

The Next Frontier: AI-Powered Medical Devices for Patient Safety and Efficiency

Adam Landman, MD

2024 Symposium on Smart and Autonomous Medical Systems (SaAMS)

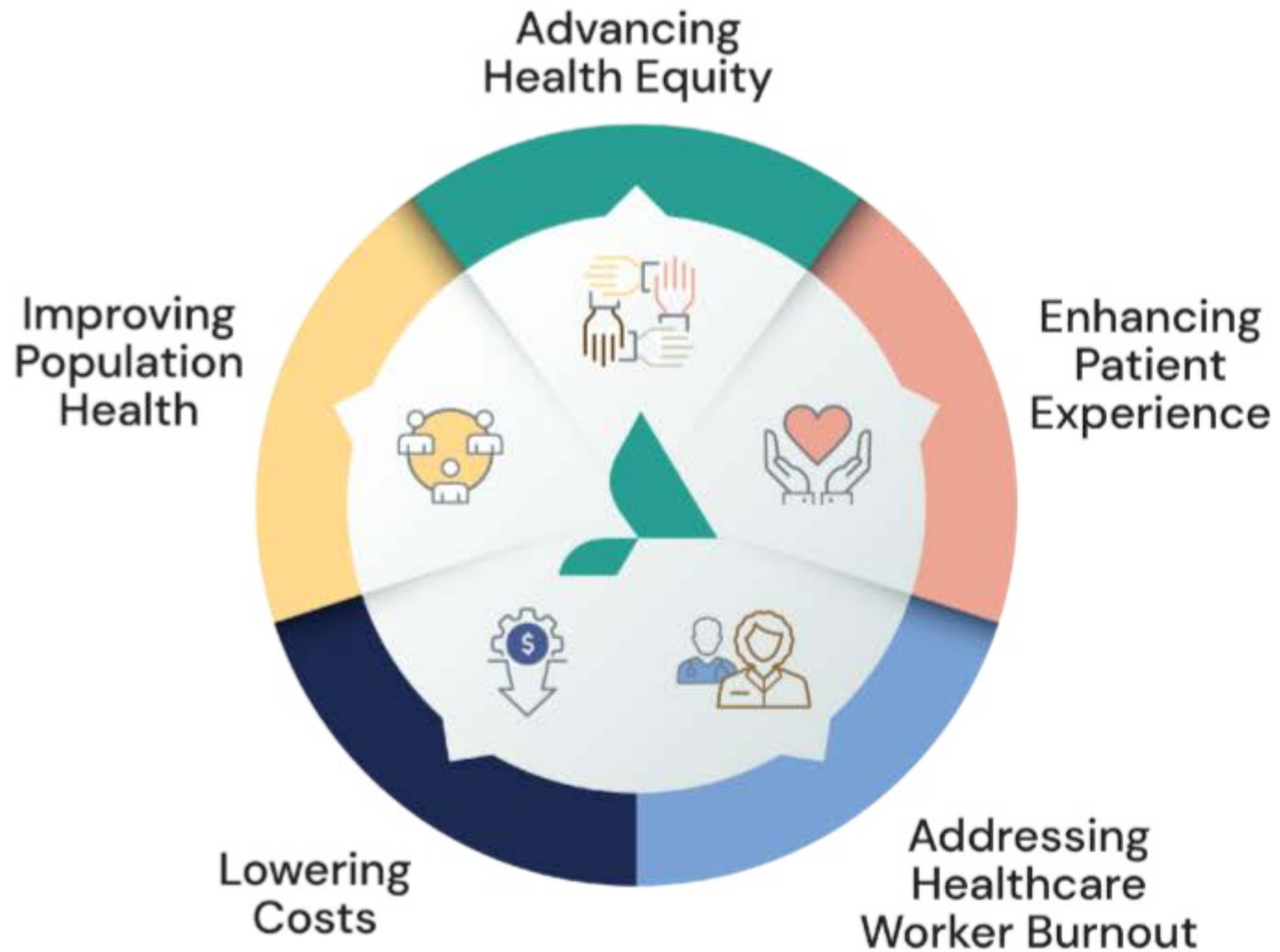
June 6, 2024

Disclosures

Consultant for Abbott Medical Device Cybersecurity Council



The Quintuple Aim of Healthcare



Healthcare is Facing Significant Headwinds



FINANCIAL PRESSURE



ACCESS TO CARE



WORKFORCE

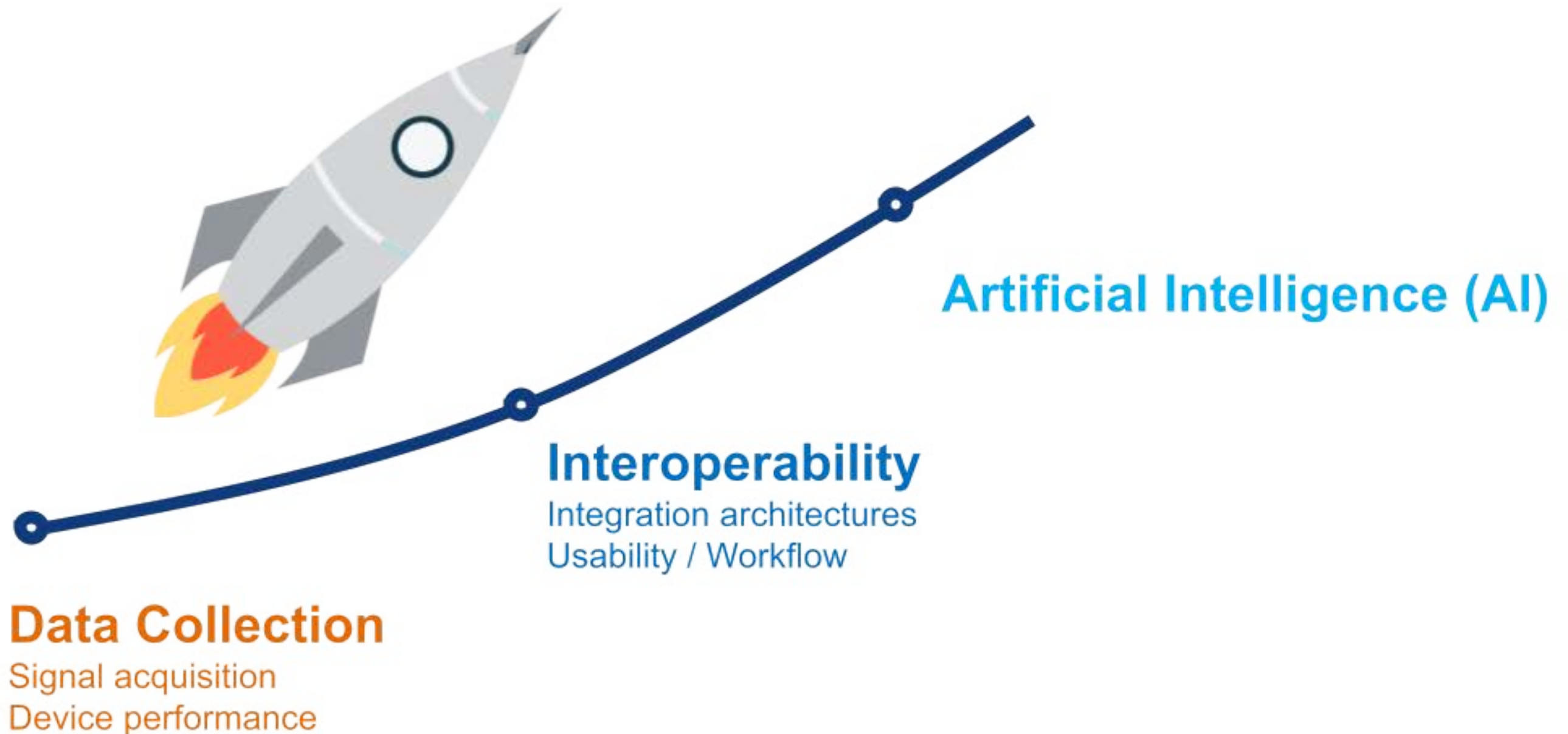
There is No Single Panacea

Better Health, Better Care, and Lower Cost

Culture	Participatory, team-based, transparent, improving
Design and Processes	Patient-anchored and tested
Patients and the Public	Fully and actively engaged
Decisions	Informed, facilitated, shared, and coordinated
Care	Starting with best practice, every time
Outcomes and Cost	Transparent and constantly maintained
Knowledge	Ongoing, seamless product of services and research
Health Information	Reliable, secure and reusable resource
Data Utility	Data stewarded and used for the common good
Digital Technology	Engine for continuous improvement
Trust fabric	Strong, protected, and actively nurtured
Leadership	Multi-focal, networked, and dynamic



Medical Device Informatics Journey



Medical Device Interoperability: OR of the Future

2004 - research grant received from CIMIT under U.S. Department of Defense (DoD) to start up MD PnP and a new initiative for Interoperability Standardization for the Operating Room of the Future



Medical Device Interoperability: Vital Sign Integration



Vitals				
BP	125/70	140/72	108/62	109/57
Pulse	78	80	72	
Site	Right Arm	Left Arm	Left Arm	Left Arm
Cuff Size	Regular	Regular	Regular	Regular
BP Position	Sitting	Sitting	Sitting	Sitting
Temp				
Temp site				
Resp	18	18		
SpO2				
Peak Flow				

