Jerold Lucey, M.D., DC '48: Inveterate researcher

By Laura Stephenson Carter

The captive baby seals were dying of starvation. Researchers at Maine's Mount Desert Island Biological Laboratory hoped to see how the seals' diving reflex affected renal blood flow. But they were about to lose their research subjects. Even hand-feeding them fish, dead or alive, didn't seem to work. It took a 22-year-old Dartmouth graduate to solve the problem. He realized that the babies had been separated from their mothers too soon and hadn't learned to catch and eat fish on their own, let alone digest them. So he homogenized the fish in a blender, then gently forced the resulting swill through a tube down the babies' throats. He smelled of seal vomit all summer, but he didn't care; he had saved the baby seals.

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That student was Jerold Lucey, M.D., who has devoted the past 55 years to saving the tiniest babies—human babies, that is. Today, he's a professor of pediatrics and chair of newborn services at the University of Vermont Medical School, editor of the journal *Pediatrics*, and an internationally respected neonatology researcher.

Things could have turned out differently, though, if Lucey had given up on his dream of becoming a doctor when he was rejected by several medical schools, including Dartmouth's. But he went to see DMS Dean Rolf Syvertsen. "I said to him, 'Gee, I didn't get into medical school.' He said, 'Don't understand that,'" Lucey says in a gravelly voice, imitating Syvertsen. "He said, 'What schools haven't you heard from?' I hadn't heard from NYU, so he said, 'Sit here, I'll be out in a few minutes.' Well, I couldn't help listening in through the door," Lucey chuckles. "He was talking loud enough. He called the dean down at NYU, whose name I can't remember, and he said something nice about me. Then he said, 'Oh, good.' There was a click and he came out and said, 'You can go to NYU.'" Lucey laughs. "Maybe I was already admitted, but I always felt Syvertsen was a big help."

If Syvertsen was so willing to help Lucey, why had DMS rejected him? Lucey thinks he knows. "I was too confident," he says with a mischievous smile. "During the interview, they said to me something . . . along the line of 'Why do you think we should take you?' And my answer to that one was, 'Well, I've done better than several of the people you've already taken here.'" He laughs. "I don't think that went over really well. I have attacks of terminal candor every so often, and that was one of them."

Before heading to medical school, Lucey spent the summer at the Mount Desert research station, which was run by Dartmouth biologist Roy Forster. Lucey helped his professor measure renal function in a fish called a sculpin. "My first significant contribution to science was devising a way to draw blood samples from fish and collect their urine," he says. His second was helping the prestigious kidney researchers from NYU, Yale, Columbia, and Johns Hopkins study the baby seals. By summer's end, he was hooked—on research . . . and on babies.

During medical school at NYU, Lucey seized every opportunity he could to spend time in premature nurseries and to participate in research, even if it meant being a research subject himself. During a third-year elective he took at Cornell, "I volunteered as a guinea pig," he says. "I drank formula for three days—nothing but formula." When he agreed to be part of the project, he laughs, he was under the impression that formula "was kind of like milk. I didn't realize what it smelled like. Toward the end I had to keep it cold, and hold my nose, and I became really nauseated." But the project was a success. It showed that adults do better at concentrating, and getting rid of, electrolytes in urine than do premature babies.

After earning his M.D. in 1952, and doing residencies at Bellevue, Columbia-Presbyterian, and Harvard, Lucey took a job as an instructor in pediatrics at the University of Vermont (UVM) in 1956.

He went on to become a driving force in premature infant care—pioneering phototherapy; testing and promoting transcutaneous oxygen monitoring, surfactant therapy, and other important treatments; and championing randomized trials among infants. He's the longtime editor of the most influential pediatrics journal in the world. And in addition to holding many leadership positions in national and international organizations, he established—and still heads up—an international forum where experts debate the pros and cons of the latest treatment advances for premature babies.

When Lucey set out to test phototherapy as a way to control jaundice in premature babies—by using light to break down excess bilirubin in the skin—he thought he'd prove it didn't work. First described in 1958 by a British physician, phototherapy wasn't even on U.S. radar screens in 1965 when a physician from Chile was doing a fellowship at UVM. The Chilean visitor asked Lucey why Vermont wasn't using phototherapy; after all, hospitals around the world, including those in Chile, were using it.

Lucey, who admits he rarely read the foreign literature back then, soon discovered more than 20 articles in Spanish, Portuguese, Italian, and French on the clinical use of phototherapy. "I was humbled, and ever since I've tried to keep up with the pediatric literature in other languages," he says. And to his surprise, his research proved that phototherapy *did* work. "Our study was confirmed by other randomized trials, and phototherapy was widely adopted over the next decade," he says. In fact, Lucey's original phototherapy device is now in the Smithsonian in Washington, D.C.

