

Transforming Medical Education through the Science of Health Care Delivery

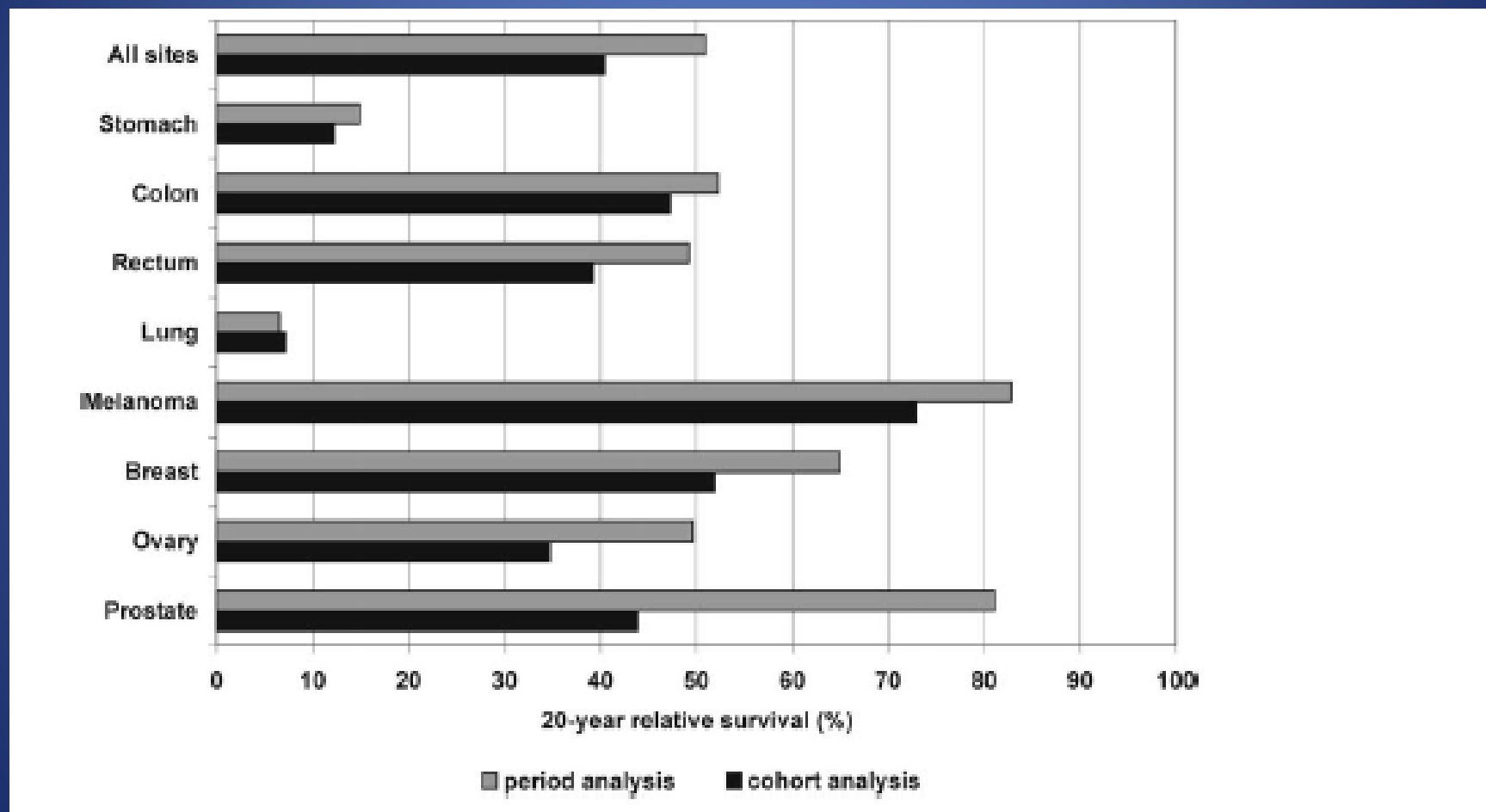
Lotte Dyrbye, MD MHPE

Professor of Medicine & Medical Education

Mayo Clinic



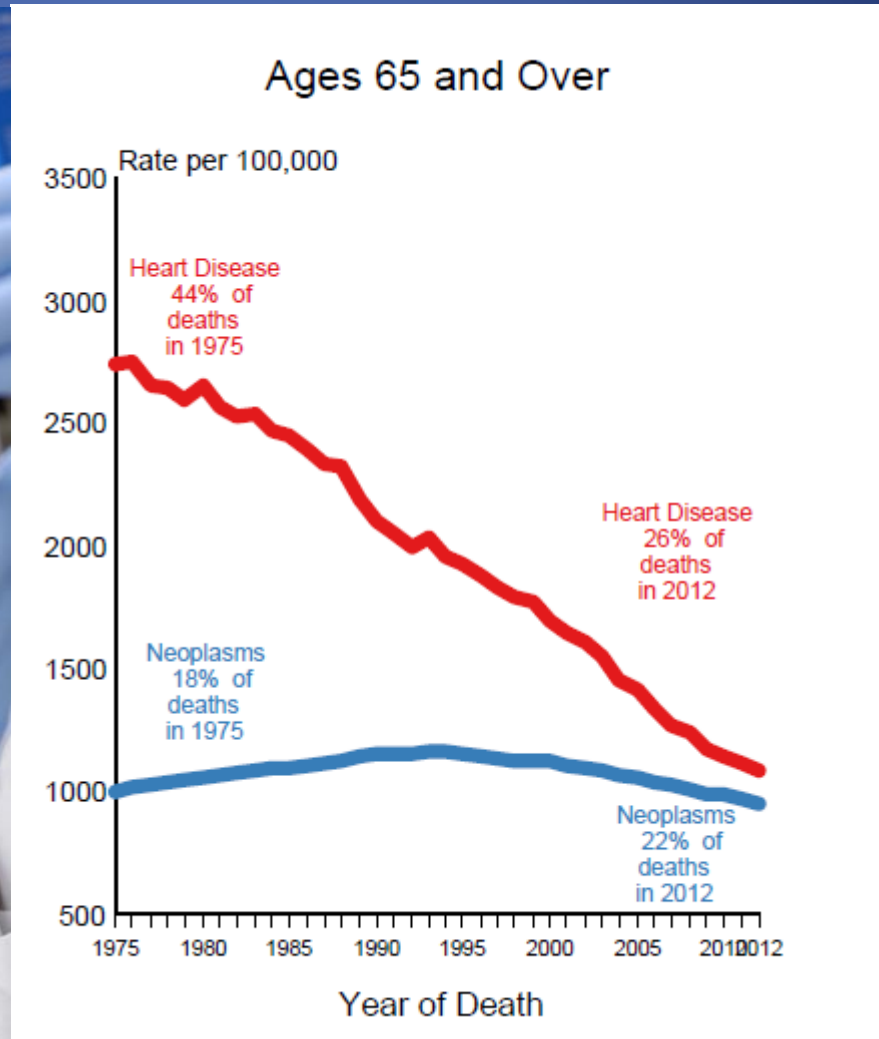
