History of Medicine and Respiratory Care

Biblical Times

• "And he put his mouth upon his mouth...and the flesh of the child became warm." II Kings 4:34
• 3000 BC - ancient Egyptian medical science is at its zenith
• 3000 BC - Chinese science believes that air was transmitted into the soul

Early Middle Ages

History of Medicine

• Hippocrates (460-370 B.C) teaches the doctrine of "essential humors"
• Aristotle (384-322 BC) records the 1st experiment in respiratory physiology
• Erasistratus (c. 304 B.C.) founds the "pneumatic" theory of respiration

History of Medicine

• Galen (130-200) believes that "pneuma" or "world spirit" from inspired air passes through invisible pores from the heart to the blood

History of Medicine

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Early Middle Ages
History of Medicine

• Many medical documents lost when the Barbarians invaded the Roman Empire
• Survival of documents and ideas credited to Cassiodorus and St. Benedict

Late Middle Ages

History of Medicine

• Resurgence of trade lead to increase in city dwellers
• This provided work, but also poverty and filth with garbage piled in the streets
• Physicians are considered "tradesmen"
• Bubonic plague ("Black Death") sweeps Europe in 1300s, killing 25 million (25% of population)

History of Medicine

• Plague is blamed on comets and lepers instead of *Yersinia pestis*
• Some lessons learned, e.g. cargo quarantine
• Helped to reduce deaths when plague returns in 1500s
• Physicians expected to do more since training was required

The Renaissance

History of Medicine

• New interest in sciences
• Leonardo da Vinci explained how lungs inflated and that fire consumed something from air
• Servetus discovered correct physiology of pulmonary circulation; wrote an anatomy textbook that was considered heresy and was burned at the stake
History of Medicine

- 1628 - Harvey clarified physiology of circulation
- Torricelli made first barometer; Pascal confirmed relationship between barometric pressure & altitude; Leeuwenhook invented the microscope

The 18th Century

- June 1774 - Scheele made oxygen by heating magnesium oxide - called it “fire air”
- Three months later, Priestly published similar findings and described breathing this “phlogisticated air” - credited with discovery of oxygen

History of Medicine

- 1780 - Lavoisier renamed “phlogiston” oxygen or “acid maker”
- Black is credited with discovery of dephlogisticated “fixed air” or CO₂
- late 1700s-early 1800s - significant discoveries in physics were made

The 19th Century

- CPR became more common, first medical classes were started in Philadelphia, 6 years later, King’s College, now Columbia opens first medical school, Jenner publishes his findings on vaccination
History of Medicine

- First clinical comparisons of signs and symptoms to autopsy findings
- Napoleon uses surgeons at battlefronts
- Laennec, the inventor of auscultation, publishes "Diseases of the Chest"
- Spallazani measures O₂ consumption and CO₂ production

History of Medicine

- 1837 - Mangus makes first quantitative analysis of O₂ and CO₂ in blood
- Hutchinson develops first spirometer and measures vital capacity of 2000 subjects
- 1844 - Colton describes effects of "laughing gas" (nitrous oxide) - 2 years later, Morton provides first ether anesthesia

History of Medicine

- 1850 - Women’s Medical College of Pennsylvania established
- 1864 - Red Cross started
- 1865 - Lister publishes theory of antiseptic methods
- 1886 - Aspirin developed
- 1895 - Roentgen discovers x-rays
- Many respiratory findings in 1800s

The 20th Century

- 1904 - Bohr, Hasselbalch and Krogh linked the processes of O₂ and CO₂ transport
- Haldane and and Barcroft prove O₂ transport is by simple diffusion
- Study of acid-base balance intensifies
- 1913 - First electrocardiogram
- Much work done in pharmaceuticals

Historical Events in Respiratory Care
Clinical Oxygen Therapy

History of Respiratory Care
- 1778 - Beddoes establishes the Pneumatic Institute in Bristol, England
- 1902 - Barcroft establishes scientific basis for O_2 therapy
- 1918 - first use of O_2 mask
- 1920 - Hill develops O_2 tent
- 1920s - Haldane develops method of diluting gases with room air - leads to "meter mask"

History of Respiratory Care
- 1920s - Haldane also devises a positive pressure breathing mask
- 1926 - Barach develops O_2 tent capable of removing CO_2
- 1938 - BLB mask developed
- 1930-40s - Barach, Andrews and others provide 1st education to those providing O_2 therapy

History of Respiratory Care
- 1940s - Indiscriminate use of O_2 leads to large number of cases of retinopathy of prematurity
- 1960s - Clinical analysis of blood gases developed
- 1960s - First "Inhalation Therapy" departments established
- 1960 - Campbell develops the Ventimask

