

Middle East HEALTH

SUPPLEMENT

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Nov - Dec 2019



Leading US hospitals at the cutting-edge of health care

NIH advances biomed with high risk, high reward research

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U.S. News & World Report has again recognized Mayo Clinic as the No. 1 hospital in the USA and top ranked in 12 specialties. Our world-class experts work together across specialties to give you the unparalleled care you deserve, making Mayo Clinic a destination for all who need certainty, options and hope.

Learn more: [mayoclinic.org](https://www.mayoclinic.org) or [mayoclinic.org/arabic](https://www.mayoclinic.org/arabic)

Rochester, Minnesota

U.S. News & World Report "Best Hospitals Honor Roll," 2019-2020.



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Publisher

Michael Hurst
michael@middleeasthealthmag.com

Editor

Callan Emery
editor@middleeasthealthmag.com

Editorial and Production

Trident Communications
www.TridentComms.media

Editorial Consultants

Dr Gamal Hammad, Dr Peter Moore, Harry Brewer

Middle East Editorial Office

PO Box 72280, Dubai, UAE
Telephone: (+9714) 391 4775
editor@middleeasthealthmag.com

Marketing Manager

Foehn Sarkar
Telephone: (+9714) 391 4775 || Fax: (+9714) 391 4888
marketing@middleeasthealthmag.com

Subscription & Admin Manager

Savita Kapoor
Telephone: (+9714) 391 4775 || Fax: (+9714) 391 4888
savita@middleeasthealthmag.com

Advertising Sales

PO Box 72280, Dubai, UAE
marketing@middleeasthealthmag.com

Americas, France

Joy Sarkar
P O Box 72280, Building No.2
2nd Floor, Dubai Media City
Dubai, United Arab Emirates
Tel: +971 4 391 4775 Fax: +971 4 391 4888
joy@middleeasthealthmag.com

Japan

Mr Katsuhiko Ishii
Ace Media Service Inc
12-6, 4-chome, Adachi-ku, Tokyo 121-0824, Japan
Tel: +81-3-5691-3335 || Fax: +81-3-5691-3336
Email: amskatsu@dream.com

China

Miss Li Ying
Medic Time Development Ltd,
Flat 1907, Tower A, Haisong Building, Tairan 9th Road,
Futian District, Shenzhen, China 518048
Tel: +86-755-239 812 21 || Fax: +86-755-239 812 33
Email: medic8@medicetime.com

Taiwan

Larry Wang
Olympia Global Co Ltd
7F, No.35, Sec 3, Shenyang Rd, Taichung
Taiwan 40651 || P O Box: 46-283 Taichung Taiwan 40799
Tel: +886- (4)-22429845 || Fax: +886- (4)-23587689
Email: media.news@msa.hinet.net



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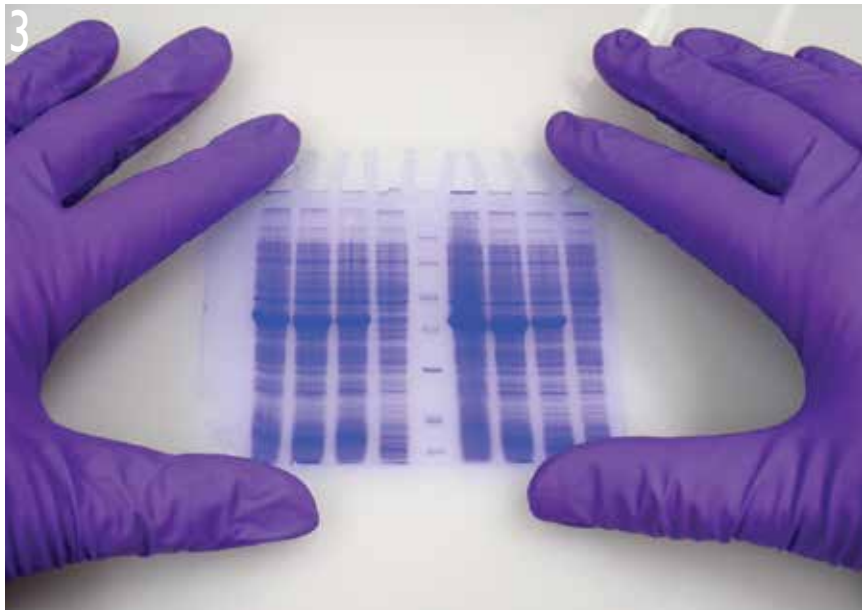
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in the Region



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in the Nation



At Inova, we are privileged to have earned your trust.

Inova Fairfax Hospital has been recognized by *U.S. News & World Report* for 2019-2020 as the recipient of the Best Hospitals Award. **Ranked #1 overall in the Washington, DC metro region** for the 5th time, this prestigious award is based on a number of key measures, including patient satisfaction. Inova was also **ranked 13th in the nation for Gynecology in caring for women.**

At Inova, we are guided by our mission to provide world-class healthcare – every time, every touch – to each person in every community we have the privilege to serve.

For more information, contact us at **+1.703.463.8432** or **international@inova.org**

NIH announces 2019 awards for High-Risk, High-Reward Research Program

The National Institutes of Health (NIH), a part of the U.S. Department of Health and Human Services, is the United States' medical research agency. Its mission is to seek fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to enhance health, lengthen life, and reduce illness and disability.

The NIH expands the biomedical knowledge base by funding cutting-edge research.

The organization notes that due in large part to the research it funds, Americans are living about 30 years longer than they did in 1900. Quality of life is also improving. Over the last quarter century, the proportion of older people with chronic disabilities has dropped by nearly one-third.

More than 80% of the NIH's budget is awarded through almost 50,000 competitive grants to more than 300,000 research personnel at over 2,500 universities and research institutions throughout the U.S. and internationally.

Innovative Research

In October this year, the NIH announced 93 grants through its High-Risk, High-Reward Research Program that will fund highly innovative biomedical or behavioral research proposed by extraordinarily creative scientists. The 93 awards total approximately US\$267 million over five years, pending available funds.

The High-Risk, High-Reward Research program catalyzes scientific discovery by supporting highly innovative research proposals that, due to their inherent risk, may struggle in the traditional peer review process despite their transformative potential. Program applicants are encouraged to think outside-the-box and to pursue trailblazing ideas in any area of research relevant to the NIH mission.

The High-Risk, High-Reward Research Program is part of the NIH Common Fund, which oversees programs that pursue major opportunities and gaps throughout the research enterprise that are of great importance to NIH and require collaboration across the agency to succeed.

The High-Risk, High-Reward Research program manages the following four awards:

- The NIH Director's Pioneer Award, established in 2004, challenges investigators at all career levels to pursue new research directions and develop groundbreaking, high-impact approaches to a broad area of biomedical, behavioral or social science.

