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*Mayo Medical School Curricular Innovations*

'Preparing Better Rounded Doctors'

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Royal College of Surgeons in Ireland
June 10th 2015

# Outline

- U.S. undergraduate medical education (UME) since the Flexner Report

- Rationale for change in UME.

-  Mayo Clinic Education Environment

- Review Mayo Medical School Curricular design around
  - Blended Learning / Teamwork/ Professionalism
  - Science of Healthcare Delivery (SHD)
  - Promoting Student Wellness and  Resiliency
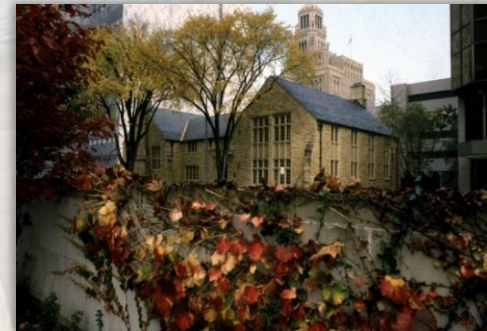
# The Flexner Report (1910)
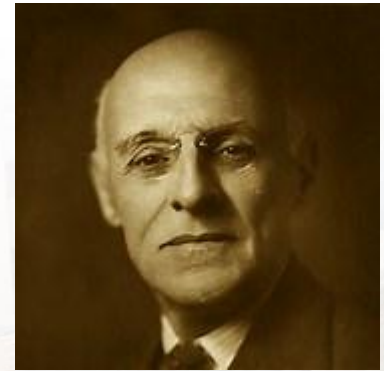

Abraham Flexner

## Recommendations

- Reduce the number of medical schools (from 155 to 31) and poorly trained physicians

- Increase the prerequisites to enter medical training

- Train physicians to practice in a scientific manner and engage medical faculty in research

- Give medical schools control of clinical instruction in hospitals

- Strengthen state regulation of medical licensure

# The Flexner Report



*"Scientific medicine in America is today sadly deficient in cultural and philosophic background. The medical curriculum is over-weighted with the scientific aspects of medicine to the exclusion of the social and humanistic aspects"*

Abraham Flexner 1925.



*"Medicine is both an art and a science, and both should make appeal to the true physician"*

Charles Mayo MD (1925)

**M**edical education seems to be in a perpetual state of unrest. From the early 1900s to the present, more than a score of reports from foundations, educational bodies, and professional task forces have criticized medical education for emphasizing scientific knowledge over biologic understanding, clinical reasoning, practical skill, and the development of character, compassion, and integrity.

Molly Cooke, M.D., David M. Irby, Ph.D., William Sullivan, Ph.D., and Kenneth M. Ludmerer, M.D.

**M**EDICAL EDUCATION SEEMS TO BE IN A PERPETUAL STATE OF UNREST. From the early 1900s to the present, more than a score of reports from foundations, educational bodies, and professional task forces have criticized medical education for emphasizing scientific knowledge over biologic understanding, clinical reasoning, practical skill, and the development of character, compassion, and integrity.[1-4] How did this situation arise, and what can be done about it? In this article, which introduces a new series on medical education in the *Journal*, we summarize the changes in medical education over the past century and describe the current challenges, using as a framework the key goals of professional education: to transmit knowledge, to impart skills, and to inculcate the values of the profession.

From the Department of Medicine, University of California, San Francisco, San Francisco (M.C., D.M.I.); the Carnegie Foundation for the Advancement of Teaching, Stanford, CA (M.C., D.M.I., W.S.); and the Department of Medicine, Washington University, St. Louis (K.M.L.).

Cooke et al: NEJM 355:1339, 2006

REVIEW ARTICLE

MEDICAL EDUCATION

Malcolm Cox, M.D., and David M. Irby, Ph.D., Editors

# American Medical Education 100 Years after the Flexner Report

"More emphasis should be placed on the social, economic, and political aspects of health care delivery…..the challenge is not defining the appropriate content but rather incorporating it into the curriculum in a manner that emphasizes its importance relative to the traditional biomedical content and then finding and preparing faculty to teach this revised curriculum"

The **NEW ENGLAND JOURNAL** *of* **MEDICINE**

VOL. 371 NO. 17

ESTABLISHED IN 1812    OCTOBER 23, 2014    NEJM.ORG

1570  Public Trust in Physicians – U.S. Medicine in International Perspective  R.J. Blendon, J.M. Benson, and J.O. Hero

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# Public Trust in Physicians
## U.S. Medicine in International Perspective

| Country | All Things Considered, Doctors in Your Country Can Be Trusted (Strongly Agree or Agree) | | Satisfaction with the Treatment You Received When You Last Visited a Doctor (Completely or Very Satisfied) | |
|---|---|---|---|---|
| | rank | % (95% CI) | rank | % (95% CI) |
| Switzerland | 1 | 83 (81–85) | 1 | 64 (61–67) |
| Denmark | 2 | 79 (77–81) | 2 | 61 (59–64) |
| Netherlands | 3 | 78 (75–80) | 11 | 47 (44–50) |
| Britain | 4 | 76 (73–79) | 7 | 51 (48–55) |
| Finland | 5 | 75 (73–78) | 9 | 49 (46–52) |
| France | 5 | 75 (73–77) | 18 | 38 (36–40) |
| Turkey | 5 | 75 (73–77) | 15 | 41 (38–43) |
| Belgium | 8 | 74 (73–76) | 5 | 54 (52–56) |
| Sweden | 8 | 74 (71–76) | 10 | 48 (45–51) |
| Australia | 10 | 73 (71–76) | 4 | 55 (52–58) |
| Czech Republic | 10 | 73 (71–75) | 16 | 39 (36–41) |
| Norway | 12 | 72 (70–74) | 5 | 54 (51–56) |

Table title: **Attitudes about Doctors, by Country.\***

| | **Rank** | **% (95% CI)** | **Rank** | **% (95% CI)** |
|---|---|---|---|---|
| United States | 24 | 58 (55-61) | 3 | 56 (54-59) |

| | | | | |
|---|---|---|---|---|
| Lithuania | 22 | 61 (58–64) | 28 | 13 (11–15) |
| Japan | 23 | 60 (57–63) | 20 | 30 (27–33) |
| Croatia | 24 | 58 (56–61) | 19 | 31 (28–34) |
| United States | 24 | 58 (55–61) | 3 | 56 (54–59) |
| Chile | 26 | 56 (52–59) | 25 | 23 (20–26) |
| Bulgaria | 27 | 46 (43–49) | 20 | 30 (27–33) |
| Russia | 28 | 45 (42–48) | 29 | 11 (9–13) |
| Poland | 29 | 43 (40–46) | 25 | 23 (21–26) |

*Respondents who answered the satisfaction question "does not apply" were not included in the denominator. Countries are rank-ordered according to the percentage of respondents who said they strongly agreed or agreed that "All things considered, doctors in [your country] can be trusted." Countries with the same rank were tied on that measure. CI denotes confidence interval. Data are from the International Social Survey Programme, 2011–2013

Blendon RJ et al: New Engl J Med, 2014;371;1570

# Decline of Trust in American Medicine

- Too expensive (17% GDP)