History of Respiratory Care
- 1970s - Reliable air/O_2 blenders developed
- 1970s - O_2 therapy moves from setup and delivery to use by educated practitioners
- 1974 - Aoyagi discovers principle of pulse oximetry
- 1970-80s - RC services begin to include ER, L&D, nursery and ICU

History of Respiratory Care
- 1970-80s - Long-term O_2 therapy becomes more common, leading to development of O_2 concentrators, portable LOX, and conserving delivery devices
Clinical Use of Mechanical Ventilation

History of Respiratory Care

- 1800s - Most devices use body-enclosing iron lung
- 1900 - Flexible metallic endotracheal tubes available
- 1909 - Oral intubation introduced by Meltzer
- 1913 - Jackson develops the laryngoscope and intratracheal catheters

History of Respiratory Care

- 1920s - Use of positive pressure ventilation with intubation increases
- 1910-50 - Various poliomyelitis epidemics increase use and understanding of negative pressure ventilators
- 1948 - Bennett introduces the TV2P “assister”
- 1950s - Scientists and engineers in Scandinavia, England and Germany develop numerous positive pressure ventilators

History of Respiratory Care

- 1948 - Bennett introduces the TV2P “assister”
- 1951 - Bird develops the “clinical magnetic respirator”
- 1952 - During Copenhagen poliomyelitis epidemic, Ibsen changed from iron lungs to tracheostomies and positive pressure ventilation - used 1400 med students to provide manual ventilation

History of Respiratory Care

- 1954 - Ruben develops the AMBU (adult manual breathing unit)
- 1950s-60s - pressure limited ventilators, such as Bird Mark 7 and Bennett PR-1 go into production
- 1964 - Emerson introduces his Post-Op or 3-PV ventilator

History of Respiratory Care

- Mid 60s - theory of constant positive pressure breathing applied to mechanical ventilation - renamed in 1967 to PEEP and used to treat ARDS
- 1970s - 2nd generation ventilators, including the Puritan-Bennett MA-1, Ohio 560, Bourns Bear 1 and Siemens 900B are developed and continue the evolution of breathing modes, adjuncts and methods of controlling ventilator functions
History of Respiratory Care

• 1971 - IMV, developed in 50s is re-introduced
• 1980s-90s - other ventilation modes introduced:
  – pressure support ventilation, pressure controlled ventilation, airway pressure-release ventilation, inverse I:E ventilation, independent lung ventilation, continuous flow ventilation and permissive hypercapnia

Clinical Practice Issues

History of Respiratory Care

• 1990s - studies by AARC started in the 1970s result in publication of the first Clinical Practice Guidelines - over 50 produced
• 1990's - scope of practice for RCPs expanded in most hospitals
• Appropriate care guided by Therapist Driven Protocols
• Reimbursement by third-party payers, primarily Medicare, Medicaid and HMOs has drastically changed the face of healthcare

Professional Organizations

• 1947 - Inhalational Therapy Association was chartered in Chicago with 59 members on April 15
• 1948 - ITA changed its name to Inhalation Therapy Association
• 1950 - ITA begins publication of the Bulletin a quarterly newsletter sent to 1500 hospitals at no charge

Professional Organizations

• 1950 - ITA sponsors a series of lectures and workshops; 31 certificates were awarded to those who had attended at least 16 of the workshops
• 1954 - prompted by an increase in members across 14 states, the ITA changes its name to the American Association of Inhalation Therapists (AAIT)
Professional Organizations

- 1970 - the five separate Inhalation Therapy Societies in Texas, join to form the Texas Society for Inhalation Therapy (TSIT), an affiliate of the AAIT; the charter is dated October 16
- 1972 - AAIT changes name to American Association for Respiratory Therapy (AART) - TSIT changes its name to Texas Society for Respiratory Therapy

- 1982 - an exponential growth for over 30 years in the demand for RCPs and respiratory care services leads to another name change from AART to the American Association for Respiratory Care (AARC); TSRT also changes its name to the Texas Society for Respiratory Care (TSRC)

Professional Organizations

- 2000s - AARC membership is now over 35,000 world-wide; TSRC membership is approximate 4000

National Board for Respiratory Care

NBRC

- 1960 - separate national voluntary credentialing organization called the American Registry of Inhalation Therapists (ARIT) was formed
- 1961 - 12 examinees receive the designation “registered inhalation therapist”
- 1968 - AAIT forms the “Technician Certification Board” (TCB), establishing a two-tiered credential system

- 1972 - AART transfers its credentialing to ARIT to establish a single national organization
- 1974 - ARIT reorganized into the National Board for Respiratory Therapy (NBRT)
- 1970s - NBRT conducts a series of studies to delineate the job roles of the technician and therapist
- 1983 - NBRT puts into place the technician-to-therapist exam system
NBRC

- 1986 - NBRT changes its name to the National Board for Respiratory Care (NBRC)
- 2000 - NBRC switches from paper/pencil exams to computer testing