- The NIH Director's New Innovator Award, established in 2007, supports unusually innovative research from early career investigators who are within 10 years of their final degree or clinical residency and have not yet received a research project grant or equivalent NIH grant.

- The NIH Director's Transformative Research Award, established in 2009, promotes cross-cutting, interdisciplinary approaches and is open to individuals and teams of investigators who propose research that could potentially create or challenge existing paradigms.

- The NIH Director's Early Independence Award, established in 2011, provides an opportunity to support exceptional junior scientists who have recently received their doctoral degree or completed their medical residency to skip traditional post-doctoral training and move immediately into independent research positions.

NIH issued 11 Pioneer awards, 60 New Innovator awards, 9 Transformative Research awards, and 13 Early Independence awards for 2019. Funding for the awards comes from the NIH Common Fund; National Center

for Complementary and Integrative Health; National Institute of Biomedical Imaging and Bioengineering; National Institute of General Medical Sciences; National Institute of Mental Health; National Institute of Neurological Disorders and Stroke; National Institute on Aging; National Institute on Alcohol Abuse and Alcoholism; and National Institute on Drug Abuse.

Below is a sample of some of the recipients:

Pioneer awards

Project Title: Biomaterials-Directed Regenerative Immunotherapies

- Jennifer H. Elisseeff, Ph.D.,
Johns Hopkins University

Jennifer Elisseeff is the Morton Goldberg Professor at the Translational Tissue Engineering Center at Johns Hopkins University. Dr Elisseeff is working at the interface of biomaterials, regenerative medicine and immunology, a redirection in research inspired by clinical translation of her therapeutic biomaterials. Establishing the field of biomaterials-directed regenerative immunology led to her discoveries of adaptive immune profiles associated with regeneration and fibrosis in biomaterial responses. Understanding and subsequently manipulating the immune system may offer novel approaches for the design of regenerative immunotherapies applicable to tissue repair in numerous clinical indications.

Project Title: From Optogenetic Functional MRI to Mechanogenetic Functional Ultrasound

- Jin Hyung Lee, Ph.D., Stanford University

Jin Hyung Lee is an Associate Professor of Neurology, Bioengineering, Neurosurgery, and Electrical Engineering (Courtesy) at Stanford University. As an Electrical Engineer by training with Neuroscience research interest, her goal is to analyze, de-

bug, and engineer the brain circuit through innovative technology. She pioneered the optogenetic functional magnetic resonance imaging technology (ofMRI) to enable cell type specific investigation of whole brain circuit mechanisms. She is now developing the mechanogenetic functional ultrasound technology to enable investigation of cell type specific whole brain function in freely moving subjects.

New Innovator Awards

Project Title: Does the Gut Have a Sense of Touch?

• Arthur Beyder, M.D., Ph.D., Mayo Clinic

Dr Beyder is a physician-scientist at the Mayo Clinic where he is an Assistant Professor of Medicine and Physiology and a physician in the Division of Gastroenterology & Hepatology.

Dr Beyder did his post-doctoral work with Dr Gianrico Farrugia, a world leader in gastrointestinal physiology & pathophysiology, and focused on ion channel mechanosensitivity and precision medicine in functional GI disorders, which are common and complex gut-brain disorders, with nearly half of patients having disruptions in gastrointestinal mechanosensation. Dr Beyder's group recently discovered a novel population of mechanosensitive epithelial sensory cells that are similar to skin's touch sensors, which prompted a potentially transformative question: "Does the gut have a sense of touch?"

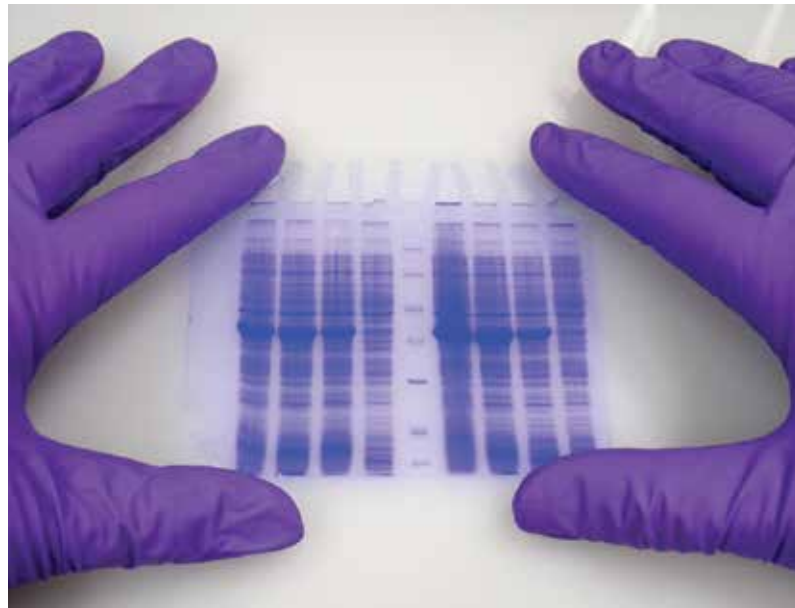
Project Title: Engineered Platelets for the Targeted Destruction of Circulating Tumor Cells

• Tara L. Deans, Ph.D., University of Utah

Tara Deans is an Assistant Professor in the Department of Biomedical Engineering at the University of Utah. Dr Deans has established a research program in applied synthetic biology to develop novel genetic tools for directing stem cell differentiation, in addition to engineering blood cells as therapeutic diagnostics and drug delivery systems.

Project Title: In Utero CRISPR-Mediated Gene Editing to Cure Congenital Monogenic Disorders

• William H. Peranteau, M.D.,
The Children's Hospital of Philadelphia



William Peranteau is an Assistant Professor in the Department of Surgery at the Children's Hospital of Philadelphia and the Perelman School of Medicine at the University of Pennsylvania. His current research focuses on developing prenatal gene therapies, including gene editing, in mid to late gestation fetuses to treat genetic diseases before birth.

Transformative Research

Project Title: Epigenetics of the Human Gut Microbiome

• Eric Alm, Ph.D., MIT, Broad Institute
Co-Principal Investigators: Peter Dedon, M.D., Ph.D.

Eric Alm is a biologist studying the human microbiome. A primary goal of his research is to translate microbiome science into new therapeutic options for patients. To realize this goal, his lab has started non-profit organizations like OpenBiome, which has provided material for fecal microbiota transplants to over 50,000 patients with recurrent *Clostridium difficile* infections, and the Global Microbiome Conservancy, which is working with nearly 100 scientists in over 30 countries to preserve global human-associated biodiversity for future generations.

