



Baylor  
College of  
Medicine

INNOVATING HEALTH AND  
EXPANDING ACCESS

# BAYLOR GLOBAL HEALTH

2021 ANNUAL REPORT



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## Message from the President & CEO

Dear Friends and Colleagues,

At Baylor College of Medicine, we believe it is important to know and care about what is going on in the rest of the world. We have learned through the current pandemic that the health events that occur around the world affect us, even if only indirectly.

Unfortunately, health is not equally distributed. Although major global events, like COVID-19, create enormous economic and social shocks, we must not forget to address the everyday health concerns of underserved communities around the world.

At Baylor College of Medicine, one of our greatest tools is innovation. Innovation provides new solutions to challenging problems. We believe innovation is worth pursuing because of the positive impact it has on lives.

I encourage you to continue to explore how the Baylor College of Medicine community can work together to make a meaningful impact both locally and globally.

I hope you will take some time to review this report and see all that we have accomplished together in the past year, even in a global pandemic. I look forward to working with the Baylor community on achieving even greater things in the coming year.

Sincerely,

A handwritten signature in black ink that reads "Paul Klotman". The signature is fluid and cursive, with a long horizontal stroke at the end.

**Paul Klotman, M.D.**  
President & CEO  
Executive Dean  
Baylor College of Medicine



## Message from the Director of Baylor Global Health

Dear Friends and Colleagues,

As the past two years have shown, global health has never been more relevant.

In the midst of an unprecedented global pandemic, our sights were set on addressing global health security and expanding access to care, locally and globally. We deployed two negative pressure Smart Pods™ to underserved areas in Harris County and launched a company (Xploration Health) to deliver these innovative units (developed at BCM) to areas facing disasters and epidemics.

In addition, we initiated our maternal health program in The Gambia, West Africa, with the goal of ensuring that mothers and babies, even in the most underserved areas of the world, have access to safe labor and delivery. A video of this program is shown here: <https://bit.ly/3FmHBph>

*And we continued to **innovate**:* developing new and cost-effective ways to deliver cancer care, diagnostics, and training. Digital medicine is here to stay, and we are leveraging this to promote access to care while virtually scaling our programs beyond the United States to Africa, South America, The Caribbean, and beyond.

The pages that follow highlight key initiatives and achievements originating from Baylor Global Health.

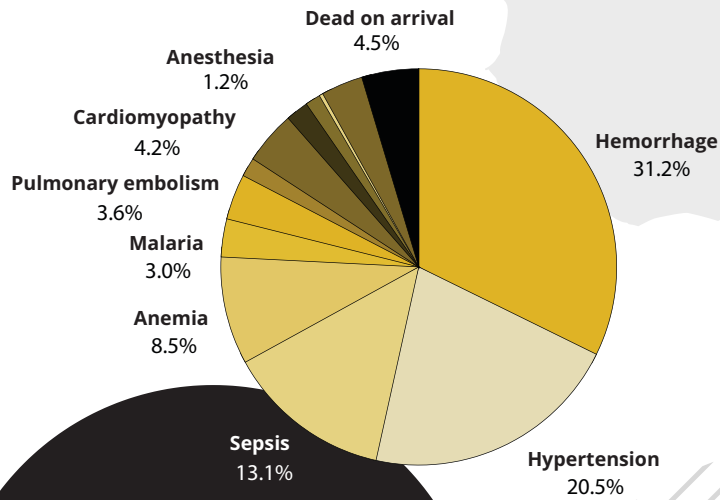
Thank you for your support and for believing in the power of ingenuity and innovation to improve healthcare worldwide.

Respectfully yours,

A handwritten signature in black ink, appearing to read 'Sharmila'.

**Sharmila Anandasabapathy, M.D., FASGE, AGAF**  
Director, Baylor Global Health  
Professor of Medicine and Gastroenterology  
Baylor College of Medicine

# The Gambia: Continuing Our Mission to Transform Maternal and Newborn Health



The Gambia is a small, coastal, English-speaking West African nation with a population just under 2 million residents. The country besets the Gambia River, its namesake, and is surrounded by Senegal to the north, east, and south and the Atlantic Ocean to the west. In The Gambia, postpartum bleeding, high blood pressure, blood-borne infection, and anemia are consistently the most common causes of maternal mortality. There has been a steady increase in the proportion of maternal deaths referred from other health facilities

**52%**

*of maternal deaths in The Gambia occur within 24 hours of arrival to the hospital.*

**85%**

*of maternal deaths in The Gambia occur in the postpartum period—a rise from 61%.*



© Photo by Tom Oldham (ridersforhealth) Flickr

to the Edward Francis Small Teaching Hospital (EFSTH), the country's only tertiary health facility, located in Banjul (the capital city).

