Jerold Lucey (1926–)

Jerold Lucey studied newborn infants in the United States in the twentieth century. In the 1960s and 1970s, Lucey studied phototherapy as a treatment for jaundice, a condition in infants whose livers cannot excrete broken down red blood cells, called bilirubin, into the bloodstream at a fast enough rate. In addition to his work in jaundice, Lucey was the editor in chief for the journal Pediatrics of the American Academy of Pediatrics. Lucey helped establish standards of care for several neonatal conditions, including neonatal jaundice and infant respiratory distress disorder (also called hyaline membrane disorder).

Lucey was born on 26 March 1926 in Holyoke, Massachusetts. Early in his childhood, Lucey and his family moved to Northampton, Massachusetts, where his parents owned a bookstore. Lucey later reported that his father was addicted to gambling and that his grandmother raised him. Lucey attended Northampton High School, where he was captain of the football team and class president. In 1944, Lucey graduated from high school and enlisted in the Navy. During his two years in the Navy, Lucey was stationed at the Great Lakes Naval Station in Great Lakes, Illinois, and later in San Francisco, California.

After his time in the Navy, Lucey enrolled in Dartmouth College in Hanover, New Hampshire, and graduated with a degree in zoology in 1948. That year, Lucey married his first wife, Jane. The two had three children, Colleen, Cathy, and David. Before enrolling in medical school, Lucey considered a career in parasitology, the study of parasites, as he'd received four rejections from among the nine medical schools he'd applied to. However, in 1948 he matriculated at New York University School of Medicine in New York City, New York.

In the summer of 1948, prior to beginning classes at New York University School of Medicine, Lucey spent his time at the Mt. Desert Island Biological Laboratory in Bar Harbor, Maine. He worked in the lab of physiologist Robert W. Berliner studying the way food moves through kidneys. The lab used infant seals who had been removed from their mother's care before they could learn to feed themselves. Lucey devised a way to feed the seals using a feeding tube as the seals were unable to keep the fish down orally. After that experience, Lucey noted the unique perspective a researcher must have when working in pediatrics and later reported that he enjoyed the challenge it presented. After completing his first year at New York University School of Medicine, Lucey returned to Mt. Desert Island Biological Laboratory the following summer in 1949.

While in medical school, Lucey also joined the research laboratory of Henry Barnett at the Cornell Medical Center in New York City, a pediatrician studying renal clearance of breast milk and formula of adults compared to human infants. According to Lucey, his experience with infant care convinced him to improve the health of premature infants.

In 1952, Lucey graduated from New York University School of Medicine. Lucey remained in New York City to complete his post-graduate medical education and embarked on a year-long internship at Bellevue Hospital in New York City. He then completed his pediatric residency at the Columbia-Presbyterian Hospital in New York City. Lucey worked with physician William Silverman who used a randomized trial, a study in which participants are assigned to different study groups at random, to test multiple antibiotics on different neonatal infections. Lucy helped show that the sulfonamide drugs were causing jaundice induced brain damage in the infants.

In 1955, Lucey began a research fellowship at the Boston Children's Hospital in Boston, Massachusetts, under physician Clement Smith. During the 1950s, there were few programs devoted specifically to neonatology, or the study of newborns or premature infants. Smith had helped estab-

lish neonatology as a field of medicine. While studying with Smith, Lucey worked with Gunn rats, rats with a genetic mutation that caused the rats to become easily jaundiced due to their lack of a particular enzyme that breaks down bilirubin in the blood.

In 1956 Lucey accepted a faculty position at the University of Vermont School of Medicine in Burlington, Vermont. In a few years he read a 1958 article by William Cremer and his colleagues Perryman and Richards on phototherapy and its use in treating jaundice. Phototherapy is the use of light wavelengths to break down bilirubin in the blood so the infant's liver can easily excrete it. At the time of Cremer's study, the standard of treatment for jaundiced infants was to perform an exchange transfusion to replace the infant's blood with donor blood to prevent anaemia and lower their bilirubin levels. Exchange transfusion can cause cardiac arrest. Phototherapy, as described by Cremer, was less invasive and the treatment was easy to perform successfully. Despite these advantages, Lucey argued that the number of test subjects was too low, as Cremer's study used nine infants, and Cremer did not prove his data came as a result of phototherapy.

