Health Systems Science Education: Preparing for the 21st-Century Healthcare System

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Objectives

1. Define Health Systems Science and describe its role in the medical education framework.

2. Describe the increasing need for clinical learning environments to achieve competency-based education, specifically in regards to Health Systems Science competencies.

3. Review strategies for allowing students to add value to care delivery and educating about Health Systems Science principles during clinical experiences.

4. Discuss challenges in integrating Health Systems Science principles in medical education.

3 Questions and Concepts
Healthcare professionals have received sufficient education to optimally function in evolving health systems:

1. Yes
2. No
Health Systems Science is the emerging “third pillar” of medical education.
A New Triad

Basic Science

Clinical Science

Health Systems Science

Health Systems Science Competencies

**Systems-Based Practice:** Demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care.
### Health Systems Science Competencies

<table>
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<tr>
<th>Functional Competencies</th>
<th>Foundational Competencies</th>
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<tr>
<td>Patient-Centered Care</td>
<td>Teaming</td>
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<tr>
<td>Processes and Collaboration</td>
<td>Leadership</td>
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<td>Clinical informatics, data, tools</td>
<td>Change Agency and Management</td>
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<td>Population and public health</td>
<td>Systems Thinking</td>
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<td>Policy and payment</td>
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<td>Value-based care</td>
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<td>Health system improvement</td>
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**Diagram:** Examples of Systems Thinking Tools

- Behavior-over-time graphs
- Stock/flow maps and computer models
- Ladder of inference
- Causal loops
- Connection circles
- Iceberg

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A medical school ensures that the learning environment of its medical education program is conducive to the ongoing development of explicit and appropriate professional behaviors in its medical students, faculty, and staff at all locations and is one in which all individuals are treated with respect.

CLER Focus Areas/Common Program Requirements

1. Patient Safety
2. Health Care Quality/Disparities
3. Care Transitions
4. Supervision
5. Fatigue Management, Mitigation, and Duty Hours
6. Professionalism
HSS Curricular Continuum

**Year 1**
- SHS711 - Science of Health Systems
  - Patient Navigator Roles (n=150 students); Systems Ethnographers

**Year 2**
- SHS721 - Science of Health Systems Course (n=150 students)

**Year 3**
- Integrated Clerkship HSS Exercises (several pilots)

**Year 4**
- SHS743 - Translating Health Systems (n=150 students)
- HSS Electives (Interprofessional Academy Elective, Population Health Elective)

**GME**
- Core HSS Curriculum (4 hours across all GME programs)
- HSS Resident Course (1-week immersive course, n=40)

**Faculty**
- Health Systems Science Academy (Year 1 n=14, Year 2 n=29)
- Health Systems Science Seminar Series
When medical students are on clinical rotations, they are:

1. An asset - they add value to care delivery and help advance the team’s work for the patient.

2. A time and resource “liability” – they tend to require more work and investment than the value they add
Value-added roles can improve alignment with clinical care while also enhancing education in HSS.
Are medical students an asset or liability?

“Value-Added Medical Education:” Experiential roles for students in practice environments that have the potential to positively impact individual patient and population health outcomes, costs of care, or other processes within the health system, while also enhancing student knowledge, attitudes, and skills in Clinical or Health Systems Science.

<table>
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<th>Asset</th>
<th>Liability</th>
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<tr>
<td>Direct patient care</td>
<td>History-taking</td>
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<tr>
<td>Evidence-based medicine</td>
<td>Patient education</td>
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<td>Patient advocates</td>
<td>“Care Extenders”</td>
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<tr>
<td>“Care Extenders”</td>
<td>Clinical process extenders</td>
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<tr>
<td>“Care Extenders”</td>
<td>Safety Analysts</td>
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<tr>
<td>“Care Extenders”</td>
<td>QI Team Extenders</td>
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<tr>
<td>“Care Extenders”</td>
<td>Population Health Managers</td>
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<tr>
<td>Research and systems projects</td>
<td>“Systems” Projects</td>
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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 Medicine, 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 Medicine 2017
Current Education Model: The Mini Physician Model

Preceptorships
Service Learning
Student-Run Free Clinics

“Chasm”

Physician
Social Worker
Nutritionist
Nurse
Physician Assistant
Care Coordinator
Patient Navigator
Physical Therapist
Patient
An Example – IM Clinic

**Team:** 2, 1st-year students, care manager, social worker, physician mentor

**Case:** 84F with multiple comorbidities with “no show” rate. Through in-clinic discussions, calls, and home visits, students learned the patient’s ex-husband was an alcoholic, and her primary means for transportation. In her cluttered apartment, she had fallen 3x during the past year, each resulting in a fracture. Students helped facilitate:

1. A motorized wheelchair,
2. In-home ramp,
3. Walk-in shower, and,
4. Dependable source for transportation.

Students helped the patient apply for public assistance, and advocated for her while she was in clinic. Following visits, students educated the patient about her treatment plan, and confusing areas. Students determined moving to a nursing home was financially unfeasible. Although she qualified for assistance, the process of approval would be lengthy. Students reached out to local churches to help identify in-home needs. They identified an organization willing to volunteer weekly and help her with activities of daily living, and providing an expanded social network.

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**Functional Competencies**
- Patient-Centered Care
- Processes and Collaboration
- Clinical informatics, data, tools
- Population and public health
- Policy and payment
- Value-based care
- Health system improvement

**Foundational Competencies**
- Systems Thinking
- Change Agency and Management
- Teaming
- Leadership
Who should be teaching Health Systems Science?

1. Physicians
2. Health system leaders (e.g. CMOs, CQOs, CNOs)
3. Community-based care managers and nurses
4. Other interprofessional providers
Integrating HSS into education and care delivery is a challenge.
## Comments from the “Frontlines”

<table>
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<th>Importance of Learning HSS</th>
<th>Practical Concerns</th>
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<td>1. “If medical education isn’t broke, don’t fix it.”</td>
<td>1. “There is limited space in an already packed curriculum.”</td>
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<td>2. “HSS is too complex and best learned in residency or practice.”</td>
<td>2. “Few faculty have the knowledge and skills to teach HSS.”</td>
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<td>3. “Early students do not have skills to contribute to health care, and the roles already exist.”</td>
<td>3. “Accreditation agencies and licensing boards do not support medical education transformation.”</td>
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<td>4. “Health Systems Science is not yet a true science.”</td>
<td>4. “Evolving health systems are not ready to partner with schools with HSS curricula.”</td>
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Gonzalo et al. Concerns and Recommendations for Integrating Health Systems Science into Medical Student Education. Acad Med 2017.
Key Challenge: Student Perspective

Current Medical Student Priorities

- GME Acceptance
  “Best Residency Program”

- Grades and Board Exams

- Basic and Clinical Science Courses

Alternative Medical Student Priorities

- GME Transition
  “Best Doctor Possible”

- Patient-centered Skills

- Balance of Basic, Clinical, and Health Systems Sciences

Health Systems Science is a “Call to Action”

1. The “Expanding Educator Bench”
   - New roles (especially interprofessional providers)
   - Evolving roles (especially clinical mentors)

2. “New” culture required in medical education and healthcare
   - Need for better integration of academic health center missions
Conclusion

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Thank you for inviting me!
Comments or questions?

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