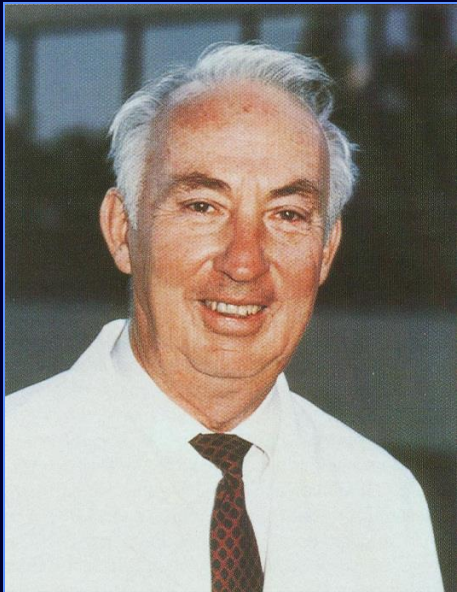


Norman E. Shumway, M.D., Ph.D.
Visionary, Innovator, Mentor and Humorist
➤ **Father of Heart Transplantation**



1923 - 2006

**The Academy at Johns Hopkins
Advisory Committee Meeting
October 8, 2020**



William A. Baumgartner, M.D.
Inaugural Chair, The Academy at Johns Hopkins
Professor Emeritus, Cardiac Surgery
Distinguished Service Professor

Norman E. Shumway, M.D., Ph.D.
Visionary, Innovator, Teacher and Humorist
➤ Father of Heart Transplantation

William A. Baumgartner, M.D.
Professor Emeritus, Cardiac Surgery

Disclosures:

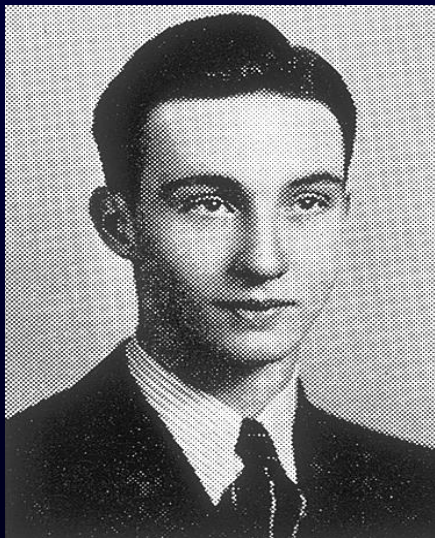
- Has no relevant financial relationships with commercial entities

Learning Objectives:

- Know the life and accomplishments of Dr. Norman Shumway
- Understand Dr. Shumway's philosophy of teaching and leadership
- Understand the early history of heart transplantation

Early Years

- Born in Kalamazoo, Michigan in 1923
- Moved to Jackson, Michigan in 1924
- Attended Jackson High School
 - Debate team
 - Valedictorian



NORMAN SHUMWAY, JR.
*"Man of few words but
great meaning."*

Assembly, Debate Club

JACKSON, MICHIGAN, FRIDAY, DECEMBER 13, 1940

Win Scholarship Honors



Courtesy of the Citizen Patriot

Pictured above are, left to right, Norman Shumway, valedictorian of the January graduating class, and Virginia Bailey and David DeWitt, who tied in points for the honor of salutatorian.

High Honor Is Won by Shumway

Is Chosen Valedictorian of January Graduating Class

After a compilation of honor points, Norman Shumway was announced as valedictorian for the graduating class of Jackson High school, January, 1941, with Virginia Bailey and David DeWitt tied for the honor of salutatorian. Norman totaled 77 honor points, four and one-half more than Virginia and David.

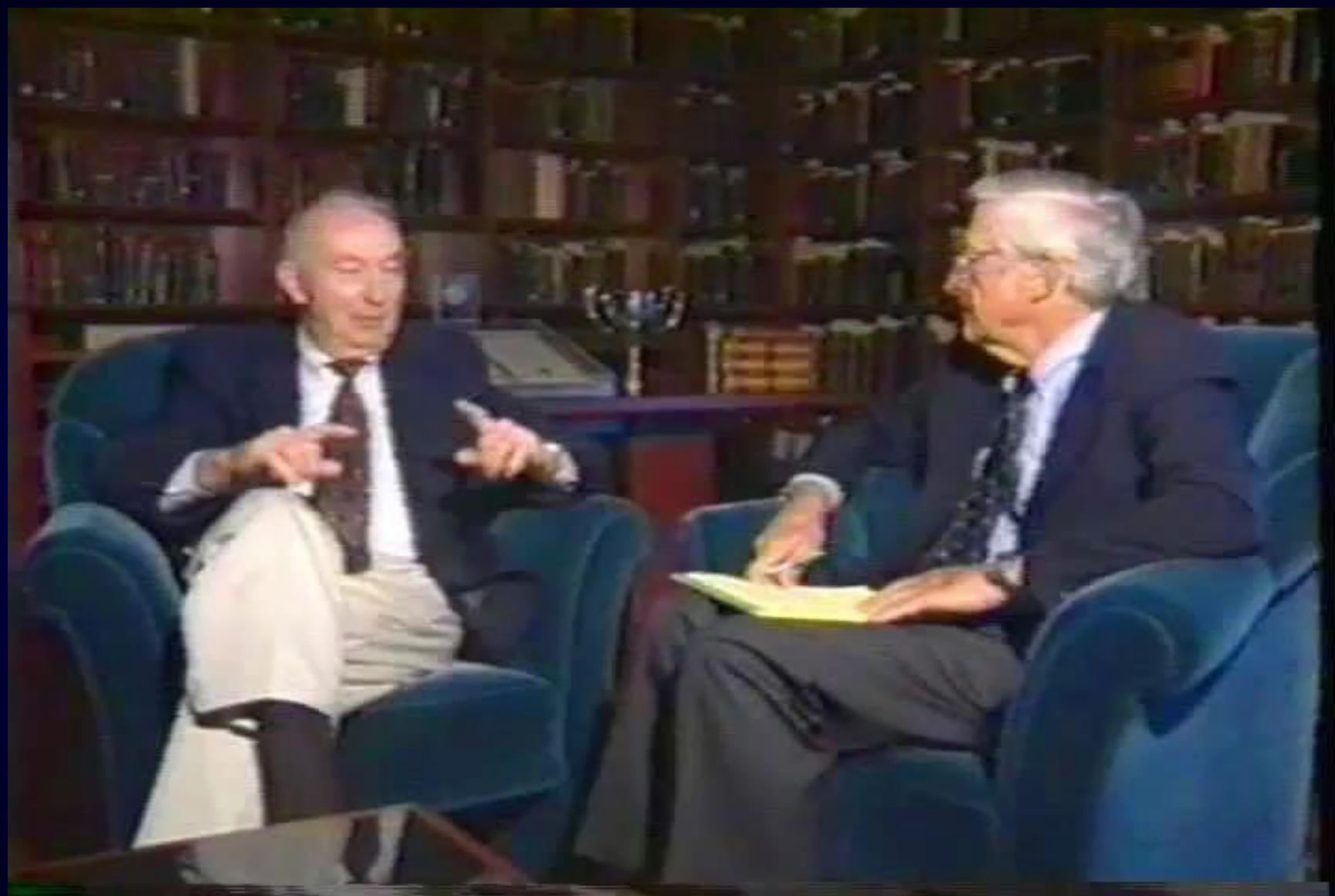
Throughout his three years in High school Norm has been a member of the debate team and one of the most active students in school. He was president of his

