Health Systems Science in Education: A Workshop
Global Forum on Innovation in Health Professional Education

The Workshop: A Three-Part Series:

Part 1: A Shared Understanding of Health Systems Science
October 24, 2023, 11:00 a.m. – 12:15 p.m. ET (virtual)

Part 2: The Importance of Health Systems Science Across Professions
November 1, 2023, 4:00 p.m. – 6:00 p.m. ET (hybrid)

Part 3: Designing, Implementing, and Evaluating Successful
HSS Training Programs
November 2, 2023, 9:00 a.m. – 12:00 p.m. ET (hybrid)

NATIONAL
ACADEMIES

Sciences
Engineering
Medicine

What is a "System"?

- A way to understand a phenomenon through a set of components that:
  - Interact
  - Follow a set of rules
  - Have boundaries

- System characteristics:
  - *Dynamic* and *interactive* components given rise to a unified whole
  - *Nonlinear* interactions
  - Outcomes are greater/different than the sum of their parts

Systems Science in Complex, High-Risk Industries

- System science is a systematic process for studying the *inputs*, *components*, *interactions*, and *outputs* of a system.

Nuclear

Defense

Aviation

Rail

MedStar Health

Systems Science and Healthcare

- Health system science is the application of systems thinking to healthcare

  Formal definition: Health systems science is a foundational framework for the study and understanding of how care is delivered, how health professionals work together to deliver that care, and how the health system can improve patient care and health care delivery. (American Medical Association)

Benefits of a "systems" approach

- Health system science can improve:
  - Organizational performance
  - Patient/Provider efficiency, experience, and satisfaction
  - Health outcomes

- Education & training in health system science is critical to achieving these improvements
  - <u>Requires</u> different health professions coming together in education and practice

Health System Science Frameworks

- There are numerous frameworks to represent and study health systems that commonly represent:
  - The core system components (both social and technical)
  - The interactions between the components
  - Important inputs and outputs

- Example: Work system model for patient safety
  - SEIPS: Systems Engineering Initiative for Patient Safety
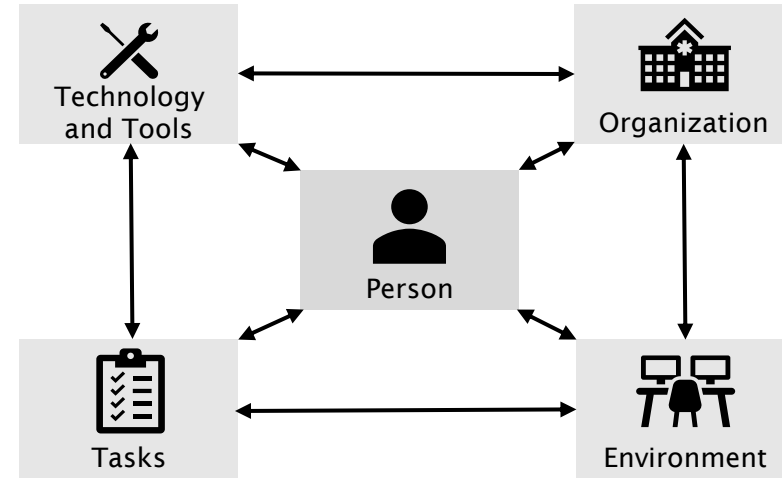
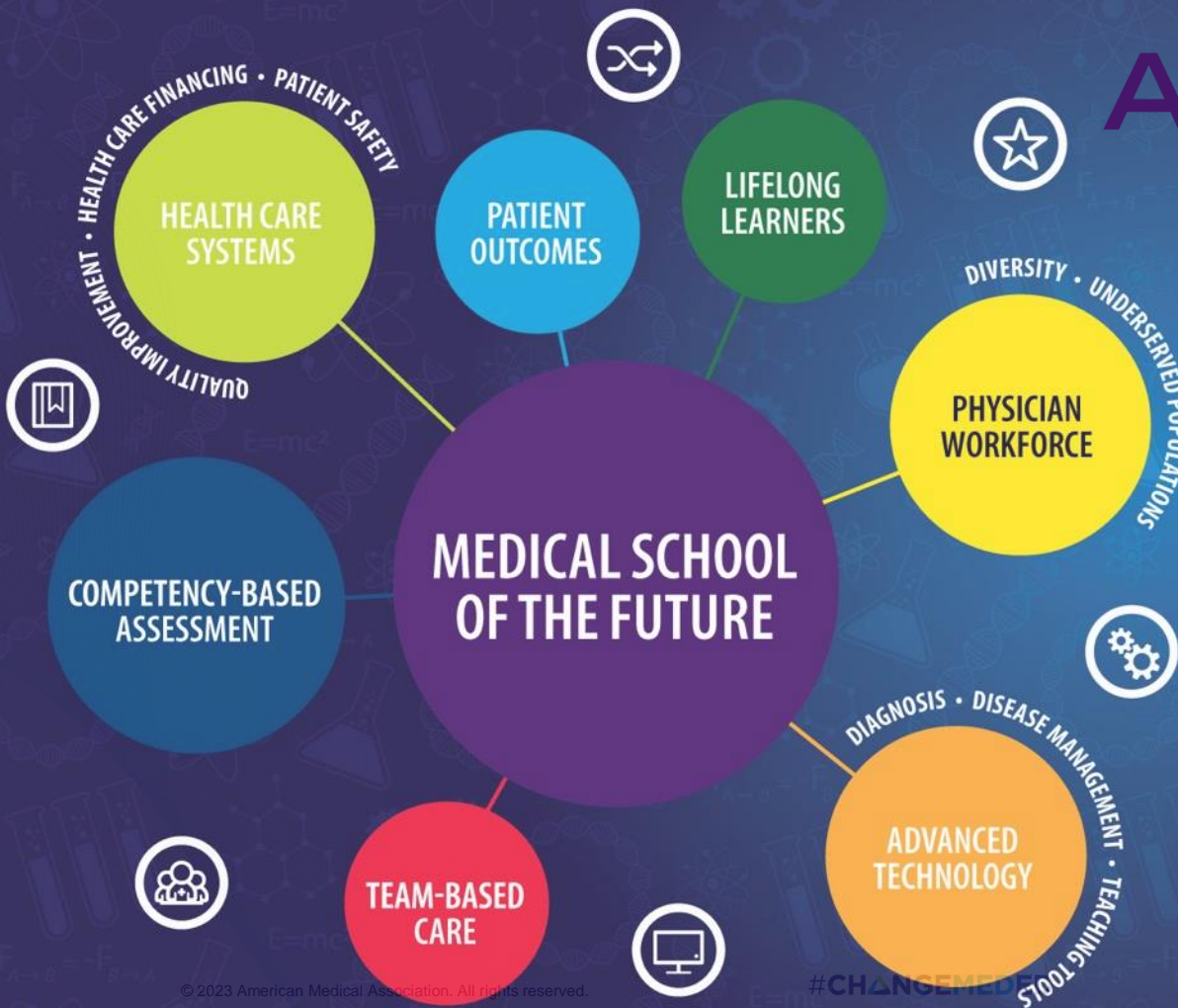Carayon et al., 2006; Carayon et al., 2015

