospital and clinic management, and local data collection and processing. Other systems, such as patient registration already in use by the IHS, are generating much of the information necessary to plan services, allocate resources, and monitor program activities.

Conclusion

The recommendations produced by this analysis of Indian health conditions and possible interventions will be used to stimulate widespread discussion about ways to effect desired service and environmental and behavioral changes. Implementation of the recommendations is both practicable and consonant with the longstanding IHS goal of raising Indian health status to the highest possible level. The proposed interventions provide direction to IHS services in the future and strongly support the Service's longstanding emphasis on disease prevention, primary care, and health promotion. Prevention services that include family planning, immunization, and water fluoridation are highly responsive to the needs of IHS's relatively young service population. Services particularly important to the specific health problems of the Indian population are early prenatal care, well-child care and developmental screening, hypertension screening and treatment, and education about diet, weight control, exercise, smoking, alcohol abuse, and vehicular and environmental safety. When these services are not readily available or accessible, the IHS has a continuing responsibility to develop the capacity to fill in the gaps.

The next step is for IHS and Indian tribes to develop a course of action that formally evaluates, according to the following principles, each recommendation within the context of local health problems:

1. Full participation by tribal governments is essential.
2. There is multilevel, multidisciplinary responsibility within IHS to ensure that each objective is fully considered.
3. Areas must have maximum flexibility in tailoring program actions responsive to each objective to local conditions.
4. Each Area is responsible for ensuring that its services address each objective satisfactorily.

Deliberation about the national health strategies of the United States, of other countries (*7*), and recent efforts at risk factor control (*8*) will produce insights useful in weighing the utility, costs, disadvantages, and benefits of each recommendation.

As an advocate for improved Indian health, the IHS will work with tribes, other public agencies, and private organizations to create a more healthful environment. Improved education and recreation, meaningful employment and, ultimately, enhanced self-esteem, will make IHS interventions most successful. The results of many of these efforts, however, will not necessarily be manifest in the short term. Motor vehicle accident deaths will decline as soon as Indians use seatbelts regularly and control drinking, but cancer rates related to cigarette smoking may take years to respond. Nonetheless, successful health promotion and disease prevention programs eventually should reduce the demand for therapeutic services and substantially improve the quality of life for Indian people.

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