

Health Problems of the Navajos in Monument Valley, Utah

FRANK R. LEMON, M.D.

A SURVEY of the health status and some of the needs of the Navajos in Monument Valley, Utah, was initiated in 1956 by the department of preventive medicine, College of Medical Evangelists, and has continued intermittently until the present time. The Monument Valley Mission Clinic was headquarters for a preliminary investigation from 1956 through 1958, and the findings of that investigation are the subject of this report.

The objectives of the study were, first, to gather information relative to the age and sex distribution of the local population; second, to identify a few of the larger health problems; third, to obtain some concept of the rate of pregnancy and the degrees of childhood mortality; and fourth, to measure the reaction to tuberculin, histoplasmin, and coccidioidin.

The survey was conducted in three phases: (a) collection of demographic and illness data; (b) test inoculations with tuberculin, coccidioidin, and histoplasmin, and X-ray screening of a random sample of the population; and (c) reinoculation with coccidioidin and followup chest X-rays of those previously screened.

Dr. Lemon is associate professor of preventive medicine, School of Medicine, College of Medical Evangelists, Loma Linda and Los Angeles, Calif. This study was supported in part by the National Foundation through student fellowship grants to Alan King, Keith Mack, Donald Weaver, and John Ruffing, who collected many of the data.

Personnel of the Monument Valley Mission Clinic, including Dr. Paul Bringle, Dr. Lloyd Mason, and Mrs. Gwendolyn Walter, R.N., assisted in the fieldwork and provided valuable liaison with the Navajos and their leaders.

The field studies were made during the summer months, June through September, of 1956, 1957, and 1958. This season is more suitable for travel by jeep, and most of the children are home from boarding school in the summer.

During the study, 1,140 individuals were identified in the families studied. Of these, 54 had had illnesses or injuries resulting in hospitalization during the previous year. One-fourth of these admissions were for tuberculosis. This does not include an undetermined number who died from illness or injury prior to hospitalization.

Study Area

The Navajo reservation occupies approximately 25,000 square miles in the northeast corner of Arizona and portions of two adjacent States. An estimated 75,000 Navajos lived on the reservation in 1958 (1a). Traditionally, the sustenance of the Navajos has been obtained from sheep raising and summer gardening, chiefly corn, in the scattered valleys, where some water is available. The economic status of the tribe has recently been elevated and their pattern of living changed somewhat by the development of oil, uranium, and other mineral deposits on the reservation. However, in many areas, they continue the nomadic life of past centuries (2, 3).