Thank you

Contact: Raj Ratwani, PhD
Raj.M.Ratwani@MedStar.net

AMA

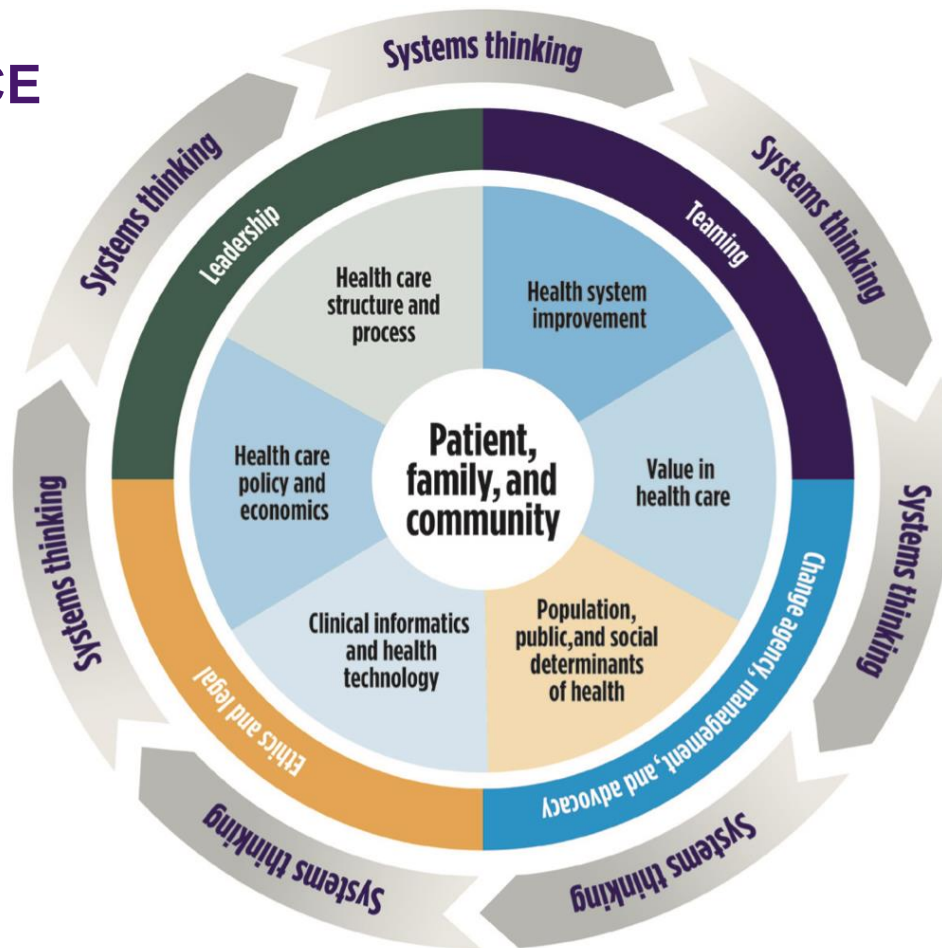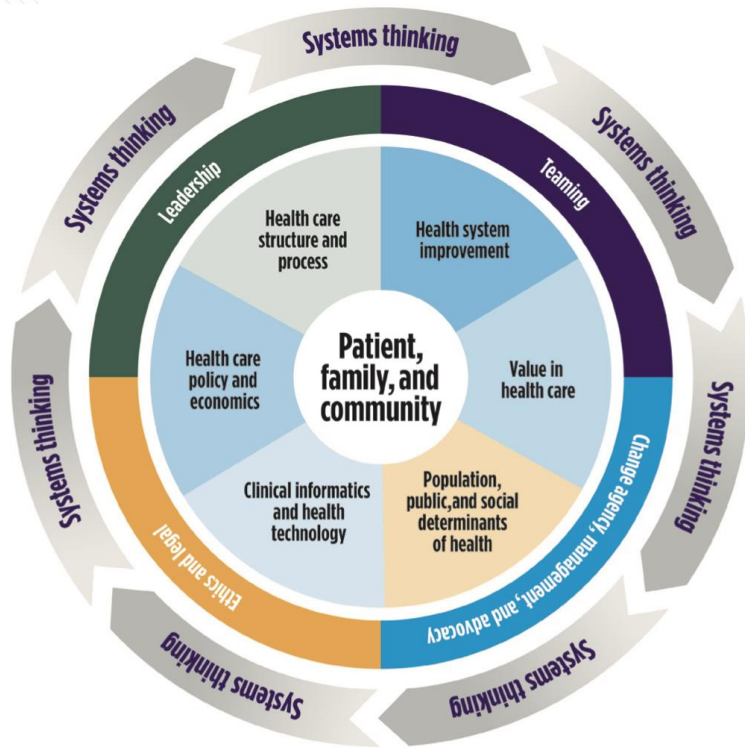HEALTH CARE FINANCING · PATIENT SAFETY

