The Third Pillar of Medical Education: Health Systems Science

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IAMSE Spring Webinar Series
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Objectives

Upon completion of this session, participants will be able to:

1. Describe and define Health Systems Science,
2. Highlight the historical context of Health Systems Science and how the field has emerged over the past century,
3. Identify the need for conducive clinical learning environments to enhance Health Systems Science education,
4. Appraise the evolving medical professionalism in healthcare towards systems citizens,
5. Describe a brief overview of sessions 2-5, and how they integrate with one another.

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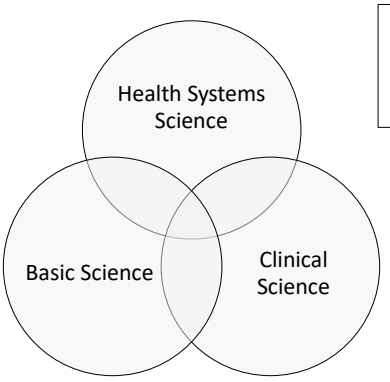
The Third Pillar of Medical Education



Health Systems Science definition:
the principles, methods, and practice of improving quality, outcomes, and costs of healthcare delivery for patients and populations within systems of medical care.

Crosson et al. Gaps in Residency Training Should Be Addressed to Prepare Doctors for 21st-Century Delivery System. Health Affairs 2011
Gonzalo JD et al. Educating for the 21st-Century Healthcare System: Framework of Basic, Clinical and Systems Sciences. Acad Medicine. 2015.
Gonzalo, et al. Identifying and Defining Curricular Content Domains for Health Systems Science. Acad Med 2016
Gonzalo, D Wolpaw, S Skochelak. Chapter 1. Health Systems Science. Elsevier. December 2016
Havyer et al. Science of health care delivery milestones for undergraduate medical education. BMC Medical Education 2017
Gonzalo et al. Aligning Education with Health Care Transformation: Identifying "New" Faculty Competencies. Acad Med 2017

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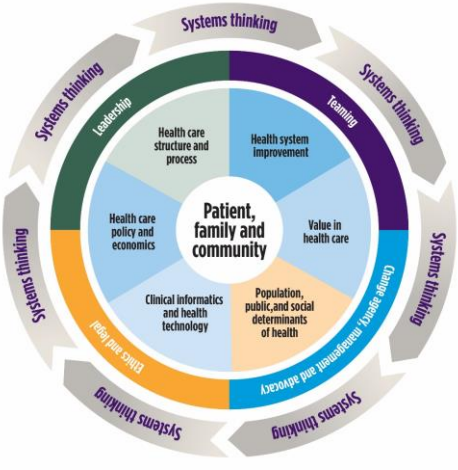
The HSS Framework



Skochelak, Hawkins, Lawson, Borkan, Starr, Gonzalo. Chapter 1. Health Systems Science. Elsevier. December 2016
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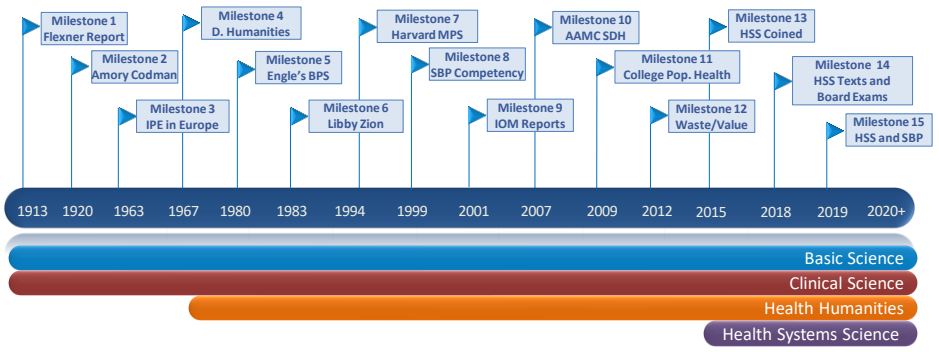
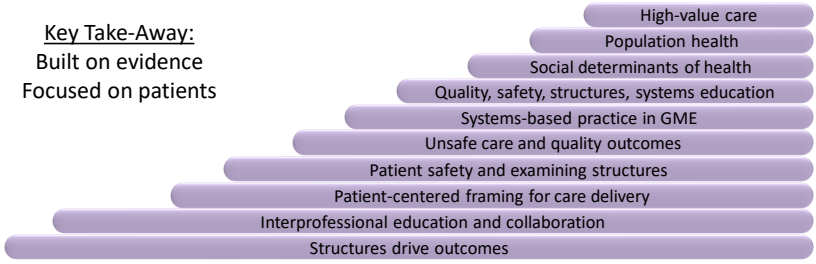
HSS Milestones: Past is Prologue



