PREFACE

Oral history has its roots in the sharing of stories which has occurred throughout the centuries. It is a primary source of historical data, gathering information from living individuals via recorded interviews. Outstanding pediatricians and other leaders in child health care are being interviewed as part of the Oral History Project at the Pediatric History Center of the American Academy of Pediatrics. Under the direction of the Historical Archives Advisory Committee, its purpose is to record and preserve the recollections of those who have made important contributions to the advancement of the health care of children through the collection of spoken memories and personal narrations.

This volume is the written record of one oral history interview. The reader is reminded that this is a verbatim transcript of spoken rather than written prose. It is intended to supplement other available sources of information about the individuals, organizations, institutions, and events that are discussed. The use of face-to-face interviews provides a unique opportunity to capture a firsthand, eyewitness account of events in an interactive session. Its importance lies less in the recitation of facts, names, and dates than in the interpretation of these by the speaker.

Historical Archives Advisory Committee, 2008/2009

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ABOUT THE INTERVIEWER

Eileen Ouellette, MD, JD

Eileen Ouellette, MD, JD, graduated from Smith College and Harvard Medical School and then completed residencies in pediatrics and child neurology at Massachusetts General Hospital. She has a law degree from Suffolk University Law School, Boston, and is a member of the Massachusetts Bar and the American Bar Association. She has extensive experience advocating for children’s health issues at the state and federal level. She is retired from North Shore Children’s Hospital in Salem, Massachusetts, where she practiced pediatric neurology.

Serving as AAP President during 2005/2006, Dr. Ouellette is also active in the AAP Section on Neurology. She is a member of the Senior and International Child Health Sections, has served on Committees on Women in Pediatrics, Career Opportunities, the Council on Government Affairs, and the Council on Sections and the Council on Sections Management Committee. In addition to her AAP activities, she has held leadership positions in the Child Neurology Society and is on its Legislative Committee.
Interview of Patricia K. Donahoe, M.D.

DR. OUELLETTE:  This is Dr. Eileen Ouellette interviewing Dr. Patricia Donahoe on May 9, 2006 in her office at the Pediatric Surgical Research Laboratories at the Massachusetts General Hospital in Boston.

Pat, you and I have known each other for a number of years, but for the purposes of our oral history project perhaps you could tell me a little bit about where you were born, where you grew up, went to college, medical school, that kind of thing.

DR. DONAHOE:  I was born here in Boston at the Boston Lying-in Hospital, grew up first in Brookline, moved to Braintree, where I had a wonderful time in junior high school and high school, and then went on to Boston University. Since I was an athlete I studied physical education but soon realized that I loved the medically related sciences, so took pre-med requirements such as organic chemistry and physics in the college of arts and sciences at BU in addition to my required curriculum. After graduation I joined the faculty at Indiana University for two years while I finished my pre-med requirements. From there I went off to Columbia University College of Physicians and Surgeons in New York. Going there was like dying and going to heaven; it was just marvelous. I had wonderful classmates and realized that I had found my calling. When I graduated from P&S I did a 5-year surgical residency at New England Medical Center, then a fellowship at Children’s Hospital [Boston] with [M.] Judah Folkman and subsequently at the Massachusetts General Hospital with W. Hardy Hendren III. That’s where we met and worked together when you were a pediatric neurologist. I went from there to England to do neonatal surgery at the Alder Hey Hospital in Liverpool, which was a regional center for newborn surgery started by Isabella Forshall. There I worked with Peter Rickham in neonatal surgery and J. Herbert Johnston in pediatric urology. I came back to the MGH and joined Hardy Hendren and Samuel Kim as junior faculty in pediatric surgery and have been here ever since.

DR. OUELLETTE:  What year did you graduate from medical school?

DR. DONAHOE:  1964.

DR. OUELLETTE:  Okay so you were two years after I was here at Harvard [Medical School]. How many women were in your class?

DR. DONAHOE:  We started with 10 and I think we graduated 6.

DR. OUELLETTE:  What was the denominator?
DR. DONAHOE: 120.

DR. OUELLETTE: How did they treat you?

DR. DONAHOE: Pretty well, except when I developed an interest in surgery; my attendings all thought that surgery was out of reach and out of the question, and probably an unwise decision. I came to enjoy surgery while I was doing research in cardiology, which required creating all sorts of cardiac defects operatively. I went through medical school trying to find something I liked better than surgery. The only thing I liked as well as surgery was pediatrics, so being a pediatric surgeon is perfect for me. At that time there were very few surgical programs open to women. I think I was the first woman to finish a surgical chief residency in Boston in the Tufts New England Medical Center program that kindly accepted me for training. Harvard did not accept women for another ten years.

DR. OUELLETTE: I know when I was at Harvard in the medical school they were still accepting women as an experiment. They were going to try it for 10 years and see how it went. I think you were probably the first woman to get a surgical internship and residency in Boston any place. Certainly there wasn’t anybody when I was there a couple of years earlier.

DR. DONAHOE: I think Ann Barnes had trained here at the MGH, but with the understanding that she was going go into OB/GYN. Ann was marvelous; she did wonderful things to open doors for women in surgery.

DR. OUELLETTE: Then when you were over with Judah, what were you doing specifically there? Were you starting to work on embryology there?

DR. DONAHOE: I started to work with Dr. Folkman on tumor angiogenesis factor. It was a thrill to work with him because he had so many ideas. He was just a mile-a-minute idea man. He was very inspiring, and much of what I’m doing now was inspired by his “can-do” attitude. He felt despite not knowing something you could learn it by doing since science will always take you in new directions. I learned that one should not be put off because of minimal experience in a particular area. That philosophy has proven to be true because the field has moved so rapidly. In no way now are we doing the kind of science that we did 30 years ago when I first started with Judah.

DR. OUELLETTE: Then you came back here and worked with Hardy. Were you then a post-residency fellow?

DR. DONAHOE: I was first a research and then a clinical fellow. It was a marvelous time. At that time we were four bare walls of empty space that Dr. Hendren had negotiated for the new 400-square-foot Pediatric Surgical
Research Laboratories. I actually started the laboratory that I now direct, but subsequently went off to do extra training in newborn surgery. I returned to continue developing this laboratory to its present 10,000-square-foot size, and concomitantly developed a busy practice in pediatric surgery.

