

**Henry Buchwald, M.D., Ph.D.**  
Narrator

**Lauren Klaffke**  
Interviewer

**ACADEMIC HEALTH CENTER  
ORAL HISTORY PROJECT**

**UNIVERSITY OF MINNESOTA**

## **ACADEMIC HEALTH CENTER ORAL HISTORY PROJECT**

In 1970, the University of Minnesota's previously autonomous College of Pharmacy and School of Dentistry were reorganized, together with the Schools of Nursing, Medicine, and Public Health, and the University Hospitals, into a centrally organized and administered Academic Health Center (AHC). The university's College of Veterinary Medicine was also closely aligned with the AHC at this time, becoming formally incorporated into the AHC in 1985.

The development of the AHC made possible the coordination and integration of the education and training of the health care professions and was part of a national trend which saw academic health centers emerge as the dominant institution in American health care in the last third of the 20<sup>th</sup> century. AHCs became not only the primary sites of health care education, but also critical sites of health sciences research and health care delivery.

The University of Minnesota's Academic Health Center Oral History Project preserves the personal stories of key individuals who were involved with the formation of the university's Academic Health Center, served in leadership roles, or have specific insights into the institution's history. By bringing together a representative group of figures in the history of the University of Minnesota's AHC, this project provides compelling documentation of recent developments in the history of American health care education, practice, and policy.

## **Biographical Sketch**

Henry Buchwald was born in Vienna, Austria. His family, fleeing from the Holocaust, came to the United States in 1938. He grew up in the boroughs of Long Island, Brooklyn and later in Manhattan in New York City. He graduated from the Bronx High School of Science in 1950 and attended Columbia College. After three years as an undergraduate, he pursued the professional option, moving on to the College of Physicians and Surgeons, the medical school of Columbia University. He completed medical school in 1957 and took an internship at Columbia Presbyterian Hospital from 1957-1958. After completing his internship, Dr. Buchwald completed his military obligations as part of the Berry Plan in the Air Force as a flight surgeon from 1958 to 1960. Because of its reputation for a strong academic surgical program, Dr. Buchwald began his residency at the University of Minnesota on September 11, 1960. He concurrently completed his Master's in Biochemistry under Dr. Ivan Frantz and became a professor in 1966. Dr. Buchwald's career has included research into the partial ileal bypass for the alleviation of chronically high cholesterol as part of the widely praised POSCH trials; the creation of the first implantable infusion pump, Infusaid, for the treatment of diabetes; and most recently the jejunoileal bypass for the treatment of obesity. He continues to be a professor of surgery and bioengineering at the University and is an Emeritus Professor of the Owen H. and Sarah Davidson Wangensteen Chair in Experimental Surgery.

## **Interview Abstract**

Dr. Henry Buchwald begins his interview talking about his early life: fleeing Austria in the midst of the Holocaust, growing up in New York, and his baccalaureate and medical education at Columbia. He discusses how he arrived at an interest in medicine, his time in the Air Force, and his reasons for choosing to pursue a residency at the University of Minnesota. As part of his time at Minnesota, Dr. Buchwald compares the University's research program with those of other medical schools, relates the profound influence of Owen Wangensteen on the Surgery Department, and discusses his early lab work and his studies of biochemistry, particularly lipids, with Ivan Frantz. In reviewing his changing research interests, Dr. Buchwald cites major diseases afflicting society at various times during his career: the increasing association of cholesterol with heart disease prompted his early interest in lipid uptake and spurred his work on the Program on Surgical Control of Hyperlipidemias (POSCH); the need for treatments for diabetes prompted his research into Infusaid, the first implantable infusion pump, a collaborative effort that led to the development of several other devices and eventually the establishment of a bioengineering program at the University; and finally, the ongoing obesity epidemic spurred Dr. Buchwald's current research into the jejunoileal bypass for the treatment of obesity. In his reflections on obesity research, Dr. Buchwald discusses the high level of stigmatism associated with the disease and the difficulty of funding research into its treatment.

Part two of Dr. Buchwald's interview begins with a discussion of the mentorship he received at the University, specifically, Drs. Owen Wangenstein, Richard Varco, Ivan Frantz, C. Walton Lillehei, and Richard Lillehei. He then relates his surgical partnership with Jack Delaney, who eventually specialized in surgical oncology—particularly related to the breast, thyroid, and endocrine system. In this same vein, Dr. Buchwald reflects on specialization within the surgical profession over his career. He then discusses his experience with NIH funding, the changing nature of surgical research, Dr. Najarian's tenure as Chief of Surgery, the ALG scandal, and Dr. Owen Wangenstein's significant financial contributions to the surgical program. The conversation then evolves toward discussions of administrative changes at the University, including the AHC reorganization, town-gown relationships, salary caps, and the merger of University Hospitals with Fairview. The interview ends with Dr. Buchwald's reflection on the changing culture of the medical profession, including discussions of individualism, teamwork, and bureaucracy.

**Interview with Doctor Henry Buchwald**

**Interviewed by Lauren Klaffke**

**Interviewed for the Academic Health Center, University of Minnesota  
Oral History Project**

**Interviewed at the office of Doctor Buchwald  
at the Variety Club Research Center  
University of Minnesota**

**Interviewed on September 28 and October 12, 2012**

Henry Buchwald - HB  
Lauren Klaffke - LK

LK: Hello. My name is Lauren Klaffke and I'm here today interviewing Doctor Henry Buchwald in his office at the Variety Club Research Center of the University of Minnesota on September 28, 2012.

Thank you for meeting with me today, Doctor Buchwald.

HB: My pleasure.

LK: To get started, I'd like to ask you a little bit about your background, where you grew up, and where you were educated.

HB: All right. I was born in Vienna, Austria, came to this country in 1938 with my mother fleeing from the Holocaust, which cost us many relatives in Europe. My father could only come in 1939 and spent a year hiding out in Hungary, being hidden by former neighbors in a little town called Herzig-Soelisch. At that time, [President] Franklin Roosevelt never dropped the quota system and never made it easier for Jewish émigrés to come to this country. I was born in Vienna, Austria. My mother was Viennese and Austrians were better than Hungarians. So the quota favored Austrians, so we came here. We had relatives here since the last part of, probably, the nineteenth century who had given us visas. Indeed, my aunt, my father's sister, and his mother were in this country. But my father, being Hungarian by nationality, was not granted a quota selection. So he spent a year fleeing from the Nazis, hiding out, and, finally, was able to join us in 1939.

Then, I grew up in Sheepshead Bay, which is down on Long Island in New York and, then, in Flatbush, Brooklyn, lots of education in the streets of New York, and, then, up in the Inwood area, Dyckman Street in Upper Manhattan, 200 Dyckman Street, where I, then, spent most of my young life.

I went to school in the various public schools and, then, got into the Bronx High School of Science from which I graduated in 1950. Today, it would be called a magnet school. There were several in the New York area. There was the Bronx High School of Science. There was Stuyvesant. There was Juilliard, different kinds of schools for people interested in different areas. I had a wonderful education at Bronx High School of Science. I played soccer, was in the orchestra, was on the swimming team. [chuckles] It was a wonderful time.

From there, I went on to Columbia College and went, after three years, on professional option, to the College of Physicians and Surgeons, the medical school of Columbia University. Columbia College, I thought was wonderful. I swam three years on the swimming team and had a lot of pleasure besides the academics. I came back to graduate with my class in 1954. I had spent, already, one year in medical school. My medical school grades counted as my senior year of college. I had the privilege of being the class valedictorian and I guess I was first in the class. I finished medical school in 1957 and the internship at Columbia Presbyterian [Hospital] in 1957-1958.

Nineteen fifty-eight to 1960, I spent in the Air Force on flying status as a flight surgeon, actually, the head flight surgeon at headquarters of the Strategic Air Command [SAC] in Omaha, Nebraska.

I came here September 11, 1960, to start my residency and finished residency in 1966. I have been on the faculty at the University ever since.

Now, in case anybody is interested, if I had my choice today, I never would have left on a professional option. That senior year in college is such a wonderful year.

LK: Yes.

HB: You've completed all your requirements for whatever field you're going into and you can take whatever you wish. I did it a lot in my junior year. I spent a lot of time in philosophy of religion taking courses given by the Union Theological Seminary and Barnard, our sister college. At that time, everybody was in such a hurry. I do regret having done this professional option thing and not just enjoying my fourth year of college. You can always make up one more year of professional training.

That's what brought me here.

LK: Good. I'll back track a bit. It sounds like when you were in high school and in college you had a lot of interests being that you were in band and a swimmer. But what prompted your interest in medicine?

HB: I didn't know what else to do.

LK: Really? [chuckles]

HB: I never knew for a long time what I wanted to do. My grandfather had been a biochemist and was barred from the University of Vienna because he wouldn't change his religion. My father was in the jewelry business. I fell in with a group of people in public school and went with them through junior high school, a group of boys, and, then, on to high school, who seemed to know what they wanted to do in life. There was a so-called opportunity class, so we did more advanced reading and so on. But they all seemed to know what they were doing. Then, I made other strong friends in high school and friends in college. Frankly, I didn't know what I wanted to do. All my friends wanted to go into medicine—a lot of them. I said, "All right. I'll go to medical school."

LK: [laughter]

HB: I was offered a fellowship in theology, because I'd taken the philosophy of religion seminars, but I saw that as a dead end. I didn't know what I was going to do with that. I wasn't going to become a rabbi. I wasn't going to become a minister. I didn't know where that would lead me, it was just interesting.

So off I went to medical school. For the first three years in medical school, until the summer of the third year, it was like it was in the past. I loved everything. I loved all learning. If we had a course in public health and I learned about little creepy bugs, I thought that was fascinating. I had a course in physiology and it was fascinating. Whatever it was, I thought it was fascinating.

[laughter]

LK: That's great.

HB: The whole idea of learning was fascinating. But, at the same time, I always came to that same wall saying, "Do I want to do this the rest of my life?"

Then, I went to Cooperstown, which is in upper New York State. They have a superb little hospital there called the Mary Imogene Bassett. There, I took a summer externship, the summer externship on surgery. There, all of a sudden, it all fit. Surgery fit me like a glove. It was an epiphany. All of a sudden, I knew what I wanted to be.

When you ask me when did I want to become a doctor, I guess, I could say never.

LK: [laughter]

HB: I wanted to become a surgeon. So the pursuit of surgery felt right and it still feels right today. I'm eighty years old. I'm still actively performing surgery, doing academics,

writing, etcetera, and so on. It's something that I've always continued to feel is what I was meant to do.

LK: That's great.

Your interest in theology and philosophy, did that affect your clinical practice at all or your relationships with your patients? Has that been an influence?

HB: Oh, who knows? That's such a difficulty question to answer.

LK: Yes.

HB: It certainly affects your reasoning and your questioning. I've done a lot of research in my life and there really is no negative result. There may be results that you didn't think were going to occur or hoped were going to occur, but they occurred. They, of course, raise new questions. That's the thrill of doing research.

[Alexander] Fleming discovered penicillin because he had dirty hands. He put some fungus into a dish where he wanted to grow bacteria. He, then, looked at this dish and he could have said, "That stupid fungus killed my bacteria," and thrown it away

LK: [chuckles] Yes.

HB: Sure, somebody else would have discovered penicillin and antibiotics, but he didn't do that. He said, "This fungus killed my bacteria. Why? It must be elaborating some substance that it could kill bacteria." I have no idea what he was growing bacteria for. I'm sure if you ask ninety-nine percent of world scientists, "Why was Fleming growing bacteria?" they can't tell you why he was growing bacteria. He had the insight to say, "There's something in this fungus that can kill bacteria." So out of this grew the fantastic...it's hard to say invention, but revelation of antibiotics.

LK: I wanted to ask you a bit about your military experience. I was wondering if you enlisted or if that was a way that you were funding your medical education.