- Inequitable access  to care

- Quality and safety failures

- Widely publicized conflicts of interest

- Decline in public esteem of the medical profession

- Low physician morale and high burnout impacting patient relationships

# American Medical Association RFA (2012)
## 'Accelerating change in Medical Education'

**Goals**

- Develop new methods for measuring and assessing key competencies for physicians at all training levels to create more flexible, individualized learning plans

- Promote exemplary methods to achieve patient safety, performance improvement and patient-centered team care

- Improve understanding of the health care system and health care financing in medical training

- Optimize the learning environment

# Accelerating Change in Medical Education AMA Grant Awardees (2011)
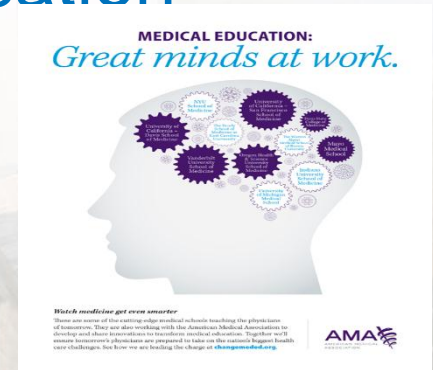
- Mayo Medical School

- Indiana University

- NYU

- Oregon Health & Science University

- Pennsylvania State University

- East Carolina University

- Brown University

- UC Davis

- UCSF

- University of Michigan

- Vanderbilt University

# THE WALL STREET JOURNAL. ( Feb17, 2015 )

## Innovation Is Sweeping Through U.S. Medical Schools

Preparing doctors—and in greater numbers—for new technologies and methods



Hofstra North Shore-LIJ Med School's curriculum starts outside the classroom with EMT training. Here students respond to a simulated auto accident. *PHOTO: HOFSTRA UNIVERSITY*

# American Medical Association RFA (2012)
## 'Accelerating change in Medical Education'

**Mayo Medical School Grant Submission**

*Optimize Student readiness for Medical Practice and life-long learning through;*

- Integration of health care and educational systems at all levels to narrow the gap between what is learned in medical school and what is needed to practice and improve medicine

- Major competency-based restructuring: Flexible progression

- Student (provider) wellness key to optimizing patient outcomes

# Mayo Clinic College of Medicine Five Schools

- **Mayo  School of Health Sciences**

- **Mayo Graduate School**

- **Mayo School of Graduate Medical Education**

- **Mayo School of Continuous Professional Development**

- **Mayo Medical School (MMS)**

# The Mayo Clinic
## *"The needs of the patient come first"*

- Integrated, academic patient focused group practice of Medicine

- Salaried consultant physicians/scientists  (n=2200)

- Three Shield Mission

- Not-for-profit

- Strong culture of collaboration

- Physician led

- Leadership term limits

- Support for Scholarship

# Mayo Medical School

**Vision**

Mayo Medical School Will Educate Physicians and Physician Scientists Who Will Transform the Practice of Medicine by Healing Both Patients and the Health Care System.

**Mission**

To train physicians and physician scientists leaders who will practice and teach patient-centered, science-driven, team-based, high-value health care, and contribute to a resilient, diverse and culturally competent physician workforce.

# MMS Curriculum Map Development

Leveraging Pedagogic Insights

"Cognitive psychology has demonstrated that facts and concepts are best recalled and put into service when they are taught, practiced, and assessed in the context in which they will be used"

Bransford J et al: How people learn: brain, mind, experience, and school. Washington, DC: National Academy Press, 1999

**Year 1 (July–Jun)**

| July | Aug | Sept | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ORIENTATION · SHCD | Basic Structure (Histology) BLOCK / Clinical Integration Basic Doctoring | SELECTIVE · SELECTIVE | Human Structure (Anatomy) BLOCK / Clinical Integration Basic Doctoring | SELECTIVE · SELECTIVE | SCIENCE of HEALTH CARE DELIVERY · SELECTIVE · SELECTIVE | Normal Function (Pathology, Immunology) BLOCK / Clinical Integration Basic Doctoring · SELECTIVE | | Principles of Disease (Microbiology, Pharmacology) BLOCK / Clinical Integration Basic Doctoring · SELECTIVE · SELECTIVE | | Brain and Nervous System Psychopathology BLOCK | SELECTIVE · SELECTIVE · SELECTIVE · SELECTIVE |

**Year 2 (July–Jun)**

| July | Aug | Sept | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Advanced Doctoring / Circulation BLOCK · SELECTIVE | Advanced Doctoring / Oxygen BLOCK · SELECTIVE | Advanced Doctoring / Hematology BLOCK · MSK BLOCK | | SELECTIVE | Clinical Integration / Renal Genitourinary BLOCK · SELECTIVE · SELECTIVE | Advanced Doctoring / Endocrine BLOCK · SELECTIVE · SELECTIVE | | Advanced Doctoring / Nutrition and Digestion BLOCK · BOARD REVIEW | SELECTIVE · WEEKS | & · BOARD EXAM | PRECLINICAL BLOCK |

**Year 3 — Core Clerkships (July–Jun)**

| CORE CLERKSHIPS | July | Aug | Sept | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Surgery (6 weeks) | | | | | VACATION | SHCD | | | | | | RESEARCH |
| Medicine (6 weeks) | | | | | | | | | | | | |
| Pediatrics (6 weeks) | | | | | | | | | | | | |
| ObGyn (6 weeks) | | | | | | | | | | | | |
| FamMd (3 wks) | | | | | | | | | | | | |
| Psych (3 wks) | | | | | | | | | | | | |
| Neuro (3 wks) | | | | | | | | | | | | |
| Research (12 weeks total) | | | | | | | | | | | | |

**Year 4 (July–May)**

| July | Aug | Sept | Oct | Nov | Dec | Jan | Feb | Mar | Apr | M |
|---|---|---|---|---|---|---|---|---|---|---|
| Hospital Internal Medicine Subinternship (4 weeks) | | | | | | | | | | |
| Medicine-Specific Elective (3 consecutive weeks) | | | | | | | | | | |
| Peds Specific-Elective (3 consecutive weeks) | | | | | | | | SHCD | | |
| Surgery-Specific Elective (3 consecutive weeks) | | | | | | | | | | |
| Emergency Medicine (4 weeks) | | | | | | | | | | |
| General Clinical Electives (12 weeks total) - *specialties, visiting clerkships* | | | | | | *international &/or under-served elective* | | | Residency Boot Camp - 1 week | |
| Social Medicine - 1 week | | | | Vacation (11 weeks) for Interviews & USMLE | | | | | | |

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# MMS Selective Blocks

1-2 week blocks, self directed, mentor guided or chosen from a list of options

Emphasize personal responsibility for the learning experience

Categories

- Career exploration

- Working in underserved communities

- Remedial activities

- Exploration of research interests

- Research presentations

- Enhancing clinical skills

# Preparing Better Rounded Doctors

- **Blended Learning / Teamwork / Professionalism**

- Science of Healthcare Delivery (SHD)

- Promoting Student Wellness and  Resiliency

# Blended Learning Collaboration

## Maximize critical thinking and application when face-to-face

- Module(s), then classroom
- Module(s), then experience
- Asynchronous modules
- Asynchronous activities