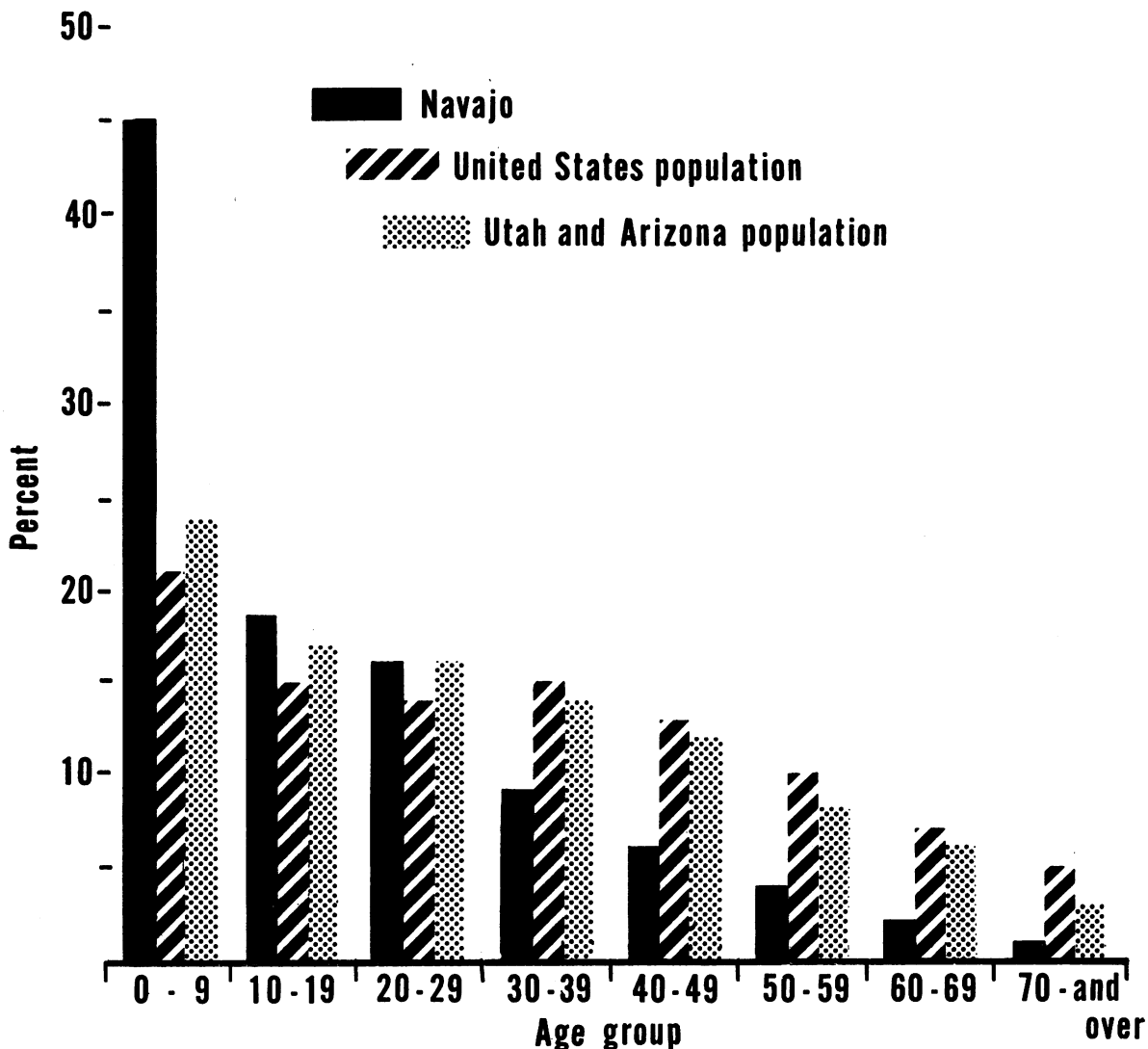
Monument Valley is 55 to 60 miles west of the "four corners" junction of the State borders of Utah, Arizona, Colorado, and New Mexico. The area of the present study is centered where Utah State Highway 47 crosses the Utah-Arizona border and extends about 15 miles south and 25 miles in other directions, encom-

passing about 1,800 square miles. The region is characteristic of the southwestern "high desert" country. The altitude is approximately 5,200 feet. The terrain is marked by dramatically shaped and colored vertical red-rock "monuments" interspersed with arid, sage-covered range land. The valley is one of the more remote and primitive areas of the Navajo reservation, being separated by 100 miles of rough dirt road from the Government hospital at Tuba City, Ariz., and, during the study, by 72 miles of similar road from the town of Blanding, Utah. Distances to other major points south and east are greater, and much of the region is seldom-traversed wilderness.

In 1956 the Navajo population of this region was estimated at between 1,500 and 1,800 individuals, living in small family groups. A few were concentrated at various points near mines, ore-processing plants, or the two trading posts at Monument Valley and nearby Oljato. There was a small immigration of families into the area during 1956 and 1957.

Vital statistics pertaining to the Navajos are difficult to obtain. Their dispersed way of existence, the frequency with which they change their names or use several names, the occasional practice of polygamy, and the inconsistent reporting of births and deaths have combined with language and cultural barriers to obscure the

Age distribution of 1,140 Navajos, by decade, 1957



census and the measurement of health problems. Some estimates have indicated a population of low average age compared with the population of the United States (1, 2); others have indicated birth rates and childhood death rates of three to four times the national average (4). Tuberculosis is a major problem. Pneumonia, gastroenteritis, and other infections, including trachoma, are the principal causes of morbidity and mortality, along with accidents (4-7). With present knowledge, all of these diseases are largely preventable.