DR. OUELLETTE: When you were at the other hospital doing newborn surgery, where was that?

DR. DONAHOE: The Alder Hey Children’s Hospital in Liverpool, England, was a regional hospital whose catchment was the entire northwest of England. It was the first time newborns had been regionalized, so it was an eye-opener for me. Sam Kim, one of my partners, had been there two years before, and when we came back to the Massachusetts General Hospital we worked with our pediatrician colleagues to develop neonatal intensive care units here. I think Dan [Daniel C.] Shannon developed the first one in the city. It was a mixed medical and surgical ICU [intensive care unit] because we didn’t have enough patients to separate; we learned the importance of working cooperatively.

DR. OUELLETTE: Now what about your family during all these years? I know you have three children, but I don’t know their ages or when in your career you had your children.

DR. DONAHOE: Jack and I were married a week before I started medical school and he started graduate business school at Columbia. Our daughter Shauna was born in 1962, between second and third year, and my daughter Tara was born between third and fourth year, which was a novel thing for P&S.

DR. OUELLETTE: And a novel thing at that time, too.

DR. DONAHOE: Yes, that’s true.

DR. OUELLETTE: Now how did you manage all the night call in third and fourth years with two little children?

DR. DONAHOE: Jack’s job was in New York; he wasn’t doing a lot of traveling. We started with a nanny, who we actually shared with other couples that had children and lived in the same apartment building. Hence began the life of juggling child care and mutual professions. It’s been very challenging and most times a lot of fun when you can see through the veil of exhaustion and chaos.

DR. OUELLETTE: What has your husband done all these years?
DR. DONAHOE: His major job was with The Ford Motor Company. When we came to Boston he worked in the Boston district. He took a year sabbatical when we went to England. After he came back he started the computer services division for Ford in New England. He stayed with that job for the rest of his professional career, retiring four years ago.

DR. OUELLETTE: You told me about your first two children, when was the third one born?

DR. DONAHOE: Jake was born while I was in Judah’s lab, after my chief residency in general surgery.

DR. OUELLETTE: So you had a bit of a hiatus while you were doing your surgical residency?

DR. DONAHOE: Yes.

DR. OUELLETTE: Now when you first started your lab, what were you working on?

DR. DONAHOE: I was working first on revascularizing the kidney. We used Goldsmith’s technique of taking the splenic artery and tunneling it through the kidney to see if it would revascularize the kidney, and indeed it did. We could subsequently go back and divide the main renal artery. I also worked with Dr. Hendren on the importance of humidification in long-term ventilation for patients undergoing long pediatric surgery procedures. It had been a real problem in the past, so we learned to humidify our ventilators in the operating suite for long cases. At that time Dr. Hendren was building the field of pediatric urology. The surgical reconstruction of these children was long, so it was a boon to be able to manage these children safely through long-term anesthesia and ventilation. We also worked on regeneration of the small bowel, and regeneration of the liver.

When I went to England I was invited to a meeting at the Royal Liverpool Medical Society, and Dr. [Thomas C.] Hamilton, an endocrinologist, discussed work done by Alfred Jost at the University of Paris studying Müllerian Inhibiting Substance. At that time [Régine] Picon had established an in-vitro model to study Müllerian Inhibiting Substance that Jost had previously studied in the embryo rabbit. I remember sitting in the back of the room, and the bells rang, and the whistles blew, and I said, “I want to work on that,” because it’s an inhibitor. Many labs were working on growth factors, so I elected to work on growth inhibitors, which gave me the opportunity to take the road less traveled. If you go the road less traveled, you have a little more time to think and plan what you’re doing. It’s more fun, and it’s a little more peaceful.
When I came back to the lab I talked to Hardy, who thought that it was a particularly good idea to work on Müllerian Inhibiting Substance (MIS) because of the many intersex patients for whom we cared. Our work on MIS helped us to understand why, for instance, patients with 46XY male pseudohermaphroditism regress the Müllerian duct. As it turns out, their testes are normal, producing testosterone, and MIS, but they have a testosterone receptor defect, so the Müllerian ducts regressed under the influence of normal MIS, but the absence of testosterone response resulted in a female phenotype. So for many reasons, we thought that studying MIS was a good project on which to focus.

I particularly thought that this growth inhibitor, which caused apoptosis in the embryo, would have broader implications. Phil Gold had shown at that time that fetal antigens were reactivated in tumors. Potentially, the receptor for MIS might be reactivated in tumors of Müllerian duct origin. We approached our studies in a number of different ways. First of all, we looked for a source of MIS. We knew it was made in the embryo, but there would not be enough material to isolate MIS from embryonic tissue, so we looked for a post-natal source. In our first series of experiments, we showed that MIS was produced after birth in rat, mouse, and rabbit. Then we looked at the bovine species, where MIS production continued for about three weeks after birth. Newborn calf testes thus became the source from which we first purified MIS. We developed an assay for MIS, and began the process of purification.

DR. OUELLETTE: Were you able to get very much of it?

DR. DONAHOE: We did not initially. I remember giving a talk at Seymour Rykland’s laboratory at Tufts, and he said “Go to Trelligan’s.” Trelligan’s was a little slaughterhouse in East Cambridge where every investigator from Harvard, Tufts, and BU went to get material from newborn calves, a source of veal for the North End restaurants. There we collected the testes, extracted and purified the MIS protein. I could never tell my father what I was doing for research.

DR. OUELLETTE: What did he think you were doing?

DR. DONAHOE: He thought we were developing an anti-cancer agent. I didn’t tell him the source; he would have been put off.

DR. OUELLETTE: Then you were able to produce MIS where you didn’t have to rely on the slaughterhouse of East Cambridge anymore.

DR. DONAHOE: The transition was important, because the owners were 80 years old and the slaughterhouse was sitting in a residential area. We figured we needed an alternative. We looked up and down the East Coast
and there was no slaughterhouse that killed for veal at this early age. The closest one was in Texas; however, they removed the gonads at three months of age by which time MIS production had waned. Given the paucity of sources, we figured we’d have to clone the MIS gene. It’s amazing how timely advances in molecular biology techniques make this possible. We cloned the human and bovine MIS gene in collaboration with the company formed by Wally [Walter] Gilbert, the early Biogen [NV] corporation. There we worked with Rich [Richard] Cate to clone the gene for MIS, taking nine months to do what today the average medical student can do in two weeks.

