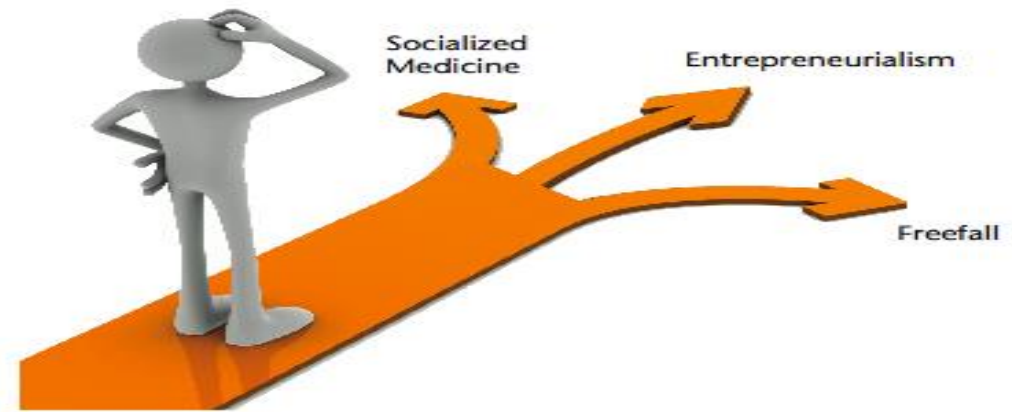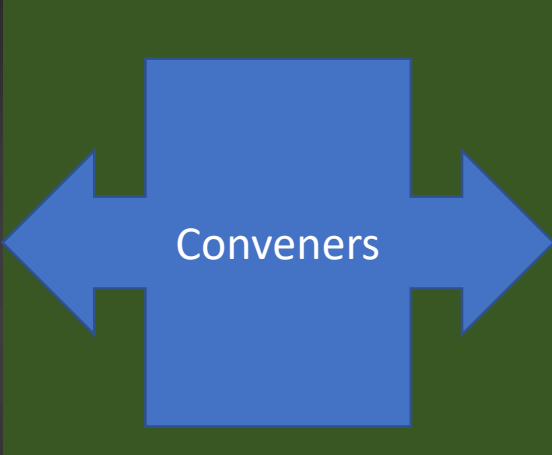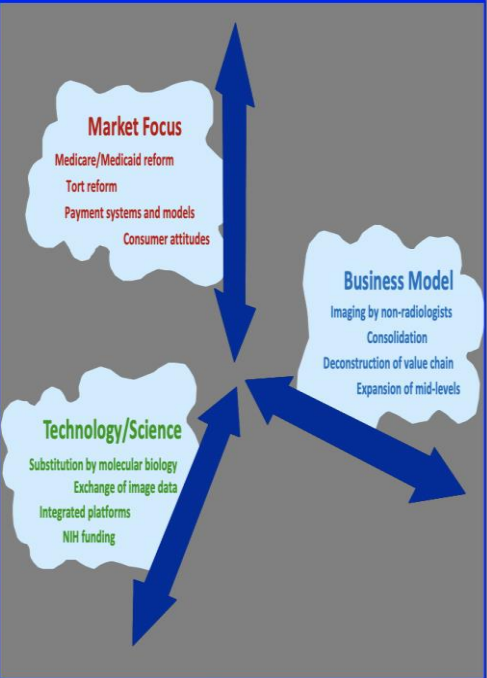How Should Imaging Industry and Academia Respond to the ESG Mandate, and What Potential Partnerships Should Be Explored?

Conveners
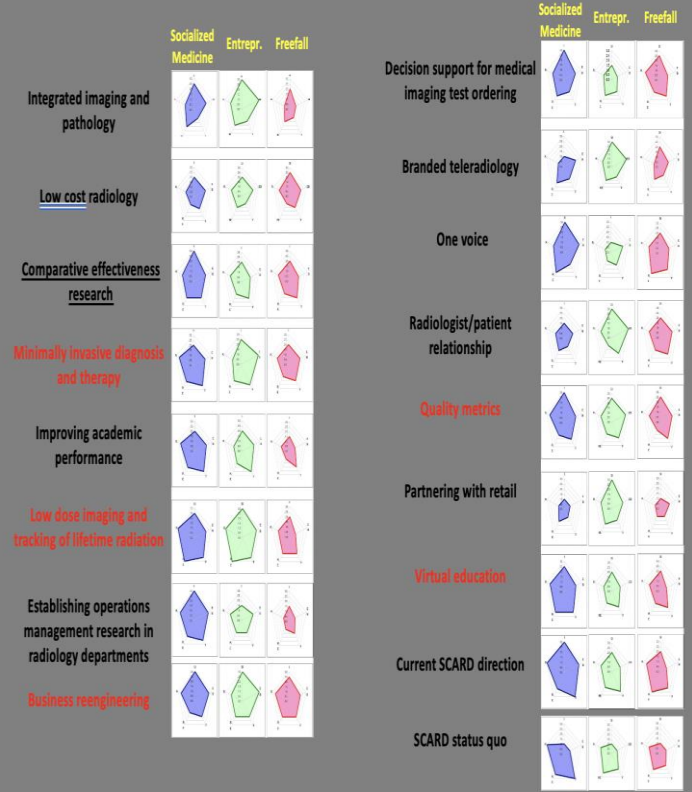
Socialized Medicine · Entrepreneurialism · Freefall

