

TEACHER KEY

TB Unit 5: Treatment
Activity 1: Treatments over Time

Description:

By completing the worksheet students will recall information from the exhibition and demonstrate an understanding of the different cures that have been applied over the years. They will connect treatment names with procedures and apply their knowledge by choosing the right treatment for the right historical character.

Time:

Exhibition Review: 20 min
Activity Sheet: 25 min + 10 min review

Objectives:

- To identify treatments for TB and what they involved.
- To apply knowledge of TB treatments by identifying likely treatments and whether or not they are likely to work.

Curriculum Links:

Reading	1. Reading for Meaning	1.4 demonstrate understanding of a variety of texts by summarizing important ideas and citing supporting details
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Materials:

Online exhibition [Fighting for Breath: Stopping the TB epidemic](http://museumofhealthcare.ca/explore/exhibits/breath/) :
<http://museumofhealthcare.ca/explore/exhibits/breath/>
Handout

Procedure:

1. Ask students to read-through the exhibition page Treatment, and its sub-pages Early Cures, Rest Therapy, and Chemotherapy.
2. Provide students with the worksheet and ask them to complete it. It is recommended that students have access to the exhibition while completing the work-sheet.
3. Review the work-sheet with the students and clarify any common misconceptions.

Background Information:

Early “Cures”:

The Ancient Romans believed [phthisis](#) to be cured in warm, dry climates, and sent their sick from Rome to Sicily or Egypt. Alternatively, warm sea-air was also thought to improve the disease in its early stages. Rest and improved diet were also recommended. Stranger recommendations include eating the bacon of a sow fed on herbs, smoking dried cow dung, bathing in human urine, or drinking elephant’s blood.

TEACHER KEY

The Early Modern Europeans (late 15th – 18th centuries) continued to apply many of these treatments, recommending marine air, sun, exercise, and the consumption of milk to improve the condition of the **phthisical** patient. They too had their “superstitious” treatments, including eating butter from cows fed in churchyards. The Royal Touch was also commonly sought to heal those with **phthisis**, though it is unlikely that the touch of European kings and queens ever did the sick much good.

Rest Therapy:

Sanatoria

The idea that climate could improve the health of **consumptives**, an idea that had been around since the time of the Ancient Greeks and Romans, set the foundation for the creation of sanatoria. After himself being cured by the invigorating air of the Himalayas, Hermann Brehmer established a centre in Prussia in 1854 where **consumptives** could benefit from exercise in the open air. In the 1870s another German, Peter Dettweiler, opened a sanatorium but ordered his patients to stay still and rest. Yet another philosophy was taken at Dr. Otto Walther’s sanatorium in the Black Forest of Germany; he insisted that overfeeding would build the body’s resistance, and instructed his patients to consume pints of milk, cheese, butter, and fatty meats. Several sanatoria were also established in the Swiss Alps, where it was believed that the altitude and brisk air would bring improved health to the sick. The ideas underlying these sanatoria, namely rest, fresh air, and regulated diet, would influence treatment regimes at sanatoria in North America.

Inspired by such centres, and his own improvement in the Adirondacks, Edward Livingston Trudeau opened the Adirondack Cottage Sanatorium in 1885, the first of its kind in North America. The Cottage San was based on open-air treatment, with six to ten patients living in each cottage, spending much of their day resting outside. Patients followed a rigid schedule of rest, eating, and small labours.

Influenced by the Adirondack Cottage Sanatorium, Mr. W. J. Gage proposed the first institution for **consumptives** in Canada in 1893; however, the Muskoka Cottage Sanatorium only opened in July 1897. Shortly thereafter, in 1902, the Muskoka Free Hospital for Consumptives was opened to care for patients unable to afford the cost of a dollar-a-day facility. By the First World War the number of sanatoria across Canada had increased to thirty, with 1800 beds, across seven provinces.

Kingston provided care for TB patients through several institutions over the years. The Sir Oliver Mowat Memorial hospital opened in 1912 as the first sanatorium in Kingston, but it closed in 1925 due to financial problems. Although the Kingston General Hospital ran a tuberculosis ward for many years, Ongwanada opened as a sanatorium in 1944 and operated as such until 1965.