DR. OUELLETTE: Nine months seems pretty short to me.

DR. DONAHOE: It had taken us five years to purify the natural protein material. We then cloned the gene for it and began to make it recombinantly, which allowed us to go to the next phase and scale up production of the recombinant human protein MIS, which we did in mammalian cells. Because fetal calf serum was required to carry the cells transfected with the human MIS gene, it was a costly process. We tried to make MIS in E. coli and yeast, but were never successful in recovering a biologically active material, so stayed with the mammalian cell culture system.

At that time Merck [& Co., Inc.] was interested in MIS but they lost interest because MIS was too expensive to make in mammalian cell culture. NIH [National Institutes of Health] fortunately continued to fund us, but it was a difficult time. Although both companies had lost interest in MIS, MGH had to fight for seven years to have rights returned from Biogen, so that another company would develop MIS. Now there’s a company called Ipsen that is scaling up production in the hope that they will be able to take MIS into the clinic.

DR. OUELLETTE: As the years have gone by, your research has adapted to new ideas and so forth. What kinds of things are you working on now? Maybe you could even give me the transition over the years of things that you’ve done.

DR. DONAHOE: Now we are testing Müllerian Inhibiting Substance against a series of tumors. It appears to be effective against tumors of Müllerian duct origin, endometrial, cervical, and also ovarian cancer, 95% of which occur on the surface epithelium of the ovary. It was Bob [Robert E.] Scully, a great ovarian pathologist here at MGH that directed us toward ovarian cancer, which appears to be an important target because most of the ovarian cancer patients recur. MIS is also effective against breast and prostate cancers. We have studied MIS against ovarian cancer and breast cancer cell lines in-vivo, where it is very effective. David T. MacLaughlin, Ph.D., who joined us full-time in 1995 after a year of working with us collaboratively, has directed the effort of purifying human MIS in the
laboratory and of transferring the protocol to industry. He also developed a very sensitive ELISA assay that we use to detect MIS in patients with intersex abnormalities. MIS allows us to differentiate whether a testis is present in a newborn baby, thus assisting in the differential diagnosis of babies with ambiguous genitalia. We also use it to detect granulosa cell tumors. The assay is predictive of recurrence before the tumors can be detected by CT or MRI. Our hope is that MIS will be used in the clinic very soon, first for ovarian cancer patients.

We also have an NICHD [National Institute of Child Health and Human Development]-funded project between MassGeneral Hospital for Children and Children’s Hospital Boston to study the genetics and the genomics of congenital diaphragmatic hernia, an important congenital anomaly that occurs 1 in 2500 live births, making it one of the most common congenital anomalies. High technology therapies are required for survival, which is accompanied by high morbidity. So, we were asked, “Why would you do genetics?” Since the tools of genetics and genomics and cytogenetics were developing so rapidly, our hypothesis was that these tools would provide new insight into the etiology of this disorder population. We have ascertained over the past five years over 350 patients, with CDH, developed and banked cell lines, and used array comparative genomic hybridization and genome wide SNP [Single nucleotide polymorphisms] analysis to study various patient cohorts. These analyses uncovered at least five chromosomal regions that we are studying intensively for genes that are involved in the etiology of congenital diaphragmatic hernia, upon which we will build. I have spent my lifetime reconstructing and taking care of kids with congenital anomalies. We want to build on the template that we developed for congenital diaphragmatic hernia for other anomalies for which there is no known cause, such as gastrochisis, anal atresia, tracheoesophageal fistula, skeletal or heart anomalies, as examples.

It is likely that all of the anomalies that we’ve been fixing for years and thinking of as accidents in utero, will have a genetic component. We are working with the Broad Institute with the long-term goal of using similar technology to study all patients in every children’s institution, starting with the Boston area. Every child born with a congenital anomaly will have a cell line established, array-based comparative genomic hybridization (CGH), and high-density SNP analysis. NIH right now is supporting our grant which supports our salaries, but the genetic analyses are presently very costly.

DR. OUELLETTE: Who pays for the actual tests and the cell lines and the storage? Is that from the NIH also?

DR. DONAHOE: That’s been funded by the NIH grant, which has been refunded for another five years. But the cuts in NIH are such that the monies that were there to do the genetics and genomics are not there in
sufficient amounts. Hence we recently sought and received funding for some of the analyses from the Broad Institute (Center for Genetics and Genomics, MIT Harvard).

Liz [Lizabeth] Perkins, PhD, an associate professor in the laboratory, is studying the receptor tyrosine kinase pathway, but also looking at tracheal development in the fly, because the genes are conserved all the way through to mammals. We can test potential therapeutics that we find in the fly or in chick and rodent models.

Allan [M.] Goldstein, M.D., is studying gut patterning and the role of the neurenteric system in development. There is a boatload of talent in the lab. I enjoy being here every day.

DR. OUELLETTE: You certainly have a fabulous lab here; you just walked me through it. I don’t think I saw all the 10,000 square feet, but it’s very dramatic.

Now you’ve obviously worked very closely with endocrinologists all these years, both clinically and I assume in some partnership way with your research?

DR. DONAHOE: Yes, both clinically and in research. I started working with the Jack [John Douglas] Crawford [II] and Hardy Hendren team in understanding the children with intersex abnormalities. I learned a great deal from each. In the management of the intersex abnormalities, we always worked hand-in-hand with our pediatric endocrinologists, as these are vital, difficult decisions. We worked as a team together with the parents based upon as much clinical and investigative knowledge as was available at the time.

DR. OUELLETTE: You’ve had time to follow a number of these children long-term. How have they done psychologically? That’s always a concern.

DR. DONAHOE: Surprisingly well. Some espouse no reconstruction until patients are able to make their own decisions. But there is the very quiet majority that are not going to voice an opinion or volunteer that they have had intersex abnormalities. Claude [J.] Migeon from Johns Hopkins [University] did a long-term follow-up of patients with intersex abnormalities. Depending upon the etiology, he found that a very large percentage of them are happy with their management and their outcome. There’s a small percentage, patients with incomplete male pseudohermaphroditism or mixed gonadal dysgenesis, that were not satisfied. However, Dr. Migeon found the satisfaction rate to be very close to 90% in the other etiologies. This outcome would not support withholding reconstruction. One must be very thoughtful with the parents in making decisions that do not require having a child going all the way through adolescence without a gender assignment.
DR. OUELLETTE: That must be awful.