20 year relative survival rates



Cohort: dx in 1979 Period: dx in 1999

Brenner Eur J Ca 2004

US Death Rates, 1976-2012



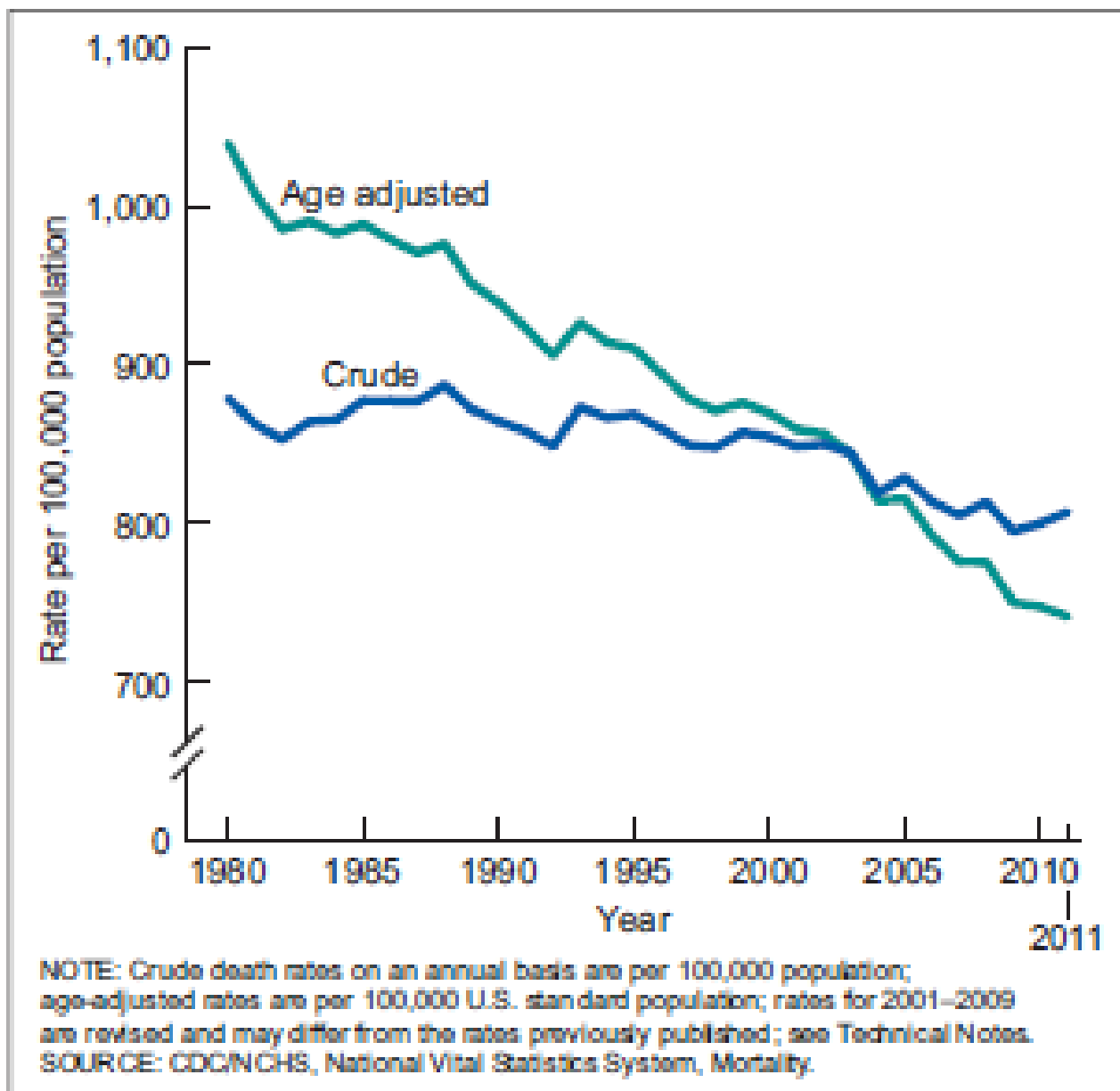
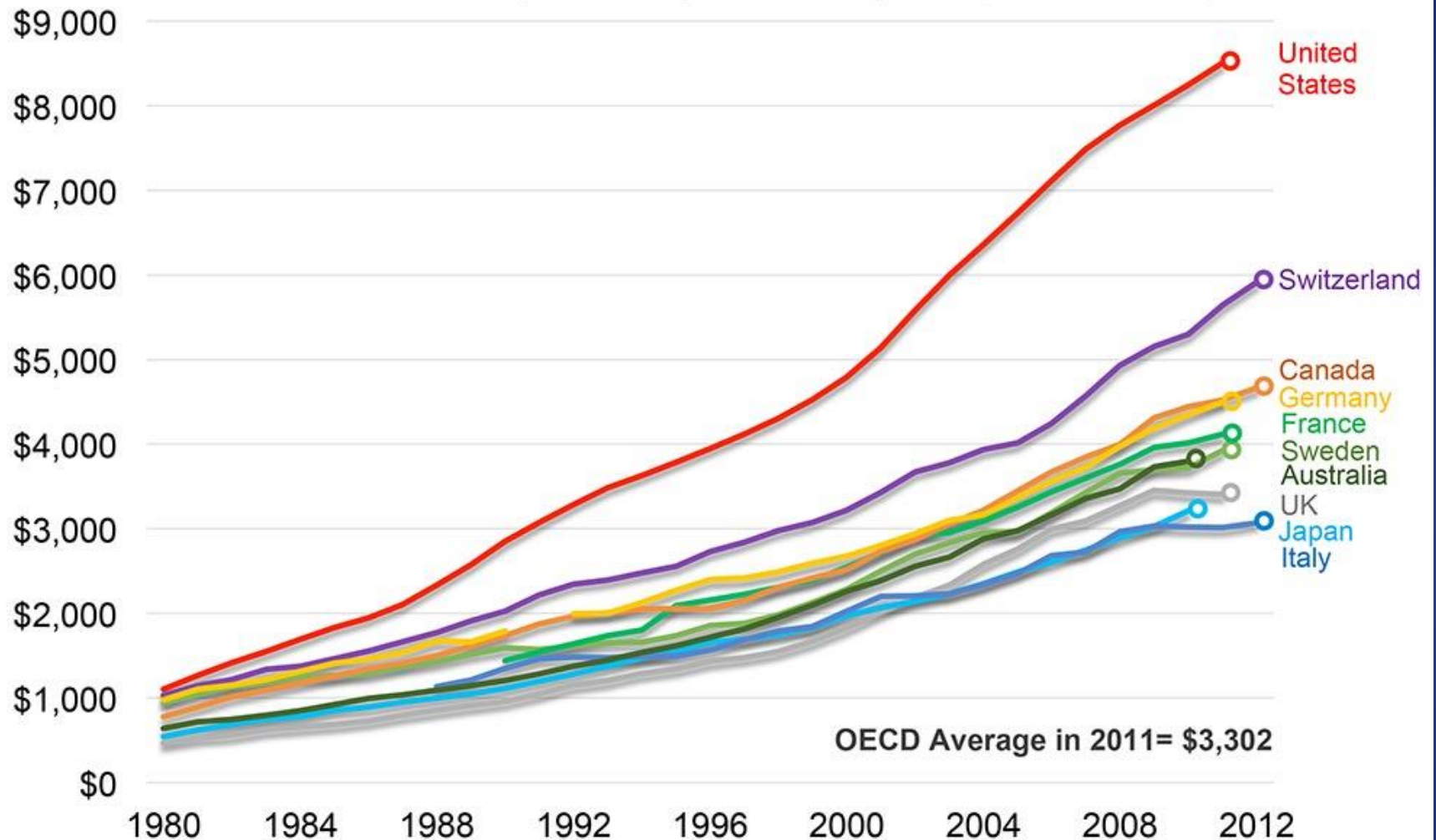