QUALITY IMPROVEMENT

HEALTH CARE SYSTEMS

PATIENT OUTCOMES

LIFELONG LEARNERS

DIVERSITY · UNDERSERVED POPULATIONS

PHYSICIAN WORKFORCE

COMPETENCY-BASED ASSESSMENT

MEDICAL SCHOOL OF THE FUTURE

DIAGNOSIS · DISEASE MANAGEMENT · TEACHING TOOLS

ADVANCED TECHNOLOGY

TEAM-BASED CARE

#CHANGEMEDED

REIMAGINING RESIDENCY

#ChangeMedEd

HEALTH SYSTEMS SCIENCE

Training Systems Thinkers

Skochelak, Hammoud, Lomis, Editors.
Health Systems Science Edition 2, Elsevier 2020.

Systems Thinking

- Think/work across multiple domains for patients & families
- Think/plan multiple steps ahead
- Understand impact of actions and inactions
- Engage and leverage the health system to provide quality care
- Anticipate system needs/pitfalls

Teaming

- Respect for team members; knows names, knows strengths/limits of team
- Roles & responsibilities; uses expertise
- Expresses gratitude & professional humility
- Emotional regulation
- Effective conflict management

Ridinger, Bonnet, Schlundt, Tekian, Riddle, Lomis. Defining Successful Practice Within Health Systems Science Among Entering Residents: A Single-Institution Qualitative Study of Graduate Medical Education Faculty Observations. Acad Med. 2021 Nov 1;96(11S):S126-S135

HEALTH SYSTEMS SCIENCE

Basic science

Clinical science

Health systems science
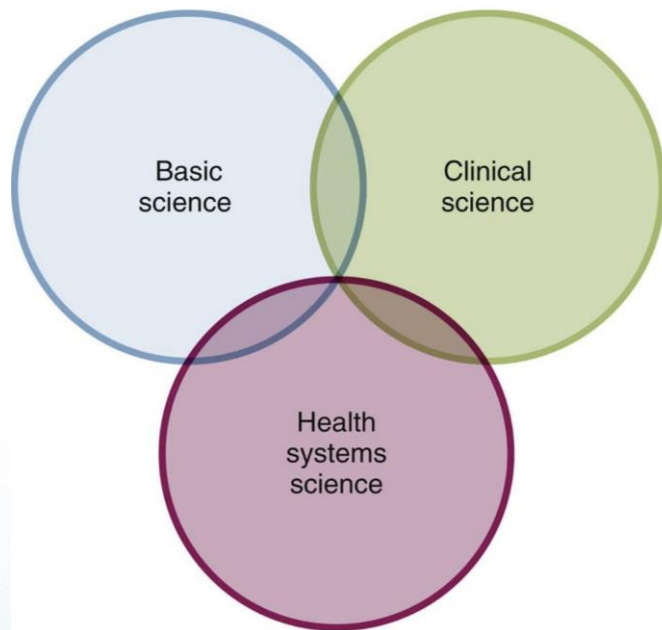
Resources developed collaboratively:

- Textbook (in 2nd edition)
- Online modules
- NBME subject examination
- Value-added roles for learners
- Faculty development programs
- Implementation guide
- Multiple peer-reviewed publications

(more to come during the Nov 2 "how to" session)

AMA resource landing page

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SLP Scope of Practice- Collaboration

- SLPs share responsibility with other professionals for creating a collaborative culture. Collaboration requires joint communication and shared decision making among all members of the team, including the individual and family, to accomplish improved service delivery and functional outcomes for the individuals served. When discussing specific roles of team members, professionals are ethically and legally obligated to determine whether they have the knowledge and skills necessary to perform such services. Collaboration occurs across all speech---language pathology practice domains.
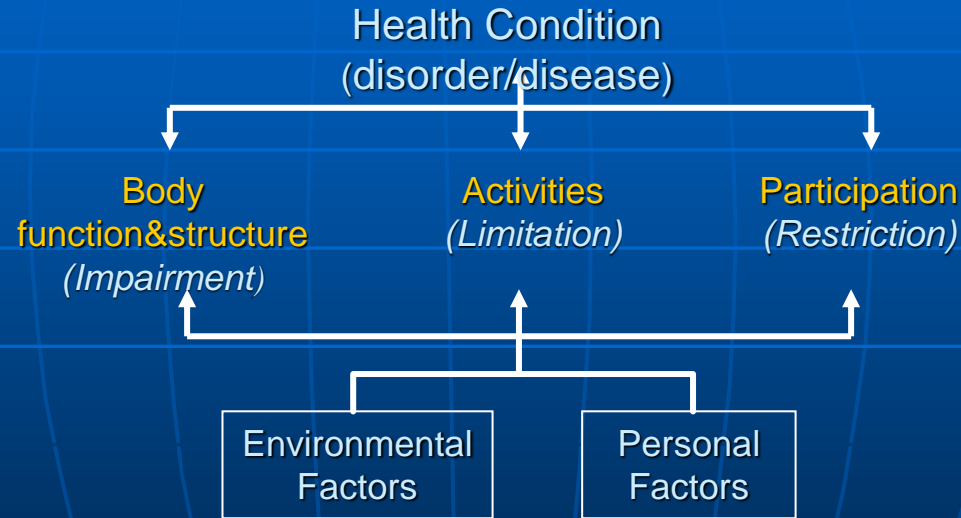
SLP Scope of Practice Populations and Systems

- In addition to direct care responsibilities, SLPs have a role in (a) managing populations to improve overall health and education, (b) improving the experience of the individuals served, and, in some circumstances, (c) reducing the cost of care. SLPs also have a role in improving the efficiency and effectiveness of service delivery. SLPs serve in roles designed to meet the demands and expectations of a changing work environment.

Health Systems Science
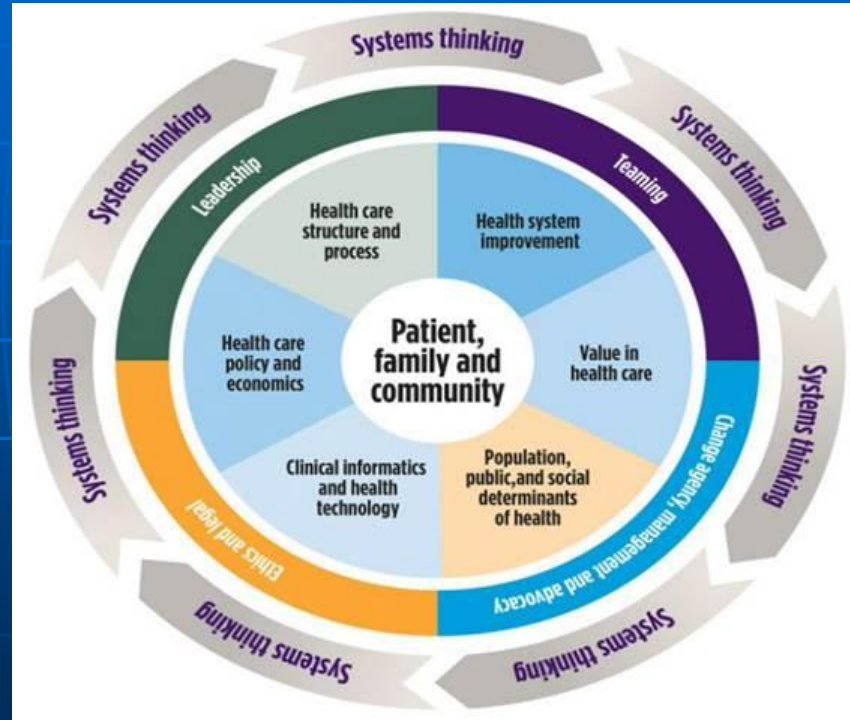
World Health Organization's
International Classification of Functioning, Disability, and Health (ICF) Framework

