Membership

- Neal J. Cohen, Psychology, IHSI Director, Chair
- Reginald J. Alston, Kinesiology and Community Health
- Stephen A. Boppart, Electrical and Computer Engineering
- Martin D. Burke, Chemistry
- Roy H. Campbell, Computer Science
- Sharon M. Donovan, Food Science and Human Nutrition
- John W. Erdman, Jr., Food Science and Human Nutrition
- Timothy M. Fan, Veterinary Clinical Medicine
- Barbara H. Fiese, Human Development and Family Studies
- Martha L. Gillette, Cell and Development Biology
- Craig G. Gunderson, Agricultural and Consumer Economics
- Wendy Heller, Psychology
- Thenkurussi (Kesh) Kesavadas, Industrial and Enterprise Systems Engineering
- King C. Li, Carle Illinois College of Medicine
- Brent W. Roberts, Psychology
- Susan L. Schantz, Comparative Biology
- James M. Slauch, Microbiology
- Brad P. Sutton, Bioengineering
- Derek E. Wildman, Molecular and Integrative Physiology
- Jeffrey A. Woods, Kinesiology and Community Health
Units/centers/programs represented in Task Force

- Biomedical Imaging Center at the Beckman Institute
- Agricultural and Consumer Economics
- Beckman Institute for Advanced Science and Technology
- Bioengineering
- Carl R. Woese Institute for Genomic Biology
- Carle Illinois College of Medicine
- Cell and Developmental Biology
- Center for Nutrition, Learning and Memory
- Center on Health, Aging, and Disability
- Chemistry
- College of Applied Health Sciences
- College of Engineering
  - Comparative Biosciences
  - Computer Science
  - Coordinated Science Lab
  - Division of Nutritional Sciences
  - Electrical and Computer Engineering
  - Family Resiliency Center
  - Food Science and Human Nutrition
  - Health Care Engineering Systems Center
  - Human Development and Family Studies
  - Industrial and Enterprise Systems Engineering
  - Information Trust Institute
  - Interdisciplinary Health Sciences Institute
- Kinesiology and Community Health
- Medical Scholars Program
- Microbiology
- Molecular and Integrative Physiology
- Neuroscience Program
- Pathobiology
- Pathology
- Pediatrics
- Psychology
- Social and Behavioral Sciences Research Initiative
- Veterinary Clinical Medicine
- Veterinary Teaching Hospital
Campus-wide input to Task Force

- **Leadership Council**
  - ACES, AHS, Beckman, Engineering, IGB, IHSI, LAS, CI COM, Social Work, Vet Med

- **CRAWG**
  - Campus Research Administrators Working Group

- **Data Experts**
  - DMI, AITS, Illinois Experts, SPA, University Library

- **Individual Units and Stakeholders**

- **Electronic Letter and Invitation to Contribute**
  - Online form or directly

- **Town Hall Meetings**
  - (upcoming)
Areas where Illinois has the greatest opportunity to positively impact state, national and global health sciences through research, education and engagement

- Consensus on 5 “Impact Areas” and 2 “Cross-cutting Threads”

Selection criteria

- Leveraging greatest existing campus strengths
- Leveraging most significant/impactful existing campus investments
- Demonstrating clearest promise of attracting significant new external funding & national leadership reputation

- Vision: Create SYNERGISTIC opportunities that advance the entire health sciences landscape at Illinois
Impact Areas & Cross-cutting Threads

- Cancer
- Maternal and Child Health
- Microbes
- Neuroscience and Behavioral Health
- Progenerative Medicine
- Health Disparities
- Tech4Health
Cancer
Innovations through Engineering and Comparative Oncology Approaches

- The 2nd leading cause of death in the U.S.
- 4 in 10 of all Americans will be diagnosed with cancer in their lifetime
Maternal and Child Health
Targeting the First 1,000 Days to Ensure a Healthy Future

- What happens in the first 1,000 days of life has lifelong impact
Microbes
Drivers of Health and Disease

- Microbes affect all aspects of life on the planet
- Microbes are both drivers of health and well-being and the cause of disease
Neuroscience and Behavioral Health
Mechanisms and Interventions

- 1 in 4 people in the world will be affected by neurological or mental disorders
- 11 institutes of the NIH fund neurological or psychological research
- People’s behaviors have huge impact on their health, well-being, and life success
Medical practice has long been about treating disease; progenerative medicine instead targets the forward design of human health.