Project Title: Virus-Like Intercellular Communication in the Nervous System


• Edward M. Campbell, Ph.D.,
Loyola University Chicago
Co-Principal Investigators: Thomas Gallagher and Jason D. Shepherd, BSc (Hons), Ph.D

Dr Campbell is a Professor at the Stritch School of Medicine at Loyola University, Chicago. His research program seeks to understand molecular and cellular mechanisms of diseases, specifically focusing on HIV-1 infection and other retroviruses, the cell to cell transmission of alpha-synuclein in Parkinson's disease, and cellular inflammatory responses.

Project Title: Single-Cell and Target-Specific Resolution of Multiple Memories Across the Brain

• Christine Ann Denny, Ph.D., Columbia University Irving Medical Center and Research Foundation for Mental Hygiene
Co-Principal Investigator: Steve Ramirez, Ph.D.

Christine Ann Denny, Ph.D. is an Associate Professor of Clinical Neurobiology in Psychiatry at Columbia University Irving Medical Center (CUIMC) and a Research Scientist V in the Division of Systems Neuroscience at the Research Foundation for Mental Hygiene, Inc. (RFMH) / New York State Psychiatric Institute (NYSPI). S Dr. Denny studies the neural basis of learning and memory in disease states, such as in depression and Alzheimer's disease (AD). Specifically, she created an activity-dependent tagging murine line, the ArcCreERT2 mice, which allows for the permanent labeling of individual memories.

• To find out more about the High-Risk, High-Reward Research program and view all the reward recipients, visit: <https://commonfund.nih.gov/highrisk> 



PRECISION CANCER CARE

Miami Cancer Institute brings to South Florida access to personalized clinical treatments and comprehensive support services delivered with unparalleled compassion. No other cancer program in the region has the combination of cancer-fighting expertise and advanced technology to best understand what's driving your cancer and deliver the precise treatments to achieve the best outcome. Selected as Florida's only member of the Memorial Sloan Kettering Cancer Alliance, Miami Cancer Institute is part of a meaningful clinical collaboration to improve the lives of cancer patients.

With Miami Cancer Institute, you no longer have to leave South Florida to receive the best and latest cancer care.



MICHAEL J. ZINNER, M.D., FACS
CEO and Executive Medical Director

To schedule an appointment, please call 786-596-2373 or visit MiamiCancerInstitute.com.



Harnessing the Power of Electricity to Kill Tumors

Miami Cancer Institute physicians use advanced NanoKnife technology for difficult-to-treat cancers, now including pancreatic cancer.

Using advanced imaging techniques such as ultrasound, X-rays, CT scans and MRI scans, interventional oncologists can look inside the body and deliver precisely targeted cancer treatments without major surgery. These treatments often involve subjecting tumors to extreme heat or freezing them to sub-zero temperatures to destroy cancer cells.

One drawback to heat-generating procedures is that they can damage nearby tissues, nerves and blood vessels. Physicians at Miami Cancer Institute are now using an advanced NanoKnife procedure for some patients, to “electrocute” cancer cells rather than “cook” them, thus preserving the surrounding area.

Using CT imaging to guide them, interventional oncologists insert the NanoKnife electrode probes into the patient’s body through tiny incisions and position them precisely in or around the tumor. Then, in a process called irreversible electroporation (IRE), powerful pulses of electrical current are delivered between the electrodes and pores are created in the walls of the tumor cells, resulting in cell death. The treated tissue is removed by the body’s natural processes in a matter of weeks, mimicking natural cell death. The NanoKnife procedure leaves the surrounding healthy areas unaffected.

Patients who undergo the NanoKnife treatment stay in the hospital overnight for observation and go home the next day. The procedure is typically very well tolerated with minimal pain or complications.

Govindarajan Narayanan, M.D., chief of interventional oncology at Miami Cancer Institute, has nine years of NanoKnife experience and is researching new uses of the technology, which to date has



Raj Narayanan, M.D.

been used primarily used for liver, kidney and soft tissue tumors. Dr. Narayanan has pioneered NanoKnife usage to treat pancreatic cancer with imaging guidance.

The NanoKnife is a welcome advancement in the fight against pancreatic cancer. The disease affects about 57,000 people in the U.S. each year, with about 25 percent of those patients at Stage 3. Regardless of the stage of pancreatic cancer, it is one of the least survivable cancers, and survival rates have not improved substantially for more than 40 years. For all stages combined, the five-year relative survival rate is 8 percent and, for those with advanced disease at the time of diagnosis, the five-year survival rate remains at 3 percent.

Furthermore, pancreatic cancer is on the rise: total deaths due to pancreatic cancer are projected to become the second leading cause of cancer-related deaths before 2030. The mortality rate is high due to the aggressive nature of the disease and lack of early warning signs.


Limited treatment options exist for Stage 3 and 4 disease, with chemotherapy and/or radiotherapy considered the standard of care. There have been advancements in both techniques, but toxicity can impact

the number of patients who can tolerate the treatment.

NanoKnife now gives Miami Cancer Institute the full complement of interventional oncology therapeutic procedures. Individual patients’ treatment plans are determined by a multidisciplinary team consisting of surgical, medical, radiation and interventional oncologists.

Dr. Narayanan is the co-principal investigator of a national clinical trial recently approved by the FDA, using NanoKnife to treat Stage 3 pancreatic cancer. The study, called “Direct IRE Cancer Treatment,” (DIRECT), will generate meaningful data for clinicians, patients, payors and other stakeholders who are equally committed to fighting this disease.

“I’ve had promising experience utilizing irreversible electroporation as a treatment option for pancreatic cancer patients,” said Dr. Narayanan. “We expect that the results of this trial will lead to a widely available alternative treatment option for advanced pancreatic cancer patients.”

• For more information on NanoKnife as well as the full range of services offered at Miami Cancer Institute, visit MiamiCancerInstitute.com 



Mayo Clinic Again Ranked No. 1 Hospital in the U.S.

Mayo Clinic in Rochester, Minnesota, was again named the best hospital in the United States in *U.S. News & World Report's* 2019-2020 'Best Hospitals.' Mayo Clinic also ranked No. 1 in more medical specialty areas than any other U.S. medical center.

Mayo Clinic has always ranked at or near the top of the annual "Best Hospitals Honor Roll." Mayo Clinic in Arizona and Minnesota was also ranked No. 1 within those states, and Mayo Clinic Florida was ranked No. 1 in Jacksonville, Florida.

