Health Care Analytics: Driving Innovation

Jonathan Woodson, MD, MSS, FACS

Director, Institute for Health System Innovation and Policy

jwoodson@bu.edu
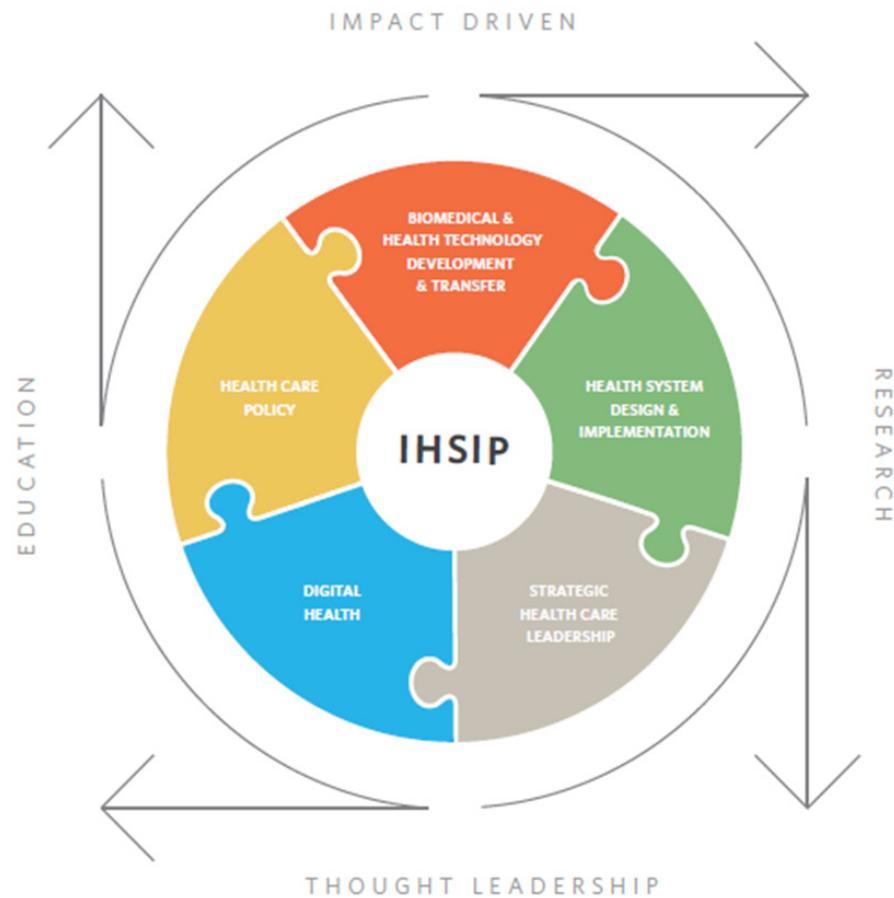
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Driving Innovation in Health Care

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Organizational Model

The IHSIP focuses on five pivotal, interconnected domains that are central to driving innovation in health care

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The "Holy Grail"-What do we want?

- Safe-"Do no harm"
- Effective- evidence based therapy leading to best outcome
- Efficient- limits waste of resources
- Patient-Centered- respectful, responsive, values-based
- Equitable-quality care for everyone in need
- High performing/Learning
- Connected- Link patient, provider care teams, provider organizations and broader political-economic communities…all pulling in the same direction

The Iron Triangle

Figure 2

Around the world, health systems face the challenge of breaking the iron triangle and improving affordable access to quality care.

In low and middle-income countries, access to healthcare services is severely limited
- Many lack access to basic services
- Poor access leads to higher mortality from treatable diseases
- Poor access stunts economic growth, limits size of addressable healthcare markets
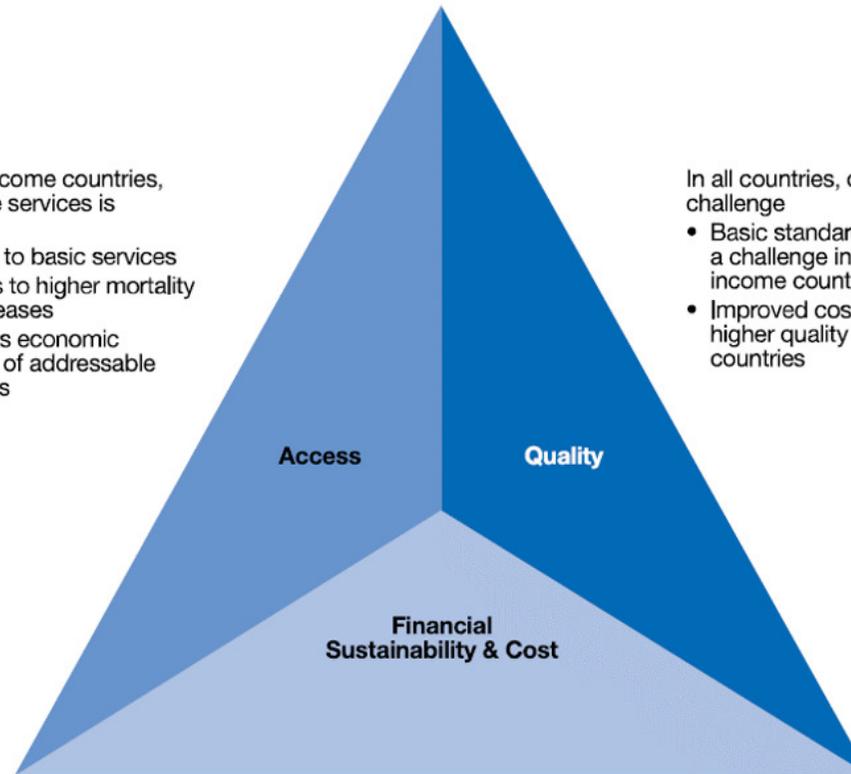
In all countries, quality is an enduring challenge
- Basic standards of medical care are a challenge in many low to middle-income countries
- Improved cost is not leading to higher quality in high-income countries

