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Infant Mortality on the Yakama Indian Reservation, 1914–1964

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The Yakama Indian Reservation is located on the Great Columbia Plateau of central Washington State.[1] It is the home of fourteen diverse tribes and bands of Native Americans who once spoke several dialects of three distinct languages, including Sahaptin, Salishan, and Chinookan. These Indians form the Yakama Nation, and their health has been closely related to the creation and execution of the reservation system of the United States since 1855 when a few chiefs signed the Yakima Treaty.[2] Beginning in the 1870s, the Office of Indian Affairs placed a large number of Indians onto a limited land base and during the late nineteenth and early twentieth centuries restricted their access to traditional foods and medicines off the reservation.

Confinement on the reservation led to changes in subsistence, maternal-child care, and housing that contributed to infant deaths resulting primarily from pneumonia, gastrointestinal disorders, tuberculosis, heart disease, and syphilis (fig. 1). The modal age (the age that appeared most often) of death on the Yakama Reservation during the era from 1914 to 1964 was children under one year of age, with 631 (16 percent) of the 3,899 deaths arising from this age group. This was the largest number of deaths suffered by any age group on the reservation. The first birth and death rates of infants from the Yakama Reservation were recorded in 1914 when an infant mortality rate could be calculated. Thus, although data on deaths exist from 1888, the central focus of this work will be that fifty-year period between 1914 and 1964.

The Yakama Treaty of 1855 and its ratification by the Senate in 1859 set into motion a series of events and circumstances that undermined the health of the Yakama people. As a result of the treaty, the various people placed on the Yakama Reservation secured a small portion of their traditional homelands in central

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Washington Territory. Other segments of their former land became part of the public domain, which the United States opened to white settlement after 1859. The government placed people from several tribes—Yakama, Palouse, Klickitat, Wishram, Wenatchee, Wasco, Wanapum, and others—on the Yakama Reservation, forcing approximately two thousand Native Americans onto the reservation where they competed for limited traditional food resources.

During the early twentieth century, the federal government limited the movement of Plateau Indians onto lands they had long used for fishing, hunting, and gathering. Although Plateau Indians had acquired seeds from Hudson Bay Company and had planted gardens, they continued to maintain their traditional economic life. During the early reservation era, some of the people ranched and farmed, but most continued traditional seasonal rounds until white settlers destroyed root grounds, salmon, and game. Indians then turned more to ranching and farming in the 1920s and to wage earning by the 1940s.[3] The reservation system ended seasonal rounds and traditional housing of mat lodges and tipis, and both of these changes affected Indian health.[4]

Whites farmed, ranched, and logged the inland Northwest, destroying animal habitats, berry patches, and root grounds. In time whites dammed the rivers, preventing salmon from running up the Columbia River and its tributaries.[5] Moreover, whites demanded that the United States restrict the movement of Native Americans across the public domain and private property, thereby restricting hunting, gathering, and fishing. The United States confined the fourteen tribes and bands of the Yakama Nation to a small geographical area, encouraging them to live in settled households and farms.[6]

By the 1920s and 1930s, the seasonal rounds largely gave way to agriculture, farm labor, and government rations. Rather than living in mat lodges and tipis, most Yakamas lived in small, wood-framed dwellings that were overcrowded, unventilated, and unsanitary. The change in Yakama diet, housing, and settlement patterns contributed to the ill health of Yakama people. Poverty crippled the health of all Yakama, including pregnant women, infants, and small children. The breakdown in seasonal rounds also prohibited women from helping one another, from educating each other about prenatal care, birthing, and child care. Western medicine did not fill the void of sharing cultural knowledge, and the Office of Indian Affairs never had sufficient money to hire physicians and field nurses capable of compensating. Infant deaths and high infant mortality rates resulted.[7]

Under the terms of the Yakama Treaty, the United States agreed to provide the Indians with medical care. However, in spite of the fact that the Health Division of the Office of Indian Affairs provided some medicines and medical attention, it was not sufficient to protect the Yakama Indians from death and disease. Moreover, the Office of Indian Affairs did not initiate professional medical supervision of Indian health until 1908 with the position of chief medical supervisor, and it did not create the Health Division until 1921, two factors that contributed to infant deaths among the Yakama. As early as 1913, Yakama Indian Agent Donald M. Carr asked the Indian Office to fund a hospital at Fort Simcoe, a project that was not completed until 1928. Carr did not have a hospital, and the best education program he could provide addressed infant and child health.

For a short period of time, field matron Esther Sprague worked as an outreach nurse, instructing "younger women with children" about "cleanliness and proper feeding." Sprague worked among the Yakama, meeting with twenty-six women in May 1917, talking "to them on caring and proper feeding of children and cleanliness." Field nurse Sprague and Carr targeted mothers and babies, recognizing the devastation of infant mortality on the Yakama Reservation. In spite of sincere concerns about infant deaths, Carr and Sprague did not have sufficient funds to hire the medical personnel, educators, or doctors. They did not have enough money to build, maintain, and staff a clinic or offer mothers programs about the spread of bacteria and viruses. Without a sufficient medical staff and health clinic, the Yakama Agency could not adequately address infant deaths.[8]

Health conditions affecting infant mortality on the Yakama Reservation were indicative of Indian health throughout the United States. Before the 1930s, Lewis Meriam deemed government efforts relating to Indian health to be "curative and not . . . educational and preventive."[9] Sufficient funding for educational programs, doctors, nurses, medicines, hospitals, and clinics was never available, in spite of the fact that agents and health officials on reservations continually requested funding for health-related expenditures. The Health Division of the Office of Indian Affairs was a failure, in part because the Congress refused to fund Indian health or consider the consequences of their budget-saving agendas. In short, Indian health was not a priority in the United States during the first half of the twentieth century.

Before the arrival of whites, medicine men and women healed the people and helped them prevent illnesses. Midwives counseled women about pregnancy, birth, delivery, and postpartum. Medicine people and midwives had less influence on what Yakama Indians termed "white man's diseases," and the Indians received little attention from white doctors and nurses. In fact, Indian agents on the Yakama Reservation reported that Indian doctors did "a great deal of harm" and the Indian Office urged agents to "do whatever you can to prevent the practice [of Indian doctoring]."[10] If the lack of adequate medical attention was detrimental for Indians as a general population, it was devastating for infants. Of the 631 infant deaths on the reservation between 1914 and 1964, 327 (52 percent) infants died of five major causes: pneumonia, gastrointestinal disorders, tuberculosis, heart disease, and syphilis (fig. 1).