Mayo Clinic is part of a select group of hospitals recognized on the "Best Hospitals Honor Roll" according to *U.S. News & World Report*. The honor roll consists of 20 hospitals with the highest overall scores in 16 medical and surgical specialties, and 9 common procedures and conditions. Mayo Clinic ranks first, second or third in 12 specialties, including No. 1 rankings in 5 specialties:

- Diabetes and Endocrinology
- Ear, Nose and Throat
- Gastroenterology and Gastroenterologic Surgery
- Nephrology
- Urology

Mayo Clinic ranked No. 2 in 6

specialties: Cardiology and Heart Surgery, Geriatrics, Gynecology, Neurology and Neurosurgery, Orthopedics, and Pulmonology and Lung Surgery. It ranked No. 3 in Cancer.

Specialties are measured based on factors such as patient survival, patient experience, nurse staffing and Magnet recognition, patient services, technology and expert opinion. Mayo Clinic staff work to deliver the highest standards of care and transform scientific discoveries into clinical advances that help people everywhere.

"Being recognized as the No. 1 health care provider in the nation is a tribute to the incredible work of our staff because it recognizes both our medical expertise as well as our commitment to compassionate, individualized care," said Gianrico Farrugia, M.D., president and CEO, Mayo Clinic. "Each day, we strive to bring hope and healing to our patients."

Mayo Clinic's commitment to quality dates back more than 150 years to when the Mayo brothers invented the team-based approach to medicine, an approach that continuously evolves and improves. Mayo Clinic's physicians are salaried to eliminate any financial pressure from


Each day, we strive to bring hope and healing to our patients.

patient care decisions. Mayo Clinic's experts work across specialties to provide comprehensive and coordinated care for patients.

"The consistency of being top ranked nationwide more often than any other hospital is truly a reflection of the thousands of staff who share the same vision of providing the best care for our patients," says Dr. Farrugia.

Mayo Clinic is an international medical destination for those seeking answers to serious or complex conditions. More than 1.2 million people from all 50 states and more than 130 countries come to Mayo Clinic each year for expert, compassionate care.

"Our primary value is that the needs of the patient come first. We take that value and we embed it in everything we do," Dr. Farrugia said.

For more information or to make an appointment, visit: mayoclinic.org/international or mayoclinic.org/arabic. 

Focus on Leading-edge Clinical Research

■ By James D. Marshall, M.D.
Chief Research Officer for Cook Children's
clinical research program

Clinical research conducted with the highest regard for ethics and science enhances the good reputation of a healthcare system. Research participation is clearly the “extra-mile” traveled by busy clinicians and their patients who have a restless and positive desire to serve children beyond providing or receiving great clinical care. While we concentrate our efforts in North Texas’ community, the good news about Cook Children’s leading-edge clinical research has been spreading far and wide; attracting children with particularly difficult diagnoses to Fort Worth to benefit from our health care teams’ investigational advanced treatments for difficult disorders. Cook Children’s special brand of purely clinical research – no lab animals here! – is blazing our star into the United States’ healthcare map.

Pharmaceutical manufacturers and academic consortia offering a continuous pipeline of access to the world’s most important medical innovations and therapeutic regimens have come to rely on many of our physicians for their leadership and creative scientific abilities. Since 2014, 787 individuals, ranging from physician Principal Investigator to staff member and including 161 medical and other allied health students, have registered to conduct research at Cook Children’s. With those researchers, over the past five years, 5,795 Cook Children’s patients became research subjects for total of 9,269 children actively contributing to the development of medical treatments for the benefit of other kids around the world. Presently, Cook Children’s professionals are engaged in the conduct of 437 research studies, which represents a steady 14% growth over the past 5 years. Representing the entire spectrum of



pediatric clinical research, we are enrolling patients in drug or medical device studies in early-phase (72), mid-phase (91) and post-marketing, registry, biology or retrospective investigations (274).

Collaboration

Coexisting with medical research, allied healthcare workers are a growing part of the driving professional power behind our research program. Through the Nursing Research program, investigators collaborate to lend their clinical training and questioning minds to science happening everywhere around Cook Children’s. Other nurses work directly in medical research in their roles as Advance Practice Nurses or Research Nurse Coordinators. Pharmacists manage the Investigational Drug Service and Research Pharmacy, train their

students and residents in clinical research, and join clinical study teams. Physical and Occupational Therapists, Child Life professionals and members of the Chaplaincy are all involved in clinical research directly and during the pursuit of advanced degrees.

In summary, Cook Children’s Health Care System is highly productive and contributory to a very important sector of United States health industry, pediatric medical research. Our research program drives medical advances, including better treatment of difficult pediatric diseases and the maintenance of good health, for infants and children here in Texas and around the world.

• For more information, please visit:
cookchildrensinternational.org
Phone: +1-682-885-4685
E-mail: international@cookchildrens.org 



Our specialty programs, services and procedures include:

Endocrinology and Diabetes Program

- Growth and Diabetes Clinics
- Hyperinsulinism Center
- Investigational new drug 18F DOPA

Level 4 Epilepsy Center

- Epilepsy Monitoring Unit
- Robotic surgery

Heart Center

- Cardiac MRI
- Fetal echocardiography
- 3-D technology
- Surgical repair of the most complex heart defects

Hematology and Oncology Center

- Bone Marrow and Stem Cell Transplant Program
- Investigational MIBG therapy for neuroblastoma

Urology/Genitourinary Institute

- Ambiguous genitalia/ disorders of sex development
- Anorectal malformation
- Bladder exstrophy
- Cloaca
- Hypospadias
- Kidney transplant
- Urogenital sinus

Neurosciences Center

- Deep brain stimulation
- Motion analysis lab for patients with cerebral palsy and movement disorders
- Stroke and Thrombosis program

Orthopedic Surgery

- Amniotic band
- Arthrogryposis
- Hand and foot abnormalities
- Hip dysplasia
- Limb length discrepancy

When it comes to your child's health care, you want one thing... *the best.*

And sometimes finding the best pediatric specialty care means traveling outside of the country. Located in Fort Worth, Texas, Cook Children's has been serving patient families for 100 years. Just minutes from the Dallas-Fort Worth International Airport, Cook Children's is a renowned integrated pediatric health care system in the United States.

At Cook Children's, each child's team of caregivers is connected to a system of pediatric specialists, clinics, and award-winning medical center. Children see the same specialists every day while an international care coordinator focuses on all the family's needs. From flight scheduling to accommodations to recreation, our dedicated international team handles every detail.



Expanding Global Reach

In a world that is increasingly more connected, patients have greater access to quality healthcare and better collaboration with the global medical community than ever before.

Whether it's telemedicine, virtual visits or building new campuses, Cleveland Clinic's continued international expansion is furthering the organization's mission of medical education, research and clinical excellence.

Cleveland Clinic has been ranked by *U.S. News & World Report's* Best Hospitals as the No. 1 hospital for heart care for 25 consecutive years, and has been in the top five ranked hospitals for the past 21 years.