Flexibility in time, location, pace

# Anatomy Block
# Blended learning

- Module(s) provided on line day before class

- Content includes gross anatomy and corresponding radiologic imaging (e.g. CT scans) relevant to next day session

Goal;

 Maximize critical thinking and application when face-to-face

# Daily Activities in Gross Anatomy, Embryology and Radiology Block



| | |
|---|---|
| **Block V** | |
| | Short anatomy and radiology briefing sessions |
| **HUMAN STRUCTURE** | Lab dissection (active learning, team-based learning, peer-teaching, review of radiology images) |
| | **ARS questions, radiology and clinical correlations, embryology team presentations, reflections on professionalism, questions and answers** |
| **CLINICAL INTEGRATION** | |
| **Basic Doctoring** | |
| 25 26 27 28 29 30 | |

# CT Imaging in Anatomy Lab

- All cadavers imaged in a high-resolution CT scanner before dissection

- Each group has access to CT scans of their designated cadaver on the mobile station with laptop computer next to dissection table

- Students can view and manipulate multi-dimensional images during dissection

- Correlation of anatomical and radiological imaging

# Audience Response System (All Blocks)



- Provides feedback to team/individual student in real time

- Has user identification capability – allows for day-to-day monitoring of student's performance

- Individual results are provided to each student on a secure web site

- Increases attentiveness, enthusiasm and participation in class learning activities

- Motivates students to read assigned material

- System is simple to use (interacts with PowerPoint) and results are easily extracted

# Teamwork, Leadership and Professionalism



- Dissection teams (4 members) with assigned responsibility to team leader (rotation)

- Peer- and self-evaluation of dissection groups

- Emphasis on team-based learning, peer-teaching, professionalism and knowledge sharing

- Each team creates own webpage on the Mayo Medical School Wikipedia to allow others access their work (student autopsy reports, clinical project reports)

# Leadership /Teamwork/ Professionalism  Assessment

## Gross Anatomy Peer-Evaluation Form

NAME _____          TEAM/TABLE # _____

At the end of the Block V, it is necessary for all members of the dissection group to assess the contributions that each team member made to the work of the group.  This contribution should reflect your judgment on:

- Preparation for the laboratory dissection and other team assignments
- Contribution to the dissection process, group discussions and assignments
- Reliable attendance in the laboratory and other team-based activities
- Flexibility and ability to resolve disagreements
- Personal commitment to honor the choices and rights of other members
- Responsibility for own actions and decisions
- Overall professionalism as demonstrated in the commitment to demonstrate values and attributes that constitute professionalism

Please assign scores that reflect how you really feel about the extent to which the other members of your team contributed to your learning and team performance. This will be your only opportunity to reward the members of your dissection team who worked hard on your behalf. (Note: If you give everyone appropriately the same score you will be hurting those who did the most and helping those who did the least.)

**Instructions:**    In the space below please rate each of the **other** members of your team except yourself by distributing 60 points. Each member's peer evaluation score will be the average of the points they receive from the other members of the team.  To complete the evaluation you should:  1) List the name of each member of your team and, 2) assign an average of twenty points to the other members of your team (Thus, for example, you should assign a total of 60 points in a four-member team and 40 points in a three-member team.) and, 3) differentiate some in your ratings; for example, you must give at least one score of 21 or higher (maximum = 30) and one score of 19 or lower.

Team Members                    Scores

1)_____

2)_____

3)_____

**Additional Feedback:** In the space below would you also briefly describe your reasons for your highest and lowest ratings.  These comments — but not information about who provided them — will be used to provide feedback to students who would like to receive it.

Reason(s) for your highest rating(s).  (Use back if necessary.)

Reason(s) for your lowest rating(s).  (Use back if necessary.)

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# Integrated Grading System

| Objective Components: | Your Score | Class Average | Percent of Final Grade | Subjective Components: | Your Score | Percent of Final Grade |
|---|---|---|---|---|---|---|
| **Written Examination** | 76.61% | **81.94%** **(SD ±5.50)** | **30%** | **Laboratory Peer-Assessment Score[1]** | 89% | **10%** |
| **Practical Examination** | 91.11% | **85.56%** **(SD ±6.95)** | **20%** | **Faculty and TAs Evaluation Score** | 95% | **10%** |
| **Audience Response System Questions** | 78.50% | **78.26%** **(SD ±4.70)** | **10%** | **Dissection Quality** | 90. % | **5%** |
| **Anatomy bed-side Presentation** | 94.00% | **96.11%** **(SD ±4.62)** | **2.5%** | **Embryology brochure** | 90. % | **2.5%** |
| **NBME Examination Gross Anatomy + Embryology** | 84.55% 600[2] | **83.74%** **(SD ±10.48)** | **10%** | **Your NBME US rank** | 86 percentile rank | |
| **NBME Examination Gross Anatomy only** | 83.46% 600[2] | **83.75%** **(SD ±10.42)** | | **Your NBME US rank** | 88 percentile rank | |

# Preparing Better Rounded Doctors

- Blended Learning / Teamwork
- **Science of Healthcare Delivery (SHCD)**
- Promoting Student Wellness and Resiliency

# SHCD
## What is it and why Mayo Medical School?

- "Three sciences"
  - Basic science
  - Clinical science
  - Systems Science (deeply engrained in Mayo Clinic past and present)

- Opportunities stemming from Mayo culture of collaboration and innovation

- Opportunity for students to add value to the practice in UME

# Science of Healthcare Delivery (SHD) Mayo Clinic Vision

Develop, together with our health system partners, a cross-cutting, longitudinal model for Science of Health Care Delivery (SHCD) that trains students in inter-professional teams providing patient-centered and community/population-oriented, science-driven, high value care across the health care system