Key Take-Away:
Built on evidence
Focused on patients



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The Comprehensive HSS Framework

Schema Crosswalk of Health Systems Science Learning Areas With Systems-Related Competencies, Accreditation Items, Curricula and Textbooks.

Health Systems Science Core Domains	Patient Experience and Context		Healthcare Delivery		Policy and Economics		Clinical Informatics and Health Technology			Population and Public Health			High-Value Care			Health System Improvement			Systems Thinking	Change Management	Ethics and Law	Leadership	Teamwork
Health Systems Science Subdomains	Patient Experience	Behaviors	Structure	Process	Policy	Economics	Informatics	Decision Support	Technology	Social Determinants	Public Health	Pop Health Improvement	Quality	Cost	Evaluation	Quality Improvement	Data and Measurement	Innovation and Scholarship					
UME Competencies and Accreditation																							
AAMC Core EPAs for Residency	*		*	**			*		*	*			*	*		**							**
Competency Areas, Health Professions	*		*	*			*		*	*		*	*	*		*		*			*	*	**
IPE/collaboration competencies	*		*	**						*		*	*								*	*	**
IHI knowledge Domains		*	*	*						*							*	*	*			*	*
AAMC QI/PS competencies		*	*				*			**		**	**	**		**	**				*		**
AAMC Grad. Questionnaire (90-04)	*	*	*	*		*		*	*	**	*	*	*	*							*		*
AAMC Grad. Questionnaire (05-09)	*	*	*	*	*	*	*	*	*	**	*	*	*	*		*					*		*
AAMC Grad. Questionnaire (10-17)	*	*	*	*	*	*	*	*	*	**	*	*	*	*		*					*	*	**
LCME Data Collection Inventory	*	**			*	*	*			**		*	*										**
USMLE Physician Competencies					*	*							*			*			*		*		
USMLE Content Outline				*	*	*	*			*	*	*	**	*		**			*		*	*	**
GME Competencies and Accreditation																							
ACGME SBP Competency Domain			**	**								*	**	*		*					*		**
ACGME harmonized milestones	**		*	*	*	*			*	**		*	*			**		*	*	**	*	*	**
ACGME Common Program Reqs		**		**								**	**			**							**
ACGME CLER Pathways to Excellence			*	**						*		*	**			**	*						*
National/Local Curricula																							
IHI Open School Curriculum	**			*						**	*	*	**	**	*	**	**	**	*	**	*	**	**
ACP High Value Care Curriculum	*					*							**	**	**	**		*					
Quality and Safety Educators Academy				*									**			**	*			*			*
Harvard Med Social Medicine course		*			*	*				**	**										*		*
East Carolina Faculty Program			*	*						*	*	*	**	*		**	*			*		*	**
Mayo Clinic Abu DOM Science of HCD	**	**	*	*	**	**	*	*	*	*		**	**	**	**	*	*		*	*		**	**
Recommendations for Curricula																							
UME policy curricula			*	*	**	**			*	*	*	*	*		*	*					*		
Preparation/Pop Health Framework		*	*	*	**	*	*		*	**	*	**	*	*							*		*
Pop Health Curricular Framework			*	*	*	*	*		*	*	*	**	*				*				*	*	*
UME-21 - Education collaborative			*	*			*	*		*			*	*									*
Textbooks																							
Pop Health: Creating Culture Wellness	*	**	*	**	*	*		**	*	**	**	**	*			*					*	*		
Understanding Patient Safety		*	*	**		*	**	*	*	*			**		*		*		*		*		*
Understanding Value-Based Care		*		*	**				*			*	**	**		*			*		*	*	*
Health Systems Science	*	*	**	**	**	**	**		**	**	**	**	**	**	*	**	**	*	**		*	*	**

The "*" and "**" designations represent degree of focus dedicated to area (*=minor focus, **=moderate/high focus).