HB: No. At that time, you had a choice. You could make yourself subject to the draft so, then, you got a draft number and some were called and some were not called. If you were going to medical school, you were exempt from the draft. The Armed Services needed physicians more than they needed soldiers, privates. Then, when you finished medical school and internship, you had three choices. One was to volunteer and go into the Armed Service of your choice and so on, and very rapidly become a captain and so on...first choice. Second choice, apply for the [Frank B.] Berry Plan, which maybe one out of ten got. It meant that you were deferred throughout residency and, then, had to serve. It was obligatory service but you already were in a specialty, a surgeon, an internist, pediatrician, whatever. Or third, you didn't volunteer, didn't go for the Berry Plan, and, then, you were drafted as a private. So very few people chose option number three. [chuckles]



LK: Right.

HB: So that's why I went into the service in 1958.

LK: What were your responsibilities?

HB: I wanted to fly. I went to the School of Aviation Medicine, starting September 11, 1958, and received my flight surgeon certification, that is, you didn't get your full certification until you had one hundred flying hours. Then, you could put on your wings on your lapel. For reasons I never could ascertain, I was assigned to SAC headquarters, the Strategic Air Command headquarters, in Omaha, Nebraska. When I went there, I went to the office of the colonel who ran personnel. He told me exactly what the Strategic Air Command was all about, an elite command. I came in with top-secret clearance and so on. I asked him, "Why am I here? Everybody else in SAC is career and I'm a two-year person." To get to the headquarters of command, usually you had to be out in the field for about six, eight years. I said, "Why am I here?" He looked at me and he said, "I've been trying to figure that out myself."

LK: [laughter]

HB: He said, "There are two alternatives. Somebody at the Pentagon made a mistake or somebody really wanted to have you here. Why don't you believe the latter? You'll feel better about it." So that's how I got to Strategic Air Command.

Basically, my responsibility was for the flying personnel at headquarters command at Offutt Air Force Base. Then, I had some responsibilities for all the SAC bases all around the world. As you know, Strategic Air Command has sort of been phased out now into [Office of] Strategic Services, which I think includes the SEALS and all the rapid response services, the SEALs [Sea, Air, and Land], Delta Force, etcetera. SAC was in charge of flying B-52s, refueling planes, KC-135 [Stratotanker]—at that time, we still had B-47 bombers—and all the missiles, the missiles in silos and missiles all around the world. In essence, SAC was the retaliatory nuclear force of the United States.

LK: Wow.

HB: SAC was, I guess, the weapon of the United States during the Cold War, *the* big weapon. So my responsibilities were not basically medical. They were personnel, and running physicals, and standards for flying personnel. A lot of it had to do with the mental preparedness and the emotional status of the work that was expected of us. The crews with the airplanes standing by just sat and waited for a command to take off. So we were the instant retaliatory force and there was never any question that we would be a first strike force, but we were ready to be an immediate retaliatory force.

So that was SAC and that was what I did for two years. It was a very interesting interlude in my life.

LK: Yes, really fascinating.

My next question goes into what brought you to the University of Minnesota.

HB: Oh, the surgery program.

LK: Was there someone specific...?

HB: Yes, Owen Wangensteen, who was the chair of the Department of Surgery. Now, Doctor Wangensteen, whom we all called “The Chief,” came here as a very, very young man, with an idea that he was going to train academic surgeons, that he was going to take the five-year requisite residency training and make it a minimum of seven years and some had eight years, nine years, ten years. Those extra years were to be spent in a laboratory, preferably in basic kinds of research. He was going to train thinking surgeons. So his graduate was a clinically well-trained surgeon, good judgment, good technician, good physician, good sense of responsibility, patient management, everything you’d want in a clinician, but concurrently a scientist, concurrently a researcher, concurrently somebody who asks questions, and went to the laboratory or in a clinical setting to find the answers. This was unique. Today, you take this kind of a perspective for granted. This was the first real, unique, surgical scientist program in this country. Others then came, like Michigan and I could name many, many others now, but this was the first.

At that time, the eastern tradition, where I had grown up, was so different. The surgeon was looked upon as a tool. The internist, pediatrician, everybody else did his thinking for him. I once went to interview for a chairmanship in the East—I won’t tell you where—and they introduced me to the head of medicine and said, “He’ll get you patients ready for surgery.” I said, “That’s very nice. Thank you.” “The head of pediatrics, he’ll get children ready.” “Oh, well, thank you, thank you.” “Anesthesiology, he’ll take care of your patients just before and immediately after surgery. For your difficult patients, here’s the head of intensive care.” I said, “What am I supposed to do?”

[laughter]

HB: “All these people are taking care of my patients, so what am I supposed to do?” They looked at me and they said, “You, you’re supposed to operate.”

There were conferences in the East. I’ve gone back as a visiting professor to Harvard, to a lot of these places. The surgical conferences, I’ve not been back for a number of years, but used to be a resident presented a case and a designated faculty member got up and held a little lecture, and, then, they wheeled the patient out who looked in a bewildered fashion at his audience. He didn’t know why he was there. Then, they wheeled in another patient and he looked in a bewildered fashion at his audience. The resident presented and a staff man gave a learned discussion.

When I came here, I was flabbergasted. For my first Saturday conference—we had grand rounds on Saturday—I go in. We don't wheel a patient through. The resident presents a case. Sometimes, he never even gets to finish his presentation and people are asking questions. People are arguing. People are shouting at each other. People are questioning the judgment and intelligence of other staff. Residents are getting into this mix. And Wangenstein is sitting there with a big smile on his face enjoying this intellectual display of his intellectual children.

LK: Yes.

HB: After a few years, I appreciated... Maybe I could read his mind and say, "Look at them. Look at them. Look at them." Out of this comes progress and knowledge.

So it's this program that attracted me and I came here.

LK: You were very interested in academic medicine?

HB: Oh, from the beginning. Actually the Department of Surgery at Columbia wasn't that fascinating until I went to the Mary Imogene Bassett where it was outstanding—that's where I had this epiphany of this is what I really want to do—but the medicine department was very strong. It was led by a gentleman called Robert [F.] Loeb. Loeb was sort of the medical Wangenstein of the East. He took me under his wing and I did everything I could to learn everything I could from that man. I asked him if I could do research in my one free summer. So I did research in nothing that I'm working in or have worked in. I built a machine to test micro amounts of histamine for the allergists, for a fellow by the name of [given name?] Van Arsdale, and that was my first publication.

So I had done research in medical school and I always wanted to do research. When I questioned the counselor of residents at Columbia Presbyterian about doing research during my residency here, he said, "No, no, no. We don't do that. You finish your residency. You establish your practice, and, then, when you make money, you start your own laboratory, and let somebody run it, like a gentleman farmer, a gentleman researcher.

Then, having sort of heard about Wangenstein and the Midwest here in Minnesota and having a close friend here... When I came for my interview, he said to me sitting in his office, "If you want just five years of surgery, this is not the place. I want you to spend two to three years in the laboratory." He was speaking my dream to me.

[chuckles]

HB: I had a vague idea, but he was articulating what...my dream must exist somewhere, and he had created it here. Then, at the end of the interview, there wasn't any matching plan. He said, "Do you think you want a job?" I said, "Oh, yes, yes, yes." He said, "Okay, you're hired."

LK: Who was this interviewing you?

HB: Doctor Wangenstein.

LK: Okay. You said you had a close friend here already?

HB: Yes, Doctor Jack Bloch, B-l-o-c-h.

LK: I'm familiar with the name.

Did you do your initial research under Doctor Wangenstein?

HB: No. No. This was also interesting. I think it gives you another insight. I did my first two years, actually a year and a half, of residency and spent eight months on Doctor Wangenstein's service, four months on Doctor [Richard] Varco's service, and I got close to both of them. Doctor Wangenstein asked me to come into his laboratory, which was considered a great, great honor. I said, "No." He looked at me.

[chuckles]

HB: He said, "Well, if you spend a couple years in the laboratory, I'll make you chief of the laboratory." And I said, "No. I find gastric physiology exciting, but it's not what I want to do." Nobody had ever refused him before. He looked at me and he said, "Well, what do you want to do?" I said, "I'm interested in working in cholesterol metabolism. I'm interested in atherosclerotic heart disease. I have certain ideas"—I had the idea for the partial ileal bypass—"of how we can have a surgical approach to hypercholesterolemia and the management of atherosclerotic cardiovascular disease." He looked at me—this is Wangenstein—and he said, "If you paint cholesterol on the back of newt, they get cancer." I said, "Oh." He said, "That's all I know about cholesterol."

LK: [chuckles]

HB: He said, "I'll put you in touch with Doctor Ivan Frantz. He is the expert in lipids and he should be your lipid advisor. How do you plan to do this work?" I said, "I'd like to have a laboratory of my own." He said, "No resident has ever had a laboratory of their own." And, to my knowledge, no resident after me has ever had a laboratory of their own. He said, "So be it. Go see Doctor Varco, who you've established a good relationship with. He controls some laboratory space and I'll give you a \$20,000 budget"—which was a lot of money. "That's for your first year. I expect you to get a grant and if you still need more money in the second year, I'll give you another \$20,000. Good luck. You can come back and talk with me and tell me what you're doing anytime, but it's not mandatory. You've asked for your laboratory. Here is your laboratory. Go to it."

LK: That's incredible.

HB: So I went in to enroll in the graduate school. We all got our Ph.D.s in surgery or one of the disciplines such as physiology or biochemistry.

I was in my laboratory by 1962, which was in this building on the fourth floor, about the size of a closet. I went to Doctor Varco. Richard Varco then became, in later years, my very close friend, and mentor, and associate for his lifetime. He gave me the space and he said, "What else can I provide you with?" The most expensive equipment I'll need is a scintillation counter, but Doctor Franz has one." He had his laboratory up there, too. I said, "I can use his scintillation counter. But I need different bench tops." At that time, in the Medical School—I don't know if it was—it couldn't have been that way in biochemistry—all the bench tops were stone. I said, "I'm going to use radioactive tracers, C-14, cholesterol and tritiated water, H-3 water. If there's a spill, it will sink into the stone. So I need stainless steel bench tops and I need a radioactive hood." These were expensive things and Varco built those for me. I don't have total verification, but I do believe that, in the Medical School, mine, tiny as it was, was the first laboratory with stainless steel bench tops. What they did is they built them over the stone and with a special radioactive hood. So that's how I started the laboratory in March 1962.

LK: That's such an incredibly supportive environment.

HB: It was. It was absolutely, wonderfully supportive. All ideas were tolerated. Wangenstein had one prejudice: if you didn't work hard.

LK: Okay.

HB: Otherwise, he was colorblind, race blind. He had *no* prejudices in this world, except if you didn't work hard. I remember one of his sayings. He had so many people here and some of them were very weird.

LK: [laughter]

HB: Some of them were very productive. Let's see if I can get this correct. He said, "It is difficult to tell the difference between genius and insanity, except genius has its limits."

LK: [chuckles]

HB: That's a paraphrase. That was one of his favorite sayings. We had a lot of genius. We also had some insanity. But we had a lot of genius here. It was an environment that encouraged research, exploration, new thoughts, and a lot came out of this environment.

LK: What prompted your interest in cholesterol intake and atherosclerosis?

HB: Well... [sigh] That's where the disease was. At that time, and it still is, the major cause of death in the United States—atherosclerotic events. The explorations of the 1950s, before I actually started research, had very much identified elevated cholesterol. Then, it became refined into LDL [low-density lipoprotein] and HDL [high-density

lipoprotein] and all the fractions and all the refinements that we have today. But, basically, cholesterol was identified with coronary heart disease. The standards were so [pause] nebulous, I guess is a good enough word, that when I was in medical school, they said the normal cholesterol is 270. What does that mean? It means if you take a bell-shaped curve of the United States population, the top of that bell shape is 270. Somewhere when I picked up my interest in this in medical school, I read that babies are born with a cholesterol of 60, 65. Later on, I read that if a baby is born with a cholesterol over 100, that child is doomed to be familial hypercholesterolemic.

