

A Career of Honor and Humility: Interview with a Pioneer in Ophthalmology

By Eli Cehelyk, BA | Faculty Mentor: Carol Shields, MD



Credit: Roger Barone, Wills Eye Hospital

“ I wasn’t looking to be a superstar, I just wanted to be good at what I did.” – Dr. Carol Shields

Imagine being a first-time parent in your early 30s, and you have just learned that your three-month old infant has retinoblastoma. Thanksgiving is right around the corner and you have no idea what the future holds. How would you feel? What thoughts would be racing through your head? With both hope and anxiety, you make an appointment at Wills Eye to see Dr. Carol Shields, a world-

renowned expert on ocular oncology.

With confidence and compassion, she walks into the room with her entire team and says, “Don’t worry, we will get everything under control for you. We will take your baby and by Christmas, he will be nearly cancer free.” To me, that is exactly what a superstar looks like.

Early childhood influences

Originally from Western Pennsylvania, Dr. Shields grew up with her seven siblings in Sharon, a steel manufacturing town. Her parents were health professionals,

and both participated in World War II. Impressively, her mother won three honorable medals for her service in the war, saving thousands of American soldiers on Christmas Eve whose boat, the Leopoldville, was torpedoed by the Germans. Dr. Shields said humbly, "I've seen some scary things, but I've never had to take care of a thousand hypothermic men. When I look at what my parents did, my job pales in comparison."

Dr. Shields' parents were instrumental in providing her with the confidence and support to follow her dreams. Reflecting back on running track in high school, Dr. Shields said, "it could have been snowing or raining, and there were no parents in the stands except for mine. My father would cut his clinic short and come to every event. They always made it no matter what. That makes you feel like you are important, not just a number in the family." The unconditional love that her parents provided her throughout her childhood gave her the ability to pursue her passions. For much of her life, that included sports.

"Sports gave me a lot of belief in myself at a young age," Dr. Shields remarked. While at the University of Notre Dame, Dr. Shields saw an advertisement on an 8.5 x 11 sheet of paper taped on a wall in her dorm titled, "Women's Basketball Tryouts." Even though she loved basketball and had played her whole life, Dr. Shields said, "I had one goal: I just wanted to pass my courses. I was intimidated coming from blue-collar Western PA, competing against all of the boys and girls from private schools." Fortunately, Dr. Shields noted, "I knew all the dirty tricks in the

book. I learned street basketball from my old home days with a good jump shot and quick hands - you could never call a foul on me." Dr. Shields decided to try out for the women's basketball team at Notre Dame. She made the team with ease, and looking back on her experience, she said, "That really made me believe in myself. I could play college basketball, balance it with my studies, and build a team from the ground up."

Entering medical training

During her collegiate years, Dr. Shields was not immediately set on being a physician.

“I never really thought about going into medicine, because medicine wasn't for women, it was mostly for men. I loved science and I thought about being a pharmacist or an optometrist. As it boiled down, I said, why should I shortchange myself? I should do what I want to do and become a doctor.”

– Dr. Carol Shields

The world is a better place because Dr. Shields decided to follow her true passion and enter the medical field. She followed her family trend of attending the University of Pittsburgh for medical school, and excelled throughout her time there. By her third year, she had a decision to make: what residency program should she enter?

"When you're from a big family, you call your older sibling," Dr. Shields remarked. Her older brother Pat was a resident at Wills

Eye at the time, and told her, “Carol, hands down you have to do ophthalmology. This field is satisfying because you give back the patient’s vision, sometimes immediately. Nearly every ophthalmologist is happy in his/her career.”

Many years later, this statement still holds true. Dr. Shields commented, “95% of ophthalmologists [today] are happy, confident and proud of their careers. You see it all the time at Wills, from the residents to the fellows. Ophthalmology attracts a lot of really good, smart people who want to be here. Ophthalmology is ahead of many other specialties in terms of surgeries and treatments. Ophthalmology was the first field to use gene therapy successfully, treating blindness in babies.”

Evolution of ocular oncology

Dr. Shields has been instrumental in driving many innovative ophthalmic therapies over the last few decades. Perhaps the quintessential example of her life-changing work relates to developments in retinoblastoma. “In the early 1900s, retinoblastoma was nearly 100% fatal, now less than 1% of affected children die. Between 1900 and 1950, ophthalmologists reduced the death rate to 50% just by better detection. Then the field of ocular oncology was conceived in the late 1970s and patients received centralized care with improvement in outcomes. When I entered in 1984 there was a 15% death rate, and that’s when I was handed the baton and was told to keep on running.”

At that point, she was one of a few ocular oncologists focusing on retinoblastoma.

“You tippy-toe through the first few months, not knowing what you’re going to see. It was just me and me.”

– Dr. Carol Shields

One of the first major developments in the treatment of retinoblastoma came in 1994, when chemotherapy became an option. Dr. Shields noted that there was a lot of fear during those chemotherapy sessions, as no one else in the world had been implementing this therapy for retinoblastoma. At that time, one would typically remove the eye of an afflicted child or irradiate it, but, as Dr. Shields explained, “one after the other, the kids came back, looking awesome. I thought to myself, this is really working.”