With its success in the U.S., the nonprofit multispecialty academic medical center has been improving the health of individuals no matter where they live.

In addition to treating foreign patients at its many locations in the U.S., Cleveland Clinic has been expanding its reach globally; first opening an outpatient center in Canada in 2006, then expanding further abroad to the UAE in 2015. Here, in partnership with Mubadala Investment Company, it opened the 364-bed Cleveland Clinic Abu Dhabi, capable of addressing a range of complex and critical care requirements distinct to the local population.

Also in the UAE, Cleveland Clinic Abu Dhabi – Al Ain Branch began offering select medical services in 2017.

Looking to the future

Other global expansions underway include Cleveland Clinic London, a 185-bed hospital to open in 2021, and the first Cleveland Clinic Connected project will launch in China, with Shanghai Luye Lilan Hospital set to open to patients in 2024. Under the Cleveland Clinic Connected agreements, physicians can access best practices and protocols created by Cleveland Clinic experts that are used at Cleveland Clinic locations worldwide.

Rob Stall, Executive Director of Cleveland Clinic International Operations, says: "As we grow and double the number of patients served by 2024,



our focus is to remain true to the standards we have established in the U.S. All of our actions and all of our locations bear the unmistakable stamp of Cleveland Clinic in terms of quality, experience and care priorities. We are exporting our successful model of healthcare, while offering a patient experience that meets the cultural and specific needs of each region."

Collaborative care and innovation


Cleveland Clinic's value-based model of healthcare involves multidisciplinary teamwork, with the patient always at the center of care. As a fully integrated healthcare delivery system, it is capable of taking on the most complex cases and providing collaborative care supported by cutting-edge research and technology.

The model has also been a catalyst for innovation, and Cleveland Clinic is known for a number of firsts, such as pioneering coronary artery bypass surgery and the first face transplant in the United States. Similarly, Cleveland Clinic Abu Dhabi has had an enormous impact on its landscape, having the only multi-organ transplant program in the UAE, and performing the nation's first successful cadaveric heart, liver and lung transplants.

Global Patient Services

All of the Cleveland Clinic locations extend its acclaimed top-level medical care not just to that country, but make healthcare more accessible for visiting patients too. Through its Global Patient Services, those in need of complex care are assisted in matters such as travel and accommodation arrangements appropriate for their condition, interpretation services, and a facilitated continuum of care, all with a thorough understanding of the cultural background and needs of patients and their families.

Dr. Nizar Zein, Chairman of Global Patient Services for Cleveland Clinic, says: "While patients travel to our facilities looking for the best possible care available, they also need empathy – a team who understands their individual needs, medical or otherwise, and who involve them in their own treatment plans."

Since its founding in 1921, Cleveland Clinic has changed the healthcare landscape in the U.S. significantly, and as it approaches its 100th anniversary, its impact in raising the standards of healthcare globally is increasingly evident. 



A global leader ranked among the world's best hospitals.

It's why patients from 185 countries have traveled to Cleveland Clinic locations for care.



ClevelandClinic.org/International
Cleveland • Florida • Las Vegas • Toronto
Abu Dhabi • London (Opening 2021)

Patients Have Access to the Latest in Science and Treatment Available

For over 20 years, Indiana University Health has been ranked by *U.S. News & World Report*. They offer adult and pediatric patients access to highly advanced care through their unique partnership with the Indiana University School of Medicine, the largest U.S. medical school. At IU Health, patients have access to the latest in science and treatment available, including procedures not found anywhere else in the U.S. Their multidisciplinary approach to specialty care brings together researchers, highly skilled specialists and leading healthcare experts to develop care plans individualized to each patient.

Accelerating the future of cancer treatment through precision medicine

Indiana University Health specialists participate in research and education internationally – giving patients advanced care, access to new and novel therapies and treatment at the highest level of expertise, including conducting full genome sequencing of over 20,000 genes for patients with late-stage cancer where no other treatment has worked.

Their multiple myeloma specialist team is performing detailed genetic analysis of over 1,000 multiple myeloma cells. Their physician researchers will study the cancer cells and the bone marrow environment in which the cancer cells live to better define the mechanism of disease with the goal of identifying potentially curable therapies that could be better tailored to the individual patient.

Their blood cancer specialists have access to CAR T cells, a novel form of immunotherapy where the patient's own immune cells are engineered to target and attack the cancer cells to achieve long-term remissions in certain subtypes of lymphoma and leukemia, and in multiple myeloma.

A trusted partner for complex cases – now virtually connecting physicians for international collaboration

The multidisciplinary clinical team at

Indiana University Health provides physicians from around the globe direct access to collaborate on patient care through our virtual consultation platform. This enables the physicians to meet virtually using an iPad, securely and easily collaborate on a patient case, and determine the right treatment plan without requiring the patient to travel.

A pioneer in prostate and testis cancer

The multidisciplinary urology team is a leader in the development and advancement of treatments for urological conditions, including:

- **Prostate cancer** – developed and were first to publish on High-Frequency Ultrasound (HIFU); used to treat prostate cancer by using concentrated high-intensity sound waves to precisely destroy prostate tissue.
- **Testis cancer** – pioneered nerve-sparing surgical techniques and treatment of advanced cancers, developed the drug combination that cured testis cancer, and treated more than 7,000 patients.

To learn more, visit iuhealth.org/prostatecare

Comprehensive transplant program among the largest in the U.S.

The IU Health transplant program provides all solid-organ transplants for adult and pediatrics, offering a full range of services with the unparalleled experience



and innovation that ensures better patient outcomes.

- **Liver transplant** – ranked 3rd in the U.S. for adult liver transplant volume, the IU Health program is nationally recognized for excellent outcomes for patients. Their team's experience and dedication are what sets them apart. The team strives to help as many patients as possible, including those with cancer and neuroendocrine tumors, Hepatitis C, and those considered ineligible at other centers.

- **Intestine/Multivisceral** – part of just a select few healthcare systems in the country that performs intestine and multivisceral transplants. And, for the past 10 years, IU Health has been one of the top two ranked adult programs in the U.S. by volume for pancreas transplants.

- **Bone Marrow Transplant** – highest volume for adult bone marrow transplants in the US, at 265 completed in 2018

To learn more, visit iuhealth.org/transplant

Connecting with Indiana University Health

IU Health is committed to providing patients with world-class medical care and supportive services. Explore their programs in detail and connect with their international concierge coordinators by visiting iuhealth.org/destination



HONORED TO BE
NATIONALLY
RANKED

22
YEARS
IN A ROW

U.S. NEWS & WORLD REPORT

DESTINATION SERVICES

Going above and beyond
to ensure international patients
receive the best care.