LK: Mmm.

HB: So isn't a normal cholesterol closer to 65 than 270? Cholesterol isn't such a quantity as your serum potassium level. If it goes too high or it goes too low, you die. It's a very immediate kind of thing. You must keep your potassium within a certain range. Not cholesterol. It can go sky high. It can go low. So normal meant population average. It didn't mean a physiologically normal cholesterol.

So what has happened over the years through the work of so many people out of this institution, like Ancel Keys, Henry Taylor, Henry Blackburn, so many people, is this level has gone down, down, down, down. Today, people say 200. Now, they're inching down to 190, 180 maybe. Then, there's the refinement. What is your LDL? What is your HDL?

This was a fascinating field for me. Originally, I thought I would pursue cardiovascular surgery. While I was a medical student, I made contact—they were nice enough to talk to me—with people like [Claude] Beck who was putting powder in the pericardial sac to stimulate collateral vessels. People were taking mammary arteries and implanting them into the heart muscle. They would start flowing and, all of a sudden, collapse. None of these things worked. But these were the very earliest attempts before the most primitive capability to do coronary vascular surgery. Now, most of that is taken away from the surgeons. It's all in the hands of the cardiologists, the ballooning of vessels, etcetera. This whole field of the heart and cardiovascular surgery, especially in the management of atherosclerotic disease was sort of an interest I had when I was in medical school, could think about it, but certainly not pursue it in the Air Force, and came here and I felt this is my opportunity. This is what I would like to do. As you said, because of the permissive atmosphere of Wangensteen, Varco, [C. Walton, "Walt"] Lillehei, all these people, I was able to do it.

LK: When you got your research space, is that when you began your master's in biochemistry?

HB: Yes. Concurrently, I worked in the laboratory. Within a year or so, I did have a grant and I could have people come in and assist me: a wonderful person, Josephine Bertish, and, then, Laurie Fitch, and, then, Marshall [Z.] Schwartz, who is now one of the most famous pediatric surgeons in our country, a member of the Board of Regents of the American College of Surgeons. At that time, he was a medical student. So these people

came in, worked with me. Concurrently with the laboratory work, I went and got my course work for my master's in biochemistry and Ph.D. in surgery.

LK: Was Frantz in biochemistry?

HB: Yes. He was a professor of biochemistry and he was my biochemistry advisor.

LK: You said you were using radioactive labels to watch the cholesterol intake. Was that when you, I guess, had that ah-ha moment where you realized that you can attack this problem through the small intestine or if you could elaborate some of your thinking with all of that?

HB: You always should read. If you do some research first and read later, it's going to hurt you when you find out that somebody has done what you thought was totally original ten, twenty years in the past.

In the 1950s, [Meyer] Friedman and [Sanford O.] Byers had done very beautiful exploratory work with isotopes on where cholesterol is absorbed in the intestine and where bile acids are absorbed, which are the end product of cholesterol metabolism, the main end product. What do you need cholesterol for? You need it to coat all your nerves. The coating on nerves has got a lot of cholesterol in it. You need it to make all the steroid hormones, cortisone, estrogen, all of those hormones, and, mostly, you need it to make bile acids for digestion. So cholesterol is an important thing. Friedman, after he had a heart attack, came up with this type A and type B personality, which I think you've heard about.

LK: Yes.

HB: He was a cardiologist. He went off with another man and spent his time on the A and B. Byers was a physiologist. They had done a lot of beautiful work in the elucidation of where cholesterol and bile acids are absorbed and so had several others.

So I read all of that. Their handicap was they didn't think in surgical terms. They didn't think like a surgeon. They had these intricate, complicated ways of measuring various isotopes and subtracting and adding and saying, "Therefore, this occurred here and this occurred there."

I approached it with the simple-minded approach of a surgeon. I said, "Now, if you bypass the ileum, it can't be absorbed there. [chuckles] So we don't have to do all this stuff. We just have to measure the relative absorption by what we had our rabbits take in and what came out in the feces. So we measured absorption. We measured absorption while it was circulating in the blood, excretion and, then, we could calculate turnover and, then, we could calculate the amount in vessels, and the freely miscible pool. For all of this, we used isotopes. We had tritiated water and C-14 cholesterol. I got to work together with an internist, who was in the laboratory of Ivan Frantz, by the name of Richard Moore. We did all these studies together. We laid the groundwork for the

partial ileal bypass. We found that if you bypass the terminal ileum, cholesterol goes down, cholesterol absorption goes down, cholesterol excretion goes up, turnover goes up, and we were able to measure synthesis without radioisotopes so that we were able to say, “What does the body do if you’re draining cholesterol and you’re draining bile acids,” which the partial ileal bypass does? It makes more! So then, the question is... It’s like a big bathtub. You pull the plug. It starts flowing down. If somebody turns on the spigot, the question is where is the new level?

LK: Yes.

HB: Luckily, we worked in rabbits and in pigs and then went to humans. Others, then, worked in white Carneau pigeons. I don’t even know what they look like. They did this, a gentleman by the name of Bruce [A.] Kottke, down at the Mayo Clinic. Then, they worked in Rhesus monkeys. It worked in everything. Then, it worked in humans. I did the first human one in May 1963.

A year or so later, there was a publication saying, “We question all of this, because we tried it in a rat and it didn’t work.” The people who published that were the Nobel Prize winners in cholesterol metabolism. [chuckles]

LK: Oh, wow! [laughter]

HB: I said, “Uh, oh. This is bad.” So I went back to the laboratory and they were right. It didn’t work in a rat, because the rat has such a tremendous synthesis mechanism. So instead of this bathtub filling at a lower level, leveling off at a lower level, it kept it right up there.

LK: Oh, wow.

HB: As far as I know, the rat is the only species that can do this. How *fortunate* I was that I started working with rabbits and, then, started to work with pigs—pigs are omnivores like we are—and, then, went to humans. As I was doing this, others were confirming the work in monkeys and so on, before somebody did it in a rat. So, indeed, it doesn’t work in a rat.

LK: [chuckles]

HB: Then, we also showed, as I said, cholesterol levels go down, absorption goes down, excretion goes up, turnover goes up, synthesis goes up. Then, we were able to measure the freely miscible pools, which would be circulating plasma, liver, and the less freely miscible pools of cholesterol, which contain the atherosclerotic plaques in arteries. The cholesterol level in all of these went down. We did all this. We published all of this. That was the initiation of the partial ileal bypass operation.

Then, in the 1970s, after a whole series of site visits, we were able to persuade the site visitors that this was a wonderful tool to test the cholesterol atherosclerosis hypothesis.



So the POSCH [Program on Surgical Control of Hyperlipidemias] trial was funded. It ended up being about a four-institution, \$65 million trial, published in 1990 in the *New England Journal of Medicine*. I worked very closely, at that time, with one of the greatest editors. [Arnold S.] Relman was the editor of the *New England Journal of Medicine*. He held it [the manuscript], because I didn't have the final data until September.

LK: [laughter]

HB: I didn't want him to publish it before I gave the presentation. I gave the presentation at the American College of Surgeons on October 8 and it came out that issue.

POSCH was the first study ever to show that cholesterol lowering will decrease heart attacks, will decrease the combined endpoint of heart attacks and death—that is, decrease death and heart attacks—decrease peripheral vascular disease, fantastically, decrease the incidents of coronary artery bypass surgery, and percutaneous transluminal angioplasty. And we did concurrent arteriograms, so it was more than a clinical study. We did arteriograms at zero, three, five, seven, and ten years, and we actually showed not only a lack of progression in the partial ileal bypass patients, who were 421 in number with control patients of 438, but we showed that you got *actual lesion regression*.

Over the years, I don't know how many POSCH papers we published, but that first one was in 1990. The next confirmatory publication was with the statin drugs and that was in 1992. So POSCH was the first study that ever showed cholesterol lowering did any good. Then, later, we published that it increased life expectancy. Then, we just published in 2009 a twenty-five year follow up showing that, still, there is a difference in life expectancy. We don't have good follow up of any of these patients anymore because we have no money. The follow up done by the death index shows that this increase in life expectancy continues to exist.

I've dominated the conversation. You're supposed to be asking me questions.

LK: [laughter] You said you did the first partial ileal bypass in 1963.

HB: On May 23, I do believe. I'm not sure, but I think so.

LK: That was for a patient with hypercholesterolemia?

HB: Familial hypercholesterolemia. The first few cases we did were all familial hypercholesterolemics. Then, we started to do people just with high cholesterol and a history of coronary disease.

LK: Hypercholesterolemia, that requires treatment or will the patient die prematurely?

HB: That, again, comes to the shifting cholesterol level. Our standard was a cholesterol in essence over 220, at that time. [pause] Do you do this for everybody? Do you do it prophylactically?

LK: Yes.

HB: Well, it's been shown by later trials that it works prophylactically. It prevents heart attacks. The POSCH trial was a secondary trial. Eight hundred and thirty-eight patients who had a documented myocardial infarction, so they already had a heart attack. It had to be documented by EKG [electrocardiogram], enzymes. They all had arteriograms, so they all had visible atherosclerosis. Then, we randomized them to 421 surgery, the rest, 438 were controls. The difference are the results of the POSCH trial, but it was a secondary trial. The first statin study was also a secondary study.

Then, I think in 1992, 1993, there was the West of Scotland [Coronary Prevention] Study, again, a statin study, which was a primary trial. It treated people before they had a heart attack. Now, they have had atherosclerosis. There is a very famous study done of the Korean War dead. These are eighteen- nineteen-year-old soldiers who died in Korea and they did autopsies on their hearts and a lot of them had severe atherosclerosis.

So the prophylactic study wasn't done on people who had no atherosclerosis, because that's impossible to ascertain. But it was done on people who had no clinical evidence, had no heart attacks, and, yet it showed that it decreased the rate of subsequent heart attacks. I think it's been fairly well determined...I think it's been *excellently* determined that lowering cholesterol lowers the rate of atherosclerotic heart disease.

Now, let me modify that. Today, there is a school of thought among some cardiologists that the statin drugs, which do an excellent job of lowering cholesterol, I would say as good or almost as good as the partial ileal bypass operation, are not really helping because they're lowering cholesterol but they're helping because they have what they call pleomorphic effects, meaning that they also influence the integrity of the blood vessels. They have so many other effects and the cholesterol lowering is just one of them. They're really beneficial because of their pleomorphic effects.

LK: Hmm.

HB: To counter that, the POSCH trial has been the only trial of pure cholesterol lowering.

LK: Yes.

HB: The POSCH has been the strongest trial of the effects of cholesterol lowering. I don't believe that the statin drugs work only on their pleomorphic effects. I think they work because they lower cholesterol and, in addition, they may have many beneficial effects as well, but I don't think the cholesterol atherosclerosis hypothesis—which I think

has become more than a hypothesis; I think it's become a fact—should be challenged. I think it's real.

LK: Forgive me if this is becoming a bit of a science lesson. You said that you began to use statins on the secondary part of the POSCH trials?

HB: No, no. We never used statins.

LK: Okay. I thought I saw in some of your literature that you had done something with Lovastatin.

HB: Ah, yes. But that had *nothing* to do with POSCH.

LK: Okay, okay.

HB: Absolutely nothing, nothing, nothing to do with POSCH.

LK: [chuckles]

HB: I thought, and some people are exploring this, and maybe something will still come out of this. I thought what do the statin drugs do besides these mysterious and vague pleomorphic effects? What we know they do is they interfere with the synthesis of cholesterol high up in the cholesterol cycle so that the two carbon fragments that go in another direction, don't pile up as some sort of toxic material, which some of the earlier drugs did like MER/29. So we know that statins prevent cholesterol synthesis.

