WOUNDS, WAR AND SURGERY
18th Century
James Lind
lime juice for scurvy
inflammation of connective tissue
Scurvy caused death at high numbers
First clinical trials
Group 1: quart cider daily
Group 2: 25 drops of vitriol daily
Group 3: 6 spoons of vinegar
Group 4: $\frac{1}{2}$ pint of sea water
Group 5: 2 oranges, 1 lemon
Group 6: barley water
Captain Cook took (1768-1779)
wort (0.1 mg/100g)
sauerkraut (10-15 mg/100g)
citrus syrup (40-60 mg/100g)
watercress (662 mg/100g)

Royal Navy 1794
Also:

Typhus

cleanliness

advantage over French

Freshwater from distillation of sea water

frigate with 240 men (1 gal/day)
carried tons of barrels of water

stale

fresh water hard to find
Anton van Leeuwenhoek
“Father of microscope”

Dutch
Made 200 microscopes
275x
560 letters to Royal Society
Animacules

Giardia
sperm
Edward Jenner 1749-1823
(Variolation = same disease)
vaccination for small pox
Cow pox = immune to small pox
Washington inoculated troops during the War of 1812. All soldiers were inoculated. In 1805, Napoleon's soldiers were inoculated. Previously, 90% of soldiers died from disease, while 10% died from injuries.
1979 WHO eradicated Coordinated public health
WOUNDS, WAR AND SURGERY
The Healing has never caught up with the Killing.
Is War Good for Medicine?

BAD
Casualties
Close quarters
Blood
Filth, trenches

GOOD
Research
Practice
Surgery
Blood banks
Sepsis, infection
Battlefield has been a laboratory for physicians: desperation creates ingenuity. War hastens the progress of medicine. Alexander the Great created a world center of medical research. Brought in Hindu physicians.
Julius Caesar gave Greek physicians Citizenship, non-combatants 1/7,000 men (Legion) Soldiers brought own bandages when Rome fell, no more medical care for soldiers
15th century guns
terrible wounds
large holes
tissue damage
Amputation

avoid tetanus, gangrene
1/3 died from infection
Civil War: 180,000 amputations
Rifle war: 94% of all injuries
5.5% artillery
.4% bayoneted
WWII: 75% artillery
No anesthesia
Speed
Last resort
Shock
Bleed
Infection
Ambulance

1487 Queen Isabella I
1792 Dominique Larrey
genius Napoleonic Wars
sent medics into battlefield
immediate care
amputated 200 in 24 hours
$\frac{3}{4}$ recovered
1865 Civil War

1 wagon/150 soldiers
Dr. Jonathan Letterman
Civil War
developed first ambulance corps
previously left on field 3-5 days
put field hospitals closer to battle
1899  1st motorized Chicago  
1950s helicopters Korea
<table>
<thead>
<tr>
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<th>Time to Treatment</th>
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<tbody>
<tr>
<td>Ancient</td>
<td>weeks</td>
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<tr>
<td>Civil War</td>
<td>2-3 days</td>
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<tr>
<td>WWI</td>
<td>10-18 hours</td>
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<tr>
<td>WWII</td>
<td>6-12 hours</td>
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<tr>
<td>Korea</td>
<td>4-6 hours</td>
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<tr>
<td>Vietnam</td>
<td>2 hours</td>
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Hospitalized died

WWII  4.5% died
Korea  2.5%
Viet Nam  1.8%

helicopters
best doctors

treat shock
“If there is any romance in war, unfortunately it does not fall to the lot of the nurse or surgeon to experience it.”
War is the mother of invention

1. Atrabine
   Japanese seized Java and all quinine trees, developed synthetic malaria preventive

2. DDT
   developed to kill lice that carried typhus outlawed in 1872
3. Inoculation
tetanus in trenches because battlefield was farms

4. Aircraft
fly high, low oxygen
5. Radiation studies
Hiroshima Aug. 6, 1945
Nagasaki

6. Barbasol on wounds
salicylic acid
Combat cleverness

Barbasol, shaving cream contains salicylic acid used to dress wounds
Florence Nightingale  1820-1910
Professional nursing roles for women
“Lady with the Lamp”  Crimean War
Established 1st Nursing School
Clara Barton 1821-1912
Nurse in Civil War
“Angel of the Battlefield”
Founded American Red Cross
Biological Weapons