Spanish (4) Class Gives Luncheon

F.F.A. Boys Take Trip to Chicago

College Years

- Pre-law student for one year at the University of Michigan
- Signed up for the Army Enlisted Reserves
- Dispatched to John Tarleton Agricultural Junior College
 - two semesters of engineering
 - took medical aptitude test
- Three quarters of pre-med at Baylor University in Waco
- Vanderbilt Medical School



Vanderbilt Years

(1945-1949)

- Four years of medical school
- Influenced by the first Chairman of Surgery, Dr. Barney Brooks (1925-1952)
- Impressed with surgical literature from the University of Minnesota

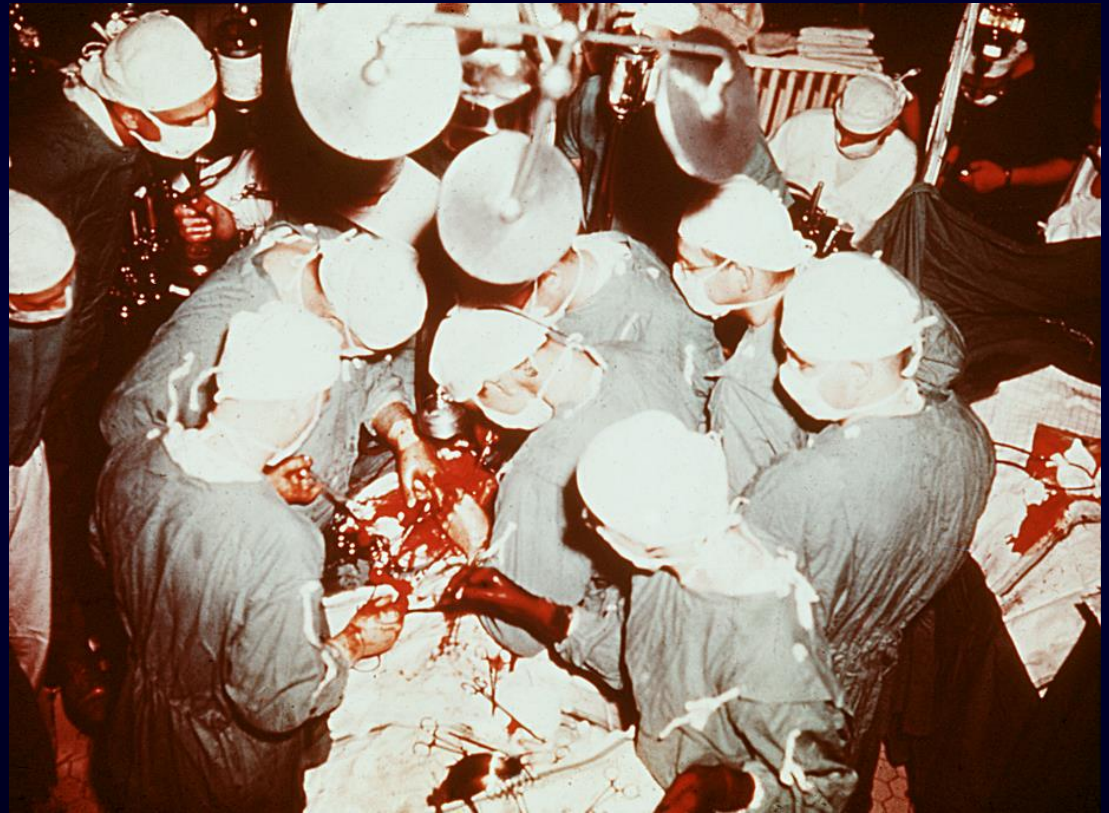
Residency at University of Minnesota

- Chairman of Surgery was Dr. Owen Wangensteen
 - “one of his greatest attributes was a total lack of envy”
 - “referred to himself as a regimental water carrier”
 - encouraged discovery and innovation
- Married Mary Lou Stuurmans in June 1951
- Interrupted for two years by the Korean War
 - Sara Shumway was born in Lake Charles, Louisiana



