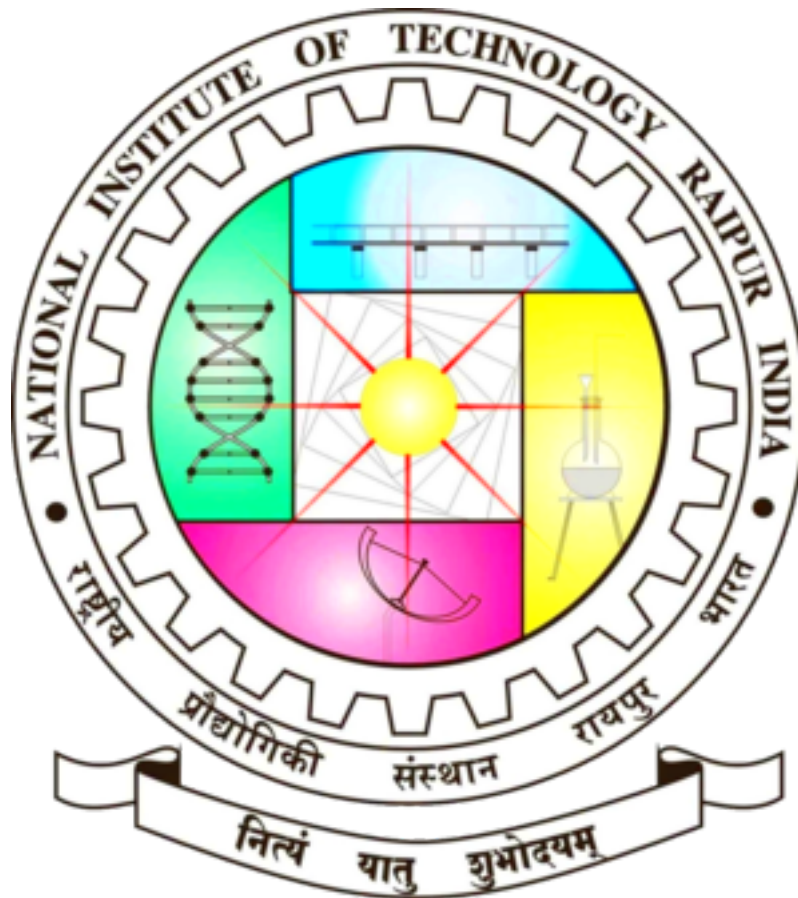


# BASIC BIOMEDICAL ENGINEERING (EVOLUTION OF MODERN HEALTHCARE SYSTEMS...)

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## 1 HEALTHCARE IN ANCIENT TIMES

The ancient Mesopotamians had no distinction between "rational science" and magic. When a person became ill, doctors would prescribe both magical formulas to be recited as well as medicinal treatments. Ancient Egypt developed a large, varied and fruitful medical tradition. The Atharvaveda, a sacred text of Hinduism dating from the Early Iron Age, is one of the first Indian texts dealing with medicine. The Atharvaveda also contains prescriptions of herbs for various ailments. The use of herbs to treat ailments would later form a large part of Ayurveda. China also developed a large body of traditional medicine. Much of the philosophy of traditional Chinese medicine derived from empirical observations of disease and illness by Taoist physicians and reflects the classical Chinese belief that individual human experiences express causative principles effective in the environment at all scales. These causative principles, whether material, essential, or mystical, correlate as the expression of the natural order of the universe.

## 2 HEALTHCARE IN MIDDLE AGES

The Islamic civilization rose to primacy in medical science as its physicians contributed significantly to the field of medicine, including anatomy, ophthalmology, pharmacology, pharmacy, physiology, and surgery. Islamic civilization's contribution to these fields within medicine was a gradual process that took hundreds of years. In addition to contributions to mankind's understanding of human anatomy, Islamicate scientists and scholars, physicians specifically, played an invaluable role in the development of the modern hospital system, creating the foundations on which more contemporary medical professionals would build models of public health systems in Europe and elsewhere. After 400 CE, the study and practice of medicine in the Western Roman Empire went into deep decline. Medical services were provided, especially for the poor, in the thousands of monastic hospitals that sprang up across Europe, but the care was rudimentary and mainly palliative. In Britain, there were but three small hospitals after 1550. Pelling and Webster estimate that in London in the 1580 to 1600 period, out of a population of nearly 200,000 people, there were about 500 medical practitioners. The London Dispensary opened in 1696, the first clinic in the British Empire to dispense medicines to poor sick people. The innovation was slow to catch on, but new dispensaries were open in the 1770s. In the Spanish Empire, the viceregal capital of Mexico City was a site of medical training for physicians and the creation of hospitals.

### 3 19th and 20th CENTURY

The practice of medicine changed in the face of rapid advances in science, as well as new approaches by physicians. Hospital doctors began much more systematic analysis of patients' symptoms in diagnosis. Among the more powerful new techniques were anaesthesia, and the development of both antiseptic and aseptic operating theatres. Public health measures became particularly important during the 1918 flu pandemic, which killed at least 50 million people around the world. It became an important case study in epidemiology. Cardiac surgery was revolutionized in 1948 as open-heart surgery was introduced for the first time since 1925. A major breakthrough in epidemiology came with the introduction of statistical maps and graphs. They allowed careful analysis of seasonality issues in disease incidents, and the maps allowed public health officials to identify critical loci for the dissemination of disease. Until the nineteenth century, the care of the insane was largely a communal and family responsibility rather than a medical one. The vast majority of the mentally ill were treated in domestic contexts with only the most unmanageable or burdensome likely to be institutionally confined. This situation was transformed radically from the late eighteenth century as, amid changing cultural conceptions of madness, a new-found optimism in the curability of insanity within the asylum setting emerged. Increasingly, lunacy was perceived less as a physiological condition than as a mental and moral one to which the correct response was persuasion, aimed at inculcating internal restraint, rather than external coercion.

### 4 MODERN HEALTHCARE

Modern healthcare has evolved and become more focused on prevention. Preventative efforts are in place to reduce and eradicate disease, support overall physical and mental health, and educate patients and families to promote safety. Due to this emphasis on prevention as well as our obsession with technology and convenience, it only makes sense that trends and new technology in healthcare focus on providing patients with more access to healthcare so that they can prevent issues before they turn into huge headaches. Modern healthcare has been transformed by advances in technology. The rise of a consumerization culture where people can easily shop around for suitable services also has an impact on modern healthcare. Medical practice managers need to respond to these changes by developing strategies to provide the best patient care while remaining profitable. For decades, technology has been used in medicine to operate specialist machinery, like MRI scanners and x-ray machines. Increasingly, technology is being used to provide a better patient experience and run a more efficient practice. Modern healthcare requires the adoption of new ways of working and liaising with patients alongside providing expected standards of care. Modern healthcare has improved the information recording process. Results and patient information is entered into a system that can be accessed by different healthcare

professionals. Additionally, mobile devices are used to update the conversations with patients in real-time. This provides more accurate reporting since secretaries are no longer required to transcribe notes, which could lead to errors. There are many applications of the IoT in modern healthcare. Remote monitoring and medical device integration are two such uses. The aim of utilizing the IoT in modern healthcare is to increase patient engagement and improve the ways that doctors deliver care. The existing models of health care provision, often subject to fragmentation and insufficient coherence, appear to be one of the main causes limiting efficiency of interventions and quality of health outcomes.