DR. DONAHOE: It’s not feasible.

DR. OUELLETTE: Is it now really the standard that everyone in the situation will be operated on and will be taken care of as soon as possible? Or are there people who wait?

DR. DONAHOE: There are people who wait. It has been our experience, in a thoughtful analysis of this with our endocrinologists, that it’s better to operate on the children when they’re young if you can make a definite diagnosis and a gender assignment. If you have an experienced surgeon, a single operation done in the newborn period allows one to use all available native tissue, rather than to do multiple stages with less tissue available when you want to do the most difficult part of the operation, which is the vaginal pull through.

DR. OUELLETTE: Has anybody done fetal surgery for this, or not yet?

DR. DONAHOE: There’s been fetal diagnoses, but not fetal intervention.

DR. OUELLETTE: Anything else about your research that you want to say that I haven’t asked you?

DR. DONAHOE: We’re very excited after over 25 years of working on MIS to be very close to taking this to clinical application. We anticipate working with our OB/GYN and reproductive biology colleagues to design clinical phase I/II, and hopefully phase III clinical trials with Müllerian Inhibiting Substance produced as a therapeutic.

DR. OUELLETTE: That’s wonderful! When do you think that you’ll be able to start doing something along those lines?

DR. DONAHOE: If the experiments go well, as we have already done the scale-up with Ipsen, I can see, starting in a year or so.

DR. OUELLETTE: Great. Terrific. Now when I was reading through your CV, I found you have 242 peer-reviewed articles, one book, 48 book chapters, and 21 reviews. That is really remarkable considering everything else you’ve done, that you’ve found time to do all this writing. Are you someone who would get up at three in the morning to write before you went to work?

DR. DONAHOE: Yes. Not quite three, maybe five.
DR. OUELLETTE: I also saw in your CV that you received an award from Ms. Magazine. Tell me a little bit about that.

DR. DONAHOE: That was back in the 1980s.

DR. OUELLETTE: 1988 it says.

DR. DONAHOE: I don’t know who made the choice, but it was a thrill. People won the award for various different categories, and I had won it for research. It was a stellar group.

DR. OUELLETTE: Who were some of the other people who won the year you won?

DR. DONAHOE: Among them were Gro Harlem Brundtland, then President of Denmark, Martina Navratilova, Bette Midler, Toni Morrison.

DR. OUELLETTE: A very interesting and diverse group of women, wasn’t it?

DR. DONAHOE: It was fun to meet them.

DR. OUELLETTE: I’d bet, that’s great. On a more serious side, in 2004 you won the [Fred Conrad] Koch Award from the Endocrine Society, which is their highest award, and then this past year, in 2005, you won the William [E.] Ladd Medal from the Section on Surgery of the American Academy of Pediatrics, which is their highest award, so you’ve managed to be recognized for your contributions, and I imagine that there are some other awards out there that are waiting for you as time goes on.

Is there anything I haven’t asked you about that you would like to say for posterity?

DR. DONAHOE: It has been a wonderful trip, and I think the most important thing, even though one may encounter bias, is to maintain one’s hunger in the gut, to do investigative work that one wants to do and not to be put off by external pressures. Women have to work harder than men because they are basically responsible for the care, maintenance, and management of the family. I am fortunate to have a wonderful husband, Jack. We’ve pitched in and done it together; I never could have done things without my buddy, Jack. The most important choice is the right mate.

DR. OUELLETTE: Did you have mentors? I said earlier that 40% of our members are under 40, and two-thirds of them are women. We keep hearing about the importance of mentoring.
DR. DONAHOE: At Columbia Physicians and Surgeons we had great women at P&S when I was there as a student. We had Virginia Kneeland Frantz, who was a great pathologist, and Virginia Apgar, who had been directed away from surgery into anesthesiology. My mentors growing up in the Harvard system were Judah Folkman, Hardy Hendren, and particularly W. Gerald Austen, who was my chief of surgery for many years. Our laboratory would not be here without his scientific support and financial endowment. He was tremendous in allowing me to develop as a surgeon, as a service chief, and as an investigator.

DR. OUELLETTE: What about relaxation? What have you done for fun? I know that you were very athletic when you were younger; have you continued?

DR. DONAHOE: I particularly like historical biographies in medical history. I read incessantly when I’m not writing. I also get a huge thrill from learning new investigative techniques. I enjoy playing with my kids and family, tennis, skiing, sailing, walking. I used to run a lot, but I have had to adapt due to back problems, so I walk; I’m happy to be able to do that.

DR. OUELLETTE: Where did you do your sailing?

DR. DONAHOE: Mainly on the East Coast, Boston Harbor. Now we sail in Hyannis Port [Massachusetts], where we keep our boat and where we have a house where all the kids come. It’s just wonderful.

DR. OUELLETTE: You have grandchildren now? How many of those do you have?

DR. DONAHOE: Three grandchildren.

DR. OUELLETTE: How old are they and what are their names?

DR. DONAHOE: Tommy is 12, Katie 14, and Andrew is 15 years of age.

DR. OUELLETTE: Is there anything else that you wanted to mention?

DR. DONAHOE: I love this lab. Although I miss clinical surgery, right now we’re immersed entirely, working the same number of hours with the same intensity. However, it is wonderful to be able to focus rather than trying to run a department, a clinical practice, and the lab at the same time. I am truly enjoying the working environment of the new laboratory.

DR. OUELLETTE: You told me earlier that you stopped seeing patients a couple of years ago. I guess you’ve continued with some of your older patients?
DR. DONAHOE: I stopped seeing patients and operating about a year ago. Dr. Rafael V. Pieretti, who was recruited as the new chief of pediatric urology, gives them wonderful care. I consult with him on difficult patients, and go to the OR with him, but I don’t see any new patients myself.

DR. OUELLETTE: How many people do you think you’ve trained in your own department, and can you tell me what some of them are doing now?