Residency at University of Minnesota

- 5 years
 - one year in the Department of Physiology
 - one and a half years in the surgical laboratories
 - two and a half years in clinical surgery
- Research with Dr. John Lewis
 - total body hypothermia (Ph.D. thesis)
- Worked with Dr. Vincent Gott







C. Walton and F. John

Norman E. Shumway, MD, PhD

Department of Cardiovascular Surgery, Stanford University School of Medicine, Stanford, California

This paper is a brief biography of two of the most important contributors to the development of open heart surgery. In 1952, John Lewis performed the first successful open heart surgical procedure of any kind, repairing an atrial septal defect under general hypothermia in a 5-year-old girl. In March 1954, Walt Lillehei, utilizing

I wish I knew them so well I could call them C and F, but actually to me they were always C. Walton Lillehei and F. John Lewis. These were the most spectacular and productive surgeons to come out of the University of Minnesota in the 1950s. The long-time chief of surgery, Owen H. Wangensteen, created an atmosphere so conducive to learning that discovery and pseudo miracles were essentially a daily occurrence.

controlled cross circulation, embarked on a series of 45 consecutive patients. The bubble oxygenator appeared in 1955, and open heart surgery was introduced to many of this nation's major medical centers.

(Ann Thorac Surg 1999;68:S34-6)

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might prevail against all of Lewis' attempts to save the patient. Probably Wangensteen's greatest attribute was his total lack of envy. When his young colleagues became world leaders in cardiac surgery, he fully supported their celebrity and took great pride in their accomplishments.

As a newly appointed faculty member, Lewis returned to the laboratory in 1950, and working with Mansur Taufic, began studies of open heart surgery under gen-



“Those days of high adventure for us fortunate enough to have been there set the style for our future travels in cardiac surgery. We never panicked. We always had fun. We kept going after early failures. We learned to persevere in the face of seemingly insurmountable obstacles both medical and political.”

Dr. Norman Shumway, referring to his training at the University of Minnesota with John Lewis and Walt Lillehei

Post Residency Early Years

- Finished training in 1957
- Offered a position at Ancker Hospital (Regions Hospital) in St. Paul
- Private practice in Santa Barbara for six weeks
- Went to San Francisco to interview with:
 - Dr. Leonard Goldman, Chief of Surgery at UCSF
 - Dr. Victor Richards, Chief of Surgery at Stanford

Stanford in the City

- Instructor in Surgery
- Operated kidney machine at night
- Worked in the experimental surgery lab
 - First resident assigned was Richard Lower
- Dr. Frank Gerbode was the primary adult heart surgeon
- Pediatric procedures at Children's Hospital
 - Primary referring physician was Dr. Anne Purdy

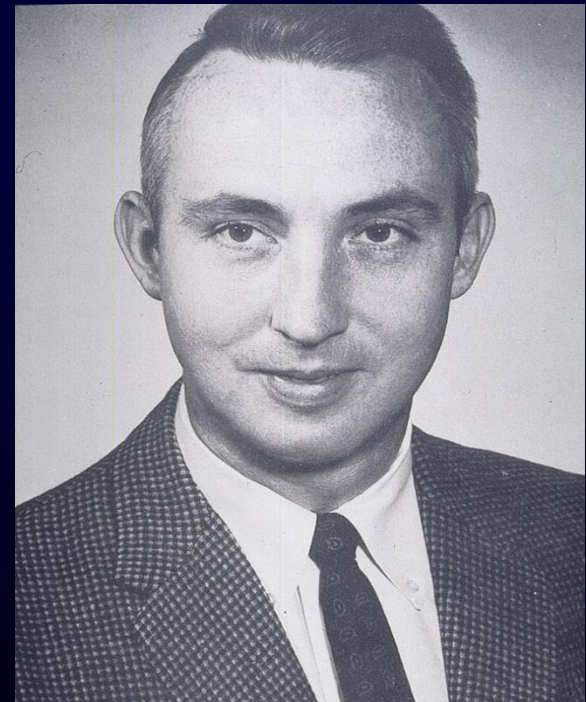
Experimental Surgery Lab

- The current method was operating on a beating heart
- Goal was to develop a new technique with the heart still, but viable with a bloodless field
 - Used topical cooling during one hour of cross clamp time
 - Bored during the wait – started doing autotransplants



Move to Palo Alto (1959)

- Dr. Garrett Allen was the first chair of surgery
 - Invited Dr. Shumway to interview as Chief of CT Surgery
- Clinical operations : Monday - Wednesday - Friday
- Laboratory operations: Tuesday - Thursday



Stanford University.

Stanf

My de

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atmos

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After

performing open heart surgery,

Children's Hospital in San Francisco.

or even head of a cardiovascular unit limiting its work to experimental and clinical problems in this field.

He would be a valuable addition to, or even head of a cardiovascular unit limiting its work to experimental and clinical problems in this field.

ressive record of training and the most part in the stimulating a, would like very much to con- in cardiac surgery at Stanford.

imental laboratory, he is now

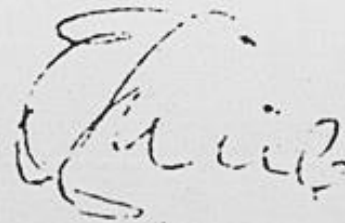
and success on patients at

He would be a valuable addition to,

May I express the hope that he may find here the opportunity to continue work in his chosen field? I believe you would find him able,

I believe you would find him able, creative and cooperative.

Very sincerely yours,



Emile Holman, M.D.



Stanford Surgeon Switches Heart In Dog—It Lives

By **GEORGE DUSHECK**
News-Call Bulletin Staff Writer

A young Stanford surgeon has successfully transplanted a living heart from one dog to another. The dog is still alive a week later.

HEART

Continued from First Page show "Doctors' News Conference."

Dr. Lower's accomplishment is, as Dr. Cohn put it, "a technical stunt." Nobody expects the dog to survive permanently.