# Collaborators
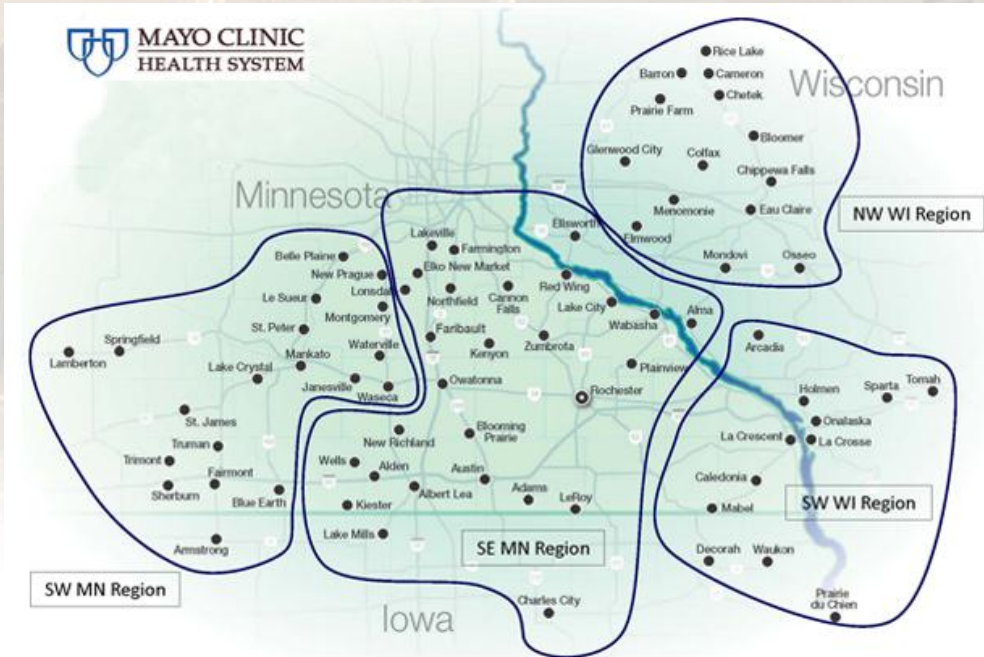
# SHCD curriculum development

- Determination of desirable Domains

- Six domain inventory; gap analysis

- 6 teams with physician co-leads in MN, AZ

- 'Big picture' curriculum mapping to integrate with MMS curriculum map

- No displacement of organ system block time

- Mix of synchronous and asynchronous modules/work

# SHCD
## Asynchronous modules and activities

- 30 modules specific to 6 domains spread across the 4 yr. curriculum

- Not linked in time to contemporaneous curriculum

- To be completed within a 6 month timeframe

- Assessment by domain leader involves satisfactory completion (80%) of domain specific questions

- SHCD milestone completion will be included in Dean's letter to GME program directors

# Mayo Medical School Science of Healthcare Delivery



- **Mayo value equation: quality/cost**
  - **Systems engineering, process improvement**
  - **Evidence based medicine**
  - **Patient safety**

- **Health disparities**
- **Wellness/health promotion**
- **Health determinants**
- **Culturally sensitive care**

- **Healthcare policy**
- **Clinical informatics**
- **Healthcare economics**

- **Shared decision making**
- **Individualized care**
- **Community resources**
- **Patient advocacy**

- **Collaboration with interprofessional teams**
- **Care transitions**

**High Value Care**

**Health Policy, Economics, Technology**

**Population-Centered Care**

**Person-Centered Care**

**Patients**

**Team-Based Care**

**Leadership**

- **Change management**
- **Motivation**
- **Strategic decision making**

Mayo core value: "*The needs of the patient come first*"

# Example; A MMS SHCD Curricular Journey (2015-19)
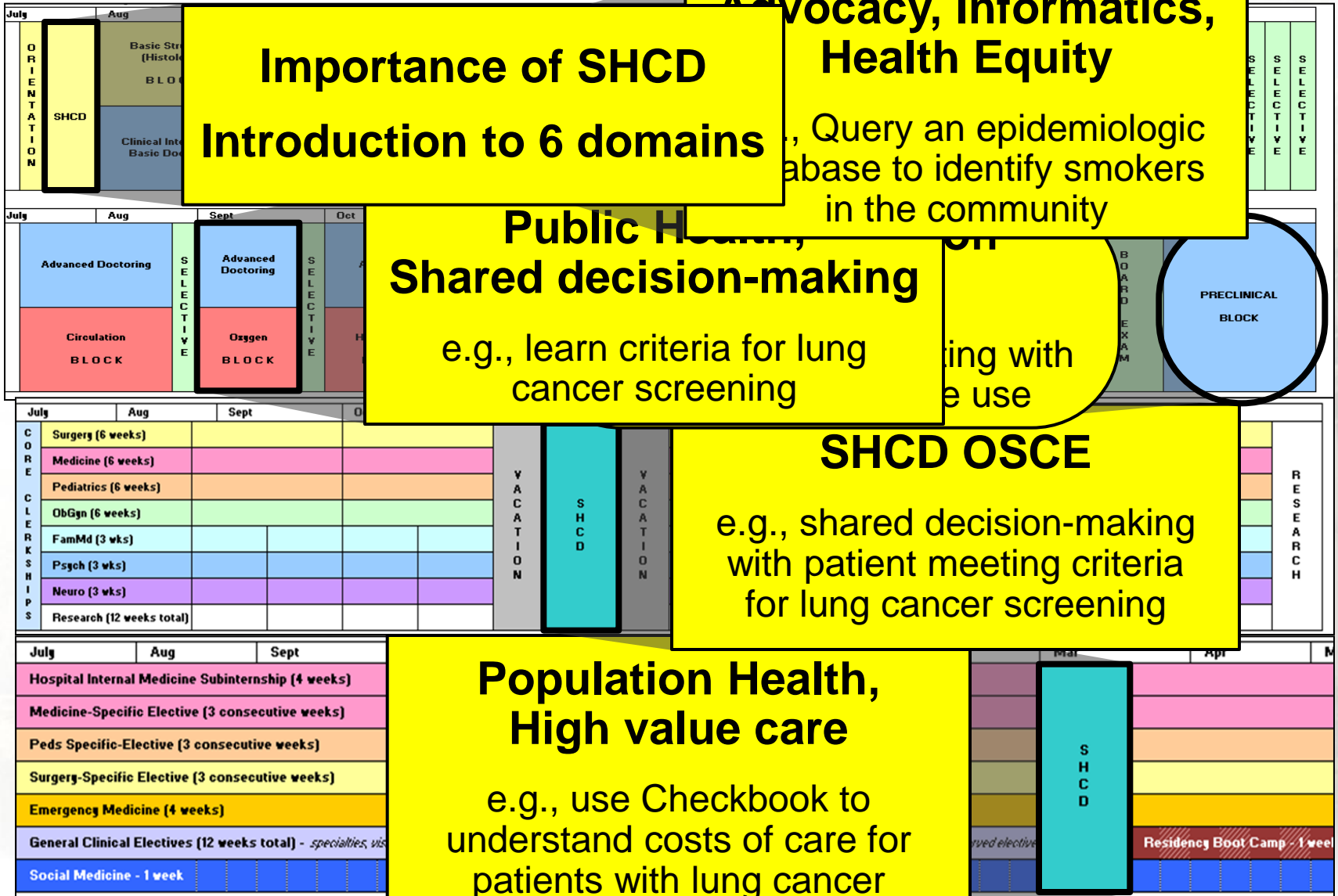


**Importance of SHCD**

**Introduction to 6 domains**

**Advocacy, Informatics, Health Equity**

e.g., Query an epidemiologic database to identify smokers in the community

**Public Health, Shared decision-making**

e.g., learn criteria for lung cancer screening

**SHCD OSCE**

e.g., shared decision-making with patient meeting criteria for lung cancer screening

**Population Health, High value care**

e.g., use Checkbook to understand costs of care for patients with lung cancer

# Preparing Better Rounded Doctors

- Blended Learning / Teamwork

- Science of Healthcare Delivery (SHD)

- **Promoting Student Wellness and  Resiliency**

# Maslach Burnout Inventory

- **Emotional exhaustion** measures feelings of being emotionally overextended and exhausted by one's work

- **Depersonalization** measures an unfeeling and impersonal response toward recipients of one's service, care treatment, or instruction

- **Personal accomplishment** measures feelings of competence and successful achievement in one's work

Maslach, C. (1976). Burned-out. Human Behavior, 9 (5), 16-22

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# Burnout and Suicidal Ideation among U.S. Medical Students

Liselotte N. Dyrbye, MD; Matthew R. Thomas, MD; F. Stanford Massie, MD; David V Power, MD; Anne Eacker, MD; William Harper, MD; Steven Durning, MD; Christine Moutier, MD; Daniel W. Szydlo, BA; Paul J. Novotny, MS; Jeff A. Sloan, PhD; and Tait D. Shanafelt, MD

**Results:** Burnout was reported by 49.6% (95% CI, 47.5% to 51.8%) of students, and 11.2% (CI, 9.9% to 12.6%) reported suicidal ideation within the past year.