DR. DONAHOE: We went from two pediatric surgeons, Dr. Kim and I, after Dr. Hendren was recruited to Children’s Hospital [Boston], to eight pediatric surgeons, and I’ve had a hand in training them clinically. We’ve trained over 90 fellows who’ve come to the laboratory over the years; they have gone on to wonderful posts as pediatric surgeons, laboratory investigators in academia and industry, chiefs of departments; one is president of a hospital, another president of a university, and another president of a medical center. We have had marvelous people trained in the lab; they have gone on to do spectacular things. I am most proud of all the people we’ve trained.

DR. DONAHOE: [Addendum after interview conclusion] I am going to the American Pediatric Surgical Association next week and at that point will be inducted as the next president following Judah Folkman, who is the current president. Moses Judah Folkman’s untimely and sudden death in February 2008 left me personally bereft and the field of pediatric surgery without its most esteemed surgeon and scientist.

END OF STATEMENT
QUESTION: In the interview, you said that during medical school you developed an interest in surgery, but that your surgical attendings expressed concerns about that career path. If you were aware that they thought that about your career interest, why did you continue to pursue that path?

DR. DONAHOE: Because I loved my surgical rotations in medical school so much.

QUESTION: You said that Dr. Folkman was a “mile-a-minute idea man.” Could you provide some examples?

DR. DONAHOE: If you brought up an idea, he saw many implications and ramifications.

QUESTION: In addition, you said that he was of the opinion that “if you didn't know about something you could learn it by doing, and you shouldn't be intimidated because you hadn't had specific training in something.” Could you please provide examples of what you and Dr. Folkman “learned by doing”? How were you able to apply that learning process elsewhere?

DR. DONAHOE: I applied his philosophy through the remainder of my professional life in surgery, learning new techniques and strategies of care. In research we learned and used organ culture, diverse animal models, cell biology, biochemistry, molecular biology, genetics, genomics, and computational biology. In the clinical sphere, if a current operation was suboptimal we improved or changed it, or incorporated a new technology which provided a better way to address a surgical problem. We worked collaboratively with our pediatric subspecialties to bring optimal management paradigms.

QUESTION: You said that along with Dr. Hendren, you had the opportunity to start the lab that you now direct. Could you please explain how you developed the lab?

DR. DONAHOE: Dr. Hendren was awarded research space for pediatric surgery, and gave me the opportunity to start and develop it. We learned increasingly sophisticated research techniques, won NIH grants and other foundation awards to support the growing number of scientist who came to the laboratory with career interest in developmental biology, reproductive biology, and genetics and genomics.

QUESTION: How did it differ from other labs at the time?
DR. DONAHOE: We were one of the few developmental biology laboratories at Massachusetts General Hospital, the only one with a direct clinical connection and only the one using organ culture.

QUESTION: What goals did you have in mind when you began it?

DR. DONAHOE: To study fetal development in general and fetal inhibitors in particular.

QUESTION: As the lab was being established, what was challenging?

DR. DONAHOE: Incorporating and learning new technologies.

QUESTION: What went better than expected?

DR. DONAHOE: Funding was simpler at the time.

QUESTION: You said that you and your husband, Jack, had a “life of juggling child care and mutual professions.” Could you please explain in what ways it was challenging and how you and your husband worked through those challenges? (A specific example might serve as a good illustration.)

DR. DONAHOE: We solved the challenges of child care by living near our families, and employing a fulltime housekeeper.

QUESTION: While you were in England you decided to pursue work with MIS.

DR. DONAHOE: I was doing newborn surgery at the time but got the idea to study MIS as a fetal inhibitor while there.

QUESTION: At that time, what were your hopes or accomplishment goals for your research? Were you aware at that time that it would develop into a career-long pursuit?

DR. DONAHOE: No.

QUESTION: Knowing what you know now, would you have changed your focus in any way? If yes, to what and why? If no, why not?

DR. DONAHOE: No. I have thoroughly enjoyed the progressive learning and the intellectual and organizational challenges that the investigations have required to maintain progress.
QUESTION: You commented that there was an issue with Biogen and getting the rights back from Biogen so another company could develop it -- and that this issue took seven years to resolve.

DR. DONAHOE: Biogen would not return licensing rights.

QUESTION: Could you please explain a little bit of the circumstances around that issue?

DR. DONAHOE: No comment.

QUESTION: How did going through that situation change the way you worked with companies? What did your team learn from dealing with that issue?

DR. DONAHOE: No comment.

QUESTION: You also commented that there have been changes to the availability and/or allocation of NIH funding. Could you please explain what kind of impact you see the changes having on current and future research?

DR. DONAHOE: The flat NIH budget in the face of rising costs and exponential technology developments has in fact resulted in reduced funding levels at NIH to a point where morale has dipped dramatically and young investigators are, by necessity, being forced to leave biomedical research.

QUESTION: As Dr. Ouellette pointed out, you have received numerous awards for your work and contributions. What award has meant the most to you and why?

DR. DONAHOE: Election to the National Academy of Sciences, DeLay Award for the care of women and children [Joseph Bolivar DeLay Humanitarian Award] (Chicago Lying in Hospital, University of Chicago Medical Center).

QUESTION: At the end of the interview, you said, “I think that's the thing of which I am the most proud: all the people we've trained.” You have so many other accomplishments -- why are you most proud of this one? Also, how do you believe that the opportunities to train others has enhanced your career?

DR. DONAHOE: We experience an incredible sense of pride when we see a trainee become a leader in his or her respected fields. I learn more from fellows, residents, and students than they learn from me. Their energy and enthusiasm is infectious.

END OF STATEMENT
Index

A
Alder Hey Children's Hospital, 1, 3
American Academy of Pediatrics, Section on Surgery, 10
American Pediatric Surgical Association, 12
Apgar, Virginia, 11
Austen, W. Gerald, 11

B
Barnes, Ann, 2
Biogen NV, 6, 15
Boston Harbor, 11
Boston University, 1, 5
Boston, Massachusetts, 1, 2, 4, 7
Braintree, Massachusetts, 1
Broad Institute, 7, 8
Brookline, Massachusetts, 1

C
Cate, Richard, 6
Children's Hospital Boston, 1, 7, 12
Columbia University College of Physicians and Surgeons, 1, 3, 11
congenital diaphragmatic hernia, 7
Crawford II, John Douglas, 8

D
Donahoe, Jack, 3, 10, 14
Donahoe, Jake, 4
Donahoe, Shauna, 3
Donahoe, Tara, 3

E
Endocrine Society, 10

F
Folkman, M. Judah, 1, 2, 4, 11, 12, 13
Ford Motor Company, 4
Forshall, Isabella, 1
Virginia Kneeland Frantz, 11