Figure 1. Crude and age-adjusted death rates: United States, 1980–2010 final and 2011 preliminary

National Vital Statistics, 2012

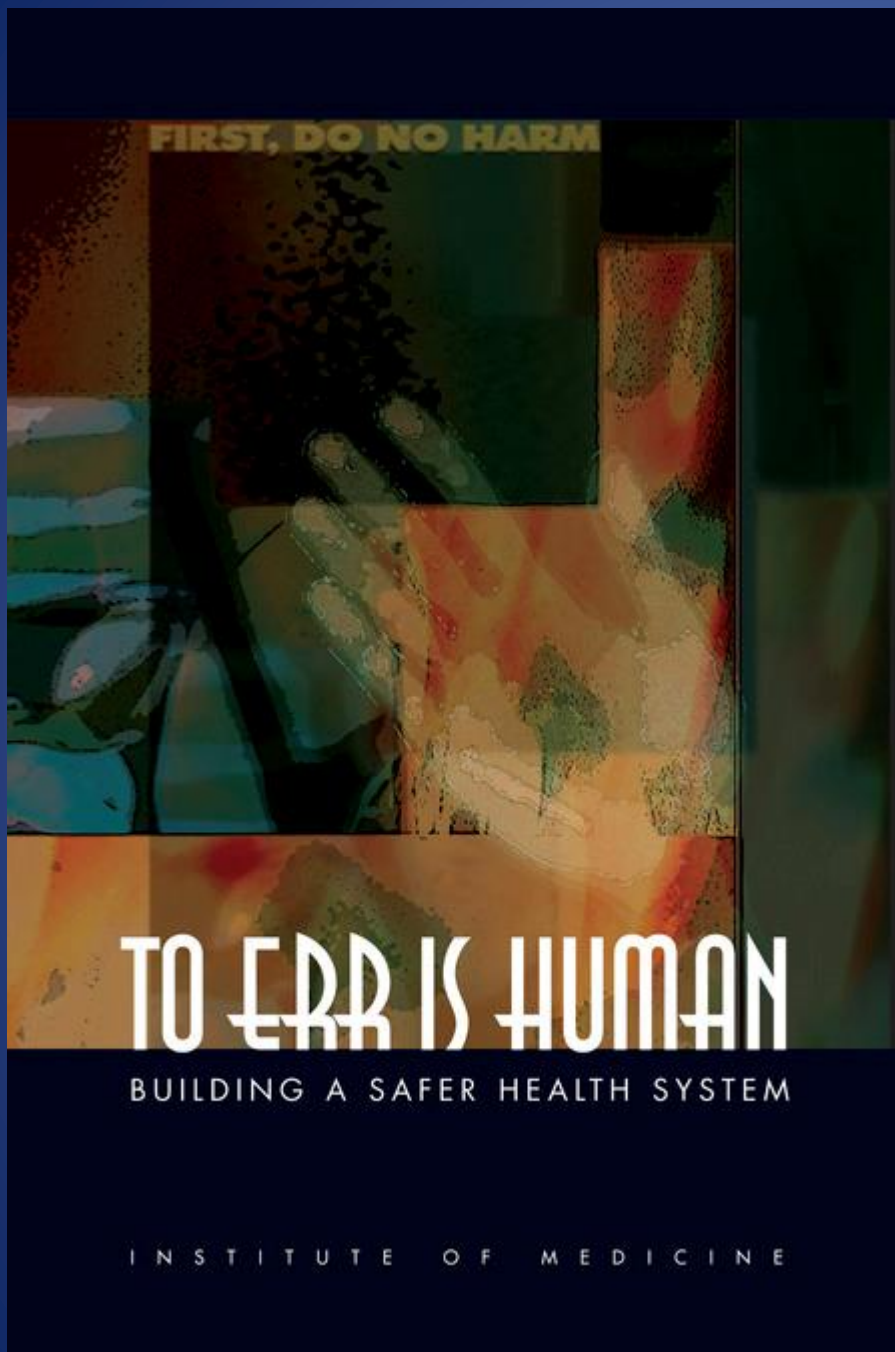
Health Care Spending Per Capita (\$US PPP)