Figure 1

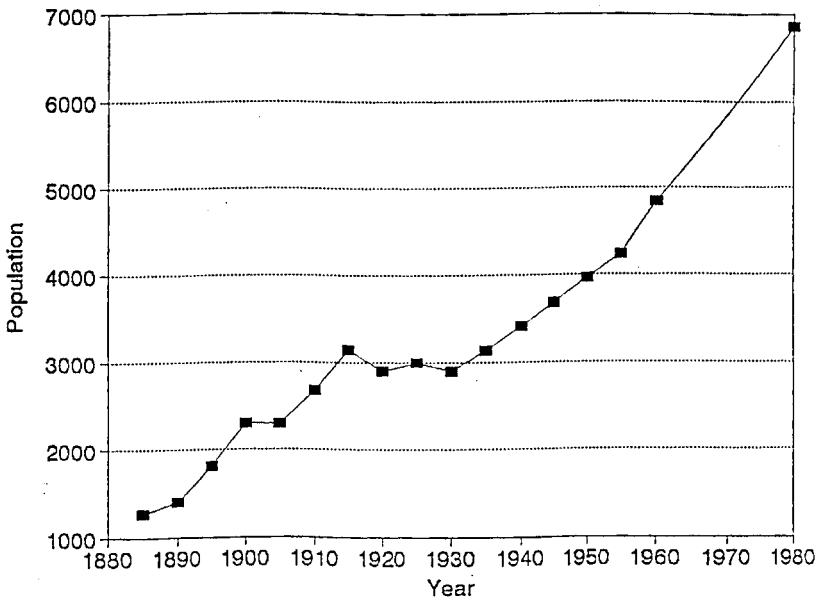
Leading Cause of Death for Children Under One Year, 1888–1964

Cause	Number of Deaths	Percent (of all deaths under one year)
Pneumonia	215	34
Gastrointestinal Disorders	66	10
Tuberculosis	18	3
Heart Disease	16	3
Syphilis	12	2
Total	327	52%

Death certificates of Yakama people, generated by employees of the Indian Office and authorized by Yakima County, form the basis of this study.[11] These records are sparse before the 1920s, when the agents began making a sincere effort to preserve death certificates. A few death records from the Yakama Reservation are available for the years from 1888 to 1924, although these data are poor, few in number, and do not represent the number or causes of deaths among Yakama people. Death certificates for the Yakama Reservation number a total of 3,899 cases and are found in the National Archives, Pacific Northwest Region, Seattle, under the Records of the Yakama Indian Agency.[12] Unfortunately, there is no way of knowing how many mothers and fathers quietly buried their infants without notifying the agency or how many agency officials failed to record infant deaths. Like other Native Americans, many Yakama disliked and distrusted agency employees, and they simply did not notify the government of their losses. Many Yakama families buried infants in their traditional fashion, without contacting government employees.

The Yakama agency began recording births in 1914, and the infant mortality rate can be calculated for many years in the twentieth century.[13] The archives contain the Yakama Indian censuses, but these are only available for selected years from 1880 to 1931, and information regarding deaths within the various censuses is incomplete, inadequate, and unreliable in comparison to death certificates.[14] The censuses offer the best information on the Yakama Indian Reservation population, indicating that the population ranged from a low of 1,272 in 1885 to a high of 3,149 in 1914.[15] The population rise during the late nineteenth and early twentieth centuries was due to the migration of

Figure 2
Yakima Population Growth, 1885–1980



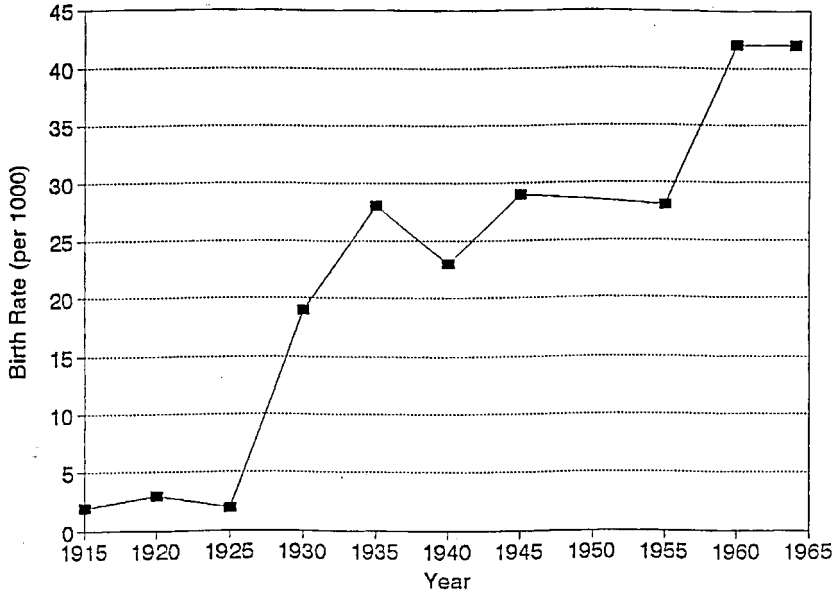
non-reservation Indians from many diverse tribes onto the reservation where they could live with friends and relatives away from the white population that encroached on former Native lands (fig. 2).

The rise in population on the Yakama Reservation was also due to the fact that the government refused to recognize Indian ownership of most lands off the reservation. If Native Americans had not filed homesteads, then most lands were open to white settlement. During the late nineteenth century, many Indians gave up hope of "owning" their aboriginal lands, so they moved to reservations where they could live in common with other Indians or take up an allotment. In the early twentieth century, the government allotted portions of the Yakama Reservation, and to do so they carefully counted and recorded the names of Indians. Some Indians farmed and ranched allotments, while others worked in the fields or on ranches run by non-Indians. The reservation system of the United States forced Indians to seek new livelihoods, for with each passing year, Indians became more confined by whites who destroyed plant, animal, and fish habitats. The growth of the Yakama population on the reservation was also influenced by an ever-increasing birth rate from 1925, when the Yakama birth rate was 2, to 1964, when the birth rate reached its zenith at 42 (fig. 3).