Health Condition
(disorder/disease)

Body
function&structure
(Impairment)

Activities
(Limitation)

Participation
(Restriction)

Environmental
Factors

Personal
Factors

ICF contributions to Health Systems Science

- Clinical Informatics – coding scheme to track

- Comprehensive integration of 1) health condition, 2) real life functioning, 3) environmental factors (social determinates of health) and 4) personal factors (specific demographic and individual characteristics of persons)

-Activity/Participation codes (e.g. eating) often so broad cannot be addressed without transdisciplinary approach

-Person orientation- no health professions listed in the ICF

-Ethical guidelines state to be used to seek social justice and equity for persons with functional health limitations to participate fully in society as they wish

Example of ICF framework intervention - Case presentation

- 70-year-old woman who has had a stroke, resulting in mild aphasia and dysarthria, mild oral stage dysphagia (swallowing disorder), moderate right arm paresis
- Has relatively intact cognitive abilities.
- 5 years ago, fitted for hearing aid that she rarely uses.
- Has dentures but since the stroke they are ill fitting
- Has incontinence

Crucial life factors

- Husband died 1 year ago, before stroke

- Two children, one with special needs who still lives with her and the other in another state

- Was born in Mexico, been in the United States since she was 16 years old, fluent in conversational English but more comfortable talking in Spanish

- Previously worked as a housekeeper in a hotel

- Lives only on her husband's Social Security check and he was a construction worker

ICF framework example - Intervention Goal

- **Beginning at the end**
  - Important life activity for this devout Catholic woman is going to Mass, often more than once a week
    - Activity/Participation code –
      - d9300 Organized religion- Engaging in organized religious ceremonies, activities, and events

Professions involved using Health Science System lens

- Speech-language pathology
- Physical therapy
- Occupational therapy
- Nutrition
- Psychology
- Optometry

- Nursing
- Physicians
- Social work
- Interpreters
- Dentistry
- Long term care specialist
- Pastoral care

ICF - Environmental Factors
Possible Facilitators and Barriers

- e 1251 Assistive products and technology for communication

- e 145 Products and technology for the practice of religion and spirituality

- e 2501 Sound quality

- e 310 Immediate family

- e540 Transportation services, systems and policies

- e580 Health services, systems and policies

- e325 Acquaintances, peers, colleagues, neighbors and community members

System barriers for speech-language pathology

- Insurance coverage including Medicare

- Definition of "medical necessity"

- Lack of knowledge of other health professionals about the full scope of practice

- Limited public knowledge of the field in health settings

Consequences to not addressing personal religious needs

- Possible depression

- Social isolation

- Non-compliance with medications

- Physical, cognitive, and mental decline

NASEM IHPE Forum Pre-Workshop: A Shared Understanding of Health Systems Science
24 October 2023

Peter Maramaldi, PhD, LCSW, MPH

Simmons School of Social Work

Harvard School of Dental Medicine

Harvard Chan School of Public Health

Beginnings of HHS in SW: Charity organizations at the end of the 20th century

- Ida Cannon, a visiting nurse St. Paul Associated Charities deepened her understanding of the connections between poverty, occupation and disease

- Influenced by Jane Adams, the Settlement House movement, the proliferation of the social work profession to ensure that immigrants and other vulnerable people, gain tools and skills to escape economic and social poverty, Cannon moved to Boston to study at Boston (Simmons) School of Social Work

- HMS Professor Richard Cabot invited her to aid in development of social service department at Mass General Hospital

- Her goal was to "make medical care effective" and "cure consumption". In 1907, Cannon was named "Head Worker" and, in 1914, "Chief of Social Service", a position she held for thirty-one years as she promoted social work in medical setting across the United States

https://www.harvardsquarelibrary.org/biographies/ida-m-cannon/

Social Work's disciplinary competencies sit squarely in Heath System Science

A profession devoted to helping **people function** the best they can **in their environment**." *National Association of Social Workers* (NASW)

Social workers help people **prevent** and *cope* with problems in their everyday lives. Projected to grow faster than most occupations *Bureau of Labor Statistics* (BLS)

Social work professionals are found in a wide variety of environments from hospital and universities, to communities of all types *Council on Social Work Education* (CSWE)

Areas of Social Work Practice

Degree levels:

BSW
MSW
DSW
PhD

- **Micro-level practice**
  - Work directly with **individuals** and help them cope with their situations.

- **Mezzo-level practice:**
  - Work with **groups** instead of individual clients.