**Progenerative Medicine**

The Forward Design of Human Health

- molecular
- detection
- exercise
- health
- drug
- endocrine
- future
- optical
- technology
- chemical
- biological
- structures
- compounds
- diseases
- behavior
- drugs
- nmr
- inhibitors
- therapy
- synthesis
- engineering
- delivery
- computational
- designed
- toxicology
- forward
- biobots
- synthetic biology
- intervention
- genomic
- catalysis
- aging
- engineered
- diagnostic
- nanoparticles
- discovery
- enhance
- anticancer
- environmental
- performance
- inflammation
- nanotechnology
- metabolism
- nanomedicine
- food
- nutrition
- mri
- design
- data enabled
- prosthetics
- cancer
Health Disparities
Promoting Health Equity Locally and Globally

- In 1966, Dr. Martin Luther King Jr stated “Of all forms of discrimination and inequalities, injustice in health is the most shocking and inhuman”

- Health disparities are large, persistent, and intergenerational
Applying Illinois’ extraordinary expertise in technology, computation, and data science to transform healthcare.
Opportunities and challenges in health-related research and education over the next five to ten years

- **Challenge #1: Leveraging Interdisciplinary Strengths that Bridge Different Units**
  - 28% of all tenure-track faculty in health activities, but widely distributed across 15 colleges

- **Strategy #1: Campus-Wide Commitment to Identified Impact Areas & Cross-Cutting Threads**
  - Cross disciplinary boundaries and bridge widely distributed units to create a unified, campus-wide roadmap for success
Opportunities and challenges in health-related research and education over the next five to ten years

- Challenge #2: Obtaining Large-Scale, Long-Term NIH Funding
  - Illinois receives 2.4% of NSF funding vs 0.19% of NIH funding
  - Historical reliance on R01 funding

- Strategy #2: **Centers of Excellence** for National Leadership in Identified Impact Areas
  - Leveraging and focusing existing campus strengths to attract NIH Center funding and create national leadership reputation
  - Strategy #1 and #2 converge – commitment to build-out identified Impact Areas with explicit goal of developing Centers of Excellence
Opportunities and challenges in health-related research and education over the next five to ten years

- **Challenge #3: Making Strategic Decisions that Broadly Benefit Health Sciences Campus-Wide**
  - Health sciences activities so distributed across campus that it limits our ability to initiate and implement fully informed, collaborative, strategic choices and investments

- **Strategy #3: Infrastructure Providing Critical Shared Support for Broadly Catalyzing and Coordinating Campus-Wide Success**
  - Shared strategic vision of synergistic excellence
  - **Shared core resources** with Clinical and Translational Science Institute (CTSI)-like capabilities that support and benefit all Centers
Health Sciences Ecosystem

A Vision of Synergistic Excellence

Clinical and Corporate Partners
- Carle Health System
- OSF HealthCare
- Mayo Clinic
- Various Corporations and Start-ups

Proposed Resources
- Tumor Model Engineering and Phenotyping Core
- Gnotobiotic and Germ-Free Animal Facility
- Pharmacokinetics/Toxicology Facility
- Neurobehavioral Assessment Lab/Core for Humans and Animals
- Brain 'Omics Center
- Medical Maker Lab
- Programs to Address Health Disparities
- Multi-Modal Human Imaging Facility (Including 7-Tesla scanner, cyclotron, and PET/CT System)
- Health Technology Faculty Seed and Team-Building Grants

