Research saves lives

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a legacy campaign
Biomechanics Research
Addressing current unmet patient care needs, surgeons and engineers collaborate to develop new devices and processes.

Legacy Devers Eye Institute Research
Expediting the development of new technologies and treatments to prevent blindness.

Legacy Institute for Surgical Education and Innovation
A fully accredited, state-of-the-art surgical training center used to train health care providers in Advanced Trauma Life Support.

Clinical Outcomes Research
Procedures performed each year at Legacy Health are scrutinized to optimize patient results.

Tumor Bank
Stores tissue samples from cancer patients to be used in research studies across the country aimed at finding a cure for cancer.

Discoveries in sight
Nearly six decades ago, Portland coffee merchant Arthur Devers bequeathed $1 million to help fund eye care for all Oregonians, regardless of their ability to pay. Today, thanks to generous donations, the Legacy Devers Eye Institute provides both comprehensive clinical services and innovative research.

Legacy researchers are making great strides in the early detection of glaucoma, as well as measuring its progression, through an imaging technique called Optical Coherence Tomography (OCT) that creates a 3-D, high-resolution reconstruction of tissue in back of the eye.

These advances help ophthalmologists identify patients who are likely to go blind so they can begin treatment earlier, slowing the progression of the disease.

“Philanthropic support has allowed us to innovate and expand our research programs,” says Claude Burgoyne, M.D., director of the Optic Nerve Head Research Laboratory at LRI. “That’s what makes Legacy Devers special. It is a highly collaborative environment in which clinicians and researchers work side by side.”
Quintin Robertson Rice was a gifted composer with a zest for life that lit up a room. At the age of 10, he could play Mozart’s Sonata in C by ear on the family’s piano. At 28, his star was quickly rising – he was writing background music for independent films, commercials and video games.

Eight years ago, Quintin’s infectious optimism and musical talent was silenced when a simple stroll turned catastrophic. He fell backwards, hitting his head on a concrete curb on a quiet street severely injuring his brainstem, causing locked-in syndrome. A neurological condition that disrupts all the motor fibers in the brain, locked-in syndrome has left Quintin conscious and aware, unable to speak and completely paralyzed.

Dale and Beverly Rice are on a mission to help their once vibrant middle son communicate again. They donated $100,000 to establish the Quintin Robertson Rice Fund for Neuro-regeneration. This fund supports groundbreaking research in the Dow Neurobiology Laboratory at LRI in neuro-regeneration following a traumatic brain injury (TBI).

“It’s a hot topic in research,” says Hoda Gebril, Ph.D., the project’s research fellow. “There is a big hope to find a cure by using cutting-edge technology to help re-program neurons.” Dr. Gebril is also personally passionate about neuro-regeneration. “My mom suffered a stroke; it was a very overwhelming moment,” she says. “TBI and stroke are affecting people’s style of life – I want to help them live a better life.”

So far, experts have generated promising results in therapeutic approaches for brain repair, from regenerative therapy development to creating a ‘brain in a dish’ that one day may provide functional improvement for those suffering from TBI, stroke or other neurodegenerative conditions, such as Alzheimer’s disease and Parkinson’s disease.

The Centers for Disease Control and Prevention estimates that 5.3 million Americans are living with disabilities from brain trauma. The most common causes of TBI are falls, motor vehicle accidents and sports injuries.

“It’s really about changing the world for the better,” Dale declares. “We want to help create solutions that will improve lives and make things just a little more livable after an adversity.”
Do you need a surgery? Do you need this medicine? Are you doing better after that hospital stay? These are just a few questions for which Shaban Demirel, O.D., Ph.D., seeks answers. As the senior clinical outcomes research scientist at LRI, he sifts through medical record data and patient surveys to learn what helps patients and what doesn’t.

Dr. Demirel works closely with clinical teams across Legacy to identify the most effective options for high-quality, cost-effective, patient-centered care. “Because everything is electronic now, I have a lot of data to create models that allow us to predict and individualize health care,” he says.

Thanks to a three-year pilot program funded by donors, Dr. Demirel has been involved with nearly 90 studies and has published three papers in scientific journals.

One of his published studies focused on family-centered rounds in the Pediatric Intensive Care Unit (PICU) at Randall Children’s Hospital at Legacy Emanuel. The findings revealed families felt more well-informed when they were included in daily, morning care team discussions. In addition, physicians discovered they had more time throughout the day to take care of patients.