We Developed "Axes of Uncertainty" from Related Sets of High Impact/High Uncertainty Forces

- Medicare/Medicaid reform
- Insurance roles, coverage and terms
- Tort reform
- Payment systems and models
- Lower cost of other providers
- Policy on self-referral
- Consumer attitudes
  - Outsourced procedures
- Managing decreased reimbursement
- Emphasis on primary care; decreased support of radiology
- Imaging by non-radiologists
- Consolidation
- Radiology Benefits Managers
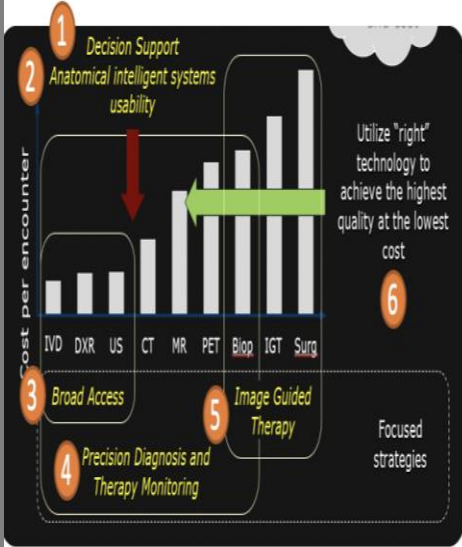- Corporate funding restrictions
- Data mining

- Demand for radiologists in multidisciplinary care
- Expansion of mid-level radiology providers
- Deconstruction of radiology value chain
- Commoditization of radiology
- Substitution by molecular biology
- Integrated molecular diagnostics/ radiology platforms
- New novel imaging
- Exchange of image data
- NIH funding
- CAD
- Virtual worlds and simulation in education
- Clinical material for teaching (more specialties)
- Etc.

Market Focus
Medicare/Medicaid reform
Tort reform
Payment systems and models
Consumer attitudes

Business Model
Imaging by non-radiologists
Consolidation
Deconstruction of value chain
Expansion of mid-levels

Technology/Science
Substitution by molecular biology
Exchange of image data
Integrated platforms
NIH funding

SCARD Strategy Initiative Ratings

red = first 5, underlined = next

Socialized Medicine · Entrepr. · Freefall

- Integrated imaging and pathology
- Low cost radiology
- Comparative effectiveness research
- Minimally invasive diagnosis and therapy
- Improving academic performance
- Low dose imaging and tracking of lifetime radiation
- Establishing operations management research in radiology departments
- Business reengineering

- Decision support for medical imaging test ordering
- Branded teleradiology
- One voice
- Radiologist/patient relationship
- Quality metrics
- Partnering with retail
- Virtual education
- Current SCARD direction
- SCARD status quo

