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## **MONTANA'S POLIO & TUBERCULOSIS EPIDEMIC HISTORY (LEST WE FORGET)**

### **GOALS**

1. Appreciate the Montana frontier history of Poliomyelitis and Tuberculosis.
2. Compare the history of treatment and presentation of Poliomyelitis and Tuberculosis.

### **KEY WORDS FOR APPLICATION**

1. Polio
2. Poliomyelitis
3. Infantile Paralysis
4. Polio Virus---1,2,3
5. Salk Vaccine
6. Sabin Vaccine
7. Trivalent Vaccine
8. Paralysis
9. Gamma Globulin
10. Tuberculosis (T.B.)
11. Nobel Peace Prize
12. Sanitarium
13. Pneumothorax
14. Chemotherapy
15. Rifampin
16. World Health Organization (WHO)
17. Lobectomy
18. Plombage
19. Pneumoperitoneum
20. Thoracoplasty
21. Streptomycin
22. Mantoux
23. Tine Test
24. Antibodies
25. Typhoid
26. Epidemic
27. Smallpox
28. Cholera
29. Influenza
30. Typhoid
31. Pirquet Test
32. PPD

## **POLIOMYELITIS (INFANTILE PARALYSIS)**

In 1909, this deadly virus was discovered and affected only humans. At first, it was thought to be restricted to babies (hence the name Infantile Paralysis). However, Polio was just as common in older children and young adults. It was common in temperate climates in the summer and with no climate seasonal pattern in the tropics. The virus, being harbored in the gastro-intestinal and mucous membrane of the nose and throat, then traveled into the bloodstream to the nervous system where it then destroyed the motor neuron cells which controls swallowing, circulation, respiration, trunk, arms, and legs. The spreading of the virus was through fecal-oral transmission and respiratory secretions with symptoms appearing in three to six weeks after exposure. The symptoms of infection were sore throat, upset stomach, headache, and muscle stiffness.

There were/are three types of Polio virus: 1, 2, and 3. Type one is the most virulent and common. The Salk and Sabin vaccines are “trivalent”—acting against all three types. Type 2 has not been detected anywhere in the world since 1999. A Polio victim was/is immune to future infection from the virus type that caused the Polio.

With the spread of Polio across the United States in the summer of 1916, six thousand children and young adults in the United States died that year and at least twenty-seven thousand were permanently disabled. One-percent became paralyzed. The total number infected with the virus was in the millions! Montana, however, had more cases per 100,000 than New York City. Why--? Using our current knowledge about viral infections, we believe that in more populated areas (like New York City) the few sporadic cases spread enough of the virus to secure some immunity and subclinical cases.

Dr. Louis Allard (a native of Laurel, Montana) arrived in Billings in 1914 from Rush Medical College in Chicago to help with the frontier epidemic. In the summer of 1916, Montana had 111 cases resulting in 24 deaths. In 1922, Yellowstone County had 41 cases and 4 deaths. In 1924, 182 youngsters were paralyzed and 23 died. “Polio Panic” and a warning of the “Awful Scourge Creeping West, Baby Paralysis Yet Unchecked” was proclaimed boldly by the Helena Independent Newspaper. During 1920-21, a total of 50 victims were paralyzed. Dr. Allard and Sister Arcadia Lea from Sisters of Charity of Leavenworth began a treatment program at St. Vincent Hospital (SCL Health Care) in Billings, thereby, treating 467 patients by 1922 from all over the country. During the summer of 1924, 182 Montana young people were paralyzed and 23 of that number had died.

Clinics began to appear on the Montana frontier that rivaled larger Polio health facilities elsewhere. Anaconda filled their swimming pools with dirt and kids were restrained from all normal activities that made life fun and worth living as a youngster. The message went out loud and clear: “Wash your hands, cover your mouth when you sneeze, pasteurize milk, dispose of garbage frequently, and do everything you can do to get rid of those flies!” In spite of the fear of other childhood fatal illnesses in 1920-1940 (diphtheria, TB, scarlet fever, whooping cough, measles, and strep throat), which was stated to occur much more frequently than Polio, the crippling disease of Polio was the most dreaded of infectious diseases! Such Polio related disabilities of being “different” or being in a wheelchair brought about ridicule which, for some, was worse than death. Since farm work was the usual way to survive on the frontier, such disability was a severe detriment to a homesteader’s survival. The hard truth—at that time there was no treatment or cure for Poliomyelitis—just the offering of help for the paralysis!

Nursing was comfort, care, prevention of secondary infections, aspirating airways, providing oxygen, and assisting with tracheostomies. Nurses isolated patients from family and friends because it was necessary. They cared for patients isolated in Iron Lungs (rigid cylinders sealed at one end with alternating air pressure for the paralyzed lungs). Elizabeth Kenney, an Australian nurse, applied hot wool packs and performed passive range of motion in an attempt to re-educate weakened muscles.

In 1950, Gamma globulin from plasma of multiple blood donors (containing many antibodies) was used for treatment. Then, in 1955, the Salk Vaccine (inactivated Polio virus/attenuated live virus) was discovered as a prophylactic treatment. Starting in 1961, this vaccine was administered orally on sugar cubes replacing the original injected vaccine. Jonas Salk and Albert Sabin used the knowledge that the immune system of the body would produce antibodies as the basis of their successful research for the development of two different vaccines. The Polio cases in the United States fell from 13.9 per 100,000 in 1954 to 0.5 in 1961. The incidence of polio decreased each year, thereafter.

Now, we see polio cases confined to a few cases in the world's under-developed countries of Southern Asia and Central Africa.

## **TUBERCULOSIS (TB)**

Sometimes known as consumption, this highly contagious bacterial disease was known as early as the 1880's to spread through coughing, sneezing, hemoptysis, and spitting. Symptoms of hoarseness and dyspnea were among the signs and symptoms of the disease. It was especially contagious during the late stages of the disease. The young and the old were the most vulnerable.

Historically, this dreaded infection was caused by *Mycobacterium tuberculosis*. Infection by this tubercle bacillus usually effected the lungs, but could affect other parts of the body. It was caused by the inhaling of the tubercle bacilli of a person with increased susceptibility by being malnourished, living in a crowded environment, or had a compromised immune system. The chances of contracting this disease was enhanced through prolonged exposure and increased virulence of the bacilli. The disease had been around for thousands of years. Many pharaohs, kings, and the wealthy over thousands of years to the poorest of the poor succumbed to this tenacious and unforgiving disease which caused inflammation in the alveoli of the lungs resulting in primary tubercle nodules.

Effective diagnosis of TB was accomplished through the invention of the stethoscope in 1816 by Rene Laennec. X-rays were performed starting in about 1866 by a Nobel Peace Prize winner named Wilhelm Rontgen. Sanitariums were placed in quiet, peaceful areas in an attempt to treat patients by exposure to fresh air, good nutrition, individually designed treatment, complete bed rest, daily vital signs, frequent exams, moderate exercise, teaching about hygiene, and surgery treatment, as needed. All of these activities and procedures nurses were responsible to perform or participate in as a total recovery treatment program. The first sanatorium was established in Poland during 1892 and by 1938 seven hundred TB sanitariums existed in the United States.

Galen Hospital in Galen, Montana was an attempt to meet the health care needs for isolation of TB patients in Montana. Out of fear for the disease, the facility was built on 40 donated acres near Montana State Hospital just outside of Butte, Montana. The first patient was admitted in 1913, and by 20 months later there were 115 patients. The major theme of treatment was isolation. Patients are

reported to have slept outside to get the prescribed fresh air—despite the weather-- and were reported to be allowed in a closed room only while dressing and during a storm. Children were admitted in 1924 with the treatment (in addition) to include progressive sunlight therapy, naps from 1 to 3 p.m., and bedtime at 9 p.m. There was an effort to include a healthy happy atmosphere, especially for the children. Due to advances in chemical cures and out-patient treatments, Galen Hospital closed on July 1, 1993.