Two-thirds of the world's population does not have access to safe, affordable, and lifesaving surgery. The Gambia Project aims to transform conditions for mothers and babies by providing safer options for C-sections, childbirth, and overall healthcare.

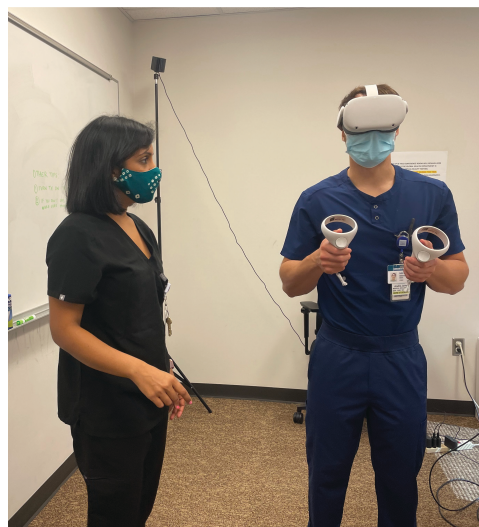
"Providing healthcare should be a basic human right, no matter where you live," declares **Dr. Rahel Selassie**, Associate Professor in the Department of Anesthesiology. "What we are going to accomplish in The Gambia will be impactful to the women who live there. Too many women die during childbirth and those who survive can develop complications from it, and both of those things can be prevented."



# Mixed Reality: A New Dimension of Endoscopic Training

A new collaboration with BCM Gastroenterology will use immersive technologies, like mixed reality (MR), to develop a platform that will usher in a new dimension in the training of healthcare professionals. Immersive technology is an interactive experience that either extends reality by adding information to a real-world environment or generates a new reality by submerging users inside a virtual, computer-generated world.

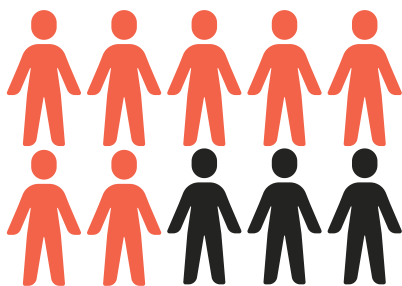
Immersive technologies, like virtual reality (VR), augmented reality (AR), and mixed reality (MR), have garnered great interest in recent years among those wanting to advance workforce development and training methods. Proponents of this technology praise its level of realism, interactivity, and ability to simulate real-world scenarios. Research suggests that AR/VR simulators provide a detailed training



Above: Dr. Richa Shukla and Andre Jove, a BCM medical student, are testing the VR training simulation.

experience with a fair and honest assessment of a user's technical skills, especially within the scientific, health and safety, and high-stress clinical fields.

Our Phase I R&D activities will investigate feasibility and pilot an integrated repository of AR and VR training applications for the technical training of healthcare professionals, especially for endoscopy. AR glasses will improve endoscopy ergonomics and VR simulation will enhance training skills. Our software partners will incorporate procedural knowledge from Baylor College of Medicine clinicians to create an AR/VR environment with 3D computer graphics and interactive models of equipment, devices, and instrumentation necessary for the optimal treatment of patients with diseases and disorders of the digestive system. Immersive reality—it's not just for gaming anymore!



*7 out of 10 individuals report that the most promising opportunities for all extended reality technology, including mixed reality (MR), will be in workforce development, including health and safety training.*