..., and depressive symp-
...cidal ideation over the
...rnout and low mental
...t predictors of suicidal
...870 students who met
...covered. Recovery from
...suicidal ideation, which
...sed suicide risk.

...for the cross-sectional
study and 65% for the longitudinal cohort study) are typical of physician surveys, nonresponse by some students reduces the precision of the estimated frequency of suicidal ideation and burnout.

**Participants:** 4287 medical students at 7 medical schools, with students at 5 institutions studied longitudinally.

**Measurements:** Prevalence of suicidal ideation in the past year and its relationship to burnout, demographic characteristics, and quality of life.

**Results:** Burnout was reported by 49.6% (95% CI, 47.5% to 51.8%) of students, and 11.2% (CI, 9.9% to 12.6%) reported suicidal ideation within the past year. In a sensitivity analysis that assumed all nonresponders did not have suicidal ideation, the prevalence of suicidal ideation in the past 12 months would be 5.8%. In the longitudinal cohort, burnout ($P < 0.001$ for all domains),

**Conclusion:** Approximately 50% of students experience burnout and 10% experience suicidal ideation during medical school. Burnout seems to be associated with increased likelihood of subsequent suicidal ideation, whereas recovery from burnout is associated with less suicidal ideation.

Dyrbye et al: Ann Intern Med 149(5):334, 2008

# Distress Among Matriculating Medical Students Relative to the General Population

Chantal M.L.R. Brazeau, MD, Tait Shanafelt, MD, Steven J. Durning, MD, PhD,

**Conclusions** These findings, along with high rates of distress reported in medical students and residents, support concerns that the training process and environment contribute to the deterioration of mental health in developing physicians.

this would support existing concerns about the negative impact of training on student well-being. The authors compared mental health indicators of MMSs versus those of a probability-based sample of the general U.S. population.

**Method**
In 2012 all MMSs at six U.S. medical schools were invited to participate in a survey during orientation. The research

31–35, 36–40, > 40) were compared with MMSs. Surveys included demographics and validated instruments to measure burnout; depression symptoms; and mental, emotional, physical, and overall of quality of life (QOL).

**Results**
Demographic characteristics of the 582/938 (62%) responding MMSs were similar to U.S. MMSs. Relative to 546 age-

These findings persisted on multivariate analysis after adjusting for age, sex, relationship status, and race/ethnicity.

**Conclusions**
These findings, along with high rates of distress reported in medical students and residents, support concerns that the training process and environment contribute to the deterioration of mental health in developing physicians.

# Ability of the Physician Well-Being Index to Identify Residents in Distress

LISELOTTE N. DYRBYE, MD, MHPE
DANIEL SATELE, BA
JEFF SLOAN, PhD
TAIT D. SHANAFELT, MD

## Abstract

**Conclusions** The 7-item PWBI appears to be a useful screening index to identify residents whose degree of distress may negatively impact the quality of care they deliver.

national sample of residents, and evaluated the performance of the index after substituting the original fatigue item with an item not associated with driving a car.

**Methods** We conducted a cross-sectional survey study of a national sample of 20 475 residents. The survey included the PWBI, instruments assessing mental quality of life (QOL) and fatigue, and items on recent suicidal ideation and medical error. Fisher exact test or Wilcoxon/

... ype I ... o ... urvey. ...ent ...of the ...l P < .001). At a threshold score of ≥ 5, the PWBI's specificity for identifying residents with low mental QOL, high fatigue, or recent suicidal ideation was 83.6%. PWBI score also stratified residents' self-reported medical errors. The PWBI performed similarly using either fatigue item.

**Conclusions** The 7-item PWBI appears to be a useful screening index to identify residents whose degree of distress may negatively impact the quality of care they deliver.

# Student Wellness

- Liaison Committee on Medical Education Standards (LCME) Requires Medical Schools to have a student Wellness Program (MS-26)

- Guidelines on optimal format and content do not exist

- Well intentioned efforts to promote exercise, adequate sleep, good nutrition ,stress management etc. are pervasive

- No proof of efficacy

# Organizational Approaches to Student Distress

- Grading system

- Curriculomegaly

- Competitiveness

- Poorly structured clerkships

- Student abuse

- Inadequate preparation in encountering human suffering

# MMS AMA Grant - Objective 3

## Student Wellness

Programming and tools to prepare students to care for themselves and each other

- MMS Advisory Program

- Year 1 Longitudinal Resiliency Curriculum

- On-line Medical Student Well-Being Index

# A Multi-institutional Study Exploring the Impact of Positive Mental Health on Medical Students' Professionalism in an Era of High Burnout

Liselotte N. Dyrbye, MD, William Harper, MD, Christine Moutier, MD, Steven J. Durning, MD, David V. Power, MD, F. Stanford Massie, MD, Anne Eacker, MD, Matthew R. Thomas, MD, Daniel Satele, Jeff A. Sloan, PhD, and Tait D. Shanafelt, MD

**Conclusions** Findings suggest that positive mental health attenuates some adverse consequences of burnout. Medical student wellness programs should aspire to prevent burnout and promote mental health.

personal experience remain poorly understood. The study simultaneously explores the relationship between positive mental health and burnout with professionalism and personal experience.

**Method**

The authors surveyed 4,400 medical students at seven U.S. medical schools in 2009 to assess mental health (categorized as languishing, moderate, and flourishing) and burnout. Additional items explored professional behaviors,

[48.2%], 2871/1,128 [24.9%], and 127/1,409 [9.1%]) and serious thoughts of dropping out (15/114 [13.2%], 30/1,128 [2.7%], and 14/1,409 [1.0%]) decreased as mental health improved from languishing, moderate, and flourishing, respectively (all $P < .0001$; this relationship between personal experience and mental health persisted independent of burnout (all $P < .001$). As mental health improved, the prevalence of unprofessional behaviors (i.e., cheating and dishonest behaviors) also declined, whereas students' altruistic

professional beliefs ($P < .0001$). The relationship between professional beliefs and mental health persisted among students with burnout, whereas fewer relationships were found among students without burnout.

**Conclusions**

Findings suggest that positive mental health attenuates some adverse consequences of burnout. Medical student wellness programs should aspire to prevent burnout and promote mental health.