Then, I had the thought what's cholesterol good for? I've already said it coats all the nerves. It makes the steroid hormones. And it makes bile acids. It does one more thing. It is essential to the integrity of every cell membrane. Every cell in our body, from cells that have no nucleus, like the red blood cell, to any cell you wish, the most complex secretory cell, all have the a cell membrane. Part of that cell membrane is a lipid protein complex, like a skeleton framework, that allows diffusion, that has active sites for attracting things, putting things in, putting things out. But part of the basic structure is cholesterol. Without cholesterol, you don't have a cell.

So I said, "Well, we also know that cancer cells are defective." They replicate fast. They take over. They kill you. But they themselves are defective. They don't do things as well as other cells. One of the things they don't do well is make cholesterol.

LK: Hmmm.

HB: All cells can make cholesterol, but if you have a rapidly replicating cell, like a cancer cell, and it has impaired cholesterol synthesis, I thought, well, maybe if you starve those cells... They must be getting the cholesterol from the plasma then, from the environment. If you starve them of cholesterol, they can't replicate so fast or replicate at all. We did some studies in tissue culture and, indeed, every standard tissue culture

media has cholesterol in it. We removed it and we showed that cancer cells in tissue culture couldn't replicate. After a while, they just couldn't do it.

So we published this and the next step would have, of course, been a major NIH [National Institutes of Health] trial. [sigh] They tried it at the NIH facility at Bethesda [Maryland] and they tried it in Houston [Texas] but they didn't do it intelligently. Instead of *continuously* giving, let's say, a statin drug to cancer patients, they gave it like they would a chemotherapeutic drug.

LK: Ohhh.

HB: They gave a big bolus for a week and, then, stopped it. The whole concept is to stop those cells from having enough cholesterol...

LK: Right.

HB: ...and don't stop them for a week and, then, give it to them for three weeks. Stop them all the time. High doses of statins, as far as I know, hasn't been tried, but, of course now, you're looking at a different environment, because there's always cholesterol in the plasma. Killing cancer cells in tissue culture is not the same as killing cancer cells or retarding them. I've always thought—I've done no more research in it; I didn't have the money—that maybe the statin drugs... Certainly, I'm not advocating, at this time, that everybody gets a partial ileal bypass. It's still a good operation for people who are refracting to the drugs or can't tolerate them. But why not, when somebody has cancer, give them high doses of a statin? They are among the most benign drugs we have, probably more benign than aspirin? Why not give them statins? Maybe it would be of some help. I would think that a trial should be done with a particular cancer that's responsive to chemotherapy and, then, have two arms, one with chemotherapy and no statins and one with chemotherapy and statins, so it's perfectly ethical. Both groups would be getting what's the best chemotherapy. Only one would be getting a statin, as well, and would that group do any better? As far as I know, it's not been done.

LK: That's really interesting.

I saw that you had also done some work with the role of Vitamin E in atherosclerosis regression. I didn't know if you had done any collaboration with the School of Public Health or Nutrition?

HB: Not really, which is sort of an offshoot.

LK: Okay.

HB: I think one of the responsibilities of a scientist and a researcher is you're going to have so many ideas that there's no way you could pursue them in your lifetime. Throw them out there. There may be a lot of people out there who have time and money but don't have ideas.

LK: Yes.

[laughter]

HB: Give them an idea and let them run with it.

LK: You also mentioned Bruce Kottke doing some studies at the Mayo with partial ileal bypass. Did you do any collaboration with him?

HB: Not really. We were just in touch.

LK: Then, as you were doing these cholesterol studies, you said part of your determination of potential patients was using electrocardiograms. So had you been doing any collaboration with the Cardiovascular Division, at that point?

HB: Well, there were a lot of collaborators in the POSCH study. Our main cardiology collaborator was Doctor Naip Tuna. Doctor Tuna just retired about a year ago at age ninety. We're in touch. He's doing well. Then, there was Doctor [Kurt] Amplatz from Radiology, who coordinated all our arteriograms. Then, supervising our EKGs was Doctor Richard Moore, who I worked with originally. I've mentioned him. He became part of the POSCH program. There were relationships in our center and all the other centers involving cardiology, radiology.

LK: I saw in some of your publications that you had done some work on catheters, as well. Was that in...?

HB: That's an entirely different life.

LK: Okay. [laughter]

HB: That's a different life. Somewhere along the line, I got interested in biomedical engineering.

LK: Yes, yes, I did see that.

HB: I hold two appointments. I hold an appointment as professor of surgery and professor of biomedical engineering.

In the 1970s, a whole group of us—Perry [J.] Blackshear, who was a professor of engineering; his son [Perry Blackshear Junior] who worked in the laboratory; Frank [D.] Dorman; Thomas [O.] Rhode; Bruce [D.] Wigness—all worked together and we came up with the first implantable infusion pump, which was, then, taken by a company called Metal Bellows, which turned its name into Infusaid. This thing has been sold back and forth. I think Ethicon owns it now. We, then, came out with a second model, a different

principle of an infusion pump. I don't know if you're interested in going into mechanics, at this point, but let's not.

LK: [chuckles]

HB: That went and had several roots and I think it's owned, right now, by Saint Jude.

Then, we developed catheters, non-clotting catheters, with valves that would be one way. Blood couldn't get back in them and clot.

Then, we invented a peritoneal shunt for shunting ascitic fluid out of people's abdomens who had ascitis.

Then, we invented a machine to do oxygen transport analysis. That still hasn't found a place in the marketplace. We found that everybody has different oxygen transport. So, if you take 100 people who give blood at a blood bank, their oxygen transport is different. Some people have a much higher oxygen transport. So it's been our concept that why shouldn't a blood bank segregate the blood as it comes in and the blood with high oxygen transport should be used in acute hemorrhage, battlefields, emergency rooms, and the other blood can be used for more routine use in the operating room, replacement, hemophilia, etcetera. If you use high oxygen transport blood, maybe you can resuscitate faster and use less blood, because you get better oxygen transport, and the less blood you use, usually the prognosis is better.

So it's an entirely different world of mine in engineering.

LK: What directed you over to engineering?

HB: Well, it was a concept. There was Richard Varco, the late Richard Varco, the late Demetre [M.] Nicoloff, who was a cardiovascular surgeon, Perry Blackshear, professor of engineering, Ken [Kenneth H.] Keller, professor of engineering, and, then, president of the University [of Minnesota], and myself. How we all got together, I don't know. I think Varco brought us all together. We said, "In medical school, there are certain things that are taught as a perspective on health and disease in the human body." So if you look at it from a certain perspective, you've got biochemistry. If you get carried away with that, then everything seems to be a chemical reaction. So you have a discipline of faculty of biochemistry. You can look at the same phenomenon that goes on from a different perspective, that of physiology. So one deals with chemistry. The other deals with the cause and effect. Of course, there's pathology, etcetera. It was our concept that so much can be looked on from the concept of engineering, that blood flow through a vessel poses certain basic engineering principles.

LK: Hmmm.

HB: It's flow rate.

LK: Yes.

HB: Engineers have been in flow for a long time. If you narrow a vessel, what happens to the flow rate? If you take your garden hose and squish it at the end, it comes out faster.

LK: [laughter]

HB: There are many basic principles of how the human body works that can be explained in engineering terms. Atherosclerotic plaques accumulate at a certain junction. Why? What makes that junction a fertile ground for the accumulation of cholesterol and fats and so on? We thought that bioengineering should be another discipline. It should be taught in a medical school. It should be part of the health sciences.

So we formed a faculty of biomedical engineers. Now, what's a faculty? At that time, it was five people with appointments of professorships in funded departments: three surgeons, two engineers. Nobody needed to pay our salary. We had our laboratories, etcetera, and so on. We came together and we said, "We are a bioengineering faculty." And the University said, "That's wonderful."

[laughter]

"We won't give you any money or anything, but that's just wonderful." Then, we started to get graduate students.

LK: Yes.

HB: And we started to get some master's students, some Ph.D. students. Out of this came that magnificent bioengineering building that you see here on campus and one of the, *largest*, now, departments with independent funding in the entire University. All the arms of biomedical engineering came about from this idea that you can look upon human function and health and disease from rheological and engineering types of principles.

LK: Was the department formally established in 1996 or in the 1990s?

HB: I don't know the exact formal establishment.

LK: Okay. When did this group come together?

HB: Mmmm... I think we came together in the mid 1970s. That's for sure. Then, I started an independent laboratory in biomedical engineering. We had independent funding from the cholesterol laboratory. The laboratory was run by Bruce Wigness; whereas, the cholesterol laboratory was run by Eve Chan. We had two different laboratories. It was sort of a different thought process. I would take off one hat and put on another hat. The thinking with the engineers is always fun.

LK: Is Biomedical Engineering [Institute] under the engineering school?

HB: I don't know where it fits in.

LK: Okay. I didn't know what its relationship to the Medical School was.

HB: I think it's got a relationship with both and I think it's an independent.

LK: Doctor Varco had brought this group together. Do you think any of his thinking in doing that was spurred by what he had seen go on with the creation of the pacemaker under Lillehei? They were using sort of engineering principles in that.

HB: I don't know. Maybe. Varco was another one of these totally imaginative free thinkers. Throughout my residency, all my life, all of Varco's life, you'd bring him a question and you'd get an answer that was never routine, that was always a fresh view. And two weeks later, you'd bring him the same question and you got a different answer, not a contradictory answer, but another fresh view. It wasn't anything out of the ordinary. One day he said, "You know, we never think of body functions in terms of engineers." He was good friends with Ken Keller. He knew all these people. So he got the idea going.

LK: In doing some of the device development you've done in your career, did you find that Minnesota was a very fertile ground for doing that because of the potential investors that would support that kind of research?

HB: [pause] I think most of our devices that went into the marketplace went out of Minnesota. One always talks about Minnesota as a fertile place for exchange of ideas, etcetera, and so on.

LK: Yes.

HB: I think it's real, but I think the impetus for free thought and exploration and working together is something that's intrinsic in any university, but, maybe, especially in this one, at that time. At the moment, we seem to have more administrative control of things rather than this less disciplined environment of working together. We did a lot of our thinking over at the Campus Club over lunch.

For instance, the second pump that we came up with... The first one worked on a chemical power cell. The second one, worked purely on teaching a piece of plastic to be a perfect spring or as near to perfect spring as one can get. I guess the original concept was mine, but in no way could I do that. I didn't have the engineering background. So, then, we gave it Frank Dorman, a genius engineer. Then, Frank took the question home. He worked with his computer and he came back with a notebook full of equations and said, "There it is." Well, of course, there was a book full of equations.

[laughter]



HB: It was no pump.

[laughter]

HB: It was nothing. It was a book full of equations. So, now, we had the concept and we had a book full of equations. Now, it was up to Tom Rohde, Bruce Wigness to say, "Let's build this thing."

[laughter]

HB: Young Perry Blackshear...bring him into the laboratory and say, "Hey, Perry, do this."

[laughter]

HB: Eventually, we built it and it looked like that.

LK: Yes. I was wondering.

HB: That's a very sophisticated model. The first ones were extremely primitive. The whole concept was, I don't care what it looks like. Does it do it? Then, true enough, it did it.

It's that kind of a cooperation that led to whatever inventions came out of our shop.

LK: Did you become interested in the insulin pumps because of your work on the heart and that relationship with diabetes? Or was that something that you guys just started working on as a group in Biomedical Engineering?

HB: Of course, diabetes is a tremendous epidemic today, too, just like obesity. You're going to ask me why I'm interested in obesity. It's a world epidemic. Diabetes is a world epidemic. These are fascinating diseases that need a lot of exploration in terms of why they exist. What's the basis? What's the pathology? What's the mechanism? What mechanisms can be elicited? We haven't talked about obesity, yet.

LK: No, we haven't.

HB: I've been in this field...at the moment probably the field that everybody associates me with, not with engineering or cholesterol.