Medical Device Interoperability – Remote Control

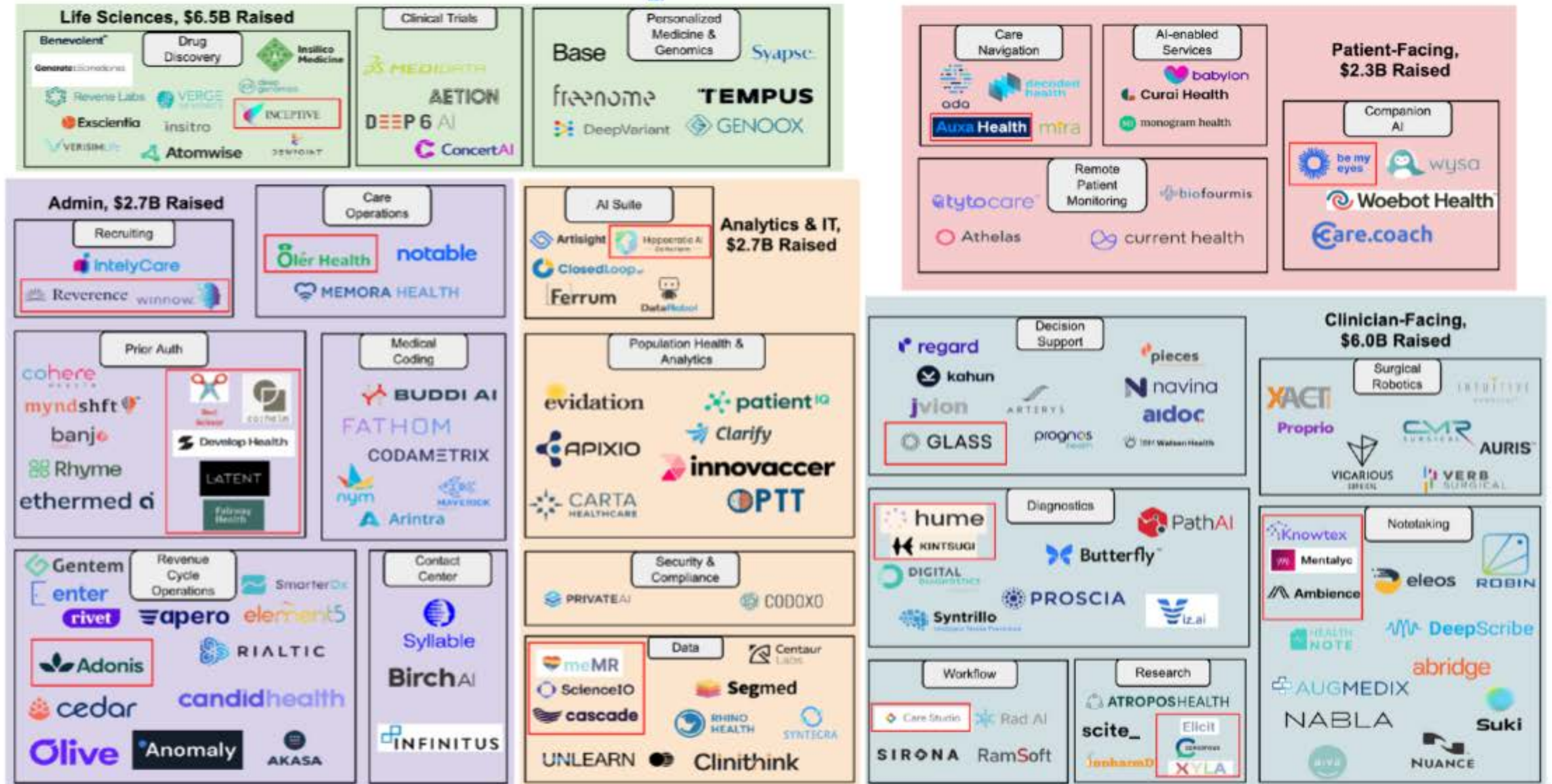
Remote control of NKV-550 ventilator controlled from DocBox ICE platform locally, as well as securely over the internet from the San Francisco exhibit to the MGH MD PnP Lab in Cambridge, Mass



