Helen Taussig and the Blue Baby Operation
Medical Education and Research in the U.S., 19th -20th Century
Americans at German medical schools

• 1870-1914: 15,000 (also Swiss, Austria)

• Features
  – Scientific medicine
  – Laboratory study
  – Full-time teachers/researchers
First U.S. medical reforms:

Harvard (1871)
- From 2 to 3 years
- Curriculum in sequence
- Laboratory work
- 4th year added in 1880s for clinical work
- New full-time professors
- Entrance exam

Followed by Pennsylvania (1877)
Michigan (1880)
Johns Hopkins (est. 1893) reforms

- Undergraduate degree required
- 2 years basic science, 2 years clinical
- Full-time faculty recruited: Welch, Halstead, Osler, Kelly
- Clinical instruction at University Hospital
- Women accepted from the start

Hopkins class of 1901

Johns Hopkins Hospital, est. 1889
Spread of Medical Reform in U.S. 1890-1910

- **East**
  - Bowdoin
  - Dartmouth
  - Tufts
  - Yale
  - New York University
  - Columbia
  - Georgetown
  - George Washington Univ.

- **Midwest and South**
  - Western Reserve (Cleveland)
  - Cincinnati
  - Minnesota
  - St. Louis University
  - Nebraska
  - Kansas
  - Drake (Iowa)
  - Tulane (New Orleans)
Spread of Medical Reform in U.S. 1890-1910

- **West**
  - Colorado
  - University of Southern California
  - California (Berkeley)

- **New Medical Schools**
  - Cornell (1898)
  - Oklahoma (1902)
  - West Virginia (1902)
  - Wake Forest (1902)
  - Indiana (1903)
  - Mississippi (1903)
  - Fordham, NY (1905)
  - Utah (1906)
  - Wisconsin (1907)
Abraham Flexner, Secretary  
General Education Board, 1917-25  
Author of *Medical Education in the United States and Canada* (1910)
Flexner Report, 1910

- Recommendation: reduce the number of schools to 31
- Results
  - 162 medical schools in 1906
    - 25,000 students
  - 76 medical schools in 1930
    - 21,000 students
Era of Medical Philanthropy:
Changes in medical school funding and research

• To 1870
  – Financed by student fees
  – Research by individuals and hospitals

• 1870-1910
  – Some funding from universities and state government
  – Begin funding from private philanthropy
  – Begin research at medical schools

• 1910-1930
  – Accelerated change in funding & research
  – Beginning of “organized” philanthropy (foundations)
Era of Medical Philanthropy: Sources

• 1902-34, 9 major U.S. foundations gave $154 million
• 1913-1928 Rockefeller GEB gave $61 million
• Individual philanthropy
  – Wealthy local businessmen
  – Local citizens of cities and region
• State government (not national)
  – California
  – Minnesota
  – Michigan
  – Wisconsin
Era of Medical Philanthropy: examples

• University of Rochester (1920)
  – $5 million from GEB
  – $5 million from George (Eastman of Kodak)

• University of Colorado (1922)
  – $700,000 from GEB, expected match of $800,000
  – $600,000 from legislature
  – $120,000 from local philanthropist
  – $80,000 from general public
Medical Discoveries in Selected Countries 1900-1926

Figure 1  Changes in the relative share of medical discoveries in selected countries.
Medical Students at Indiana University, 1907-1998
Medical students at Indiana University -- 1907
Medical students at Indiana University -- 1913
Medical students at Indiana University -- 1925
Medical students at Indiana University -- 1939
Medical students at Indiana University -- 1947
Medical students at Indiana University -- 1955
Medical students at Indiana University -- 1977
The Principle Characters in the “blue baby” operation

Helen Taussig

Alfred Blalock

Vivian Thomas
p. 428 “In seeking out a major figure whose contributions epitomize the emergence of twentieth-century American medical achievement, thoughts necessarily turn toward that first of our country’s true universities, and one of the most dramatic advances that has ever been made there, the development of the “blue-baby operation” of Helen Taussig and Alfred Blalock.”