The most complete data regarding Indian deaths on the Yakama Reservation were recorded between 1924 and 1946, a time period that corresponds with national reforms in Indian affairs. The demand to investigate American Indian affairs culminated with an in-depth research project probing health, education, and administration. The result was the publication in

Figure 3

Yakima Birth Rates, 1915–1964



1928 of *The Problem of Indian Administration*, commonly called *The Meriam Report.*[16] The publication was a far-reaching document which fueled the national reform of Indian affairs that had started earlier in the 1920s. In 1932, Americans elected Franklin Roosevelt as president, who selected John Collier as commissioner of Indian Affairs. Collier served in this capacity from 1933 to 1946, and as a reformer, he followed some of the recommendations made in the *Meriam Report*, including an improvement of Indian health.[17]

According to the report, "taken as a whole practically every activity undertaken by the national government for the promotion of the health of the Indians is below a reasonable standard of efficiency." Meriam added that "The health work of the Indian Service falls markedly below the standards maintained by the Public Health Service, the Veterans' Bureau, and the Army and the Navy."[18] The *Meriam Report* had reported that "accurate figures based on reasonably complete records are not yet secured" because the Office of Indian Affairs, which "for many years had rules and regulations requiring the collection and tabulation of some vital statistics," had failed to collect the data.

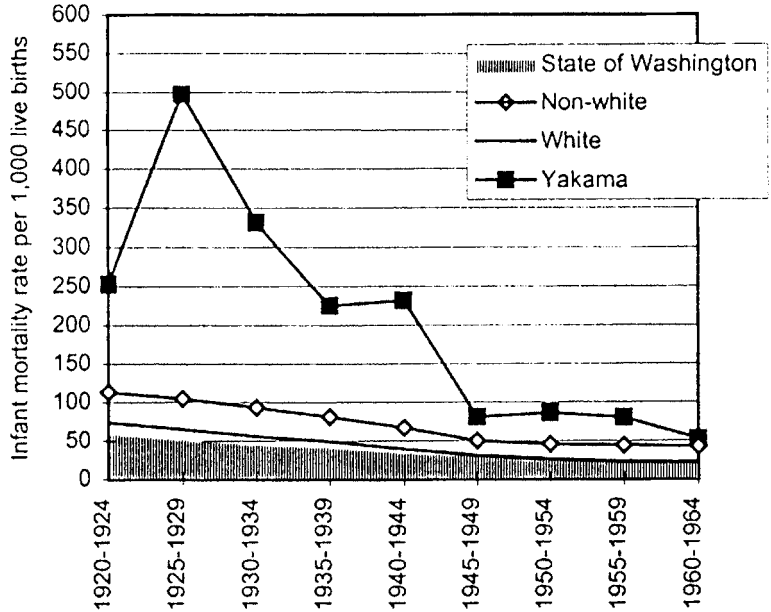
Meriam was particularly concerned that the Office of Indian Affairs had not recorded Indian deaths. He specifically pointed out that "no report is made to the Indian Office" for "many of the Indian deaths which occur on reservations." When deaths were recorded, the information was often "defective in that some of the essential items are missing." Among the missing data were the cause of death and age of the person at death.[19] Incomplete data before the 1920s was certainly the norm at the Yakama Indian agency. Before the 1920s, Yakama agency officials had little interest in keeping accurate and complete records, but after the 1920s they made a greater effort to do so. Since the "statistics and records of medical activities at present are incomplete and as a rule unreliable," Collier demanded that the agencies keep better records.[20] After the 1920s the death records on the Yakama Reservation were more numerous and complete than previous years, and this fact corresponds with the national reform of Indian affairs.

Families on the Yakama Reservation kept their own death records—oral and written—but these data are difficult to acquire and may not be complete. The Yakama agency also kept some death registers and noted a few deaths in the tribal census. However, the best data on Yakama deaths are the death certificates, which provide such variables as the person's name, maiden name, gender, age, tribe, blood quantum, informant, marital status, date of death, place of death, and cause of death. Records during the 1950s and 1960s included additional information not found in the earlier documents such as the deceased's residence, date of birth, place of birth, mother's maiden name, father's name, patient's doctor's name, registrar doctor's name, name of funeral home director, and name of cemetery. The variables coded for this study included the deceased's age, gender, year, and cause of death with the purpose of examining these variables relating to infant deaths in depth.[21]

An analysis of this data from 1914 to 1964 reveals that the age group of under one year of age showed the most marked number of deaths than any

age group. In spite of the fact that death certificates exist and inform us about infant deaths, many of the death certificates did not indicate the cause of death for a child, or the space provided for cause of death was left blank or offers the word "unknown."[22] The unknown or unrecorded deaths of Yakama children are not addressed in the narrative, but they are used to address the overall number of deaths and are briefly mentioned in the notes. This study examines the most important causes of death among infants, comparing their deaths to those suffered by the general population of Washington, whites in the United States, and the combined "non-white" population of the country that included African Americans, Asian Americans, Latinos, Native Americans, and others. The work also compares infant mortality rates among these various populations (fig. 4).

Figure 4
Comparative Infant Mortality Rates
(Moving Averages)



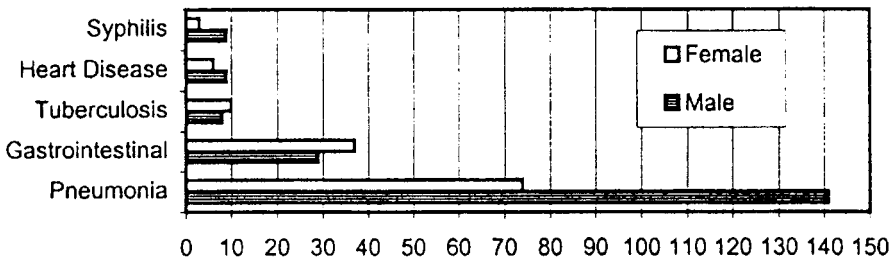
One of the foremost factors leading to the death of infants on the Yakama Indian Reservation was poverty.[23] Poverty, disease, and death thrived on the reservation, and Native Americans died in large numbers, particularly infants. Indians lacked natural biological immunities to many diseases, and they died from smallpox, viruses, and measles. The Yakama had little "medicine" with which to combat diseases brought by whites, and they did not have sufficient space to use indigenous methods of quarantine. Reservation officials could not and did not provide enough medicines or cutting-edge health care systems. Yakama people continued to be at risk in terms of death on the reservation during the first half of the twentieth century, and this was particularly true of infants.

INFANT DEATHS

As figure 1 shows, of the 631 infant deaths, 327 died of five leading causes. The foremost killer of Yakama infants was pneumonia, which took the lives of 215 (34 percent) children under one year of age. Of these deaths by pneumonia, 141 (66 percent) males died, while 74 (34 percent) succumbed to the disease (fig. 5). Pneumonia sometimes was brought on by influenza or a viral infection of the lungs. Infants living in substandard and unsanitary housing with inadequate health care fell victim to pneumonia and died.