Indiana University Health provides patients from around the world direct access to our top-ranked team of highly skilled physicians. Through our partnership with the largest medical school in the country, we offer the latest innovative treatments and leading-edge therapies. Our dedicated concierge services team can guide you through the broad range of services we offer patients of any age and assist with travel accommodations.

Contact our Destination Services team at
luhealth.org/Destination or +1.317.963.2020



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Indiana University Health

Expert Multidisciplinary Neurosurgery Teams Provide Minimally Invasive and Keyhole Approaches for Brain, Skull Base and Pituitary Tumors



At Pacific Neuroscience Institute, our patients receive world-class, personalized care. Our international patient care program focuses on putting you at ease, treating the most complex brain conditions including brain, skull base and pituitary tumors.

PNI is conveniently located 20 minutes from Los Angeles International Airport in beautiful Santa Monica, California. We provide an exclusive boutique experience within the award-winning Providence hospital system, the third largest in the United States. You and your loved ones will find easy access to amenities on our intimate campus. With our state-of-the-art dedicated neurosurgical operating theater, private rooms and VIP suites, you can be confident of receiving the most advanced care throughout your stay. Our nationally and internationally renowned neurosurgeons, ENT surgeons, neuro-oncologists, neuro-ophthalmologists, and endocrine specialists are among the best, and PNI's individualized approach means you receive expert medical attention from the moment you arrive.

Think Neuro. Think PNI. You can count on our experience and expertise

Our highly specialized medical professionals have vast experience across a wide spectrum of neurological and cranial disorders. PNI is a global destination for prompt treatment of complex conditions with a prime focus on quality of life.

All the crucial elements in one place focused on you

We have created a better model that fos-

ters collaborative neuroscience care under one roof. With our specialists working side by side to reach a diagnosis and optimal treatment plan, PNI is a patient-centric place you can trust.

With a personalized, compassionate approach to care

You will receive a hands-on approach by leaders in the field. From consult to surgery, the experts you meet at your first visit will be with you all along the way to help you reach optimal health.

Think Brain Tumor. Think PNI. Minimally invasive, more effective treatments

When it comes to restoring quality of life, experience matters. Our PNI surgeons have helped lead the way world-wide in advancing safe and effective minimally invasive keyhole and endoscopic brain tumor removal including for meningiomas, gliomas, schwannomas and metastatic brain tumors.

Clinical trials & novel approaches

PNI neuro-oncologists are at the forefront of applying brain tumor genomics to developing personalized treatments, including the evaluation of clinical trial eligibility. We provide targeted therapies and advanced treatment options patients may not have elsewhere.

There's always time for a second opinion

If you or a loved one has been recently diagnosed with a brain or skull base tumor there's time for you to get another viewpoint. We'll provide a rapid review

of your records and imaging and give you our unique perspective on optimal treatment.

Think Pituitary. Think PNI. Advanced treatments backed by experience

Our team of specialists treat all types of pituitary tumors and related conditions. PNI director and neurosurgeon Dr. Daniel Kelly has one of the most extensive endoscopic pituitary surgical experiences world-wide. We strive to get it right the first time, leading to shorter hospital stays, and better long-term outcomes.

A collaborative approach to care

Pituitary adenomas, craniopharyngiomas and Rathke's cleft cysts are complex in their diagnosis and treatment, requiring a team approach. We literally wrote the book on *Pituitary Centers of Excellence*, allowing our patients to be evaluated and treated by specialists in endocrinology, neurosurgery, neuro-ophthalmology, and ENT, typically in one visit.

A fresh perspective on pituitary tumors and hormonal health

We treat patients with the most challenging of pituitary and skull base tumors, including many with prior surgery and other treatments. We routinely provide second opinions and a safe surgical option for patients deemed "non-operative" elsewhere.

- We welcome you to Pacific Neuroscience Institute.

Visit PacificNeuro.org to schedule a consultation or call us at: +1 310-582-7450.

BRAIN TUMOR TREATMENT

First class care all the way
at Pacific Neuroscience Institute



- ★ The **premier destination** for exclusive and personalized concierge treatment sought out by discerning patients and their families
- ★ A **global leader** in endoscopic and keyhole neurosurgery for brain, skull base and pituitary tumors
- ★ World-renowned surgeons perform advanced, minimally invasive brain surgery for **faster recovery**, leaving **no visible scars**
- ★ Providing **award-winning medical care** at Providence hospitals in Los Angeles, the third largest hospital system in the United States
- ★ With **5-star ratings** in the thousands, and recommended across the nation and the world



"Undoubtedly, the top neurosurgeons in the USA or the world. I can't say enough about the top talent of surgeons, but it's their hearts, caring, concern and humanness that is unparalleled to any other group. If I could give Pacific Neuroscience Institute unlimited stars, I would!"

Patient Review, Facebook



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World-Class Care Within Reach

Atrium Health, formerly known as Carolinas HealthCare System, is one of the most innovative healthcare organizations in the United States. We provide a full spectrum of clinical services, which are consistently recognized by both customers and industry experts among the nation's best. We are committed to delivering outstanding patient outcomes and advancing the science of care across the southeastern U.S., particularly through our state-of-the-art cancer institutes, award-winning pediatric hospital, and cutting-edge heart and vascular care.

Levine Cancer Institute: The best cancer care anywhere

At Levine Cancer Institute, you'll find one of the nation's finest and fastest growing medical teams, with expertise in surgical, radiation, medical, and hematological oncology. We treat all varieties of solid tumor and blood cancers, including the rarest and most challenging cases.

"Too often, geography separates people from the cancer care they need. We aim to erase the distance between our patients and the best specialists," said Derek Raghavan, MD, PhD, President of Atrium Health's Levine Cancer Institute.

One way that Levine Cancer Institute bridges geographic divides is through a one-of-a-kind virtual platform that allows physicians to collaborate across disciplines and locations. Through this system, all of our patients can be confident in knowing that they

have the best professionals on their case.

Our adult blood and marrow transplant unit stands among the country's best in outcomes and was accredited by the Foundation for the Accreditation of Cellular Therapy for its high standards of evidence and controls. Additionally, our expansive clinical trials program has produced landmark research and routinely grants our patients access to the latest treatments available anywhere in the world.

Levine Children's: Integrated, award-winning, kid-approved

Atrium Health's Levine Children's Hospital grants families access to an integrated network of 30+ pediatric subspecialties, including cardiology, oncology, neurology, and orthopedics. Our dedicated team of 150 specialists ensures that we provide care that is tailor-made for the littlest patients.

Year after year, *U.S. News & World Report's* prestigious hospitals ranking has recognized numerous high-performing specialties at Atrium Health, including cancer, cardiology and heart surgery, neonatology, gastroenterology and GI surgery, nephrology, orthopedics, and neurology and neurosurgery. Levine Children's is the only children's hospital in our region to have consistently received this designation for more than a decade.