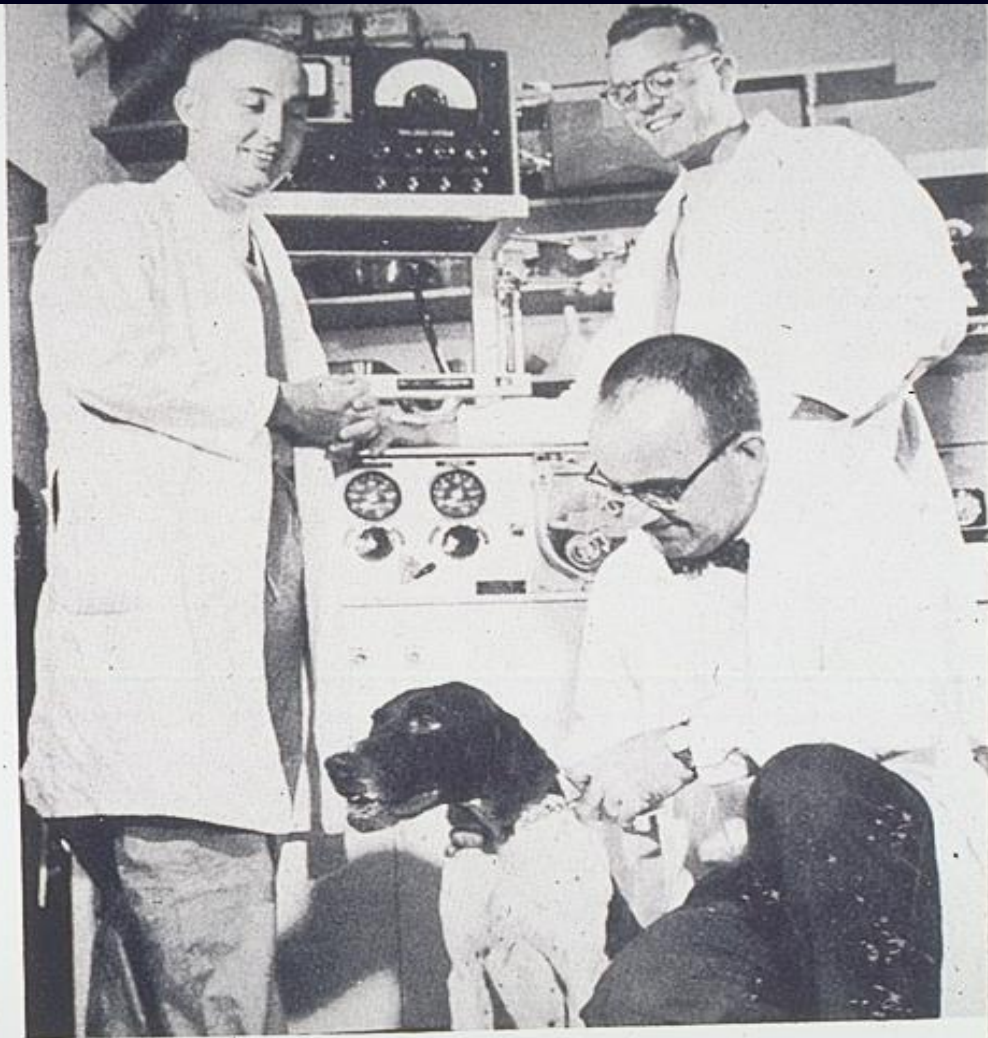
Organs transplanted from one animal to another create a host-donor reaction which

The daring experiment was carried out by Dr. Richard Lower, working with Dr. Norman Shumway at Stanford's new Palo Alto medical center.

Other surgeons have attempted similar heart transplants: the animals all have died within hours.

DR. LOWER'S operation differs in one respect from previous attempts:

He left in the host dog a portion of the wall of the upper cham-



NAMED "RESEARCH DOG HERO OF 1960" by the National Society for Medical Research this month was "Sam," a 4-year-old pointer who is living with a transplanted heart valve. Sam was operate

Challenges of Heart Transplantation

- Denervation
- Immunosuppression
- Detection of rejection

Long-term survival of cardiac homografts

Surgery
July 1965

RICHARD R. LOWER, M.D.
EUGENE DONG, JR., M.D.
NORMAN E. SHUMWAY, M.D.
PALO ALTO, CALIF.
*From the Division of Cardiovascular Surgery,
Department of Surgery, Stanford University
School of Medicine*

The reversibility of homograft rejection by immunosuppressive agents is becoming an established therapeutic concept. The successful application of this concept is dependent upon the early threatened rejection are presumably irreversible damage. This approach pertains to the heart, lung, and endocrine glands, and endocrine glands by appropriate specific metabolic forms primarily ; thus requires a detailed monitoring. Early impracticability is difficult. The electrocardiogram reflecting the mechanical function which rejection. This study presents our initial efforts to correlate electrocardiographic changes



Fig. 9. Dog No. 5-25, Group III. This animal remains vigorous 8 months after cardiac homograft transplantation. Weight loss and failure to grow hair are evidently a result of drug therapy.

surviving from 4 to 21 days after transplantation, and from 25 animals treated with immunosuppressive drugs surviving 6 to 250 days. Donor and recipient animals were monitored with respect to body weight. Animals received preoperative digitalis or none received digitalis or digitalis received postoperative digitalis for approximately 1 to 3 weeks after when indicated by electrocardiographic rejection. Animals treated with immunosuppressive drugs were divided into three groups: the first group consisted of 12 dogs receiving immunosuppressive therapy; the second group received postoperative immunosuppressive therapy for 1 to 3 weeks, with digitalis therapy so that delayed rejection was observed; and the third group received intermittent immunosuppressive drug therapy during periods of threatened rejection. Because of the small numbers in-



Journal of the American Medical Association, *November 20, 1967*:

“‘We think the way is clear for trial of human heart transplantation,’ says surgeon Norman E. Shumway (Stanford University).