Biomedical Translational Research Facility
- Computational AI and Health Data Analytics Center (to partner with Mayo Clinic)
- Center of Excellence Addressing Health Disparities in the First 1,000 Days
- Health Care Engineering Systems Center
- Coordinated Science Lab
- Beckman Institute (with proposed build-out of Cancer shared resources/core facilities)
- Micro and Nanotechnology Lab
- Frederick Seitz Materials Research Lab

Health-Related Institutes and Centers
- National Center for Supercomputing Applications (including Blue Waters)
- Roy J. Carver Biotechnology Center/Keck Center
- Interdisciplinary Health Sciences Institute
- Carl R. Woese Institute for Genomic Biology
- IHSI/ Clinical & Translational Science Institute (CTSI)
- NCI-designated Cancer Center
- Center for Progenerative Medicine
- Center of Excellence in Interventional Neuroscience

Community Outposts
- University of Illinois Extension
- Family Resiliency Center (with proposed program to reduce health disparities in the first 1,000 days)
- Recreation Programs
- Libraries
- Mobile Units
- Local Schools
Centers of Excellence

Campus investments:
1. Initial startup support (physical space, discretionary operating funds, administrative staff)
2. Increased priority in advancement/development activities
3. Faculty hires

Results:
1. Increased research funding portfolio
2. Higher productivity
3. Greater reputational and leadership status
4. Increased philanthropic opportunities
Ways we better leverage our research strengths to enhance the university’s educational mission in health-related fields

- Partnering of the (other) Academic Colleges with the Carle Illinois College of Medicine in educating physician-scientists, physician-engineers, and physician-innovators
- Creation of new majors, minors, and professional programs around health sciences in many Academic Colleges
- New opportunities for hands-on education with clinical and corporate partners
- New opportunities for enhanced training and education in clinical and translational research and innovation
Critical Role of Academic Colleges

- Faculty excellence and student support
- Hands-on education programs
- Training and education on how to seek, conduct, and apply research
- New majors, minors, and professional programs in Healthcare Innovations
- Stronger connections to community outposts

ACADEMIC COLLEGES

THE NEXT 150
Ways to best engage our local community through the health sciences

- Strengthen programs and connections to university engagement outposts in the community
- Investment in a *Health Sciences Community Engagement Core*
- Community outreach as an integrated part of research (*Engaged Research*)
- Development and support for Health Sciences Scholars embedded in community programs (*Engaged Education*)
Specific actions that would be most effective in realizing our potential in health-related education, research and engagement
Recommendation #1: Investments in Identified Impact Areas and Cross-cutting Threads

Recommendation #2: Investments in Creating Centers of Excellence

Recommendation #3: Investments in Infrastructure Providing Critical Support for Illinois Health Sciences

- Programs to Address Health Disparities
  - Pharmokinetics/Toxicology Facility
  - Computational AI and Health Data Analytics Center (to partner with Mayo Clinic)
  - Center of Excellence Addressing Health Disparities in the First 1,000 Days
  - Multi-Modal Human Imaging Facility (including 7-Tesla scanner, cyclotron, and PET/CT System)
  - Brain 'Omics Center
- One Health Center for the Genomics of Infectious Disease
- Gnotobiotic and Germ-Free Animal Facility
- Tumor Model Engineering and Phenotyping Core
- Build-out of Cancer Shared Resources/Core Facilities in the Beckman Institute
- Medical Maker Lab
- Health Technology Faculty Seed and Team-Building Grants
- NCI-designated Cancer Center
- Center for Regenerative Medicine
- Brain 'Omics Center
- Lab/Core for Humans and Animals

THE NEXT 150
Illinois has unique ability to view the world through a variety of interdisciplinary prisms and to work collaboratively.

Illinois’ commitment to health and well-being transcends any one department, college, or unit.