Source: OECD Health Data 2013.

Data note: PPP = purchasing power parity.

Produced by Veronique de Rugy, Mercatus Center at George Mason University.



- 44,000 to 98,000 people die in hospitals each year because of preventable medical errors
- Hospital-based errors 8th leading cause of death in the United States
 - ahead of breast cancer, AIDS, and motor vehicle accidents

New Models of Care





**Big
Data**

High Value Care

Health Care Reform and Cost Control

Peter R. Orszag, Ph.D., and Ezekiel J. Emanuel, M.D., Ph.D.

NEJM 2010

CLINICAL GUIDELINE



Cardiac Screening With Electrocardiography, Stress Echocardiography, or Myocardial Perfusion Imaging: Advice for High-Value Care From the American College of Physicians

Roger Chou, MD, for the High Value Care Task Force of the American College of Physicians*

Ann Intern Med 2015

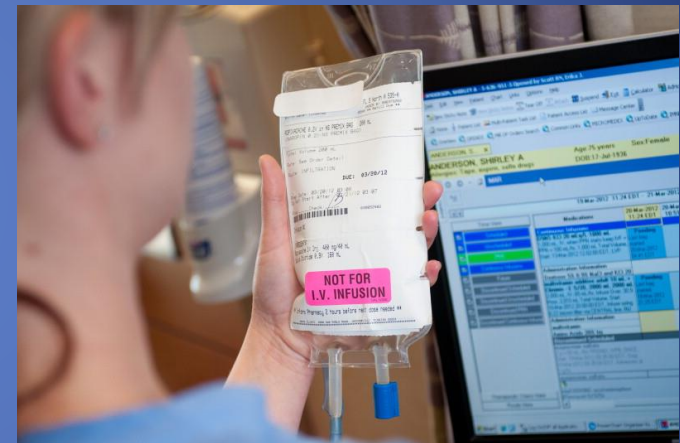
J Shoulder Elbow Surg (2013) 22, 1000-1009

Value-based shoulder surgery: practicing outcomes-driven, cost-conscious care

Eric M. Black, MD, Laurence D. Higgins, MD, Jon J.P. Warner, MD*

National Patient Safety Initiatives

- Patient identification
- Effective communication
- Medication safety
- Infection control
- Patient falls
- Pressure ulcer
- Suicide risk
- Universal protocol wrong site, wrong procedure, wrong person surgery



Wellness Promotion Disease Prevention

- Health/Wellness coaching
 - Physical activity
 - Dietary choices
- Community-based delivery of preventative services
 - School-based immunization programs
 - Mammography





Population Health

Advancing health outcomes of groups of individuals

- ACO
- eHealth
- Panel managers
- Community health care workers





Practice Realities of Today and Tomorrow

- What are we doing to prepare the next generation of physicians?
- What new competencies are needed?
- How does trainee clinical education fit within new models of care?
- What are trainees' role in improving outcomes, safety, and patient satisfaction and in reducing cost of care?



Calls for Reform of Medical Education by the Carnegie Foundation for the Advancement of Teaching: 1910 and 2010

David M. Irby, PhD, Molly Cooke, MD, and Bridget C. O'Brien, PhD

Calls for Change in Medical Education

A Decade of Reports Calling for Change in Medical Education: What Do They Say?

Susan E. Skochelak, MD, MPH

Abstract

Purpose

To review the recommendations of 15 U.S. and Canadian reports, published in the last decade, that call for significant changes in medical education.

Method

The author selected reports published in the last decade that emphasized recommendations for medical education in the United States and Canada and a broad spectrum of sources.

Results

The purpose, methods, and content of each report are briefly described. The reports were selected because they

future directions in the health care workforce. The author provides an overview and synthesis of these reports and reveals a number of common

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Gaps In Residency Training Should Be Addressed To Better Prepare Doctors For A Twenty-First-Century Delivery System

[Expand](#)

Francis J. Crosson^{1,*}, Jean Leu², Beth M. Roemer³ and Murray N. Ross⁴



Physician Leadership Education

Physicians are being called upon to bring their expertise to bear on the management of the clinical enterprise in collaboration with other hospital leaders.

How do they ensure they are prepared?



American Hospital Association



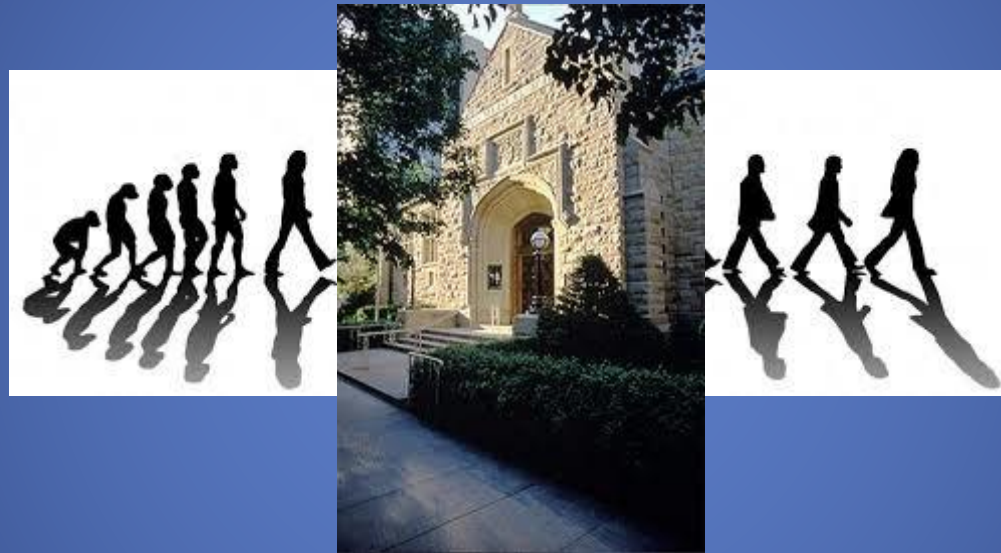
American Hospital Association's
PHYSICIAN LEADERSHIP FORUM