Imaging Modalities and Costs: Opportunities to Increase Value

Research Area	Description	Improves:
1) Clinical Decision Support	Ensuring appropriate testing at the point of care	Cost / Quality
2) Anatomical Intelligent Systems	Improving accuracy & speed	Quality
3) Broad Access	Efficient workflows to improve throughput & access	Service
4) Precision Diagnosis & Therapy Monitoring	Predicting therapy effectiveness through scans; with lab, pathology	Quality
5) Image Guided Therapy	Cost-effective implementation of image-guided intervention	Cost / Quality
6) "Hospital to home"	Shifting technology toward people with less formal training (e.g., mobile u/s)	Cost / Service
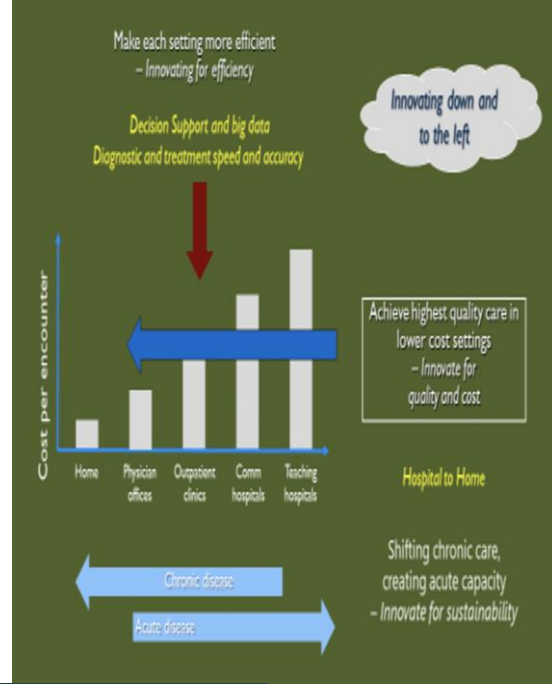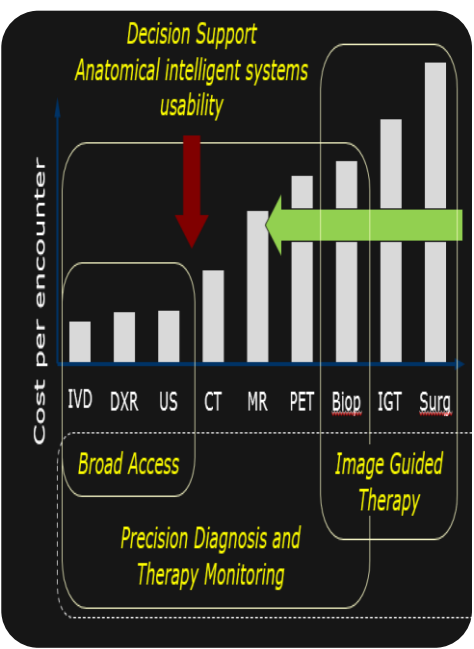
Research focused on transforming health and reducing cost by delivering care closer to home. MSU has strengths in Imaging Sciences, Supply Chain Management, Biomedical Engineering, Industrial Engineering and Systems Design, Communication Arts & Sciences, Waste Mgmt, and Packaging.

STRATEGIC PLAN • SUSTAINABLE HEALTH MICHIGAN STATE UNIVERSITY

Goal: Enhance quality of life for people everywhere by comprehensively leveraging expertise and research activity to improve health and the systems that affect health

- **Objective 1**
  Meet the physical and mental health needs of our students, faculty and staff

- **Objective 2**
  Partner with communities and organizations to reduce health disparities (racial, ethnic, gender, rural-urban) in Michigan by 2030

- **Objective 3**
  Engage the entire MSU campus in a comprehensive approach to improving health, leveraging expertise and elevating care, education and research activities

- **Objective 4**
  Lead nationally in devising innovative educational pathways to careers in health, supplementing existing health and premedical majors and evolve curriculum to incorporate commitment to an inclusive and healthy society

- **Objective 5**
  Work with health and business partners across Michigan to ensure patients and families have access to equitable, high-quality, affordable and safe health care

Objective / Breakout Room	Proposal Number	Proposal Title	Approximate Presentation Time
		Proposals to be Reviewed at the Synergy Symposium	
1	93	The Spartan Be Well Initiative	12:10 PM
1	67	Public Health (One Health)	12:13 PM
1	103	Foundational Sustainable Health and Well-being Strategy	12:16 PM
1	104	A Scalable Approach for Assessing and Improving Mental Health of MSU Community	12:19 PM
2	6	Expansion of a successful pediatric fruit and vegetable prescription program statewide	12:22 PM
2	20	Michigan Center for Sustainable Maternal and Infant Health Equity	12:25 PM
2	42	Center for Cancer Research focused on Disparities and Health Equity	12:28 PM
2	106	Reducing Michigan Health Disparities by Connecting Research to Policy	12:31 PM
2	90	Violence Prevention in Secondary and Higher Education	12:34 PM
2	46	Establish the Institute for Health Policy Center for Veterans' Health	12:37 PM
2	60	Establish the MSU Transgender Medicine Center (TGMC)	12:40 PM
2	21	Advance Sustainable Health in Michigan with a Center for Health Equity	12:43 PM
2	27	MSU Lactation Educational Pathway to Diversify the Lactation Workforce and Reduce Breastfeeding Racial Disparities	12:46 PM
2	33	MSU Center for the Promotion of Food as Medicine	12:49 PM
2	43	Maawanji'iwewin—Promoting Family Health and Well-Being to Meet Needs Defined by Indigenous Communities	12:52 PM
3	13	Center of Excellence for Imaging and Image-Guided Therapies (CI²)	12:55 PM
3	35	Center for Symbiont Research	12:58 PM
3	88	Michigan State University One Health Alliance (MSU OHA)	1:01 PM
3	92	Reimagining Well-Being and Optimal Aging in Long-Term Care for Older Adults in Michigan	1:04 PM
Break (5 min)			1:05 - 1:10 PM
4	1	Innovative educational pathways to careers in health	1:10 PM
4	41	Developing a unified model for STEM programing in Detroit K-12 Schools to focus on increasing number of minority students...	1:13 PM
4	52	Expanding the CHM Research to Reduce Disparities in Disease (R2D2) Program to include COM, CON, and Honors College students	1:16 PM
4	78	Innovative educational pathways through community-engaged learning strategies to motivate high school students...	1:19 PM
4	91	Clinical Simulation: An Innovative Path to Sustainable Health	1:22 PM
4	95	Creation of an Advanced Practice Provider (APP) Neuroscience Fellowship	1:25 PM
5	5	Michigan Implementation Science Center (MISC)	1:28 PM
5	15	Addiction Consortium On Research and EducatioN (ACORN)	1:31 PM
5	54	Addressing Health Disparities of Underserved Older Adults: Virtual and Mobile Geriatric Assessment and Training...	1:34 PM
5	69	The MSU Institutes of Pediatric Mental Health	1:37 PM
5	79	Surviving and Thriving: improving neuropsychological outcomes for people surviving diseases and exposures that effect the brain	1:40 PM