In 1965 Lucey met Mario Ferreiro, a physician from Chile pursing a fellowship at the University of Vermont in the pediatrics department. Ferreiro, suggested that they conduct their own trial of phototherapy treatment in jaundiced infants. Lucey, drawing on his work with Silverman, decided to use a randomized, controlled trial to test the theory that phototherapy could treat jaundice in premature infants. The work began in the mid-1960s and culminated with a 1968 research report. In their study, Lucey, Ferreiro, and Jane Hewitt demonstrated that phototherapy was an effective treatment in neonatal jaundice. The study included 111 infants. All the infants were comparable in terms of weight, age, and weeks of gestation. The researchers randomly divided the infants into two groups, those who received phototherapy and those who did not. Both groups were cared for in similar apparatus during the study, the only difference was the presence of lights on the apparatus for the phototherapy group. The apparatus was one of the first models of phototherapy lights used in the United States. The phototherapy chamber Lucey constructed and used in his 1968 study, called "bili lights", was later displayed at the Smithsonian Institute Washington, D.C. Trials of phototherapy in the following decade confirmed the results of Lucey's study.

Lucey argued throughout the 1970s for the effectiveness of phototherapy as a safe treatment for jaundice. Gerard Odell, a physician from Johns Hopkins University in Baltimore, Maryland, with a background in physical chemistry, argued that phototherapy had no clinical effectiveness and banned its use at Johns Hopkins. For two years, mainly at American Pediatric Society annual meetings, Odell challenged the growing acceptance of phototherapy amongst the pediatric community, earning the nickname Prince of Darkness in contrast to Lucey, the Prince of Light. Lucey and Odell never came to an agreement, even after phototherapy became the standard of treatment for jaundiced infants in the United States.

Lucey continued his research on kernicterus, phototherapy, and jaundice in infants when he became the editor in chief of the journal Pediatrics, published by the American Academy of Pediatrics, in 1974. Some of the articles Lucey published at this time detailed the shortcomings of phototherapy in low birth weight children who already had extremely high bilirubin levels before phototherapy was applied, for those infants, physicians must perform exchange therapy.

By the middle of the 1970s though, Lucey said he had done all he could in phototherapy and began looking for other areas of neonatal care to improve. Lucey used his position as editor-in-chief of Pediatrics to travel the world observing research projects in pediatrics. He first traveled to Hawaii, where he met his second wife, Ingela Lucey, a woman from Berlin. She traveled with Lucey and they married in the late 1970s. They had one child together. Lucey continued to travel throughout Europe during this time visiting different hospitals and observing the newborn infant units.

By the 1980s, Lucey pursued other topics in neonatology. He, in collaboration with physicians Johnathan Gitlin, Roger Soll, Richard Parad, Jeffrey Horbar, Henry Feldman, and William Taeusch, performed another randomized controlled study on infants afflicted with hyaline membrane disease, a respiratory condition in newborns for which the site of air exchange in the lungs is covered by a membrane sheath, making breathing nearly impossible. The group designed a study to determine if surfactant extracted from cows could improve respiratory function in infants affected by the disease. Surfactant is a fluid secreted by the lungs that assists in gas exchange. Infants born with hyaline

membrane disease do not make this fluid. Forty-one infants, born between November 1983 and March 1985, were placed in the study. The findings, published in 1987, found there was improved respiratory function in the infants that received the treatment versus those who did not.