American College of Physician Executives
an American Hospital Association

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

Medical School Admission



How do we better identify at admission who has the potential to become the best doctor in our evolving health care system ?

MCAT 2015

“Today’s medical students are entering a health care system that has undergone enormous change since the MCAT exam was last revised.”

– Association of American Medical Colleges

MCAT 2015



The NEW ENGLAND JOURNAL *of* MEDICINE

New section on behavioral and social sciences &
a section on critical analysis

- Ways in which people perceive and react to the world
- Factors that influence behavior and behavior change
- Factors that influence how we think about ourselves and others
- Ways in which culture and social differences influence well-being
- Ways in which social stratification affects access to resources

Perspective
APRIL 5, 2012

Building a Better Physician — The Case for the New MCAT

Robert M. Kaplan, Ph.D., Jason M. Satterfield, Ph.D., and Raynard S. Kington, M.D., Ph.D.

MCAT 2015

“The health care system of tomorrow will require a different kind of physician.”

- Darrel Kirch, MD

AAMC President & CEO

A physician who

- does more to promote prevention & wellness
- is culturally competent
- leads & works in unified teams to coordinate care



It's time to rebuild physician education from the ground up

Accelerating Change in Medical Education

- Exemplary methods to achieve **patient safety, performance improvement and patient centered team care**
- Understanding of **health care system and health care financing**
- Competency based assessment & **flexible individualized learning plans**
- Optimize the **learning environment**

AMA Accelerating Change in Medical Education

- January 2013: 5 year grants to 8-10 schools
- RFP process
 - > 80 % medical schools applied
 - 30 invited to submit detailed proposals
 - 11 awards
- Consortium formed with 11 schools to establish common projects, rigorous national evaluation plan, and speed dissemination of ideas
- Schools partnering with health care systems for redesign

\$11 Million to Transform way future physicians are trained

“We are thrilled to award funding to 11 medical schools for their bold, transformative proposals designed to close the gaps between how medical students are trained and how health care is delivered,” **said AMA President Jeremy A. Lazarus, M.D.**

“This AMA initiative will identify specific changes in medical education that can be applied in medical schools throughout the nation to enable students to thrive in a changing health care environment and improve the health of our nation’s patients.”

MEDICAL EDUCATION: *Great minds at work.*



Watch medicine get even smarter

These are some of the cutting-edge medical schools teaching the physicians of tomorrow. They are also working with the American Medical Association to develop and share innovations to transform medical education. Together we'll ensure tomorrow's physicians are prepared to take on the nation's biggest health care challenges. See how we are leading the charge at changemed.org.



AMA Accelerating Change in Medical Education

Consortium Innovation Themes

- Optimizing Student Readiness for Medical Practice and Life-long Learning
- Developing Competency Based Pathways
- Teaching New Content in Healthcare Delivery Science
- Working with Healthcare Delivery Systems in Novel Ways
- Making Technology Work for Learning
- Shaping Tomorrows Leaders
- Facilitating Student (provider) Wellness

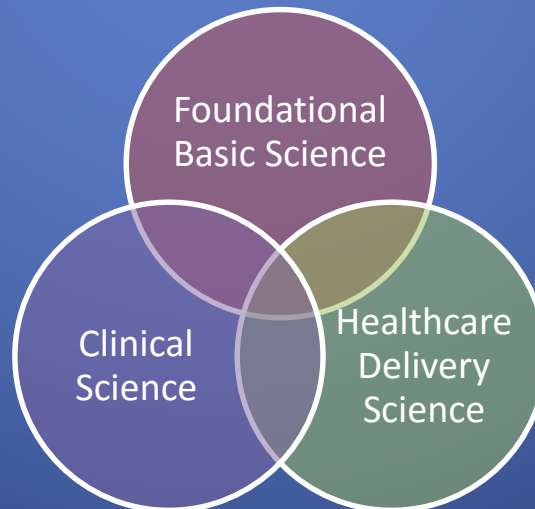
Mayo Medical School: Education in the Science of Health Care Delivery

MMS is developing with clinical partners and collaborators a cross-cutting, longitudinal, model for Science of Health Care Delivery that trains students in inter-professional teams providing patient-centered and community/population-oriented, science-driven, high value care across the health care system

Mayo Medical School: Education in the Science of Health Care Delivery

“Three sciences”

- Basic science
- Clinical science
- Systems science (SHCD) (part of our Mayo ‘DNA’)



Mayo Medical School: Education in the Science of Health Care Delivery

- *Core curriculum*
 - Integration across 4 year MMS curriculum; some content already exists but not linked
 - 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; future plans for integrated degree

Mayo Medical School: Education in the Science of Health Care Delivery



Person-centered Care

Focus on individual patients

- Shared decision making
- Individualized care
- Social determinants of health
- Community resources
- Patient advocacy
- Cultural humility



Population-centered Care

Focus on population health

- Health determinants
- Health disparities
- Wellness/health promotion
- Population health management, Advocacy
- Public/global health
- Epidemiology, biostatistics



High Value Care

$$\text{Value} = \frac{\text{Outcomes} + \text{Safety} + \text{Service}}{\text{Cost}}$$

- 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 teamwork, interdependency
- Care transitions/ handoffs
- Simulation, crisis scenarios
- Longitudinal assessment portfolio of teamwork skills