“‘We have achieved a degree of experience with heart transplantation in the laboratory with which we feel confident we can take appropriate care of the patient with a cardiac transplant. . . . Although animal work should and will continue, we are more or less at the threshold of clinical application.’”

Newsweek, *December 18, 1967*:

THE HEART: MIRACLE IN CAPE TOWN

“Early Sunday morning, December 3, in Cape Town, South Africa, Dr. Christian Neethling Barnard and a 30-man surgical team at Groote Schuur Hospital . . . removed [Louis] Washkansky’s own incurably diseased heart and replaced it with a healthy heart from Denise Ann Darvall, an automobile-accident victim.”





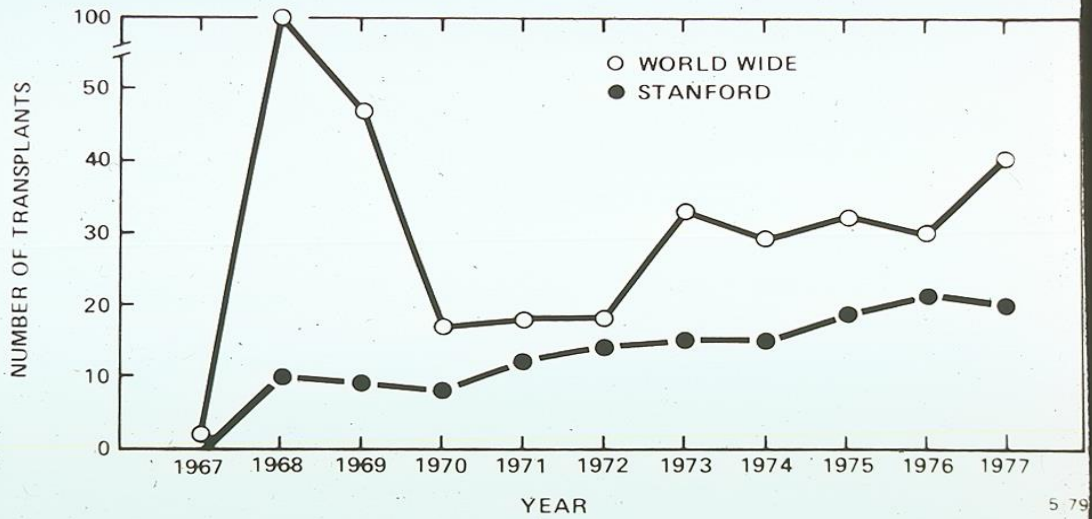
Transplants To Continue ---Shumway

1307

STANFORD — Dr. Norman Shumway Monday defended his second unsuccessful heart transplant operation as justified because "we are dealing with patients who face certain death if nothing is done." The crewcut surgeon said in a statement issued by Palo Alto Hospital that the cardiac operations would continue. "We see other types of patients who qualify as heart recipients."

pumping blood through his system six times faster than his own heart. Medical bulletins released Sunday indicated Rizor, the father of four children, was proving. He joked with doctors visited with his wife Eileen, asked nurses for "something stronger than apple juice" drink. He even breathed for his second transplant operation.

STANFORD CARDIAC TRANSPLANTATION



5 79



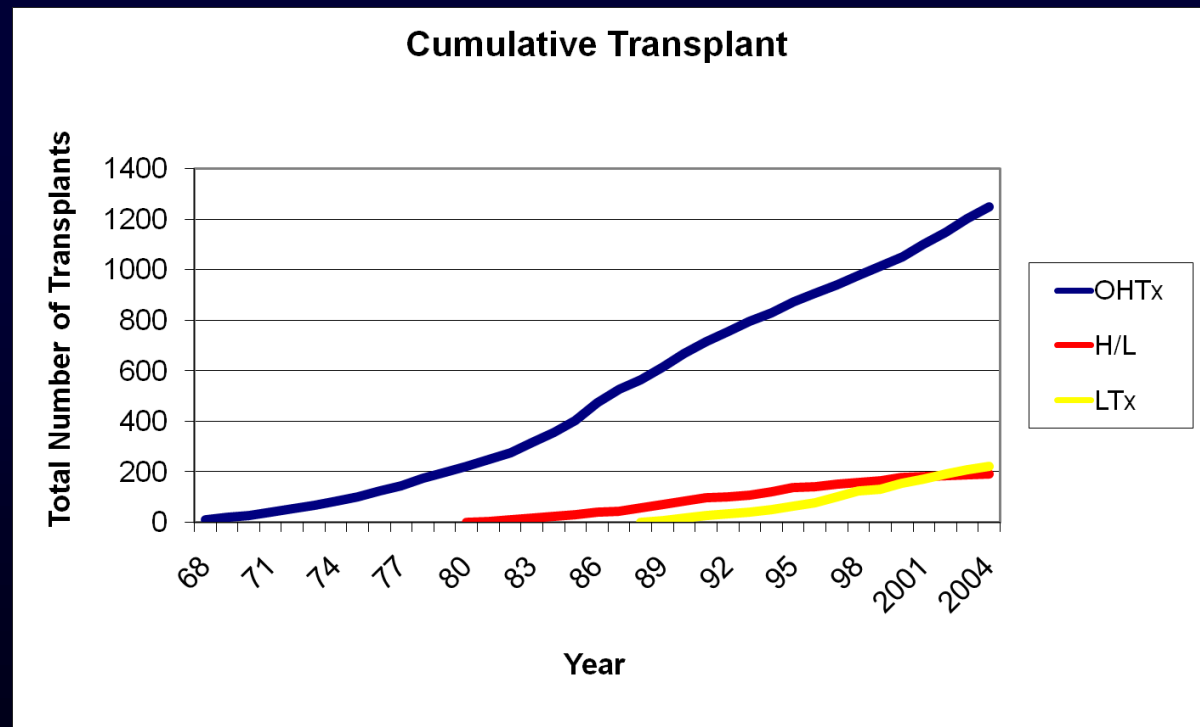
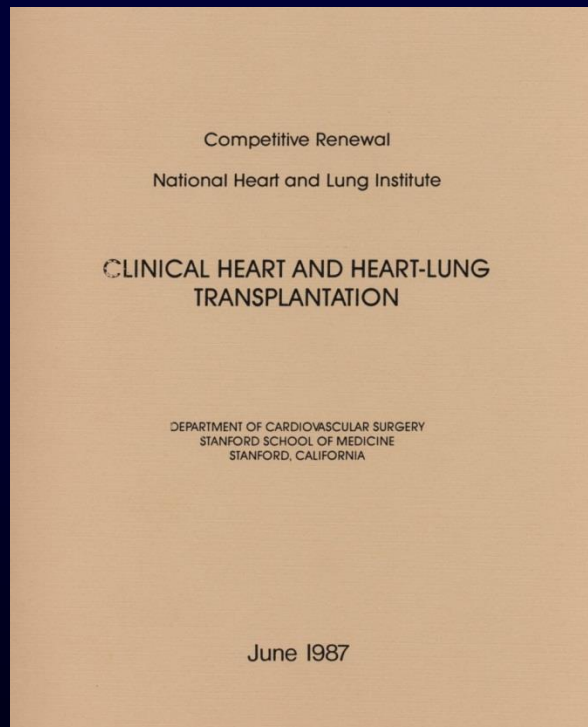
10 Years of Developments in the Experimental Laboratory

