

Larry Longo: A Life Worthwhile

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Figure 1. Mrs. Sharon Reece, Dr. E. Albert Reece, and Dr. Lawrence Longo (from left to right) at Loma Linda University in 2010. This image was provided to Dr. Reece by Pastor Brad Thorp.

When I heard that Lawrence Longo, MD, had passed away, my thoughts and prayers first turned to his surviving family members, especially his beloved wife, BJ. I trust that their fond and irreplaceable memories will sustain them through this difficult time. I then reflected on Larry, the compassionate person, the drive to heal he possessed, and the contributions he made to science. Larry was not only a great physician but also an exceptional scientist who followed his passion for improving the health and well-being of pregnant women and their unborn babies. As a fellow reproductive physician-scientist, I came to deeply appreciate the respect that Larry commanded within the medical and biomedical research professions, in the field of perinatal developmental biology, and the great influence of his reputation and character. Larry was soft spoken, thoughtful, and humble—attributes nurtured by his deep devotion to his faith as a Seventh Day Adventist. Through his good works and honorable deeds, he was a roaring giant of a man. He lived his life purposefully, blazing trails and making an impact along the way.

An Advocate for the Fetal Patient

In the 1950s, when Larry had just begun his professional journey, access to the fetus was limited. Often obstetricians and gynecologists (ob/gyns) viewed the pregnant woman as the sole patient. The idea that the fetus was also a patient was not yet the widespread mind-set that it is today. Then amniocentesis was introduced in 1952,¹ and chorionic villus sampling (CVS) soon followed in the 1960s,² giving ob/gyns unprecedented access to the unborn baby. Highly accurate procedures for diagnosing fetal anomalies carried risks to both mother and baby, notably an increased risk of miscarriage. The results also took several weeks to arrive.

Both amniocentesis and CVS remain in use today, but the big breakthrough in fetal diagnostic testing came in 1958 with the use of ultrasound to assess the health of the unborn baby, followed by the development of real-time ultrasound in the 1970s, Doppler imaging in the 1980s, and color Doppler in the 1990s.³ With greater fetal imaging technologies, we could not only diagnose potential problems, but then had the real opportunity to fix them via fetal surgery. The sequencing of the human genome in 2003 represented the beginning of yet another revolution in ob/gyn practice, and today physicians can assess the health of the baby by analyzing fetal cells in a sample of the mother's blood.

However, in the 1950s and 1960s, Larry and his contemporaries did not have access to the fetal diagnostic tools available today and, therefore, witnessed the devastation and heartbreak that birth defects brought to their patients. For Larry, it was clear that the fetus needed to be viewed as an individual patient. Therefore, he embarked on the journey of his lifetime which uncovered some of the major contributors to perinatal biology.

Larry became one of the staunchest advocates for the health of the fetal patient. Over the course of his 60-year-plus-long career, he was a major force behind the Surgeon General's warning labels about the hazards of cigarette smoking on

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health, especially maternal and fetal health. His work on the benefits of exercise during pregnancy helped lead to the American College of Obstetricians and Gynecologists' recommendations on physical activity to improve pregnancy outcomes. In addition, his early studies with pulmonologist Robert Forster, II, MD, set the stage for his research on the effects of low oxygen, such as that experienced by people living in high altitudes, on maternal and child health.^{4,5}

The Consummate Physician-Scientist

Shortly after completing his medical degree, Larry turned his attention to research, recognizing that improving maternal and fetal outcomes would require a deeper understanding of the underlying bases of health and disease. He was the consummate physician-scientist. As the dean of a research-intensive medical school, my colleagues and I at the University of Maryland School of Medicine have required our medical students to pursue research as part of their education. I believe Larry would have agreed with us. Academically trained physicians are absolutely critical to our healthcare enterprise because they have experience conducting biomedical research in a clinical care setting. We need more doctors interested in helping patients, not just at the bedside, but at the bench as well.

As the founding director of Loma Linda University's Center for Perinatal Biology, Larry worked hard to recruit like-minded colleagues who shared his passion for scientific research. Then he gave them the support to do bold, innovative—perhaps even audacious—work while not micromanaging them.⁵ He benefited greatly from institutional support of his vision and his work.

Unfortunately, at times, policy makers seem to have a love-hate relationship with research. Despite all the incredible advances that basic science has brought our society—from better cancer therapies, to the real possibility of personalized medicine, to the development of the first-ever Ebola vaccine, to the Internet, to the creation of Google⁶—public investment in research has remained static for almost two decades. The ramifications of reducing federal support for research has been documented in two recent articles in which I participated.^{7,8} This reduction has thwarted the efforts to increase young people's interest in science, technology, engineering and mathematics (STEM) careers by constricting salary support and stimulating a surplus of competition for grants and jobs for those who want to pursue these careers.

As reports of laboratories shutting down due to funding crises emerge,⁹ Larry's center was a shining exception. His center was funded continuously by the National Institutes of Health for many decades. He shared with me in 2010 when I visited Loma Linda University to receive its Distinguished Service Award (Figure 1) how pleased he was to receive a renewal for his grant to study the signal transduction mechanisms of the cerebrovasculature of the developing fetus, premature baby, and adult, from the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development. In 2014, at nearly 90 years old, he once again had that grant renewed, this time with a perfect score! Sadly, this turned out to be his final award.

A Legacy of Selflessness

At a time when many investigators might consider slowing down, Larry worked tirelessly to ensure the health of pregnant women and their unborn babies, until his death. He had an incredible career and many prestigious accomplishments. He was one of the forefathers of the field of perinatal biology. However, rather than fading from public life, Larry used the latter part of his career to mentor and nurture the next generation of scientists and physician-scientists. In this way, he continued to contribute to the discipline that filled his mind and heart for so many years. I cannot believe that Larry ever looked at his watch and declared, "Time's up! Meeting's over," when working in his laboratory or meeting with one of his trainees or colleagues to discuss their latest results, project ideas, or their careers. If more investigators in their mid-60s invested another 15 or 20 years to the development of the next generation of scientists and physician-scientists, and to the discipline in general, we could envision even greater advances in health maintenance and disease prevention across the board.

Larry's reach extended beyond his collaborators and mentees. Although many of us may never have received an opportunity to work with him directly, myself included, Larry's brilliance and generosity of spirit touched us all. Years ago, when I first met him at Loma Linda University, we shared that we held a common faith and would not miss an opportunity to discuss ideas on everything. We developed a friendship that surpassed medicine. I closely followed his career, but little did I know that he also kept up with mine. Last year, entirely "out of the blue," I received a letter from Larry, informing me that he was planning to nominate me for an honorary fellowship at the Royal College of Obstetricians and Gynaecologists. He was a fellow and, based on his knowledge of my career, felt that I should be inducted too. I was surprised, not simply because Larry's offer was so kind and generous but because he did not ask for anything in return. He simply thought I deserved such an honor—how thoughtful and selfless!

If I were to survey my colleagues, I am confident that others would have many similar Larry Longo stories to share. He was a paragon of thoughtfulness, empathy, and care. A unique man, Larry was ahead of his time, irreplaceable, and will be missed the world over. Through his pioneering work, Larry made a difference in the lives of patients and their children, his colleagues, trainees, and friends, and even in his death, he continues to make a major impact on medicine and science. As Albert Einstein once said, "Only a life lived for others is a life worthwhile." Larry truly embodied that sentiment. Although we shall persevere, as Larry would have encouraged us to do, it is not without a heavy heart.

Thank you, Larry Longo, for your advocacy, your contributions as a physician-scientist, and for your selflessness. You will be sorely missed.

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