Collection of Data

In 1956, assisted by interpreters, the investigators extended partial enumeration of Navajos from the vicinity of the clinic to progressively more distant perimeters. Data were collected in each family on the age, sex, and occupation of each member. Women of childbearing age were identified, as were members of the family who had died during the past year or who had suffered an illness or injury requiring hospitalization. More detailed inquiry was made of those persons reported to have such illnesses, injuries, or pregnancies. At the same time, clinic and hogan visits were tabulated to give an index of clinical problems. Of 468 consecutive visits, 178, or 38 percent, were pediatric in nature; 173, or 37 percent, general medical; and 55, or 12 percent, for routine dental complaints. The remainder involved both routine and emergency surgical and obstetrical care. The preponderance of general medical and pediatric contacts indicates an opportunity for health education and preventive medicine.

Age and Sex Distribution

The age distribution of the 1,140 Navajos identified is notable when compared with the populations of the entire United States, or the States of Arizona and Utah (see chart), or the total Navajo population. Seven hundred and twenty-one (63 percent) were under 20 years of age. This age group was estimated at 57 percent of the total Navajo population in 1950 (1a). The marked shift toward the younger ages is represented by the extremes. Children aged 0-9 years comprised 45 percent of the Navajo population in the study area, or an esti-

mated 34.6 percent of the total Navajo population in 1957 (1b), compared with 21 percent in the United States as a whole and 24 percent in the Arizona-Utah population. Those 50 years of age and older comprised only 6 percent of this Navajo group in contrast to 22 percent in the United States and 17 percent in the Arizona-Utah population.

The sex distribution of the study group was 574 male and 566 female, of whom 419 (37 percent) were 20 years of age or older. There were 20 married women under age 20.

Of 234 employed or employable men in the families studied, 78 percent were engaged in mining, shepherding, and construction, 4.7 percent were storekeepers or medicine men or were retired, and 17.3 percent were engaged in miscellaneous occupations.

Pregnancy and Childhood Mortality

Information provided by 175 Navajo mothers in the childbearing ages 17-49 years revealed a high pregnancy rate. Of these mothers, 142, or 81 percent, reported a pregnancy on an average of at least every 2 years (table 1). More than one-third averaged a pregnancy yearly. An annual pregnancy was common up to age 29, and an average of one pregnancy at least every 2 years up to age 39. Fifty-five percent had had five or more pregnancies; nearly one-third, more than seven. These women reported 857 live births and 38 pregnancies ending in fetal death, a ratio of 22.6 to 1. In the continental United States in 1957, the ratio of registered live births to fetal deaths was 45.9 to 1 (8, 9).

We believe that among the Navajos there was a cultural reticence to report, and probably a failure to recall, stillbirths or abortions. We know of no exactly comparable data concerning the average frequency of pregnancies among women of the United States. A report on child spacing published in 1958 (10) indicated that among a group of 66,930 women in the United States aged 15-44 years, there were 26,438 (39.5 percent) of various or no parity whose marriage or last live birth had been within a 2-year interval. Twenty-two percent of these had a live birth within that 2-year interval; 17 percent had a live birth within 1 year after marriage or after a previous birth.

The frequency of childhood mortality is indicated by the report of 73 of 175 mothers that they had lost one or more children after birth (table 2). The most common causes of death, on the basis of descriptive information provided by clinic records or by the parents, were respiratory, gastrointestinal, and central nervous system infections, and injury.

Of 146 childhood deaths among 857 live births from 1927 to 1956, 108 occurred during infancy (table 2). A crude comparison of the death rate among Navajo infants with the United States infant death rate is made on the basis of these 108 deaths. Of all newborns reported by mothers in the study group, 12.6 percent died during infancy. This represents an average infant death rate for each of these 30 years which may have been more or less than 126 per 1,000.

The decline in infant mortality in the United States during the period 1927-56 was virtually a straight-line fall (11, fig. 1). Therefore, it is possible to estimate an average rate for this period which is nearly a correct summation for the entire 30 years' experience. At the midpoint of this period the infant mortality rate in the United States was between 40.4 in 1942 and 45.3 in 1941 (12), an average of about 42 per 1,000, or 4.2 percent of all newborns. Thus, infant mortality reported by these Navajo mothers during the period 1927-56 appears to be about three times the rate for the United States.