Transitions of Care

Social determinants

Patient safety

QI

IPE

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Gonzalo, Chang, Dekhtyar, Starr, Holmboe, D Wolpaw. Health Systems Science in Medical Education: Unifying the Components to Catalyze Transformation. Academic Medicine, 2020

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Why does a comprehensive HSS framework matter?

1. Ensures core competencies are not marginalized (e.g. HSS $\neq$ QI)
2. Accounts for related competencies in curricular design
3. Establishes a foundation for comprehensive pedagogies
4. Provides a clear learning pathway for UME → GME → workforce
5. Facilitates a shift towards a national standard
6. Catalyzes the new healthcare professionalism of systems citizens.

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Gonzalo, Chang, Dekhtyar, Starr, Holmboe, D Wolpaw. Health Systems Science in Medical Education: Unifying the Components to Catalyze Transformation. Academic Medicine, 2020

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Key Implications for US Medical Education

1. Value-Added Roles for Medical Students
2. The Expanding Educator Bench of US Medical Schools
3. The Clinical Learning Environment
4. The New Professionalism: Systems Citizenship

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Value-Added Roles for Medical Students

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Are medical students an asset or "liability"?

"**Value-Added Medical Education:** Experiential roles for students in practice environments that can positively impact patient and population health outcomes, costs of care, or other processes within the health system, while also enhancing student competencies in Clinical or Health Systems Science.

Direct patient care
History-taking
Evidence-based medicine
Patient education
Patient advocates
Value chief
Care Extenders
Clinical process extenders
Patient navigator
Safety analysts
QI team extenders
Population health managers
Research and systems projects
"Systems" Projects

Shea et al. Compensation to a dept. of medicine for the teaching of medical students. NEJM 96
Jones et al. On the cost of educating a medical student. Acad Med 97
Lin, et al. Value-Added Medical Education: Engaging Future Doctors to Transform HealthCare Today, JGIM 2014
Gonzalo et al. Medical Students as Systems Ethnographers: Exploring Patient Experiences and Systems Vulnerabilities in the ED. AEM 2017
Gonzalo et al. A Constructive Reframing of Student Roles Using a "Communities of Practice" Lens. Acad Med 2017

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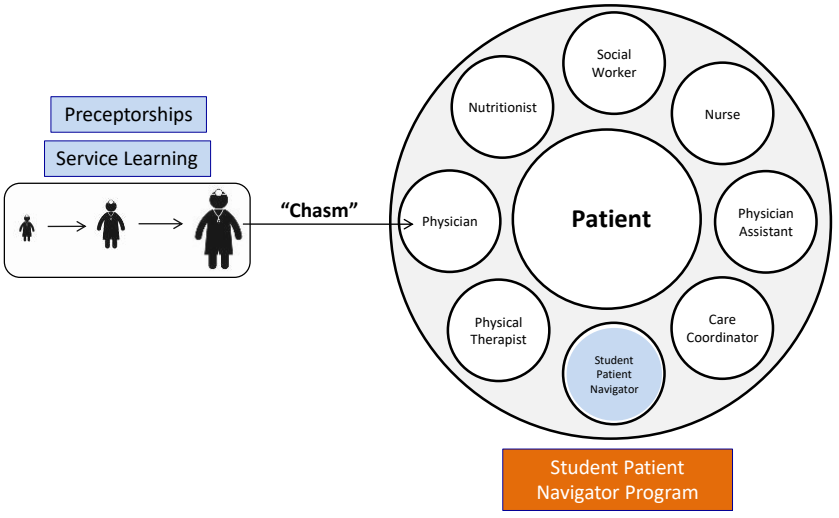
Current Education Model: The Mini Physician Model