We wanted to build an implantable pump. So, then, the question was what we'd put in it so it works? The first thing we tried is heparin. It worked. We did humans, but there isn't a big use for that and it had some deleterious side effects, the continuous heparin infusion. The next thing we thought...chemotherapy, because if somebody has liver metastases from, let's say, ovarian cancer or colon cancer, and you put the catheter into

the liver, you can increase the concentration of your chemotherapeutic drug 400-fold...some of them, 200-, 400-fold. That sounds wonderful.

Well, there are two sisters—I don't know if they're still in practice—in New York in the cancer hospital, [Memorial] Sloan-Kettering, the Kemeny sisters, K-e-m-e-n-y, [Margaret and Nancy Kemeny] who really worked with this. I think one's a surgeon and one's a pathologist or an internist. They're still doing a lot of pump implants there for chemotherapy and people are using it. But it had never caught on. Why? Because, basically, the chemotherapeutic agents that we have today, increasing the flow to the liver 200-fold or the concentration to the liver 200-fold doesn't make that much difference. So pumps for chemotherapy are a splendid idea. The focus, the infusion of chemotherapeutic drugs to a locus, but you have to have the right drugs. Now, if somebody would come out with a drug that when given intravenously would do a little something for certain cancers, but if you hit it with 200 times the concentration directly, it could eradicate it. Well, then, I think you'd see a real renaissance in the use of chemotherapeutic drugs.

From there, there was a gentleman by the name of [Burton M.] Onofrio down at the Mayo Clinic, who thought it'd be a good idea to use our pump intrathecally for pain control, people who have terrible pain. You give them a lot of morphine and, then, they're somnolent. They can't function. But if you give just a little morphine into the intrathecal space around the spinal cord, it controls the pain and, yet, they can function. Then, he went on to using antispasmodic drugs. That, today, has been the major use of the pumps: intrathecal infusion of antispasmodics and pain control.

The fourth thing that we worked on was insulin. We worked on that and our first publication on insulin was in the *New England Journal of Medicine* in 1980. I forgot how many patients we did, but that was our first patient presentation. There was a society built around this called ISGIIDD, the Internationals Study Group for Implantable Insulin Delivery Devices. There were three groups within this group or three factions within this group. There were people who were building pumps, delivering pumps. That was us. Then, others got into the field with different kinds of mechanisms, electronic, etcetera. Ours was mechanical; others were electronic. People were interested in delivery vehicles: the pumps. Then, there were people who were interested in the sensing of blood glucose levels, because, sure, you can deliver on a continuous basis, but the pancreas doesn't do that.

LK: Right.

HB: It looks at what's happening and, then, it gives a response. So we needed a good implantable sensor. The sensor people had been at it far long that we were. So when we got into the field in the 1970s, the sensor people, when we had our ISGIIDD meetings, were there, builders of the pump were there. We ignored the sensor area. But they're still not there. [chuckles] Forty years later, we still don't have a good implantable sensor. Then, finally, the third group of people were the interdigitators or the ones who can build a sensitive control mechanism in a micro area, in essence, a nano-computer,

that could take the information from a sensor and make the pump respond as a pancreas would. That's there. That kind of knowledge is commonplace today. If we had a real sensor... There are several real pumps out there now. We have several microcomputers that can make the pump do what it's supposed to do, reacting to the blood glucose the same way the pancreas would, but we still don't have that system put together. We tackled it and, then, the big companies tackled it, no better than we did. Insulin has to be stabilized. It's a protein. You put it in a pump at body temperature, it's got to be stabilized. We decided, okay, we're going to become biochemists again. We made a stable insulin and, then, the big companies, like Novo and Nordisk, the big insulin companies, they all played with it. I think a stable insulin is, now, available. Still, putting the whole thing together has not been done.

LK: You had mentioned, as we were getting into pumps, your obesity research. How did you get into that area? That's a big question.

[laughter]

LK: That's where we can start, I suppose.

HB: All right, let's start with that. It goes back, again, to Richard Varco.

LK: Okay.

HB: In 1953, Richard Varco probably did the first obesity operation...

LK: Oh.

HB: ...specifically for obesity, a jejunoileal bypass.

LK: I didn't realize that.

HB: He never wrote it up.

LK: Okay.

HB: I, later, researched it and it was there.

During my chief residency in 1966, Richard Varco approached me and said, "I want you to get into obesity and do jejunoileal bypass."

Oh, I have to preface this... He was a baker and making bread, a jar of yeast exploded and cut his median nerve and he didn't operate for two years.

LK: Wow.

HB: He regained function. He was a *master* technician. But I don't think he ever felt he was the same again. So he didn't operate much longer when he came back and he retired. His arm was in a cast when I was a chief resident and, then, when I finished residency and came on the faculty. During that time period, he would ask me to do jejunoileal bypasses. I steadfastly refused. I said, "I want my name to be associated with *partial* ileal bypass, and cholesterol, and atherosclerosis. I don't want it to be associated with obesity management."

Well, one day, right in this hallway, he was coming down the hall, and I think he had a fresh cast on his arm, and he was in a particularly bad and grumbly mood. He looked at me, and he waved his cast in my face, and he said, "We have to start obesity surgery. You have to do jejunoileal bypass. If I could do it, I would do it! I can't! I'm *asking* you to do it and you *refuse* me!" I said, "Okay, Richard, I'll do it."

[laughter]

HB: So that's when I started doing obesity surgery. It was about 1966.

Then, I got to know these people and I got to be very empathetic. I realized that they did not have the emotional appeal that other diseases have. On the contrary, they elicit only prejudice. This person is just a slob. If he would just control his eating, he wouldn't be obese. It's terrible. They were considered, and still in many ways are, lower than an alcoholic. Alcoholism, today, is a disease. They were considered lower than drug addicts.

LK: Mmmm.

HB: These people have a disease. Instead of having the sympathy and the funding of society to do something about it... If you hold up a child as a poster who has the most rare disease in the world, you can get billions of dollars in research. You cannot hold up a 400-pound patient in your arms and get a penny.

LK: Right.

HB: It's an area where there's a tremendous need. We are moving, in the next ten, fifteen, twenty years, if nothing stops it, to fifty percent of our population being obese. Obesity leads to heart attacks, diabetes...I could list you 100 things that it leads to. Yet, it is a difficult area to work in. These people, instead of being treated as victims of a disease, being treated with sympathy and kindness, are treated with derision and prejudice. That aspect drew me, the humane aspect.

The other aspect that drew me is the scientific one. Nobody knows why people are obese. There's a problem to be solved here. Since we do so many obesity operations now, still less than one percent of the obese population, it's a human laboratory and we're learning how hormones change, how neurological conduction changes. We should not only be able to learn what we do with our surgery, but what drugs could possibly imitate

the surgery and get rid of the surgery, and, most important, what makes people obese in the first place.

Let's stick on that topic for a minute.

LK: Okay.

HB: Is it genetics? Well, certainly, genetics is a major component. There are people who can eat their heads off all day long and stay skinny as a rail. In the beginning, I wouldn't believe some of my obese patients, but, now, I believe them. They say, "I don't eat that much. My husband eats twice as much and look at him and look at me." There is certainly a difference in metabolism. You can take certain people and give them 4,000 calories and they'll burn it. You can give somebody else 2,000 calories and they'll store it. That gets back to the genetics. So there is a genetic pre-inclination that probably works through body metabolism. But, still, it doesn't explain why, in the last fifty years or so, we have an epidemic. We haven't changed our genes. Everybody blames it on McDonalds, fast foods, a sedentary lifestyle, which is all true. But, at the same time, there's such an emphasis on running and exercise, and an active lifestyle. It's hard to think that just a sedentary lifestyle does it. But, of course, I think it's a major component. Among our obese population, now, are farmers. Well, when they were plowing the fields behind an ox or a horse and pushing the plow, they weren't obese. Now, they're sitting in the John Deere in an air-conditioned cab eating a sandwich and the John Deere does the plowing.

[chuckles]

HB: It is true, but it still doesn't seem to give the whole answer.

So, do we have anything better? No, but we have hints. There are certain bacteria that facilitate the breakdown of food and, therefore, sort of pre-prepare it for absorption. If we take germ-free mice, take littermates, and give them this particular form of bacteria and give another one another form, these litter mates, the one that got that particular form, like having a pre-digested food intake, they get obese.

LK: Hmmm.

HB: The others don't. So, now, if you take the obese mice and you purge them, get rid of all those bad bugs—well, not bad bugs; they're very efficient bugs—and you give them the other bugs, they lose weight.

All right. So why not humans? Well, it's been shown that obese humans may have more of those highly efficient bugs. So treat everybody with antibiotics, give them only the good bugs...it doesn't work. A free-society human being gets bugs from everywhere and the floor of the human gut will soon be repopulated, depending on where you live and just the fact that you're a human being. It's a scientific insight. Did these especially, helpful bacteria just sort of start fifty years ago, maybe? Maybe not.

Then, there are certain viruses we know that if they go to the hypothalamus of the brain, which has satiety centers, feeding centers, etcetera, they can stimulate hunger, eating, obesity, losing weight, satiety. Are we dealing with a virus? There are so many questions.

LK: Yes.

HB: Now, we're looking upon our surgery, not in terms of is it restrictive, does it prevent people from eating, is it malabsorbative, but what is it doing to their hormones? There are hundreds of gut hormones that are affected. There are fat hormones. What's it doing to their neurological network? What are we doing with our surgery? If we can elicit that, as I said, then, maybe we can get drugs to imitate it, but, more importantly, we can maybe find out what's wrong with obese people in the first place. The best therapy is to find out what's wrong and counteract it in the first place.

I can't help but think that there's something loose in our world today that has something to do with the obesity epidemic that wasn't there fifty some odd years ago. Certainly, genetics plays a role. Certainly, the availability of food plays a role. If you don't have food, you can't get obese. If you're starving, you don't get obese. Certainly, sedentary lifestyle plays a role. But I think there must be something in addition. Since we are not going to change our genetics, and we're striving for everyone to have food, and sedentary lifestyles are only going to increase, it would behoove us to find out what the X factor is and try to do something about that, rather than what's being done today and saying, "Go out and do more exercise." It isn't helping.

All right. Shall we call it a day for today or what do you want to do?

LK: If I can ask you one follow up question to what we just talked about... I have several other categories of questions relating to other things within the Department, like changing leadership and structural changes. Would you mind if we set up another shorter interview?

HB: No. Let's do that.

LK: Okay. May I ask you one more question?

HB: Absolutely.

LK: You made the comment that Richard Varco had approached you about this in 1966, was it?

HB: Yes.

LK: That seems really early to me. You made the comment about the difficulty of getting funding for this, but, now, it's become such a very public problem. How did the funding change over the years?

HB: Not much.

LK: Really?

HB: Not much. The bias is still there. The funding spent by the NIH on obesity research is miniscule in comparison to other areas...

LK: Really?

HB: ...a lot to do with lobbying Congress. NIH does what the Congress tells them to do. They're not the pure sacrosanct research organization working only on principle and need. They do what the Congress tells them to. The bias is still there. If you take any particular disease... Now, you can take common diseases, let's say cancer of the breast, what is spent on cancer of the breast in relationship to the number of...whatever statistic you want, let's say new cases a year or known cases in the population, get all these numbers from the CDC [Centers for Disease Control and Prevention] in Atlanta [Georgia], some sort of an apportionment of money spent for that disease. That's a common disease: cancer of the breast. Or take a less common disease, a certain form of hemophilia, and figure out how much money is spent for that. If you use that same principle and take the *huge* number of obese and how much money is spent for that, it's far, far less than for a common other disease or an uncommon other disease.

If you look at operating rooms today, the most common operation in general surgery—I'm not talking hip replacement—may well be metabolic bariatric surgery. Yet, I don't know of one chairman of surgery who is a metabolic bariatric surgeon. This is where we're teaching the future of surgery is in departments of surgery.

LK: Yes.