- Topical hypothermia provided excellent preservation
- Function was not altered by denervation
- Use of EKG changes to detect rejection (Lower)
- Development of the transvenous endomyocardial biopsy (based on Kono Bioptome) (Philip Caves and Margaret Billingham)
- Production of rabbit antithymocyte globulin
- Use of cyclosporin A for heart transplantation (Phil Oyer and Ed Stinson)
- Use of Cy-A for heart-lung transplantation (Bruce Reitz)



1970 - 1993

- NIH Program-Project Grant provided clinical and laboratory funding for all aspects of the transplant studies at Stanford
- >20 million dollars and numerous investigators with Ed Stinson as PI



Dr. Barnard's Story

- Wrote to David Hume at MCV regarding rejection in kidney transplantation
 - Course offered August-October 1967
- Worked in Hume's lab
- Barnard's former perfusionist, Carl Goosen worked at MCV
- Lower allowed Barnard to watch the procedures
- "I'm going to bloody do it..." - Barnard

Research Milestones: Transplantation

- 1959 Selective hypothermia of the Heart in Anoxic Cardiac arrest – SG&O (Shumway/Lower/Stofer)
 ➔ 12 additional papers
- 1960 Studies on the Orthotopic Homotransplantation of the Canine Heart – Surgical Forum (Lower/Shumway)
- 1961 Homovital Transplantation of the Heart – JTCVS (Lower/Stofer/Shumway)
- 1961 Complete Homograft Replacement of the Heart and both Lungs – Surgery (Lower/Stofer/Hurley/Shumway)
- 1965 Long-term Survival of Cardiac Homografts – Surgery (Lower/Dong/Shumway)
 ➔ ~300 additional papers

Research Milestones: Biological Valves

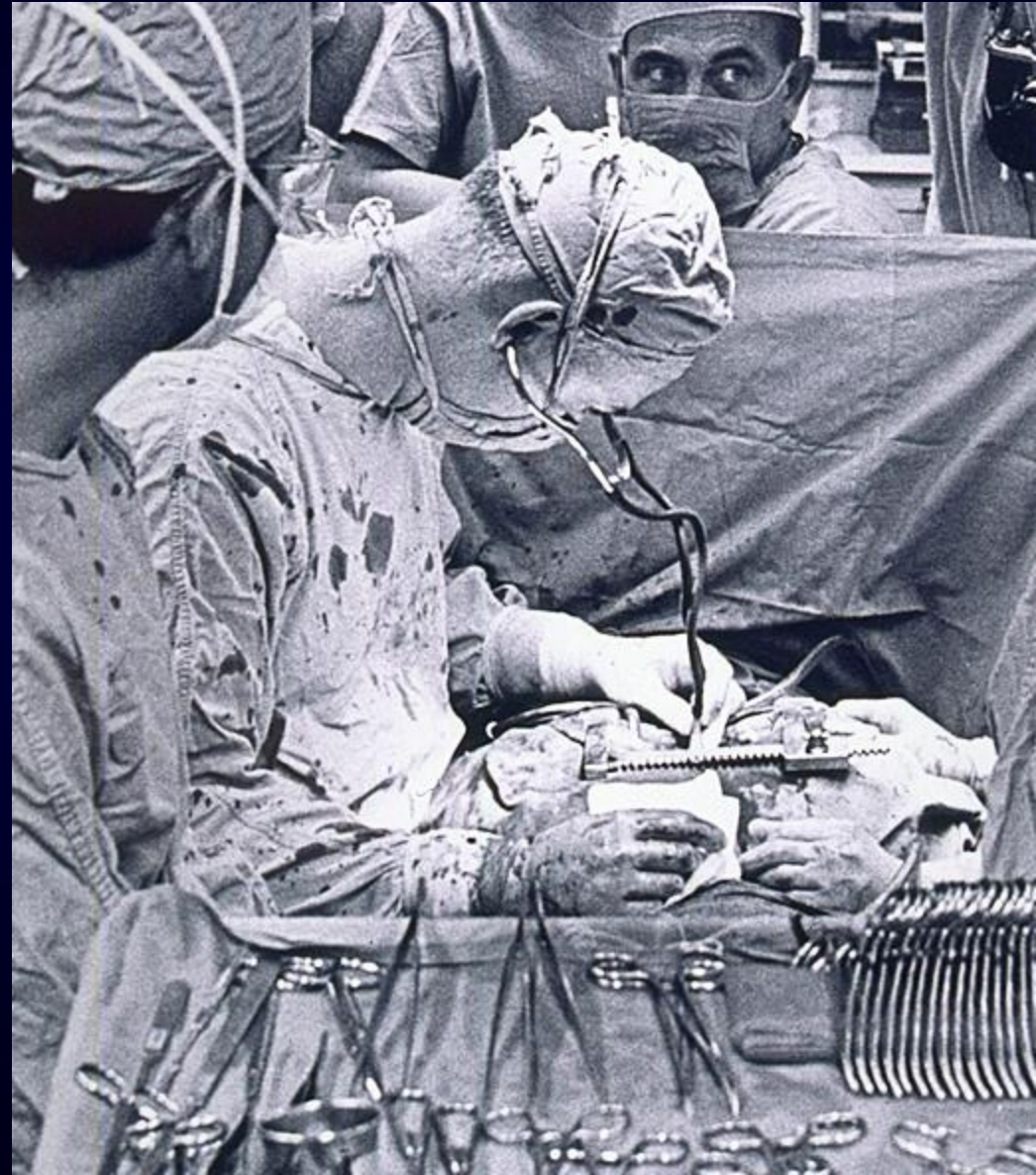
- 1961 Total excision of the Mitral Valve and Replacement with the Autologous Pulmonic Valve - JTCVS (Lower/Stofer/Shumway)
- 1966 Replacement of the Aortic Valve with the Autologous Pulmonic Valve – Surgical Forum (Pillsbury/Shumway)
- 1968 Aortic valve replacement with the Fresh Valve Homograft – Am. J. Surg (Stinson/Angell/Iben/Shumway)
- 1980 Clinical Durability of the Hancock Porcine Bioprosthetic Valve – JTCVS (Oyer/Miller/Stinson/Reitz/Moreno-Cabral/Shumway)