# Medical Student Well-Being Index*

| Item | Question | Domain & Subdomain |
|------|----------|--------------------|
| 1 | Do you feel burned out from medical school? | Burnout – Emotional exhaustion |
| 2 | Do you worry that medical school is hardening you emotionally? | Burnout – Depersonalization |
| 3 | During the past month have you often been bothered by feeling down, depressed, or hopeless? | Depression |
| 4 | In the past month, have you fallen asleep while stopped in traffic or driving? | Fatigue |
| 5 | During the past month, have you felt that all things you had to do were piling up so high that you could not overcome them | Stress |
| 6 | During the past month, have you been bothered by emotional problems (such as feeling anxious, depressed, or irritable)? | Quality of life – Mental |
| 7 | During the past month, has your physical health interfered with your ability to do your daily work at home and/or away from home? | Quality of life – Physical |

# Mayo Medical School Resiliency Toolbox

Develop programming and tools to prepare students to care for themselves and each other

- Well being Index; validated, longitudinal, individualized self-assessment/self-help tool with personalized feedback linked to just-in-time resources to aid medical students in distress

- New advisory system system (modules and face to face wellness /resiliency training and self-care education,

- Year 1 longitudinal small group facilitated wellness curriculum

# Wellness and Resiliency Curriculum

**Orientation;**

<span style="color:red">Workshop on Stress.</span>

- Prevalence

- Precipitants (general and specific to medical school)

- Adverse impacts (personal and professional)

- Neurophysiologic/Psychological substrates of stress and wellness

- Strategies overview

- Available resources

Amit Sood MD

THE
MAYO CLINIC
GUIDE TO
STRESS-FREE
Living

AMIT SOOD, M.D., M.Sc.

# Wellness Group Discussions

Themes
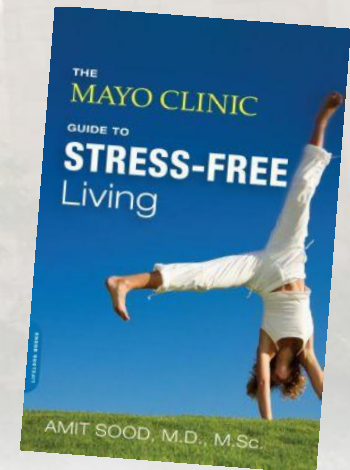
- acceptance
- forgiveness
- compassion
- gratitude
- meaning purpose
- relationships

- Year 1 regularly scheduled-in team based lunch sessions (mandatory)

- Four groups (12-14 students with doctorate level facilitators)

- Theme based discussions

- Application of a theme to experience and observations during an agreed upon calendar date

- Student engagement and feedback

# Preparing Better Rounded Doctors
## Acknowledgements

Darcy Reed MD
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Associate Dean for Student Affairs

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Lisolette (Lotte) Dyrbye MD
Professor of Medical Education

Susan Romanski MD
Director, Curriculum for Basic and Advanced Doctoring

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# MAYO

*Thank You!*

# Questions & Discussion

# 2015-16

- Block 1
  - Kick off for all 6 domains
  - Colors exercise
  - Aging game
  - A day in the life
  - Cultural humility workshop

- Block 4
  - Curricula in all 6 domains
  - EBM
  - Intro to 'big data'

# Person-centered Care

## *Focus on individual patients*

- Shared decision making

- Individualized care

- Social determinants of health

- Community resources

- Patient **a**dvocacy

- Cultural humility

- Biases pt  ←→ provider

# High Value Care

*Value = Outcomes + Safety + Service*

*Cost*

- EBM
- Quality/process improvement
- Patient safety
- High value cost conscious care (Choosing Wisely)
- Patient experience

# Team-based Care



*Focus on team approach to care*

- Inter & intra-professional interdependency

- Care transitions/handoffs

# Health policy, economics, technology



*Focus on informatics & larger systems*

- Healthcare policy, law, regulatory agencies

- Meso- and macro-systems

- Clinical informatics

- Healthcare economics

# Leadership

*Focus on foundational physician leadership skills*

- Change management

- Transformational and emergent leadership

- Leadership in high performing health care organizations

# Curriculum development

- Outcomes

- Inventory; gap analysis

- 'Big picture' curriculum mapping to integrate with MMS curriculum map

- 6 teams with physician co-leads in MN, AZ

- Bringing 'best practices' and new learnings from AMA ACE Consortium and collaborators

# 2015-16

- Block 1
  - Kick off for all 6 domains
  - Colors exercise
  - Aging game
  - A day in the life
  - Cultural humility workshop

- Block 4
  - Curricula in all 6 domains
  - EBM
  - Intro to 'big data'

# AMA Grant -- Objective 2

**Milestone-based advancement in SHCD**

- Milestones for SHCD based on the ACGME milestones

- Novel student assessment tools corresponding to SHCD milestones

- Building a model for flexible progression of students within SHCD based on milestone achievement

# Population-centered Care

*Focus on population health*

- Health determinants

- Health disparities

- Wellness/health promotion

- Population health management, **A**dvocacy

- Public/global health

- Epidemiology, biostatistics

# The NEW ENGLAND JOURNAL of MEDICINE

**1586   Getting the Right Medical Students –
Nature versus Nurture** R.M. Schwartzstein

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# The Evolution of the Medical College Admission Test (MCAT Exam)

Trey Pigg, MCAT research specialist, and Marc Kroopnick, MEng, PhD, manager, MCAT Development and Psychometrics,

am), the nationally administered standardized
edical schools. Periodic reviews of this exam help
eld of medicine.

ril 2015. The early MCAT exam focused on memory
cepts in the behavioral and social sciences. The 2015
30. The timeline below, which follows in part from

**2015**

- Shifts the focus from testing what students know to testing how well they use what they know
- Includes a new behavioral and social sciences section
- Tests new biochemistry concepts
- Uses a different score scale than the two previous versions to avoid inappropriate comparisons
- Reports section scores from 118 to 132 and sums them to create a total score, ranging from 472 to 528
- Test sections:
  - Chemical and physical foundations of biological systems
  - Critical analysis and reasoning skills
  - Biological and biochemical foundations of living systems
  - Psychological, social, and biological foundations of behavior

- Named the "Professional School Aptitude Test" (In 1948, renamed the "Medical College Admission Test")
  - Added verbal and quantitative sections and an emphasis on liberal arts through a "Modern Society" section
  - Reported section scores on a scale of 200 to 800
- Test sections:
  - Verbal ability
  - Quantitative ability
  - Science achievement
  - Understanding modern society (in 1962, this became "General Information")

- Science problems
- Skills analysis: reading
- Skills analysis: quantitative

**2015**

- Shifts the focus from testing what students know to testing how well they use what they know
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**1991**

- Introduced a "Writing Sample" section to provide information about each examinee's ability to develop, synthesize, and present ideas clearly and logically
- Included quantitative reasoning in the science sections, rather than as a stand-alone section
- Reported writing sample scores on an alphabetical scale (J to T)
- Reported the other three section scores on a scale of 1 to 15, which were summed to create a total score, ranging from 3 to 45
- Test sections:
  - Verbal reasoning
  - Biological sciences
  - Physical sciences
  - Writing sample (removed in 2013)

**2030**

Throughout the years, the MCAT exam has emphasized different types of knowledge and skills reflecting contemporary thought on what is necessary to demonstrate readiness to learn in medical school.