Figure 5

Cause of Death by Gender for Infants Under One Year, 1888–1964



Between 1925 and 1964, pneumonia was the most dangerous disease among Yakama infants and children, who died of viral or bacterial pneumonia. The disease was generally an inflammation of the lungs, although other organs and parts of the body could become inflamed. In addition, infants with pneumonia ran high fevers, alternately experiencing chills and sweats. The disease was characterized by chest pains, coughing, and difficulty in breathing. Death resulted more often if infants had an underlying condition such as malnutrition, infection, tuberculosis, or heart disease—all of which thrived on the Yakama Reservation. In these cases, pneumonia was the primary cause of death, but other problems contributed to the body's weakened state which made the child susceptible to pneumonia. For Yakama infants lacking a minimal standard of living, pneumonia was deadly.[24]

Gastrointestinal disorders caused the death of 66 (10 percent) infants during the era under examination. This was the second leading cause of death among children under one year of age. Gastrointestinal disorders took the lives of 37 (56 percent) females and 29 (44 percent) males. Yakama infants died often of gastrointestinal disorders resulting from gastroenteritis, vomiting, diarrhea, and infections of the stomach, intestines, and other areas of the digestive tract. Yakama infants died of dehydration and diarrhea, two major elements of gastrointestinal disorders which took the lives of many infants and children—and continues to do so among poverty-stricken children from diverse populations around the world.

Disorders of the digestive tract proved fatal, particularly when infections developed. Antibiotics were scarce on the reservation or simply not available,

and children without medicines to fight bacterial infections often died. Thus, bacilli and infections struck many organs of Yakama infants. The stomach, intestines, and other parts of the digestive tract contain essential bacilli for life, but sometimes dangerous bacilli invade the body, multiply rapidly, and infect the gut wall before entering the bloodstream and spreading to other parts of the body. Gastrointestinal infections were nearly always caused by bacterium, and children infected with the disorder suffered abdominal and intestinal pain, cramps, diarrhea, fever, and vomiting. Most often infants became dehydrated, and although they were thirsty, they were unable to keep fluids in their stomachs.[25] Among Yakama infants, gastrointestinal disorders were the second leading cause of death, followed by tuberculosis (fig. 5).

Between 1914 and 1964, a total of 18 (3 percent) infants died of tuberculosis. Officials recording these deaths through the death certificates most often indicated that infants had died of "tuberculosis," rarely specifying the type. Occasionally the certificates indicated that the infant had died of "pulmonary tuberculosis," even though the disease could attack brains, lungs, kidneys, bones, or other parts of the body. Although Alexander Fleming discovered penicillin in 1928, the antibiotic was not readily available on the reservation until the late 1930s and early 1940s. Politics played an enormous role, as white politicians determined the fate of many Native people by refusing to fund health care for Native Americans as stipulated in treaties. After all, the people living and dying on the Yakama Reservation were only Indians who did not vote and who had little political influence. Of the 18 Yakama infants that died of tuberculosis, 10 (56 percent) were females and 8 (44 percent) were males.

The fact that more female infants died of tuberculosis than male babies established a trend that was reflected in the general Yakama population. On the Yakama Reservation during the fifty-year period, females died more often than males of tuberculosis by a 54 to 46 percent margin. However, infants did not suffer from tuberculosis as much as older children and young adults. During the seventy-six year period from 1888 to 1964, children in that category under four years of age experienced 56 (9 percent) of all deaths caused by tuberculosis. In contrast, a total of 43 percent of all tuberculosis deaths occurred among Yakama people between the ages of fifteen and twenty-nine. Throughout the Yakama population, deaths resulting from tuberculosis were the result of malnutrition, unsanitary living conditions, and inadequate medical care.

Although tuberculosis normally takes time to develop, it was one of the most important causes of death among Yakama infants. Tuberculosis is caused by airborne bacilli, which generally spread from one person to another, landing in the lungs where the bacilli multiply and destroy tissues. The bacilli are usually attacked by natural antibodies, but they can spread to other body parts. The bacilli may react to antibodies, but if children have a low resistance, the tubercle bacilli can travel to other parts of the body through the blood, attacking other organs. For months or years the tubercle bacilli can travel about the body or lay dormant. This process can occur for some time as bacilli remain inactive, but they can also become active at any point. In small chil-

dren, the tubercle bacilli can take hold quickly, particularly if mothers and infants are ill, undernourished, or living in unsanitary or overcrowded housing.[26] According to Selman Waksman, an authority on tuberculosis, American Indians suffered severely because they were "confined to barracks or permanent reservation quarters" where they showed "a marked rise in tuberculosis rate[s] which far exceed that of either negro or white persons." He also argued that the semi-nomadic life of many Native Americans was conducive to good health, free from the ravages of tuberculosis.[27]

Infants affected by tuberculosis experienced fatigue, fever, and loss of appetite. They usually had a dry cough producing phlegm filled with blood and pus. Tuberculosis spread as a result of contact with phylum, pus, and blood. Patients coughed and spit, spreading the bacilli onto others, bed clothing, blankets, and other material items. Dishes, eating utensils, and cups became contaminated, and the disease spread uncontrollably from patient to family to friends. Children carried tuberculosis to school, social events, and church, spreading it innocently among the larger reservation population. When tuberculosis struck, infants lost weight and could develop lumps in their bodies from swollen lymph nodes. Tuberculosis ravaged Native American populations during the first half of the twentieth century because of poor living conditions, malnutrition, and a host of other diseases that preyed on Native peoples (fig. 5).[28]

Heart disease was the fourth major cause of death among Yakama infants, taking the lives of 16 (3 percent) children under one year of age. Of these infants, 9 (56 percent) were females and 6 (44 percent) were males, with 1 infant's gender unknown. Like tuberculosis, these were roughly the same percentages experienced in the general population of the Yakama, with females leading males in the number of heart-related deaths by a margin of 52 to 48 percent. Most of the heart-related deaths that occurred within the Yakama population occurred among the very young and the old. Within that group of Yakama under four years of age, 20 (6 percent) deaths occurred, and of this number, 16 were suffered by infants under one year of age. Heart diseases of all types were responsible for many deaths among infants under one year of age and children under four.