Hannibal 248-183 BC
- anthrax
- poisonous snakes on ships

Tartars 1346 AD
- threw plague bodies

1763 English blankets smallpox

1940 Japanese dropped bubonic fleas
WOUNDS, WAR AND SURGERY
Surgery
1. Anatomy
2. Stop Blood Loss
3. Pain
4. Control infection
1. Anatomy

Galen animals
unchallenged for 100s years

Vesalius,
Dutch, corrected Galen
1543 published book
Renaissance 1350-1650

dissection

Michelangelo
Leonardo da Vinci
Vesalius

first book of dissection

On the Fabric of the Human Body
Leonardo da Vinci
Mona Lisa
Leda and the Swan
Michelangelo
Pieta
Sistine Chapel
Michelangelo’s David
Andries van Wesel = Vesalius (1514-1564)
Flemish moved to Venice
met illustrator Johan van Calcar, student of Titian
Produced most important work since Galen AND correct
*de humani coporis fabrica*
*On the Fabric of the Human Body*
Born in Brussels
Educated in Paris
Prof at Padua at age 24
Published 1543
Vesalius
Beginning of modern medicine
“On the Fabric of the Human Body”
Drawings of Vesalius used for centuries
1543 public dissection
Assembled bones
World’s oldest surviving anatomical
Still in Museum University of Basel
Correction from Galen (at least 200):
  sternum 3 parts
  heart septum
  vestibule in temporal bone
  fetal circulation
  human caeca appendix
John Hunter

Scottish, 10th child, poor student
Worked for brother, William
1st anatomy school in Britain 1746
procure bodies, competition
Barber-Surgeon Guild allowed
4 criminal cadavers/year
“Sack ‘Em Up Men”
10/night 300/year
2,000 bodies in 12 years
14,000 parts collected
only 3,500 left after blitz
2. Stop Bleeding

Ambroise Pare 1537

battlefield surgeon

amputated many limbs

Invented ligature on arteries
Ambroise Pare
Father of Modern Surgery
Developed ligature to seal blood vessels
Stopped cauterization
Stopped boiling oil
Documented ‘phantom’ pain
3. Pain Relief

a. Hypnotism
b. Alcohol

Mesopotamia 3,500 BC
Drugs only used for Ceremonial, Social, not surgery
Opium, mandrake, hemlock
wine, henbane
Needed something inevitable, complete, safe
c. Ether

William Morton 1846

explosive

irritant
d. Chloroform

James Simpson can overdose

reduces rate of all cells

heart stops

Dr. John Snow (cholera 1854)

1/3 tsp. enough, ½ tsp. kills

invented inhaler,

patients 4,000, no deaths
Considered unethical by many Physicians and Church of England

Queen Victoria requested John Snow to use chloroform for her 8th and 9th children

Became acceptable
4. Stop Infection

Semmelweis 1847

Women dying after childbirth
Doctor delivered vs midwives
Wash hands with chloride lime
Cut death rate from 30%-1%
NO ONE LISTENED!!!
Ignaz Semmelweis
Hungarian
1847
Louis Pasteur
Wine, beer, Rabies, anthrax silkworms
Birth of Bacteriology
Mediocre student
Not physician, chemist
Fermentation
Pasteurization
Spontaneous generation
Vaccination for Rabies
“In the field of observation, chance favors only the prepared mind”
Joseph Lister
1865
Carbolic acid (phenol)

Father of Modern Surgery
Believed miasma causes disease
Aired out wards
Surgeons did not wash hands
Took pride in bloody gowns
Started spraying 5% carbolic acid on instruments, hands, wounds
Reduced gangrene
Robert Koch  1843
Devised a method of proving which germ caused an infection.
Koch’s postulates:
  1. pathogen present in all cases
  2. pathogen isolated and grown
  3. must cause disease in naïve
  4. pathogen reisolated and shown to be same pathogen
William Halsted  1890
Flexible gloves made by Goodyear Rubber

Removed spectators

Today  5-6% nosocomial infection
From hospitalization
Mechnikov 1882
First to see phagocytes
WBCs
“Thorn in the Starfish”
Alexander Fleming
Scottish
Penicillin
1928
Cancer
1600 BC Egypt
1713 cervical cancer in nuns
1761 nasal cancer from snuff
1775 scrotal cancer in chimney sweeps
1800 leukemia