G
Gilbert, Walter, 6
Gold, Phil, 5
Goldstein, Allan M., 8

H
Hamilton, Thomas C., 4
Harvard Medical School, 1, 2, 5, 11
Hendren, W. Hardy III, 1, 2, 4, 5, 8, 11, 12, 13
Hyannis Port, Massachusetts, 11

I
Indiana University, 1
intersex abnormalities, 5, 7, 8
Ipsen, 6, 9

J
Johnston, J. Herbert, 1
Joseph Bolivar DeLee Humanitarian Award, 15
Jost, Alfred, 4

K
Kim, Samuel, 1, 3, 12
Koch Award, 10

L
Liverpool, England, 1, 3

M
MacLaughlin, David T., 6
Massachusetts General Hospital, 1, 2, 3, 6, 14
Mass General Hospital for Children, 7
Merck & Co., Inc, 6
Migeon, Claude J., 8
Müllerian inhibiting substance, 4, 5, 6, 7, 9, 14

N
National Academy of Sciences, 15
National Institutes of Health, 6, 7, 13, 15
New England Medical Center, 1

P
Pediatric Surgical Research Laboratories [Massachusetts General Hospital], 1, 3, 13
Perkins, Lizabeth, 8
Picon, Régine, 4
Pieretti, Rafael V., 12

R
Rickham, Peter, 1
Royal Liverpool Medical Society, 4
Rykland, Seymore, 5
S
Scully, Robert E., 6
Shannon, Daniel C., 3

T
Tufts-New England Medical Center, 2, 5

U
University of Paris, 4

W
William E. Ladd Medal, 10
CURRICULUM VITAE

Name: Patricia K. Donahoe, M.D.

Present Position: Director, Pediatric Surgical Research Laboratories, Massachusetts General Hospital
Marshall K. Bartlett Professor of Surgery, Harvard Medical School, Cambridge, MA

Address/Telephone: Pediatric Surgical Research Laboratories
Massachusetts General Hospital
CPZN 6206
Boston, MA 02114
617-724-1600
617-726-5067 (fax)

Place of Birth: Boston, Massachusetts

Education:
1958 B.S. Boston University (Magna cum laude)
1964 M.D. Columbia University College of Physicians and Surgeons
1989 A.M. Harvard University (honorary)

Postdoctoral Training:

Internship and Residencies:
1964-1969 Surgical Intern, Junior Assistant, Senior Assistant, Senior and Chief Surgical Resident and Teaching Fellow, Tufts New England Medical Center, Boston, MA
1971-1972 Senior Registrar, Alder Hey Children's Hospital and Neonatal Surgical Unit, Liverpool, England

Research Fellowships:
1969-1970 Research Fellow, Children's Hospital Medical Center, Harvard Medical School, Boston, MA (Judah Folkman, MD)
1970-1971 Research Fellow, Massachusetts General Hospital, Harvard Medical School, Boston, MA (W. Hardy Hendren, MD)

Licensure and Certification:
State of Massachusetts - Registration No. 29158 (Expiration Date: 4/12/2005)
State of New Hampshire - License No. 3948 (9/1966)
American Board of Surgery - General Surgery (1971) (Certificate # 17889)
American Board of Surgery - Pediatric Surgery (1976)

Academic Appointments:
1973-1986 Clinical Assistant, Instructor, Assistant Professor, Associate Professor in Surgery, Harvard Medical School, Boston, MA
1985- Student Advisor, Harvard Medical School and Harvard-MIT Division of Health Sciences and Technology (HST)
1985-1993 Faculty, Cell and Developmental Biology Department, Harvard Medical School, Boston, MA
1993- Associate Faculty, Biological and Biomedical Sciences Program, Harvard Medical School, Boston, MA
1986- Associate Professor of Surgery at the Massachusetts General Hospital, Harvard Medical School, Boston, MA
1988- Tenured Chair (Marshall K. Bartlett Professor of Surgery)
1990-1996 Member thesis committee, Department of Genetics, Harvard Medical School, Boston, MA
1992- Senior Fellow, Francis Weld Peabody Society, Harvard Medical School, Boston, MA
2000- HST Board of Advisors
2002-2005 Distinguished Scholar, Academy at the Harvard Medical School

Hospital Appointments:

1973-1985 Clinical Associate in Surgery, Assistant in Surgery, Assistant Surgeon, Associate Visiting Surgeon, Massachusetts General Hospital, Boston, MA
1984-1991 Chief, Division of Pediatric Surgery; Massachusetts General Hospital, Boston, MA
1991-2003 Chief, Pediatric Surgical Services, Massachusetts General Hospital, Boston, MA
1986- Visiting Surgeon, Massachusetts General Hospital, Boston, MA
1973- Principal Investigator and Director, Pediatric Surgical Research Laboratory, Massachusetts General Hospital, Boston, MA
1977- Committee on Research, Massachusetts General Hospital, Boston, MA
1980-1982 Chairman, Subcommittee on the Review of Research Proposals, Committee on Research, Massachusetts General Hospital, Boston, MA
1985-1988 Vice Chairman, Executive Committee on Research, Massachusetts General Hospital, Boston, MA
1988-1991 Chairman, Executive Committee on Research, Massachusetts General Hospital, Boston, MA
1980-2003 Executive Committee on Research, Massachusetts General Hospital, Boston
1988-1994 General Executive Committee, Massachusetts General Hospital, Boston, MA
1994-2003 Chiefs’ Council, Massachusetts General Hospital, Boston, MA
1993-1995 Chair, Gene Therapy Subcommittee, Massachusetts General Hospital, Boston, MA
2003- Chief, Pediatric Surgical Services, Emerita

Principal Clinical and Hospital Service Responsibilities:

Chief, Pediatric Surgical Services, Emeritus, Massachusetts General Hospital
Visiting Surgeon, Massachusetts General Hospital

Consultant:

Shriners’ Burn Institute
Brigham and Women’s Hospital

Grants:

1974 Hood Foundation Grant
1975 King Trust Grant
1976-2010 National Institutes of Health Grant #1 RO1 CA17393-30
1993-97 National Institutes of Health Grant #1 RO1 HD30812
1994-2005 National Institutes of Health Grant #1 RO1 HD32112
1995-99 March of Dimes #FY96-0909
1990-2005 National Institutes of Health Grant #T-32 HD07396
1991-2000 National Institutes of Health Grant #P-30 HD28138
2000-2005 National Institutes of Health Grant #U54HD28138
2001-2006 National Institutes of Health Grant #P01 HD39942-04
1982-91 American Cancer Society Grant #PDT-221
1982-85 Directed Giving Award - Johnson and Johnson
1991-94 FD-R-000669-02
1992-93 American Cancer Society Grant #RD#359
------ Multiple NIH (NRSA), American Cancer Society, Surdna, American College of Surgeons, Society of University Surgeons, and other foundation training fellowships

Patents Issued:

4/26/2006
1983  Purified Müllerian Inhibiting Substance and Method of Purification. USPN 4,404,188
1984  Method of Preparing Hybridomas and of Purifying Immunogenic Materials. USPN 4,487,833
1985  Purified Müllerian Inhibiting Substance and Method of Use. USPN 4,510,131
1988  Use of Müllerian Inhibiting Substance as a Contraceptive Agent. USPN 4,753,794
1989  Monoclonal Antibody to Müllerian Inhibiting Substance. USPN 4,792,601
1991  Use of EGF to Reverse the Contraceptive Activity of MIS. USPN 5,010,055
1991  Purified Müllerian Inhibiting Substance and Process for Human Ovarian Cancer Cells. USPN 5,011,687
1991  DNA Sequences, Recombinant DNA Molecules and Processes for Producing Müllerian Inhibiting Substance-like Polypeptides. USPN 5,047,336
1993  Use of Müllerian Inhibiting Substance, and its Agonists and Antagonists in the Treatment of Respiratory Distress Syndrome. USPN 5,198,420
1994  Treatment of Male Infertility by Administration of a Müllerian Inhibiting Substance and Surgery and/or Hormonal Treatment. USPN 5,484,768
1996  Nucleic Acids Encoding a TGF-Beta Type 1 Receptor. USPN 5,538,892
1997  Use of Müllerian Inhibiting Substance for Treating Certain Tumors and for Modulating Class I Major Histo compatibility Antigen Expression. USPN 5,661,126
2004  Use of Müllerian Inhibiting Substance for Treating Excess Androgen States, USPN 6673352

Major Research Interests:

Study of fetal inducers and regressors and their development as potential chemotherapeutic agents
Understanding the molecular and genetic causes of congenital abnormalities
Growth factors and inhibitors - effects on immune response
Etiology and treatment of intersex abnormalities
Etiology and treatment of congenital urological disorders
Genetic defects in diaphragmatic hernia and In utero pharmacological treatment of congenital diaphragmatic hernia
Gene therapy in utero

Other Professional Positions and Major Visiting Appointments:

Fellow, American Academy of Arts and Sciences
Fellow, National Academy of Sciences
Fellow, Institute of Medicine
Board of Trustees, Boston University
Scientific Advisory Board, Collagen Corporation, Palo Alto, CA 1987-1990
Subcommittee of Professors, Harvard Medical School, Boston, MA
Chairman, Board of Scientific Counselors, National Institute of Environmental Health Sciences
Scientific Advisory Council of the Sophia Foundation, Rotterdam, Holland
MIT Corporation Visiting Committee Member, Boston, MA
Board of Scientific Consultants, Memorial Sloan-Kettering Cancer Center, NY, NY
External Advisory Board, Wyeth-Ayerst Research, Philadelphia, PA
National Institute of Child Health and Human Development, National Advisory Council of the NIH
Science Advisory Committee, Genzyme Corporation
Harvard Medical School Faculty Council (1985-)
Chairman, Scientific Advisory Board, St. Jude's Hospital
Chairman and Committee Member, Burroughs Wellcome Fund Career Award Advisory Committee
President Elect, American Pediatric Surgical Association

Awards and Honors:

1964  Borden Undergraduate Research Award, Columbia University College of Physicians and Surgeons
1973  Peter Paul Rickham Traveling Fellow
1977-1980  Junior Faculty Fellowship Award, American Cancer Society  
1984       Alumni Award for Distinguished Public Service to the Profession, Boston University  
1985       Distinguished Lecturer, Japanese Society of Pediatric Surgeons  
1985       Burroughs Wellcome Distinguished Lecturer  
1987       Robert E. Gross Lectureship & Award  
1987       James Cuozzo Memorial Lecture, Wistar Institute  
1987       Fellow, American Academy of Arts and Sciences  
1988       Woman of the Year, Ms. Magazine  
1988       Lawson Wilkins Pediatric Endocrine Society, Eli Lilly Lecturer  
1990       The 1990 Ortho 21st Century Science Award  
1990       Australasian College of Surgeons Visiting Professor  
1991*      Fellow - Institute of Medicine, National Academy of Science  
1993       The NIH Lecture  
1994       Student Research Day Faculty Lecture, Brown University  
1994       Braintree High School Athletic Hall of Fame  
1994       Astwood Award - Endocrine Society  
1994       Outstanding Bostonian Award  
1994       Soma Weiss Faculty Lecture, Harvard Medical School  
1995       Presidential Lecture, Society of Gynecologic Investigation  
1995       Gold Medal Alumni Award for Distinguished Achievements in Medicine, Columbia College of Physicians and Surgeons  
1995       Award for Basic Science, The Society for the Advancement of Women's Health Research and Warner Wellcome  
1996       Boston University Athletic Hall of Fame  
1996       Farr Lectureship, Yale University  
1996       Dunphy Professorship - University of California, San Francisco  
1996       Nina Starr Braunwald Award  
1997       The 25th New England Endocrine Conference Plenary Lecturer  
1998       Montreal Endocrine Retreat - Plenary Lecture  
1998       AUA - Pediatric Urology Meredith P. Campbell Lecture  
1998       Fellow of the American Association for the Advancement of Science  
1999*      Fellow, National Academy of Sciences  
1999       Lecture, BU School of Medicine Department of Pathology and Laboratory Medicine Seminar Series  
1999       Lecture, Development Biology and Histopathology of the Uterus, NIH  
1999       McCloud Lecture, Montreal Children's Hospital, Montreal, Canada  
1999       Lecture, Mount Sinai School of Medicine, NY, NY  
2000       Lecture, Japan Surgical Society, Tokyo, Japan  
2000       Lecture, Reproductive Tract Biology, Gordon Conference, New London, CT  
2001       Van Wyk Visiting Professor, University of North Carolina, Chapel Hill  
2001       Frontiers in Science Lecturer, Case Western Reserve University, OH  
2001       Sorono Lecturer, Reproductive Endocrinology, Italy  
2001       Lecture, Distinguished Seminar, University of Iowa  
2001       Utter Memorial Lecture, Case Western University, Cleveland, OH  
2001       Lecture, Harvard School of Dental Medicine, Grand Rounds, Boston, MA  
2001       Lecture, Surgical Grand Rounds, Children's Hospital, Boston, MA  
2001       Lecture, Women's Cancer Visiting Committee, Massachusetts General Hospital, Boston, MA  
2002       President, Boston Surgical Society, Presidential Address  
2002       Consensus Workshop on Congenital Adrenal Hyperplasia, Lawson Wilkins Pediatric Endocrine Society and The European Pediatric Endocrine Society, Gloucester, MA  
2002       Lecture, Genetics, Development and Reproductive Biology Course, Harvard Medical School  
2004       Flance-Karl Award, American Surgical Association  
2004       Fred Conrad Koch Award, The Endocrine Society  
2004       Honorary Doctor of Science, Northwestern University  
2005       Joseph Bolivar DeLee Humanitarian Award, Chicago Lying-In Hospital  
2005       William Ladd Medal, American Academy of Pediatrics
2006               Merrill S. Davis Lecturer, Department of Surgery Indiana University School of Medicine