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In the early days, typical stays in the sanatoria lasted only three to nine months, but by the 1920s, as society became increasingly concerned with isolating the contagious, stays were often between two to five years.

Life in “the San” was routine. A balance between rest and exercise was sought, but many patients found the hours sitting still tedious and boring. Some tried to liven things up by sneaking out of the San at night or pulling pranks on other patients. For the most part, though, the rules were followed and those “taking the cure” were made to rest upwards of five hours a day.

Rest hours often took place outside, combining fresh air, rest, and [heliotherapy](#) treatments. Early sanatoria treatments often had patients sleeping on verandas or in tents to maximize patient exposure to fresh air. Many sanatoria required patients to sunbathe for several hours a day in the belief that the sun would improve their condition.

Also important was sanatoria’s ability to educate patients on hygiene to stop the spread of TB and to provide occupational training. As sanatoria grew and expanded over the first half of the twentieth century, they added recreational halls, craft rooms, barber shops, libraries, and schools to help make stays more bearable.

Sanatoria began to decline in the 1950s and 1960s after the discovery of several drugs effective against TB.

Collapse Therapies

Between the 1930s and 1950s, approximately one third of patients with pulmonary TB underwent collapse therapy. Collapse therapies include: [pneumothorax](#), [phrenic](#) paralysis, and thoracoplasties. It was thought that collapsing part of the lung would give the lung a rest and a chance to repair itself, and also that collapse would cut off the oxygen supply to TB bacteria in the lung and thereby kill them.

○ **Pneumothorax**

Carlo Forlanini first raised the idea of artificially collapsing the lung by pneumothorax treatment, to allow the lung to rest and heal, in 1882 and performed the first pneumothorax in 1892.

Air or nitrogen is injected into the [intrapleural space](#), increasing the pressure until the lung collapses. This process reverses naturally, and patients undergoing pneumothorax treatment had to return for gas “top-ups” every few weeks.

In Canada, the first pneumothorax treatment was given in 1898, but the treatment did not become common until the 1930s.

After Dr. Norman Bethune underwent pneumothorax treatment, at his own request, in the late 1920s and saw improvement because of it, he decided to dedicate himself to the

TEACHER KEY

improvement of TB treatment. He developed and modified many instruments used in **thoracic** surgeries, including the pneumothorax machine.

Between 1931 and 1939, 1,600 pneumothorax treatments and 60,000 refills were done at the Queen Alexandra Sanatorium in London, Ontario. Despite such numbers, however, some scholars have speculated that only about 10% of sanatorium patients ever received pneumothorax treatment.

○ **Phrenic Paralysis**

Phrenic paralysis is a reversible procedure that inhibits the function of the lung, allowing it to rest. One of the **phrenic nerves**, which run from the neck to the diaphragm on both the left and right sides of the body, is crushed. This stops the transmission of nervous signals that tell the **diaphragm** to contract automatically. Without these signals, the **diaphragm** ceases to contract on the side on which the nerve was crushed, which in turn stops the lung on that side from inflating and deflating. This treatment was common during the 1930s.

○ **Thoracoplasty**

The first thoracoplasty surgery was performed in Canada in 1912.

Such surgeries involve the removal of several ribs at a time to cause the deflation of part of the lung. Often several surgeries were needed, as the average patient required the removal of eight ribs before lung collapse was deemed sufficient. One sanatorium patient, Clara Raina Flannigan, had seven ribs removed from her left side and four ribs removed from her right in 1943/44 and 1947, respectively. Although such measures may seem drastic to us today, Clara wanted thoracoplasty surgery as she believed that this was her only chance of fighting tuberculosis.

Thoracoplasties were considered more radical than **pneumothorax** treatments or **phrenic** paralysis because there were irreversible. They were generally considered only after long periods of bed rest and other treatments had failed to cause an improvement in the TB patient.

Chemotherapy:

Various herbal remedies and medicines have been prescribed to tuberculosis patients over the centuries, but the first truly effective medicines were not discovered until the mid-twentieth century.

○ **Patent Medicines:**

Tuberculosis was one of the most common diseases of the 19th century. Unsurprisingly, a number of remedies or patent medicines, from cod liver oil to tonics, were created by companies and individuals that advertised that they were able to cure **consumption**. None

TEACHER KEY

of these remedies lived up to their promise, though many did contain ingredients such as alcohol and opium that could dull the senses and, perhaps, bring temporary relief.