Reference
1. McGaghie W. Assessing readiness for medical education: Evolution of the Medical College Admission Test. JAMA. 2002;288:1085–1090.
Author contact: mkroopnick@aamc.org
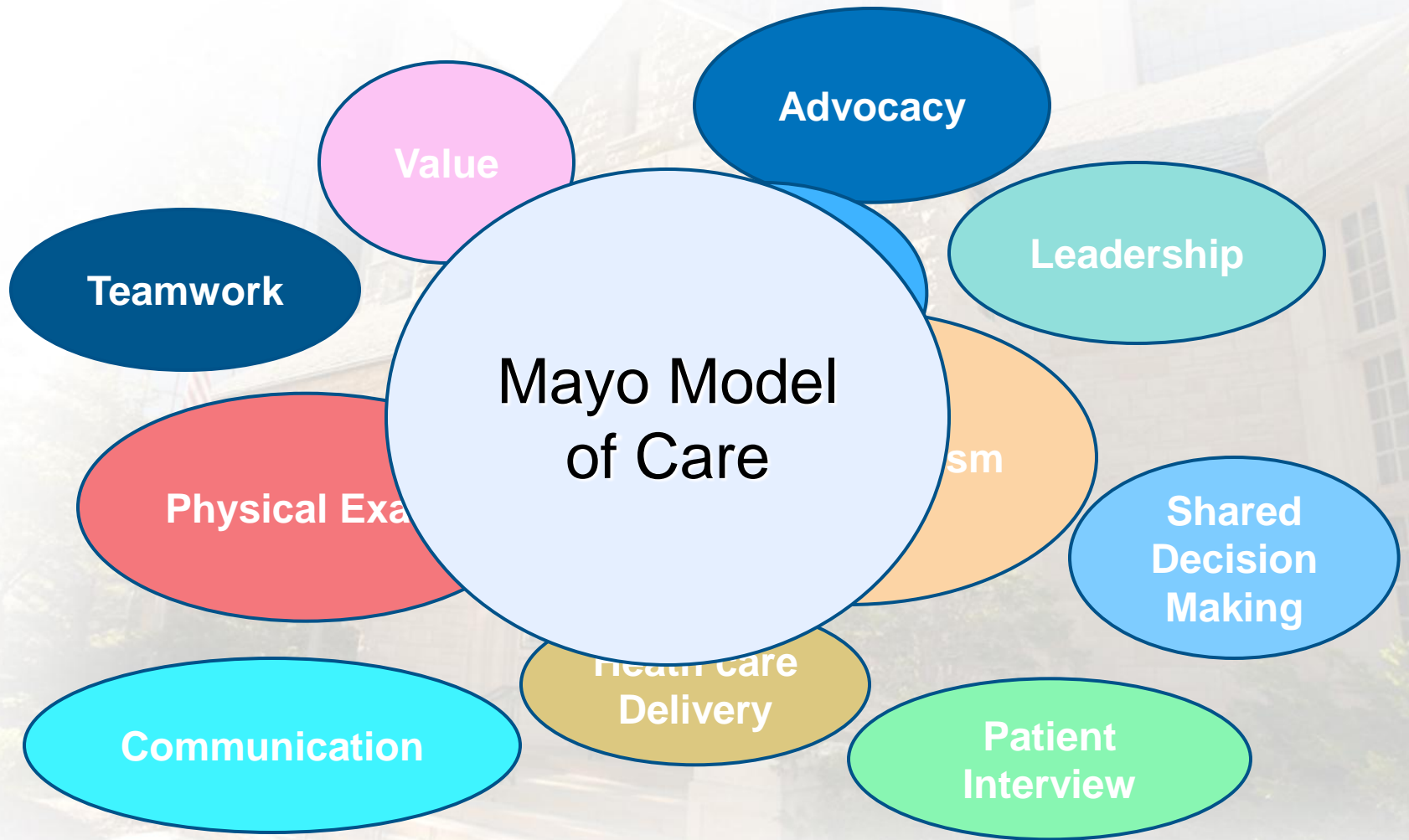
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# Accountability for Educational Outcomes

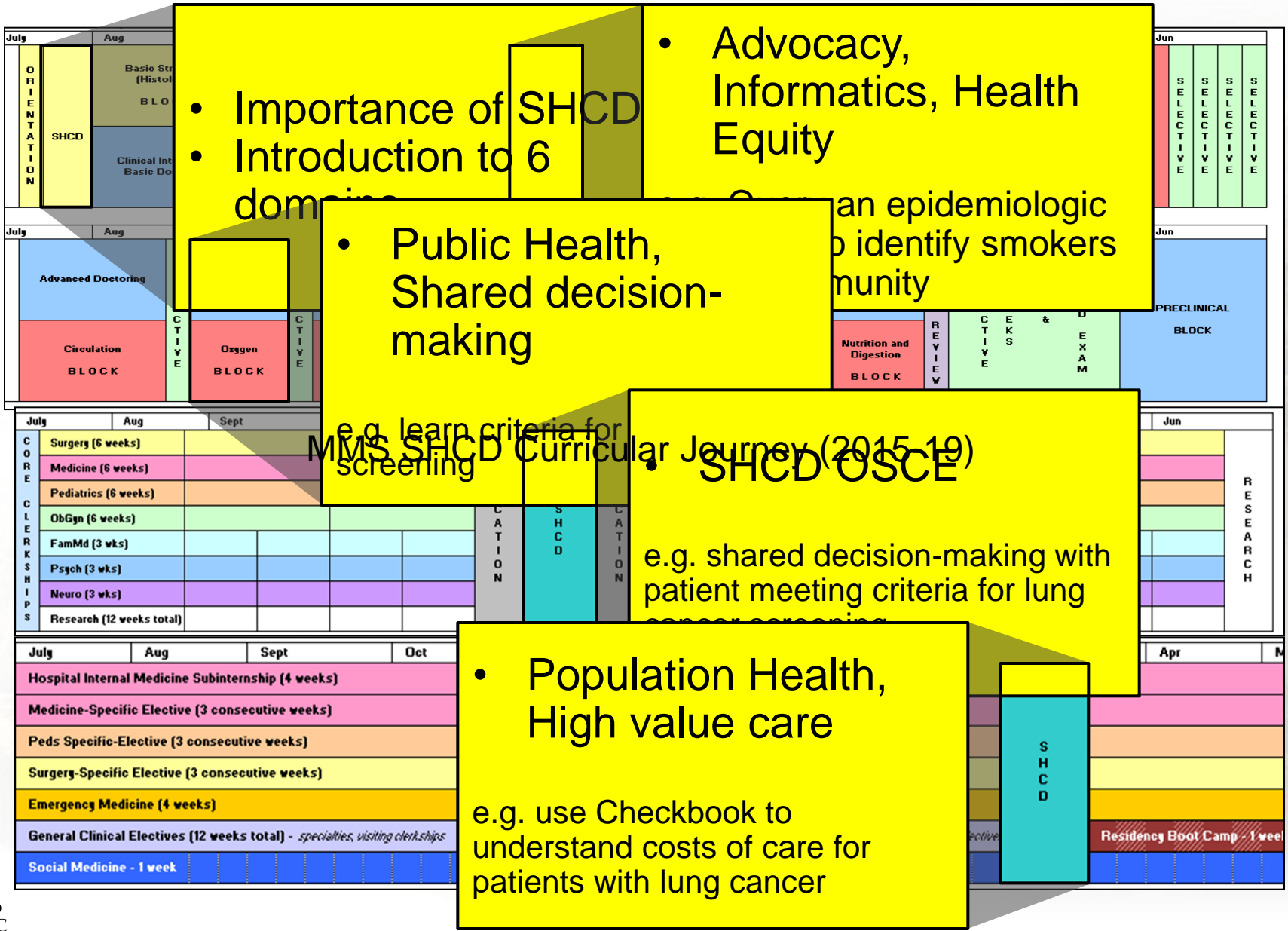Public needs, societal expectations
Professional self-regulation & autonomy