Heart disease includes many disorders such as diseases of the valves, congenital heart disease, heart attacks, heart failure, and others. Most infant deaths involving the heart were from congenital heart disease or abnormalities of the heart at the time of birth. Congenital heart disease was caused in the fetus, particularly when the mother had an infection or contracted German measles (rubella) while she was pregnant. Some disorders of the heart were genetic, including Down's Syndrome and Marfan's Syndrome, the latter of which is a disorder of the collagen or protein fibrous tissue that strengthens the vessels, valves, and heart. Because of the lack of prenatal care, poverty, and the lack of traditional foods, mothers were not nutritionally fit and their fetuses could develop in an unhealthy manner. The syndromes mentioned above likely developed among Yakama infants, but death certificates were not specific about these syndromes, providing only general, descriptive, non-medical causes of death.[29]

Finally, syphilis was the fifth leading cause of death among Yakama infants. All of them contracted the deadly disease while in utero. A total of 12 (2 percent) children under one year of age died of syphilis, and of this number, 9 (75 percent) were males and 3 (25 percent) were females. During the years between 1888 and 1964, a total of 19 Yakama people died of syphilis. Thus, 79 percent of all Yakama that died of syphilis were children who had contracted the disease from their mothers. Of this number, 12 were infants and 15 were children in that group under four years of age. During the same time period, only two adults died of the disease. Syphilis is a sexually transmitted disease caused by a bacterium known as *treponema pallidum*. On the Yakama Reservation, syphilis was transmitted from mothers to their fetuses, and when the disease went untreated among mothers and their infants, it killed the infants (fig. 5).

A total of 70 percent of all infant deaths among Yakama people occurred between 1924 and 1945, and the largest number of infant deaths in a single year occurred in 1931 during the darkest times of the Great Depression when 36 children under one year of age died on the Yakama Reservation. Only 28 percent of the infant deaths on the reservation occurred between 1946 and 1964, and the number of infant deaths dropped dramatically after World War II as a result of antibiotics, improved sanitation and health care, and improved economy in part due to wage labor (fig. 4).

INFANT MORTALITY RATE

Birth records for Native peoples living on the Yakama Indian agency were available for all the years between 1914 and 1964, except for the years 1915, 1916, 1917, 1920, 1922, 1924, and 1925.[30] For years in which sufficient data was available, an infant mortality rate was calculated and compared to whites and non-whites in the United States as well as the general population of Washington—the state surrounding the Yakama Nation (figs. 4, 6). The most complete data on births and deaths on the Yakama Indian Reservation were found between 1926 and 1964, during which the Yakama experienced their highest infant mortality rate (in 1927): 684 per 1,000 live births. That same year whites in the United States had an infant mortality rate of 61, non-whites had a rate of 100, and the people of Washington had a rate of 50. The Yakama had an infant mortality rate markedly higher than that of other populations within the United States. Although this comparison is between a small population and three larger populations, the comparison is useful as a way of illustrating the high rate of infant mortality on a reservation (figs. 4, 6).

An examination of the infant mortality rates experienced by Yakama people and whites within the United States demonstrates that, over a period of forty years with the exception of 1948, the Yakama always had a higher infant mortality rate than whites. This trend is also relevant when comparing the infant mortality rate of the Yakama with the people of Washington. Again, except for the year 1948, the Yakama had an infant mortality rate higher than the people of Washington; most years the infant mortality rate of the Yakama was many times higher, and this may well have been the result of poor record-

Figure 6

Infant Mortality Rates for Yakima, Whites, Non-whites, and Washington State, 1914–1964

Year	Yakama	Births/ Death < 1	Whites	Non-Whites	State of Washington
1914	500	2/1	NA	NA	NA
1919	375	8/3	83	131	63
1921	77	13/1	73	109	55
1923	429	7/3	74	117	57
1926	444	36/16	70	112	56
1927	684	19/13	61	100	50
1928	474	57/27	64	106	48
1929	384	73/28	63	102	49
1930	564	55/31	60	100	49
1931	373	83/31	57	93	48
1932	316	95/30	53	86	45
1933	209	91/19	53	91	39
1934	193	86/16	55	94	43
1935	270	89/24	52	83	45
1936	127	63/8	53	88	45
1937	167	60/10	50	83	45
1938	173	81/14	47	79	40
1939	389	72/28	44	74	39
1940	342	79/27	43	74	35
1941	276	87/24	41	75	34
1942	130	92/12	37	65	33
1943	101	119/12	38	63	35
1944	311	103/32	37	60	34
1945	103	107/11	36	57	35
1946	100	80/8	32	50	33
1947	68	88/6	30	49	28
1948	19	106/2	30	47	28
1949	117	103/12	29	47	27
1950	111	72/8	27	45	27
1951	32	62/2	26	45	24
1952	78	128/10	26	47	25
1953	104	96/10	25	47	25
1954	104	135/14	24	43	24
1955	133	120/16	24	43	23
1956	70	129/9	23	42	23
1957	85	130/11	23	44	23
1958	79	151/12	24	46	25
1959	31	162/5	23	44	23
1960	29	205/6	23	43	23
1961	40	174/7	22	41	22
1962	91	186/17	22	41	21
1963	76	144/11	22	42	22
1964	26	230/6	22	41	

keeping. Although the difference is not as great, over a period of four decades the Yakama experienced an infant mortality rate per 1,000 live births higher than that of non-whites in the United States. However, the Yakama infant mortality rate declined generally between 1926 and 1964, dropping continually below the 100 deaths per 1,000 live births after 1955. This was likely due to a general improvement in health in the 1940s and early 1950s, better health care administered by the Public Health Service after 1954, and a decline in deaths caused by infectious diseases (figs. 4, 6). This trend was marked with a dramatic decline in the number of deaths caused by gastrointestinal disorders and tuberculosis, both of which were nearly eradicated in the 1940s. In addition, although infant deaths caused by pneumonia continued, the number of these deaths declined.