- **Macro-level practice**:
  - Lead and establish **social change** on a large scale through **organizing, policy change, and administration.**

Educational Policy and Accreditation Standards

Estimates of the SW workforce vary

Table courtesy of Brianna M. Lombardi, PhD, MSW

UNC School of Medicine, Department of Family Medicine, Carolina Health Workforce Research Center at the Cecil G. Sheps Center for Health Services Research, Research Assistant Professor in the School of Social Work.

	ACS (American Community Survey)	ASWB (State Licensure Data)	NPPES (National Plan and Provider Enumeration System by CMS)	OEWS/BLS (Occupation Employment and Wage Survey / Bureau of Labor Statistics)
	Weighted self survey	State license agencies reported	Self-reported	Weighted Employer reported
Estimate date	2019 ACS 1 Year	November 2021	November 2021	2021 Employment
Estimate	1,022,859	541,635	284,793	677,400
Available subcategories	Highest Education Master degree or higher: 409,532	Clinical: 325,442 Master: 143,051 Bachelor: 68,445 Associate: 4,697		Child, family & school: 340,040 Health: 173,880 MH/SUD: 113,790 All other SW: 49,390

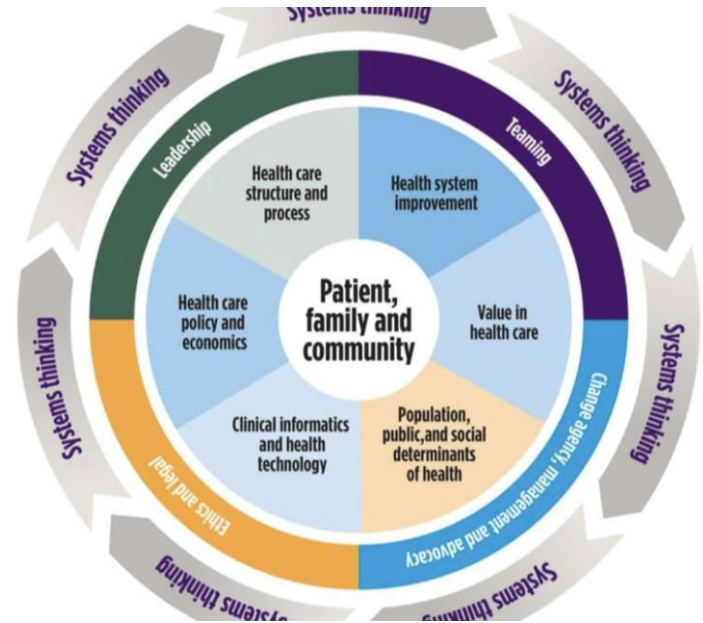Social Work's disciplinary competencies are grounded in ecology: Ecological perspective of person-in-environment

https://www.frontiersin.org/articles/10.3389/fpubh.2020.00131/full

The Social Ecological Model of Health

Culture

Policies
(institutional, local, state, federal)

Community, Organizations, Institutions

Interpersonal

Individual

Adapted by Tasha Golden © 2019

Systems thinking

Leadership

Teaming

Health care structure and process

Health system improvement

Health care policy and economics

Patient, family and community

Value in health care

Clinical informatics and health technology

Population, public, and social determinants of health

Ethics and legal

Change agency, management and advocacy

Highly complementary models

Social Determinants of Health

Education Access and Quality

Health Care Access and Quality

Economic Stability

Neighborhood and Built Environment

Social and Community Context

HealthyPeople 2030

INTEGRATING SOCIAL CARE INTO THE DELIVERY OF HEALTH CARE

MOVING UPSTREAM TO IMPROVE THE NATION'S HEALTH

SPECIALIZED PRACTICE CURRICULAR GUIDE for HEALTH SOCIAL WORK

Policy & Law

Data & Surveillance

Equity

Infrastructure & Capacity

SDOH

Social Conditions

Structural Conditions

Evaluation & Evidence Building

Community Engagement

Partnerships & Collaboration

Rush

ABOUT US

NEWS & RESOURCES

Coalition for Social Work Health

ELEVATING AND EXPANDING SOCIAL WORK'S HEALTH AND HEALTHCARE

IPEC
Interprofessional Education Collaborative

Join IPEC today!

The IHI Triple Aim

The Quadruple Aim

Population Health

Clinical Well-

Experience of Care

Per Capita

Better

Some exemplars of SW's participation in HSS

Biopsychosocial Models (including genetics)

Person in Environment (including providers)

Ecological Perspective (dynamic interplay)

Social Systems theories (micro, mezzo, macro)

Inclusion, Equity, and Diversity—Required curricular competencies by the Council on Social Work Education

Health Systems Science in Physical Therapy Education

Mission

We promote justice, equity, diversity, and inclusivity, as we foster continuous improvement to elevate the educational community, profession and public by furthering quality in physical therapy education and practice.

