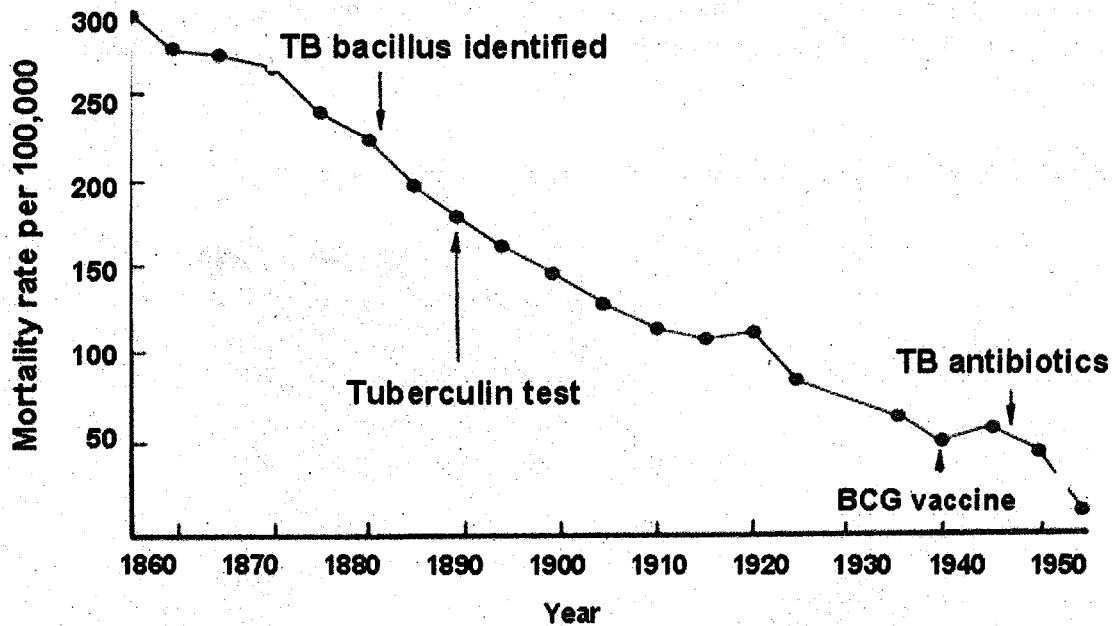


**Tuberculosis** is a lung disease caused by a bacterium. Before the discovery of antibiotics, many people died from it. Currently, patients with tuberculosis are treated with antibiotics.

Line Graph A shows the mortality rate from tuberculosis from the years 1860-1950. Look at the graph, then read the text below. As you read the text, think about how discoveries that are described in the text correspond to events that are noted on the line graph.



**LINE GRAPH A: MORTALITY RATE FOR TUBERCULOSIS, 1860-1950**

Tuberculosis was a big worry in the 19th and early 20<sup>th</sup> centuries. In 1815, one in four deaths in England was due to "consumption" (this was what tuberculosis was called at the time).