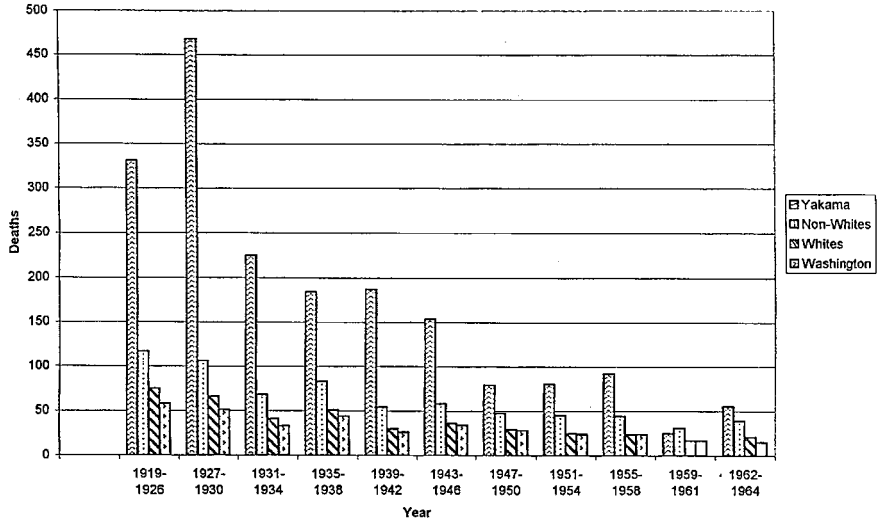
Infant mortality rates for the Yakama are erratic, because the Yakama constitute a small population in which the ebb and flow of deaths fluctuated greatly. Therefore, moving averages (an average of death rates during a four-year period) of infant mortalities were calculated for the years in which data was available from 1920 to 1964 (fig. 7).[31] The data show a general and steady decline in the infant mortality rate of Yakama from 1925 to 1964, except for a slight rise between 1940 and 1944. This rise in the infant mortality rate may have been related to World War II, a time when Yakama men and women went off to war or worked in defense-related activities that may have placed fetuses and newborn babies at risk. This was also a time of drought in the American West, which may have affected food supplies, a complication that influenced food rationing. Overall, the moving averages depicting infant mortality rates on the Yakama Reservation declined from a high of 497 per 1,000 live births during the years from 1925 to 1929 to 52 per 1,000 live births during the years from 1960 to 1964. This important decline in the infant mortality rate was due to an improved standard of living on the reservation and better health care. The moving average of infant mortality rate demonstrated that the infant mortality rate within the Yakama Indian population was consistently higher than that of whites and non-whites within the United States as well as the people of Washington State (fig. 7).

The moving averages of infant mortality rates show that the highest rates of death occurred from roughly the 1920s to 1945. In part, this was the result of the Great Depression, which struck rural areas in the 1920s before the stock market crash. The general health of the Yakama people was poor during this era, and this was, in part, connected to the economic problems of the state and nation. The Yakama Nation was situated in an area heavily tied to ranching and agriculture, and since both of these economic pursuits suffered in the 1920s and 1930s, so did Yakama people. The lives of Yakama people were also tied to the national reforms in Indian affairs during this same time period. The reformers did not push their agenda until the 1920s, and their efforts did not bear fruit until the late 1930s and early 1940s. However, their efforts had many tangible results, including an improvement in economic, political, and educational matters pertaining to Native Americans.

Another factor that had a bearing on infant mortality rates on the Yakama Reservation was the passage in 1954 of Public Law 83-568, a bill known as the

Figure 7

Yakama Infant Mortality Rate Comparisios per 1000 Live Births, 1919–1964



Transfer Act, which transferred the health care of American Indians and Alaska Natives from the Bureau of Indian Affairs in the Interior Department to the Department of Health, Education, and Welfare—known today as the Department of Health and Human Services. Throughout most of the twentieth century, the Public Health Service had aided the Interior Department in its efforts to deliver health care to Native Americans, but after 1954 it took full command of health delivery among Indian people. The Public Health Service had a great deal of experience and expertise in dealing with public health issues, and the public entity had more resources to devote to prenatal and postnatal care for both mother and baby.

These factors soon contributed to the decline of infant mortality. Health care improved during the 1950s on the Yakama Reservation, and this is evident in lower infant mortality rates in comparison to most years of the previous decades. Still, over the course of much of the twentieth century, the Yakama witnessed numerous infant deaths. During the course of forty-two years, from 1922 to 1964, the Yakama experienced an average infant mortality rate per 1,000 live births of 198, while during the same years whites in the Untied States had an infant mortality rate of 41. Thus, the Yakama's infant mortality rate was roughly double that of non-whites in the United States and nearly five times greater than that of whites in the country (figs. 4, 6, 7).

CONCLUSION

Yakama infants constituted the largest number of deaths recorded in the death certificates for any age group among Native people living on the Yakama Indian Reservation between 1914 and 1964. Infants died primarily of

pneumonia, gastrointestinal disorders, tuberculosis, heart disease, and syphilis. All of these causes were significantly influenced by removal to and life on the reservation, where poverty flourished. Poor diets, unsanitary housing, and social anomie contributed to infant deaths. In addition, the health division of the Office of Indian Affairs did not adequately educate or care for Native people, particularly pregnant mothers.

Infants on the reservation were at risk because of the lack of medicine, doctors, nurses, and hospitals. They were at risk because mothers received little or no prenatal care or basic education about sanitation, disease prevention, disease control, and techniques of quarantining infants and other patients. Before the United States created the reservation in the Pacific Northwest, midwives and elders among the Native population advised and assisted women and babies on a number of health-related issues, but with the destruction of the seasonal round, women of child-bearing age were often without the old health support group. Furthermore, wage earning off the reservation, boarding school experiences, the decline of Yakama language use, and isolation from elders contributed to the loss and transference of traditional knowledge among Yakama women.

Mothers and babies were also at risk because parents no longer ate as many traditional foods or served them to their children. The Yakama Reservation became a host for bacilli and viruses that preyed on infants who were undernourished and who lived in cramped, unsanitary homes. Bacilli spread rapidly through the air and on such material items as blankets, bedding, cups, flatware, dishes, and clothing. They thrived in homes where people were unaccustomed to cleaning themselves or material items with soap and disinfectants, since they had never needed to do so before the introduction of so many new and deadly bacterium. They did not understand germ theory, and, as a result, bacilli spread quickly from person to person, spreading pneumonia, tuberculosis, and a variety of gastrointestinal disorders.

When the government of the United States forced fourteen diverse tribes and bands onto the reservation, the government broke a pattern of life that had been established at the time of Yakama creation, when humans formed a spiritual, physical, and cultural relationship with salmon, deer, roots, berries, and other foods. In the early twentieth century the government ended seasonal rounds of Indians, forcing them to remain on the reservation rather than move from root to fishing to hunting grounds. The government broke the natural cycle of the people, which had profound health implications. In addition to a detrimental change in diet, the government altered familial and band relationships. As Indians became more sedentary, grandmothers, mothers, aunts, and other relatives who once shared in the caring of children no longer banded together as regularly to travel from the rivers to the plateaus and from the plateaus to the mountains.

The relationship between women in the care of each other's children through extended families and extended relationships was changed by the reservation system, which encouraged or required Indians to remain in certain areas where extended family and friends may or may not have been located. Furthermore, the reservation altered the role of women who had once gathered a predominant amount of natural fruits and vegetables. Although

women gathered some roots and berries, they generally ran their family's affairs on the reservation through ranching, farming, and wage earning. Women gradually did not share as many child care duties, even though they had to work outside of the home for the family's survival. Many men also worked outside the home, often traveling great distances to work on ranches or pick hops and fruit. Some men hunted and fished, but racism and state game and fish officers ignored sovereign treaty rights of Native men by jailing them for continuing a traditional way of life.