In 1987, Lucey established a network of Neonatal Intensive Care Units (NICU) that provided standardized care and places to perform randomized, controlled trials. Lucey named the network the Vermont Oxford Neonatal Network (VON), due to the sabbatical Lucey took to Oxford University in Oxford, UK, where he imagined the concept. When Lucey established VON, the network had only thirty hospitals. By 2015, VON included 850 NICUs around the world. Lucey himself has had a continued presence in VON, at the University of Vermont, working with low-birth weight infants.

Lucey ended his thirty-five year term as editor-in-chief of the Pediatrics journal and retired from his position at the University of Vermont in 2009. Under his tenure as editor, the journal's circulation increased from 12,000 to 66,000 readers and its accessibility was increased by the electronic conversion of the journal.

Lucey received multiple awards for his contributions to neonatology including the American Academy of Pediatrics Lifetime Achievement Award, the American Pediatric Society John Howland Award, the Alfred I DuPont Award for Excellence in Children's Health Care. He was inducted into the Institute of Medicine of the National Academy of Sciences and the recipient of the organization's Gustav O. Lienhard Award. The University of Vermont College of Medicine endowed a chair position in neonatology in Lucey's honor. Lucey authored more than 160 articles, edited six books, wrote multiple chapters across eleven texts, and participated in several films and videos.

By 2016, Lucey lived in Vermont and published articles reviewing topics in neonatology. His 2012 "A New Era in Neonatology Brain Care: We Can Do Better," critiqued the progress made in adapting new and advanced therapies for infant care.

Sources

1. Berliner, Robert, Thomas Kennedy, and James Hilton. "Renal Mechanisms for Excretion of Potassium." American Journal of Physiology 162 (1950): 348–367.
2. Cremer, Richard J., P. W. Perryman, and D. H. Richards. "Influence of light on the hyperbilirubinemia of infants." The Lancet 271 (1958): 1094–7.
3. First, Lewis R. "Introduction of the American Pediatric Society's 2009 John Howland Award Recipient, Jerold F. Lucey, M.D." Pediatric Research 67 (2010): 107–9.
4. Gartner, Lawrence M, comp. Jerold F. Lucey, MD. Vermont: American Academy of Pediatrics, 2002. https://www2.aap.org/sections/perinatal/pdf/luceyoralhistory.pdf (Accessed March 26, 2016).
5. Gitlin, Johnathan F., Roger F. Soll, Richard B. Parad, Jeffrey D. Horbar, Henry A. Feldman, Jerold F. Lucey, and H. William Taeusch. "Randomized controlled trial of exogenous surfactant for the treatment of hyaline membrane disease pediatrics. " Pediatrics 79 (1987): 31–37.
6. Institute of Medicine. "Jerold Lucey, Leader and Innovator in Neonatal Care, Recieves Institute of Medicine's 2011 Lienhard Award." National Academy of Sciences. http://www8.nationalacademies.org/
RecordID=10172011b (Accessed March 18, 2015).
7. Lucey, Jerold F., Mario Ferreiro, and Jean Hewitt. "Prevention of Hyperbilirubinemia of Prematurity by Phototherapy." Pediatrics 41 (1968): 1047–54.
8. Lucey, Jerold F. "The Unsolved Problem of Kernicterus in Susceptible Low Birth Weight Infant." Pediatrics 49 (1972): 646–47.
9. Lucey, Jerold F. "A New Era in Neonatology Brain Care: We Can Do Better." Pediatrics 129 (2012): 1164–5.
10. Nachbur, Jennifer. "Dr. Lucey, Editor of Pediatrics Receives Two Honors." Pediatrics 120 (2007): 1406–7.
11. Silverman, William A., Dorothy H Andersen, William A. Blanc, Douglas N Crozier. "A Difference in Mortality Rate and Incidence of Kernicterus among Premature Infants Allotted to Two Prophylactic Antibacterial Regimens." Pediatrics. 18 (1956): 614–25.

12. University of Vermont. “University Distinguished Professor Program.” University of Vermont. http://www.uvm.edu/provost/udp/?Page=lucey.html&SM=submenu1.html (Accessed March 18, 2015).