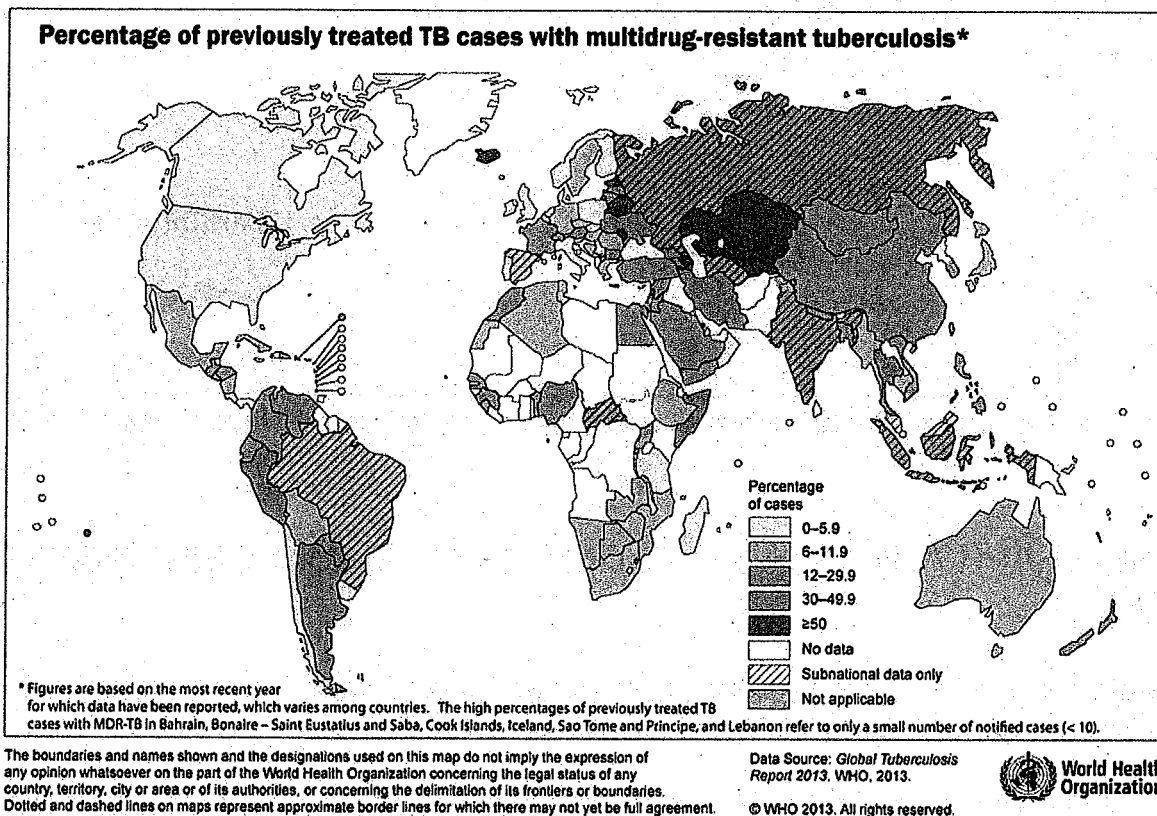
The bacillus causing tuberculosis, *M. tuberculosis*, was identified on 24 March 1882 by Robert Koch. Once scientists knew what the bacteria that caused the disease looked like, they could "search" for it. One thing that was discovered was that many cases of TB were caused by infected milk. One form of the bacteria that caused tuberculosis originated in cows. People drank infected milk and became sick.

Then, Louis Pasteur, a French scientist, discovered that many harmful bacteria in food could be killed by briefly heating the food. This process is called *pasteurization*, and is still used today. The incidence of infected milk was greatly reduced by the invention of the pasteurization process to sterilize milk. In 1890, Koch developed a screening test for the presence of pre-symptomatic

tuberculosis. This allowed doctors to see who was probably infected with TB and isolate them from other people so the disease had less chance to spread.

Albert Calmette and Camille Guérin are two French scientists who were able to develop a vaccine against tuberculosis in 1906. The vaccine they developed was called BCG. The BCG vaccine was first used on humans in 1921 in France, but was not used widely in the US, Great Britain, and Germany until after World War II.

In 1946, the development of the antibiotic streptomycin made it possible to effectively treat and cure TB. At first, there were hopes of completely eliminating TB from the population. These were dashed after the rise of drug-resistant strains in the 1980s. The rise of tuberculosis cases that are resistant to drugs prompted the World Health Organization to declare a global health emergency in 1993.



## MAP B: Percentage of Cases of Tuberculosis that are now Resistant to Antibiotics, per Country.

- (1) Name three countries where drug-resistant tuberculosis is a big problem.
- (2) Name three countries where it is NOT much of a problem.
- (3) Why do you think there is such a difference from one country to the next?