The public health nurses established by Lillian Wald became a vital part of curbing TB. In New York City, the public health nurses were expounding the public health requirements to “NOT SPIT ON THE FLOOR, NO SLEEPING IN A ROOM WITH A PERSON WITH CONSUMPTION, AND NOTIFY THE PHYSICIAN OF SOCIAL RELATIONS WITH A PERSON SUFFERING WITH CONSUMPTION!” The nurses managed the education, prevention, and community recognition of the disease. The proclamation went forth:

*“Public health is purchasable—within natural limitations a community can determine its own death rate.”* Hermann Biggs

## **TB TREATMENT HISTORY**

Treatment in the 1800’s: Artificial Pneumothorax (collapsing a lung by introducing air into the pleural space), Pneumoperitoneum with Phrenicotomy (crushing or surgical division of the phrenic nerve leading to ipsilateral paralysis of the diaphragm).

1940’s: Phrenicotomy (surgical division of the phrenic nerve to secure collapse of a diseased lung by paralyzing the diaphragm on one side), Plombage (Insertion of a “plombe” to collapse the lung—e.g. fat, paraffin wax, ping-pong balls, plastic sponges, Oleo/oil), Lobectomy (surgical removal of a lobe of the lung), Pneumothorax (artificial collapsing of a lung), Thoracoplasty (removal or resecting one or more ribs to obliterate the pleural cavity and collapse a diseased lung), and Chemotherapy using the antibiotic, Streptomycin.

1950’s: Chemotherapy: Isoniazid (INH)/Rimifon, pyrazinamide, Cycloserine.

1960’s: Rifampin was introduced as a treatment for TB, Leprosy, and other infections.

1980’s: Drug resistant strains of TB emerged increasing TB cases.

Today: Chemotherapy includes multiple drug use. Refapentine was introduced in 2000.

As of 1993, the World Health Organization (WHO) declared TB a global emergency—even though death from TB in the United States decreased significantly from 300/100,000 in 1786. (In 2010, .02/100,000 deaths occurred as a comparison.) The highest number of cases is found in third world countries, with approximately 10,000 cases diagnosed during 2013. *The overprescribing of antibiotics of one-half million of the world’s population has caused resistance to antibiotics that once treated successfully tuberculosis.* The truth seems to be—TB CAN NOW BE CONTROLLED. Often, the combination of TB drugs is used as a part of today’s, so called, simple and inexpensive eradication of TB.

The well-known Mantoux screening test, tuberculin sensitivity test, Pirquet test, or PPD (purified protein derivative) are the most used skin tests used around the world. They have largely replaced the multiple puncture tests, such as the Tine Test. Positive reactions to these tests include the determining of

induration (palpable swelling) within a 48 to 72-hour period. A reddened area with no induration during that time-frame indicates a negative response. The evidence of induration indicates a possible development of antibodies against the tubercle bacillus. The findings indicate a need for nurses to teach regarding the results of the skin test as an independent and important aspect of the practice of nursing!

## **LEST WE FORGET**

Rocky Mountain Spotted Fever (in the Bitterroot Valley), Smallpox and Cholera (in Stevensville), Influenza, and Typhoid (in Gallatin County) were also prominent epidemics in Montana history.

Why do we care about our health care epidemic history as Montana nurses? Because-- it (an epidemic) could happen again and because history could repeat itself-- perhaps by a different name and face!? For those of us who have “bagged” the bodies of unfortunate diseased patients behind locked and isolated corridors during an epidemic, and as we stood over them in our protective garb and lamented with them the lack of family presence at the time of their death, those memories will never fade! We move forward, now, with a heavy heart caused by our memories and hope it will not ever happen--again!

We, as nurses, know health care in the *digital age* will never capture or replace the essence of the human spirit to recognize the pain of disease, and the pangs of death. We have learned through history that NOW our nursing role is an outcome of more education and experience—not-with-standing our desire to nurture the human spirit. With that increased knowledge and experience, our future involvement in epidemic resolution will be an outcome of our professional abilities of recognition, treatment, and prevention.

In our nursing history, we should recall the description of the true art and caring depicted by our profession (lest we forget!):

“Nursing is an art, and if it is to be made an art, it requires as exclusive a devotion, as hard a preparation, as any painter’s or sculptor’s work; for what is the having to do with dead canvas or cold marble, compared with having to do with the living body—the temple of God’s spirit? It is one of the Fine Arts; I had almost said, the **FINEST OF THE FINE ARTS.**” Florence Nightingale (1820-1910)

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