The data on pregnancy and childhood mortality among the Navajos suggest, in a population that is young compared with the

Table 2. Deaths among offspring¹ of 73 of 175 Navajo mothers in Monument Valley, Utah, 1927-56, by age group

Age at death (years)	Number	Percent	Common causes of death
0-1.....	108	74	Respiratory, gastrointestinal, meningial, and secondary infections following childhood diseases.
Died before 1950.	68	47	
Died 1950 and after.	40	27	
2-9.....	32	22	Injuries.
10 and over.....	6	4	
Total.....	146	100	

¹ Majority born since 1930.

surrounding white population, a probable high birth rate, with an associated high rate of infant and childhood mortality. The data are insufficient, however, to give current birth and infant death rates precisely. It was our impression that, with the increased availability and use of health services in the area since 1950, there has been a decline in infant mortality.

Inoculations and X-rays

During 1956 and 1957 nearly 1,000 individuals were tested for their reactions to one or more intermediate strength tuberculin, histoplasmin, and coccidioidin (tables 3 and 4).

In 1956, intermediate strength tuberculin was administered intradermally to a random selection of Navajos aged 29 and under. In 1957, additional test inoculations with tuberculin,

Table 1. Pregnancy experience of 175 Navajo mothers¹ aged 17-49 years, Monument Valley, Utah

Average interval between pregnancies (years)	Total		Age group (years)							
			15-19		20-29		30-39		40-49	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1.....	65	37.0	12	19.0	47	72.0	4	6.0	2	3.0
2.....	77	44.0	1	1.0	32	42.0	35	45.0	9	12.0
3.....	17	10.0	0	0	4	24.0	4	24.0	9	52.0
4 or more.....	16	9.0	0	0	3	19.0	7	43.0	6	38.0
Total.....	175	100.0	13	7.4	86	49.1	50	28.6	26	14.9

¹ Based on 175 "married" women ages 17-49 in hogans and camps surveyed.

Table 3. Reactions to 378 histoplasmin and 492 coccidioidin skin tests among Navajo Indians in Monument Valley, Utah, by age group, 1957

Age (years)	Antigen			
	Histoplasmin ¹		Coccidioidin ²	
	Positive	Negative	Positive	Negative
0-19-----	2	232	11	312
20 and over----	3	121	9	145
Unknown-----	0	20	3	12
Total-----	5	373	23	469

¹ Equivalent to NIH reference histoplasmin.

² Cutter 1:1,000 dilution, biologically standardized.

coccidioidin, and histoplasmin were performed among a random sample of the total study population. At the same time, this sample was subjected to a screening X-ray of the chest, usually provided by a mobile unit of the Public Health Service, with technical and consultative assistance from officers of the Service's Division of Indian Health. Radiographs were read by Dr. Paul Deeb, department of radiology, School of Medicine, College of Medical Evangelists. Of those variously skin tested, 32 had abnormal pulmonary findings (table 5), and of these 27 were tuberculin positive, 2 were coccidioidin positive, and none of 15 was his-

toplasmin reactive. These data suggest that persistent inflammatory, calcified, or fibrotic lesions of the lungs in Navajos in this area are most likely due to tubercular infection. However, the possibility of endemic coccidioidomycosis is suggested.

Of the 967 persons tuberculin tested in 1957, 229, or 23.7 percent, reacted positively (table 4). It is surprising to find only 8.2 percent positive among children 14 years of age and under. Other investigators have reported as high as 22 to 33 percent positive reactions up to age 12 in other areas of the reservation (R. R. Omran, at the 1958 meeting of the American Public Health Association, and personal communication from Dr. Kurt Dueschle). In April 1959, when 32 Navajo preschool and elementary school children aged 6-14 years were tested with tuberculin at Mexican Hat, Utah, at the northern perimeter of the Monument Valley study area, 2 reacted positively (personal communication from Dr. Lloyd Mason, July 1959).