Gonzalo et al. A Constructive Reframing of Student Roles Using a "Communities of Practice" Lens. Acad Med 2017
Skochelak, Hawkins, Lawson, Borkan, Starr, Gonzalo. Chapter 1. Health Systems Science. Elsevier. December 2016
Hunderfund, Gonzalo et al. Value-Added Activities in Medical Education: Factors Influencing Their Potential Engagement. Acad Med 2018
Gonzalo JD, et al. A practical guide for implementing and maintaining value-added clinical systems learning roles. Adv Health Sci Educ 2018
Gonzalo JD, et al. Educating Systems-Aware Physicians: Students Education in Patient Navigation. BMC Medical Education 2018

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What are students learning?

1. Patient's perspective on health care and his/her health
2. Patient's social determinants that are impacting his/her health
3. Communicating with patients
4. Interprofessional collaboration and teamwork
5. Healthcare delivery and the system
6. Systems thinking
7. Clinical medicine

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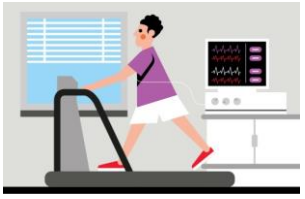
Gonzalo et al. Educating patient-centered, systems-aware physicians: student perceptions of value-added clinical systems learning roles. BMC Med Ed 2018

What are students learning?

1st-year medical student working as a patient navigator in the Physical Medicine and Rehab Hospital was assigned to perform a home safety assessment for a patient pending discharge. He failed to attend the scheduled appointment with the patient, which was uncovered after the social worker talked to the patient the following week. When confronted with this information, the student communicated that it was not clear to him about the expectation for the experience.



"The Mini Stress Test"

Penn State College of Medicine Medical Student EPAs for Patient Navigation
Student is entrusted to:
1. Interact professionally with patients, staff, and clinicians in both informal and clinically-based settings.
2. Effectively manage communication with patients and members of the interprofessional care team.
3. Comprehensively assess and diagnose the root causes of a patient's healthcare situation.
4. Identify and facilitate linkage of health system and community resources for patients in need.
5. Participate in and contribute to the ongoing work of an interprofessional care team within a clinical setting.
6. Document patient encounters in the electronic health record in a timely and accurate manner.
7. Apply the habits of a system thinker when they work to address patients' healthcare situation.
8. Build a therapeutic relationship with a patient.

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The Expanding Educator Bench of US Medical Schools

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HSS Impacts the Community of Educators

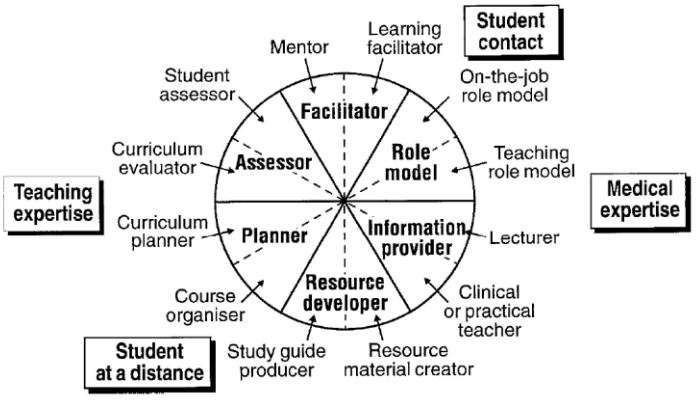

Figure 1. The 12 roles of the teacher.