Major Committee Assignments:

National and Regional

1980-1982 Chairman, Publications Committee, American Pediatric Surgical Association
1986-1993 Board of Directors, Massachusetts Division of American Cancer Society.
1989    Councillor, Massachusetts Division, American College of Surgeons
1990    Treasurer, Massachusetts Division, American College of Surgeons
1990-1993 Board of Governors, American Pediatric Surgical Association
1990-1995 Biochemistry and Endocrinology Study Section, American Cancer Society, Atlanta, GA
1991-1994 Chairman, Board of Scientific Counselors, NIH (NIEHS)
1996-2001 National Child Health and Human Development National Advisory Council of the NIH
1998    First Vice-President, American Surgical Association
2001-2002 President Boston Surgical Society

Editorial Boards:

1983- Editorial Board, "Endocrinology"
1983- Editorial Board, "Journal of Pediatric Surgery"
1992- Editorial Board, "International Journal of Oncology"
1993- Editorial Board, "Endocrine Reviews"
1993-1995 Editorial Board, "Environmental Health Perspectives"
1994- Associate Editor, "Clinical Cancer Research"
1994-2004 Editorial Board, "Seminars in Reproductive Medicine"
1995- Editorial Board, "Annals of Surgery"
1996- Editorial Board, "Journal of American College of Surgeons"
1999- Editor, "Proceedings National Academy of Sciences"

Memberships, Offices and Committee Assignments in Professional Societies:

1969- The American Medical Association
1971- American Board of Surgery
1973- Fellow, Massachusetts Medical Society
1975- Fellow, American College of Surgeons
1975- Fellow, Boston Surgical Society
1976- Association for Academic Surgery
1976- British Association of Pediatric Surgeons
1977- The Endocrine Society
1977- American Academy of Pediatrics, Surgical Section
1977- American Pediatric Surgical Association
1977- Biology Club, American College of Surgeons
1978- American Association for the Advancement of Science
1980- Society of University Surgeons
1980- New England Section of the American Urological Association, Inc.
1981- New England Surgical Society
1981- Societe Internationale de Chirurgie
1982-1985 Treasurer, Boston Surgical Society
1995-1996 Vice President, Boston Surgical Society
1983- American Surgical Association (1998-First Vice-President)
1986- Surgical Biology Club
1986-1993 Board of Directors, Massachusetts Division, American Cancer Society.
1990-1992 Massachusetts Chapter of the American College of Surgeons-Treasurer
1998- Fellow, American Association for the Advancement of Science
1996- Advisory Committee, Burroughs Wellcome Fund Career Awards in the Biomedical Sciences
1997- St. Jude Scientific Advisory Board
2002-2003 President, Boston Surgical Society
2003 Chair, Burroughs Wellcome Fund Career Awards in the Biomedical Sciences
California Institute for Regenerative Medicine
2007 President Elect, American Pediatric Surgical Association

Teaching Responsibilities:

Supervision of Senior thesis students from Harvard University and Tufts University, Pre-doctoral, Post-doctoral, and Research Fellows (6 Ph.D. and M.D. fellows/yr., > 80 since 1973)
Resident and Medical Student Teaching in Clinical Pediatric Surgery
Harvard Medical School Lectures:
Anatomy
Embryology
Pre- and Post-doctoral teaching in Developmental Biology Research
Postgraduate Course Teaching in:
Pediatrics
Surgery, General, Pediatric, and Thoracic
Reproductive Endocrinology
Gynecology
Gynecologic Pathology
Distinguished Scholar, Academy at Harvard Medical School

Bibliography:

Original Reports:


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54. Hutson JM, Donahoe PK. Müllerian Inhibiting Substance is a circulating hormone in the chick-quaill chimera. Endocrinology 1983; 113:1470-5.
55. Fallat ME, Hutson JM, Budzik GP, Donahoe PK. The role of nucleotide pyrophosphatase in Müllerian Duct Regression. Develop Biol 1983; 100:358-64.
60. Ikawa H, Hutson JM, Budzik GP, Donahoe PK. Cyclic Adenosine 3',5'-monophosphate modulation of Müllerian duct regression. Endocrinology 1984; 114:1686-91.
77. Hutson JM, Donahoe PK. The hormonal control of testicular descent. Endocrine Reviews 1986; 7:270-83


240. Gupta V, Gimmina Y, Kawakubo H, Rangnekar V, MacLaughlin DT, Donahoe PK, Maheshwara S. Mullerian Inhibiting Substance stimulated NFKB activation through phospho-Smad1 is dependent on the sequence of the NFKB binding site. Submitted.


Books:


Book Chapters:


4/26/2006


Reviews:


