The term Medical thermometer is derived from two Greek words “therme” which means heat and “metron” or measure. It is named after Galileo Galilei because he discovered the principle on which this thermometer is based. Italian inventor, Santorio Santorio invented the thermoscope, a precursor to the thermometer. The first modern thermometer, the mercury thermometer with a standardized scale, was invented by Daniel Gabriel Fahrenheit. The Allbutt Clinical Thermometer was the first practical device for taking temperatures. Dr. Jacob Fraden invented an infrared thermometer called the ThermoScan Human Ear Thermometer in 1984.

The variation in body temperature has been the sign of malfunction of human body since days of Hippocrates. The earliest tool to measure body temperature was human hand. The term Medical thermometer is derived from two Greek words “therme” which means heat and “metron” or measure.

Galileo Galilei discovered a principle on which the invention was actually based and probably invented in 1593 the first ever thermoscope. A Galileo thermometer (or Galilean thermometer) is a thermometer made of a sealed glass cylinder containing a clear liquid and several glass vessels of varying densities. As the temperature changes, the individual floats rise or fall in proportion to their respective density.
It was named after Galileo Galilei because he discovered the principle on which this thermometer is based—that the density of a liquid changes in proportion to its temperature—and he also invented a thermoscope based on this principle.

Italian inventor, Santorio Santorio invented the thermoscope, a precursor to the thermometer. Santorio was the first to apply a numerical scale to his thermoscope, an invention that measured temperature and which later evolved into the thermometer.

Santorio was born on March 29, 1561 and died on February 22, 1636. He was also called Santorio Santorii or Sanctorius of Padua. He was a professor at Padua University from 1611 to 1624, and researched the sciences of temperature, respiration and weight, and metabolism. He measured what he described as “insensible perspiration”, laying the foundation for the future study of metabolism. He adapted several of Galileo’s inventions to medical practice, resulting in his development of a clinical thermometer (1612) and a pulse clock (1602).

Santorio was a physician and the founder of quantitative measurement in medicine. He was the first to use a thermometer-like device to measure body temperature, and also invented various instruments, including a hygrometer and a water-bed, a wind gauge, a water current meter, and the pulsilogium, the first machine to measure pulse.

**STANDARDISED SCALES**

The first modern thermometer, the mercury thermometer with a standardized scale, was invented by Daniel Gabriel Fahrenheit (1686-1736) in 1714. The mercury-in-glass or mercury thermometer was invented by physicist Daniel Gabriel Fahrenheit in Amsterdam (1714). It consists of a bulb containing mercury attached to a glass tube of narrow diameter; the volume of mercury in the tube is much less than the volume in the bulb. The volume of mercury changes slightly with temperature; the small change in volume drives the narrow mercury column a relatively long way up the tube.

Daniel Gabriel met Olaus Roemer, a Danish astronomer, in Copenhagen. Roemer had invented an alcohol (wine) thermometer.
Roemer’s thermometer had two points, 60 degrees as the temperature of boiling water and 7 1/2 degrees as the temperature of melting ice. At that time, temperature scales were not standardized and everybody made up their own scale. Fahrenheit modified Roemer’s design and scale, and invented the new mercury thermometer with a Fahrenheit scale. The Fahrenheit scale divided the freezing and boiling points of water into 180 degrees. 32°F was the freezing point of water and 212°F was the boiling point of water. 0°F was based on the temperature of an equal mixture of water, ice, and salt. Daniel Fahrenheit based his temperature scale on the temperature of the human body. Originally, the human body temperature was 100°F on the Fahrenheit scale, but it has since been adjusted to 98.6°F.

In 1742, Swedish astronomer, Anders Celsius invented the Celsius temperature scale, which was named after the inventor. Anders Celsius was born in Uppsala, Sweden in 1701, where he succeeded his father as professor of astronomy in 1730. It was there that he built Sweden’s first observatory in 1741, the Uppsala Observatory, where he was appointed director. He devised the centigrade scale or “Celsius scale” of temperature in 1742. The Celsius temperature scale is also referred to as the centigrade scale. Centigrade means “consisting of or divided into 100 degrees”. The Celsius scale, invented by Swedish Astronomer Anders Celsius (1701-1744), has 100 degrees between the freezing point (0°C) and boiling point (100°C) of pure water at sea level air pressure. The term “Celsius” was adopted in 1948 by an international conference on weights and measures.
data of more than 1 million axillary readings from more than 25,000 patients. He determined that there was a diurnal variation in daily body temperatures ranging from 97.3°F in the morning to 99.5°F in the evening. He also originated the standard of 98.6°F as “normal body temperature” that we use today. His readings took 20 minutes to perform, and for anyone but the most patient of physicians, this was not a practical device

MODERN DAY THERMOMETER
By the nineteenth century, doctors recognised the importance of recording the temperatures of patients. They had begun to link extremes of temperature with specific illnesses. Despite this, the thermometer remained an inconvenient, large and cumbersome instrument. The Allbutt Clinical Thermometer was the first practical device for taking temperatures. It could be easily carried around large hospitals and gave rapid, accurate readings.

This version became an indispensable diagnostic aid, joining the stethoscope in the doctor’s armoury. The Allbutt Clinical Thermometer was around 6 inches long, and contained mercury. It resembles very closely the thermometers of today.

Sir Thomas Clifford Allbutt (1836-1925) is one of Yorkshire’s most celebrated physicians. Born in Dewsbury, he trained in London and Cambridge, and moved to Leeds, where he worked at the Leeds General Infirmary for twenty years. It was during this time that he devised the clinical thermometer. After the demands of hospital practice, Allbutt spent a brief period as a consultant to London asylums. He then took up the prestigious Regius Chair in medicine at Cambridge, which he held until his death in 1925. Apart from his invention, Allbutt’s other major contribution to medicine was his eight-volume collection, A System of Medicine, which was published between 1896-1899. This became one of the most widely-used sets of medical textbooks in Britain.

Modern thermometers come in many different varieties. New thermometers are being designed that can read a patient’s temperature using infrared technology. These devices can determine a person’s temperature in about one minute, and take the reading from inside the ear, rather than the mouth. In this century the thermometer have moved to digital and infrared versions. Digital thermometers are capable of finding a temperature
and producing an electronic number within a minute of use. Digital ear thermometers also produce a quick and accurate temperature. Dr. Jacob Fraden invented an infrared thermometer called the Thermoscan Human Ear Thermometer in 1984. These thermometers use an infrared light to scan the heat radiation in a patient’s ear or forehead.

References:
1. Allbutt TC. On the use of the ophthalmoscope in diseases of the nervous system and of the kidneys; also in certain other general disorders. London and New York: Macmillan, 1871.