Access

Quality

Financial Sustainability & Cost

In high-income countries, the cost of delivering health care is unsustainable
- Growth in spending on healthcare outstrips GDP growth
- Burden is unsustainable if not checked
- Continued growth in these markets will be challenging for healthcare firms to achieve

Using Data to Drive Change

- Data is everywhere
- How do we create "useable knowledge and wisdom"
- Create interoperability
- Leverage investments
- Advance machine learning
- Match data/information availability to work-flow
- Match data analysis/informatics to operational needs/questions

Exponential Technologies

Influential technologies and associated paradigm shifts have been growing and will converge to disrupt the healthcare industry over the next 10 years
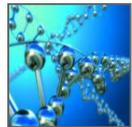
Synthetic Biology & Nanotechnology
The ability to produce synthetic tissues and organs creates new opportunities for surgical therapy and device production

Virtual / Augmented Reality
Immersive 3D representations to what a person sees to allow advanced simulation or digitally-enhanced problem solving

Robotics
Next generation robotics and automation technologies that can work alongside or replace humans

Genomics & Proteomics
Understanding the gene structure, function, evolution, and mapping of all living organisms

Ambient Computing
Ecosystem of "things" that intelligently respond in real time to business needs through connectivity and sensing

Telemedicine
Technology-enabled care delivery that allows for remote communication, diagnosis, and treatment with a physician

Digital Medicine
Digital medicine offers smart medication, continuous monitoring, behavior modification, and personalized interventions
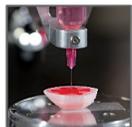
Data Democratization
Seamless information exchange facilitating interoperability between payer, provider, pharmacy, and patient

Blockchain
Distributed data repository that brings transparency, disintermediation, trust, and auditability capabilities

Additive Manufacturing
3D scanning, digital design, and 3D printing digitize the creation/ distribution of products, including body parts

Cognitive Computing
Artificial intelligence, natural language processing, semantics computing, predictive algorithms, dark analytics, and machine learning

API / Gig Economy
New ways to engage with both communities and individuals through unique platforms to extract untapped value and harness a changing workforce

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Disruptive Digital Threats

Spot Market: Price and quality transparency let customers pick the best care at the lowest price
Disruptors: eBay, Amazon, Amino, Yelp

Cyber Doc: Physicians highly leverage cognitive devices giving more time for clinical work and allowing for panel expansion
Disruptors: Google, Apple, Mayo Clinic

Push Prognosis: Predictive analytics paired with multi-sensor data allow customers to put their healthcare on 'autopilot'
Disruptors: Fitbit, Comcast, Google, Jenny Craig

Automate Everything: Efficient robotic workforce minimizes overhead and improves work-life balance for physicians
Disruptors: Amazon Robotics, iRobot, Uber, daVinci

Galaxy Care: Virtual care allows patients to engage in healthcare when and where it's most convenient or necessary
Disruptors: Microsoft, CVS, Facebook

Mighty Data: The value of clinical data is reduced and third parties own the truly valuable information
Disruptors: Fitbit, Facebook, WebMD, Amazon

Health IT on Demand: Barriers to entry are lowered and technology doesn't provide a competitive advantage
Disruptors: Salesforce, Google, Cleveland Clinic

Tailor Made: Personalized drugs, pathways, and devices based on patient history and genomics improve clinical outcomes
Disruptors: 23andMe, Bayer, Medtronic

Disruptive threats emerge from combinations of exponential technologies that fuel potentially competitive business models

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MOC vision/Health Analytics

- Multi-party, secure (PHI), sharing Cloud
- Offer services with low barrier entry
- Disaggregate data/ massive data sets
- Research
- Building systems to do research
- Real systems/real scale/real users/real problems
- Consumers as partners

- Trauma research initiative-
- Accountable Care Organizations/Value based care;

Value= $\dfrac{\text{Access+ Outcomes}}{\text{Costs}}$

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