"We offer the care and medical expertise that every child deserves," said Stacy Nicholson, MD, President of Atrium Health's Levine Children's. "From care

packages, to overnight rooms for parents, to bedsheets that are hand-selected by kids before a hospital stay, we help every child feel as safe and comfortable as possible."

Sanger Heart & Vascular Institute: Comprehensive, cutting-edge cardiovascular care

For more than 50 years, Sanger Heart & Vascular Institute has delivered life-saving care for every kind of heart condition. Our team includes some of the world's most distinguished surgeons, who pioneered and still perform some of the world's most complex procedures.

We are ushering in a new era of coronary diagnosis and treatment – one in which genetic evaluation, state-of-the-art imaging, and minimally invasive techniques afford better health outcomes. We have the only center for minimally invasive heart bypass in the southeastern U.S. and lead the country in heart transplant survival outcomes. We also have one of the highest-volume centers for catheter-based heart valve therapies, which have a limited number of skilled operators across the U.S.

"Where you go for your heart or vascular treatments can make all the difference," said Geoffrey Rose, MD, President of Atrium Health's Sanger Heart & Vascular Institute. "No matter your cardiovascular condition, we can deliver the latest and most promising therapies."

- For more information, visit: [AtriumHealth.org/Global](https://www.AtriumHealth.org/Global).





World-class care within reach.

At Atrium Health, one of the leading healthcare systems in the United States, we give patients the world's best care – no matter where they call home.

Exceptional Medicine

-  Leading-edge treatment for rare and complex cancers at Levine Cancer Institute
-  Award-winning children's care at Levine Children's Hospital
-  Heart transplant and minimally invasive bypass surgery at Sanger Heart & Vascular Institute

Personalized Service

-  Dedicated patient navigator
-  Medical appointment coordination
-  Travel arrangements
-  Language services and other cultural comforts





A Premier Destination for International Patients

Introducing the International Medicine Program at Inova

Inova is a world-class healthcare system located in the Washington, DC metro area. Serving more than two million people annually, our services are premiere destinations for international patients with complex medical needs and serious illness.

A Top-Ranked Health System

Inova's hospitals have been recognized on the *U.S. News & World Report Best Hospitals* list for more than 18 years. Inova Fairfax Hospital has been recognized by *U.S. News & World Report* for 2019-2020 as the recipient of the Best Hospitals Award. Ranked #1 in the Washington, DC metro region for the fifth time, this award is based on a number of key measures, including patient satisfaction. *U.S. News & World Report* also ranked Inova Fairfax Hospital #13 in the nation for Gynecology.

Another reflection of Inova's commitment to high-quality services is that all five Inova hospitals earned an "A" grade from The Leapfrog Group, the top inde-

pendent healthcare ratings company in the U.S., indicating the highest levels of quality and safety.

Our hospitals hold 21 disease-specific certifications from The Joint Commission in areas such as stroke, spine surgery and shoulder replacement.

In addition, Inova has the only Level 1 Trauma Center in Northern Virginia with a full scope of trauma care from point of injury to recovery. Some of Inova's physicians served as surgeons or consultants to the surgeons in the U.S. military and have extensive experience in post-traumatic injuries, similar to those seen in wars.

Inova services and locations are in close proximity to Washington, DC, and the region has two commercial airports, premier restaurants, high-end shopping and entertainment, a selection of luxury and discounted hotels, safe and reliable public transportation and outstanding higher education institutions.

International Medicine


Inova International Medicine provides healthcare services to meet the cultural and

personal needs of international patients and their families. Inova International Medicine provides a wide range of services, including trained medical interpreters, patient coordinators, customized care for high-profile patients and follow-up care with physicians, nurses and specialists.

Global Observership Program

Inova offers foreign medical providers the opportunity to learn from our experts and experience clinical practice in a U.S. setting. Our Global Observership Program is tailored to specialists interested in gaining more knowledge of the U.S. healthcare system, observing hospital system operations in a community setting and learning about privacy and HIPPA regulations.

Areas of observership include rehabilitation, heart, lung and vascular, oncology and neuroscience. Observerships range from one week to one month, during which time participants can attend procedures and surgeries, inpatient rounds and teaching conferences.

- To learn more, contact us at +1-703-463-8432 or international@inova.org. 

β-blockers Build Heart Muscle

Surgery can mend congenital heart defects shortly after birth, but those babies will carry a higher risk of heart failure throughout the rest of their lives. Yet, according to a *Science Translational Medicine* study published October 9 by UPMC Children's Hospital of Pittsburgh researchers, β-blockers could supplement surgery to regenerate infant heart muscle and mitigate the lasting effects of congenital heart disease.

"The question is no longer 'can we save this baby?'" said senior author Bernhard Kühn, MD, associate professor of pediatrics at the University of Pittsburgh School of Medicine and director of the Pediatric Institute for Heart Regeneration and Therapeutics at UPMC Children's Hospital. "The challenge for our young patients is that we want to enable them to have a long lifespan, ideally as long as a person without heart disease."

For a relatively common congenital heart defect called Tetralogy of Fallot, treatment typically involves surgery at around 3-6 months of age, which is incidentally when heart muscle cells – cardiomyocytes – are at peak production. Decreased heart function during the first few months may be causing these infants to miss an essential opportunity to build heart muscle.

Kühn's team collected heart tissue from 12 infants who underwent corrective surgery for Tetralogy of Fallot, and found that more than half of the cardiomyocytes in these samples had started to divide but then got stalled midway through the process, like conjoined twins. The ultimate result was fewer cardiomyocytes overall, which makes the heart more vulnerable to damage later on.

"By the time our surgeons operate on these patients, the horse is already out of the barn," Kühn said. "Our data show that

they have up to 30% fewer cardiomyocytes than a normal infant has at this age. That's significant. To put that in context, an adult's heart attack can destroy up to 30% of cardiomyocytes."

Through a series of experiments in human and mouse tissue, the researchers traced this cell division failure back to β-adrenergic receptors.

The natural next step was to ask whether the β-adrenergic receptor blocker propranolol – a common blood pressure medication – could stimulate proper cell division in infants with congenital heart defects and improve heart function.

Indeed, in the heart tissue samples taken from infants with Tetralogy of Fallot, propranolol enabled dividing cells to separate properly.

And in mice, propranolol treatment during the first weeks of life allowed for better recovery from heart attacks in adulthood. Compared to untreated controls, mice that were given propranolol as pups retained 30% more cardiomyocytes and were able to eject 24% greater blood volume following a heart attack.

According to Kühn, having such promising results with a tried-and-true drug like propranolol means the pathway to clinical translation could be relatively quick.