Health policy, economics, technology

*Focus on informatics & larger
Health 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



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

July	Aug	Sept	Apr	May	Jun
Advanced Doctoring		Advanced Doctoring	BOARD EXAM	PRECLINICAL BLOCK	
Circulation BLOCK					

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

July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Hospital Internal Medicine Subinternship (4 weeks)								S H C D			
Medicine-Specific Elective (3 consecutive weeks)											
Peds Specific-Elective (3 consecutive weeks)											
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							

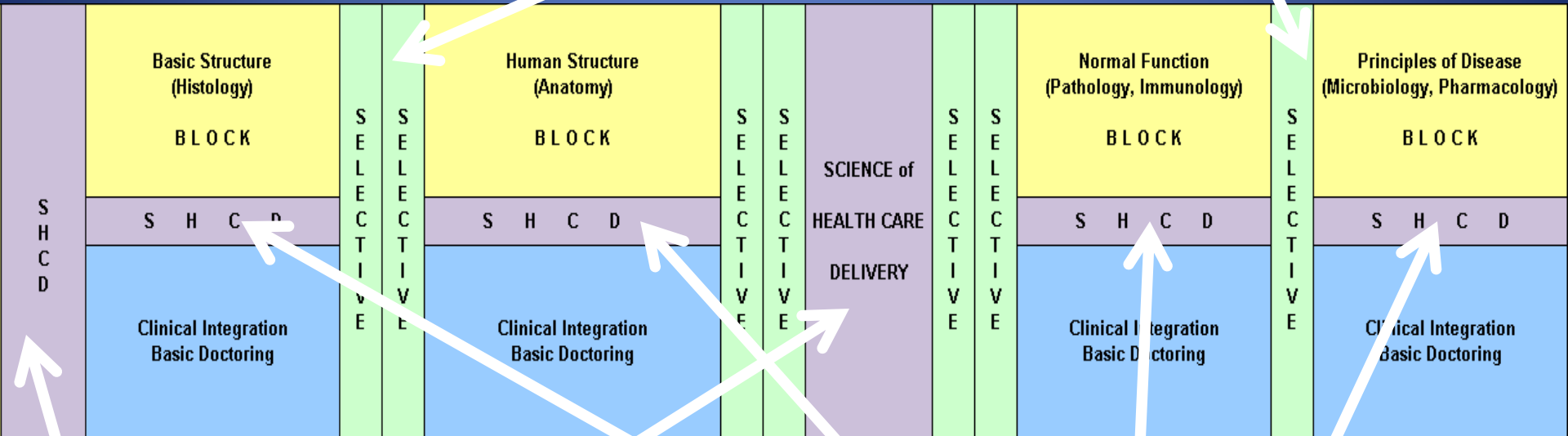
How does SHCD fit ??

SHCD curriculum snapshot

- 6 longitudinal 'courses' throughout 4-years
- Blended learning model
 - 70 hours online
 - 120+ hours classroom
 - 60+ hours clinical/ experiential
- Intentionally 'front-loaded'
 - first course in MMS is SHCD!
- Each domain has a core faculty
 - familiar faces, images, themes, content

Year 1

Independent
modules



Blended
learning

Clinical
experiences

Year 3

Surgery					SHCD	Psych	Medicine					SHCD	Neuro				
SHCD	Fam Med				Ob/ Gyn				SHCD	Pediatrics							



PIVoT

- Patient-centered, population-based, Interdisciplinary, Value oriented, Team experience
- Students shadow each member of a MCHS care team followed by written reflection
 - explain how care team members add value
 - describe how team based care facilitates high-value, cost-effective care