Competency-based education
Evidence, measurement, validity

Quantification of knowledge, skills, behaviors, patient outcomes

# Art of Medicine



Value

Advocacy

Teamwork

Leadership

Mayo Model of Care

Physical Exam

sm

Shared Decision Making

Health care Delivery

Communication

Patient Interview

# A MMS SHCD Curricular Journey (2015-19)



- Importance of SHCD
- Introduction to 6 domains

- Advocacy, Informatics, Health Equity

  e.g. an epidemiologic to identify smokers munity

- Public Health, Shared decision-making

  e.g. learn criteria for screening

MMS SHCD Curricular Journey (2015-19)

- SHCD OSCE

  e.g. shared decision-making with patient meeting criteria for lung cancer screening

- Population Health, High value care

  e.g. use Checkbook to understand costs of care for patients with lung cancer

# Competency-Based Education

"In a traditional educational system, the unit of progression is **time** and it is **teacher-centered.**

 In a competency-based education system, the unit of progression is **mastery** of specific knowledge and skills and is **learner-centered**."

# Technology assisted Blended Learning and Teamwork in Anatomy

☑ Formation of teams

Formation of small dissection teams, selected to achieve diversity based on several criteria:

- Gender
- Cultural background
- Geographical location of college
- College majors
- State of residence
- MD/PhD program
- Previous experience in  anatomy
- MCAT (average/team is very similar)

# Accountability for Educational Outcomes

Public needs, societal expectations
Professional self-regulation & autonomy

↓

Competency-based education
Evidence, measurement, validity

↓

Quantification of knowledge, skills,
behaviors, patient outcomes

# Competency-Based Education

"In a traditional educational system, the unit of progression is **time** and it is **teacher-centered.**

In a competency-based education system, the unit of progression is **mastery** of specific knowledge and skills and is **learner-centered**."

# Art of Medicine

# What's New

- Incorporation of "blended learning"

- Combination of face-to-face education & online modules
  - Built into curriculum over the first 2 years
  - Incorporation into all 14 blocks: Histology, genetics, principles of disease, etc

- Requires changes in mindset for faculty (practicing consultants) and students

- Requires collaboration across the Enterprise (shield and geography)

# Cognitive Behavioral Approaches to Student Distress (NW)

- Identify behavior you wish to improve

- Monitor the baseline behavior

- Learn about recommendations for targeted behavior

- Set personal goals

- Implement a self improvement plan

- Perform self assessment of effectiveness and identify promoters and barriers

# Why SHCD??

- National call for med education to 'catch up' and link with changing patient/society needs, healthcare environment

- Explicit way of linking/learning how many factors come together to affect health care delivery, health outcomes

Skochelak SE. A Decade of Reports Calling for Change . . .*Acad Med* 2010; 85:S26–S33.

Lucey CR. Medical Education: Part of the Problem and Part of the Solution. *JAMA Int Med*, E1-E5. July 15, 2013.

Pershing S and VR Fuchs. Restructuring Medical Education . . . *Acad Med* 2013;88:1798–1801.

# Mayo Clinic College of Medicine Five Schools

- **Mayo  School of Health Sciences**
  - **1100 students in 70 programs; certification to doctoral level**

- **Mayo Graduate School**
  - **190 PhD, 120 Master's students**

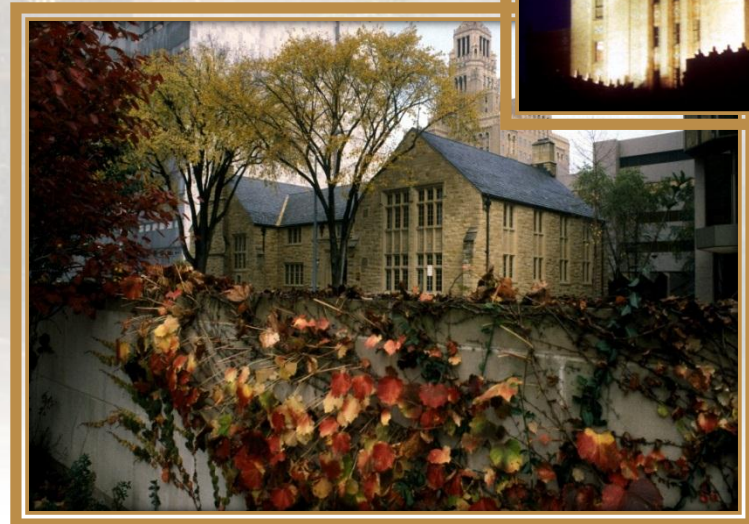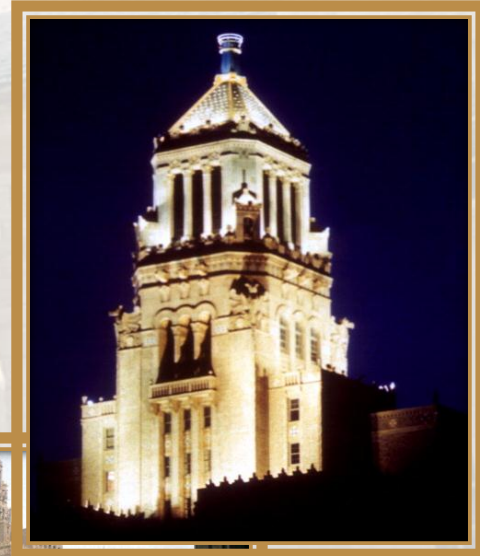- **Mayo School of Graduate Medical Education**
  - **271 programs training 1550 physicians (largest in country)**

# Mayo Clinic College of Medicine Review of Our Five Schools

- **Mayo School of Continuous Professional Development**
  - **130,000 participants a year. In 2012, 65% were physicians and 75% were from outside Mayo**

- **Mayo Medical School**
  - **200-210 students**
  - **18-20 MD/PhD track**

# Current challenges in UME

- Education not recognized broadly as a viable path to scholarship; it is the road less travelled

-  National call to educators to help fix the Broken Health care system

-  Expertise in the delivery of health care is as important as traditional medical knowledge but not taught

- Technological advances and generational differences are driving changes

- Team based care and learning is the new paradigm but not routinely modeled

- Physician burnout at all time high, and mental health profiles are declining in 'millennials'

# Science of Healthcare Delivery Curriculum

- *Core curriculum*
  - Integration across 4 year MMS curriculum
  - MMS graduates to earn certificate in SHCD
  - Mix of on-line modules, blended learning, and clinical experiences

- *Deeper dive*:  SHCD selective, scholarly project

- *Masters in SHCD (ASU):*  option now for additional year to earn degree; planning underway for integrated degree