➡ 81 additional papers

Research Milestones: Congenital Heart Surgery

- 1965 Results of Total Surgical Correction for Fallot's Tetralogy – Circ (Shumway/Lower/Hurley/Pillsbury)

➔ 87 additional papers



Research Milestones: Aortic Surgery

- 1979 The Operative Treatment of Aortic Dissections: experience with 125 patients over a 16 year period – JTCVS (Miller/Stinson/Oyer/Rossiter/Reitz/Griepp/Shumway)

➡ 26 additional papers

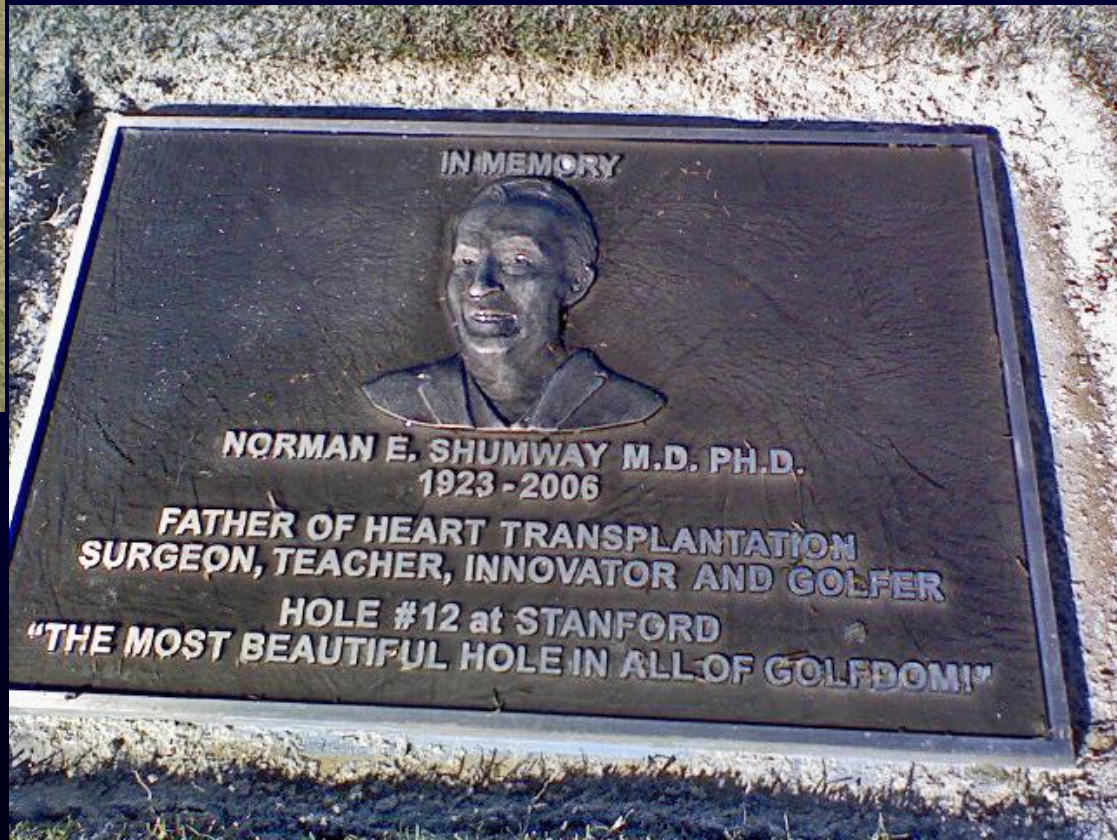
History of Golf

- Began in high school (hitchhiked to Ann Arbor, MI)
- Became “a love” at Stanford
 - Saturday foursome
 - NES
 - Jim Mark, M.D.
(Chief of Thoracic Surgery)
 - Ron Dorfman, M.D.
(Pathologist)
 - Bill Rogoway, M.D.
(Oncologist)
- Senior Cardiovascular Surgery Society

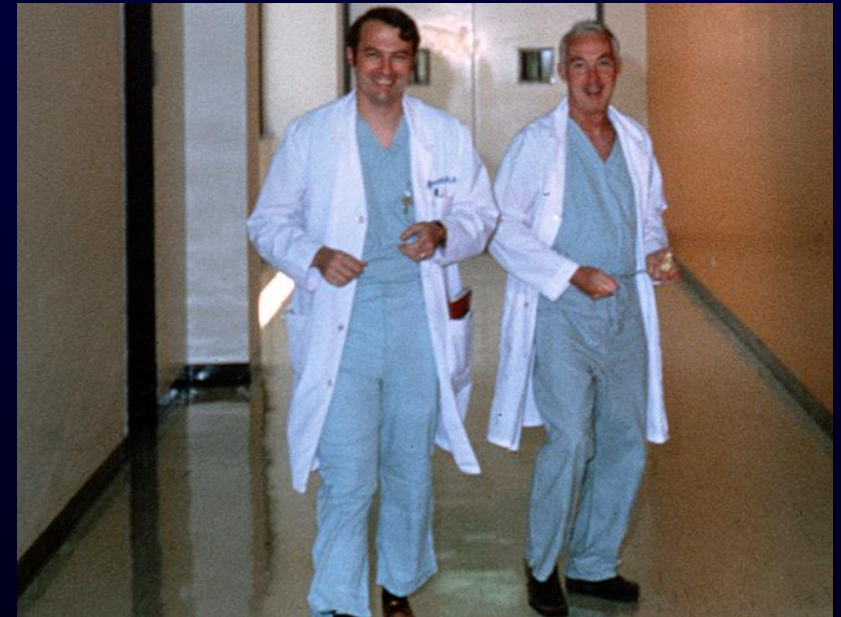


- Culminated in Pebble Beach at the 1993 AT&T Pebble Beach Pro-AM Tournament





History of Humor



Honors/Awards (45)

- René Leriche Prize of the International Surgical Society (1971)
- President, American Association of Thoracic Surgery (1986-87)
- American Surgical Association Medallion for Scientific Achievement (1993)
- Lister Medal of the Royal College of Surgeons of England (1994)





Sara Shumway, M.D.

BS, Stanford University,

MD, Vanderbilt University

General Surgery Residency, Vanderbilt University

CT Surgery Residency, Johns Hopkins University

Professor of Surgery, Vice Chief, Division of CT Surgery

Societies (25)

- All the prestigious US organizations
- Variety of international organizations
- Honorary fellowship in all 4 Royal Colleges (England, Ireland, Glasgow, Edinburgh)

Trainees

- 76 beginning with Richard Lower
- 22 became chiefs and/or chairs of departments and/or divisions
- 1 became U.S. Senate Majority Leader

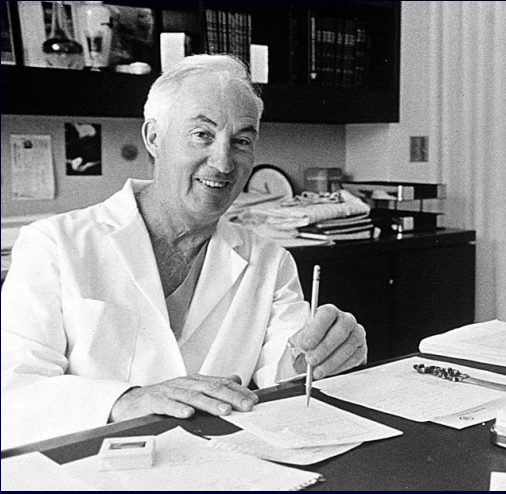


Shumway Residents and Fellows

Directors of University CT Divisions/Depts

Resident	University
• John Baldwin	Yale/ Baylor
• Bill Baumgartner	Johns Hopkins
• Tom Burdon	Palo Alto VA- Stanford
• Phillip Caves	Glasgow
• Larry Cohn	Brigham- Harvard
• Jack Copeland	Arizona
• Pat Daily	U C San Diego
• Randy Griep	Downstate/ Mt Sinai
• Ed Hurley	U C Davis
• Stu Jamieson	U C San Diego
• Richard Lower	M C Virginia
• Pat McCarthy	Northwestern
• Michael Mill	U North Carolina
• Dennis Modry	Edmonton
• Bruce Reitz	Johns Hopkins/ Stanford
• Hermann Reichensperner	U Hamburg
• George Sarris	Onassis Heart Center
• Wm C Scott	Stoneybrook
• Julian Smith	Monash U
• Vaughn Starnes	U Southern California
• John Wallwork	Cambridge – Papworth
• Don Watson	U Tenn - Memphis

Conclusion



- Pioneered concept of topical hypothermia resulting in increased survival of many patients undergoing cardiac surgery
- Made major contributions in the fields of biologic valves, CHS and aortic surgery
- Developed a technique of first assisting which produced highly trained CT surgeons
- Persisted in heart transplantation benefitting thousands of patients over the last 4 + decades
- Created a legacy of 1st, 2nd, 3rd, and now 4th generation trainees
- Demonstrated that cardiac surgery can be fun while being intense and hard work

Acknowledgements

- Personal relationship with Dr. Shumway
- Drs. Sara Shumway, Bruce Reitz, Vince Gott, and Bill Brody
- Video interview of Dr. Shumway by Dr. William Stoney
- “Every second counts: The Race to Transplant the First Human Heart” by Donald McRae
- Stanford Grand Rounds – Remembering Norman
- King of Hearts by G. Wayne Miller
- Stanford Video: The Vision of Perseus