Of the 967 persons tested with tuberculin, 158 were tested in both years, and of these 6 converted to positive in the interval. In 1957, two of the 6 "converters" had an X-ray report of a suspicious inflammatory lesion of the lungs. Five of 378 persons tested with histoplasmin were positive (table 3), and of these none revealed any significant findings on chest X-ray. They may have been "false positives" following administration of antibiotics (13). Twenty-

Table 4. Results of tuberculin tests ¹ on 967 Navajos in Monument Valley, Utah, 1956 and 1957

Age group (years)	Total tested	Reaction				
		Positive			Negative	
		Number	Percent	Cumulative percent	Number	Percent
0-4-----	301	6	2.0	2.0	295	98.0
5-9-----	252	23	9.1	5.2	229	90.9
10-14-----	130	27	20.8	8.2	103	79.2
15-19-----	81	31	38.3	11.4	50	61.7
20-29-----	76	49	64.5	16.2	27	35.5
30-49-----	61	46	75.4	20.2	15	24.6
50 and over-----	47	41	87.2	23.5	6	12.8
Unknown-----	19	6	31.6	23.7	13	68.4
Total-----	967	229	23.7	23.7	738	76.3

¹ Parke-Davis P.P.D. 0.0001 mg. in 0.1 ml.

Table 5. Skin test reaction of 32 of 44 Navajos with positive chest X-rays, Monument Valley, Utah, 1957

X-ray diagnosis	Number X-rayed	Number skin tested	Reaction					
			Tuberculin		Histoplasmin ¹		Coccidioidin ¹	
			Positive	Negative	Positive	Negative	Positive	Negative
Acute lesion.....	6	4	2	2	0	3	0	4
Calcified pulmonary lesion.....	17	10	8	2	0	3	1	8
Calcified secondary lesion.....	12	10	10	0	0	8	0	7
Fibrosis.....	9	8	7	1	0	1	1	7
Total.....	44	32	27	5	0	15	2	26

¹ Histoplasmin and coccidioidin tests were not done on all 32 patients who were tested with tuberculin.

three of 492 persons tested with coccidioidin were positive; half of them under 20 years of age (table 3). Of these 23 individuals, 2 had suspicious X-ray findings. These were suggestive of a calcified "primary" lesion of the lung in one instance and of "fibrosis" of a portion of the lung field in the other. Of the 11 coccidioidin positive reactors under 20 years of age, 2 had been off the reservation in nearby areas of Arizona and New Mexico. Three had regularly lived farther than 50 miles south of Monument Valley. Six were local residents.

X-ray Followup

In 1958, a followup chest X-ray was made on 36 of 44 individuals whose 1957 X-rays had suggested acute or chronic inflammatory chest lesions. Two of these were reported to have "probable active pulmonary inflammatory disease"; four were suspected of having other intrathoracic pathology. One individual was located in a tuberculosis sanitarium, and two were reported as deceased, cause unknown. Twenty-seven were found to have no significant lesion on reexamination.

Discussion

The Navajo way of life is in many ways foreign to life outside the reservation. Health practices and attitudes continue to be influenced by ancient cultural concepts, although some of these concepts are modified as the Navajo is

regularly exposed to the "white man's medicine" and to his ideas of hygiene and sanitation. On the reservation, considerable variation in morbidity and mortality experience probably exists between different areas with differing availability of health services.

The pattern of a predominantly young population, exhibiting evidence of a high birth rate and a high infant death rate appears to be true in Monument Valley as other investigators have estimated it to be in other areas of the Navajo reservation. However, the difficulty of obtaining precise data inhibits broad interpretation of our findings.

Because of their way of life, insanitary practices, and the distances to medical facilities, it is not surprising that morbidity and mortality from infectious diseases continue to be major problems among the Navajos. The challenge to health workers is to seek correction of those factors which predispose these people to preventable disease.

Although tuberculosis may be a special problem for the Navajo on a racial basis, it would be of interest to compare data concerning this infection among those living on the reservation with similar data for those living in the environmental conditions and by the standards of the surrounding white population.

Summary

The somewhat isolated group of Navajos in the Monument Valley area of Utah is made up

of a predominantly young population with an apparently high birth rate and a high childhood death rate. Major disease problems of the area include tuberculosis and other respiratory, gastroenteric, and miscellaneous infections. Of 967 individuals tuberculin tested, 229 were found to be positive, whereas of 378 tested with histoplasmin, only 5 were positive, and of 492 tested with coccidioidin, only 23 were found positive. It is believed that a crude baseline for the health status of Navajos in the region has been ascertained. Further study is contemplated to define more precisely the nature of these and other health problems.

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