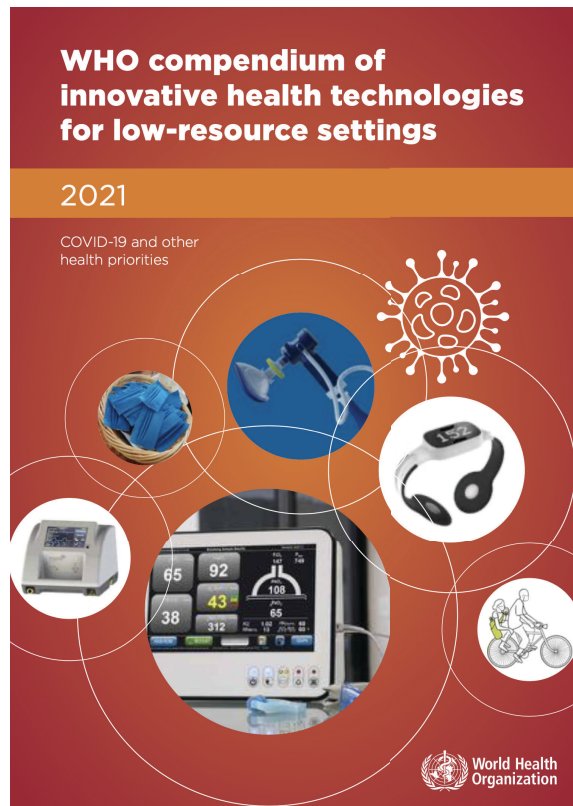
# WHO Features Smart Pod™ in 2021 Compendium for Innovative Health Technologies

Smart Pod™ has been included in the World Health Organization's 2021 WHO compendium of innovative health technologies for low-resource settings, which was officially released on Aug. 31, 2021.

This report recognizes new commercially available and prototype medical technologies, which have been evaluated and determined to possess significant global potential to accelerate access to care, improve health outcomes, enhance quality of life, and solve unmet medical needs. Additionally, this report aims to bring awareness and foster increased implementation and adoption of technologies, especially in low-resource settings.

This is the 5<sup>th</sup> edition of the compendium for innovative health technologies, and the 2021 report prioritizes COVID-19 preparedness and response and other health priorities.

The Smart Pod™, a rapidly-deployable and expandable mobile medical facility, has been described as “the 21st century MASH unit,” which evokes the history of Baylor College of Medicine. Dr. Michael E. DeBakey, former Baylor College of Medicine President and Chair of the Department of Surgery, first conceived the Mobile Army Surgical Hospital (MASH) unit in 1945.



# 35%

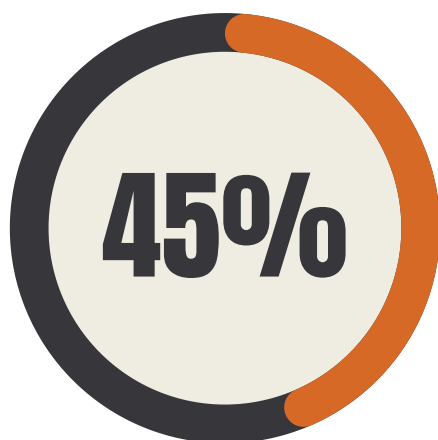
*of healthcare facilities across 54 low- and middle-income countries (LMICs) do not have water and soap for handwashing and 19% do not have modernized sanitation.*

# >8M

*individuals in LMICs die per year due to poor-quality health infrastructure, education, communication, and transport, which leads to \$6 trillion in economic welfare losses.*

In March 2020, the world faced a new challenge: the COVID-19 pandemic. Locally, healthcare capacity was quickly overwhelmed. Texas' Harris County Precinct 2 requested that Baylor Global Health develop a state-of-the-art, rapidly deployable medical facility with safe and private examination rooms. These Smart Pod™ facilities were optimized for patient workflow and included a negative pressure (NP) isolation room with HEPA filter air-purification.

The units were unveiled in the Aldine and Pasadena communities of Harris County and were initially used for COVID-19 PCR testing and symptom management. Eventually, these units became ground zero for the COVID-19 vaccination effort.



*of Aldine residents (6,893 people) have no healthcare coverage, compared to Texas (20%) and Harris County (excluding the City of Houston) (19%). An equal proportion (45%) rate their health as poor or fair.*

## Smart Pod™ in Houston: The 21st Century MASH Unit



Above: Dr. Sharmila Anandasabapathy, director of Baylor Global Health and professor at Baylor College of Medicine, addresses the crowd, as Harris County Precinct 2 Commissioner Adrian Garcia and Dr. Paul Klotman, president and CEO of Baylor College of Medicine, listen during the unveiling of the newest Smart Pod™ in the Aldine community. Aldine, Harris County is a local neighborhood with limited access to healthcare.