1. **What are the key ways a radiology department can save energy, reduce waste, recycle?**
   A. Reuse- Avoid single use
   B. Recycle- 55% of total pkg is waste – 76% can be recycled
   C. Separate medical waste properly -requires additional energy prior to final disposal
   D. Source locally
B. Eliminate stand-by mode; workstations shut down after 1 hour of inactivity (excess HVAC)
C. Energy conscious off hours climate control (HVAC Highest E and CO2- 57% energy from off hour))
D. Just-In-Time (JIT) purchasing reduces waste
E. Light Control Systems and Energy Efficiency Bulbs (7% energy drain)
F. Industrial Engineering and Systems Designs – Lean, Six Sigma, Queueing, Network Medicine, Gemba Walks journey of the patient, staff and faculty
G. Integrate into the Academic Mission – Systems Based Practice, OR and Data Scientists, Identify and Address Unwanted Variability, Model and Manage to Outcomes

Scope 3 emissions - not produced by Department itself, but indirectly responsible for up and down its value chain
A. Industry - Lighter, Smaller, Easier Siting Requirements
B. Decommissioning of imaging equipment and workstations
C. Build mechanisms to aggregate log file information-
D. Partner in Systems Optimization Research

2. Is remote working/teleradiology helpful for reducing energy use and waste in radiology? How do we measure impact? Are there any patient telehealth models that are applicable to radiology practice?

A. Yes: if done correctly

B. Measuring the impact requires:
 A deliberate and ongoing accounting for reduced carbon footprint related to commuting and office square footage, HVAC at home, 'shifting costs'
-Cost/benefit analyses to deploy technology into radiologists' homes should incorporate enhanced value propositions that are bidirectional—better for radiologists and patients. Monitor administrative, economic, and service value gains

C. Telehealth considerations:
-Similar to telemedicine, there are urban concentrations of radiology specialists
-Networked radiology to underserved areas prevent misdiagnosed and late-stage diagnosis
-Technological inequities are drivers of health inequities and included the lack of access to technology, computers, smartphones, broadband internet access, or high-speed cellular service. -Having reliable access to broadband brings expertise to populations historically marginalized and/or underserved.

3. The Has sufficient attention been paid to the data volume generated by radiology and is there "waste data" that should be reduced?

I. There has not been enough attention spent on data storage. Health data storage is one of the largest use cases for data center across the globe.

 1.Lack of awareness of 'cost..financial and ESG'

2.'Just in case I ever need it approach'….implemented a 5 year data deletion from last use

3. Misaligned incentives – corporate monetization of storage aligns with creating systems that acquire greater amounts of data

4. Better ways to ensure that low quality, improper, and unimportant data is deleted is crucial to reducing data storage waste.

5. Making the data center as efficient as possible with the use of alternative energy are one of the ways I've seen large data center companies combat some of the waste.

6. AI places a new value on data storage

4. What is the potential to streamline and simplify radiology imaging protocols and use of contrast agents to reduce waste?

1. Remains High – Sequence creep increases cost and burnout

2. AI can reduce waste of resources by ensuring appropriate testing, reducing the need for repeat imaging and improving resource utilization.

3. Oral contrast standardization – There are environmental and potential human issues related to gadolinium deposition into the environment and into patients. Higher relaxivity

4. Correlating the Radiological Assessment of Patient Motion with the Incidence of Repeat Sequences Documented by Log Files: Reduction in repeat imaging rates, decrease resource wastage, analyzing of instances where AI led to avoiding redundant procedures

5. Scanner sensitivity: Whole Body PET with 30X increase sensitivity – faster, less sedation, less contract

For our two cyclotron systems: controlled flow path that takes the exhaust from the radiopharmacy 100 min to get from the beginning to the end.

Once the exhaust leaves the maze it goes through our carbon filter bank and then exhausted 200ft in the air through our twin strobic fans.