Medical Device Cybersecurity

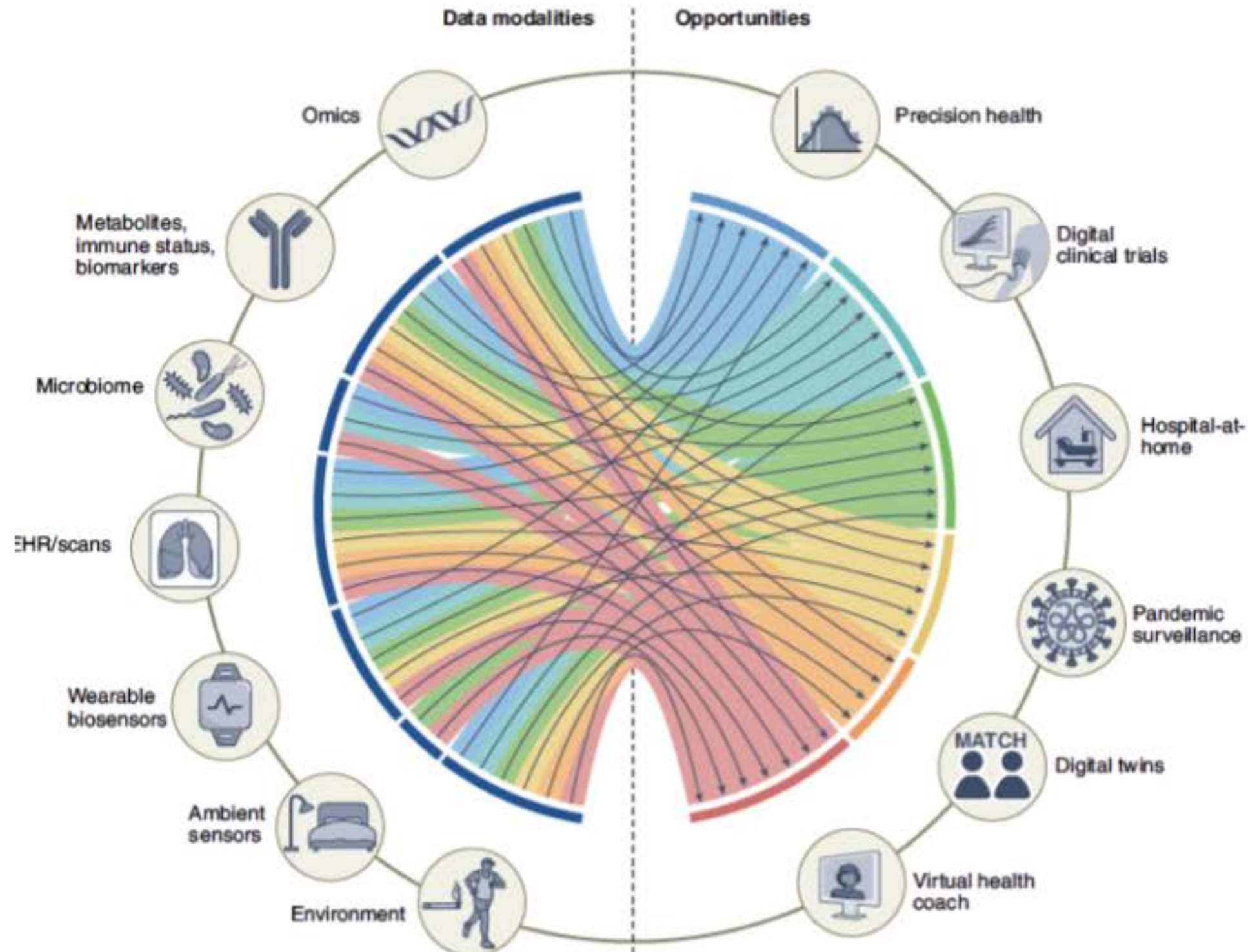


The Healthcare AI Landscape

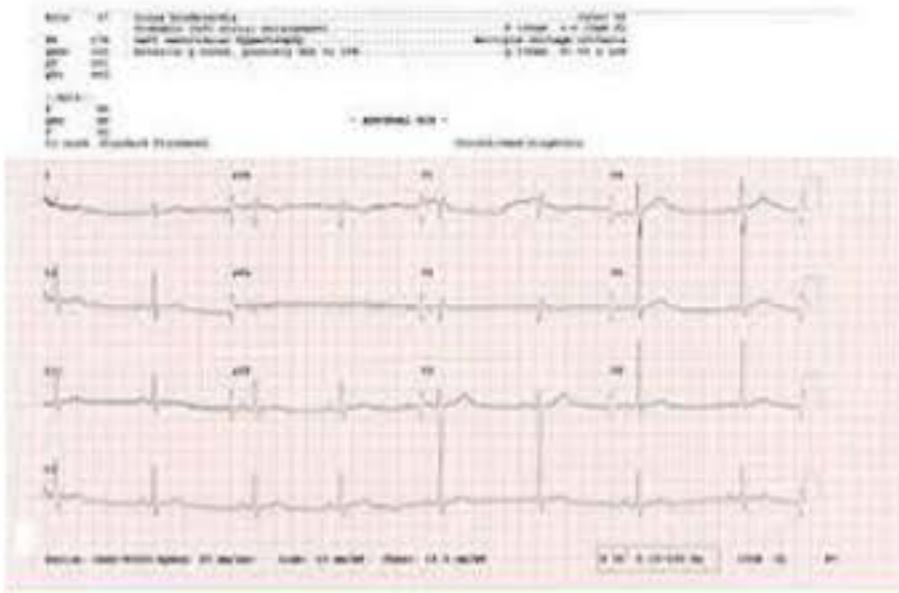


Multimodal Biomedical AI

Leverage data from many sources



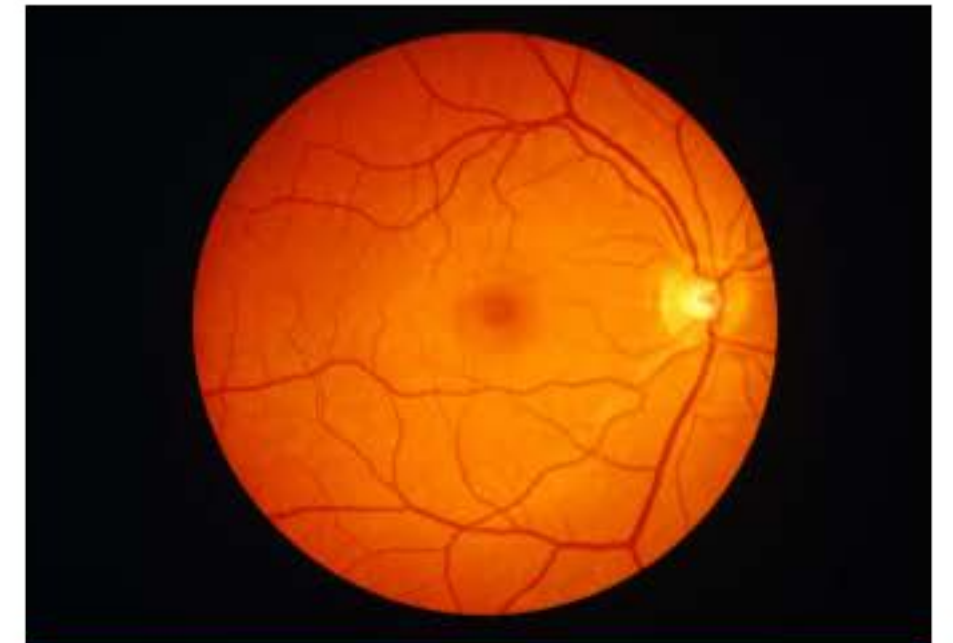
Medical Devices and Artificial Intelligence



**ELECTROCARDIOGRAM
(ECG)**



WEARABLES



FUNDOSCOPIC EXAM

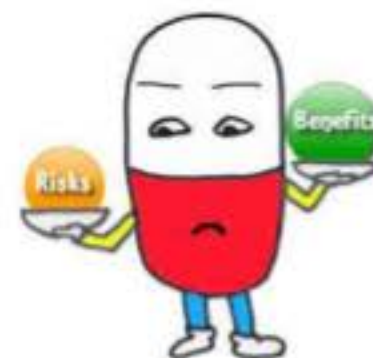
What is needed to Advance Medical Device + AI?



RELIABILITY



SAFETY



BENEFIT/ROI



FDA APPROVAL



BIAS



PRIVACY/SECURITY



TRANSPARENCY



INFORMED CONSENT

Medical Device Plug-and-Play Interoperability Program (MD PnP)



Special Message from Dr. Anne Klibanski President and CEO, Mass General Brigham

“The integration of smart and autonomous medical systems (SaAMS) within healthcare settings will revolutionize patient care by significantly enhancing precision, efficiency, and outcomes with new and emerging technologies.

These advanced capabilities are pivotal to our mission to deliver cutting-edge treatments and improve health outcomes on a global scale. Since 2004, under the leadership of Dr. Julian M. Goldman, the Medical Device Plug-and-Play Interoperability Program (MD PnP) has positioned Mass General Brigham as a frontrunner of global cross-sector innovation and leadership in patient safety, thus paving the way for a future where smart and autonomous medical systems become a standard in healthcare.”





Mass General Brigham