“Research is all about collecting data, analyzing it and making conclusions that can change a policy or practice,” Dr. Demirel says. “Whether it’s the way we care for patients or the way we run a health system, it allows us to push into an era of totally customized medicine.”
When Joe Frascella, Ph.D., arrived in Oregon last year to take the helm as vice president of Legacy Research Institute (LRI), he was immediately struck by the close working relationships between research scientists and their colleagues at Legacy Health’s medical centers and clinics.

“The one thing that stood out is how well LRI does translation, taking findings from our laboratories and using them to treat our patients,” says Dr. Frascella, who joined Legacy after three decades at the National Institutes of Health.

“When you have this closeness between researchers and clinicians, that’s really where the magic happens,” he says. That’s why he wants to encourage these collaborative relationships that make LRI an incubator for new ideas and novel research. “Even a small coffee kiosk at LRI,” he says, “could foster the kinds of conversations that lead to important partnerships.”

Partnerships between researchers and trauma surgeons have already resulted in the creation of the only force-controlled sling proven to safely and effectively stabilize a traumatic pelvis injury. They also developed rib plates used to mend broken segments of the rib cage.

“Philanthropy drives these innovations,” Dr. Frascella says. Federal funding for medical research is generally conservative and limited to projects with a high probability of delivering specific results. Private donations provide researchers with more time and more latitude to explore.

Often, the results of philanthropy lead to federal funding and additional research. “What is unique here are the very generous opportunities that our donors provide,” he says. “Philanthropy allows us to ask questions that are more innovative and that might not otherwise be funded.”

“The Legacy Research Institute is making a difference,” he says. “Our research is saving lives and transforming medical care.”

“Philanthropy is a vital spark for innovation and breakthroughs. Taking findings in the laboratory and transforming it to medical care – that’s what LRI does best.”

– Joe Frascella, Ph.D.,
Vice President, Legacy Research Institute
advancements in trauma patient care

Scientists at LRI have created many innovative devices that directly improve patient care, including a pelvic sling and a rib plating system. Both were developed in the Legacy Biomechanics Lab co-founded by Michael Bottlang, Ph.D.

The design and development of the pelvic sling began with a collaboration between Legacy research scientists and trauma surgeons. The device stabilizes pelvic fractures and limits internal bleeding in emergency situations following traumatic crushing injuries. The device was licensed to a local manufacturer and more than 100,000 are in use worldwide.

The rib plate system helps stabilize multiple bone fractures caused by major rib cage injury that can limit lung function, leading to death. The curved metal plates are attached to fractured bones during surgery to steady the ribs and spare the soft tissue of the lungs. The design process included a comprehensive study to determine the average geometry of human ribs to allow for the proper fit for each plate. To date, more than 1,000 patients worldwide have benefitted directly from this research.

a novel approach to bike helmets

Think back to your first car. Maybe it didn’t have airbags or even seat belts. Over the years, safety improvements have added anti-lock brakes, rear cameras and side airbags. However, in the world of bike safety, helmets have remained essentially unchanged.

To meet current safety requirements, helmets need to withstand 300 Gs of pressure (300 times the force of gravity). “They’ve changed the design – made it lighter, look better, but as far as technology that really helps prevent brain injury, nothing new has been adopted,” explains Michael Bottlang, Ph.D. “A sticker on your helmet just means it has met that basic requirement.”

Using a novel analysis of helmet technologies, Dr. Bottlang created the HIT (Helmet Impact Testing) Facility at LRI. HIT reproduces the various angles and impact that occur from a bike fall, including a traumatic brain injury (TBI).

“Helmets were designed to prevent your skull from cracking, no one was looking at what happens to the brain itself,” he notes. “Skull injury and brain injury are very different.” In a bike accident, TBIs occur more often than skull fractures. And, according to the American Association of Neurological Surgeons, bicycling has the highest number of TBI injuries among all sports categories – almost 40,000 more than football.

Dr. Bottlang’s team has filmed a video showing what happens when their testing machine takes a simulated brain using raw eggs and compares the protection of the helmet when it strikes straight down versus an oblique angle. The eggs stay intact with the straight strike, but crack when the angle is changed.

“There aren’t any chemicals that can put scrambled eggs back together,” he states. “The one shot we have is a better helmet. It’s a huge impact we can have on consumer education, manufacturers and test labs.”