Fast forward to 2006, and Dr. Shields was on the verge of yet another major breakthrough: intravitreal chemotherapy. Injecting chemotherapy directly into the eye – the first in the U.S. at the time to do this. Dr. Shields noted that, “The scariest part was that the Jefferson pharmacy would not mix the chemotherapy for me. Because it was very unstable and only lasted one hour, I had to mix the chemotherapy in the operating room. I was sweating bullets, mixing chemotherapy that I would be injecting, often into the only remaining eye of a baby.” Initially, Dr. Shields attempted this option on three kids, and to her surprise, intravitreal chemotherapy was successful. However, the effects only lasted for six months. After years of exploring dosage and treatment regimens, by 2012, Dr. Shields was saving



Dr. Jerry Shields (left) and Dr. Carol Shields (right) pose for a picture at Wills Eye Hospital, where they have both spearheaded advances in ocular oncology.

Credit: Roger Barone, Wills Eye Hospital

nearly every eye with retinoblastoma through intravitreal chemotherapy.

Advocacy for novel therapies

Most recently, Dr. Shields spearheaded yet another major revolution in the treatment of retinoblastoma: intraarterial chemotherapy through the ophthalmic artery, the blood vessel that directly supplies the eye. She first approached the neurosurgical team at CHOP as they provided the chemotherapy for these children, but they declined to attempt this new treatment. Without blinking an eye, Dr. Shields then approached Dr. Rosenwasser, the Chief of Neurosurgery at Jefferson, with her idea and he agreed to perform the operation. Dr. Shields said, "He did the first twenty. The first took seven hours of delicate catheterization of an infant's vascular tree, but with practice and nuances this procedure now takes less than 1 hour. Along with Jefferson neurosurgery, we are now one of the leading centers in the world for intraarterial chemotherapy."

In just one day, Dr. Shields has treated

children from Missouri, Florida, Maryland, Illinois, and Oklahoma with intraarterial chemotherapy, changing the lives of children and families across the country. "Now the [retinoblastoma] death rate is 1%...and if the parents listen and follow the regimen that we tell them to, there is nearly a 0% mortality rate."

Dr. Shields has played an influential role in revolutionizing the field of ocular oncology, while also serving as a role model for women in all fields of medicine. When she entered medical school, her class was comprised of only 20% women. She said, "I knew it would be an uphill challenge, and I used my sports mind to practice and learn so that I could thrive."

Dr. Shields took those lessons from sports and applied them to her academic and medical careers. With her incredible grit and work ethic, Dr. Shields did not let her challenges take control over her. She was also grateful to be surrounded by strong, kind, and intelligent women throughout medical school and residency who helped her accomplish her goals.

“When I was at the University of Pittsburgh Medical School, my advisor was a woman, and she had a major impact on me. She was a cardiologist who had five children. She was such a normal and beautiful person and I said to myself, “Wow, she has it all together, if she can do it, so can I.”

A lasting impact

Today, Dr. Shields is undoubtedly one of the most influential ophthalmologists in the world. Despite her numerous accomplishments, esteemed awards, and groundbreaking publications, Dr. Shields remains incredibly humble. When asked about how she handles the recognition, she said, “I observed how my husband, Jerry, handled this. Jerry was a major leader in the field for years. He is humble, kind, friendly and didn’t let it get to his head.” She followed by sharing what her greatest joy has been throughout her career: “when a patient says thank you.”

“Today I got a little sheet of paper from a girl from Missouri who made a stick figure drawing of herself and me holding hands and it said, “Thank you Dr. Shields for taking care of me.” I save all of those notes, I have two cabinets filled with letters like those. Perhaps the most meaningful comment came from young parents from Alabama, whose child had retinoblastoma in both eyes. After treating their child, the father said, “Dr. Shields, thank you so much from taking time away from your family to help my son.” She added, “I just want these kids to have everything that my kids have.”

Training the next generation

Dr. Shields’ selflessness and humility is also exemplified in her mentorship of students and fellow ophthalmologists across the country. “Yesterday, I received numerous email consults from people all over the U.S., and I try to send them a quick reply with advice. That’s just what we do,” Dr. Shields said.

Dr. Shields would like to convey three critical pieces of advice for medical students who are interested in pursuing ophthalmology. First, “Be confident in yourself, be proud of yourself. You are smart. You have to be intelligent to go to college, get into medical school and pass the courses that they give you. Sometimes people do not have enough self-confidence. Be proud of yourself and think positive.”

Next, “Have a dream and achieve it. If your dream is to become an ophthalmologist, find the path, cut the weeds out, be nice to people along the way. Find yourself 1 - 2 mentors who can guide you with decision-making along your path.”

Lastly, “Once you become an ophthalmologist, be thankful and give back. Not just to your medical school and where you did residency but look back to the people who started you off. Every year I give donations to all of the schools that my children attended. Maybe you can give back free screenings or free eye care to underprivileged children. Carve out a bit of charity and provide opportunity.”

“Be good to people, and goodness will come back to you.”

– Dr. Carol Shields