HB: If you look at the major meetings—next week starts the American College of Surgeons—and you look at all the major topics, about 120, 150, one is bariatric surgery. You have topics, the right hernia, the left hernia, the earlobe, whatever, but this most common disease occupies so much bias still and so little attention. Now, that's in surgery. We're the ones working in this field.

If you look into medicine, the attention is there, but, basically, it says, "Eat less. Exercise more. Go away." That's therapy. Or "I'll give you this drug which may cause you to lose two percent of your weight." Big deal. It does nothing. There is far too little attention paid to this very major problem that keeps growing. And with it, comes Type 2 Diabetes. We manage cholesterol lowering, we treat hypertension, we have an increased awareness about cigarette smoking, at least in this country. We've managed to stop the curve of atherosclerotic disease and, actually, start a downtrend. It's now going to

plateau and maybe go up again because of diabetes, which leads to atherosclerosis and diabetes is intimately linked to obesity and so on. We're not paying enough attention to this disease in public, in government, in the media, and in our teaching hospitals, in our teaching universities. The publicity we get is mostly bad. If you have somebody, let's say with cancer of the pancreas, and you operate on them and they die, nobody writes about it. If you have somebody with obesity, an equally malignant disease, maybe not as fast but equally malignant, and the patient dies, it's in every newspaper, "Another Patient Dies from Obesity Surgery."

LK: Yes.

HB: We haven't progressed much in the perception of obesity and I think we may have a chance now if we talk about a perception of metabolic diseases rather than just fatness, if we talk about diabetes, and hypertension, and bad spines, and reflux disease. I think we're talking more about things that people can have empathy for, and funding can be available for, and teaching can be done about. Maybe we can reverse this disease rather than just say, "Well, that's the way it is." It shouldn't be.

LK: I don't want to keep you much longer. I know you have someplace to go at three o'clock. So I'll set up another appointment with Danette [M. Oien]. I may have some follow up questions when I listen to your interview again.

HB: Sure.

LK: Then, I'll get into some of the other questions I didn't get to today.

Thank you so much for the interview.

HB: You're very welcome.

LK: I'm enjoying this.

[break in the interview]

LK: This is Lauren Klaffke. I'm here again with Doctor Henry Buchwald in his office at the Variety Club Research Center. It's October 19, 2012.

In our conversation several weeks ago, we had talked about Owen Wangensteen, and Richard Varco, and Ivan Frantz. Were there any other mentors that you had at the University that you wanted to comment on?

HB: Well, you know, you learn from everybody. I certainly learned from the two Lilliheis, Walt and Rich [Richard]. Rich, unfortunately, died extremely young. When I came out of residency, basically after a short tenure while Doctor Wangensteen was still active and I was on his service, so-called purple surgery, I went on red. Red was Rich Lillehei and Jack Delaney. Certainly, Rich was always a mentor. He was always a friend



and a mentor throughout my residency. As we covered, I had my own laboratory and was more closely aligned with Richard Varco and Owen Wangenstein, but I always learned a lot from Rich.

Walt was Walt, one of the most unusual human beings that ever lived. His sense of...there is nothing that cannot be accomplished if you try hard enough and the conviction that the time had come for open heart surgery and it was going to be here to stay, and that there were so many people who could be helped with congenital heart disease and acquired atherosclerotic or aortic stenosis disease and so on. He was a fascinating person to be around.

Then, for many, many years, Jack Delaney and I were, in essence, partners. Red surgery was Rich Lillehei, Jack, and myself, until Rich died. Even though there were many other attendings, usually three, four, maybe five, on the other services, we never went more than two, because we were such a busy service. Really, we ran a full general surgical service. Over time, the way of the world caused us to specialize. When we started, Jack and I did all the gastrointestinal surgery from the esophagus down to the anus. We did breasts and thyroid. We did aneurisms and...

LK: Oh, wow!

HB: ...peripheral vascular disease, hernias...whatever, we did it. With the evolving times and the nature of the times, specialization started. Vascular surgery, so we gave up vascular surgery. Colorectal, we still did quite a few colons. But the colorectal people started to take over that area, not because in any way they were better surgeons—I think we were as good if not better than anybody else—but because the colorectal area was no longer a surgical, per se, area, but was in confluence with oncology.

LK: Okay.

HB: The specialty meant that maybe you did radiation first. Maybe you did certain chemotherapy and, then, adjuvant chemotherapy. So it became a science of its own of which the surgical part, where Jack and I were very good, was only part of a containment of cancer, mostly. The area of general surgery, for us and for everybody in this country, started to narrow and narrow and narrow.

Then, after a while, Jack was particularly interested in breasts and thyroid, endocrine, and I was particularly interested in gastrointestinal, so even though we seamlessly covered for each other, he stopped doing gastrointestinal and I stopped doing breast, thyroid, endocrine, and we also became specialized. Then, of course, I became specialized within the specialty of gastrointestinal by going into bariatric surgery.

So I learned a lot from Jack just by being with him, one of the wisest people and somebody, really, you should interview.

LK: Yes, Dominique Tobbell has actually interviewed him.

HB: Okay. He's one of the wisest people who has ever been in this institution, many pithy sayings, and many fantastic insights.

So those were my other mentors.

LK: You had brought up this increasing specialization. Would you say that was a trend in medicine at large or was this more a result of changing technology use or both, perhaps?

HB: Probably both...probably both. They go hand in hand. As increased technology comes into any specific area, that area broadens and the basic knowledge base and the techniques that become involved become more encompassing. So you have the alternative of being an expert when fields are expanding and you want to become an expert and want to maintain being an expert. The referring world—surgery is a matter of referrals; we're not primary physicians—is looking for who is the expert in a particular area. You have to concentrate on part of what was your domain before. It's a matter of time expenditure. I think the individual does it by delving into a certain area and wanting to be very knowledgeable and the best in that area. The outside world does it because they will say, "Let's send this patient over to Jack Delaney and Henry Buchwald, but she's got a breast cancer. Send her to Jack." The outside determinants of referral start making people into specialists, as well as their own inclinations.

Well, of course, this has gone to the point now that most people who finish a five-year surgical residency after medical school are now taking fellowships. So the idea of, as we did, starting out in a big general practice and, then, becoming specialists by our own inclination and by the forces that were placed upon us no longer assists today; it's an election from the very beginning. People finish their residency and they go and take a transplant fellowship and they're going to do transplants all of their life. Or we have a bariatric fellowship now and they're going to be bariatric surgeons, or colorectal surgeons, or intensivists. Specialization is now an immediate phenomenon after completing residency.

LK: Are there still general surgeons?

HB: Oh, there are, there are. General surgeons today—I'm not talking about the older people; I'm talking about young general surgeons who are just starting out in the field—I think their main opportunities are out in the rural areas. If you're the only surgeon for a hundred miles around and somebody has an incarcerated hernia, and you say, "Oh, I'm sorry, I only do thyroid surgery..."

[laughter]

HB: ...that wouldn't go.

LK: Right.

HB: In outside communities, rural communities, I think there's still a major role for general surgeons. If somebody *wants* to be a general surgeon, I think, in their mindset, they have to think of themselves as having a rural practice.

One more word on that...

LK: Yes.

HB: This kind of specialization isn't limited to academia.

LK: Right.

HB: If you look outside of the University or outside any university in any major city, you'll see that specialization is in private practice, certainly as much as it is in academia. Any young surgeon that wants advice and says, "Listen, I really want to be a general surgeon," then that person should put into their equation, "I want to be a general surgeon in a rural setting." If he says, "I want to be a general surgeon in the middle of a major city," that's not going to probably be feasible.

LK: Going off talking about rural surgeons... I've seen a lot of push in other schools within the AHC [Academic Health Center] to address medical issues in rural areas, just because of a lack of access to doctors. Is there much of a push within Surgery to create more general surgeons for those rural areas or is that much of a concern?

HB: I don't know how to honestly answer that. Our own Surgery Department has evolved. I guess this is going to be one of your next topics. Under Wangenstein, we were a strict academic training program. Wangenstein wanted to train academic surgeons who did research. Then, as we went into the [Doctor John] Najarian years, and as we're now in the [Selwyn M.] Vickers years, the tendency has been that we're going to do both, that many of our graduates are never going to be an academic surgeon. They have no interest, and we have an interest in training them if this is their election. The training program has metamorphosized into something it wasn't when Wangenstein started it. I don't know how, really, to answer that in terms of other teaching facilities, who from the very beginning were interested in training general surgeons, which most of them are. There are very few institutions that have the Wangenstein commitment saying, "We're going to teach the next generation of academic surgeons."

LK: Then, going back to specialties again... I've heard several doctors talk about silos, people kind of staying within their specialty and not branching out. Have you seen specialization have any problematic effect on people becoming too focused on a narrow area and not attending to other systems?

HB: Well, you see this all the time. You see this all the time as people become real experts in one area. Let's say a patient consults within their area and says, "While I'm

here, I also have this and this problem,” the doctor is very likely to say, “Oh, well, go see my colleague.”

LK: Okay. [chuckles]

HB: Yes, I think, after a while, you can get out of touch either because you don’t want to do anything else besides your area or you don’t feel that it’s fair. Why not send the patient to somebody whose area that problem is in?

LK: You began to talk a bit about this a moment ago that with Owen Wangenstein, there’s this very big emphasis on the academic research, as you said. Did that atmosphere change when John Najarian came in? What was his premise as chief of surgery?

HB: It changed somewhat. It took on a gradual change. Let’s go back.

LK: Okay.

HB: The major surgical centers in my time period were on the East Coast. I finished medical school in 1957. The major surgical centers were on the East Coast. They trained surgeons to be technicians. They may have some scholarship but it was always very limited to their area of technical expertise.

Years later—stop me if we’ve gone over this story before—I was offered a chairmanship on the East Coast and before I said, “I’m not really interested in any chairmanship,” they showed me around and introduced me to the head of medicine and they said, “He’ll get your...”

LK: Right.

HB: We’ve gone over that.

LK: Right.

HB: That was the atmosphere on the East Coast. The surgeon was the technician and I always wanted to get away from that. I always wanted to do research and, as I told you the last time, I came here and Wangenstein, who I didn’t know existed in those days, but I found out he existed and the program existed, it was the only such program. Then, it spread to Michigan and other places. But at that time, he read my dream for me and I said, “Yes, yes, yes. That’s what I want to do.”

So this program started something, training people for a career in academic surgery, which meant technical excellence, clinical acumen, basic science research. You had to have your laboratory. During that time period, getting an NIH grant was never easy but it was relatively much easier. You had an idea. It was a good idea. You could get it funded.

Then, things started to happen. The things that started to happen were other places who were training academic surgeons and the concept of doing basic research for an academic surgeon started to get more and more difficult. The NIH and the statistics...you can look at the curve of the NIH funding that from about the 1960s on until today, the number of grants given to M.D.s is always down, down, down. Now, it's fairly low. Most of the grants are going to Ph.D.s or M.D.s who have abandoned clinical practice and are really in the laboratory. So if you look at basic science research and you apply and your CV [curriculum vitae] says you're an active clinical surgeon, there's a tremendous prejudice against giving you a grant.

LK: Hmm.

HB: The NIH study sections, of course, keep this momentum going, because they're filled with people who are Ph.D.s or M.D.s working in a laboratory and they select their own kind to get the next grant and the next grant. The concept of getting major grants from the NIH for clinical surgical M.D.s has gone down, down, down, down.

Another bias of the NIH, which, of course, I have felt in my last few years, is they're *tremendously* biased for age. If you get to be over sixty-five, there are hardly any NIH primary RO1 grant holders. That's another bias of the NIH. They may be the National Institutes of Health, but they're not free of biases. With this emphasis, it became ever increasingly difficult to fulfill the Wangenstein doctrine of being a clinician, a technician, and a basic scientist.

So the program started to change. With this program change came the era of the computer. When you had to sit down with a hand calculator or a piece of paper and a pencil doing big outcome studies... The word outcomes started to replace results. Results is part of an experiment. Outcomes has sort of a different connotation. The field started to channel more and more and more.