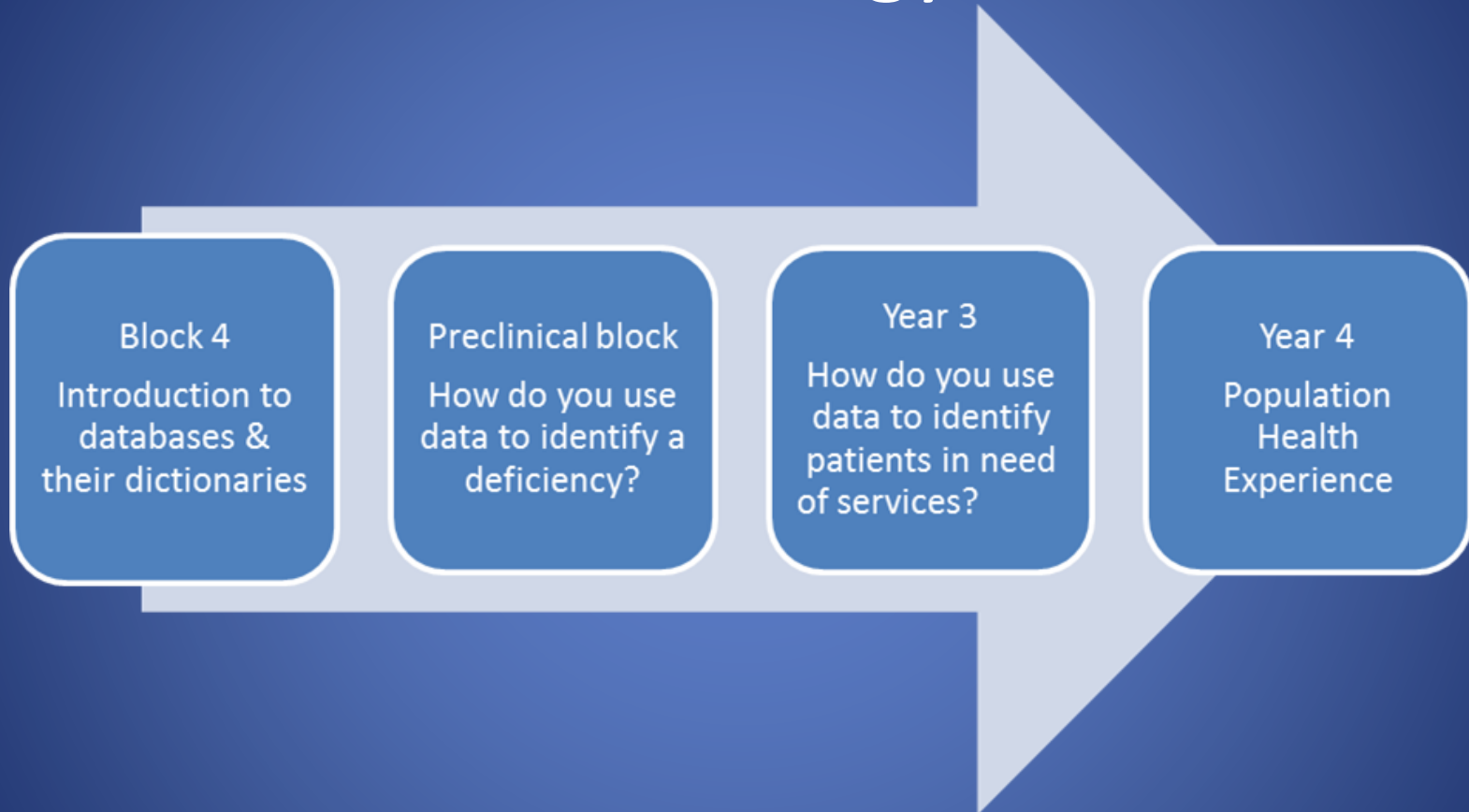
Team-based care, Population health

Health Behavior Coaching

- Collaborative with Mayo Clinic Wellness Coaching Certificate Program
- Students learn to optimize health and reduce disease burden through individualized wellness coaching
- Students coach each other
- ‘Value-added’ clinical application coaching dialysis patients and pregnant women

Person-Centered Care

Data Analytics & Information Technology



Health Policy, Economics, & Technology

Clinical Leadership in Population Health Management (CLiP)

- Understand and apply population surveillance to gaps in processes and outcomes of care
 - Identify metrics for measuring quality of care and patient care outcomes within a population
 - Review existing data to identify opportunities for improving health of a population
 - Perform population health assessments
 - Identify points of leverage for change and improvement; identify barriers and facilitating factors
 - Develop an evidence-based population health improvement plan
- Conduct an intervention to improve patient care metrics in the Mayo Clinic Health System

Population Health

Student Wellness & Resiliency

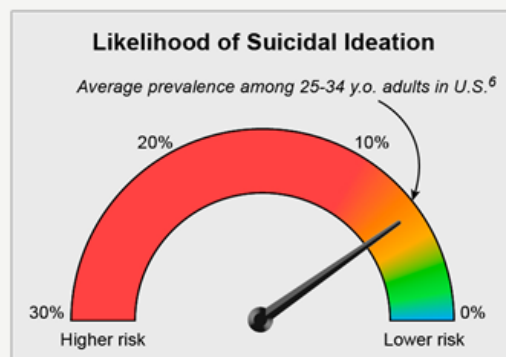
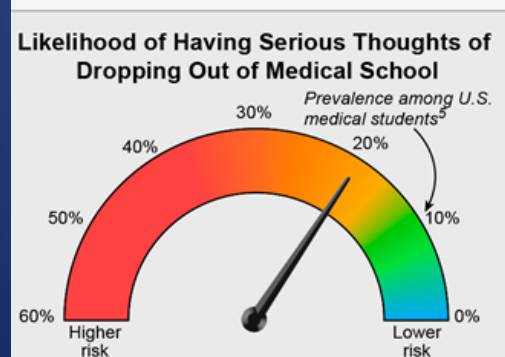
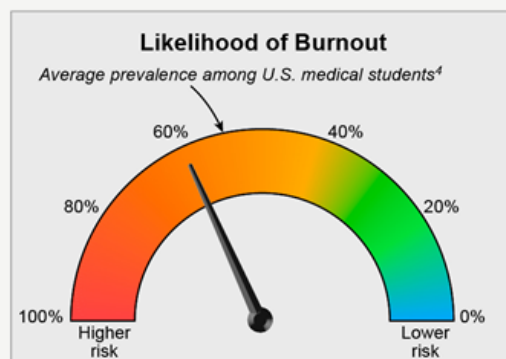
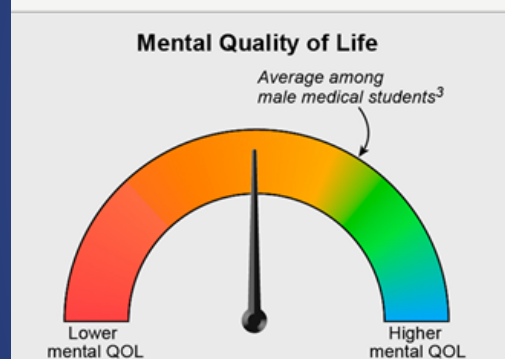
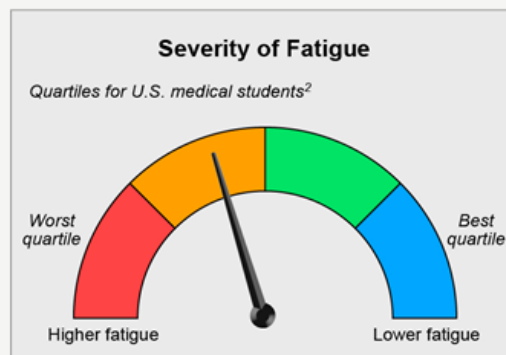
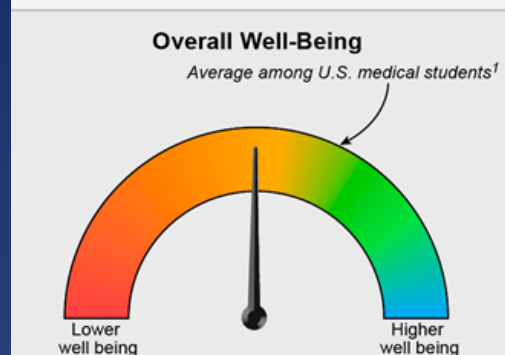
- Medical training and practice are stressful and include many uncertainties
- To help ensure students thrive and are personally well-equipped to handle unforeseen challenges, we are developing innovative programming and tools to optimally prepare students to care for themselves.
- Doing so will fill a serious void as little is known about how best to design and implement student well-being programs required by the LCME.