“Of the two, it is Taussig whose life seems to me the more representative of the story being told in this book.”
From Nuland, Ch. 14 “A Triumph of 20th Century Medicine: Helen Taussig and the Blue-Baby Operation”

pp. 428-9 “It is probably no coincidence that the advent of equality for women physicians should be accompanied by a reawakening of a sense of our original mission, the healing of our fellows.”

p. 429 “Medicine is not a science but an art that uses science to explore what William Harvey called Nature’s closest secrets, that we may better minister to her children.”
From Nuland, Ch. 14 “A Triumph of 20th Century Medicine: Helen Taussig and the Blue-Baby Operation”

p. 429 “In discussing the women’s liberation movement in America, he [William Sloan Coffin] said, ‘The woman who most needs liberating is the woman who lives inside of each man. This, I think, is the great awareness that the increasing influence of female physicians has brought about.”
Fallot’s tetralogy

- Stenosis of pulmonary outflow
- Interventricular septal defect
- Thick-walled right ventricle
- Displaced aorta
Fallot’s tetralogy

- Stenosis of pulmonary outflow
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Maude Abbott (1869-1940)
Helen Taussig and Edwards Park
Fluoroscopy in the 1940s

1948 fluoroscope

1926 illustration
X-rays of Fallot’s tetralogy
Two classic pictures of Helen Taussig
Switching Arteries
Sidertracks Blood and Oxygen to Otherwise Starved Lungs

The "Blue" Babies' Blood Lacks Vital Oxygen Because the Artery (1) From the Heart to the Lung Is Constricted. By Seizing an Artery of the Arm (2), Tying it Off (3) and Anastomosing it to the Lung Artery (4) the Constricted is By-Passed.

By Robert D. Potter

Woman physician's courageous research and imagination, and the skill of one of the world's great surgeons have combined to save the lives of a number of baby children whose mothers had considered doomed to early death—may be saved.

These babies are blue because they are suffering from a lack of oxygen. This is caused by a condition known as congenital heart disease. The oxygen from the mother to their lungs is so restricted that their blood never gets oxygen to make cheeks ruddy. Their feet are blue, and they can walk only a few steps with exhaustion. Doctors used to think they would die before they could walk.

But one medical center gave hope—and more, for since Nov. 30, 1944, Dr. Blalock, Professor of Surgery at the Johns Hopkins Hospital, has been conquering the "blue baby" malady by operating on arteriobypass surgery to carry blood to the lungs, where it can receive its vital oxygen. In 80 operations have been performed by "Blue" babies. In many cases almost miraculous recovery has resulted.

Dr. Blalock's method is to make an incision in the chest, below the rib and to make a Y-shaped incision in the blood vessels. Then he inserts a tube-like graft, which is made of the patient's own dura mater (a covering for the brain). The graft is inserted in the aorta, the large artery that supplies the lung. Then, the graft is passed through the heart to the right lung artery. The surgeon then makes an incision in the chest wall and attaches the graft to the right lung artery. The blood now flows through the graft, instead of the constricted artery, and oxygen is supplied to the lungs.

Saving Our Doomed 'Blue' Babies


Little Bonnie Stewart of Florida Is Another of the 25 Sidedtracked by the New Johns Hopkins Surgery.

Mike's "blue zipper" is the healing incision near his heart where Dr. Blalock went in to do the operation. But for his mother she tells how he had been the "tiniest" baby of the litter. "He could barely walk five feet before he had to stop. This operation should have been done last year. But we couldn't get it done. But we are glad we got it done."

"I had to wheel him everywhere for fear someone would step on him or spill a drink on him."

"When I think of the operation, I get goose bumps."
The "Blue" Babies' Blood Lacks Vital Oxygen Because the Artery (1) From the Heart to the Lung is Constricted. By Severing an Artery of the Arm (2), Tying it Off (3) and Attaching It to the Lung Artery (4) the Constriction Is By-Passed.
Links to websites

• 50th anniversary exhibit on operation at Johns Hopkins
• “Partners of the Heart” PBS documentary
Thalidomide Tragedy

• In 1950s thalidomide was approved for use as a sedative in Europe, not in USA by FDA
• Taken to control sleep and nausea throughout pregnancy
• Caused severe deformities in fetus
• Many woman did not know they were taking an experimental drug nor give informed consent
• 12,000 babies born with severe deformities
Thalidomide Tragedy

- 1962 **Dr. Frances Kelsey**, FDA medical officer, in keeping the drug off the U.S. market, arouse public support for stronger drug regulation.
- **Kefauver-Harris drug amendments** passed to ensure drug efficacy and greater drug safety. For the first time, drug manufacturers are required to prove to FDA the effectiveness of their products before marketing them.
Newspaper report (July 15, 1962)

Frances Kelsey makes headlines on July 15, 1962 after winning her two-year battle to keep thalidomide out of the American market.