Doing randomized trials was another relatively new concept among neonatologists back then, though Lucey had been a big believer in

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TONY RINALDO

Bilirubin lights—like the one pictured here over Lucey's shoulder—are now found in neonatal units nationwide, thanks to his research.

them since the mid-1950s. He had worked at Columbia-Presbyterian with Dr. William Silverman, one of the first physicians anywhere to do randomized trials with infants. One of Silverman's early studies uncovered what Lucey calls a "lethal association" between a commonly used antibiotic and an accumulation of excess bilirubin.

Later, as head of the American Academy of Pediatrics' Fetus and Newborn Committee (which he headed from 1966 to 1972), Lucey led the movement to regionalize the care of premature infants. He founded the Vermont-New Hampshire regional perinatal care program, working closely with DHMC and his friend Saul Blatman, M.D., a pediatrician at Dartmouth. In 1972, he established a neonatal intensive care unit at UVM's Mary Fletcher Hospital. In 1974, he became editor-in-chief of *Pediatrics*—which is now, thanks to his efforts, the largest-circulation journal for pediatricians in the world, published in several foreign-language editions.

In the late 1970s, Lucey did a sabbatical in Marburg, Germany, with researchers who had developed a way to measure oxygen transcutaneously—that is, through the skin. "It changed the way we measured oxygen in babies," he says. "Previous to this, you'd stick a needle in an artery. We used to get four samples a day. Four arterial sticks in a small baby is very tough." The transcutaneous monitor made it possible to measure oxygen continuously, showing that oxygen levels fluctuated every time a baby was touched. "It led to much gentler handling of babies [and] positioning of them," Lucey says.

In 1980, Lucey started the annual "Hot Topics in Neonatology" conference, a forum in which neonatologists from around the world gather to discuss and debate the newest advances in the field.

One of the hottest advances in preemie care during the 1980s was the introduction of surfactant therapy to alleviate respiratory distress. Ironically, Lucey had witnessed early surfactant research in Boston without realizing its significance. While he was a resident there, Mary Ellen Avery was measuring lung sweat at Boston Children's Hospital. "None of us thought that was very important," Lucey recalls. "She did a study finally that showed that newborn infants didn't have as much of this lung sweat, which is called surfactant, as older lungs."

About 12 years later, a Japanese physician "isolated that substance from the surface of animal lungs, cleaned it up, and started putting it into newborn babies," Lucey explains. Surfactant therapy is "the biggest single thing that's happened in newborn care in the last 50 years. It changed the death rate by about 40% in very small infants."

Lucey remembers the first baby treated with surfactant at UVM. "The baby was very blue," he says. Liquid surfactant was poured down a tube into the baby's lungs. "Pouring it in and having the baby become pink was startling," he says. Most medicines don't have such immediate and dramatic effects. But there's ongoing debate as to how best to administer the therapy. "It's still just a problem of how much and when," says Lucey. "Should you give it very early or should you wait, or should you push it in or aerosolize it?"

Although the U.S. is a leader in the care of preemies, Lucey is quick to point out that many advances now taken for granted were made in other countries. Japan, for instance, leads the world in keeping the smallest babies alive. The first intrauterine transfusions were done in New Zealand. A South African developed the technique of continuous positive airway pressure used in assisted breathing. And amniocentesis, the extraction of amniotic fluid from the uterus so it can be tested, was first done in England.

In 1988, Lucey spent a mini-sabbatical at Oxford University. A year later he founded, and is still president of, the Vermont-Oxford Network, which does large randomized trials of new therapies. The group includes 400 neonatal units in the U.S. and abroad and manages the largest database for preterm infants in the world.

But in spite of advances allowing tinier and tinier babies to survive, Lucey knows there's still a lot to be done—both to help prevent prematurity in the first place and to take better care of preemies who do make it. "Those are two things I'm concentrating on now," he says, noting that in the U.S., "prematurity is a disease of poverty."

Lucey adds if he were starting his career in neonatology today, he'd focus on the brain. "Most of the other problems—infection, lung disease—they're solved," he says. "Brain growth, no. And we've got wonderful ways of visualizing the brain now. Nobody's ever tackled the problem of why can't the brain be better than it is now."

He reasons that since studies have shown that nutrition and hormones can improve the intelligence of primitive animals, there's hope for people, too. No one dares do such studies on humans yet. But "in 50 years they might," predicts the inveterate researcher. ■