"This all comes together in a very applicable way," Kühn said. "Propranolol was synthesized nearly 60 years ago, so we're able to bypass a lot of the ground work that would have to be done if we had identified a receptor that doesn't have a drug for it."

This work was supported by the National Institutes of Health (grants R01HL106302 and UL1TR001857), Foundation Leducq (grant 15CVD03), Children's Cardiomyopathy Foundation, Children's Hospital of Pittsburgh Foundation, Heartfest and the Pennsylvania Department of Health.



Bernhard Kühn, MD, PDC

Other authors on the study include Honghai Liu, Ph.D., Niyatie Ammanamanchi, M.S., Christopher Lewarchik, Ph.D., Krithika Rao, Ph.D., Lu Han, Ph.D., Dean Yimlamai, M.D., Ph.D., Balakrishnan Ganapathy, M.S., Nathalie Chen, Kathryn Little, M.A., R.N., Kimberly Francis, Melita Viegas, M.D., Dennis Kostka, Ph.D., Mousumi Moulik, M.D., Jennifer Johnson, D.O., Jacqueline Weinberg, M.D., Miguel Reyes-Múgica, M.D., of UPMC Children's Hospital and Pitt; Cheng-Hai Zhang, Ph.D., Sangita Suresh, Ph.D., Gerrida Uys, Ph.D., Maryline Abrial, Ph.D., Sangita Choudhury, Ph.D., Stuart Walsh, Ph.D., of Boston Children's Hospital and Harvard University; Christelle Guillermer, Ph.D., Matthew Steinhauser, M.D., of Brigham & Women's Hospital and Harvard Medical School; Mugdha Khaladkar, Ph.D., Jennifer Spaethling, Ph.D., James Eberwine, Ph.D., Junhyong Kim, Ph.D., of University of Pennsylvania; Mahesh Sharma, M.D., of the University of North Carolina at Chapel Hill; Jun Ding, Ph.D., Ziv Bar-Joseph, Ph.D., of Carnegie Mellon University; and Abha Bais, Ph.D., Yijun Wu, Ph.D., Vijay Yechoor, M.D., of Pitt. [MEH](#)

The Time Is Now for Precision Care

By Charles Wiener, M.D.
President, Johns Hopkins Medicine International
Professor of Medicine and Physiology,
Johns Hopkins University School of Medicine

There is a common misperception that “precision medicine” is interchangeable with “genetics” or “genomics.”

Johns Hopkins Medicine’s view of precision medicine recognizes that the care of individual patients requires a broad knowledge of their physiology, genetics, environment, behavior and all the other factors that influence health and disease.

We see precision medicine as using the most modern science – including biomedical and data science – to care for patients as individuals.

Johns Hopkins Medicine colleagues Antony Rosen, vice dean for research and professor of medicine, and Scott Zeger, professor of biostatistics and medicine, suggest precision medicine can reimagine medicine. And they argue that a reimagining is way past due if we are going to rectify the US\$1 trillion wasted each year by basing clinical decisions on inadequate data.

Rosen and Zeger encourage a much swifter adoption of advanced technologies and increased computational power to generate very precise measurements and analyses of health data related to individuals and to broader populations, however we choose to define them.

We can gather large quantities of longitudinal data about the people we treat to create a scientific framework to guide patients in decisions related to their health state, disease trajectory and best bet for treatment. By developing better measurements of each patient, the data will uncover disease subgroups, and we can more precisely target care that has produced clinically relevant outcomes for patients with similar conditions.

Like Rosen and Zeger, I believe precision



medicine is how we’re going to transform patient care and even medical education.

In one effort to return patients to the center of care – where they belong – educators at Johns Hopkins have implemented the Aliko Initiative, a project that trains interns, residents and medical students to really get to know their patients so they can tailor evidence-based medical treatment for specific individuals’ needs.

The initiative began at Johns Hopkins Bayview Medical Center in 2006 and has strengthened our approach to restoring medicine as a public trust. It instills core skills and behaviors residents should demonstrate as practitioners. Every intern at Bayview Medical Center spends four weeks on the Aliko service, and internal medicine residents spend an extra two to six weeks later in their residency.


They gather thorough social histories. They engage in unrushed, structured conversations with patients about how to take medications at home. They also make phone calls and home visits and check in with primary care providers to make sure patients are, in fact,

getting better after discharge.

While Johns Hopkins Bayview Medical Center has been the core of the Aliko Initiative, we have expanded the project across Johns Hopkins Medicine and beyond. For example, we have provided the curriculum’s materials to the public on MedEd Portal, a peer-reviewed open educational resource for the health sciences sponsored by the Association of American Medical Colleges.

We firmly believe that the aspiration to provide precision medicine must also include how the patient’s environment, community and behavior affect individual health.

There are no generic patients. So we are teaching physicians to slow down and get to know each patient as a person. Taking this time will mean making more accurate diagnoses, providing better treatment choices, and achieving greater patient understanding and satisfaction – saving time, and lives, in the long run.

• To learn more about how Johns Hopkins is leading precision medicine: hopkinsmedicine.org/inhealth 

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Giving new hope to children with metabolic disease

UPMC Children's Hospital of Pittsburgh is a leading international center for liver transplantation as a treatment for metabolic disease.

As one of the best children's hospitals in the United States, as named by U.S. News & World Report, UPMC Children's Hospital of Pittsburgh is a pioneer in the field of liver transplantation, which has proven to be a life-changing solution for patients with metabolic disease.

Liver transplantation can dramatically reduce symptoms, and in cases like maple syrup urine disease (MSUD), can provide a cure.

Liver transplantation is more than a life-saving procedure; it's also an attractive approach for improving quality of life for many patients with metabolic disease. In 2004, we developed the protocol for liver transplantation for MSUD. Today, we've performed more transplants on patients with MSUD than any other center in the world. That's more than 70 patients with a 100-percent survival rate. All of these patients show normal liver function, have avoided the risk of neurological complications, and enjoy an unrestricted diet.

We've performed more liver transplants for patients with metabolic disease than any other transplant center.

Since the inception of our program in 1981, our world-renowned experts have performed more than 1,700 liver transplants - that's more than any other center in the United States - with survival rates that exceed national averages. Additionally, we've performed more than 330 liver transplants for patients with metabolic disease, which is more than any other center, including adult facilities. Also, we're leaders in living-donor liver transplants, which eliminate wait times for a deceased donor and can provide excellent outcomes.

Find out more about our excellent outcomes and extraordinary care.

Our experience, expertise, and commitment to innovation and compassionate care are reasons why patients and families from around the world travel to UPMC Children's Hospital of Pittsburgh. For a free phone consultation with one of our experts in liver transplantation as a therapeutic option for metabolic disease, please email international@chp.edu.