**Challenge Themes**

**1. Global Health & Equity**

**Challenge Overview:** Tackle the critical issue of disparities in healthcare access and outcomes among diverse populations. This challenge seeks innovative solutions to bridge the gaps in healthcare delivery and ensure that high-quality care is accessible to all individuals, regardless of geography, socioeconomic status, or ethnicity. The solutions will mainly focus on removing barriers to healthcare access and improving health equity on a global scale.

**Data Sources: To be updated**

**Some Examples:**

* **Telemedicine Platforms:** Develop tailored telemedicine solutions for underserved regions that address local health needs and infrastructure limitations.
* **AI-Driven Diagnostics:** Create AI tools for accurate diagnostics in low-resource settings where access to advanced medical equipment is limited.
* **Community-Based Health Education:** Design educational tools and platforms that enhance health literacy and empower communities with essential health information.

**USE CASES**

* Making outpatient scheduled dialysis accessible to undocumented immigrants without health insurance
* Reducing physician bias while delivering care
* Imporving access to care
* Can basic information be collected by wearable to understand who needs what and what kind of care when
* AR training applications
* Miniaturization of devices
* Robotic ultrasound/pocket ultrasound
* Improving virtual care
* Care close to home
* Digital care networks
* Predicting post-partum hemorrhage
* Preventing End stage renal disease
* Eye exams

**2. Innovative Medical Education**

**Challenge Overview:** Transform the landscape of medical education by developing cutting-edge tools and methods that make learning more interactive, comprehensive, and accessible for future healthcare professionals. This challenge aims to revolutionize how medical knowledge is delivered and absorbed, enhancing the educational experience, clinical reasoning, and preparing students for the evolving healthcare environment.

**Data Sources: To be updated**

**Some Examples:**

* **Virtual Reality Simulations:** Develop immersive VR simulations that provide hands-on training experiences for medical procedures, anatomy, and patient interactions.
* **AI-Powered Tutoring Systems:** Create intelligent tutoring systems that offer personalized learning experiences, assessments, and feedback to students.
* **Collaborative Platforms:** Build platforms that facilitate remote learning, peer collaboration, and skill-building through interactive sessions and real-time feedback.

**USE CASES**

* Virtual Learning Environments
* Zoom with augmented reality
* AR/VR simulation
* Feedback
* Dynamic/real-time feedback to medical students on history and exam
* Dynamic feedback regarding patient satisfaction during conversations
* Can AI learn the psychology of students to identify patterns that match up with thought processes
* Drilling down complex medical content down to the molecular/pathophysiology level.  Teaching Molecule to cell to organ to human.  E.G. Sickle cell - talking about genetic factors, messing up that one base pair, all the downstream effects of that

**3. Enhancing Patient Care & Safety and Optimizing Health Outcomes**

**Challenge Overview:** Innovate solutions that directly impact patient care and safety, focusing on improving care delivery, enhancing monitoring capabilities, and preventing medical errors. This challenge encourages the development of technologies that streamline patient care processes, ensure safety, and ultimately lead to better patient outcomes. Focus on strategies and technologies that drive improved health outcomes by enabling personalized care, leveraging predictive analytics, and increasing patient engagement. This challenge seeks solutions that utilize data and technology to tailor treatments to individual needs and enhance overall health management.

**Data Sources: To be updated**

**Some Examples:**

* **Smart Monitoring Systems:** Develop advanced monitoring systems that provide real-time data on patient vitals, enabling timely interventions and improved care.
* **AI-Assisted Decision Support:** Create AI tools that support clinical decision-making by analyzing patient data and suggesting evidence-based treatment options.
* **Predictive Analytics:** Create algorithms that can predict an outcome, allowing for early interventions and resource allocation
* **Real-Time Feedback Platforms:** Design systems that collect and analyze patient feedback to identify safety concerns and enhance the overall patient experience.
* **Predictive Models for Chronic Disease:** Develop predictive analytics tools that help manage chronic diseases by forecasting potential complications and tailoring interventions.
* **Patient Engagement Apps:** Create applications that encourage patients to actively participate in their own care, track their health progress, and communicate with their healthcare providers.
* **Data-Driven Personalized Medicine:** Build tools that analyze patient data to develop customized treatment plans and optimize therapeutic outcomes.

**USE CASES**

* Decreasing re-admission for heart failure patients including improved education, clarification on medication regimens and confirmation of outpatient follow up visits
* Decreasing central line associated infections
* Decreasing inappropriate pan cultures in patients with signs of infection where a specific source would be more appropriate to culture
* Decreasing foley catheter associated urinary tract infections including increasing use of nurse driven protocol for foley removal
* Increasing hand hygiene compliance hospital wide
* Increased prescribing of buprenorphine to patients discharged from the ED following overdoses
* Improved goals of care discussions with patients at right place and time by right provider with increased use of POLST form to avoid ICU, etc., for patients who would have been better served by hospice
* Early identification of patients at risk for hospitalization associated deconditioning and prioritizing physical therapy resources for these patients to increase discharges from home to home
* Measuring the risk of severe outcomes like hypoglycemia (dangerously low blood glucose) like monitoring continuous glucose in inpatients with severe illnesses.

**4. Advancing Operational Excellence in Healthcare**

**Challenge Overview:** Enhance the efficiency and effectiveness of healthcare systems through innovative solutions that streamline operations, reduce costs, and improve service delivery. This challenge invites you to develop technologies that optimize workflows, manage resources effectively, and improve coordination among healthcare providers.

**Data Sources: To be updated**

**Some Examples:**

* **EHR Optimization:** Innovate with solutions that enhance the functionality and usability of electronic health records (EHRs), improving data entry, access, and patient information management.
* **Resource Allocation Algorithms:** Create algorithms that optimize the allocation of healthcare resources, such as staff and equipment, to improve operational efficiency.
* **Provider Coordination Systems:** Design systems that facilitate better coordination and communication among healthcare providers, enhancing collaborative care and patient outcomes.

**USE CASES**

* Decreasing length of stay for inpatients
* Facilitating admission of clinically appropriate less sick patients directly to Somerset hospital from the RWJUH ED as a default when clinically appropriate
* Defining appropriate hospitalist staffing for different shifts including overnight appropriate to the clinical complexity of the patients at RWJUH
* Decreasing inappropriate use of imaging studies on inpatients including identifying studies that would be more appropriately scheduled as outpatient studies, e.g. lumbar spine MRI without red flags
* Improving Scheduling and reducing No Shows/Cancellations
* Solution to facilitate use of the EPIC problem list outpatient and inpatient including problem list clean up. This would help us capture CMI.
* Facilitating use of EPIC Chat by clinicians and others to improve communication throughout the hospital
* Increasing use of the ventilator bundle in ICUs
* Increasing compliance with the Sepsis bundle hospital wide
* Decreasing surgical site infections including increased compliance with known bundles such as colon surgery bundle
* Improved AI and natural language processing coding and documentation in real time when providers are charting, likely by facilitating use of the Dragon/Nuance tool and expansion to all providers
* Heart failure re-admission - getting discrete EF out of echo reports - NLP/LLM.  Getting discrete data out of unstructured data reports