Student Wellness & Resiliency

- Validated, longitudinal, individualized web-based self-assessment tool based on Medical Student Well-Being Index
 - immediate personalized feedback
 - track scores over time
 - linked to just-in-time resources to aid medical students in distress
 - aggregate, de-identified school-level reports
- New advising system
- Longitudinal required wellness curriculum

resources made available by your medical school by clicking on the resources tab.

The dashboards below provide an approximation of how your score relates to that of other US medical students and indicate some of the potential risks associated with your score at the population level.



Additional details can be found in the following peer-reviewed publications:

- Efficacy of a brief screening tool to identify medical students in distress.
- Development and preliminary psychometric properties of a well-being index for medical students.
- Ability of the physician well-being index to identify residents in distress.
- An interactive individualized intervention to promote behavioral change to increase personal well-being in US surgeons.
- Utility of a brief screening tool to identify physicians in distress.

The risk of your mental health adversely affecting you personally and professionally in medical school is high. We strongly encourage you to seek help from a professional mental health provider. Information



Dashboard


Complete the Index

[Take the Index](#)

Reports


[View your score over time](#)

Resources




Stress & Resiliency

- Self-care
- Identifying values
- Adapt to change
- Mindfulness




Fatigue

- Sleep
- Time management
- Boost energy




Emotional Concerns

- Stress
- Anxiety
- Burnout
- Depression




Suicidal Thoughts

- Getting help




Health Behavior

- Diet
- Exercise
- Preventative medical care




Money

- Debt management
- Financial aid
- Personal needs




Alcohol / Substance Use

- Getting help




Career Specialty Choice

- Specialty choice
- Choosing a residency
- Relocating



Academic Issues

- Struggling in a class
- Getting behind
- Test anxiety



Access Medical Care

Reports

[MSWBI Score Over Time](#) / [Student Mean Score](#) / [Student Mean Score By Gender](#) / [Index Completion Chart](#)

/ [Student Mean Score by Year](#) / [Resource Access Chart](#) / [At Risk Chart](#)

[MSWBI Score Over Time](#)

[Student Mean Score](#)

[Student Mean Score By Gender](#)

[Index Completion Chart](#)

[Student Mean Score by Year](#)

[Resource Access Chart](#)

[At Risk Chart](#)

Novel Assessments



Assessing SHCD: Milestones & EPAs

“Speaking the same language across the educational continuum”



SHCD Milestones

- Adapted from published GME milestones
- Mapped to AAMC EPAs for entering residency
- Intentional ‘hand-off’ from UME to GME

Observed Structured Clinical Examinations

- Patient Hand-off
- Shared Decision Making
- Disclosure of Medical Error
- High Value Cost Conscious Care

Patient Hand-off Station

Objectives:

- 1) Demonstrate the ability to effectively hand-off patients during times of care transition
- 2) Effectively mitigate a dysfunctional/impatient team member in a professional manner.

Task

- The medical student must handoff 2 patients to the pediatric resident on call that night, while effectively and professionally handling the resident's impatience and disinterest. The student must be able to adjust the sign-out to the patient's severity of illness and overcome communication challenges.

Scoring

- Item checklist modified from the iPASS evaluation tool developed by Starmer and Spector and colleagues

Shared Decision Making Station

Objective

- Demonstrate effective communication skills that promote shared medical decision making with patients.

Task

- The medical student is requested to have a shared decision making conversation with a patient who has osteoporosis and is reluctant to take medical therapy to prevent further fractures (guidelines recommend consideration of medical therapy in this clinical situation).

Scoring

- Item checklist modified from the OPTION scale developed by Elwyn and colleagues

Disclosure of a Medical Error Station

Objective

- Demonstrate effective communication skills when disclosing a medical error.

Task

- The medical student is requested to disclose a medical error to a hospitalized patient who developed hypoglycemia due to inappropriate transition from an insulin infusion to subcutaneous insulin.

Scoring

- Item checklist focusing on discussion content and effective communication skills related to disclosing a medical error.

High Value Cost Conscious Care Station

Objective:

- To demonstrate patient centered communication skills that help overcome barriers to delivering high value cost conscious care.

Task:

- The student is requested to have a discussion with a patient with recent onset low back pain who is requesting imaging studies. The characteristics of the case indicate that imaging studies are not indicated at this time.

Scoring:

- Item checklist focusing on patient centered communication skills - adapted from a number of sources including the American College of Physician's High Value Care initiative

Checkbook

- Web-based tool
- Retrieves actual patients' cost and billing data
- Specified patient & time interval
- Develop structured reflection
 - students examine the cost of care they provided to patients,
 - review whether ordering behaviors were consistent with evidence-based guidelines, and
 - identify opportunities for improving high value care.

Patient Name: Date: 4/23/2013	Visit		
Description	Charge	Remove	
Venipuncture	\$27.52	✓	
Sodium, blood or plasma	\$29.00	✓	
Potassium, blood or plasma	\$27.94	✓	
2-D/M-mode echo-tech	\$1,966.58		
2-D/M-mode echo-prof	\$707.39		
85 rows returned		Total: \$15,296.06	
Total excluding selected items: \$15,211.60			
DRG Reimbursements DRG Code: 312 Description: Syncope and Collapse High \$5,531 Low \$4,266			

Competency Based Progression

Once we have developed a successful model for SHCD, *we will apply it to the remainder of our curriculum such that ultimately student progression within MMS will be completely competency-based*, including the possibility of early graduation or additional individualized and specialty-specific enrichment programs.

Education in the Science of Health Care Delivery

- is aligned with Mayo's strategic focus on patient-centered, community/ population-oriented, high value care provided by collaborative care teams practicing in new practice models
- will equip the next generation of learners with knowledge and skills to better address the growing complexities of human health and disease and to become leaders for positive health systems change

Questions & Discussion



MAYO MEDICAL SCHOOL Forging Ahead...