Vision

Transforming Physical Therapy education to empower innovation, ensure excellence, and advance the profession for populations served.

Scope of Accreditation Activities

CAPTE accredits physical therapist professional education programs offered at the clinical doctoral degree level by higher education institutions in the United States and internationally. CAPTE also accredits physical therapist assistant education programs offered at the associate degree level by higher education institutions in the United States.

Systems Science in PT Profession

Perspective

Movement Variability and the Use of Nonlinear Tools: Principles to Guide Physical Therapist Practice

Regina T Harbourne, Nicholas Stergiou

Fields studying movement generation, including robotics, psychology, cognitive science, and neuroscience, utilize concepts and tools related to the pervasiveness of variability in biological systems. The concepts of variability and complexity and the nonlinear tools used to measure these concepts open new vistas for physical therapist practice and research in movement dysfunction of all types. Because mounting evidence supports the necessity of variability for health and functional movement, both in theory and in action. By providing clinical examples, as well as applying existing knowledge about complex systems, the aim of this article is to create a springboard for new directions in physical therapist research and practice.

RT Harbourne, PT, MS, PCS, is Assistant Professor, Physical Therapy Department, Munroe-Meyer Institute, University of Nebraska Medical Center, 985450 Nebraska Medical Center, Omaha, NE 68198-5450 (USA). Address all correspondence to Ms Harbourne at: rharbour@unmc.edu.

N Stergiou, PhD, is Director of the Nebraska Biomechanics Core Facility, College of Education and College of Public Health, University of Nebraska at Omaha and University of Nebraska Medical Center.

Optimization of Movement: A Dynamical Systems Approach to Movement Systems as Emergent Phenomena FREE

Andrew A Guccione ✉, Brian T Neville, Steven Z George

Toward Systems Science in Rehabilitation

Alan M. Jette

PTJ: Physical Therapy Outcomes Registry as a Potential Leader in 'Systems Science'

Review

"What are the risk-adjusted outcomes for individuals with a specific classification/movement diagnosis?" "Are patient outcomes better if the treatment provided matches the patient's classification/movement diagnosis?"

Those are the kinds of questions that can be answered through systems science, which emphasizes collecting and analyzing clinical data using a common language, say authors of a "Point of View" article in the November issue of _PTJ_ (_Physical Therapy_). They believe it's a scientific approach that could make APTA's Physical Therapy Outcomes Registry (Registry) a crucial tool in reducing unwarranted variation in practice.

Learning Health Systems Work

The premise of a learning health system was first introduced by the Institute of Medicine and defined as a system:
*"in which science, informatics, incentives, and culture are all aligned for continuous improvement and innovation, with best practices seamlessly embedded in the care process, patients and families as active participants in all elements, and new knowledge is captured as an integral by-product of the care experience."* (IOM, Best Care at Lower Cost, 2013)

LeaRRn
LEARNING HEALTH SYSTEMS REHABILITATION RESEARCH NETWORK
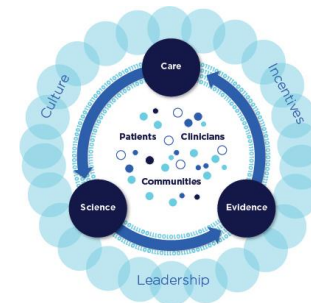
LeaRRn's Specific Aims

1: Create a LHS Innovation Hub that partners researchers with healthcare systems and engages stakeholders, including patients, providers, administrators, payers and policymakers, to develop rehabilitation-focused LHS research questions.

2: Provide funding and methodological/technical support for LHS Scholars and Pilot Study Awardees to transform research ideas into full-scale studies conducted in real-world practice.

3: Develop a knowledge repository, tailor LHS resources for rehabilitation and disseminate materials to advance best practices in rehabilitation LHS research. LeaRRn will serve as a resource and incubator for rehabilitation researchers interested in LHS research.