○ **Gold Salts:**

Used since at least the 1830s in Europe, gold salts were administered in an attempt to cure **consumption**. Part of their initial appeal was their exoticism and the eliteness they conferred due their cost, but after Koch stated that gold salts inhibited TB bacilli growth in 1890 more and more scientists began experimenting with them. The creation of sanocrysin was one outcome.

Created in Denmark in 1925, sanocrysin (sodium-gold-thio-sulphate) was said to neutralize TB and confer immunity. Side-effects to the intramuscular injections were severe, though, including fever, weight loss, vomiting, and – in many cases – death. Yet, use of sanocrysin continued until the Second World War, despite the fact that no scientific tests demonstrated its effectiveness against TB.

○ **Antibiotics and Synthetic TB Drugs:**

The first antibiotic found to be effective against tuberculosis was discovered in the lab of Selman Waksman in 1943. Streptomycin, developed from soil fungus, killed tuberculosis bacteria but had some severe side-effects, including dizziness, fever, headache, nausea, loss of balance, and/or deafness. It was also soon found that TB bacteria were able to develop resistance to streptomycin. As a result, streptomycin and para-amino salicylic acid (PAS), a **synthetic** drug also discovered in 1944, were jointly prescribed, limiting the development of drug resistant bacteria.

Isonicotonic hydrazide, most commonly called isoniazid, was found to be effective against tuberculosis in 1952. Though having fewer side-effects than streptomycin, when prescribed on its own isoniazid also created drug resistant strains of TB. When prescribed with streptomycin and PAS the incidence of drug resistance decreased. This cocktail of drugs was the first to cure tuberculosis and formed the basis of TB treatment in Canada until the 1970s.

Today, tuberculosis is typically treated with a six-to-twelve month course of isoniazid, rifampin, and pyrazinamide or ethambutol.

Side effects to this drug regimen can be quite severe. Rashes, itch, fever, dizziness, nausea, fatigue, joint pain, and liver failure are but a few of the possible effects. As a result, some patients discontinue their treatment plan rather than experience these side-effects. In turn, stopping treatment early creates drug-resistant strains of the bacteria. Part of the World Health Organization's Directly Observed Therapy Short-course (DOTS) program involves greater supervision of treatment in an attempt to stop treatment drop-out and the development of drug resistance.

TEACHER KEY

TB Unit 5: Treatment

ANSWER SHEET: Treatments over Time

1. Match the Treatments listed in column A with the appropriate definition in column B.

1.	Pneumothorax	3.	Ingestion of gold compounds to reduce inflammation and slow the progression of disease.
2.	Sanatorium	7.	Removal of one or more ribs, causing partial lung collapse.
3.	Gold Salts	6.	A substance that that can destroy or inhibit the growth of other microorganisms.
4.	The Royal Touch	5.	Crushing of the pair of nerves that arise from cervical spinal roots and pass down the thorax, which temporarily stops them from innervating the diaphragm and causing breathing.
5.	Phrenic Paralysis	8.	Over-the-counter medicines that claimed to cure many ailments, but were rarely successful.
6.	Antibiotics	2.	An institution for the treatment of sick persons, especially a private hospital for convalescents or patients with chronic diseases or mental disorders.
7.	Thoracoplasty	1.	A collection of air or gas in the chest or pleural space that causes part or all of a lung to collapse.
8.	Patent medications	4.	A miraculous cure transmitted through the hands of the King or Queen.

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2. You're the Doctor! Choose the TB treatment(s) you would prescribe to each of the following patients from different historical eras.
How successful do you think your prescriptions would be? Why?

Potential Treatments:

Sanatorium
Royal Touch

Gold Salts
Patent Medicines

Antibiotics
Collapse Therapies

Historical Era	Image	Treatment Prescribed	Success?
Middle Ages		Royal Touch	No
Victorian (19 th century)	 Upper Classes	Sanatorium Gold Salts	Possible No
Victorian (19 th century)	 Lower Classes	Patent Medicines	Unlikely
1900-1940		Sanatorium Collapse Therapies	Possible Possible
1945+		Antibiotics Sanatorium Collapse Therapies (becoming less common)	V. Likely Possible Possible

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