The reservation system of the United States destroyed the standard of living of Native peoples and introduced a host of bacilli and viruses among the Yakama population. Poverty resulted and with it came ill health and death. Once the United States destroyed much of Indian culture, the government failed to enrich the body and bodies of Yakama people with nutritious foods, medicine, doctors, nurses, and health systems in accordance with trust and treaty responsibilities. Without housing, sanitation, education, hospitals, and medical staffs—and living in a state of social disarray—Yakama infants were at risk for many diseases, the most aggressive and deadly being pneumonia. These circumstances contributed to the ill health and deaths of Yakama people of all ages. Death was particularly pronounced among Yakama infants who fell victim to pneumonia, gastrointestinal disorders, tuberculosis, heart disease, and syphilis. Death stalked all Yakama people during the 1914 to 1964 era, but babies under the age of one suffered the most.[32]

NOTES

1. In 1994, the Confederated Tribes of the Yakama Nation changed the spelling of their name from Yakima to Yakama. Thus the form used in describing the tribe, reservation, agency, and people is Yakama throughout this work. However, the treaty, city, valley, and river is presented here as Yakima. The term *Yakama* is used to denote all of the Native people living on the Yakama Reservation, since the death certificates almost never delineate the diverse tribes and bands of individuals who died on the reservation. Fourteen distinct tribes and bands, three distinct languages, and several dialects of these languages are represented on the Yakama Reservation.

2. This study was made possible in part by a research grant provided by the National Council of Learned Societies, National Endowment for the Humanities, and the Ford Foundation. The author thanks the following scholars, physicians, and public health officials for reading portions of the manuscript and verifying the accuracy of medical information about diseases. These include Edgar W. Butler, John Weeks, Neal Hickman, Terry Smith, Lisa Firth, and Brad Richie. For information on the Yakima Treaty, see Documents Relating to Negotiations Ratified and Unratified Treaties of the United States, National Archives, Record Group 75, Microfilm T494, Reel 5. Also see Charles S. Kappler, *Indian Affairs, Laws and Treaties* 2 (Washington, DC: Government Printing Office [GPO], 1940), 698–702. Article five of the Yakima Treaty specifically mentions hospitals and medicine to be provided for twenty years. The government did not provide the Yakama with minimum health care until the 1950s.

3. For the most detailed treatment of traditional foods among Indians of the Columbia Plateau, see Eugene S. Hunn, *Nch'i-Wana, "The Big River": Mid-Columbia*

Indians and Their Land (Seattle: University of Washington Press, 1990), 138–200. Also, see Helen Hersh Schuster, "Yakima Indian Traditionalism: A Study in Continuity and Change" (Ann Arbor: University Microfilms International, 1975), 68–87, 204, 238, 262.

4. Schuster, "Yakima Indian Traditionalism," 46–50. According to McWhorter, a white neighbor and rancher in the Yakima Valley, in 1913 most Yakama lived in one- or two-room shacks with a "lean-to kitchen" outside. See Lucullus Virgil McWhorter, *The Crime Against the Yakimas* (North Yakima, WA: Republic Press, 1913).

5. For destruction of salmon through irrigation projects, see Yakima Tribal Council, *The Yakimas: Treaty Centennial, 1855–1955* (Yakima, WA: Republic Press, 1955), 36, 48.

6. Hunn, *Nch'i-Wana,* 270–272, 292–293. For general studies on dams located on the Columbia River and its tributaries, see United States Department of the Army, *Review Report on Columbia River and Tributaries,* Corps of Engineers, North Pacific Division, October 1, 1948; United States Department of Interior, "The Columbia River," *House Executive Document* 473, 81st Congress, 2nd Session, 1950; Bureau of Indian Affairs, *Report on the Source, Nature and Extent of the Fishing, Hunting and Miscellaneous Related Rights of Certain Tribes in Washington and Oregon...* (Los Angeles: Office of Indian Affairs, Division of Forestry and Grazing, 1942); and T. W. Mermel, ed. and comp., *Register of Dams in the United States: Completed, Under Construction and Proposed* (New York: McGraw Hill, 1958).

7. Schuster, "Yakima Indian Traditionalism," 270–275.

8. A brief history of health agencies dealing with Native Americans is found in "Comprehensive Health Care Program for American Indians and Alaska Natives," United States Department of Health and Human Services, Washington, DC, n.d., p. 6. For information about duration programs on the Yakama Reservation, see Carr to Commissioner of Indian Affairs, June 7, 1917, and Sprague to Carr, May 5, 1917, "Health and Hospitalization Records and Reports, 1912–1940," Box 264, National Archives, Pacific Northwest Region, Seattle Record Group 75. Hereafter cited as NA, PNWR, RG 75.

9. Lewis Meriam, *The Problem of Indian Administration* (New York: Johnson Reprint Corporation, 1971), 259. Meriam asserted in the narrative that the health delivery of the Bureau of Indian Affairs "has to a great extent been merely palliative in practice," which was certainly the case on the Yakama Reservation.

10. Schuster, "Yakima Indian Traditionalism," 165–176. Schuster states that the Yakama recognize that some illnesses are caused by traditional factors, such as spirit sickness, contact with powerful totems or places, and witchcraft. Other sickness is classified as "white diseases." One of Schuster's informants stated, "We get sickness from white man: measles, chickenpox, smallpox, whooping cough, flu, and all from white man." Ibid., 176. Information on Indian doctors is taken from Meritt to Carr, January 24, 1916, "Medicine Men," NA, PNWR, RG 75.

11. In 1884 the United States House and Senate passed an appropriations bill that required the Office of Indian Affairs to keep vital statistics on Indian reservations. Nevertheless, most agencies failed to comply with the law, including agents on the Yakama Reservation until 1888. However, the statistics kept did not reflect the births and deaths on the reservation. No birth records were kept until 1914, and the death records were almost nonexistent until 1924. Information regarding the appropriations bill of 1884 was provided by Lee Francis (Laguna Pueblo), who worked for the Bureau

of Indian Affairs in Washington, D.C. The death certificates used in this study originated after 1907 when Washington became a death registry state, and the Yakima County Health Office began recording the certificates of death. County officials recorded some Indian deaths on the reservation but not many. County health officials relied on agency employees to notify them of deaths, and apparently this did not happen to any extent until 1924 when the Yakama agency made a major effort in reporting deaths.