I sat down a number of years ago with the, then, head of the American College of Surgeons. I said, "You're not emphasizing doing any kind of doing basic research for surgeons." He said, "No, because it's dead."

LK: Oh, wow.

HB: He said, "Surgical research will be clinical research. It will be outcomes research." It will be, I looked up the last 1,000 cases and this is what I found, or I was part of this big study, or I went to look at something nobody else has looked at. What's the relationship of this and this blood level to this and this disease? These are things we couldn't do before the era of computers. We couldn't do this before the era of electronic records.

Now, you can ask the computer a stupid question. If you asked a stupid question before the computer, you would spend a month getting an answer. You would say, "Boy, have I wasted my time."

[laughter]

HB: Now, you can ask the computer a stupid question and within minutes or certainly by the next day, the computer will have an answer for you. And, then, you say, "That was a stupid question." And you can go on and ask another one.

LK: [chuckles]

HB: The emphasis has been that if you do this outcomes research, if you do clinical research, if you want to say, "Well, what's the relationship of potassium level to people born with a sixth toe?" you can ask the computer that question. You can ask the computer any number of stupid questions and if you're lucky, one of them comes up with an interesting answer and you can pursue that. So the range of research has been tremendously increased by the computer and the rapidity of getting a response from huge national databases.

The program, therefore, transitioned with the times. We were, therefore, not exclusively training academic surgeons anymore, though we did. I can't give you a percentage. We still were training and are training, under Doctor Vickers, surgeons who want to be clinicians and basic researchers, but the number is going down, because the opportunities are going down.

With this, comes another force and it's the driving force of everything in life. It's money. Institutions are more and more thinking, surgeons can earn more money than a pediatrician, so let's keep those guys in the operating room bringing in money and leave the research to others. With this came the institution of the so-called clinical track towards tenure rather than the academic track towards tenure. The money is a big, big driver. The president tells the dean of the medical school, "Make us more money, because we need money for the Latin department." The dean will say to the surgery department, "You guys can make the money. You make more money."

[laughter]

HB: Then, the chairman of surgery has to, even if he is a tremendous academician, decide, I'm not going to keep this job. The main thing I'm going to be judged on is how much money my department can make. So there is this transition and the transition is, I think, a response to the evolving times.

LK: What is the atmosphere in the Surgical Department specifically, or the Medical School more generally, about that reallocation of funds? Has the Surgical Department ever not gotten enough money to do what it wants to do, because of the way the money is distributed University-wide?

HB: I don't have much to do with economics, certainly not at this point.

LK: Okay.

HB: I'm very, very happy minding my own business and doing a limited amount of surgery, seeing patients, writing books, and doing scholastic, academic things. It's unfair to ask me about the economics of the institution, but the *emphasis* on money keeps getting stronger and stronger. I think the emphasis on scholarship keeps getting, possibly, less and less.

LK: I do have a couple of questions about funding. Would you have any comments on the relationship between the State Legislature and the Medical School in terms of funding at all or like national politics in terms of Medicare and Medicaid effects on teaching and research?

HB: Not really. There are people who are much more expert in this at this stage than I am.

LK: Okay.

You talked about the transition to more clinical research with computers and that kind of happened under Najarian, but not because of Najarian. I was wondering if you maybe had any comments on his leadership style in comparison to Wangenstein or any other important ways that he led the department.

HB: They're different individuals. I think Wangenstein was much more catholic, not in terms of the religious Catholic but catholic in the broad approach. He was interested in *everything*. If somebody had a new idea, Varco and Lillehei said, "We should do open heart surgery." He said, "Oh, that's great. That's wonderful." I came to him and I said, "We should be interested in cholesterol." He said, "Oh, that's great. That's wonderful." He was interested *always* in a huge expansion of ideas and he was behind everybody's individual effort. I think I told you in our last interview that he had only one prejudice: people who didn't work hard. Outside of that, everything was fine. People who did work hard, he gave them all his support. That's why I think so many new things started under him. He supported new ideas, new enterprise, and hard work.

Najarian had more of a laissez-faire attitude. He let you do what you wanted, but his focus was in transplants. So if cardiovascular people were doing something, I was doing something in obesity, whatever, fine. Do it. But it wasn't dear to his heart. His heart was in transplant. The concept of everything can be done, a lot of new work should be encouraged, that was the main thing. Certainly, Najarian didn't say, "I don't want you to do that," or "This isn't good," or "We're going to emphasize on that." If you wanted to do it... "You go ahead and do it. Go get your grant. Do this. Do that. You're on your own. I'm interested in transplants."

[laughter]

LK: With his transplant work and the legal issues that emerged surrounding ALG [Antilymphocyte Globulin], do you have any comments on how that affected the department or the atmosphere at all?

HB: Well, we lost a lot of money; that we all know.

LK: Yes.

HB: I think everybody blamed the Surgery Department and blamed Najarian. He had to give up his chairmanship. He was exonerated in court. He wasn't found guilty of anything. I think it was certainly an example of the University turning against itself. In essence, it broke our Department. I think whatever reserves we had were cleaned out of the Department. Then, when Doctor Vickers took over, it isn't as if he took over a wealthy Department. He was *forced* from the very beginning to start thinking of *money*. Certainly, you always have to think of money no matter when, but the emphasis just keeps growing and growing and growing. If you want to hire more people, bring in money to hire them. If you want to start this and this endeavor, okay, but bring in the money to do it. That's the pressure he's been under. Then, of course, everyone in the Department is under that pressure. There is no reserve. There are no free funds to say, "It's a good idea. Go ahead. I'll give you some money from the departmental reserves to do it." There is no departmental reserve.

LK: I was listening to our interview again. When you were talking about approaching, I think it was, Doctor Varco about wanting to pursue cholesterol research, he's like, here's the lab and...

HB: That was Doctor Wangenstein.

LK: Doctor Wangenstein, okay.

HB: Here's \$20,000. Where did he get the money from? He had a tremendous skill, a people skill. We would have these annual meetings over in the Coffman [Building]. There would be little stands set up and each laboratory would have their stand. He would invite the richest people in the neighborhood and they would come. They would find something they wanted. They had a relative with cancer of the colon. Here were these people working on cancer of the colon. Wangenstein had the tremendous ability of getting these people to contribute unassigned funds, funds assigned to research, and he had industry that would support him. So he had this pot of money and Najarian had a pot of money from unassigned funds that they could give people to do research and if a resident wanted to go to a meeting and present a paper. "Of course. Put in the paperwork and your trip will be funded." That was a tremendous ability of Wangenstein.

Also, what he did is he rarely, if ever, charged his wealthy clients.



LK: Hmmm.

HB: People would come to him for—he was a general surgeon—let’s say a hernia repair. He would say, “How much money do I charge him for a hernia repair? I’ll charge him nothing. I’ll just tell him about our research program...”

LK: Ahhh.

HB: “and ask him if he wants to make a gift.” He had this tremendous talent to do this. He was totally dedicated. He lived a very conservative life himself. He watched birds. That doesn’t take a lot of money.

LK: No.

[laughter]

HB: I never saw him drive a fancy car. He spent his whole time studying, working, thinking, writing, and so on. His very spartan, conservative lifestyle was easy to see for everybody and everybody realized that this man is gathering money for research.

LK: He did a great deal with the [Wangensteen] Historical Library, too.

HB: Absolutely. That was one of his great attributes.

LK: I want to change topics a little bit and talk about Med School and the AHC reorganization. I was wondering if you could speak at all to the negotiation of power between department chairs and the dean in terms of how it affected funding or surgical practice or research.

HB: [pause] Not much. As I said, the last ten years or more where a lot of changes have occurred, I’ve tried to do what I wanted to do, make my contribution through seeing patients, and adding to knowledge and scholarship, and staying away from politics.

[laughter]

HB: It’s very obvious that there has been a shift and the shift is always going uphill to more and more administration. It used to be that the chairman, not only of Surgery but of Medicine, that all the major chairmen were princes in their domain. They had power. They had money, etcetera. The dean was not the dominant figure. Also, if you look twenty-five, thirty years ago, there was tension here, not only here—actually, here, we didn’t have that much tension—but all over the country. There was tension between powerful chairmen, very commonly with surgery and the dean. Foolishly, a lot of this exploded into the civil law courts.

LK: Hmmm.

HB: Almost every time, the head of surgery lost and the dean won. Certainly, over time, the power of the dean has become greater than the power of the individual chair. They're no longer princes of their realms.

Then, came the next level up. We had to have a vice president...

LK: Right.

HB: ...incorporating the Medical School, Public Health School, Nursing, and so on. Power keeps shifting away from the people who are really responsible for teaching the next generation of surgeons, doctors, physicians, pediatricians, whatever, and away from people who are, one, actually involved in clinical practice and, two, actually involved in research to people who, even though they may have started as M.D.s are becoming more and more, administrators. The whole administrative picture has gotten so complex. It's like when we talked about the specialization. Now, to be a chairman, you have to be an economist. You have to be an administrator. There are a lot of people who want to go that career track and they're going back to school to get an MBA [Master of Business Administration]. The complexity and the ever-increasing rise to administrative authority has changed everything. There has been this transition. For the rest of my career, I'm not going to have any fun.

LK: [chuckles]

HB: It's somebody else's world right now.

LK: Yes.

HB: It's a world of administration, of continuous mandates to do this and to do this and to do that. It's less trust in the individual. More trust in the institution.

LK: Do you have a sense of what the reaction of the...

[break in the interview as Doctor Buchwald takes a telephone call]

LK: As the health sciences concepts emerged and led to this reorganization... I was wondering if you could speak at all to how the Department of Surgery felt about that shift.

HB: Surgeons are individualists. We always hate to lose autonomy. The more autonomy we lose, the unhappier one becomes.

LK: Right. I know part of this reorganization was the idea of a team approach to teaching. Did that change the relationship between the clinical and basic sciences at all for surgery?

HB: I wouldn't have enough knowledge to comment.

LK: Okay. Do you know if this changed your relationships or other surgeons' with like the School of Nursing or Public Health at all because they were all under the same umbrella?

HB: I wouldn't know how to comment on that either. Over the years, I've had a very close relationship with the School of Public Health, because of my work in cholesterol metabolism. Henry Blackburn, professor of epidemiology in the School of Public Health, we communicate, and I used to know Ancel Keys and the people there. So, people had a relationship not on the basis of, we're somehow under an administrative umbrella, why don't you guys have lunch together. We used to have a very strong relationship based on mutual interest. As I told you in our previous conversation, I've had a very strong relationship with Engineering. Even to this day, I'm still a professor in Biomedical Engineering and I'm doing a project with the engineers. So I know a lot of the engineers, but it isn't any kind of, we're going to bring you kids together. It's you and I are interested in the same thing. Let's work together.

LK: Okay. Yes, yes.

Do you have any sense of the attitude of the faculty in response to Robert Howard's decision to leave the Medical School?

HB: [pause] No.

LK: What about the appointment of Lyle French as vice president of the AHC. I know he was a surgeon.

HB: He was the head of Neurosurgery.

LK: Right.

HB: Not really.

LK: Then, the appointment of Neal Vanselow, any comments on that?

HB: [pause] Not really.

LK: When we were talking earlier, you had mentioned referrals. I was wondering if you had any comment on town versus gown relationships or responsibilities of the Medical School to private practice, continuing education, that sort of thing.

HB: [pause] [chuckles] Our job is to train the next generation of surgeons. Internal Medicine's job is to train the next generation of internists. Family Practice the next generation of family... That's our job. The better we train them, the more of a competition they become.