Harden and Crosby. AMEE Guide No 20: The good teacher is more than a lecturer - the twelve roles of the teacher. Medical Teacher 2000
Gonzalo, Chang, Wolpaw. New Educator Roles for Health Systems Science: Implications for U.S. Medical School Faculty. Academic Medicine 2018

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New and Evolving Medical Educator Roles for HSS

Categories	Examples
Classroom Instructor (PBL, lecturer)	Evolving role: Hospitalist physician facilitates a small group
	New role: Director of Nursing Ambulatory Care leads social determinants of health workshop
Clinical supervisor ("attending")	Evolving role: PCP coaches learner through high-value, cost-conscious decision making
	New role: QI Chief collaborates with student to align project goals and obtain data
Curriculum Leader/Evaluator	Evolving role: Associate Dean for Evaluation facilitates new HSS assessments
	New role: Associate Dean for HSS Education oversees design of HSS curricula
Mentor or advisor	Evolving role: Clinician-investigator mentors student in informatics research in high-value care
	New role: QI/Lean/Black Belt staff mentors student in clinically-based project

Implication 1: The "new" educators are already in our community.

Implication 2: We can help develop skills of these educators.

Implication 3: We can meaningfully acknowledge and "incentivize" these educators.

Harden and Crosby. AMEE Guide No 20: The good teacher is more than a lecturer - the twelve roles of the teacher. Medical Teacher 2000
Gonzalo, Chuang, Glod, McGillen, Munyon, Wolpaw. In the "Control Center" of Systems of Care. JGIM 2020
Gonzalo , Chang, Wolpaw. New educator roles for HSS: implications of new physician competencies for med school faculty. Acad Med 2019
Gonzalo, Ogrinc. Health Systems Science: The" Broccoli" of Undergraduate Medical Student Education. Acad Med, 2019

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The Clinical Learning Environment

"Our first impressions are generated by our experiences and our environment, which means that we can change our first impressions…by changing the experiences that comprise those impressions" – Malcolm Gladwell

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Gonzalo JD, Singh M. How Systems Citizenship is No Accident in Health Professions Education. AHRQ PSNet 2018

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Does the environment matter for a comprehensive HSS framework?

Imagine the following scenario…

A patient is admitted with a hip fracture. The patient develops sepsis due to pneumonia post-operatively. Based on the patient's primary service, the delivery of care will look differently.

If on a surgical service, and the patient has worsening clinical progression, the surgical ICU attending and a critical care trained RN are contacted and the patient is upgraded to the ICU.

If on a medicine service, and the patient has worsening clinical progression, a medicine senior resident will come be contacted and the patient is most likely upgraded to an intermediate care unit.

The environment (primary service) is determining clinical care based on factors such as teamwork, policy, and structures and process.

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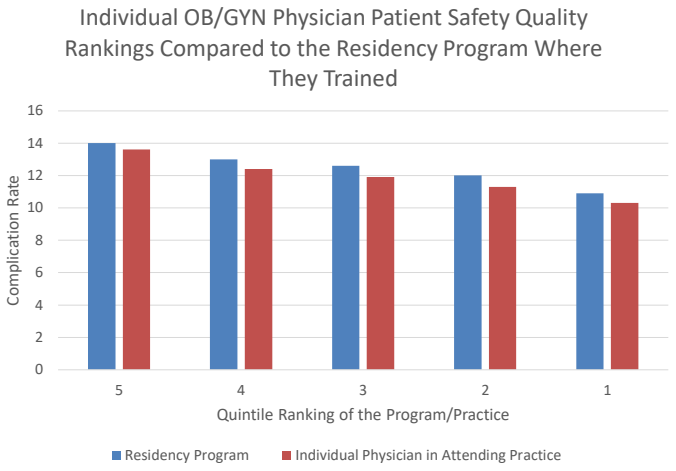
Why does the environment for a comprehensive HSS framework matter?



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Asch, Nicholson, Srinivas, Herrin, Epstein. Evaluating obstetrical residency programs using patient outcomes. *Jama* 2009.

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The New Professionalism: Systems Citizenship

"Is medical education designed to be transformative (e.g., a physician as a refined alloy produced from the ore of a medical student) or additive (she is the same person but with highly enhanced skills in science, technology and humanities)?"