12. Death Certificates, Yakama Indian Agency, 1888–1964, NA, PNWR, RG 75.

13. The infant mortality rate is the number of deaths of infants under one per 1,000 births. The National Archives, Pacific Northwest Region, contains birth records for most years after 1914. These vital statistics were kept by the Yakama Indian agency.

14. Death data found in the censuses do not provide information on primary or secondary causes, date of death, place of death, blood quantum, or other variables commonly found on death certificates. The census data run from July 1 to June 30, and it is often difficult to ascertain in which year a person died. Also, the censuses do not provide information on deaths after 1900, and it is intellectually hazardous to assume that because a person appeared on one census and not on the next that the person died. Some Yakama moved off the reservation to live on another reservation, a common practice among the Plateau Indians. Thus the best data dealing with deaths on the Yakama Indian Reservation in the twentieth century are found in the death certificates.

15. Yakama Indian Censuses, 1885–1931, NA, PNWR, RG 75.

16. Meriam, *The Problem of Indian Administration,* 170–182. An analysis of the statistical information is found in this segment of the report. The reform of Indian affairs received a boost when John D. Rockefeller, Jr., provided a grant to the Institute for Government Research—renamed the Brookings Institute. The Institute appointed Lewis Meriam to conduct the research, who in turn appointed a team to help him deconstruct the workings of the Office of Indian Affairs. Their report is an indictment of policies and led to many reforms.

17. Kenneth R. Philp, *John Collier's Crusade for Indian Reform, 1920–1954* (Tucson: University of Arizona Press, 1977), 114, 126–127, 130, 134.

18. Meriam, *The Problem of Indian Administration,* 189.

19. Ibid., 189, 266. This is in reference to eleven reservations surveyed for their death records, none of which was the Yakama Reservation. However, the principle is accurate for the Yakama Reservation.

20. Ibid.

21. Yakama Death Certificates, NA, PNWR, RG 75. This work is part of a larger social and cultural study that will deal with Yakama deaths between 1888 and 1964, including all age groups.

22. Cases 4537, 4540, 4541, 4542, 4543, 4552, 4558, Yakama Death Certificates, NA, PNWR, RG 75. Others could be cited but this run provides an example of a series of unknown or unrecorded deaths on the Yakama Reservation. The author chose not to include the names of the deceased in order to protect the privacy of the Yakama families.

23. Clifford E. Trafzer and Richard D. Scheuerman, *Renegade Tribe: The Palouse Indians and the Invasion of the Inland Pacific Northwest* (Pullman: Washington State University Press, 1986): 93–102; Hunn, *Nch'i-Wana,* 138–200; Schuster, "Yakima Indian

Traditionalism," 243–246, 249– 251. For a historical perspective of the importance of disease, see Alfred W. Crosby, *The Columbian Exchange: The Biological and Cultural Consequences of 1492* (Westport, Connecticut: Greenwood Publishing Company, 1972); Frederick Fox Cartwright, *Disease and History* (London: Hart-Davis, 1972); Howard Simpson, *Invisible Armies* (Indianapolis: Bobbs-Merrill, 1980); and Ann F. Ramenofsky, *Vectors of Death (*Albuquerque: University of New Mexico Press, 1987). Some Yakama children died of suffocation which, in some cases, was the recording official's assessment of sudden infant death syndrome or "crib death."

24. Wesley W. Spink, *Infectious Diseases: Prevention and Treatment in the Nineteenth Century* (Minneapolis: University of Minnesota Press, 1978), 209–212; Frank MacFarlan Burnet and David O. White, *Natural History of Infectious Diseases* (Cambridge: Cambridge University Press, 1972), 32–43, 52–69; Andrew B. Christie, *Infectious Diseases: Epidemeology and Clinical Practice* (Edinburgh and London: E. and S. Livingstone, 1969), 269–299; and Jeffrey R. M. Kunz and Asher J. Finkle, *The American Medical Association Family Medical Guide,* (New York: Random House, 1987), 365, 695.

25. Kunz and Finkle, *Family Medical Guide*, 467, 664, 702; Christie, *Infectious Diseases,* 122–167; Spink, *Infectious Diseases,* 246–247; Burnet and White, *Natural History of Infectious Diseases,* 70–87.

26. Tuberculosis was the leading killer of all Yakama ages 0 to 99, during the 1888–1964 era. See Ales Hrdlickas, "Tuberculosis Among Certain Indian Tribes in the United States," *Annual Report of the Bureau of American Ethnography* 42 (Washington, DC: Smithsonian Institution Press, 1909), 31–32; Spink, *Infectious Diseases*, 220–221, 224; Burnet and White, *Natural History of Infectious Diseases*, 213–224; Jay Arthur Meyers, *Captain of All These Men of Death* (St. Louis, MO: Warren H. Green, 1977), 73–83, 142–158; Selman A. Waksman, *The Conquest of Tuberculosis* (Berkeley: University of California Press, 1964), 24; Kunz and Finkle, *Family Medical Guide*, 574, 719, 748; Spink, *Infectious Diseases*, 220–222. The most significant work on the subject in recent years is Barbara Bates, *Bargaining for Life: A Social History of Tuberculosis, 1876–1938* (Philadelphia: University of Pennsylvania Press, 1992).

27. Waksman, *The Conquest of Tuberculosis*, 24.

28. Waksman, *The Conquest of Tuberculosis*, 24; Meriam, *The Problem of Indian Administration*, 204–208; *San Bernardino Sun*, March 15, 1994, 15. According to this article, a recent study of lung and lymph tissue taken from the body of a Peruvian Indian woman believed to have lived 1,000 years ago indicates "that tuberculosis was not introduced to the Americas by Europeans" but that it was native to this land. This is a theory long held by some scholars, but the physical evidence of the tissue is revealing. Although tuberculosis existed in the Americas prior to 1492, there is no evidence that it existed among the Yakama. Wilmar L. Salo, a scholar working for the University of Minnesota, pointed out that "the harsh treatment of the Indians undoubtedly contributed to the American epidemic of the disease." San Bernardino *Sun*, March 15, 1994.

29. Waksman, *The Conquest of Tuberculosis*, 24.

30. An infant mortality rate is the number of deaths of children under one year of age per 1,000 live births in the population, excluding premature births and stillbirths.

31. Moving averages are used when the data are erratic, which is often the case when dealing with a small population like that of the Yakama. In such cases, infant mortality rates or crude death rates for a number of years are added together and

divided by the number of years. This tends to smooth out the data so that it may be read more easily.

32. Clifford E. Trafzer, *Death Stalks the Yakama: Epidemiological Transitions and Mortality on the Yakama Indian Reservation, 1888–1964* (East Lansing: Michigan State University Press, 1997), 158–165.