[laughter]

HB: If you train a superb bariatric surgeon and he goes out in the community, he becomes your competition, in a sense. Now, in bariatrics, I don't think that really holds because there's so many people who need our services. I think the main burden for all people in bariatric surgery is patient access being blocked by insurance carriers and so on. But in other fields, there is competition and that's always been there. You train people. They go out. They become competitors of the University. At the same time, I think that we have a very healthy relationship with the community. I think we're on very good terms with the community hospitals. My partners operate in several of the community hospitals. In the past, I used to go over and do cases at Abbott [Northwestern Hospital]. I don't see really much of this town/gown that people always have talked about. I think it was much stronger in the past.

LK: The relationship?

HB: The antagonism.

LK: Ohhh.

HB: When Wangenstein started here, the people in town tried to prevent him from having a service. They tried to prevent him establishing an operating service and you need an operating service to teach surgery. This isn't a textbook discipline. You have to have actual patients to do surgery to teach surgery. So he had a great difficulty with the community. They were against him for a long, long time. When I came here in 1960, the town/gown relationship was quite hostile. Wangenstein would get *extremely* upset if we did anything in any of the local hospitals. That's one thing that upset him greatly. He was a man who was very flexible in everything else. So that was a time of great hostility. I think since that time, we have probably turned out the greater percentage of community surgeons. Certainly, the competition exists, but I think there's also a camaraderie that exists...groups like the Minneapolis Surgical Society, Saint Paul Surgical Society, Minnesota Surgical Society, and we have a bariatric group that meets from the Mayo Clinic [Rochester, Minnesota] from all over the state and ourselves. I think that town/gown hostility is much, much weaker, if it exists at all at the moment. I think it's a good healthy relationship.

LK: It sounds like a more collaborative...

HB: A much more collegial, collaborative relationship.

LK: There was a change of policy at the University, I know, about regulations on salaries coming out of clinical practice within Surgery at the University. Could you speak at all to the position of surgeons on that change in policy?

HB: What particular change in policy are you talking about?

LK: Something about salary caps on clinical practices, of surgeries taking place here at the University, I believe it was.

HB: Well, there are caps and there are regents' rules, which have to be obeyed by everybody, except the head football coach and the head basketball coach. They not only have a higher salary than anybody at the University, including the president, but they can go out and keep all the money they can make on endorsements, and camps, and whatever else. It's like Orwell's farm: everybody is equal but some people are more equal than others.

LK: Yes.

HB: Again, this is what we talked about before. There is control by ever-ascending administration who will, then, say, "Oh, this is capped and you can't do this and you can't do that."

I think there were two equally productive, and ethical, and logical systems. One was the Wangenstein system where he said, "You have a salary according to your academic rank and years of seniority." So a professor got paid more than an associate. An associate got paid more than an assistant, like in any other department. Then, he said, "Some of you don't want to do a lot of clinical surgery. You want to, basically, be in the laboratory. Go to it." To others he said, "You want to be clinical practice. As long as you contribute to the education and still have a laboratory, make as much money as you want. Don't burden me with it. Have your secretary do the billing. Hire the billing... Do whatever you want. Whatever money you make, that's your business as long as you maintain the academic integrity of your position in the department." So people like Lillehei and Varco made a lot of money. What did they do with it? At the end of their careers, they made major endowments back to the University.

LK: Right.

HB: Well, the system evolved under Najarian and it was sort of forced upon him, but, basically, it was an okay system. It became a departmental system. He established that here's your base salary and, then, you can keep so and so much of what you get and, then, a percentage of the next amount, etcetera. This would allow a building up of the cash reserve of the department. It was a flexible kind of program. It was built on...Duke had model like that. It was all in the Department of Surgery. If we brought in a lot of money, there was a lot of money available. If we brought in less money, we had to draw back on things. So it was a departmental model and everybody was happy. The rules were clear-cut and everybody was happy. So, once again, that sense of individualism was met. If you wanted to do twice as much surgery as the next person, you would get more money. If you wanted to spend the time doing research, getting grants, maybe making some money from the grants, principle investigator's income, and so on, fine.

But, now, all this has been taken outside the department. It's in UMP [University of Minnesota Physicians]. It's people getting rewards for things that we used to do as part

of our job. People, now, get financial rewards for titles. The assistant to the educational chair gets a certain amount of money. We used to do all these things for nothing. I mean, it was part of our job. I ran the Credentials Committee here for years and years. I ran the Intern Program. I ran the Residency Program. I sat on various committees. It was part of my job. I didn't expect anybody to give me money for this. Today, the money is distributed by titles, a lot of money. It ends up by some people doing a lot of surgery, working very hard, being capped, and the money redistributed by titles, allowing others to do less surgery, fewer cases, and spend their time being administrators.

We are getting very administrative heavy...*are*, not getting. Administration and administrative functions are, now, financially rewarded. I think that's been a very major transition. I don't know if this has to be, if it's an evolution that can't be helped. But I'm not so sure it is necessarily for the good. All evolution is not progress.

LK: [laughter]

Since we're getting a little bit back to funding, the last funding question I have is about the decision to sell University Hospitals to Fairview [Health Systems]. I didn't know if you could speak about how that affected clinical training or research at the University.

HB: [pause] We get some money from Fairview, of course, and I think that's beneficial. I think the functioning of the University Hospital isn't any different than it had been when it was *the University* Hospital from when it is the Fairview Hospital. I think the concept isn't a bad one. I'm not sure that it's always been executed correctly or in the best manner for patients and people working here. But, all in all, I certainly don't think the union has decreased our patient care. It's probably increased our patient care. I think it would be very hard to say whether the alliance with Fairview has been beneficial to academia or has been harmful to academia, probably neither one, I think. It's a fairly neutral prospect.

LK: You had mentioned that you had been on the Credentials Committee. Maybe you'll have insight into this particular question. I was wondering if you could comment at all on recruitment of minorities and women into the Surgical Department. I don't know if that was at all a part of your role with doing credentials or what that entailed.

HB: I guess we looked to maybe favor women and minorities way back. Maybe now, we have to look to favor men.

[chuckles]

HB: We've got more women coming into surgery. I think we probably did that and it was probably justified at the time, but it wasn't us doing this mostly. I think it was the drive coming up. Let's say we can take twelve interns. If you got a hundred male applicants, that's one thing. If, today, we have sixty women applicants and forty male applicants, it's driving the process. I think the desire to go into medicine has been there in women way before they reach us. We're the tail end of this process.

LK: Right, right.

HB: They have to decide that in college. It's medical school and, then, they have to decide a specialty, surgery, so we're at the tail end of this process. So, today, and for many, many years now, I think our selection policy is really unbiased in the sense we try to get the best. We try to get the very best people in here to be in our program. It happens today that women are becoming dominant in surgery. When I started, there were no surgeons who were women. There were no residents who were women. It's been a gradual process and it's been a very interesting and sort of a rewarding process. I have four girls, my wife and I have four girls. So it's been very good to see that the women who are in our program are leading very normal lives. They are not trying to be men. They marry. They have children. They have children during their residency. They are surgeons. They have made their personal world adjustments comparable to what the male surgeons had to make, too. It's probably not easy to be married to a surgeon if that surgeon is either a man or a woman. With the sharing of childcare and so on... The only distinction that you can't get around is the nine months of pregnancy. But outside of that, the childrearing, home responsibilities, and so on, it doesn't matter. If you have a female surgeon whoever is going to marry her has to make the adjustment just like in the past when you had a male surgeon and whoever was going to marry that male surgeon had to make adjustments.

LK: Are any of your daughters in medicine?

HB: No.

[hearty laughter]

LK: I guess that my last sort of wrap up question... Any major changes in medical practice or culture during your tenure? I guess you sort of commented on the push for clinical research, but is there anything else that you want to comment on?

HB: I've had a long time in practice.

LK: Right.

HB: I think there has been a retreat from individualism, as you said, the team concept. I'm not sure that's all good. When I was in college, I took courses over at the Union Theological Seminary with the great theologian Reinhold Niebuhr. He always said that a committee leaves the opportunity to hide and the most ethical decisions are made by an individual who will not face the responsibility of those decisions. I can see that there are many unethical and wrong approaches to this team system. The individual person making a decision in clinical medicine, clinical surgery, etcetera, because he comes with a sense of responsibility...I'm not sure that should be superceded by the team system where everybody has an equal voice until you go and get sued and, then, in the law court, it's still the surgeon who is on the line for it.

[chuckles]

HB: I think the going away from individualism has been a very prominent feature of the last fifty years and I don't think that's a good thing. It doesn't mean you should have an autocrat. It means people should listen, talk to each other, communicate, but this whole idea of sharing everything means a negation of responsibility, because a committee cannot be responsible. A committee does not go home feeling, have I done the right thing? Have I helped this patient? Have I done the wrong thing? Have I hurt this patient? That's such an individual thing. I think it's so different than saying, "Well, I wanted to do A but the group wanted to do B and they out-voted me. So what can I do about it?" I think the going away from individualism has not been good.

With this, also, comes the individualism of practice income. If you were in charge of your own income whether you were in a community practice, private practice, or at a university practice, it was your decision. If you wanted to make a lot of money, you had to, first of all, be good and, then, you had to work at that. If you wanted to do something else with your time, it's your decision. Now, it's become an administrative corporate decision. On the one hand, surgeons should go and operate, make a lot of money, and, on the other hand, income is capped. We're becoming more and more employees. As you know, there are many hospitals now that have contracts with their surgeons. They are no longer individual...call them entrepreneurs, if you wish, but they're no longer individual practitioners. They work for a hospital and when you work for the hospital, maybe the incentive starts to be lacking.

Whole institutions are going in that direction. In the past if I said, "I want to see this patient in the clinic next week," "Yes, Doctor. I'll put her on clinic." Now, if you say, "I want to see this patient in the clinic next week," somebody will say, "You can't. You're full." So, then, you scream and yell and say, "Overbook." So you go to clinic and instead of at four o'clock, four-thirty, when clinic closes, you're still seeing patients till six, six-thirty. You find yourself very lonely. There's nobody there. They've all gone home—or most of them have gone home. Maybe your assigned nurse hasn't gone home. Can we schedule this test? We can't right now, because the people have gone home. Once you get to that institutionalization, the going away from individuality... This isn't just in academia; it's everywhere, it's absolutely everywhere. You know yourself, if you call now for a doctor's appointment, they will say, "Yes, Doctor So and So can see you in February." You say, "I don't want to be seen in February." "He or she doesn't have any openings until then." That approach is antithetical to my way of thinking.

When my third daughter had her first, second, or third child, one of their children, she was raving about her OB [obstetrician]. Now, this is a private practice. She was raving about her OB. Oh, she's so wonderful. Oh, she's so wonderful." It wasn't Doctor So and So. It was all first name. So the OB was my *friend*. Well, then, she went in to deliver. Her friend wasn't there. It was one of her partners whom she'd hardly ever met, because that person was now doing deliveries on that day.



LK: Ohhh. [whispered]

HB: Then, she delivered. Everything is fine. Then, she called her OB, her friend. That person is in the next building. She said, "I can't come over. I'm on clinics." So this corporate practice isn't limited to a university. It's probably even more so out in the community. I don't think that's the old, true, established, and ethical relationship between doctors and patients. I don't care if she calls her OB by her first name or by her nickname or whatever, but when she comes in to deliver, she should be there.

LK: Right.

HB: If she can't be there, she should come over that evening and say, "Sure sorry that I just couldn't make it. I'm so glad everything is okay." But, no, she didn't have an obstetrician. She had a corporation.

LK: Do you have any final thoughts on the Medical School or the AHC or the Hospitals or is there anything else you want to add?

HB: Hmmm.

[laughter]

LK: We have covered a lot of ground.

HB: We've covered a lot of ground.

I don't know how long my tenure will still be here. I'm still enjoying what I'm doing. I still think I'm contributing. I don't know what the future will hold. [pause] I'd like to see less top down, but I don't think that may ever happen again. I think, as I said, evolution is not necessarily progress.

LK: Well, thank you so much for meeting with me again.

HB: Thank you.

[End of the Interview]

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