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Gonzalo JD, Singh M. How Systems Citizenship is No Accident in Health Professions Education. AHRQ PSNet 2018

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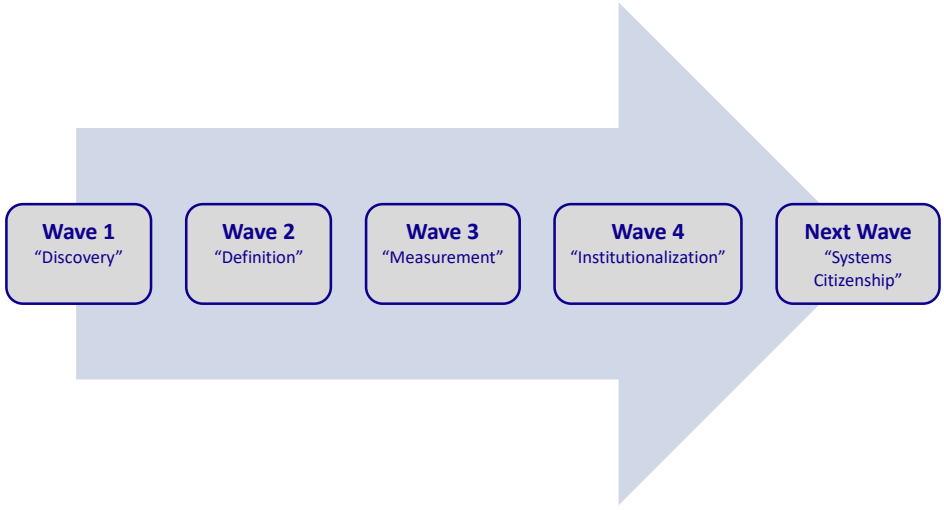
The New Professionalism



Hafferty, Levinson. Moving Beyond Nostalgia and Motives: Towards a Complexity Science View of Professionalism. Perspectives in Bio/Med 2008
Irby, Hamstra. Parting the Clouds: Three Professionalism Frameworks in Medical Education. Acad Med 2016
Lucey, Souba. The Problem With the Problem of Professionalism. Acad Med 2010
Cruess, Cruess, Steinert. Amending Miller's Pyramid to Include Professional Identity Formation. Acad Med 2016
Gruen, Pearson, Brennan. Physician-Citizens—Public Roles and Professional Obligations. JAMA 2004
Brennan. Physicians' Professional Responsibility to Improve the Quality of Care. Acad Med 2002

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Systems Citizens

Clinical learning environments need to be transformed

Systems Transformation Network
Penn State Health
Allegheny Health Network
Geisinger Health
Kaiser Permanente SOM/Northern CA GME

"Systems-Based Practice for the 21st-Century Healthcare System: Developing Residents as Systems Citizens."

Evolving professionalism in healthcare

LCME Data Collection Inventory; Common Program Requirements. www.acgme.org
T. Brigham. Knitting the Continuum Together: Seizing the Opportunity to Improve Medical Education. www.acgme.org
Asch et al. Evaluating Obstetrical Residency Programs Using Patient Outcomes. JAMA 2009
Hunderfund, A. et al. Medical Student Exposure to Cost-Conscious Role-Modeling Behaviors. Acad Medicine 2016.
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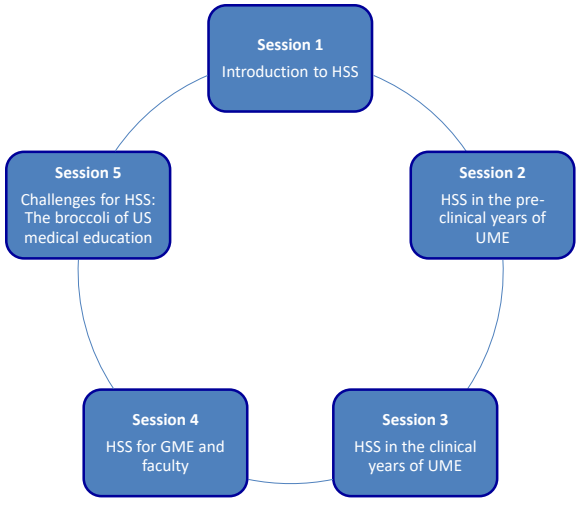
An Outline for the Series



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