An Award-Winning Concept for Increasing Community Care Capacity



WINNER: American City & County's 2020 Crown Communities Award



WINNER: 2021 NACo Achievement Award



*of Harris County adults are unable to see a doctor due to affordability and cost, compared to Texas (18%) and the US (12%). More women (27%) found doctor's visits unaffordable compared to men (17%).*



*of City of Pasadena residents (48,022 people) are uninsured, compared to Texas (22%) and Harris County (excluding the City of Houston) (23%).*

“With all the debate over our state and nation’s healthcare future, we decided to take matters into our own hands, bringing services directly to the Precinct 2 Community. Harris County is home to the finest medical center in the nation. But, many residents of Precinct 2 cannot access services from the Texas Medical Center,” said **Commissioner Adrian Garcia**. “My goal was to bring all the resources of the Texas Medical Center directly into our neighborhoods.”

# An Ounce of Prevention: Reducing the Global Burden of Cardiovascular Disease

Salim Virani, M.D., Ph.D., is a tenured Professor of Cardiology and Cardiovascular Research at Baylor College of Medicine and an investigator in the Health Policy, Quality, and Informatics Program at the Michael E. DeBakey VA Health Services Research and Development Center of Innovation in Houston, Texas. Clinically, he is a preventive cardiologist at Baylor College of Medicine and the Michael E. DeBakey VA Medical Center (MEDVAMC) and has a special interest in the management of complex dyslipidemias. Moreover, he is no stranger to global health issues.



Salim S. Virani, M.D., Ph.D.

Through the Aga Khan Development Network, Dr. Virani worked with a team to enhance the quality of care for cardiovascular diseases (CVDs) in Tanzania, Kenya, Tajikistan, and Pakistan. In Dar es Salam, Tanzania, and Mombasa, Kenya, Dr. Virani furthered quality improvement (QI) for cardiac catheterization laboratories. In Tajikistan, he participated in a train-the-trainer model training program for local authorities and supported an echocardiography laboratory, improving the treatment of hypertension in remote areas. Through the World Heart Federation's Emerging Leaders Program, as part of a multinational team of investigators, Dr. Virani explored the utility of adherence clubs to improve hypertension control in Nigeria. His team also conducted the first pilot randomized controlled trial (RCT) to test the efficacy of text message and interactive voice

response (IVR)-based intervention to promote medication adherence among heart attack and stroke patients in Karachi, Pakistan.

Dr. Virani spends approximately 15-20 hours per week in voluntary service with a dedicated team of volunteers to provide educational and behavioral intervention related resources to combat noncommunicable diseases (NCDs) in the community and plays an active role in healthcare capacity building for communities in South Asia, Central Asia, and East

Africa. He was recently appointed to the WHO Technical Advisory Group on Noncommunicable Diseases, which is tasked with promoting innovative research and development for the prevention and control of NCDs. He will also lead Baylor Global Health's Cardiac Research program in 2022.

# 32%

*of all deaths worldwide (an estimated 17.9 million) occur due to cardiovascular diseases (CVDs), making this class of diseases the leading cause of death globally.*

# Telepathology: A Global Opportunity for Enhanced Cancer Detection

Daniel Rosen, M.D., M.Ed., is board certified in Anatomical Pathology and Clinical Pathology and possesses over 20 years of experience in pathology. He began his pathology training in Argentina where he also learned the basics of digital imaging technology, as applied to pathology. Later, his interests in cancer research led him to MD Anderson Cancer Center where he combined computerized image analysis technology and high-throughput tissue microarrays (TMAs) to investigate different biomarkers in ovarian and breast cancer. In fact, Dr. Rosen designed and validated the first ovarian cancer tissue microarray.

Dr. Rosen was invited to join the validation of the high-resolution microendoscopy (HRME), an imaging device that was innovated at Baylor Global Health, by evaluating the biopsy specimens acquired during the HRME procedure. Most specimens were

assessed on site, and the remote interpretation of microscopic images was challenging at best.

While conducting many trips from the United States to China and Honduras, Dr. Rosen had an epiphany. He realized that a simple inexpensive telepathology solution could help acquire high resolution images for later assessment. He began learning about 3D printing and began the development of his first prototypes. During this process, Dr. Rosen learned that a group led by Richard Bowman, Ph.D. from the University of Bath, a public research university located in Bath, Somerset, United Kingdom, had developed a similar device, called the “OpenFlexure Microscope,” which could be modified to the needs of the project. He contacted Dr. Bowman and shared his idea, which was met with great interest. After a few modifications to the original prototype, Dr. Rosen was able to create

several working models of the OpenFlexure device. He is currently conducting validation studies to assess the accuracy of this microscope to diagnose surgical specimens and cytology smears.



Daniel G. Rosen, M.D., M.Ed.

**40%**  
*of the globe's pathologists are employed in the United States and these pathologists serve approximately 3% of world's population.*

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