https://sites.brown.edu/learrn/

Models of Cooperation vs. Collaboration
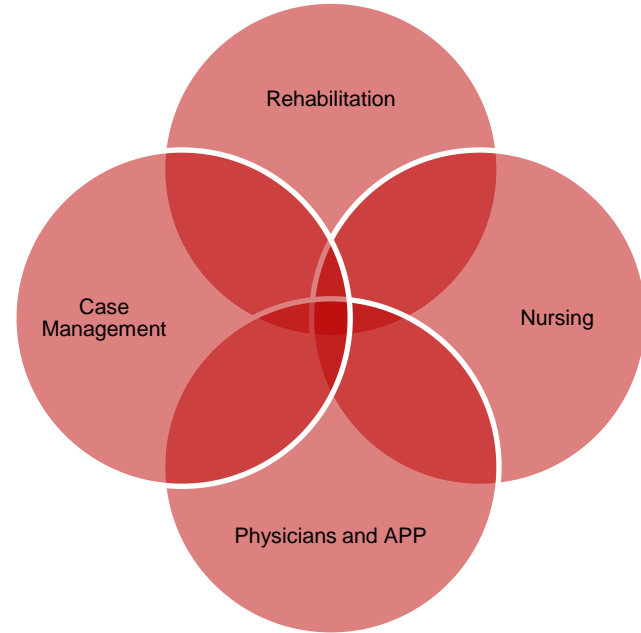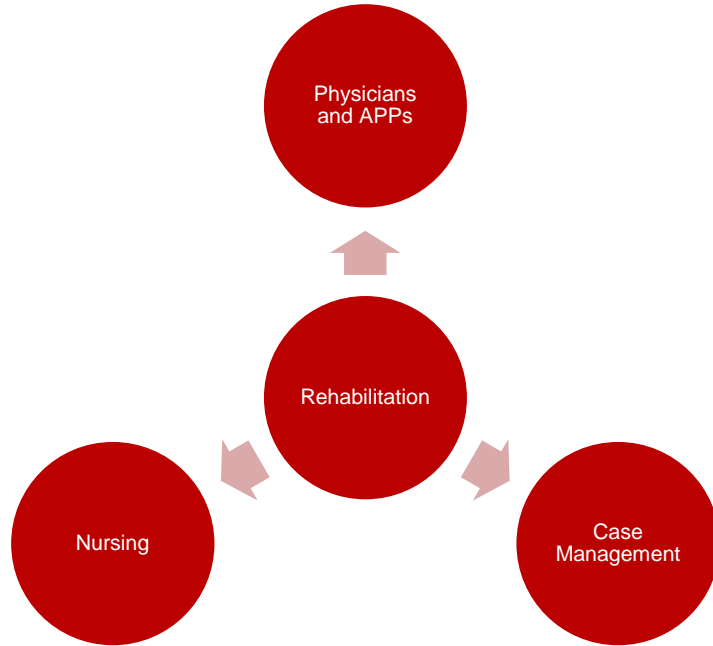
Health Systems Domains, Activities, and Processes

Operational Excellence

Patient Safety and Quality

Health Equity

Evidence-Based Practice

Health IT

Systematic Evidence Searches and Guideline Development

Population Health Efforts

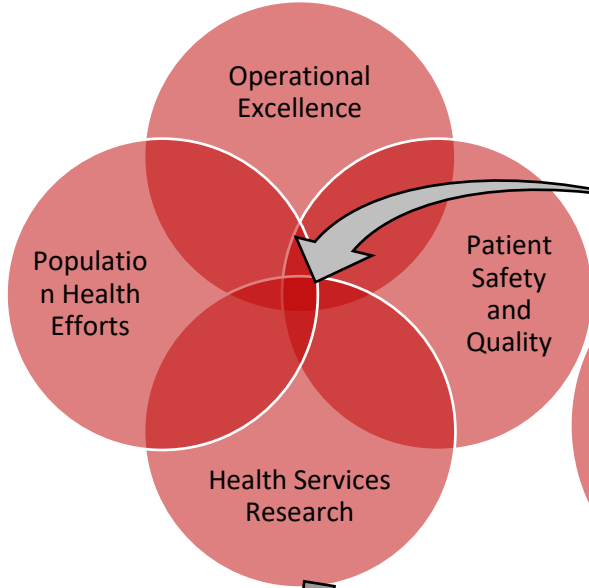Health Services Research

Improvement and Implementation Sciences

Systems Science
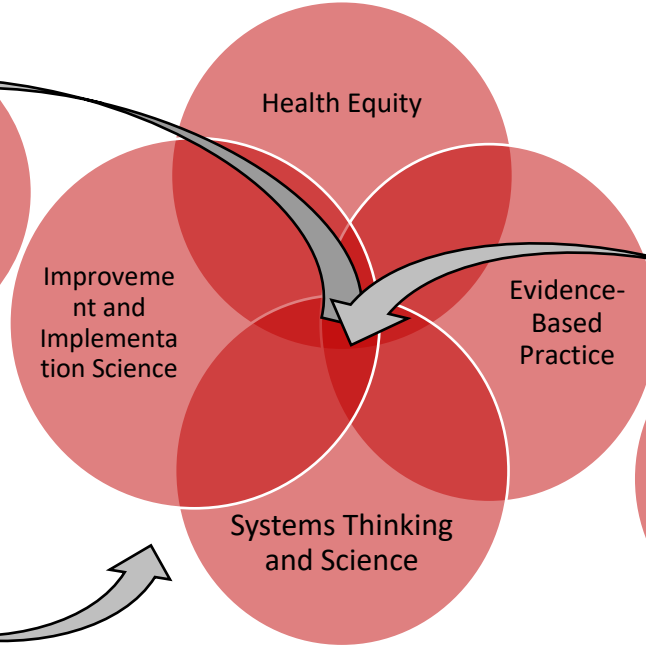
Facilitation and Dissemination

Data Collection, Extraction, and Analysis

Learning Health System Science In Practice